

IALC Travel to Jordan  
18 October 2003 to 26 October 2003

## **Aqaba Water Friendly Garden & Wadi Musa Wastewater Treatment Plant Visitors Center and Demonstration Site**

Section I: Travel notes  
Section II: Aqaba Water Friendly Garden  
Section III: Wadi Musa Wastewater Treatment Plant Visitors Center and  
Demonstration Site

Dr. Margaret Livingston  
Dr. Erin Addison  
Ms. Karen Vitkay  
University of Arizona  
Department of Landscape Architecture



JORDAN October 18, 2003 – October 25, 2003



Dr. Akrum Tamimi - IALC  
[akrumt@email.arizona.edu](mailto:akrumt@email.arizona.edu)  
079 6687702

Mohammad Shahbaz  
Program Director  
The Higher Council for Science and Technology  
Jordan Badia Research and Development Programme (BRDP)  
[brdp@hcst.gov.jo](mailto:brdp@hcst.gov.jo)  
[www.badia.gov.jo](http://www.badia.gov.jo)  
(962)6 5335284  
(Admin assist. Shireen)

Shhadeh Abu Hdaib  
Engineer - Director General  
Petra Region Authority, Wadi Mousa  
[prc@joinnet.com.jo](mailto:prc@joinnet.com.jo)  
[www.petra\\_pra.com.jo](http://www.petra_pra.com.jo)  
tel: (962)3 2157092

Dr. Salim Al-Moghrabi  
Aqaba Special Economic Zone Authority  
Head of Permitting & EIA Section  
[smoghrabi@aseza.jo](mailto:smoghrabi@aseza.jo)  
[www.aqabazone.com](http://www.aqabazone.com)  
tel: (962)3 2091000 X2284  
cell: (962)79 5945127

Arch. Khaled Rjab Abu Aisheh  
Aqaba Special Economic Zone Authority  
Environmental Impact Assessment Senior Officer  
Environmental Planning Directorate  
[kaledasheh@yahoo.com](mailto:kaledasheh@yahoo.com)  
tel: (962)3 2091000 x2253  
cell: (962)79 5835829

Dr. Margaret Livingston  
Department of Landscape Architecture - University of Arizona  
[mlivings@u.arizona.edu](mailto:mlivings@u.arizona.edu)

Dr. Erin Addison  
Department of Landscape Architecture - University of Arizona  
[eaddison@email.arizona.edu](mailto:eaddison@email.arizona.edu)

Karen Vitkay  
Department of Landscape Architecture - University of Arizona  
[kvitkay@email.arizona.edu](mailto:kvitkay@email.arizona.edu)  
1 (520) 400-2577

## Table of Contents

Section I: Travel Notes.....	4
Meeting with Muhandis (Engineer) Mohammad Shahbaz at Badia Research & Development Programme (BRDP).....	4
Visit to the Wadi Musa project site.....	5
Meeting with Petra Regional Authority (PRA).....	6
Meeting with Dr. Salim Al-Moghrabi of ASEZA.....	6
Meeting with Dr. Al-Moghrabi and Engineer Taysir at Demonstration Site.....	7
Tour of public parks of Aqaba.....	8
Tour of ASEZA projects.....	9
Second meeting with Dr. Al-Moghrabi.....	9
Travel to Amman, meeting with Dr. Tamimi and Robert Freitas, and Collection of background information.....	10
Team report work.....	10
Team report.....	11
Section II: Water Friendly Garden.....	11
Program.....	11
Site Analysis.....	12
Design Implications.....	12
Design Team.....	13
Proposed Timeline.....	14
Section III: Wadi Musa Wastewater Treatment Plant: Visitors Center & Demonstration Site.....	15
Project description.....	15
Site discussion.....	15
Opportunities.....	15
Constraints.....	16
Preliminary design concept.....	18
Three "zones".....	18
Interpretive Center.....	18
Demonstration plots.....	20
Periphery/surrounding landscape.....	21
Proposed Timeline.....	22

## Section I: Travel Notes

### October 18-19

Dr. Livingston, Dr. Addison, and Ms. Vitkay traveled to Jordan. We arrived in `Amman 7:15 pm. and were met at airport by Dr. Akrum Tamimi. We stayed in the Marriott Hotel, `Amman.

### Monday, October 20

#### Meeting with *Muhandis* (Engineer) Mohammad Shahbaz at Badia Research & Development Programme (BRDP)

Muhandis Shahbaz briefed us mostly on the **Wadi Musa Wastewater Re-Use Implementation Project**. BRDP is placing enormous emphasis on interpretation of the project, and the area to be included in the landscape plan is quite large – including the proposed visitors center, demonstration plots, and some recreational (picnic) areas on the perimeter. (More detail on the scope of the project is included in "Section II: Preliminary timeline and site discussion," attached.) Muhandis Shahbaz was extremely helpful in characterizing the tribal issues involved and the effort to co-opt stakeholders in the development and implementation of the project.

There was an evident sense of urgency about starting work on the design and construction of the visitors' center. mentioned more than once that BRDP needs "elevations for the architecture by Christmas."



