

REPORT
ON THE ICOMOS REACTIVE MONITORING MISSION TO WORLD
HERITAGE SITE

UM ER-RASAS (JORDAN)

(30 March – 3 April 2005)

Angela Maria Ferroni

Reactive monitoring mission to Um er-Rasas (Jordan)

MISSION REPORT

By Angela Maria Ferroni

Dates of mission 30 March – 3 April 2005

Mission's background

The archaeological site of Um er-Rasas was inscribed on the World Heritage List in July 2004, at the 28th session of the World Heritage Committee in China.

Concerning the management plan -one of the requirements for inscription- the nomination dossier did only indicate the scope of such plan but without any indications on time frame for its preparation or implementation.

For this reason, upon the inscription on the World Heritage List, the Committee requested the Jordan Government to submit to the World Heritage Centre its annual work plan for the first year following the inscription of the site, the complete management plan and conservation plans and to organise two monitoring mission to review the progress of the implementation of these plans.

Further the Committee requested the World Heritage Centre, in consultation with ICOMOS, to submit a report on these monitoring missions for the consideration of the Committee at its 29th and 30th sessions, in 2005 and 2006, respectively.

Schedule of the mission

30 March		Arrival in Amman
31 March	9.00-11.30	Meeting at the Department of Antiquities (DoA) of the Hashemite Kingdom of Jordan with: Dr. Fawaz Al-Khraysheh, the Director-General of Antiquities Mr. Abd Al-Samee Abu Diya, archaeologist (DoA) Mr. Ali Khayat, archaeologist (DoA) Ms. May Shaer, architect (DoA) Mr. Amer Kamash, architect (DoA) Mrs. Sabal Al-Zaben, architect (DoA) Mr. Wolfgang Koellish, architect (DoA, CIM) Mrs. Mervat Ha'obsh, architect (MoTA) Mr. Malcolm Duff (EU Project co-ordinator)
	11.30-18.30	Visit to Um er-Rasas accompanied by Malcolm Duff, Abd Al-Samee Abu Diya, Mervat Ha'obsh, Ali Khayat, Amer Kamash
1 April	10.00-19.30	Visit to Um er-Rasas and Madaba archaeological sites accompanied by Ali Khayat and Wolfgang Koellish
2 April	10.00-14.30	Visit to the Citadel of Amman, Archaeological Museum, Roman Theatre accompanied by Ali Khayat
	17.00-19.00	Debriefing with Wolfgang Koellish
	19.00-21.30	Debriefing with Malcolm Duff, Abd Al-Samee Abu Diya, Mervat Ha'obsh, May Shaer, Sabal Al-Zaben

Summary of the mission

Two on-the-spot investigations were performed to assess general situation of Um er-Rasas archaeological site and its surroundings. Meetings and discussions were held with representatives from the Department of Antiquities and from Ministry of Tourism in order to get updated information about activities under way and improvements in the preparation of the site management plan since the inscription on the List.

INTRODUCTION**1.1 Description of the Site**

Um er-Rasas is an archaeological site of the Roman-Byzantine-Early Moslem periods. The site includes four main components:

- a. the Roman *castrum*, an almost square fortified settlement, founded in the late 3rd century A.D. along the borders of the Roman Empire (the *Limes*), linked with the ancient incense route. The *castrum*, of the size of about 150x150 meter, is almost unexcavated: the only structures completely brought to light are the so-called Twin Churches; some soundings were carried out to expose the North and South gates.
- b. the northern settlement area, which extends over 6 ha, includes several churches from the Byzantine to the Umayyad period (fig. 1). The only excavated structures on the site are for the most part churches: they show significant, superb mosaic floors. St. Stephen's Church, in particular, has the largest and probably the most complete of Jordan's church mosaic, showing a representation, and identification, of ancient towns in Palestine, Jordan and Egypt. Bedouin families occupied this area during the past 150 years leaving characteristic traditional houses in the site (fig. 3).



Fig. 1 – the northern settlement viewed from North

- c. the Tower complex, 1,5 km North of the *castrum*, comprising a 14 meter high stone tower, identified with a Stylite tower from Byzantine era. The tower is associated with a small three-nave church annex, two ruined buildings, quarries and cisterns (fig. 2).



Fig. 2 – the tower complex

- d. ancient agricultural fields, which cover much of the land to the north of the ancient town, comprising terracing, water channels and storage cisterns and an irrigation system.

