

Archaeological Evidence of Water Distribution and Quarrying Activity at Qaṣr al-Ḥallābāt

Introduction

This paper concerns the results of three seasons of survey and excavation by the Department of Antiquities of the Umayyad settlement surrounding Qaṣr al-Ḥallābāt between 2002-2004 (Ghrayyib 2003).

Qaṣr al-Ḥallābāt is located 25km to the North-east of the city of az-Zarqā', on the southeast edge of the modern town of al-Ḥallābāt al-Gharbiyya and was previously investigated by the Department of Antiquities between 1979-1981 (Bisheh 1980, 1982, 1985).

The most prominent architectural feature is the Qaṣr on the top of the mound, which dominates the site. Originally it was a Roman defense fort. In the first half of the eightieth century, during the Umayyad period, it was completely rebuilt and transformed into a lavishly decorated palace. A small mosque is located southeast of the qaṣr. A partnership project between the Department of Antiquities of Jordan and the Spanish Historic Heritage Institute, Ministry of Culture, aims to restore the Qaṣr and the mosque, under the direction of Ignacio Arce (FIG. 1).

An Umayyad settlement surrounds the qaṣr, its houses consisting of many rooms around an open courtyard (FIG. 2). They are built of undressed stones (limestone, re-used basalt blocks and field-stone), and coated in order to hide the irregular surfaces of the walls and reinforce the structures. According to the results of the excavation, these houses were residences of servants working in the Qaṣr and contained pottery types and stone objects for grinding and processing seeds and vegetables (Bisheh 1985; Ghrayyib 2003). The settlement grew spontaneously, as is evident comparing the very fine architecture of the Qaṣr and the mosque with the masonry of the houses.

The site is served by a well-planned hydraulic

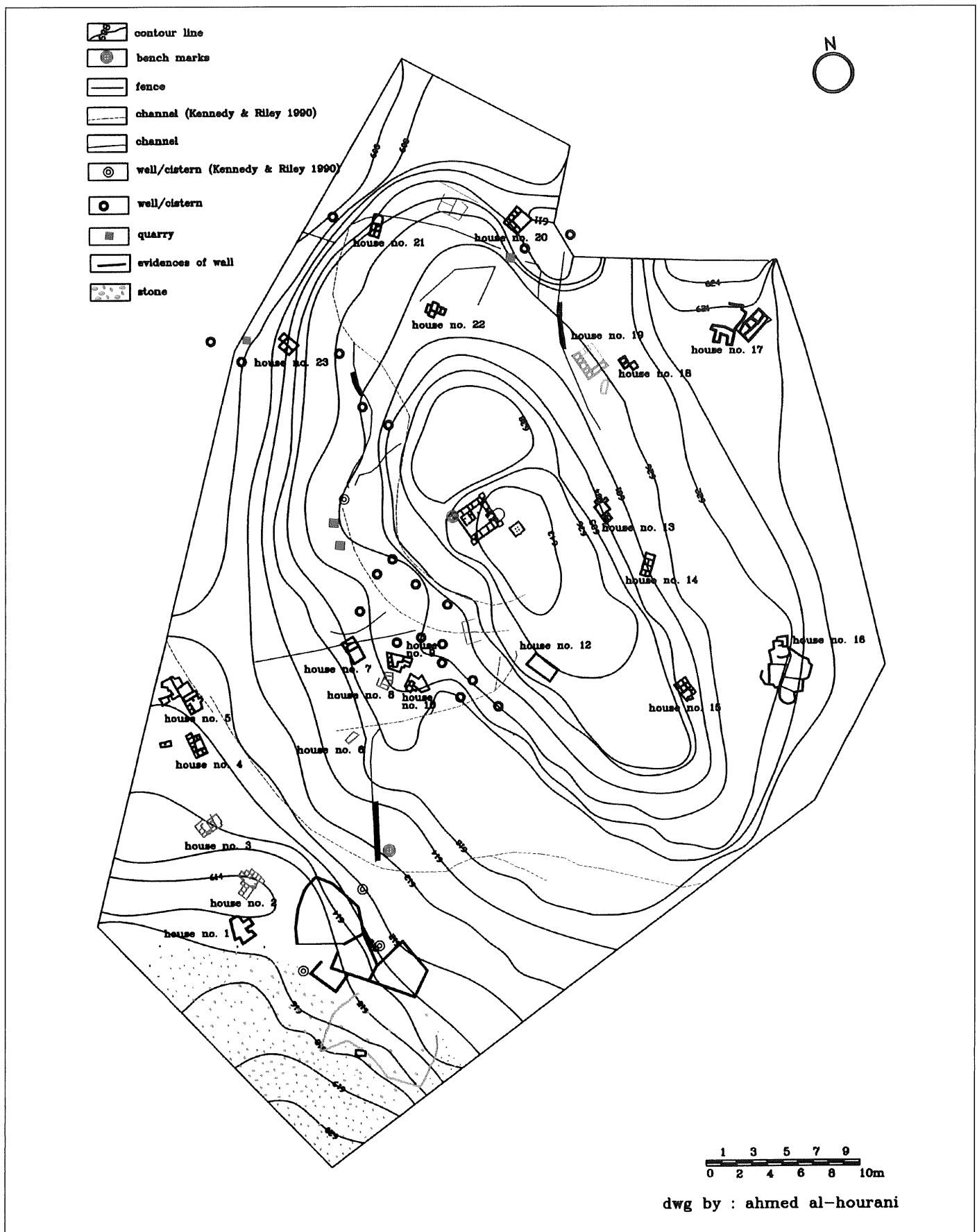
system including different kinds of canals, a reservoir and several cisterns.

