Arab Republic of Egypt

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT

SECONDARY CITIES

Environmental Assessment

Environmental Assessment Report

For

New Valley Governorate
El Mounira and Naser El Thowra Villages, Kharga Oasis,
Balat, El Gedida and Tanidah Villages, Dakhla Oasis

National Organization for Potable Water and Sanitary Drainage (NOPWASD)

US Agency for International Development (USAID)
USAID Project No. 263-0236

CDM International Inc.

In association with

Dr. Ahmed Abdel-Warith Consulting Engineers

USAID FROM THE AMERICAN PEOPLE

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Acronyms and Abbreviations

AAW	Dr. Ahmed Abdel-Warith Consulting Engineers
CDM	CDM International Inc.
GOE	Government of Egypt
NOPWASD	National Organization for Potable Water and Sanitary Drainage
USAID	United States Agency for International Development
DI	Ductile Iron
EA	Environmental Assessment
ED/CM	Engineering Design and Construction Management
EIS	Environmental Impact Statement
FM	Force Main
HCC	House Connection Chamber
ID	Identification Number
HHS	Households
LE	Egyptian Pounds
MH	Manhole
PS	Pump Station
RCP	Reinforced Concrete Pipe
RR	Railroad
uPVC	Unplasticized Polyvinyl Chloride
VC	Virtified Clay
WTP	Water Treatment Plant
WWISP	Water and Wastewater Institutional Support Project
WWWTP	Wastewater Treatment Plant
$	United States Dollars

Weights and Measures

BOD_5	5-day biochemical oxygen demand
COD	Chemical Oxygen Demand
Feddan	A unit of area equal to 4,200m^2
Hectare	A unit of area equal to 10,000m^2
lpcd	Liters per capita per day
lps	Liters per second
m	Meter
m^3/hour	Cubic meters per hour
mg/L	Milligrams per liter
mm	Millimeters
m/s	Meter per second
NTU	Normal Turbidity Units
^oC	Temperature in degrees Celsius
ug/L	Micrograms per Liter
uS/cm	Microsiemens per centimeter – unit of measure of conductivity. Equal to micromhos/cm in U.S. system of measurements
km	Kilometer

New Valley Environmental Assessment
Executive Summary

The USAID-funded Egypt Infrastructure Improvements Project is preparing to implement improvements to wastewater facilities in two villages in Egypt's New Valley (Wadi Gedid) and potentially three additional villages should funding be available. These projects in the New Valley Governorate are to be implemented for the Government of Egypt (GOE) through the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the United States Agency for International Development (USAID).

In accordance with 22 CFR 216, this is the projects' Environmental Assessment Report, a detailed study of the reasonably foreseeable significant effects, both beneficial and adverse, of a proposed action on the environment.

The project villages are El Mounira in the Kharga Oasis, and Balat in Dakhla Oasis. El Mounira is to receive a sewerage system, a pump station, a force main to a new stabilization pond wastewater treatment plant, and the treatment plant itself. Balat is to receive a new stabilization pond plant with nearly 10 times the capacity of the plant it replaces. The additional three villages are Naser El Thowra in the Kharga Oasis and El Gedida and Tanidah in the Dakhla Oasis and will each receive a sewerage system, a pump station, a force main and the new stabilization pond wastewater treatment plant. In each case, the planned population to be served is 10,000 in Year 2030.

Located some hundreds of kilometers due west of Luxor, the New Valley is a vast region in Egypt's Western Desert. In two principal "oases," groundwater is being pumped to irrigate extensive areas of new farmland, and to supply several clusters of towns and villages. Although some Pharaonic antiquities testify to occupation in ancient times, the region has in recent times been settled only since 1959.

Wastewater collection and treatment systems serve many but by no means all of the towns and villages. Some 20 villages already have stabilization ponds for wastewater treatment, but many do not, and some of the existing plants are already seriously overloaded.

Stabilization ponds use a simple wastewater treatment technology that is effective and reliable, though extensive in area required per unit capacity. They are well suited for remote desert settlements where low-tech, low-maintenance, and low-energy facilities are essential, yet the requisite space is affordable.

Environmentally positive aspects of the proposed systems are:

- The systems will give the villages a more healthful and attractive environment.
- The ponds are to be located at a distance, and generally downwind, from the densely-settled areas.
- The ponds are to be lined to limit the loss of water, and contamination of the aquifer, due to infiltration.

