Ain al-Sira Site Analysis

Ehsan Abushadi

Follow this and additional works at: https://fount.aucegypt.edu/studenttxt

Part of the Architectural Engineering Commons

Recommended Citation
https://fount.aucegypt.edu/studenttxt/52

This Other is brought to you for free and open access by AUC Knowledge Fountain. It has been accepted for inclusion in Papers, Posters, and Presentations by an authorized administrator of AUC Knowledge Fountain. For more information, please contact fountadmin@aucegypt.edu.
Site Analysis of Ain al-Sira, for the design of a sustainable school for AENG 453. The site analysis looks at the history of the area, the topography, the water bodies and the situation today.
Contents
Table of Figures ................................................................. 3
Ain al-Sira General Overview .............................................. 5
North Fustat and the Fustat Plateau ..................................... 5
Ain al-Sira, the Lake ........................................................... 5
Babylon (Qasr al-Sham) ....................................................... 11
Fustat, the city ................................................................. 11
The Mosque of Amr .......................................................... 11
The Houses of Fustat ......................................................... 12
The Area Today ............................................................... 14
Project Developments ....................................................... 16
Demographics .................................................................. 17
Ain al-Sira physical changes since the start of the new millennia 18
The Plots ....................................................................... 24
Plot 1 ........................................................................... 24
  Physical Response ......................................................... 25
  Environmental Aspects .................................................... 26
  Social Aspects .............................................................. 26
Plot #2 ........................................................................ 27
  Physical Response ......................................................... 27
  Environmental Aspects .................................................... 27
Social Aspects .................................................................. 27
Plot #3 ........................................................................ 28
  Physical Response ......................................................... 28
  Environmental Aspects .................................................... 28
Social Aspects .................................................................. 28
Plot #4 ........................................................................ 29
  Physical Response ......................................................... 29
  Environmental Aspects .................................................... 30
Social Aspects .................................................................. 30
Plot #5 ........................................................................ 30
  Physical Response ......................................................... 30
  Environmental Response .................................................. 32
Social Aspects .................................................................. 32
Plot #6 ........................................................................ 32
  Physical Response ......................................................... 33
  Environmental Response .................................................. 33
Social Aspects .................................................................. 33
Site Evaluation .................................................................. 34
References ..................................................................... 35
Appendix ....................................................................... 36
Table of Figures