Quarrying Activity

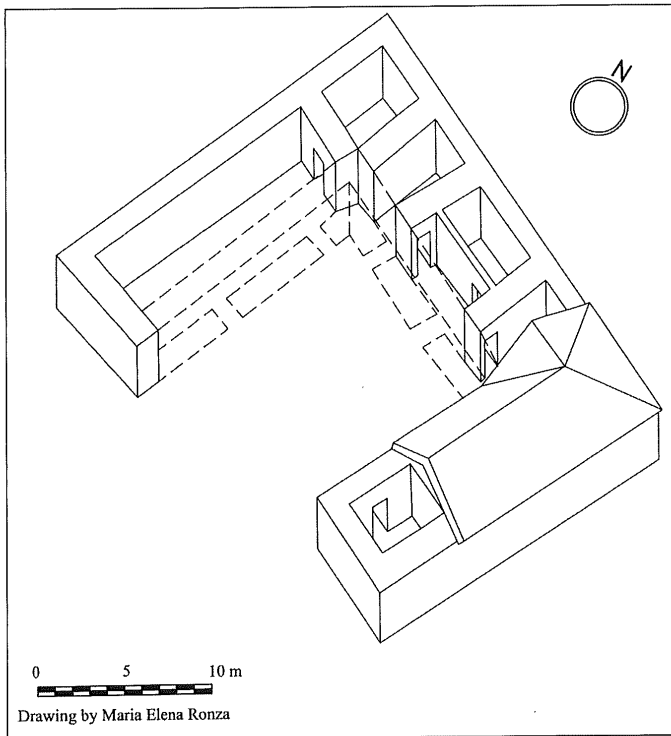
The site was exploited during the Roman period as source of stone. Evidence of quarrying was identified during the 2002 season (Ghrayyib 2003). Evidence of underground and surface quarrying has been identified. Four underground quarries are located on the western slope (FIGS. 3, 4) and the reservoir itself probably served as a quarry (Ghrayyib 2003). A large number of standardized quarried blocks are abandoned in the area of the reservoir (FIG. 1). They were quarried locally and most probably they were left there for maturing (FIGS. 5, 6). They are oriented (north-south or northeast-southwest) and organized in partitions according to their dimensions (FIG. 7). The measurements of the blocks fit in the Roman system of measurement (*pes monetalis* 0.296m). Similar standardized blocks are attested at the quarries of the area of Khirbat Yājūz dated to Roman period (Ronza 2004). This organization of the blocks was intended to test the quality of the stone (Ghrayyib 2003). Orientation and partitions were probably used to indicate the date of extraction and the provenance of the blocks in the absence of *notae lapidicinarum*. Those inscriptions were incised on the blocks by a chisel and were coloured with minium (Dolci 1997). They indicated the date, the name of the person in charge of the section, the engineer in charge of cutting and the names of his subalterns. Those marks are diffuse in the early period and became very rare during the Empire (Dolci 1998; Lugli 1957).

