



# ANNUAL SHARJAH ARCHAEOLOGY

---

## ISSUE 19

Annual Magazine concerned with publication of the result of archaeological excavations and researches in the Emirate of Sharjah  
Sharjah Archaeology Authority - Govt. of Sharjah

هيئة الشارقة للآثار

هيئة الشارقة للآثار



مجلة الشارقة للآثار

مجلة الشارقة للآثار

**ANNUAL  
SHARJAH  
ARCHAEOLOGY**

ISSUE 19

# هيئة الشارقة للآثار



# هيئة الشارقة للآثار

All rights reserved

Sharjah Archaeology Authority

First Edition - 2021

P.O. Box: 30300 - Sharjah, United Arab Emirates

Phone: +971 6 5668000

Fax: +971 6 5660334

Website: [www.saa.shj.ae](http://www.saa.shj.ae)

Email: [info@saa.shj.ae](mailto:info@saa.shj.ae)



# هيئة الشارقة للآثار

# هيئة الشارقة للآثار

**Chairman:**

**Dr. Sabah Abood Jasim**

**General Supervisor:**

**Eisa Yousif**

**Directorate of Archaeology:**

**Sharjah Archaeology Authority (SAA)  
U.A.E**

**Typing:**

**Majed Saleh**

**Editorial Secretary:**

**Amna AlAli**

# Introduction

By the end of 2021, which coincides with the expected date of the issuance of the new issue of the Annual Sharjah Archaeology Magazine, we would like to underscore the fact that this year was a continuation of the case that prevailed in the past year due to the critical juncture caused by the large scale epidemic. This situation has, naturally, led to a reduction in the range of activities related to Archaeological Survey and excavation by foreign excavation missions operating on the lands of Sharjah. Nevertheless, the local excavation mission has continued its activities unabated in several important archaeological sites and accomplished significant tasks and made remarkable discoveries.

In this connection, reference can be made to the beautiful discovery of a relatively small pottery jar that contained 409 silver tetradrachma coins, weighing between 16-17g. The coins produced by one or two templates bear the iconography of that period, all inspired by Alexander the Great's coins and his Seleucid successors. Among the coins discovered were new, previously unrecognized versions in Mleiha and the southeastern region of the Arabian Peninsula.

And on that note, the local mission found another set of coins. Of particular interest is the collection of Abbasid dirhams dating back to the first Abbasid era. These were issued by the Abbasid caliphs, namely Caliph Abu Jaafar Al Mansour, Caliph Mohamed Al Mahdi, Caliph Haroun Al Rashid, Caliph Mohamed Al Amin and Caliph Abu Jaafar Abdullah Al Maamoun. They also include a silver "dirham-link" of Lady Zubaida (Umm Jaafar), the wife of Haroun Al Rashid.

A number of glazed pottery fragments from the first Abbasid period were also discovered. These critical and unprecedented discoveries date back to the second/third century AH (the eighth century / the ninth century AD). These have important political, economic and commercial implications and confirm that the region was part of the international trade network and a central hub for the passage of trade convoys in that historical period. Some of these dirhams were found inside a small green glazed Abbasid jar with four small square bronze peices, used as different weights to value coins.

The activity of the local team has extended to include archaeological sites in Al Madame Plain, the central region, the eastern coast in Kalba, Khorfakkan and Dibba. The work involved implementing a series of excavations, archaeological surveys, and aerial surveys photography to achieve more impressive results.

The authority has organized a series of lectures and seminars remotely via Zoom platforms in academic activities and under special procedures and preventive health measures. The total has reached 48, which dealt with various archaeological topics in which scientists and researchers from inside and outside the country participated, and have been very useful and very well attended.

In this new issue of the Annual Sharjah Archaeology magazine, we shall be glad to present several reports submitted by foreign archaeological excavations, which dealt with the results of their work during the previous years. An example of this is the first report that deals with the work of the Spanish archaeological mission from the Autonomous University of Madrid within the "Al Madam Project", which is a continuation of the first stage implemented in 2018.

In 2019, a joint team was formed consisting of archaeologists and specialists from the Autonomous University of Madrid and a team from the World Digital Heritage from the United States of America. The team recorded and documented what has been previously discovered from layers and buildings dating back to the Iron Age era at the Al- Al Thuqeibah site through aerial surveys and photography and ground-based laser scanner; to obtain high-resolution three-dimensional photos.

The work of the joint mission focused, in particular, on the mud-brick workshop. They were studying the techniques used in the manufacturing of bricks, measuring, drawing and photographing the footprints of the workers in the workshop, their used tools, Drainage basin, and the mixing of materials used in the production process, in addition to taking accurate photographic shots in various places of the workshop.

The second report deals with the Austrian archaeological excavation mission from the Austrian Archaeological Institute in Vienna that was carried out over one month in early 2019 at a Bronze Age site in Kalba. The work plan included conducting geophysical surveys in coordination with a specialized team from the Atlas Berlin Company to clarify how large the Bronze Age settlement was and the features of settlement during that period. A few archaeological finds were discovered and recorded, especially pottery pieces from the Bronze and Iron Ages.

The third report covers the results of the Japanese archaeological excavation mission from Kanazawa University in Khor Fakkan to determine the location of the old city wall built during the Portuguese period at the eastern end next to the old port during the fifteenth century. The report includes an exciting brief of the historical periods and information about the features and conditions of the ancient city.

Indeed, the mentioned expedition was able to find parts of this wall that extended for a distance of 155 meters in the back of the old town. During the excavations, a large group of various pottery pieces dating back to the 14-16 centuries were found. These represent green or blue-white and celadon glazed china bowls with a few grey glazed Vietnamese vessels, Iranian painted vessels and green glazed dishes imported from Myanmar. Islamic pottery pieces from the Abbasid period, dated around the ninth century AD, were also found.