Figure 1 Fragment of Plan général de la Ville du Kaire et des Environns, Baur & Sautz (1846) ........................................... 6
Figure 2 Fragment of Plan général de la Ville du Kaire et des Environns, Baur & Sautz (1846) ........................................... 6
Figure 3 Fragment of Eastern Environs of Cairo, Wagner & Debes (1885) ........................................... 6
Figure 4 Fragment of Environns of Cairo, Stanford’s Geographical Establishment (1888) ........................................... 7
Figure 5 Fragment of Cook’s Map of the Environs of Cairo, W. & A.K. Johnston Limited (1897) ........................................... 8
Figure 6 Fragment of Map of Environns of Cairo, Wagner & Debes (1898) ........................................... 8
Figure 7 Fragment of Environns of Cairo, Wagner & Debes (1908) ........................................... 9
Figure 8 Fragment of Environns of Cairo, Wagner & Debes (1914) ........................................... 9
Figure 9 Fragment of Historic map of Cairo, Egypt, Niccolosoff (c. 1933) ........................................... 10
Figure 10 Fragment of Cairo No. 2, 1:10,000, Edition 4-AMS, Series PP71, U.S. Army Map Service (1958) ........................................... 10
Figure 11 Axonometric reconstruction of the fort of Babylon by Nicholas Warner, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 11
Figure 12 Monuments in the Babylon enclosure of Old Cairo, by Nicholas Warner, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 11
Figure 13 Reconstruction of the plan of the fort of Babylon by Nicholas Warner and Peter Shaheen, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 11
Figure 14 Ethnic Groups and Multi-tribal Quarters, from Al-Fustat, its foundation and early urban development, Kubiak ........................................... 12
Figure 15 Fustat street network excavated by Ali Bahgat, from Al-Fustat, its foundation and early urban development, Kubiak ........................................... 12
Figure 16 House No. I, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 12
Figure 17 House No. II, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 12
Figure 18 House No. III, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 13
Figure 19 House No. V, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 13
Figure 20 House No. VI, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 13
Figure 21 Different house types, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 13
Figure 22 House No. VIII, by Aly Bahgat and Gabriel, in The Muslim Architecture of Egypt, Creswell ........................................... 13
Figure 23 Google Earth image of area captured June 24, 2012 ........................................... 14
Figure 24 Aerial view of the mosque of Amr, cemetery and informal settlement, by Rajan Patel, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 14
Figure 25 Aerial view of the fortress of Babylon, by Rajan Patel, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 14
Figure 26 Fragment of the “Historical Map”, showing urban development of the area up until c.1888, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning ........................................... 15
Figure 27 Fragment of the “Average Building Heights”, showing urban development of the area up until c.1888, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning ........................................... 15
Figure 28 Fragment from “Land Use” c.1888, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning ........................................... 15
Figure 29 “Fustat Project Location”, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning ........................................... 15
Figure 30 Cross-section C-D, marked on Figure 28, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning ........................................... 15
Figure 31 “Recommended for Development”, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning ........................................... 16
Figure 32 Program arrangement, from Al-Fustat: Revitalizing the Old Capital, Ain Shams & Clemson Universities ........................................... 16
Figure 33 Redesign proposals, from Al-Fustat: Revitalizing the Old Capital, Ain Shams & Clemson Universities ........................................... 16
Figure 34 Population Density, From Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO ........................................... 17
Figure 35 Unemployment, From Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO ........................................... 17
Figure 36 Literacy, From Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO ........................................... 17
Figure 37 Google Earth image of area captured October 7, 2000 ........................................... 18
Figure 38 Google Earth image of area captured May 24, 2003 ........................................... 18
Figure 39 Google Earth image of area captured May 29, 2006 ........................................... 19
Figure 40 Google Earth image of area captured July 2, 2007 ........................................... 19
Figure 41 Google Earth image of area captured July 24, 2009 ........................................... 20
Figure 42 Google Earth image of area captured November 5, 2009 ........................................... 20
Figure 43 Google Earth image of area captured November 5, 2010 ........................................... 21
Figure 44 Google Earth image of area captured June 12, 2011 ........................................... 21
Figure 45 Google Earth image of area captured June 24, 2012 ........................................... 22
Figure 46 Fragment of “Relief contour lines” c.1888, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning ........................................... 22
Figure 47 Relief-cross section east-west c.1888, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning ........................................... 23
Figure 48 Plan of shafts and their network, used for dewatering during the conservation project, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen ........................................... 23
Figure 49 Plot 1, between Cairoland and the Qarafa, overlooking the Ain al-Sira lake. ........................................... 24
Figure 50 Plot #1 & #2 surroundings ........................................... 24
Figure 51 Plot #1 & #2 urban fabric & solid-void distribution analysis ........................................... 25
Figure 52 Building inside Cairoland’s empty sand plot, with architectural influence from the 60s ........................................... 25
Figure 53 Back gate of land adjacent to Cairoland ........................................... 25
Figure 54 View of Fustat garden ........................................... 25
Figure 55 View of Ain al-Sira Lake ........................................... 25
Figure 56 Sketch of the informal settlement on the banks of the lake ........................................... 26
Figure 57 Sketch of lake showing the Qarafa skyline in the background with the imposing alien middle-income development on the right ........................................... 26
Figure 58 Map of Old Cairo District; Source - خرائط محافظة القاهرة - خرائط محافظة القاهرة ........................................... 26
Figure 59 Map of Khalifa & Mokattam District; Source - خرائط محافظة القاهرة ........................................... 26
Figure 60 Plot #2, Cairoland ........................................... 27
Figure 61 South of Ain al-Sira – East of Civilization Museum ........................................... 28
Figure 62 Plot #3 surroundings ........................................... 28
Figure 63 Plot #3 urban fabric & solid-void distribution analysis ........................................... 28
Figure 64 Civilizations museum ........................................... 29
Figure 65 Around Fustat excavation site ........................................... 29
Figure 66 Plot #4 surroundings ........................................... 29
Site Analysis

The area of Ain al-Sira was chosen as the site for the model Egyptian school despite it being a unique area. The philosophy behind this is that the model school should be designed in such a way that it would not become the blueprint for all schools but rather it becoming a guide on how to design schools according to the context of each area. In other words it would be a way of dealing with parameters as these vary from area to area.

The plots provided for the project at Ain al-Sira each have their own advantages and disadvantages, even though one will be selected the others will be used as aid on how to ensure that the school is designed as a methodology rather than a product by comparing how certain design elements would or wouldn't be different if it had been placed on one of the other sites. For this purpose, more than one plot will be thoroughly analysed.

Ain al-Sira General Overview

North Fustat and the Fustat Plateau

The whole area encompassed by what is today Aqueduct (Magr el ‘Ayoun) and Old Cairo road (Masr el Qadima) is referred to as North Fustat while the area from Old Cairo road to the Ring Road is the Fustat plateau. In the past this whole area had a rough topography due to natural erosion and quarrying (Kubaik, 1987). Figure 2 shows some of the topographical arteries which were used as roads. However, the topography shown in Figure 2 would not have been anything like the original topography of early medieval times.

The topography of the region has been constantly changing. Since the late Middle Ages rubble and refuse has been amassing in the valleys and valley sides, as well as raising the height of hills (Kubaik, 1987). Much of the land was levelled off post-1950s to build low income housing. With these modern urban developments many of the old roads in the valleys that connected Fustat to Islamic Cairo have disappeared and the ones that remain are not clear.

Ain al-Sira, the Lake

Ain al-Sira is categorised as a well (EL-Jakee, Moussa, Mohamed, & Mohamed, 2009), it’s water rich in minerals and sulphates (Ahmed, 2013). People would bathe in the lake for its healing properties. During Nasser’s rule the lake came to be mixed with sewage water (Ahmed, 2013), the situation has not improved since then as the existing high water table contains sewage. Levels of coliforms, a bacteria present in fecal matter used as an indicator for its source, found at Ain al-Sira were as high as the levels found in New Cairo’s untreated sewage (EL-Jakee et al., 2009).