The Hydraulic System

The hydraulic system depends on waterfalls and consists of a capillary canals network serving sev-



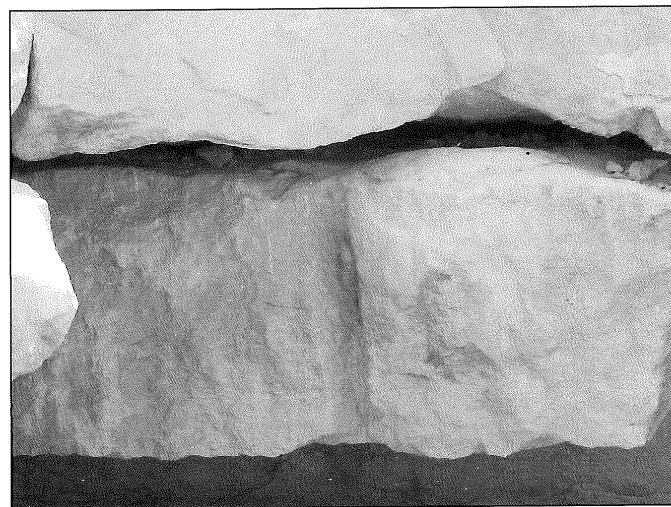
1. Topographical map of the site.



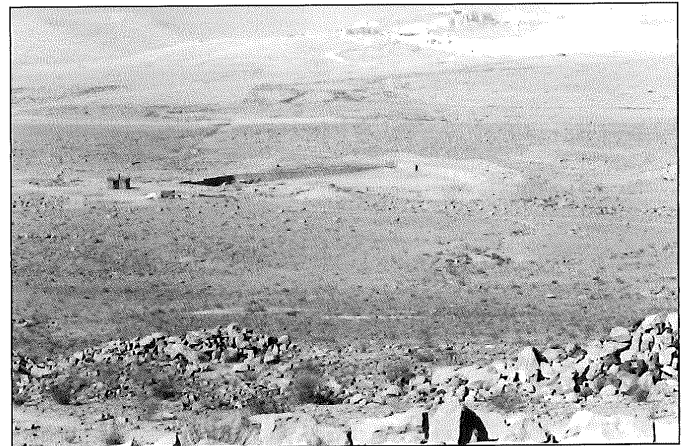
2. Typological reconstruction of an Umayyad house.



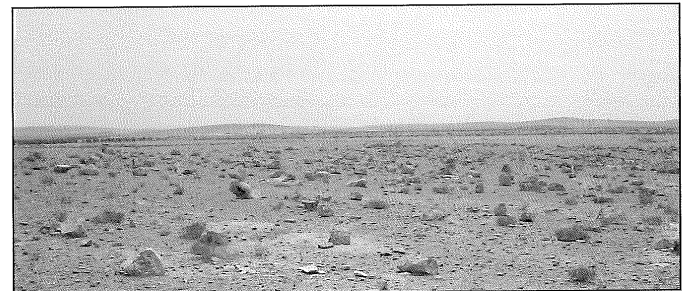
3. Underground quarry on the western slope.



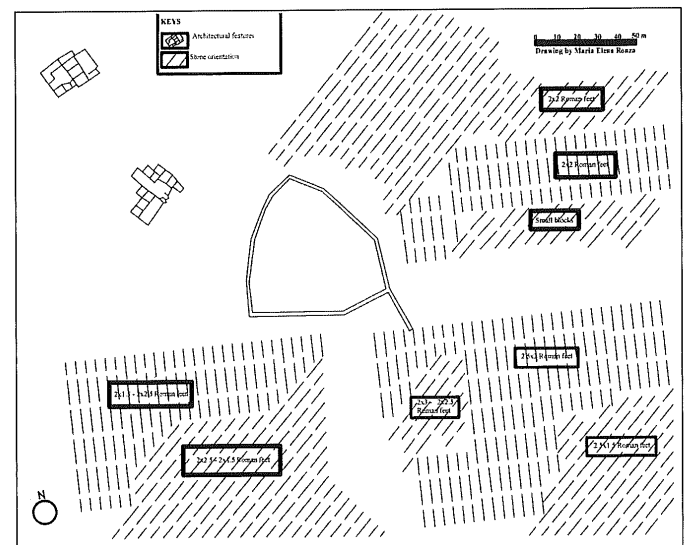
4. Detail of the quarry.