We remain eager to work with the Japanese mission, but this time in the centre of Sharjah; to research and understand the features and features of the old city, its residential neighbourhoods and its traditional markets, and to study the historical developmental stages in this part that represents the heart of the town.

A Ground Penetrating Radar (GPR) survey in Sharjah's Bank Street and the surrounding area were preceded by the excavations. Its results were the basis for subsequent excavations and examining and checking old maps and aerial photographs taken from the early nineteenth century until the second half of the twentieth century. Excavations took place from November 2012 to May 2013.

The fifth report in this issue is devoted to reviewing the details of the exhibition of the Sharjah Archaeology Authority, which was held at the National Archaeology Museum in Lisbon, Portugal, in late 2019 - late 2020 under the theme "Identity and Civilization". The exhibition was well attended and achieved unparalleled success among the Portuguese community and the various media in Portugal and the neighbouring European countries. The exhibition was scheduled to be hosted by other Portuguese cities, but the circumstances and status of the epidemic have prevented it.

The report reviews all the stages that accompanied the exhibition. It deals with the concept of allocating the five spaces that were contained in the exhibition and presenting the geographical and historical context, population, economy and archaeological remains according to their chronological order, with the screening of a variety of documentaries on various aspects of life in the Emirate of Sharjah.

**Dr. Sabah Abboud Jasim**  
Director General  
Sharjah Archaeology Authority





# Index

Al Madam Project Sharjah - United Arab Emirates	10
--	----

Preliminary Report on the 2019 Austrian Fieldwork at Kalba (K4)	32
--	----

First Research into Khorfakkan Town Wall, Summer 2018	42
--	----

Excavation at Heart of Sharjah: Bank Street Archaeological Survey 2012/13 Winter Season	76
---	----

Final Report Identity And Culture Sharjah Archaeological Heritage (Uae) Exhibition (I&C - Sah)	234
---	-----

# Al Madam Project Sharjah - United Arab Emirates

1. Introduction	2.2 Identification of mudbricks works	3. Al Madam 1-Thuqeibah Core, House H0
2. Al Madam 1. Mudbrick Working Area (MWA1)	2.2.1 De visu analyses	4. Conclusions
2.1 Photogrammetry Works	2.2.2 Instruments and software	
2.1.1 Aerial photogrammetry	2.2.3 Sampling zones	
2.1.2 Terrestrial photogrammetry		
2.1.3 Land laser scanner		
2.1.4 Projected post-processing work		
2.1.5. 360° photography		

## 1 Introduction

In accordance with the proposed works, during 2019 the team from the Universidad Autónoma de Madrid (UAM) in Sharjah, carried out a field season of excavations at the al Madam site (Sharjah, United Arab Emirates). The general and scientific planning and the direction of this expedition was headed by Professor Doctor Carmen del Cerro Linares. The 2019 field season benefited from grants of the Palarq Foundation and the Research Vice Rectorate of Universidad Autónoma de Madrid, as well as by the secular multifarious support that, upon arrival, was supplied by the Sharjah Archaeology Authority. The group, which later developed into a joint Spanish-American team under the direction of the UAM included the following scholars:

### **The Archaeology and Restoration team (UAM):**

- Prof. Dr. Carmen del Cerro Linares, UAM Professor (archaeologist, historian and team director)
- Prof. Dr. Arturo Morales Muñiz, Chair of Zoology at UAM (archaeozoologist)
- Dr. Miguel Ángel Hervás Herrera (archaeologist and historian)
- Dr. Pablo Guerra García (archaeologist and curator, UPM)
- Carlos Fernández Rodríguez (graduate student, UAM)
- Miguel Ángel Nuñez Villanueva (archaeologist and curator, SAA)

### **The Global digital Heritage Team:**

- Dr Herbert Maschner (Director)
- Dr Victor López-Menchero Bendicho (archaeologist and historian)
- Jeff Du Vernay (graduate student)
- Bart McLeod, (graduate student)

The team of archaeologists worked in two areas of the al Madam1 archaeological complex, while the Biological team carried out work in the laboratory at Mleiha, while collecting and preparing reference specimens.



## 2 Al Madam 1 Mudbrick Working Area (MWA1)

### 2.1 Photogrammetry Works

(Herbert Maschner, Miguel Hervás Herrera, Víctor López-Menchero, Jeff Du Vernay and Bart McLeod)

The excavation area at al Madam 1 known as the Mudbrick Working Area (MWA1), which had been completely excavated on a stepwise manner during previous field seasons, was emptied of its protective padding to carry out works of documentation to obtain an as accurate as possible 3D model. The main objective was to create this 3D model with a very high resolution of the excavated complex, where it would be possible to identify and measure with precision all footprints and traces of the tools documented during previous excavations in the dry mud found on the bottom of the pools. We aimed for a model that would not only allow us to obtain a detailed aerial view of footprints, but also insights for a detailed study of the production techniques of mudbricks during the Iron Age.

The emptying the excavated area was carried out by a team of twenty workmen, four archaeologists and a restorer, lasting for ten complete working days. With this end in view, the strategy that was followed consisted in working from the periphery of the enclosure inwards to insure an adequate conservation of footprints and traces of the tools used during the process of works.