The lake of Ain al-Sira was formed after the earth had ruptured during an earthquake in 1926, causing underground water to surface, it had spanned across 30 acres (Ahmed, 2013). However, observing maps of Cairo from 1846 to 1958, Figure 1 to Figure 10, it becomes evident that Ahmed’s (2013) dating of the formation of Ain al-Sira is not completely correct. The first appearance, as far as this research can demonstrate, of any water bodies in the area dates to before 1898, Figure 6. It would not be accurate to say it was formed between 1897 and 1898 because it cannot be confirmed that the 1897 map was drawn that year, as the date it has is the date it was published. If we are to assume that Ahmed (2013) is correct and Ain al-Sira was formed as a result of an earthquake, then it could have been formed as a result of the July 17, 1887 earthquake, which caused some damage in Fustat (Ambraseys, Melville & Adams, 1994). However, this would not explain why it was not drawn in the 1897 map, ten years later. This suggests that maybe Ain al-Sira was formed over a series of earthquakes each contributing to its formation. In the period between 1898 and 1887 there were two minor earthquakes. The first originated in Lower Egypt, took place December 7, 1895, shocks were felt in Cairo but no damage was reported. The second originated in the Hellenic Arc, took place on June 29, 1896, Cairo felt a slight earthquake but again no damage was reported. Between 1856 and 1887 there had been 7 moderately violent earthquakes and shocks felt by Cairo, one caused extensive damages, half of them caused moderate damage and the other half caused no damage. (Ambraseys, Melville & Adams, 1994)

Despite this information, Ahmed (2013) was not completely incorrect when dating Ain al-Sira to 1926. Comparing the 1908 Environs of Cairo to the 1914 Environs of Cairo 1:75,000, Figure 7 and Figure 8 respectively, both by Wagner & Debes, it is noticeable that the water bodies fluctuated in water content where five widely spaced water bodies in the 1908 map were reduced, in the 1914 map, to one water body tiny in comparison to what had existed. The lakes later resurface as shown in Nicohosoff’s1933 map, Figure 9. On June 26, 1926, there was a large earthquake originating in the Hellenic Arc which caused damage in poorer areas of Cairo as well as causing a new hot spring in Helwan near its other existing thermal springs (Ambraseys, Melville & Adams, 1994). There are two possibilities for the great reduction in water of the lakes at Ain al-Sira:

1. The source of the water could have been obstructed by any of the three earthquakes that occurred between 1906 and 1918 that were felt in Cairo, causing the lakes to dry out. The 1926 earthquake could have unblocked the source allowing for the lake to form again.
2. Overuse of the lake waters could have contributed to drying out as there was a greater output than input.
Figure 1 Fragment of Plan général de la Ville du Kaire et des Environs, Baur & Szultz (1846)

Figure 2 Fragment of Plan Du Kaire Ancien, Erhand (1878)
Figure 3 Fragment of Eastern Environs of Cairo, Wagner & Debes (1885)

Figure 4 Fragment of The Environs of Cairo, Stanford's Geographical Establishment (1888)
Figure 5: Fragment of Cook's Map of the Environs of Cairo, W. & A.K. Johnston Limited (1897)

Figure 6: Fragment of Map of the Environs of Cairo, Wagner & Debes (1898)
Figure 7 Fragment of Environos of Cairo, Wagner & Debes (1908)

Figure 8 Fragment of Environos of Cairo 1:75.000, Wagner & Debes (1914)
Figure 9 Fragment of Historic map of Cairo, Egypt, Nicohosoff (c. 1933)

Figure 10 Fragment of Cairo No. 2, 1:10,000, Edition 4-AMS, Series P972, U.S. Army Map Service (1958)
Babylon (Qasr al-Sham)
Babylon was either a Byzantine fortress (Creswell, 1979) or a Roman fortress (Butler, 1914). If Butler’s account is correct, the fortress would have originally been founded by Nebuchadnezzar, king of Medes and Persia, hence the name Babylon, and later built into a fortress by the Roman Emperor Trajan. Trajan also built the canal of Trajan, sometimes called Amnis Traianus, which passing through the fort’s gates connected the Nile to the Red Sea (Butler, 1914). See

The Babylon fortress hosts the old synagogues, Coptic and Orthodox churches of Cairo as can be seen in Figure 12.

Originally the fort was located on the river edge but due to the changing course of the Nile, change caused by soil erosion and land formation due to the floods, it is now located further inland.