Figure 1 Badia Research Office

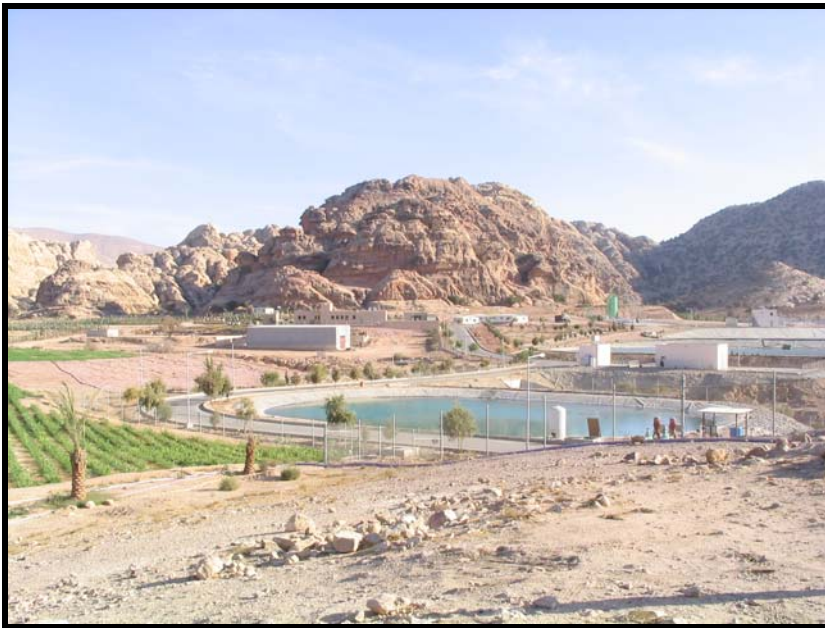
Muhandis Shahbaz perceives the `Aqaba Demonstration Site as a model design for low-water-use gardens. It will be utilized by local, regional and international tourists (tourism in `Aqaba is a significant economic force). BDRP would like the garden to be a progressive teaching site focused on the diversity and environmental value of plant materials. He mentioned the potential for including crop plants, a research area, the relation of the coral reefs, medicinal plants, interpretation of the coral reefs, and graywater. He also responded positively to the idea of incorporating a wildlife habitat area. Overall, he envisions the focus as being the environment and not the culture of the area. It should appeal to a wide audience base and present a solid case to be proud of. It should not be extravagant, but should achieve its beauty through a sophisticated design. A wide range of built and plant materials are available for incorporation. Possibly the design should start with the regional geologic history of the rift valley and evolution. The site archeology needs to be respected and incorporated. The site is a significant location situated near the most expensive resort hotels and the palaces and near the waterfront. It was emphasized that `Aqaba has a need for open space.

Muhandis Shahbaz forecasted that Dr. Al-Moghrabi of the ASEZA office will be able to contribute significantly. He also recommended Dawud al-Eisawi's *Wild Flowers of Jordan*, as well a reference on amphibians and reptiles.

Departed `Amman in BRDP truck to the Wadi Musa project site and reviewed the anthropological analysis of the Wadi Musa project (Tarawneh, Mohammed Fayez, "Socio-economic Assessment for the Wadi Mousa<sup>1</sup> Wastewater Re-use Implementation Project") during the drive.

### Visit to the Wadi Musa project site

We met first with Muhandis Haidar, the director of the treatment plant. We then walked up to the site where the projected structure is to be located. It is a spectacular site, with 360 degrees of rugged mountain views, and an excellent overview of the



**Figure 2 Wadi Musa Treatment Plant**

demonstration plots (for further detail, see "Section II: Preliminary timeline").

*Haris* (the resident 'guard') Abu `Abd al-Kareem is a middle-aged man from the `Amariin tribe. It was very interesting to listen to his conversation with Dr. Tamimi, which closely iterated from a personal perspective much of what Muhandis Shahbaz had outlined in our meeting and what Tarawneh has

written regarding the `Amariin and the economic situation in Wadi Musa.

For details of Dr. Addison's initial responses to the site, based on this visit and on meetings and the Tarawneh article, please see the "Preliminary timeline and site discussion," attached.

Visited Petra *siq*. It was interesting to visit Petra with the Wadi Musa project in mind – to imagine creating a visitor experience at the project which is related to the main

---

<sup>1</sup> As far as possible, we are using the standard scholarly system of transliteration for Arabic – e.g., Wadi *Musa*, not Wadi *Mousa*. These spellings vary because the vowel sounds in spoken Arabic vary widely with dialect, and because Arabic vowels sounds don't precisely correspond to English.

tourist attraction, but somehow extends interpretation of the area into the modern period.

Dinner with Dr. Tamimi, Ms. Vitkay, Dr. Addison, and Dr. Livingston.

---

## **Tuesday, October 21**

### **Meeting with Petra Regional Authority (PRA)**

We were able to meet Muhandis Shahadeh Abu Hdaib, the Director General of the PRA. He will be crucial to the success of the Wadi Musa project because it is PRA who creates the design guidelines for structures in the Petra Valley, as well as allotting the land on which the structure will be built.