Fig 1 Aerial view. Process of emptying and cleaning of Mudbrick Working Area (MWA1)



Fig 2 Process of emptying and cleaning of Mudbrick Working Area (MWA1)

Once emptied and carefully cleaned the totality of the area the photogrammetry work proceeded as follows:

## 2.1.1 Aerial Photogrammetry

Based on geometry and texture, aerial photographs were taken to obtain a 3D model of all the excavated area. To this end, an unmanned DJI UAV drone, model Phantom 4 Pro Plus, equipped with a digital camera with a one-inch sensor and with 20 Mpx of effective resolution was used. The flights took place on January 28th - 29th, 2019. In total, eight flights were made:

- 1 automatic programmed drone flight with the specialized Ptx 4D capture software, on double screen, at a height of 20 m with an 80% of frontal overlap, an 80% of lateral overlap and a camera inclination angle of 70°. This flight made 245 photographs.
- 1 automatic programmed drone flight with the specialized PTX 4D capture software, on double screen, at a height of 14 m with an 80% of frontal overlap, and 80% lateral overlap, and a camera inclination angle of 70°. This flight took 448 photographs.
- 1 automatic programmed drone flight with specialized PTX software Capture with a double screen, at a height of 10 m. with an 80% of frontal overlap, and 80% lateral overlap, and a camera inclination angle of 70°. This flight took 882 photographs.
- 1 unprogrammed flight to obtain zenithal plan views at heights of 60m, 55m, 50m, 45m, 40m, 35m and 30m.
- 1 unprogrammed flight to obtain oblique views of a complete ring at a height of 27m.
- 1 unprogrammed flight to obtain oblique views of a complete ring at a height of 20m.
- 1 unprogrammed flight to obtain oblique views of a complete ring at a height of 10.
- 1 unprogrammed flight to obtain oblique views of a complete ring at a height of 6.

A total of 2.250 photographs were taken (18,4Gb memory). A complete copy of this archive was handed over to the Sharjah Archaeological Authority.



Fig 3 Aerial photogrammetry works on the area with a UAV DJI Phantom 4 Pro Plus drone





**Fig 4** Zenithal view obtained with UAV DJI Phantom 4 Pro Plus



**Fig 5** Aerial photograph (Oblique view) taken with UAV DJI Phantom 4 Pro Plus





**Fig 6** Aerial photograph (Oblique view) taken with UAV DJI Phantom 4 Pro Plus .

## 2.1.2 Terrestrial Photogrammetry

Terrestrial photographs were also taken to obtain a 3D high resolution model of each of the pools, based on their geometry and texture. To this end, the following digital cameras were used:

- Sony A7 III with a complete sensor format of 24 Mpx, equipped with a Zeiss Distagon 2.8/18mm objective;
- Sony A 7 RIII with a complete format sensor of 42 Mpx equipped Zeiss Distagon 1.4/35mm objective;
- Canon 5D Mark IV with a complete sensor format of 36 mpx equipped with a Sigma 35mm 1.1 4 DG objective.



**Fig 7** Terrestrial photogrammetry works

The photographs were taken during the 29th, 30th and 31st of January and on February 1st , 2019.

Between 500 and 700 high resolution photographs were taken of each of the 64 pools previously recognized in the archaeological complex. In total, some 38,000 photographs were taken.





Fig 8 Terrestrial photogrammetry works



Fig 9 Terrestrial photogrammetry works

### 2.1.3 Land Laser Scanner

Lastly, 60 different Land laser scanner positions were taken throughout the whole complex to obtain precise 3D models based on the capture of the geometry. To this end, two FARO Focus S70 land laser scanners, with a precision margin of  $\pm 1\text{mm}$  and 19 arcseconds of angular precision for vertical and horizontal angles, and with a precision of 2mm in the position of the scanner at a distance of 10m were used.

The FARO scanner is capable of gathering data using different parameters of resolution and quality. As concerns this specific project, the data were obtained with a 1/5 resolution and a 4x quality; in total, 102,500 points per second were captured. The colour of the images was taken with a digital camera integrated into the scanners.



Fig 10 Works with a terrestrial FARO Focus S70 Laser Scanner

### 2.1.4 Projected post-processing work

The projected 3D model is built through the combination of data coming from both the aerial and terrestrial photogrammetry as well as by the land laser scanners. These data will be all imported into the specialized Reality Capture (RC) computer programme. A 3D model with 'normal' resolution will be created afterwards. This model will be later reduced, unwrapped and textured. In order to create the texture of the model, only images taken with the Sony and Canon digital cameras will be used since their quality is far higher to that of the camera integrated into the FARO scanners.

The ensuing model will be exported from RC in OBJ format to be cleaned and repaired and afterwards imported into Geomagic Wrap, where the Mesh Doctor repair tool will be run.

Once we reach this stage, the model will be reimported from RC and retextured so that the final version will have high resolution in an RC setting. Once cleaned, the resulting model will be exported again from RC to Meshlab, to be reduced in size allowing one to obtain a simplified version of it.



Subsequently, the model will be reduced using the Meshlab Quadric Edge Collapse (with texture) tool and a normal mapping from the high-resolution model to the simplified version in xNormal to highlight the footprints and the tool marks documented in the study area will be implemented. The resulting version will be uploaded to Sketchfab.

This model has three different scales or levels of definition: a very high-resolution model of the whole complex where the mudbricks were made which is essentially based on texture; an ultra-high-definition model, based mainly on geometry, and an ultra-high-definition model of each of the 64 pools based essentially on their texture. This last level of precision will allow us to carry out a detailed study of the footprints and traces of the tools used, applying filters of the D-Streht software which will highlight the micro-relief of both footprints and tool traces, so as to increase both their definition and visibility.

## 2.1.5 360° Photography

In addition to the works thus far reported to obtain the 3D model, 30 spherical photos, also called 360° photos, were taken to generate a virtual view of the area where the Thuqeibah mudbricks were made. To achieve this, a spheric Insta 360 Pro digital camera, equipped with 6 F2.4 bull's eye objectives, each up to 120 Mbps resolutions, were used.



Fig 11 360° photograph works using a 360° Pro. Insta camera



Fig 12 360° photograph works using a 360° Pro. Insta camera



Fig 13 3D model resulting from the 2019 season of work

# هيئة الشارقة للآثار



## 2.2 Identification of the mud materials

(Pablo Guerra Garcia)

The archaeological area that we studied comprised houses built with mudbrick walls (H0 and H6) as well as the aforementioned area where mud was produced for the fabrication of construction materials (MWA1). The later area consisted of 64 pools for the extraction, kneading and decant of clay, two canals, one extraction pit and a well.