Fustat, the city
Amr ibn al-‘As captured Babylon after it surrendered following a seven month siege on April AD 641, he then went on to capture Alexandria. Upon his return from Alexandria to Babylon, he founded his Fustat as his capital – misr, meaning capital - on the edge of Babylon. He first built his house and was later commissioned by the Khalif to build a congregational mosque which became known as the mosque of Amr ibn al-‘As. (Creswell, 1979)

Originally a camp city, since those were the living arrangements of the moving army, it maintained the military structure while becoming a permanent camp to make it easy to control and mobilise, as well as maintaining the tribes together to integrate into a community. This arrangement resulted in a unique urban development pattern. The tribes formed their own clusters with the land between tribes being no-man’s land, see Figure 14. The street networks would not have only been affected by the tent arrangement, but also by the diverse space and irregular land. There is no specific evidence that the camp city consisted of tents like Bedouin camps and early Arab army housing however, it is plausible. Eventually, the camp had mud and reed huts and then houses built. Based on the population, the city would have measure 5-6 x 1-2 km. However, some areas of the city fell into disuse due to their irregular shapes, growing social-ethnic differences caused by the increasing wealth of the upper class that wanted larger houses, and quarters’ limits. (Kubiak, 1987)

Al-Fustat seized to be the capital of Egypt when in AD 750, the Abbasids took over Egypt.

The areas of Fustat that were least affected by modern planning is the one east and north-east of the mosque of Amr ibn ‘As (Kubiak, 1987), despite the areas of quarrying that took place in its midst over the years, it could present a good reference on how the city developed while maintaining its identity. One could then forecast how it would have developed further if it were still fully inhabited, which is not the case.

The Mosque of Amr
Most historians agree that it was built following the fashion of the mosque at the Prophet’s house, made of palm columns and tie-beams. It only measures 29 x 17.5 m. With low roofs, lighting was provided by the six doors to the mosque that always remained open. The mosque was located 4 m away from the house of Amr ibn al-‘As. The mosque was not only used for prayer but also for official announcements and public ceremonies. Other prayer places or smaller mosques built by each tribe in their neighbourhood were also used for political or municipal meeting places for tribal affairs. The mosque underwent many expansions and redecorations. (Creswell, 1979)
The Houses of Fustat

Since the Arab army was unskilled in construction they hired the local labor to build their houses. As a result, the Fustat houses have a clear Coptic influence (Kubaiq, 1987).

Materials used in construction according to Kubaiq (1987):

- Mud bricks
- Mud mortar
- Red burned bricks
- Lime mortar
- Gypsum
- Stone
- Palm trees

Cesspools were dug or cut into the bedrock to collect waste from latrines under houses, although pipes were found at Fustat, their intention was not for central sewage (Kubaiq).

Examples of the Fustat Houses
Figure 18 House No. III, by AlyBahgat and Gabriel, in *The Muslim Architecture of Egypt*, Creswell

Figure 19 House No. V, by AlyBahgat and Gabriel, in *The Muslim Architecture of Egypt*, Creswell

Figure 20 House No. VI, by AlyBahgat and Gabriel, in *The Muslim Architecture of Egypt*, Creswell

Figure 21 Different house types, by AlyBahgat and Gabriel, in *The Muslim Architecture of Egypt*, Creswell

Figure 22 House No. VIII, by AlyBahgat and Gabriel, in *The Muslim Architecture of Egypt*, Creswell
The Area Today

Figure 23 Google Earth image of area captured June 24, 2012

Key:

A. Amr ibn al-'As Mosque
B. Aqueduct (Magr el 'Ayoun)
C. Café overlooking lake
D. Champion’s Club (Nady al-abtal)
E. City of the dead (al-Qarafa)
F. Civilizations Museum (incomplete)
G. Coptic Cairo
H. Coptic Cemetery
I. Coptic Museum & Mar Girgis – site of Babylon (Qasr al-Sham)
J. Egyptian Club (Nady al-Masry)
K. Fustat excavations
L. Fustat Garden (Hadiqat al-Fustat)
M. Fustat Traditional Crafts Center
N. General Authority for the Environment
O. Leather Tanners
P. Mar Girgis Metro Station
Q. Ministry of Culture for traditional arts
R. Ministry of Interior Security and Guard Offices
S. Potters
T. Souk Fustat (Fustat Market)
U. Youth Club (Nady al-shabab)

Figure 24 Aerial view of the mosque of Amr, cemetery and informal settlement, by Rajan Patel, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen

Figure 25 Aerial view of the fortress of Babylon, by Rajan Patel, from Babylon of Egypt: The archaeology of old Cairo and the origins of the city, Shaheen
Figure 26 Fragment of the “Historical Map”, showing urban development of the area up until c.1988, from implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning.

Figure 27 Fragment of the “Average Building Heights”, showing urban development of the area up until c.1988, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning.

Figure 28 Fragment from “Land Use” c.1988, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning.

Figure 29 “Fustat Project Location”, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning.

Figure 30 Cross-section C-D, marked on Figure 28, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning.
Kubiak (1987) mentions that a dump more than 10m thick and covering over ten hectares filled up many of the cavities and natural depressions of the topography, and obscuring many unexplored ruins. The date of his book coincides with the date of the map shown in Figure 28, it is then safe to assume that the dump he refers to is the one shown in Figure 28, which was later covered and converted into Fustat Garden, labeled ‘L’ in Figure 23. In a way the existence of the land fill helped preserve the ruins, quarries and topography underneath, because if it had not been a landfill it would have been flattened like the land it’s left. If anyone chooses to learn more about it, the garden and landfill underneath can always be excavated.