This seemed to be a very successful meeting, and Dr. Livingston was able to show examples of Tucson xeriscape and interpretive trails, to which Muhandis Abu Hdaib and others seemed very responsive.



**Meeting with the Petra Regional Authority**

Muhandis Abu Hdaib focused on the importance of the Wadi Musa project as a "pioneer project," the importance of interpreting and disseminating the technical information generated by the project, the possibility that the site might have more than a regional interest, and his interest in having family recreational facilities included in the design.

### **Meeting with Dr. Salim Al-Moghrabi of ASEZA**

During our conversation, it emerged almost immediately that what ASEZA needs is a water budget for a masterplan, not an open space masterplan, per se. Dr. al-Moghrabi was concerned about the implementation of any open space design without a water budget. He was concerned specifically that too many people/projects will be promised treated water, in excess of the actual supply.

Conversely, the demonstration garden appears ready for implementation. Dr. Al-Moghrabi envisions the garden as a model for the people of `Aqaba. The site is located at the center of `Aqaba and the need for water conservation and reuse is great. Introductions were made and we summarized the ideas generated during the BRDP

meeting. Dr. Al-Moghrabi responded specifically that the idea of a bird-focused garden would present problems due to the close proximity of the airport and flight routes and perhaps the idea of a medicinal plant garden may not be successful in conjunction with the idea of water reuse. Speaking about funding for implementation, Dr. Livingston emphasized that the work produced (sketches, plans and elevations) can be used as communication tools and funding generators. Dr. Al-Moghrabi stressed the need for collaboration between the Arizona design team and ASEZA staff members. He is also emphatic about the continuous involvement of the design team through implementation, to assure that construction carries through the original intention of the design. Dr. al-Moghrabi mentioned the importance of close cooperation with Muhandis Tha'ir, who was abroad and therefore unable to attend the meeting.

Dr. al-Moghrabi emphasized that, once installed, the garden will be reliably maintained by ASEZA. He feels that the culturally sensitive approach to the installation would be to introduce the garden first as a low-water-use demonstration, and to phase in the significance of the treated water use. He remarked that the local population has fears about treated water – Muslim sensitivity to issues of purity are an important factor in the acceptance of the concept, and thus acceptance of the garden should occur first. Apparently there are already rumors concerning illness (Dr. al-Moghrabi mentioned livestock diarrhea and miscarriage) related to the treated wastewater use at Wadi Musa. However unfounded these may be, the issue and use of treated wastewater needs to be approached thoughtfully.

---

### **Wednesday, October 22**

#### **Meeting with Dr. Al-Moghrabi and Engineer Taysir at Demonstration Site**

We started the day by meeting Dr. Al-Moghrabi and Engineer Muhandis Taysir (also with ASEZA) at the Demonstration site. We walked the proposed garden site, including the enclosed on-site pumping station at the southern end of the site. The on-site pumping station collects the city wastewater before delivery to the treatment plant. The site

currently includes a few islands of palmettos. These are seen as a rarity and should be conserved. Another prominent tree in the area is the native "Sidra" tree (*Ziziphus spinachristi*). Other street trees located near the site include flame tree (*Poinciana pulcherrima*), tamarisk (*Tamarisk aphylla*), date palm (*Phoenix dactylifera*), *Ficus microcarpa nitida*, and *Leucena spp.* Within the pumping station walls vegetation included guava, mango, banana, basil, olive, fig, Jerusalem thorn (*Parkinsonia aculeata*), and citrus. All of the Jordanians present expressed a desire for fragrant smelling plants.



**Figure 3 ` Aqaba Demonstration Garden Site**

The area north of the proposed garden site is residential; east is the Movenpick Hotel; the property to the west is privately owned, and to the south is another hotel under construction. There is a plan to upgrade the pumping station as well as a need to interpret it. Potential exists to integrate the station into the garden. It was discussed that the American Center for Oriental Research (ACOR) is a primary source for mosaic history and information. It should also be noted that the proposed garden site is contiguous to open excavation squares from Dr. S. Thomas Parker's excavation of Roman Aila (Aqaba). ACOR and Dr. Parker himself are important resources for the treatment and interpretation of these remains.

### Tour of public parks of Aqaba



**Figure 4: Linear park on Hammamat al-Tunisiyya St.**

We visited a linear park on the main thoroughfare of Aqaba town --d *Shar'a Hammamat al-Tunisiyya*. The park is very successful in terms of use. The majority of users appeared to be Jordanians. Overall, the park is extensive in its use of water. Each end of the park includes fountains as well as a large central fountain. Picnic areas are included as well as an amphitheater. Grass

appears throughout and is used by the public. The park is extremely accessible from many directions.

We visited another successful city space called Princess Salma Park. It incorporates local stone, no turf, painted walls, and an extensive, well-utilized children's play area. An amphitheater onsite features regularly scheduled cultural events which ASEAZA staff say are well-attended. Identification signs for plants are present. The site also has a local library.



**Figure 5 Plant sign at Salma**

Our next destination was a community garden site near the beachfront called the *hafayir*. Despite a move in the late '90's to eliminate the site, the gardens have persisted due to pressures by environmental/ cultural activists in Amman as well as the local population, who still actively use the site for food



production. The *hafayir* displayed the effectiveness of mature vegetation for creation of shade and microclimates for gardens.