**Fig 14** View from the north-east where the pools beside structure H6 and one of the extraction pits are seen

Once the sand deposits that covered the site were removed, we proceeded to identify and document the different types of clay found at al Madam 1-Thuqeibah. To this end, a system of microscopic characterization, based on high-resolution micro-snapshots using a potent portable microscope was implemented. These in situ microphotographs did not in any way altered the quality of the original materials.

## 2.2.1 De visu analyses

The outlay of the construction elements at al Madam 1-Thuqeibah demanded micro-snapshots of the foundations of H0 and H6, and those of the decant pools, to be taken. These photographs were made on the exterior of the mudbricks as well as on the joints and mortar layers (Fig.15) of the walls.



**Fig 15** Detail of the outer foundations of structure H6 where the rows of mudbricks, their joints and mortar layers can be seen.

Upon inspection, these mudbricks featured at least two different kinds of textures, namely:

- A conglomerate of medium-sized particles incorporating silica aggregates,
- A conglomerate of medium-size particles where the ferric aggregates, typical for this area, are well documented.

From a visual standpoint, both the joints and mortar layers are characterized by their lack of agglutinating lime, the mudbrick joints being a type of plaster whose main component is clay with silicon aggregates and some medium sized ferric aggregates.

As for the decant pools, at least three different substrates have been identified:

- Clay-like materials, with very fine-grained aggregates and a homogenous texture. This substrate is present chiefly in the basins of the northern and southern quarters.
- Clay-like materials with fine-grained aggregates and a heterogeneous texture where work imprints (e.g., footprints, extraction marks, etc.) are seen. These were documented throughout most of the production area.
- Clay-like materials featuring medium to coarse grained aggregates (local ferrites); documented on the pools of the southern quarter and in the upper levels.

## 2.2.2 Instruments and Software

The micro-snapshots series was taken using a model VMS-004 USB Veho microscope, with a 20 x 400 magnifying capacity, and a 640 x 480 mode digital zoom that incorporated eight 2.0 interpolated megapixel LED and CMOS lamps. A total of 398 micro-snapshots, ranging from 5.70-15 megas with 500 ppp resolutions, were taken. The treatment and caliber of the images was achieved with the VETHO 1.3 software.

**Fig 16** Process of taking a micro-snapshot on the outer foundations of H6



Once the micro-snapshots are stored, a comprehensive macroscopic study to determine the granulometry from the different sampling zones will be carried out. This will include, in the case of the treatment of images, the GIMP 2.8.0 and ImageJ 1.51 J8 programmes; For a basic characterization of samples, both IMP Scope 1.65 (8a) and Micam 1.6 will be implemented, whereas the former software, along with JMicrovision 1.2.7 and Digimizer 5.3.5, will be employed for measuring and granulometrics.

Thanks to this non-destructive methodology, we will obtain data relative to the distribution of the aggregates in clay, the mudbricks and plasters, as well as the complete and relative metrics of the various components.

## 2.2.3 Sampling zones

The micro-snapshots were taken in the following zones of the Thuqeibah site:

### Structure H6

- Northern and outer perimetral foundation
- Western and outer perimetral foundation
- Central inner foundation (southern profile height)
- Southern inner foundation (western profile height)
- Organic material in mudbricks and joints

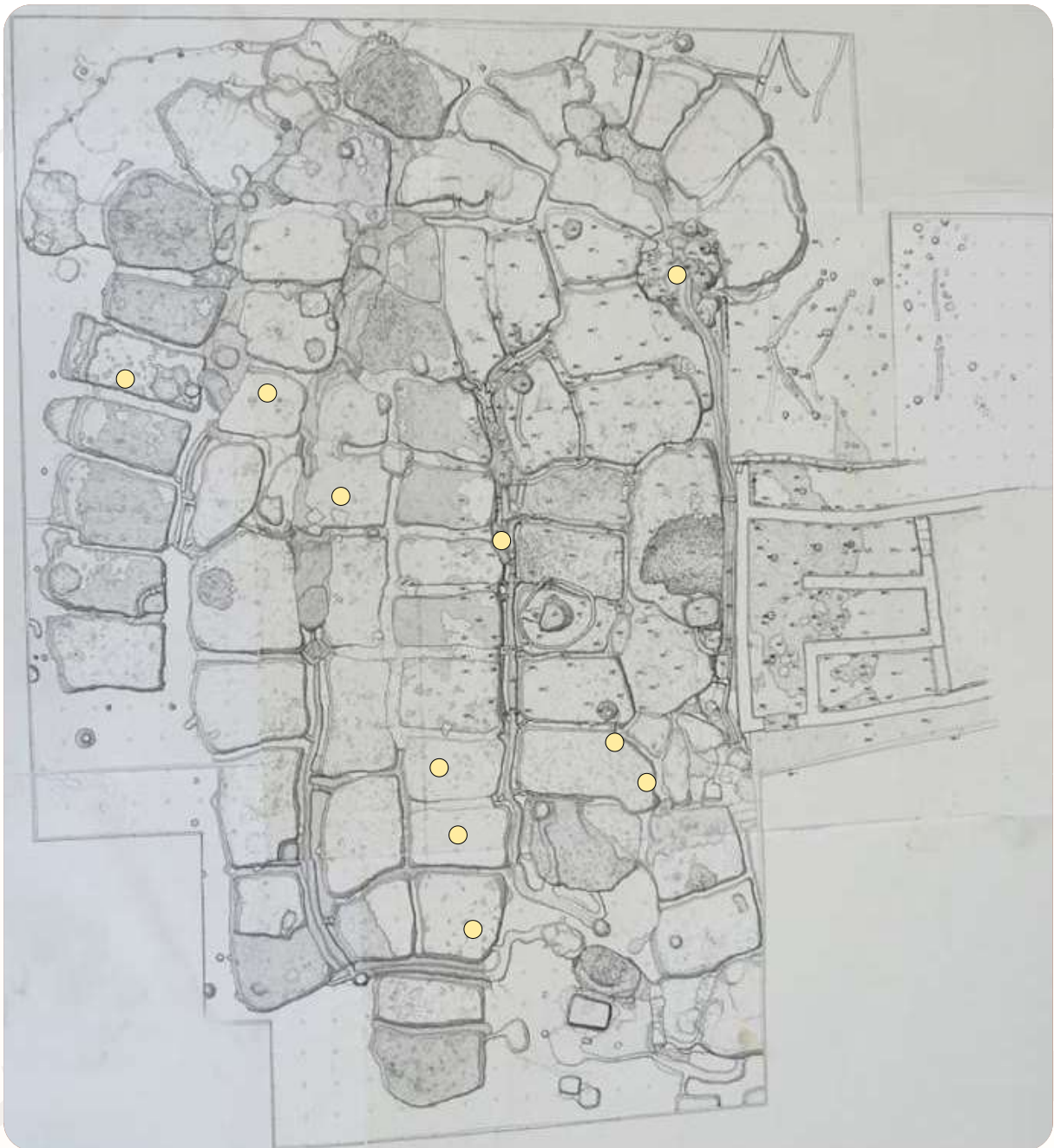
**Fig 17** Sampling points taken on the foundations of the H6 Structure