During design, environmental aspects to be considered include:

- In El Mounira, Naser El Thowra, El Gedida and Tanidah, wherever a sewer line stops short of reaching existing or potential sources of wastewater, the end manhole should be sized and sited to accept septage discharge from haulers emptying onsite wastewater holding tanks or soakaway pits.

- The effluent will be suitable for irrigation of woodland plantation and of certain crops. The choice of what is to be irrigated, as well as observance of seasonal requirements and limitations, will be negotiated between NOPWASD and the Ministry of Agriculture and Land Reclamation.

- In El Mounira, the proposed stabilization pond site may be threatened by the advance of several barchan dunes a short distance to the north. The prevailing winds drive these dunes south at a rate not yet determined, but burial by such dunes would clearly shorten the life of the pond system. The most practical mitigation measure would be to locate the plant out of the trajectory of the dune, or sufficiently far south as to have an acceptably long life before being buried.

- The operation of a wastewater system, even a small and simple one, requires a certain level of water quality sampling and analysis. This need could be met at wastewater plants in the regional capitals, Kharga and Mout, with wastewater laboratories sized and equipped to serve all the wastewater plants in their regions.

- From time to time the ponds, particularly the anaerobic ponds, will need to be dredged of sludge. An item for longer-term planning for the whole region would be provision of a remote sludge-handling site. The stabilized sludge is valuable as a soil builder for woodland and certain crops.

During construction, aspects to be considered include:

- The problem of expansive soils. Where found, this problem is to be addressed by proven techniques of over-excavation and backfill with inert sand and gravel.

- The potential impact of construction activities on antiquities. There are few if any known antiquities near the proposed construction sites, but it is quite possible that buried antique objects will be unearthed during construction, and should be handled in a manner that conserves them while not unduly delaying the construction schedule.

- Sewer installation will unavoidably block streets. The width of the excavated trench plus that of the side-cast excavate will effectively block a street of typical width. Where there must be over-excavation of expansive soils, the obstruction will be even greater. If antiquities are unearthed, there will be delays in construction. Sewer installation must therefore be scheduled to occupy any one section of a street for the least possible duration, and not block more than one street at a time in any one small area.

Monitoring issues

During sewer construction, monitoring should ensure that the construction crews:

- Observe Egyptian safety regulations.
- Overexcavate trenches as needed when expansive soils are encountered.
- Are alert for antiquities encountered during excavation.
- Schedule work so as to block any one street for as short a time as possible.
- Limit the amount of dust raised, to be not much more than is typical of a desert setting.

During wastewater treatment plant construction, monitoring should ensure that the construction crews:

- Observe Egyptian safety regulations.
- Overexcavate as needed where expansive soils are encountered.
- Are alert for antiquities encountered.
- Properly install the liner that is to minimize seepage from the ponds.
- Control dust generation if it is an issue for the health and safety of construction crews and nearby residents or property.

During the years of plant operation, annual monitoring should be alert to:

- Any complaints of excessive odor or noise from the pump stations, which are located within the village.
- Any complaints of excessive odor from the stabilization ponds, particularly those of Balat, which are surrounded, at a distance, by irrigated fields and some residences.
- Any complaints of insect pests such as mosquitoes or flies attributed to the stabilization ponds.
- The presence, numbers, general health, and species of birds on the ponds.
- The rate of barchan dune advance toward the El Mounira stabilization ponds.
- The quality and consistency of routine sampling at the wastewater plants, and analysis of the samples on site or at the analytical laboratory, wherever located.

- Whether disposal operations are proceeding satisfactorily, with effluent flowing from the plant and being used productively for irrigation, or being stored, or used in another acceptable manner.

Final words

Experience with the 20 or so existing stabilization pond systems in the New Valley, and those elsewhere in Egypt, has been mostly positive. Aside from odor problems at some overloaded ponds, and some damage to buildings due to sewer leaks in areas of expansive soils, the problems appear to be few. The principal message from New Valley citizens and their representatives is that they are impatient to receive more such systems.

مشروع تطوير البنية التحتية في مصر

الملخص التنفيـــذى

تقوم الحكومه الأمريكية بتمويل مشروع تطوير البنية التحتية في مصر والذى يشمل مشروعات لتحسين خدمات الصرف الصحي لعدد قريتين بمحافظة الوادي الجديد مع امكانية اضافه ثلاث قرى أخرى فى حالة توفير التمويل اللازم لهم.