### Tour of ASEZA projects

We were afforded an opportunity to visit a date farm irrigated by wastewater. The farm manager walked the site with us indicating which plant materials he thought were most successful. Due to dust storms, wind screens are an essential element at the site. Plants included: sweet acacia (*Acacia farnesiana*), coast beefwood (*Casuarina stricta*), flame tree, hopbush (*Dodonea viscosa*), South American mesquite (most likely *Prosopis alba*), and *Eucalyptus spp.* `Aqaba receives about 2.5 inches of rainfall per year. We



**Figure 6 Date farming with treated wastewater**

we were also shown the site of the new Wastewater Treatment Plant (to be completed by 2005). ASEZA has done extensive plantings in the medians between the airport and the center of town. Palms and bougainvillea appeared to be the most dominant plants. Local rock was also used. We revisited Shari'a Hammamat al-Tunisiyya for more digital images. We also stopped at another roadside park near the royal palace that currently under construction. Built elements were largely constructed of wood and local rock material. The site also contained a soccer field.

### Second meeting with Dr. Al-Moghrabi

We reconvened at the ASEZA office. Dr. Al-Moghrabi provided us with lists of plants used in `Aqaba. He suggested that the garden should also include a demonstration of hardscape such as paths and seating areas and other built elements. We asked about the subject of vandalism in `Aqaba, as stripping of plants appears to be a regular habit. Dr. al-Moghrabi said that at the linear park many plants did have to be replanted due to vandalism. However, the use of security personnel and replanting has curbed this behavior. The practice no longer seems to be an issue at the linear park. Dr. Al-Moghrabi does not feel that the park – either Hammamat al-Tunisiyya or the proposed demonstration garden – should be enclosed. Because it is a public open space, it should be very welcoming. As design elements, however, walls may be incorporated to define spaces within the site. Use of the park after hours should be anticipated since night activity in `Aqaba is significant. Furthermore, youth-related activities should be considered in the design due to the significant high number of younger individuals in the `Aqaba (and Jordan in general) population. In the context of a discussion of using olive trees as ornamentals it emerged that plants which traditionally yield crops are expected to do so, and are considered disappointing if they are used only for aesthetic purposes. Due to the economy people expect plants to yield food products. It was suggested to avoid plants which are tempting to vandalism.

Opportunities exist to include an edible garden, a native garden, and an exotic low-water-use garden. Essential elements throughout the proposed design should include seating, shade, lighting, walkways, native plant species, examples of windscreens, buffers, aromatic plants, the relationship with the coral reef, interpretive information and a restroom facility. It is possible that efforts could be coordinated with whatever plans exist to interpret the antiquities site and anticipate and equip it for tourism – e.g., plans for a restroom facility. An outdoor classroom or large group gathering area is also possible. Play equipment has been observed to be very successful and might be incorporated. The design will be limited to the western side of the excavation site and plant availability will be investigated. It was decided that the garden would no longer be referred to as a "cactus garden," but rather will be called the **"Water Friendly Garden."** The name distinguishes the overriding goal of the garden and is welcoming in nature. A potential icon for the garden will be the native Sidra tree. It is an appropriate icon in that it is a symbol that the local population will identify with (as with the saguaro in Arizona).

Residential walk to identify plants: walked residential neighborhood adjacent to demonstration site to observe and record the prevailing plant palette. Frequently occurring species included: olive, fig, jasmine, date palm, and flame tree. Unidentified plants are currently being investigated.

Dinner at Movenpick with team

---

### **Thursday, October 23**

#### **Travel to `Amman, meeting with Dr. Tamimi and Robert Freitas, and collection of background information**

Arrived in Amman, taxi to ACOR from Marka (one hour). Dr. Livingston met with Dr. Tamimi and Robert Freitas in the afternoon. Dr. Addison and Ms. Vitkay visited al-Aydi; discussed with Ahmad al-Azazme (a local historian) some background concerning the `Amariin/ Huweitat/ Bani Sakhr tribal histories (these are the tribes/ clans associated with the area where the Wadi Musa project is taking place and involved in the farm cooperative). Dr. Addison and Ms. Vitkay left for Mahis, and later met with Bashar ash-Shobaki (al-Ghunmiyyin) of Ministry of Agriculture, collecting background information relating to the Shobak/ Wadi Musa area tribes.

---

### **Friday, 24 October**

#### **Team report work**

Worked on team report and conducted library research RE: Wadi Musa; telephone discussion with Bashar filling in details on al-`Amariin/ Layathne/ Bidoul/ Huweitat tribal relations.

Visited with Kurt Zamore, Asst. Director of ACOR and discussed plans for archaeological remains at the Aila site (Roman `Aqaba), which is a factor in the demonstration garden site plan and implementation. The site includes the remains of what may be the oldest known church. Structures are mudbrick (IIIrd century?), and thus even more delicate than most archaeological remains. The site has been excavated by Professor S. Thomas Parker of UNC State University.