The historical importance of the site and the quality of the discovered vestiges, as well as the beauties of the landscape, can make Um er-Rasas easily integrated to overall archaeological tours in Jordan. Moreover after inscription on the World heritage List tourism on the site is expected to increase.

1.2 European Commission Programme

The European Commission is providing assistance to the Ministry of Tourism and Antiquities (MoTA), its Department of Antiquities (DoA) and the Jordan Tourism Board (JTB), to improve their ability to promote Jordan as a tourist destination, through the preservation and presentation of two sites of archaeological and cultural importance (Um er-Rasas and Lehun), and through upgrading site management capabilities.

Under the programme “*Protection and Promotion of Cultural Heritage in the Hashemite Kingdom of Jordan*”, a financing agreement was signed between the European Commission and the Jordan Ministry of Planning, with the MoTA named as the beneficiary. The € 4.1 million programme includes international technical assistance, works and supplies. On the total budget, € 2.63 million are dedicated to design and implement a site conservation and presentation strategy for Um er-Rasas, aimed at raising quality of research, restoration and site management, visitor facilities and information:

❖ Technical assistance	€ 382,212
❖ Works	€ 1.900,00
❖ Equipment	€ 88,00
❖ Site management	€ 100,00
❖ Information	€ 161,00

Works contract include construction of:

- ✓ Visitor centre
- ✓ Shelter over St. Stephen's complex
- ✓ Shelter over Church of Lions in funds available
- ✓ Access footpaths, signage and viewing platforms
- ✓ Parking at visitor centre and Stylite Tower
- ✓ Interpretation and visitor information materials

2. GENERAL OBSERVATIONS ON THE SITE

2.1 Site management

The archaeological site of Um er-Rasas is under the control by the Department of Antiquities which is part of the Ministry of Tourism and Antiquities.

No management staff is present on the site. There are only few guards on the spot, staying in a small concrete building close to the St. Stephen complex.

2.2 Protection

The body responsible for the protection of the archaeological site is the Department of Antiquities.

At present time there are no fences surrounding the archaeological remains; no signs or panels identify the boundaries of WH Site on the spot.

The modern village, not far from the vestiges of the ancient settlement, is not particularly disturbing because there are a few tens of houses, one or two floors, of a more or less homogeneous typology. Only few buildings are located inside the archaeological perimeter, such as the police station, the post office, the hospital and three private houses.

Some nomadic Bedouins live in tents in and outside the archaeological site.



Fig. 4 – the area between the northern settlement and the tower with Bedouins' tents

2.3 Archaeological research

Neither excavation works nor conservation interventions are being conducted on the site at this time. However, very limited soundings, near the northern gate of the *castrum*, seem recent (figg. 5-6); it is not clear who made them, but they certainly cannot be considered real archaeological searching both for size and the inadequate method used.



Fig. 5 – recent archaeological (?) sounding



Fig. 6 – recent archaeological (?) sounding

2.4 State of conservation

Serious structural problems affect the site, which, apart from collapses due to past earthquakes, has been also quarried to provide building material. Besides the risk of further deterioration for the monuments, the present situation is highly dangerous for visitors; uncovered archaeological soundings and deep trenches make the situation worse. Also for this reason certain parts of ancient buildings would require urgent consolidation interventions (fig. 7-8).



Fig. 7 – dangerous situation for visitors and structure



Fig. 8 – ancient structures at the risk of collapse

Moreover some structures, built with local shell-limestone, exposed to atmospheric condition show erosion phenomena; the erosion is particularly clear on some types of limestone, such as the one used for architectonical elements (fig. 9).



Fig. 9 – serious erosion damage on the top of the Stylite Tower

It possible to see rare fragments of plaster on the walls, which are often detaching (fig. 10-11).



Fig. 10 – fragmented wall plaster



Fig. 11 – fragmented wall painting

In general, most of the recognisable conservation works on the site have been carried out using mortars and white cement which, although more compatible with the ancient structures from a visual point of view, still remain inadequate and also cause damage that can accelerate other natural stone deterioration processes due to exposure to atmospheric agents.

Moreover, all conservation interventions have been carried out following excavation works, and not in the framework of a global strategy: this situation has lead to different approaches and conservation methodologies used on the site.

In 1990 an hangar-like shelter was built to protect mosaic floors of St. Stephen's Church (fig. 12); the same shelter covers also the apse of St. Sergius Bishop. Suspended walkways allow people to visit the monument without walking on the fragile floorings (fig. 13). However, the protective structure shows some damage today and does not work very well because of the lack of a rain-water drainage system: on west side, in particular, water becomes stagnant under the shelter, favouring biological deterioration phenomena over the mosaics of the apse of St. Sergius Bishop Church (fig. 14).