**Project Developments**

There have been many project redevelopments proposed for the area. Of the most recent ones, only one has been started although it only amounts to 5% of the total proposal, that shown in Figure 29, which due to its slow progress – that 5% being still under construction despite its proposal pre-1988 – it may be that the project will not be completed, particularly as it would mean displacing many people. Another proposal, submitted in 1988 is that shown in Figure 31, which has also not been implemented. The main issues with these two proposals are that they do not design for historic, urban or societal preservation; they are completely redesigning the fabrics of the area. In the same document as the mentioned proposals is also an intricate system of drainage for the whole area and plateau, which was also never implemented, and as an alternative to the large scale housing projects, a proposal which suggests half of the area between Salah Salem and the Ring Road into “Fustat Garden”.

---

Figure 31 “Recommended for Development”, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 2, General Organization for Physical Planning

A student proposal designed between Ain Shams and Clemson University students also offered two alternatives, which although they do take into consideration the importance of historic preservation, designing for an archeological park, they disregard the importance of preserving the historic urban fabric, Figure 32 & Figure 33.

Figure 32 Program arrangement, from Al-Fustat: Revitalizing the Old Capital, Ain Shams & Clemson Universities

Figure 33 Redesign proposals, from Al-Fustat: Revitalizing the Old Capital, Ain Shams & Clemson Universities
Demographics

Figure 34 Population Density, From Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO

Comparing the population density of Misr al-Qadima, 146.1 people/hectar, to the maximum and minimum, 574.4 & 66.0 people/hectar respectively, it can be said that Misr al-Qadima has medium-low population density, Figure 34. The area also has the highest unemployment rate in Historic Cairo, 8%, Figure 35. Its illiteracy, 29%, compared to the maximum and minimum, 34% and 13% respectively, it can be said that illiteracy is above average, Figure 36.

It is therefore important that the school be designed in such a manner that it would contribute to the employment of the district.

Figure 35 Unemployment, from Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO

Figure 36 Illiteracy, From Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, UNESCO
Ain al-Sira physical changes since the start of the new millennia

Figure 37 Google Earth image of area captured October 7, 2000

Figure 38 Google Earth image of area captured May 24, 2003
Figure 39 Google Earth image of area captured May 29, 2006

Figure 40 Google Earth image of area captured July 2, 2007
Figure 41 Google Earth image of area captured July 24, 2009

Figure 42 Google Earth image of area captured November 5, 2009
Figure 43: Google Earth image of area captured November 5, 2010.

Figure 44: Google Earth image of area captured June 12, 2011.
There has been a large change in the surface water masses of the area where some have dried out while others have grown. Looking at the first available Google image of the area dated 2000, Figure 37, seven congregations of surface water are visible. Comparing Figure 37 to Figure 39, captured 2006, we find that water areas B, C, D and F have greatly been reduced in surface area, whereas volume H was formed. The following year, Figure 40, volume D had become almost inexisten, volume E was no longer visible through the vegetation, volume H had dried up. By mid-2009, Figure 41, volume C has vanished, B had become a small fraction of what it once was, volume H had resurfaced. Half a year later, Figure 42, volume B had almost halved in surface area. In 2010, Figure 43, volume B became a tiny patch of water and contrary to most patterns in the area, volume G claimed the land between itself and the point where volume F was: about a fourth of volume G’s original surface area. By 2011, volume B had almost disappeared, volume D had grown slightly but with murky water, and volume H had deepened the area it reclaimed. The 2012 image, Figure 45, reveals a small patch of greenery, about one fifth of the 2000 greenery, represents the high water table that volumes B, C and D left.

The increase in surface area of volume G can be attributed to a rise in the water table caused by digging, both for archaeological and construction purposes (Ahmed, 2013). However, other causes for the rise in water level include higher Nile levels, seepage from Muqattam, irrigation, leaking water and sewage pipes, and well water extraction (Shaheen, 2010); since Ain al-Sira is on lower land, as can be seen from Figure 46 and Figure 47, this sewage water runs down to Ain al-Sira. It is an urban problem, not a district problem.

Although Figure 6 to Figure 10 show that the water bodies did fluctuate in water content of its own accord for natural reasons, indirect human activity also affected the water content. The bodies of water B, C, D, E were originally formed by an overall rise in the water table that was a result of the High Dam being built causing the land to swamp/flood due to seepage, as shown in Figure 28; prior to the dam the valley had been dry for most of the year (Kubiak, 1987). Since the year 2000 the general disappearance of surface water for volumes B, C, and D is most likely to have been a result of being buried under the land fill. Monitoring closely the Google images through the years it can be observed that there is a land mass that increases over the years in height and in reach, filling the land, and the water bodies. A sudden change is more obvious between the years 2006 and 2007, Figure 39 and Figure 40 respectively, where the land gained height and a ridge is obvious marking the height difference. This ridge can be observed spreading south-east, east and then north along the green valley, encompassing and finally burying volume C by mid-2009. One can see a similar development of increased ground level on the shores of volume G, except where it swamped part of the land.