Kurt does not think Parker is returning this summer, and believes that he (Tom) is finished excavating. Kurt's recommendation is to contact Parker directly to discuss his plans for the archaeological site. We also discussed the (Islamic) Ayla site, which is contiguous to the Roman `Aqaba site, and probably lies under the west half of the plot where the demonstration garden site is located. ACOR is interested in obtaining our plant list, and some recommendation of shallow-rooted plants to use on the Ayla site.

In this context we also discussed the disproportionate cost of interpretive signs on sites -- even construction costs pale by comparison. This is interesting in regard to both the `Aqaba and Wadi Musa project sites, but also suggests why there is such a conspicuous lack of interpretive materials on sites all over Jordan.

Searched (unsuccessfully) for maps in ACOR library -- the small-scale maps for both the `Aqaba and Petra grids were missing from the map files. Conducted telephone conversations with several former colleagues from the cultural heritage industry, trying to verify contact numbers for architects Sahel al-Hiyari and Rami Daher.

---

**Saturday, 25 October**

### **Team report**

Assembled notes for and worked on report; Drs. Livingston and Addison made phone calls to BRDP, the Department of Lands & Surveys, Department of Mines and Petroleum Research (regarding maps), and others of Dr. Livingston's contacts at CSBE (Center for the Study of the Built Environment). Pertinent maps were copied and we continued the search for architects for the Wadi Musa project.

## **Section II: Water Friendly Garden**

Preliminary Program, Site Analysis, Design Implications, and Timeline

Submitted by: Ms. Karen Vitkay -- MLA Candidate

Reviewed by : Dr. Margaret Livingston

School of Landscape Architecture, University of Arizona

### *Program*

The goal of the Water Friendly Garden in `Aqaba, Jordan, is to acquaint its users with the concept of aesthetically pleasing, low-water-use planting designs and elements

appropriate to the region of `Aqaba. Significant water availability issues, coral reefs, and cultural orientation necessitate the thoughtful use of reclaimed water in Jordan.

### *Site Analysis*

The location of the Water Friendly Garden is exceptional. It is located in the Jordan Rift Valley on the coast of the Gulf of `Aqaba. `Aqaba is a major national and international tourist destination, as well as Jordan's only port city and the site of an innovative economic project called the `Aqaba Special Economic Zone, all aspects of which are essential to the economy of Jordan. Anticipated users of the proposed demonstration project are both local and national Jordanians as well as the international community.

`Aqaba receives approximately 2.5 inches of rainfall per year in the winter season. Summers are exceptionally warm, whereas, winters are mild. Shade elements will be essential to the design. The proposed demonstration site is at an important conjunction of the waterfront, new resort development, and residential development. Adjacent land usages include both residential and commercial. The commercial businesses serve both the local and tourist community including small shops and restaurants as well as high-end hotels.

The site includes a significant archeological excavation from the Roman-Byzantine period on its eastern boundary. The southeastern corner includes a wastewater pumping station. Although the pumping station is currently separated from the proposed garden site by a wall, it has the potential to be incorporated into the design. A wide sidewalk with street trees and bus-stops lines the remaining three sides. The surrounding streets carry a significant amount of traffic, but the pedestrian crossings appear to function satisfactorily. The soil on the proposed site is predominantly sand and methods of water retention need to be considered. Existing trees, including the above-mentioned palmetto islands, are viewed as assets and efforts should be made to retain them. Site topography is apparent with the highest points being near the site edges and the low point being the archeological excavation.

### *Design Implications*

The primary goal of the Water Friendly Garden will be to inform users of the site about the conservation of water. This will be achieved through the utilization of low-water-use plants, reclaimed water, passive water harvesting, and clear interpretive information. Primary functional areas will include an entry and orientation area, a series of distinct garden or design element displays, the incorporated pumping station, small activity nodes and a children's area. Essential elements include:

- shade (trees, built structures)
- seating (local materials)
- lights (night usage)
- native plants
- low water use plants
- walkways (local materials)
- design examples (i.e. buffers, screens, aromatics)
- reference to the archeological site

- interpretive information (i.e. signage, kiosks, brochures)

Additional possible elements include:

- large group gathering/orientation area
- picnic area
- children's play/education area
- medicinal plant display
- regional environmental information
- display of built elements such as walkways and patios
- examples of irrigation components
- explanation of reclaimed water use (later phase)
- incorporation of pumping station and lecture room
- drinking fountain

Again, as mentioned in the meeting with Muhandis Shahbaz, the garden should not be too complex, but rather should achieve its beauty through a sophisticated design. Local materials should be used whenever possible in both the built elements and plant choices. There appears to be plenty of rock available in the area for use in built elements. Wood construction is commonly used in park settings and is likely to persist due to the mild climate. Several native plant species were found to thrive in the urban setting. Design elements should appeal to both the local community and the larger international audience.

### *Design Team*

The final design of the Water Friendly Garden will develop through the collaborative exchange of ideas. The design team will include (at least): Dr. Livingston (Assistant Professor, University of Arizona), Ms. Vitkay (MLA candidate, University of Arizona), Khaled Rajab Abu Aisheh (ASEZA), and Muhandis. Taysir (ASEZA). Dr. Al-Moghrabi (ASEZA) and Dr. Addison (MLA candidate, University of Arizona) will also serve as consultants.