*fig. 13 – the shelter covering
St.Stephen Church's mosaics*



*fig. 14 – suspended walkways
under the shelter*



*fig. 15 biological deterioration
phenomena affect the mosaic of
S. Sergius Bishop Church*

The other mosaic floorings on the site are preserved by resorting to temporary reburial: generally an earth layer and a plastic net are used to cover the mosaic surfaces; sometimes plastic sheets have been seen under the earth. Almost everywhere shrubby vegetation is growing on these protective layers (fig. 11-16).



Fig. 16 – Shrubby vegetation grows on earth layer covering mosaics in S. Paul Church

2.5 Main risks affecting the site

Earthquake risk

Under EC Programme, geology and seismology data, were collected. From these early analyses it appears that the site, close to the Dead Sea Transform fault, belongs to seismic 'Zone 3' with intensity VIII on the Modified Mercally Scale, which corresponds to 6.2 - 6.9 on the Richter magnitude.

Environmental risk

EC Programme has provided also data about climatic condition in Um er-Rasas that benefits from a dry continental climate with two main season: summer very sunny, dry and hot, and winter cold and rainy. Temperature show average level's variations, from 0 to 40 ° C and more, Wind, generally blowing from west, can be violent and bring dust.

2.6 Presentation – interpretation

An appropriate policy for interpretation and presentation of Um er-Rasas is lacking, only the churches with their mosaic floors are easily appreciable by all visitors. The other archaeological structures, all almost unexcavated, are more difficult to understand for the layman.

In general, collapses due to past earthquakes, as well the chaos in which the various areas covered with scattered architectural and structural elements are left, make most of the site incomprehensible to visitors, and also very difficult to access (fig. 17-18).



Fig. 17 - chaos left by recent collapses



Fig. 18 – unexcavated areas inside the castrum

2.7 Tourism

At the moment the archaeological area is visited by 8.000-12.000 people per year; the entrance is free, but no visitor facilities are on the site.

3. MANAGEMENT OF THE SITE – WORK IN PROGRESS

3.1 Working-group set up

At the moment a small working-group, composed of employees from the Ministry of Tourism and Antiquities and its Department of Antiquities (Mr. Abd Al-Samee Abu Diya, Mrs. Mervat Ha'obsh, Mr. Ali Khayat, Mr. Amer Kamash, Ms. May Shaer, Mrs. Sabal Zaben) and of the EC Programme Coordinator (Mr. Malcolm Duff) is working to draw up a draft of the Management Plan, that is expected to be completed in early 2006, by 31st March at the latest.

The same group could continue to work as the Core Management Team that will have the responsibility of organizing, managing and coordinating the Site Management Manual, monitoring and reviewing activities carried out, until the foreseen Site Management Unit staff is appointed.

3.2 Preparatory work for management plan

The preparatory organizational work for management plan is completed. The working-group from DoA and MoTA has defined the aims and drawn up the contents of the Management Plan:

- a) Introduction
- b) Historical background
- c) World heritage inscription
- d) Documentation and records strategy
- e) Conservation and preservation strategy
- f) Archaeological and environment research strategy
- g) Community strategy
- h) Zoning/land use strategy
- i) Tourism, interpretation & marketing strategy
- j) Long term objectives
- k) Short and medium term objectives
- l) Protection issues and priority projects
- m) Management plans 2005-2010
- n) Management organization and responsibilities
- o) Implementation plan 2005-2010

At the moment Several Special Strategy Committees, comprising teams of experts from DoA and other Ministries if appropriate, assisted by MoTA or Universities, are working on strategies aimed at different issues.

Documentation and records

Concerning this aspect the Committee is developing a strategy aimed at identifying, collecting and recording what exists using a standard methodology, identifying probable gaps in know information and preparing a programme for the work to be undertaken, identifying resource requirements.

The material collected and archived should include:

- a) published written material, photographs, film, video, on Um er-Rasas from whatever source,
- b) records of excavation, conservation or restoration carried out by DoA or authorized team of archaeologist,
- c) satellite or aerial photography, both historical and contemporary, topographical survey drawings, etc.
- d) Geophysical, climate or reports prepared on any aspects of Um er-Rasas site or its surrounding area,
- e) Copies of master plans, land use plans or other policy or strategy document concerning the site and its territory

A GIS is expected to be used for the collection, storage, management and display of data.