## Pools

As explained in the previous heading, micro-snapshots of the pools were only taken on those spots where all three kinds of clays, classified according to their granulometry, were documented (i.e., pool numbers 19, 20, 38, 39, 51 and 59).



**Fig 18** Sampling points taken on the Mudbrick Working Area (MWA1)

Micro-snapshots have been also taken on certain places with abundant evidence of tool and footprint traces. Specifically, 45 micro-snapshots have been taken on pools numbers 6, 22, 23 and 38, to obtain information about their granulometry and compare these results with those previously obtained in the structure.

Lastly, micro-snapshots were taken on the extraction pools located on the north-eastern margin since here one can clearly document the perimeter of extraction on the soil of a clay characterized on first inspection by a rather coarse granulometry.

### 3 Al Madam 1 Thuqeibah Core, House H0

(Carmen del Cerro Linares, Carlos Fernández Rodríguez, Miguel Ángel Núñez Villanueva, Miguel Ángel Hervás Herrera and Pablo Guerra García)

The core of the Iron Age settlement at al Madam 1-Thuqeibah is defined by several houses connected by perimetral walls that were excavated between 1995-1998.

The settlement was discovered by Sharjah Archaeology Authority who began excavations in 1988 near the village of Thuqeibah. As a result of these excavations, a house (later labelled by us H0) built of mudbricks was discovered that bridged the dunes and the forest steppe (Fig. 19). This house evidenced an excellent state of conservation but has been neither published nor completely excavated. The house features nine rooms and either a patio or an open space on its west side. The walls still reach a height of 2.15m, and this has allowed for the conservation of a door, windows, a staircase of ten steps and part of a roof formed by palm tree trunks cut in half that is documented on the corners of some rooms; this roof, placed directly on top of the mudbrick walls, was kept in place by slabs of limestone.

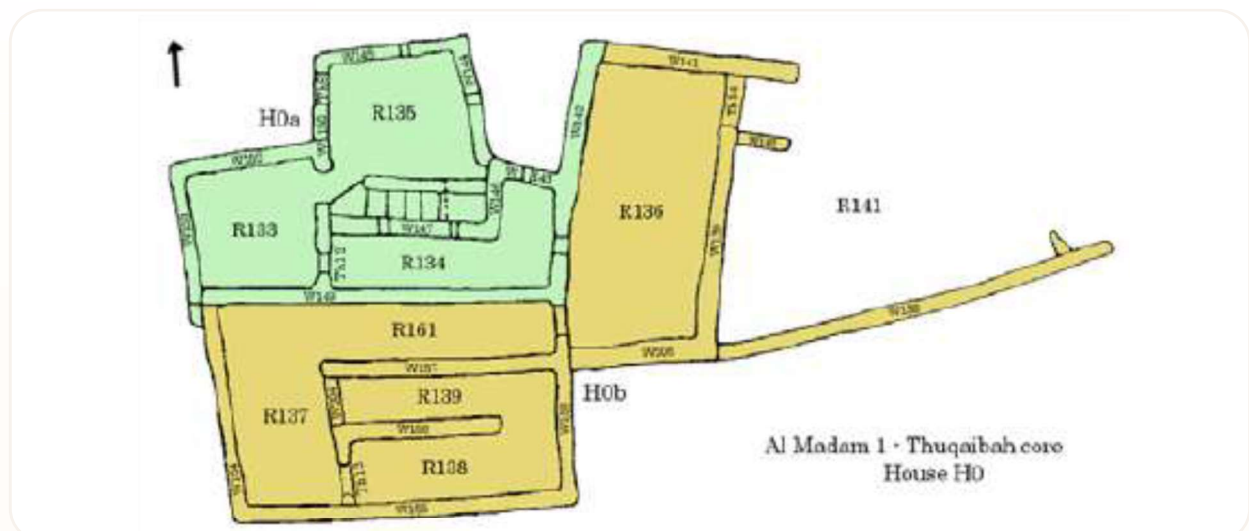
There exist at least three phases of construction and enlargement of this house not documented during the original excavations, though evident from the windows that were blocked when building the staircase and the two blocks with independent entrances which form the structure. The southern block represents the original house, with four rooms that conferred it a rectangular shape. In the first enlargement of the house, a low-standing wall and a slightly larger room (R136), allowing access to the original quarters, were added on the western end. The third constructive stage included a block that incorporated three square-shaped rooms (R.133, R.134 and R.135), a staircase attached to the northernmost room of the previous phase, and an entrance with threshold and three steps, that remained independent of the primitive block. The staircase, granting access to the roof rather than to a second floor, blocked some of the external windows of the primitive house (Fig 19).