5. The reservoir and the quarried blocks.



6. The quarried blocks.



7. The arrangement of the blocks around the reservoir, according to orientation and dimension (Sketch).

eral cisterns. The canals were made of locally quarried limestone and were plastered and probably covered (FIG. 8). The main canals run according to the contour lines, the secondary canals follow the slope of the mound and direct the water towards the cisterns (FIG. 1) serving each single house or residential complex (Ghrrayib 2003).

During the 2004 season of excavation at house no. 7 (FIG. 9), a 4.10m long canal was identified at the southeast corner of room no. 8 (FIG. 10). It

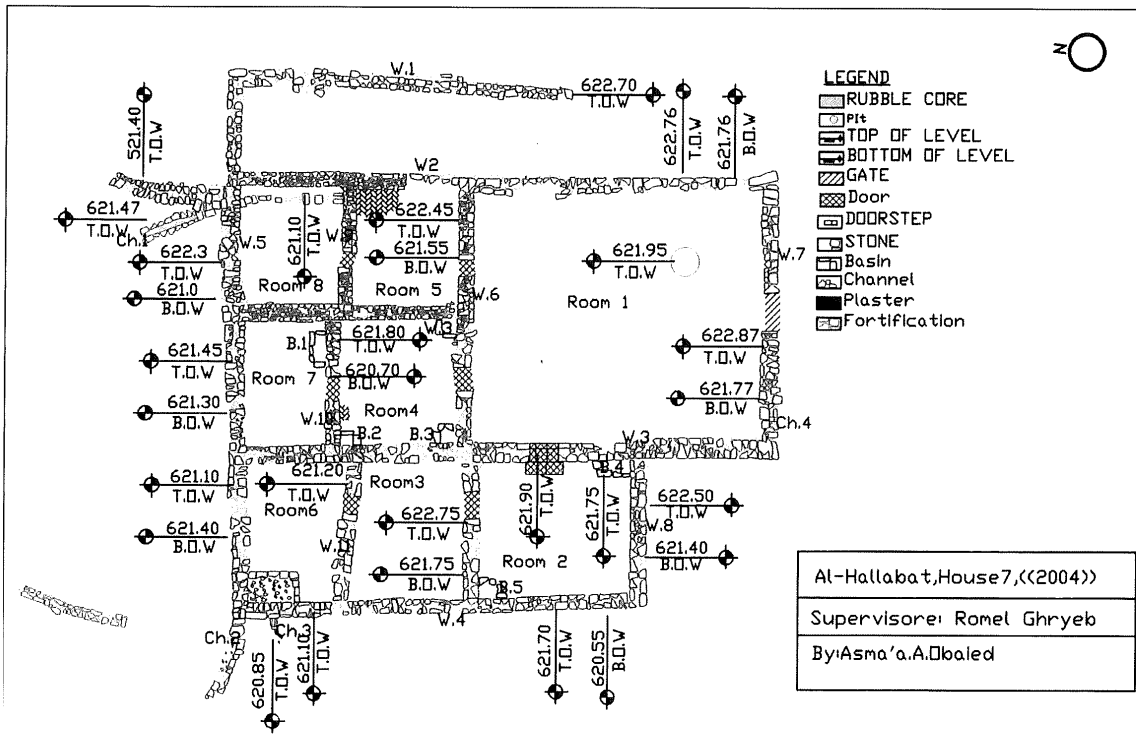


8. A water canal.

is made of stone and it is completely plastered. A drainage system related to several basin in rooms no. 2, no. 4, no. 5, no. 6 and no. 7 was investigated (FIG. 11). The basins are carved into the stone and some of them were plastered (FIG. 12). Most probably the other houses had a similar drainage system and were connected to the hydraulic system by similar canals, but no evidence had been found at the present stage of excavation.

As mentioned, each house or residential complex is served by one or more cisterns (FIG. 1) and although the canals appear to be part of a single large-scale project, due to the identical building materials and methods used, the cisterns are not. They are dug into the bedrock in a bell shape and were completely plastered (FIGS. 13, 14). The peculiar features of each cistern show that they are carved without planning, due to their location and the different materials, finishing and dimensions (FIGS. 15, 16).