Conservation and preservation

An overall assessment of the state of conservation of the archaeological structures was carried out under the EC Programme last years. The strategy which is being established is aimed at a careful identification of damage and its origin, at assessing the durability of structures and material under different atmospheric condition, the carrying capacity of ancient structures and the environment impact of the introduction of modern utility services, evaluation of the costs of repair, conservation and long-term maintenance. All data will allow;

- a) to develop a long-term strategy for conservation and preservation,

- b) to prepare the basic procedure manual to be followed for all works,
- c) to prepare a suggested programme for the work to be undertaken by the DoA,
- d) to identify structures at risk and priority projects,
- e) to define annual preventive maintenance,
- f) to define annual work programme 2005-2010
- g) to identify resource requirements.

Archaeology research

The Special Committee is developing a strategy aimed at:

- a) developing the long term strategy for research including its objectives
- b) preparing the policies and the basic procedures to be followed
- c) preparing a programme for the work to be undertaken by the DoA and others, identifying the priority projects,
- d) preparing terms of reference for each research project,
- e) preparing the legal Contract that shall govern the relationship between the DoA and the other research institution/body,
- f) preparing procedure for interfacing with the other strategies (tourism, conservation, etc.)

Natural environment

The Special Committee has responsibility to:

- a) develop the long term strategy,
- b) prepare the policies and the basic procedures to be followed,
- c) define the baselines studies that are required,
- d) prepare a programme for research work to be undertaken,
- e) identify priority research projects,
- f) prepare terms of reference for each research project.

Tourism, interpretation and marketing

Including the site of Um er-Rasas among the top ten attractions visited by tourists in Jordan requires the development of specific strategies; the Special Committee is working:

- a) to develop a long-term strategy for tourism, interpretation and marketing,
- b) to assess carrying capacity
- c) to define service standard and plan visitor facilities
- d) to develop strategies for the development of events, festivals, products, merchandising, etc.,
- e) to prepare interpretation facilities and materials and information materials,
- f) to prepare the general policies to be followed and detailed plans,
- g) to prepare procedures for interfacing with other strategies.

Community strategy

The site is at the centre of a thriving traditional rural community comprising members of tribal societies; its preservation has been assured by the habits and attitudes of the local community in the past years. Strategies are being developed to maintain their involvement with the site and to benefit from the economic opportunities from the enhancement of the site.

MoTA has commissioned a socio-economic study that provides a wealth of baseline data on the community, identifying a variety of needs and several opportunities.

Concerning the land in the ownership of the Government outside the WHS boundary, the special Committee is preparing:

- a) strategies and policies for access by the local community to practice traditional grazing,
- b) strategies and policies for access by the nomadic tribes to utilize the site for camping and practice traditional grazing,
- c) legal agreements for use in both the situations
- d) strategies and policies to define and govern commercial activities by the local community
- e) strategies to assist the Municipality in administering the lands in private ownership adjacent to the WHS

Land use, environment and landscape

To ensure conservation and protection of WHS setting, strategies and policies need to be developed that will enable traditional rights and practices to continue where appropriate and for new developments to take place.

3.3 Preparatory work for management structure

The working-group from DoA and MoTA is developing a proposal for the Management Unit including:

- p) the organization structure,
- q) functional responsibilities,
- r) proposed staffing levels,
- s) job description,
- t) training requirements,
- u) equipment and other requirements,
- v) indicative set-up budget,
- w) indicative annual costs

Budgets available for training once core team are just identified; training for Site Manager will include visit to European World Heritage Sites. It is foreseen additional technical assistance by practicing expert to advise on Management Procedures Manual.

3.4 Activities in progress

- Under EC Programme all land inside WHS boundary will be owned by the Government and be administrated by the WHS Management Unit.
Most of the land surrounding the northern settlement will have been purchased by April 2005.



Fig. 19 – map showing lands that will be land by april 2005

- EC-funded work at Um er-Rasas includes international technical assistance to draw up a plan for the preservation and presentation of the mosaics discovered to date. The works includes a new shelter that will cover the whole St. Stephen's Church complex displaying for the first time the spatial relationship between the Churches and their mosaics (fig. 21). Tent roof will be drawn over the edges to produce

classical tented form (fig. 20). The design phase is almost completed. Procedure for work will be completed by October 2005.