Once all houses were excavated, the Spanish Archaeological team carried out stratigraphic soundings to check whether these were in some way connected. In 1998, Stratigraphical Sounding SS3 reached to the entrance of the northern block of house H0 and allowed one to see that this house had not been completely excavated. The team considered the possibility of re-excavating this structure in the future and so, to avoid further destruction by erosion or anthropic disturbance, the house was covered by a mesh and with sand, in the hope of being able to return to it on a later date.

In the absence of published material to support a detailed planning, though certain that the 1988 excavation remained incomplete, permission was requested to Sharjah Archaeological Authority to remove the sand that covered the house since 1998 and start the excavation. This house has two clearly defined blocks -H0a to the north and H0b to the south and east- (Fig. 20) and represented too much work for a field season that was planned to last for only three weeks (17th January - 7th February). It was therefore decided that only one block was to be excavated. In the end, the Spanish team decided this block to be the northern one, including House H0a and rooms R.135, R 134 and R 133, a feasible task given only 7 working days of investigation on the field.



**Fig 19** House H0 after the 1988 excavations of the local team



**Fig 20** Schematic plan of house H0 at al Madam 1 - Thuqaibah (Drawing: Miguel Angel Núñez Villanueva). The intervention on the H0a sector is marked.

## Room R.135

The removal of the protective sand in house H0a started in room R.135, the biggest room in the house and the one whose southern wall gives support to the staircase. This wall was clearly damaged, with a sufficiently important crack that made us reconsider the removal of all the sand in the room given the possibility that the wall could collapse. For such reason, we decided to empty only the northern half of Room R135, along wall W134, until a mortar floor (Fig. 21) that the team excavating in 1998 failed to document, was reached (F169). This mortar was made from the same material with which the house mudbricks get stuck.



The cleaning the floor allowed us to discover the threshold at the entrance of the house (Th8) whose existence had not been documented by the 1988 team. Once excavated, the threshold (Fig. 22) revealed two construction stages and allowed us to document the modifications the house underwent through time, namely:

- **Initial construction phase:** here the threshold of the house is accessed through two steps, a first one formed by two big mudbricks (50 x 50 cm) and the second one featuring only a single, slightly smaller (46 x 39 cm) mudbrick. This threshold was documented to be associated with floor F169.
- **Abandonment stage**
- **Second construction phase:** non-kneaded rocky material over the aforementioned threshold allowed a pillar to be settled that would presumably support a lintel on the verge of collapse. A new floor at the entrance of the house, this one also documented by the 1988 team, is now set in place.



Fig 21 Zenithal view of room R.135, floor F169 and the threshold Th8 of H0a



Fig 22 Th8 threshold from house H0a

## Room R.134

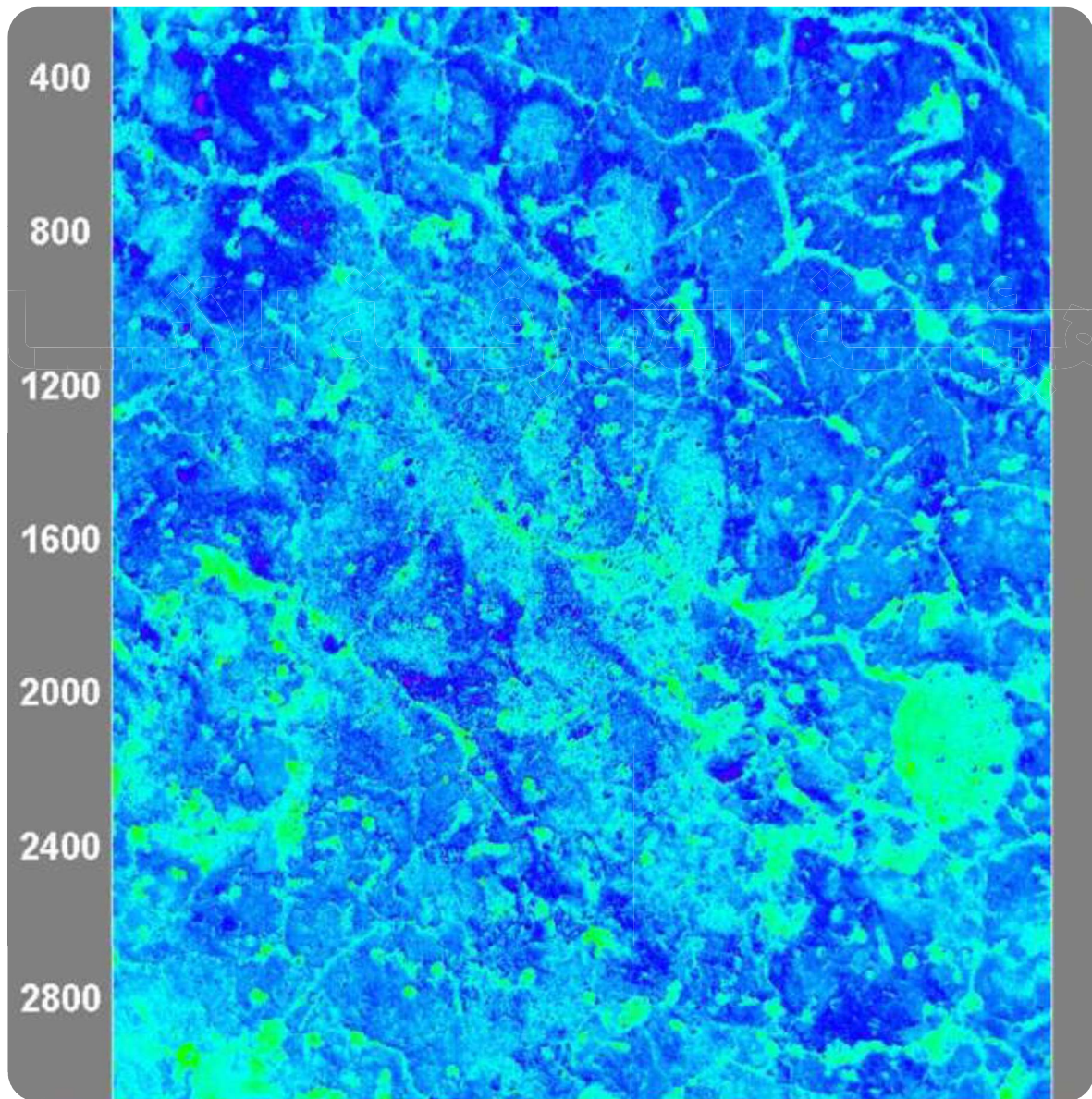
Upon removing the protective sand overlying the room and the level of abandonment that accumulated since the time of the original excavation (1988) and that of the Spanish team (1998), a floor (F171) was documented in this room that had not been previously recorded. This was a mortar floor, levelled though broken in a semi-circular scar in the middle of the room, all along wall W149. The floor featured several hand and footprints. Inside hole P15 (1,41 x 0,78cm), we documented mudbrick lumps with reed imprints, not just on one face, but also on two sides of the mudbrick that signal one corner. What could be thus taken to represent material with imprints from the roof that fell on it are the remains of a mass of material for construction that was being kneaded inside a square-shaped reed basket, placed on the floor and against the wall (Fig. 23). It appears that this material was being kneaded for refurbishing the house. This type of containers (“cane baskets”) have not been identified thus far in Iron Age sites from the Oman Peninsula and although we did not record traces of this basketry work, we learned about the existence of reed working thanks to tools that the site has already yielded. In the period that follows the Iron Age III, this type of plated reed work is documented in the Mleiha tombs, built with mudbricks dried over reed carpets, whose traces they left on them. This type of basketry work on reed continued in the Islamic world until a few decades ago.