Figure 46 Fragment of “Relief contour lines” c.1988, from Implementation of the homogeneous sector concept, homogeneous sector no. 1 Cairo Centre final report November 1988, vol. 1, General Organization for Physical Planning
However, the increase in landfill was not the only factor that affected the decrease in water in the region. Water body D was not engulfed by landfill yet it also experienced water reduction. This may be allocated to a USAID funded project that aimed to lower the groundwater level in old Cairo, particularly the area of Babylon to provide access to the flooded basements of many monuments (Shaheen, 2010). Between the late 1970s and 2000, the ground water in that area had risen by about 2 metres. Some twenty-two shafts for dewatering were built, when the project was ended the water rose again.
The Plots

Plot 1

Figure 49 Plot 1, between Cairoland and the Qarafa, overlooking the Ain al-Sira lake

Figure 50 Plot #1 & #2 surroundings
Physical Response

- 30 feddan
- Easily accessible by cars as it is next to main roads
- Location would target children from the informal settlement within the plot, children living in the Qarafa and children living in the north east area between the aqueduct and
- There already is a primary school opposite the Champion’s Club in the public housing area

- Plot has two fronts: overlooking lake, overlooking the Qarafa
- There’s a service road that leads to the back of Cairoland, ending at the back door – parking is currently used for buses and for driving classes
- There are a few buildings in the plot adjacent to Cairoland that are intact, clearly influenced by 60s architecture, Figure 52
- Plot opens up to the back of Fustat Garden – no fence, also has access to the Civilizations Museum’s back gate
- The Fustat garden is on higher land and can be seen from the plot
- Cairoland and Civilizations Museum are concrete structures, the informal settlement inside the plot are either stone, bughdally or brick structures
- Mosque in the informal settlement that is flooded by the lake
- The section of the Qarafa that can be seen are mostly brick tombs from the 60s onwards, only a few are older and in stone
- The bank of the lake closest to the bus parking was raised using debris – remnants of tiles and rocks are identifiable
- The informal settlement was fenced off from the rest of the plot
- The plot is generally empty of people except for the informal settlement
- Children not from the informal settlement would be required to cross main streets – dangerous
- There is a variety of urban textures to integrate which would give an interesting contextual building
- The topography was flatten, takes away from the character of the area
Environmental Aspects
- Prevailing wind is north
- Little precipitation
- Passive cooling due to the large body of water
- Reeds grow on the banks and in the middle of the lake in clusters
- Reeds are inhabited, probably by rodents, cats, dogs and birds
- Building techniques of the cemetery consist of wall bearing stone or brick masonry
- Building techniques of the informal area is predominantly Baghdadly as it is an old settlement, and reinforced concrete & baked red brick
- Timber roofs in some informal houses
- Lake is polluted by sewage
- Air is polluted by the ash and smoke of burned garbage
- Some reeds are burned by children to clear the path to the lake for them to swim
- No seepage

Social Aspects
- In popular areas territoriality tends to be a strong issue – this may be a problem for plot #1 as the plot, along with the lake, is located in the district of Al-Khalifa & Mokattam while the rest of Ain al-Sira belongs to the district of Old Cairo, Figure 58 & Figure 59 respectively
- The school can either overcome the territoriality issue or be ruled by it
- Since the plot is right next to the Youth Club which acts more like a community center it would be a bit redundant to have a community oriented school so close to the Youth Club when other plots lack the proximity to these services
- Urban setting
- Surrounding buildings are mostly residential, abandoned, graves or parks/clubs
- Main roads and side road are in good conditions, all are two lane two-ways
Plot #2

Figure 60 Plot #2, Cairoland

Physical Response
- 10 Feddan
- Easily accessible by cars as it is next to main roads
- Location would target children from the informal settlement within the plot, children living in the Qarafa and children living in the north east area between the aqueduct and
- There already is a primary school opposite the Champion’s Club in the public housing area
- There’s a service road that leads to the back of Cairoland, ending at the back door – parking is currently used for buses and for driving classes
- Many buildings in Cairoland are intact, clearly influenced by 60s architecture, Figure 52
- The Fustat garden is on higher land and can be seen from the plot
- Cairoland and Civilizations Museum are concrete structures, the informal settlement inside the plot are either stone, bughdally or brick structures
- The informal settlement was fenced off from the rest of the plot
- The plot is generally empty of people except for the informal settlement
- The plot is linear in form
- Low-income public housing across Salah Salem, children would be required to cross main street – dangerous
- There is a variety of urban textures to integrate which would give an interesting contextual building
- The topography was flatten, takes away from the character of the area

Environmental Aspects
- Prevailing wind is north
- Little precipitation
- Passive cooling due to the large body of water and gardens nearby
- Building techniques of the cemetery consist of wall bearing stone or brick masonry
- Building techniques of the informal area is predominantly bughdally as it is an old settlement
- Lake is polluted by sewage
- Air is polluted by the ash and smoke of burned garbage
- Many of the buildings remain intake, they could be remodelled and reused
- The plot is full of amusement park rides, can be re-engineered into other machines or steel recycled into
- Potential for being a brown field due to the rides that would have needed lubricants and such
- Ground relatively dry