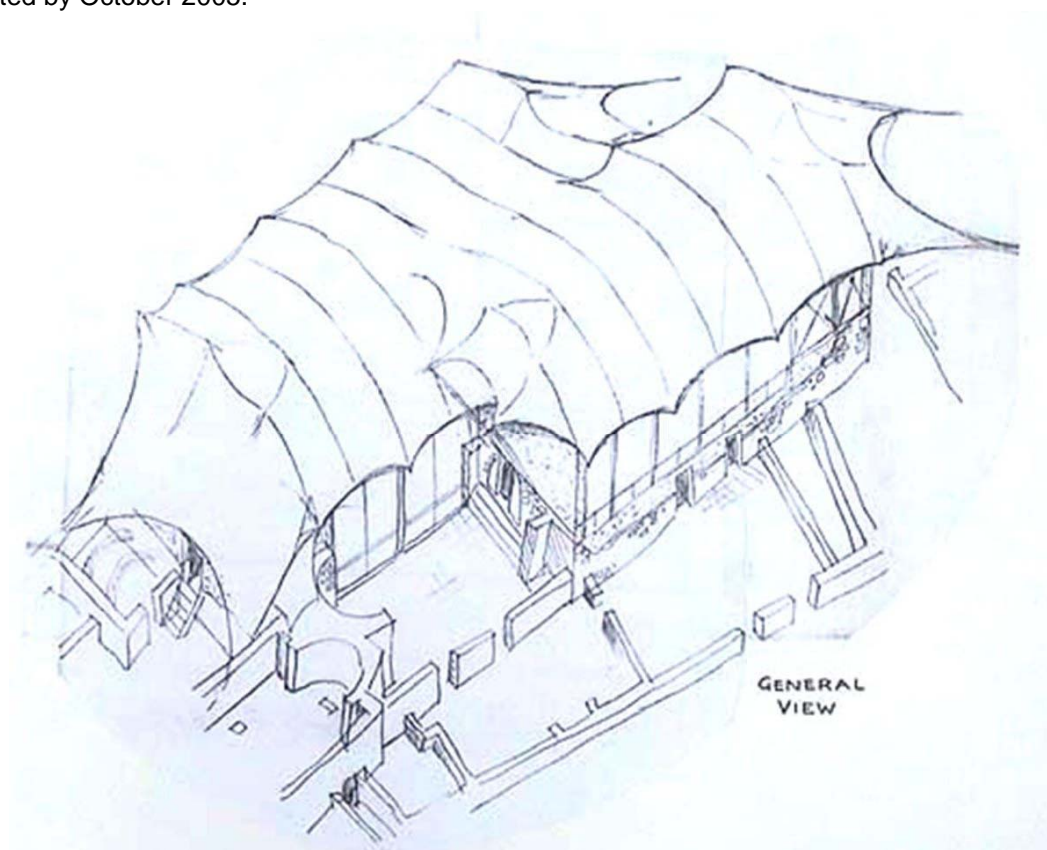


Fig. 20 – shelter designed for St. Stephen complex

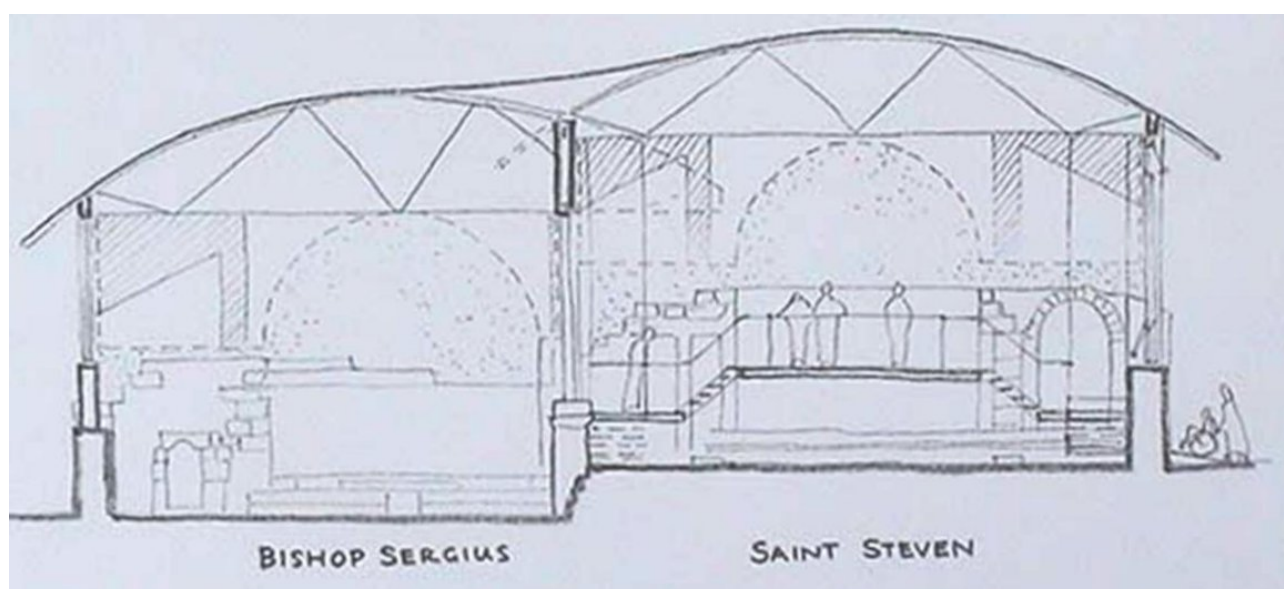


Fig. 21 – shelter designed for St. Stephen complex

- A Preservation and Conservation Specialist Study is underway by the Department of Antiquities, coordinated by Mr. Wolfgang Koellisch.
- Access footpaths, signage and viewing platforms are being planned. Footpaths will provide safe access to the most important parts of the site (fig. 22), and be fenced to prevent access to unexcavated areas making easier visitor management.



Fig. 22 – Hypothesis for pathway in the area of northern settlement

- In February 2005 geophysical surveys were performed at Um er-Rasas site by the Geophysics Division of the Natural Resources Authority of Jordan, with the objectives of: a) mapping buried structures, b) locating buried artefacts, c) identifying target zones quickly thereby reducing the required amount of costly excavation, d) evaluating the applicability of geophysics as an archaeological aid in studying historic sites in Jordan.