An interesting case is the cistern south of house no. 20 that has a square pilaster made of local limestone and re-used basalt blocks to hold the ceiling. Whilst its walls were plastered to avoid the loss of water due to the permeability of limestone, the pilaster is not plastered. Before entering the cistern the water is stored in a plastered settling basin (FIGS. 17, 18). A similar cistern lies under the pavement of the main courtyard of the qaṣr. It has a



9. Plan of house no. 7.



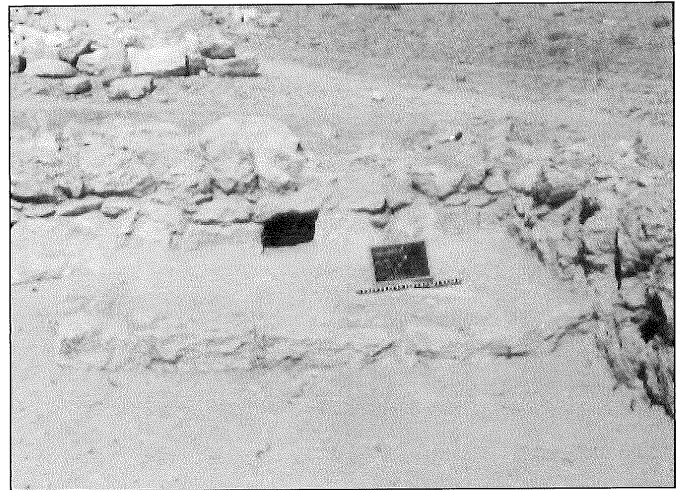
10. The 4.10m long canal of house no. 7.



11. Detail of the drainage system of house no. 7.

square pilaster to hold the ceiling and its walls are plastered.

At the bottom of the mound is the reservoir of about 8000 cubic metres surrounded by earth (FIG. 5). It is partially dug inside the bedrock and partially built of local limestone with rubble core walls of well dressed external blocks and a core of



12. Basin in house no. 7.



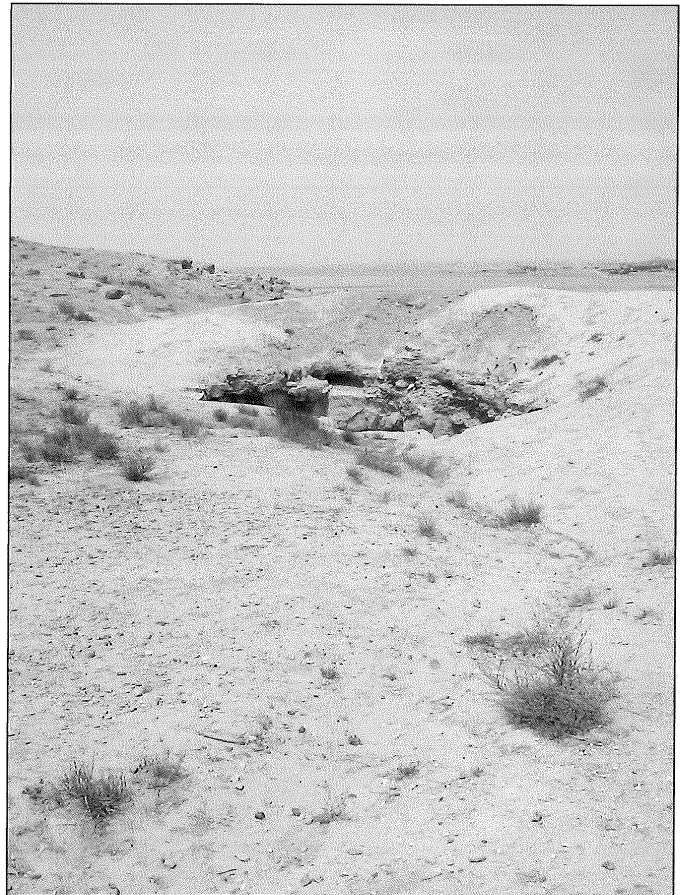
13. Cistern on the western slope.

small stones and concrete (Ghrayyib 2003). A settling basin is built along the southern edge of the reservoir.