وهذه المشروعات المقرر تنفيذها بمحافظة الوادى الجديد لدعم جمهورية مصر العربيه وذلك من خلال الهيئة القومية لمياه الشرب والصرف الصحى ممثل للحكومة المصرية والوكالة الأمريكية للتنمية الدولية USAID ممثل للحكومة الأمريكية .

وفقا لمتطلبات الوكالة الأمريكية للتنمية الدولية رقم (22CFR 216) يجب اعداد تقرير التقيم البيئى للمشروع والذى يحتوى على دراسة تفصيليه للتوقعات المنطقيه للتأثيرات البيئية سواء المفيده او الضاره وأتخاذ الأجراءات اللازمة لتعظيم الايجابيات النافعة و الحد من الآثار الضارة السلبية.

يشمل المشروع قرية المنيرة بالواحات الخارجـــة وقرية بـــلاط بالواحات الداخلـــــة .
تشمل الأعمال المقترحـــة لقرية المنيرة انشاء شبكة تجميع مياه الصرف الصحى بالانحدار الطبيعى ومحطة رفع و خطوط طرد حيث يتم ضخها الى موقع محطة المعالجة الجديدة ومعالجتها بنظام بحيرات الأكسدة الطبيعية .

أما لقرية بلاط فسوف يتم انشاء محطة معالجة جديدة بنظام بحيرات الأكسدة الطبيعية سعتها تمثل عشرة اضعاف سعة المحطة القائمه حاليا التى سيتم استبدالها.
هذا بالاضافه الى ثلاث قرى اخرى وهى ناصر الثوره بالواحات الخارجـــة وقريتى الجديده وتنيده بالواحات الداخلـــــة وسوف يتم خدمة هذه القرى بشبكات تجميع مياه الصرف الصحى بالانحدار الطبيعى ومحطات رفع و خطوط طرد و محطات معالجة جديدة بنظام بحيرات الأكسدة الطبيعية .والتعداد المخدوم المتوقع حتى عام ٢٠٣٠ يبلغ حوالى ١٠٠٠٠ نسمه .

تقع محافظة الوادى الجديد غرب مدينة الأقصر وعلى مسافه قدرها حوالى ٣٠٠ كيلومتر وتمثل اوسع اقليم بالصحراء الغربية ، وتوجد بالمحافظة عدة واحات أهمها الوحات الداخلة والخارجة وتعتمد تلك الواحات على ضخ المياه الجوفية لرى زراعات مكثفة وأمداد عديد من تجمعات قرى بالمياه بمياه الشرب . وبالرغم من وجود أثار فرعونية القديمه بالمنطقة ومالها من أهمية الأ أن التنمية بالمحافظة لم تبدأ الأ حديثا منذ عام ١٩٥٩ .

يخدم نظام تجميع ومعالجة الصرف الصحى العديد من الاماكن هناك ،ولكن لا تشمل الكثير من المدن والقرى فيوجد حوالى ٢٠ قرية مخدومه بمحطات معالجة بنظام بحيرات الأكسدة الطبيعية بينما يوجد العديد من القرى ليس لديها هذه الخدمه و وايضا العديد من محطات المعالجه تعانى بشكل واضح من زيادة التصرفات التى تصلها عن الطاقة التصميمة .

وتتميز محطة المعالجة المقترحة بنظام بحيرات الأكسدة الطبيعية ، أنها تكنولوجيا بسيطه تتناسب مع طبيعة القرى القائمة خصوصا بالمناطق النائية التى تتوفر بها المساحات من الفضاء الاراضى الزهيدة الثمن حيث أن هذا النوع من التكنولوجيا الذى يتميز بسهولة الصيانة وبمحدوده أستهلاك للطاقة قد يكون ضرورى لمثل هذه المناطق .

ومن التأثيرات والأعتبارات الأيجابية لأنظمة الصرف الصحى المقترحة :

- سوف يوفر مناخ صحى وبيئي جذاب للقرى المخدومة .
- اختبار موقع محطة المعالجه بعيدة عن التجمعات السكانية وفى عكس أتجاه الريـــح .
- يتم عزل قاع بحيرات الأكسدة للحد من تسرب مياه الصرف الصحى للارض وبالتالى الحد من تلوث المياه الجوفية .