Different types of measurements (magnetic, gravity, resistivity and ground penetrating radar-GPR) were collected over the mosaic floors of St. Stephen and Bishop Sergius Churches and at the Lions Church (see Annex 1). The presence of the shelter over the St. Stephen Church has limited geophysical surveys, but integrated different systems have allowed to map, in remarkable detail, underground buildings with arches shape of walls oriented north-south under that church (fig. 23) and subsurface building system with rooms under the Lion Church.

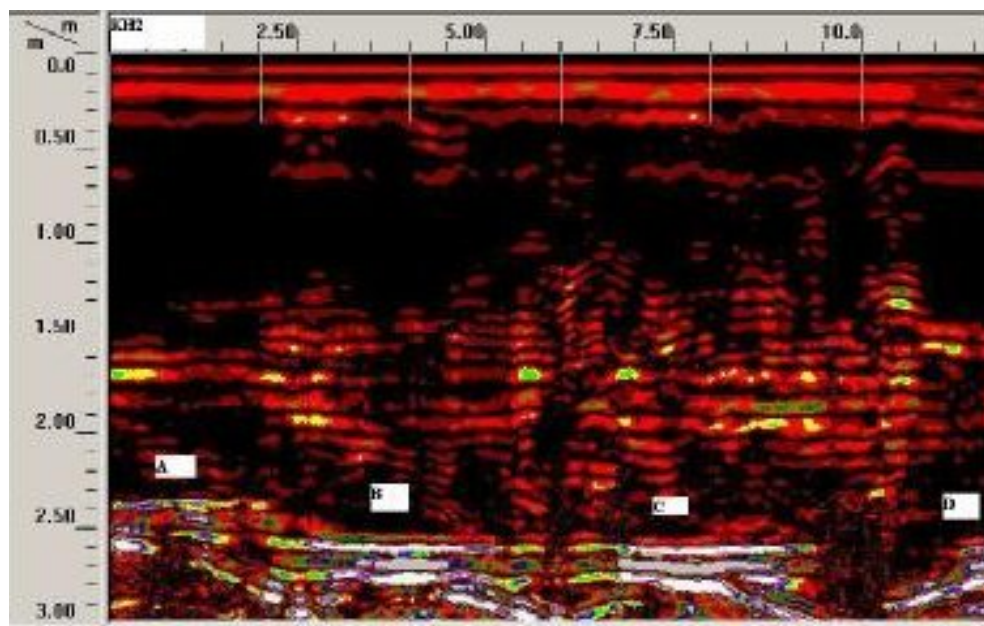


Fig. 23 – interpreted 400 MHz GPR section along one survey line at St. Stephen Church

- The MoTA staff is preparing video and posters for use at an Archaeological Exhibition that will be opened at Um er-Rasas in May. Furthermore a range of information, promotional and marketing materials are being planned for the Site.
- Um er-Rasas World Heritage Dedication Ceremony is being organized for the end of May and EC sponsored directional signs to be installed on the site.
- At present, it seems that there is a good harmony between the MoTA staff and the DoA one; they get on well together and objectives and strategies worked out for Management Plan are really shared. It could guarantee an absolute preservation and conservation of the values of the archaeological site in the framework of the social-economic development of territory.