## *PROPOSED TIMELINE*

- Dec. 31, 2003:** Preliminary conceptual Master Plan(s) for ASEZA review.
- March 15, 2004:** Second draft of Master Plan for ASEZA review.
- June 2004:** Final Master Plan, including details about built elements (pathways, patios, ramadas & seating).
- Summer 2004:** Final details for planting design (plant species, size, and number).
- August 2004:** First draft of Interpretive Elements.
- Fall 2004:** Collaborative development of Interpretive Elements.
- Dec. 31, 2004** Final version of Interpretive Elements (signage, kiosk, brochures).

*Note: This is a proposed timeline and subject to review.*

### **Section III:**

## **Wadi Musa Wastewater Treatment Plant: Visitors Center & Demonstration Site**

Preliminary Program, Site Analysis, Design Implications, and Timeline

Submitted by: Dr. Erin Addison

Reviewed by: Dr. Margaret Livingston

School of Landscape Architecture, University of Arizona

The following is a preliminary discussion of possibilities for the development of an interpretive landscape design at the Wadi Musa Wastewater Treatment Plant. These suggestions are based on a meeting with Muhandis Mohammad Shahbaz of Badia Research Development Project (20 October 2003) a brief site visit later the same day, and a meeting with Muhandis Shhadeh Abu Hdaib, Director General of Petra Regional Authority (21 October 2003).

### **Project description**

The task as we understand it is to develop a landscape design for an interpretive center (the proposed "visitors center") and demonstration site that will elucidate the complex matrix of historical, natural, environmental, technical and cultural factors which bear on its success, as well as serve the public at several levels as an educational site. Users are perceived to be locals as well as Jordanian and foreign tourists. Muhandis Shahbaz expressed a desire that the center also be a venue for actual, ongoing discussion and forums amongst stakeholders and others. Both Muhandis Shahbaz and Muhandis Abu Hdaib expressed an interest in developing areas for recreational use – e.g., picnicking – on the site, as well. In terms of design, Muhandis Abu Hdaib expressed a desire to maintain an historical aesthetic which would "complete the Petra experience."

### **Site discussion**

It is beyond the scope of the present time-frame to offer a genuine site analysis, but it seems worthwhile to summarize the salient opportunities and constraints present.

#### ***Opportunities***

- The outstanding feature of the site is the spectacular physical beauty of its context. With the dramatic views that surround the site for 360 degrees, there is little need for intense planting, high screens, (e.g. walls or fences), etc.



**Figure 7: one view of the skyline behind the site**

- The background research already conducted by Mohamed Fayez Tarawneh for BRDP is invaluable in terms of project development, stakeholder investment and site interpretation.
- There appears to be strong community support for the project (at least partly because of the BRDP's social/ cultural groundwork). It also appears that institutional support (agencies, Ministries) is strong.
- The strong tradition of water catchment and conservation in the Wadi Musa and Wadi `Araba areas affords a sense of historical continuity and a strong interpretive theme.

#### ***Constraints***

- Our understanding is that, at present, the project consists of parcels totaling 1069 dunums, of which 690 are arable and 300 presently irrigated by 700cm<sup>3</sup>/day supply of reclaimed water. At present only those 700cm<sup>3</sup>/day can be guaranteed, although at times the rate is higher. The supply of water is directly affected by the amount of tourism present in the Wadi Musa area.





**Figure 8: drip irrigation (left) and demonstration crop (right)**

- We have heard varying estimates of the actual salinity of the reclaimed water. This is a figure that will have to be established securely before we proceed with planting design, and in order to ensure the long term viability of the project itself (due to the tendency for irrigated soils in arid climates to build up saline deposit).
- There appear to be time constraints for the design and implementation of the project.
- Some have observed that the site is somewhat remote and the road somewhat challenging. It is this author's opinion that this factor is not a major constraint – people who visit Petra (whether local or foreign) have already committed themselves to long drives over sometimes narrow and winding roads. People who live here will not perceive this road as a challenge. Given the sparse vegetation of the surrounding area, a site affording significant cultural interpretation, spectacular views *and* comfortable, shaded recreational venues would be an asset to the greater Petra area. It would be important, however, to afford proper signs and perhaps a mini-bus stop to the site.



**Figure 9: entrance road**

### **Preliminary design concept**

It must be stressed that the following ideas are very preliminary and precede proper site research and analysis. They are almost entirely flexible pending feedback from potential users and the various agencies involved. The purpose of summarizing these thoughts at this point is to begin what should develop into several cycles of design generation, feedback, and revision.

### **Three "zones"**

Development of the site seems to fall quite naturally into three zones:

- (1) the interpretive center
- (2) the demonstration plots
- (3) the periphery/ surrounding landscape.

This immediately suggests an approach to phasing in the design over time.