In this site, specimens with reed imprints were later selected and micro-snapshots taken using a 20-400 amplifications VEHO microscope with cold LED light; In addition, one of the imprints was studied with thermal imaging, 3D-modelling, gradient analysis, and spectral plus infra-red analyses (Fig. 24)



**Fig 19** Pit P15 during excavation evidencing mortar with traces of vegetables, belonging to a cane basket





**Fig 24** Thermal image of the footprint found in room R.134

## Room R.133

In this room we proceeded to remove the protective sand until the protective mesh and a floor made of mortar which had been documented in the prior excavation was reached. The later feature suggests that this room was the best documented one of the entire house and our mission just recorded what had been previously found. However, the excavation of the 1980s was probably not exhaustive since we found pottery and bronze/copper tweezers (M279) next to W152, with parallels in other sectors of the settlement. A peculiar awl was associated with these tweezers, the former being a tool previously never documented among this kind of objects in the region (Fig. 25).

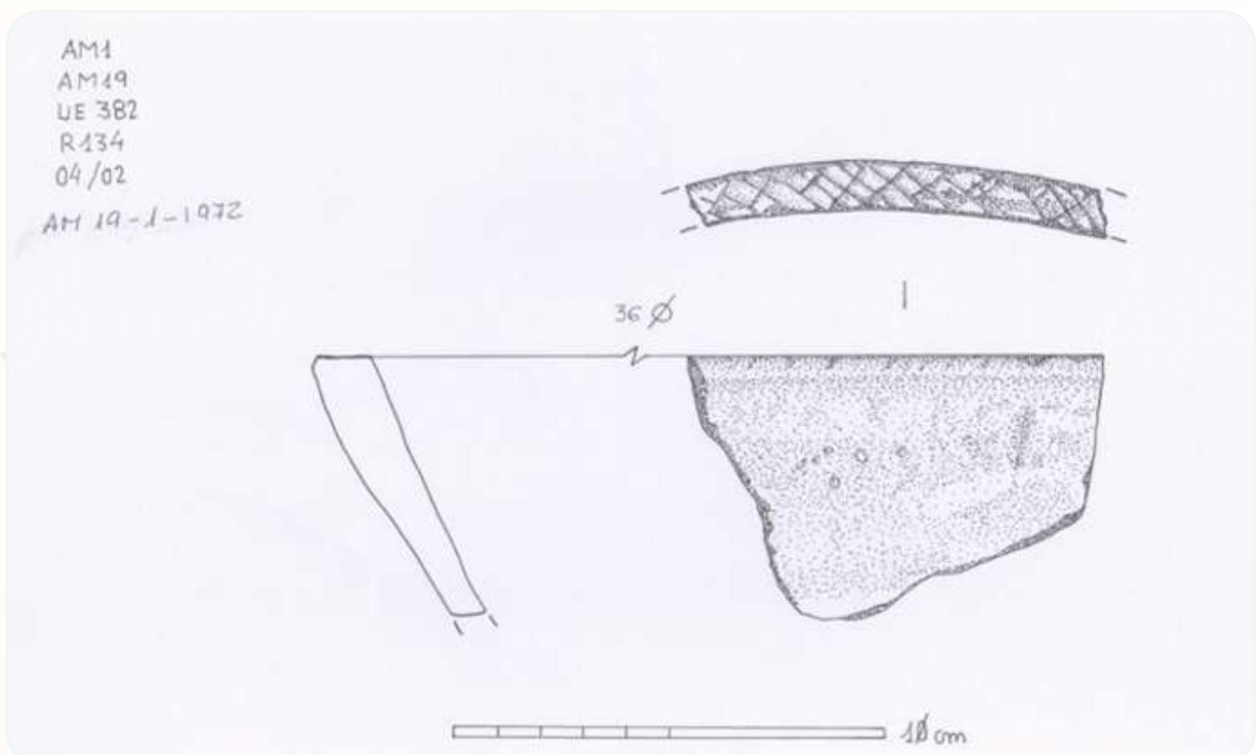


**Fig 25** Tweezers (M279) found in room R.135 of the H0a house before restoration

The pottery retrieved in House H0a for the most part derives from the protective sand infilling; this has thus been taken to represent intrusions and has been disregarded for research purposes. Only pottery found within a well-defined context was studied. This is all Iron Age II pottery, consisting of a red and beige fine and rather common ware with either red or brown slip or without slip. It was shaped into small to medium size bowls with or without carena and medium size jars with relief decoration on the body.



**Fig 26** Iron Age II potsherds from House H0a



**Fig 27** Medium sized bowl of buff ware with a brown slip, decorated with x- shaped figures on its rim, AM19-1-1972 (Drawing: Pablo Guerra García).

## 4 Conclusions

The January-February 2019 field season at al Madam has yet again been a multi-disciplinary activity on the part of the Spanish team of the UAM in Sharjah, supported on this occasion by the Palarq Foundation. The team was made up of archaeologists and biologists who very often work together as part of two research groups of UAM. These are the Culturas, tecnologías y medio ambiente de las sociedades del Oriente Próximo (HUM F-057) and the Laboratorio de Arqueozoología LAZ-UAM (EXP C-065) whose directors, respectively, are J.M. Córdoba Zoilo y A. Morales Muñiz.

This new expedition presented us with an invaluable opportunity to retrieve documentary evidence from our previous excavations, carried out over a period of years, thanks to data digitalization and its subsequent diffusion. Throughout 2019, the analysis of all these new documents allowed us to include the Mudbrick Working Area (MAW1) in national and international forums and to partly set the stage for its forthcoming publication. Among the items deriving from this initiative we can mention the following:

### Articles

P. Guerra y MA. Hervás, “Análisis sobre los procesos de producción de materiales constructivos en la Edad del Hierro en Thuqeibah (al-Madam, Sharjah, EAU)” en A. Dominguez, et al., (eds) *nomina in aqua scripta*, Homenaje a Joaquín María Córdoba Zoilo (in press)

### Congresses

C. del Cerro and C. Fernández “Photogrammetry works at al Madam (Sharjah, UAE) on the 2019 season of work,” 12 ICAANE, Bolonia 14-18th April, 2020