4. RECOMMENDATIONS

4.1 Concerning priority actions

- Before for the implementation of the project in progress, it would be advisable to improve general situation of the archaeological area from the point of view of security, backfilling deep trenches and soundings and fencing some areas that there is the risk of collapses, such as the area near St. Paul Church (fig. 24).



Fig. 24 – an excavation uncovered at the risk of collapse near S. Paul Church

- To channel people straightaway onto pre-established paths could be important also in order to avoid unintentional damage and losses caused by visitors or local people crossing the site and walking or trampling upon the ancient structures.
- Some structures in danger of imminent collapse would need to be urgently consolidated by means of masonry supports.

4.2 As regard some key management issues

4.2.1 Research objectives and strategy

- Up till now most of the ancient structures have neither been fully recognised nor studied and documented. Archaeological investigation on the site focused on the Christian religion development and history in the territory: so only churches were excavated. It should be important to extend and direct the research toward other aspects, particularly those related to the character of housing, town plan and daily life during Roman, Byzantine and Early Moslem periods.
- It is recommended to develop a comprehensive research strategy, also aimed at integrating the activities of all archaeological missions on the site. Their precious support could be directed to address the points listed in the Management Plan. The presence of foreign archaeological teams on the site could be increased promoting Um er-Rasas at international level by using university web-sites of.
- It would be useful to consider the preparation of good practices guidance to help raise the quality of archaeological works; it should include advice concerning documentation, survey and excavation works on archaeological monuments; the various types of archaeological works and analyses should be standardised and described in detail. This guidance could be an Annex of the Management Plan.
- In order to improve the archaeological skills, a further item of the Management Plan must be the assessment of training needs for archaeological staff and the development of training programmes to raise the knowledge of stratigraphic principles and excavation techniques.
- It is highly recommended that the research strategy take into account the removal of excavated earth from the archaeological area. Earth mounds left by previous excavations must be removed from the site and it must be established in advance where to discharge the earth from new diggings.

4.2.2 Conservation objectives and strategy

- Conservations plans for the WH Site should be drawn up making use of detailed drawings in a scale suitable for the production of thematic maps showing a) the state of conservation of all structures, b) the type of deterioration process and level of priority of intervention, c) the various types of interventions. These maps should be kept for future reference and periodic monitoring. Procedures and materials to be applied in the conservation treatments should be identified through testing and described in the conservation plans.
- The Department of Antiquities is already working to arrange guidelines for conservation interventions on monuments and sites of cultural and archaeological importance; the various types of interventions should be described in detail, including technical specifications of the materials required. These Guidelines, including a long-term monitoring and maintenance procedures and plans, might be related with conservation plans.
- The use of white cement should be always avoided and, following present conservation trends, it is advisable to resort to more compatible and reversible materials, such as traditional lime-based mortars, mixed with appropriate inert material (normally dust and grit made of the same material as the ancient structures). Mixtures should be experimented and tested over a reasonable time in order to assess their effectiveness and durability compared to ancient material. It must be stressed that the choice in favour of traditional material implies regular and more frequent maintenance interventions.
- In order to improve the conservation skills of local workers and strengthen their capacity in the use of traditional materials, training activities should be carried out by the Department of Antiquities.

- With reference to the revision of old restoration works, the elimination of cement mortars is suggested only if its removal is possible without risk for the original structures.
- Concerning monuments affected by structural problems, it should be necessary to carry out an in-depth study on the original construction techniques and to conduct a vulnerability analysis, identifying priorities and types of problems. A structural conservation plan should be drawn up based on these assessments.
- Unstable blocks could be stabilized by providing necessary supports, sometimes also re-using original fallen stones. This would be possible since in any case this kind of intervention would not be an attempt to reconstitute the original architectural profiles.
However, re-integration of missing elements should be allowed only when required by the need to ensure the overall structural stability of the monuments.
- It is advisable not to undertake restoration works on monuments which are not at the risk of collapse, just out of a desire to complete them.
Reconstruction interventions should always be avoided. Anastylis, although permitted on archaeological ruins by the *Venice Charter*, should be carried out only when all elements and information needed for the work are likely available.
- Concerning the Stylite Tower and other monuments, they show less structural problems (fig. 25-26), which may be solved with limited conservation actions and a suitable and constant maintenance.