Social Aspects
- In popular areas territoriality tends to be a strong issue – this may be a problem for plot #1 as the plot, along with the lake, is located in the district of al-Khalifa & Mokattam while the rest of Ain al-Sira belongs to the district of Old Cairo, Figure 58 & Figure 59 respectively – The school can either overcome the territoriality issue or be ruled by it
- Since the plot is right next to the Youth Club which acts more like a community center it would be a bit redundant to have a community oriented school so close to the Youth Club when other plots lack the proximity to these services
- Urban setting
- Surrounding buildings are mostly residential, abandoned, graves or parks/clubs
- Main roads and side road are in good conditions, all are two lane two-ways
- The part of street which the main entrance overlooks, Malik al-Salih joining into Salah Salem, had a queue of transportation for the gas station located at the fork. The queue stretched past the main entrance of Cairoland, appropriating the drop-off lane as a service road. This could cause future problems when accessing the site from the main entrance
- The layout of Cairoland consists of an L-shaped main pedestrian path with rides on either side
Plot #3

Physical Response
- 7 feddan
- Accessible via Masr al Qadima road
- Not as easily accessible to informal areas
- Since its next to an MOI building may be limited to ground floor building only
- Next to the Museum of Civilizations – which is not contextual
- Closest to the middle-income housing that is under development
- Flat topography
- Contemporary buildings have no unique urban character

Environmental Aspects
- Prevailing wind is north
- Little precipitation
- Passive cooling due to the large body of water and gardens nearby
- Lake is polluted by sewage
- Reinforced concrete is predominant in this area
- Ground seemed relatively dry
- Air is polluted by the ash and smoke of burned garbage
- Potential for being a brown field due to the rides that would have needed lubricants and such
- Near an indefinite construction site – raises dust and causes air pollution

Social Aspects
- Does the land belong to the museum?
- Would indirectly target the middle-income children as they live closer to it, isolated from any other residential areas
- The middle-income development is predominantly uninhabited, which community would the school target?
- The middle-income community is in less need as the low-income community
Figure 64 Civilizations museum

Plot #4

Figure 65 Around Fustat excavation site

Figure 66 Plot #4 surroundings

Figure 67 Plot #4 urban fabric & solid-void distribution analysis
Physical Response
- 75 feddan
- Accessible via secondary roads from Masr al Qadima road or al Malik al Saleh
- Near informal area, would need to respect tight urban fabric
- Half of the land is swamp land
- Half of the land is a landfill
- Near historic Fustat
- Includes Fustat archaeological site
- Large differences in topography – however many are a result of garbage, may not be safe to build on
- Lots of urban fabrics on site
- Archaeological site – cannot build on ruins or potential excavation ground
- Lots of debris, not good to build on
- A desolate view
- Topography offers character as well as variation to the new developments which cut and fill the land

Environmental Aspects
- Prevailing wind is north & little precipitation
- Swamp land – unhealthy/unsanitary
- Filtration of swamp into other land
- Landfill – unhealthy/unsanitary
- Pollution from burning garbage - unhealthy/unsanitary
- Secluded and quiet
- The old Fustat housed were made of mudbrick, baked red brick, stone, lime mortar, gypsum mortar
- Could use recyclable materials found in the landfill, create a recycling/reuse identity for the community

Social Aspects
- Would target low-income
- Near traditional crafts – potters, quarrymen
- Near heritage – perfect for heritage school
- By building there would prevent littering to some extent
- Building would either show others importance of heritage, or encourage others to also build in the archaeological site
- Could employ local craftsmen in the building of the school – creating instant employment
- Could build using the special crafts of the area

Plot #5

Figure 68 Archaeological remains of old Fustat – mountainous landfill seen in the background
Figure 69 Another view of the ruins of old Fustat
Figure 70 View of swamped land

Figure 71 Between Pottery Centre and Souk al-Fustat
The garden was started in 2005 after the plot had been empty since 1998 following the bulldozing of the potteries that had been present on that land (Shaheen, 2010).
Physical Response
- Large variation of urban fabrics
- Near historic area
- Directly targets the informal settlements that threaten the historic preservation of the area
- Overlooks the archaeological site
- Plot encompasses the dewatering shafts that were built between 2000-2005 – can be put into use to lower water level
- Access from bus stop or from Masr al Qadima Road
- Green areas already exist
- Some traditional architecture near site for inspiration – the Traditional Crafts Center
- Very close to a low-income large residential area

Environmental Response
- Prevailing wind is north
- Little precipitation
- Landfill - unhealthy/unsanitary
- Pollution from burning garbage - unhealthy/unsanitary
- The old Fustat housed were made of mudbrick, baked red brick, stone, lime mortar, gypsum mortar
- Could use recyclable materials found in the landfill, create a recycling/reuse identity for the community
- The new houses of reinforced concrete and baked red brick