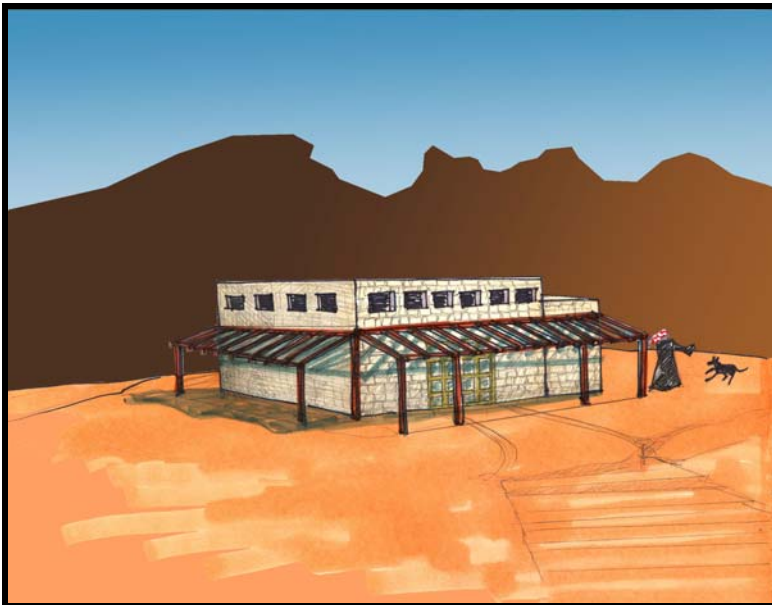
### ***Interpretive Center***

The first priority should be the interpretive center. Its proposed location is ideal, with an overlook view of the site. As a team we immediately agreed that the structure will need very little in the way of planting around it. The rock on which it sits is very grand and



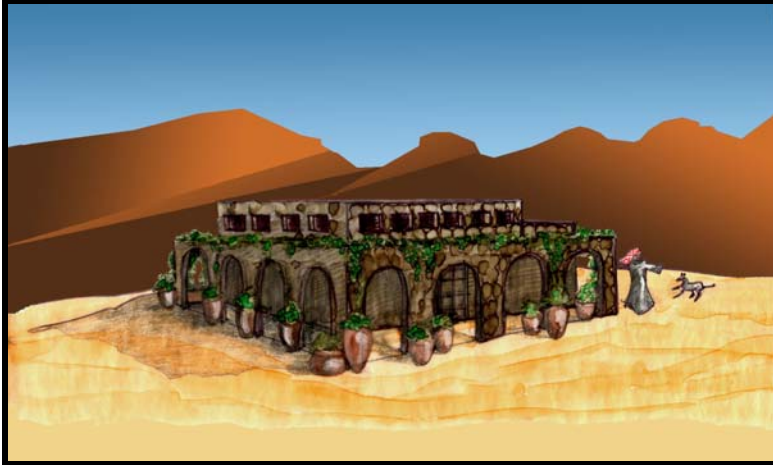
**Figure 10: the existing structure on location of proposed interpretive center**

it is important that visitors sense the starkness of the basic soil context. The interpretive center should direct the visitor's view to the plant materials in the demonstration plots. That having been said, it will be important to incorporate shade – perhaps in the form of



**Figure 11: stone structure with arbor**

arbors or arcades – around the structure, so that visitors can view the surroundings comfortably from the vantage point of the structure. Depending on the design of the structure, a small patio surround might be appropriate, perhaps with container plantings.



**Figure 12: stone structure, arcade, container plantings**

There are, practically speaking, two areas of design concern at the interpretive center – (1) the exterior of the building and its shade apparatus, patio, etc., and (2) the interpretive material and meeting rooms on the interior. Construction of the building itself (exterior) immediately, while the more time-intensive work on the research and design of the interpretive material (interior) proceeds apace.

### ***Demonstration plots***

At this point what seems appropriate would be a "trail" or pathway which would lead the visitor through the plots. Along the pathway would occur "nodes" where interpretive material would be provided under shaded cover.

For example, a stone-cobbled pathway might lead the viewer along the perimeter of the fields, where he would see symbols directing his attention to plant materials, irrigation technology, etc. At the intersection of two plots the viewer would reach a vine-covered arbor where he could read interpretive text regarding the indicated matters of interest along the perimeter (plants, irrigation, etc.).

At this point the visitor might be offered the choice to continue along the perimeter, viewing the next crop and the next "node," or to turn down a pathway between the two crops to encounter more a more detailed discussion of the material on the first plot.

So far, with the interpretive center, the design serves three levels of interest:

- a general interest in the matrix of historical, natural, environmental, technical and cultural factors at work at the site (interpretive center);
- a keener interest in the crops and the project itself (perimeter path/nodes);
- a profound interest in the details of the plantings, irrigation, soils, etc. (intersecting pathways/ detail nodes).