Fig. 25 – The Stylite tower



Fig. 26 – structural and erosion damage on the Stylite tower

- Water standing on the northern area adjacent to St. Stephen's complex should be intercepted and deviated towards the East, also using new drainage works to be designed based on specific studies, including integrated geophysical surveys, such as gravity, magnetic and resistivity surveys. It is advisable, moreover, to draw up a specific thematic map showing the water flows in the entire area, before planning any intervention.
- Concerning the new physical protection in substitution of the existing shelter on the St. Stephen's Church complex, the feasibility of such proposed structure needs to be better verified not only with respect to possible ancient structures adjacent the complex, but also with regard to the strong impact which such a shelter will have on the archaeological landscape and environment. Furthermore it is highly recommended to install control units for the measurement of microclimate data (temperature, relative humidity and wind speed/direction) both within and outside sheltered area. These microclimatic data, monitored and collected at least over two seasonal cycles, will be processed and integrated with environmental parameters to draw up useful indicators for assessing adequacy and effectiveness of the shelter (fig. 27).



Fig. 27 – damage from humidity on mosaic floor of sheltered St. Stephen Church

- Concerning the other churches adorned by significant mosaic floor, it is suggested to ensure their preservation only by means of continuous maintenance interventions and by covering mosaics during adverse seasons. Although with this procedure mosaics are not always available for everyone to see and appreciate, it certainly seems better than the building of protective shelters, because of their strong archaeological and landscape impact.
- It is recommended to cover mosaics by means of suitable material, such as special geo-textile layers and draining sand layers.
The use of plastic sheets should always be avoided.

4.2.3 Risk assessment

- It is recommended to assess carefully earthquake risks and to develop an earthquake-protection strategy for increasing the resistance of ancient ruins.

Generally, on archaeological sites seismic events can have a stronger impact only on standing elements and slender structures, such as the Stylite tower. For this reason it will be necessary to pay particular attention in conducting the vulnerability assessment on such monuments; since the methods of analyses prepared for modern building cannot be applied to a ruin, in order to define its structural vulnerability it will be necessary to analyse the probabilities with which such an event can produce damage, beginning by examining the damage that similar events produced in the past on it. The earthquake vulnerability analysis has to consider also an accurate study of the monument, aimed at identifying the possible constructive stratifications, reuses, modifications, repairs, etc.

- Interventions aimed at improving the static condition of the ruins in relation to its earthquake vulnerability would be planned while respecting in full of the ancient construction, with an aim to raising the mechanical resistance of materials with traditional interventions without altering its overall state.

4.2.4 *Presentation-interpretation, visitor facilities*

- Earth mounds left by previous excavations within and close to the archaeological area should be moved, to facilitate the understanding of the site.
- Appropriate facilities for the tourists should be developed according to a plan that takes into account the traditional vernacular architecture to ensure that no alteration is caused to the cultural and landscape values of the area (fig. 28).



Fig. 28 – The area surroundings the Tower complex

4.2.5 *Community strategy*

- Educational activities should be encouraged to increase the awareness of local people concerning the meaning of the value of a site they share with all humanity.

4.2.6 *Environment and landscape*

- At the moment the houses of the modern village are not a problem. However, especially in view of the expected tourist development, it is important to take under control urban development and changes to avoid possible future problems in terms of impact on archaeological remains.

4.2.7 *Monitoring the Site*

- It should be important that the staff working on Management Plan considers the need to establish an appropriate monitoring system, aimed at assessing the results of adopted policies and strategies for the preservation and development of the WHS of Um er-Rasas. This monitoring system, in a form of a detailed plan for the Management Unit, will identify the values of the site, the factors affecting it and will define key indicators to assess both positive and negative changes in the conservation and enhancement of the archaeological site and its territory (i.e. variations in the state of conservation, number of monuments opened to the public, use of assets, number and type of visitors, land surface purchased by the Government, benefits for local population –such as number of people employed in activities linked to the site, etc.) . Concerning the state of conservation of archaeological assets the monitoring system will base the periodic observations on the thematic maps, drawn up for working out conservation and maintenance plan, and up-date them in order to evaluate the effectiveness of conservation strategy.