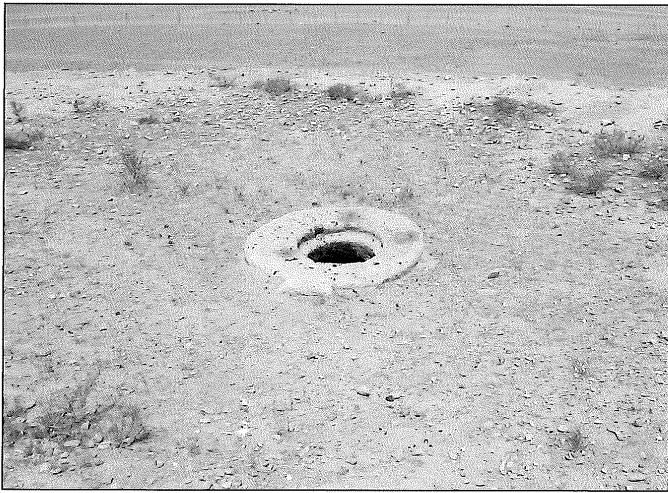
Taking into account all of the above, it appears that the reservoir and the cisterns were not part of a single building operation: they probably belong to different periods. Some of them, on the southwest slope, are earlier than the settlement and influenced the position of the houses; some others are con-



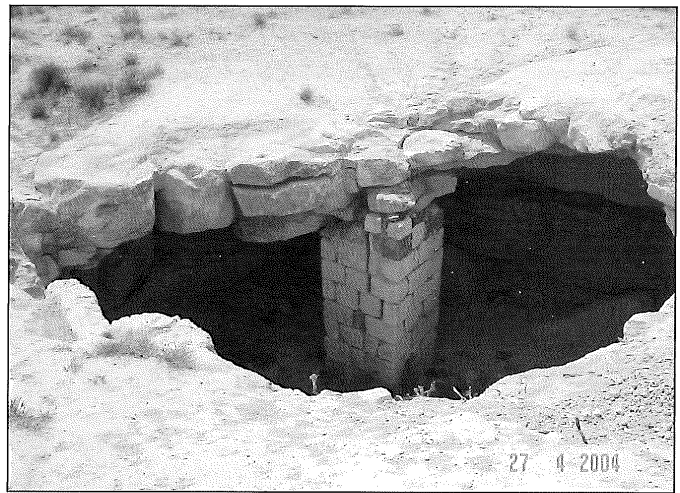
14. Detail of the plastered wall of the cistern.



16. Cistern on the western slope.



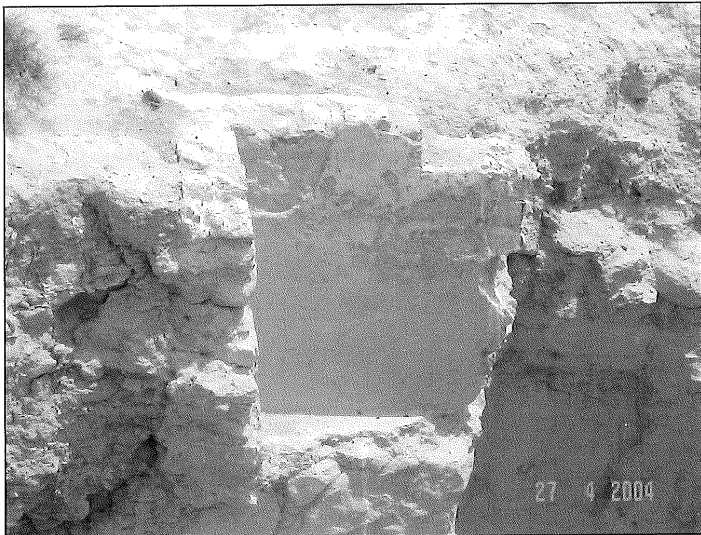
15. Mouth of cistern on the western slope.



17. The cistern near house no. 20.

temporary with the houses. On the other hand, the canal network is a single large-scale project which aimed at the preservation of the maximum storable volume of water and at the re-distribution of the surplus water to agriculture through the drainage system of the houses. A walled agricultural enclosure is located approximately 400m to the west of the castle and this also has a well planned water distribution system (Bisheh 1982).

The transformation of arid lands is a feature common to several Umayyad sites, such as Qaṣr Muṣhāsh (Bisheh 1989), Wādī al-Qanāṭir (Bujard and Genequand 2001), Umm al-Walīd (Bujard and Genequand 2001), Khān az-Zabīb (Bujard and Genequand 2001), Ma'ān (Genequand 2003). The Umayyad dynasty, due to the political stability, was able to settle the Jordanian steppe, introducing the agricultural exploitation of desert areas.



18. Detail of the settling basin.

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