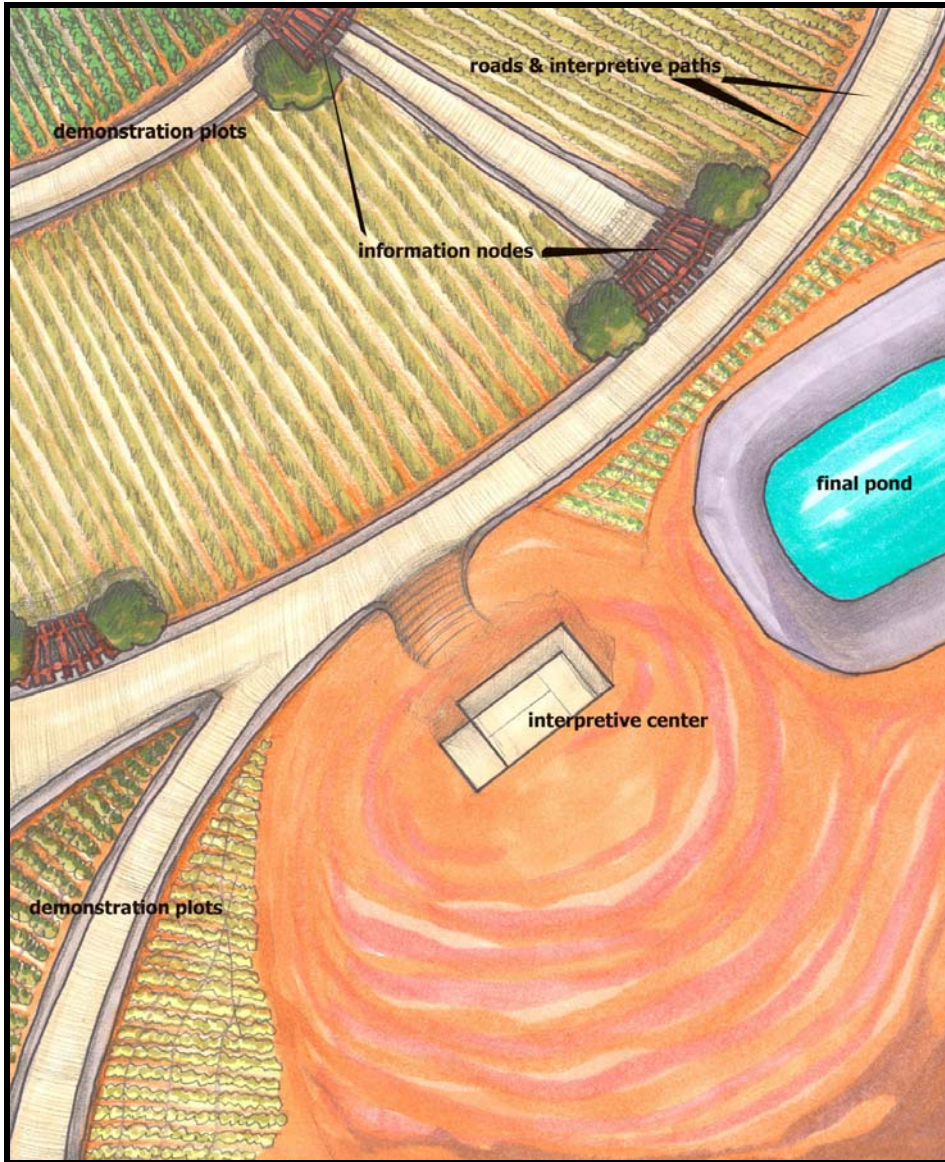


Figure 13: conceptual example of plots/paths/nodes<sup>2</sup>

***Periphery/ surrounding landscape***

At selected areas around the periphery of the demonstration site itself, it would seem appropriate to place clusters of trees, shade structures, and picnic facilities (e.g. a table and trash receptacle) to serve the proposed recreational function of the site. These areas should ideally frame chosen views inward – toward the demonstration site, and outward – toward the spectacular natural landscape. Planting materials should be carefully chosen not only to demonstrate the use of treated wastewater, but to encourage water conservation habits in general.

<sup>2</sup> It is important to note that Figure 12 is intended only to give a sense of the concept – it was drawn based on impressions from one brief site visit, and with out benefit of topographical maps, etc.

## *PROPOSED TIMELINE*

- Dec. 31, 2003:** draft 1 of landscape design masterplan
- Jan. 1-15, 2004:** presentation & revisions of landscape design masterplan by Addison in Jordan
- March 15, 2004:** draft 2 of landscape design masterplan<sup>3</sup>  
first details of pathways & nodes
- March 31, 2004:** presentation and revisions of draft 2 by Addison in Jordan (see n.3)
- June 1, 2004:**<sup>4</sup> draft 3 of landscape design masterplan  
second drafts of pathways/ nodes  
first draft of recreational clusters
- June 15, 2004:** final revisions of landscape design masterplan  
revisions of detail drafts
- June 30, 2004:** final draft of landscape design masterplan
- July 31, 2004:** final drafts of pathways/ nodes and recreational clusters
- August 1, 2004:** first draft of interpretive materials (text)  
first draft of interpretive materials (design)
- Fall, 2004:** continuous discussion, feedback and revision of interpretive text
- Oct. 31, 2004:** presentation and revision of interpretive design
- Dec. 31, 2004:** final draft of interpretive materials

---

<sup>3</sup> this is an approximate date, contingent on the spring break period at the University of Arizona. This timeline is provisional, and requires further discussion with supervising professor Dr. Margaret Livingston, as well as the other parties concerned.

<sup>4</sup> It is projected that Addison will be resident in Jordan after June 1 and throughout the completion of the project.