Social Aspects
- Would target low-income
- Near traditional crafts – potters, quarrymen
- Near heritage – perfect for heritage school
- By building there would prevent littering to some extent
- Building would either show others importance of heritage, or encourage others to also build in the archaeological site
- Near the Fustat market, could aim to buy needed things from there as much as possible

Plot #6

Figure 80 North of Khayyala Lake, south of new Upper middle class housing development
Figure 81 Plot #6 surroundings
Figure 82 Plot #6 urban fabric & solid-void distribution analysis
Physical Response
- 50 feddan
- Land has high filtration
- Large part of the land is near land reclaimed by lake – very likely not good for construction – too weak
- Land is a debris landfill – site is not flat
- Overlooks the lake
- Overlooks the informal settlement on the cliff – Batn el Baqara
- Far end of lake, at the edge of the informal settlement cliff
- Cliff edge used as landfill – falls into lake – lake becomes landfill (waterfall)
- Pollution from litter in lake makes water unusable without treatment and can help spread diseases
- Lots of material reuse potential from debris site
- We found a fragment of a tombstone, dated by a professor of Islamic Architecture to the 9th century – probably came from the debris of the foundation excavation from the middle-income development – the Qarafa cemetery probably originated in Ain al-Sira then spread to the east – potential good excavation site for kids

Environmental Response
- Lots of stone for reuse
- Land has potential to swamp
- Water contamination from landfill
- Water contamination from sewage
- Soft land
- Mostly reinforced concrete and baked red brick construction

Social Aspects
- Help bridge the low-income and middle-income children from the informal and formal area respectively
- Establish a reusing mentality
- Establish a archaeological sensitive mentality
### Site Evaluation

N/A = Not Available/Applicable  
0 = None/not at all  
1 = slightly/poor  
5 = absolutely/excellent

<table>
<thead>
<tr>
<th>Location</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near historical context</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Near buildings of certain urban importance</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Surrounding buildings have variety of construction materials</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Accessibility from main roads</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Accessibility from residential areas</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Accessibility from residential areas that does not involve crossing main roads</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Accessibility from metro</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Large area for future development</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Near more than one residential area</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Not near areas that are prone to congestion</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>In an area that can provide activities for the children that would complement their school work</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Un-built land</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Surrounding buildings have variety of construction materials</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Interesting urban fabrics that do not follow modern urban planning</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not in a swamping prone area</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>View of water</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Quality of water</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>Water can be used in passive design</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment &amp; Healthiness</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy air</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Prevailing wind is unobstructed by other buildings</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Not near a landfill</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not near stagnant water</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quiet area</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Away from construction zones</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Reusable materials</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Raw materials</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Near existing greenery</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Would not replace a lot of greenery</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topography</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some irregularity of terrain to maintain the true essence of the historic area</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>N/A</td>
</tr>
<tr>
<td>Solid ground – i.e. not layers of sand and garbage</td>
<td>0</td>
<td>5</td>
<td>N/A</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Land not too steep</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Not a drainage area (i.e. valley or downhill)</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near a community that lacks sufficient schools</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Not near a community center or other building that may offer services to the community</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Contributes to targeting an environmental issue</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Contributes to settling local political issues: territoriality, income class segregation</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
<th>Plot 4</th>
<th>Plot 5</th>
<th>Plot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>107</td>
<td>90</td>
<td>105</td>
<td>109</td>
<td>79</td>
<td></td>
</tr>
</tbody>
</table>

Plots #1 & #5 have almost equal scores. The site for the school will be on one of these. The decision will be made based on the study of the “the proposal of protection measures for the world heritage property” in Urban Regeneration project for Historic Cairo, First Report of Activities, July 2010 – June 2012, which is available in the appendix. Although I have a personal preference to Plot #5, Plot #1 would be more applicable to the rest of Egypt for being less unique. However, it would also be interesting to adjust the school so it may fit on a swamped land as in rural Egypt a lot of the land has seepage.
References


Stanford’s Geographical Establishment. (1888). The environs of Cairo [map]. In Murray, John’s a handbook for travellers in Lower and Upper Egypt; including descriptions of the course of the Nile through Egypt and Nubia, Alexandria, Cairo, The Pyramids, Thebes, The Suez Canal, The Peninsula of Mount Sinai, the Oases, the Fayoum, &c. in Two Parts - Part I. Seventh Edition. Retrieved February 27, 2013 from Travelers http://hdl.handle.net/1911/9434


Wagner & Debes. (1885). Eastern Environs of Cairo [map]. In Baedeker, Karl’s Egypt, handbook for travellers. pt. 1. Lower Egypt, with the Fayum and the peninsula of Sinai. Retrieved February 27, 2013 from Travelers in the Middle East Archive (TIMEA)http://hdl.handle.net/1911/9308


Wagner & Debes. (1914). Environs of Cairo 1:75,000 [map]. In Baedeker, Karl’s Egypt and the Sudan. Seventh remodelled edition. Retrieved February 27, 2013 from Travelers in the Middle East Archive (TIMEA)http://hdl.handle.net/1911/9372

References
Appendix