C. del Cerro, “Humanos, animales y herramientas. Lo que las huellas nos enseñan y la digitalización nos revela en el yacimiento de al Madam”, 54th Seminar for Arabian Studies, Córdoba 15-18 de julio de 2020

### Seminars

C. del Cerro, “al Madam y el Patrimonio arqueológico de Sharjah. Inclusión de la Región Central de Emiratos Árabes Unidos en el Patrimonio Mundial por la UNESCO”, URJC, Madrid, 15 de noviembre de 2019

C. del Cerro, “El proyecto al Madam y el Patrimonio arqueológico de Sharjah. Excavación, gestión e inclusión de la Región Central de Emiratos Árabes Unidos en el Patrimonio Mundial por la UNESCO”. Seminario del programa de doctorado en estudios del Mundo antiguo. II Seminario del Instituto de investigación en Ciencias de la Antigüedad. Mundo antiguo: investigación y método. UAM, 17 de diciembre de 2019

The so-called Mudbrick Working Area, dating from Iron Age II (800 – 600 BCE) is an exceptional site that is already well acknowledged in the archaeology of the region and within the whole Near East, given that the installations where the materials for construction for any given population are difficult to document, as such work for the most part takes place over sand or floors, and does not cut the substrate which would leave the mark that we have been able to record. The hundreds of visible human hand and footprints, animal hooves and traces of tools were additionally



increased thanks to a digitalization process that allowed us to locate evidence that the naked eye is unable to spot, and also visible marks that had been substantially eroded through time despite our attempts to carry out a meticulous excavation and consolidation process to preserve the area.

The area is so extensive (900 m<sup>2</sup>) that we stood little chance to study and document it as a whole for its complete diffusion. To this end, the incorporation of the Global Digital Heritage group into our project has allowed this whole area of production to become accessible to the scientific community in a simple and comprehensive way <https://sketchfab.com/3d-models/al-thuqaibah-sharjah-uae-a1db2dbc616c46eead0eb8a10cf8a150> and, in a partial manner showing some of the individual pools as is the case of <https://sketchfab.com/3d-models/al-thuqaibah-basin-50-c4744bfb6aa94291bf63630ff3790a42>

The presence of the Global Digital Heritage team additionally allowed us to elaborate a 3D model of the H0a house <https://sketchfab.com/3d-models/al-thuqaibah-small-dwelling-sharjah-uae-edd2451e84e44640acfd60ee3c923e42> one of the main aims of our research effort during this 2019 field season.

We would like to conclude this report by expressing our deep gratitude to the Sharjah Archaeology Authority for their commitment, availability and devotion to our work. Palarq Foundation is warmly thanked for their financial support and the Research Vice-Rectorate of UAM for their interest and collaboration. The Global Digital Heritage team is acknowledged for their ability to solve difficulties of having to undertake such an ambitious project in such a large and difficult to deal with area, affected not only by the heat, the wind and the sand of the nearby Arabian desert, but also by the whitish background against which all pictures had to be taken.

Carmen del Cerro, Miguel Ángel Hervás, Pablo Guerra and Carlos Fernández

Mleiha (Sharjah), 20th January 2020

هيئة الشارقة للآثار



# هيئة الشارقة للآثار

# هيئة الشارقة للآثار