سوف يؤخذ اثناء التصميم الأعتبارات التالـــــيه :

- فى كلا من المنيره و ناصر الثوره والجديده حيث تنتهى خطوط مواسير الصرف الصحى وتكون بالقرب مصادر قائمه او محتمله للصرف الصحى من بعض المناطق المجاورة الغير مخدومة بشبكة صرف صحى فانه سوف يتم تنفيذ غرف تفتيش بسعه مناسبه فى أقرب أماكن مناسبة لأمكانية الصرف عليها من هذه المناطق الغير مخدومة بأستخدام عربات الكســـح أو غيرها.

- تحسين نوعية مياه الصرف الصحى المعالجة والتى يمكن أعادة أستخدامها لـــرى زراعات خشبية او محاصيل اخرى مناسبه ليمكن الأستفادة بها , ويتم ذلك تحت ادارة و أشراف وزارة الزراعة واستصلاح الاراضى بالتعاون مع الهيئة القومية لمياه الشرب والصرف الصحى .

- محطة المعالجة بقرية المنيرة يمكن أن تتعرض لمخاطر الردم نتيجة زحف الكثبان الرمليه لمسافات قصيره فى أتجاه الشمال ، وحركة الرياح السائده التى تدفع هذه الكثبان الى الجنوب لم تحدد بعد . علما بأن الردم نتيجة حركة الكثبان تقصر العمر الأفتراضى نظام أحواض المعالجة. والاجراء الاكثر تخفيفا هو اختيار موقع المعالجه خارج مسار الكثبان اومسافه بعيده كفايه نحو الجنوب لأطالة العمر الأفتراضى لمحطة المعالجة قبل ردمها.

- على الرغم من بساطة اعمال المعالجه المقترحة وسهوله تشغيلها لكن الامر يتطلب عمل متابعة دورية وتحاليل لنوعية المياه أثناء تشغيل نظام المعالجة
وضرورة أجراء التحاليل المعملية يتطلب توافر خدمات التحاليل المعملية المتخصصة بمعامل مجهزه وتكون بشكل كافى، وتكون اقليميه مركزيه بمدينتى الخارجه وموط كعواصم الاقليم .

- مراعاة ضرورة التخلص الآمن من حين لاخر من كميات الحمأة المترسبة والمتراكمة داخل أحواض المعالجة خصوصا الاحواض اللاهوائيه
يجب للتخطيط طويل توفير مساحة مناسبة من الأرض فى مكان بعيد يستخدم لتجفيف هذه الحمأة والمواد المترسبة من محطات المعالجه وذلك لقيمتها بعد أن تتخمر تماما وذلك لأمكانية أعادة أستخدامها فى الزراعة بطريق آمكنـــة .

سوف يؤخذ اثناء التنفيذ الأعتبارات التالـــــيه :

- في حالة التعامل مع مشاكل تربة طينية قابلة للأنتعاش بزيادة حجمها عند تشبعها بالمياه حيثما وجدت يتعين معالجتها بالأساليب ألمتبعه وذلك بأجراء عملية أحلال للتربة برمال وحصى مناسبة مع زيادة الحفر بما يتناسب مع عملية الأحلال للتربة .

- التأثيرات ألمتوقعه في حالة وجود آثار أثناء إعمال التنفيذ والمتوقع وجود قليل من الآثار بالقرب من موقع الأعمال المقترحة وحيث أنه ليس من المعروف وجود آثار بتلك المناطق ولكن فى حالة العثور على آثار أثناء التنفيذ ، يجب أن يتم التعامل معها طبقا للآجراءات واللوائح المعمول بها فى مثل تلك الحالات وتفادى حدوث تأخير فى برنامج التنفيذ .

- أماكن تنفيذ شبكة الصرف الصحي في مسارتها غالبا ما تسبب اضطرابات لا يمكن تفاديها بالطرقات ويؤدى إلى حدوث اختناقات لحركة المرور بالشوارع نتيجة الحفر وتشوين تربه الحفر على الجوانب ويزداد ذلك فى حالة وجود أحلال للتربة في أنواع التربه المنتفشة وأيضا في حالة وجود آثار مما يزداد الأمر خطورة ولعدم التأثير على برنامج التنفيذ يجب عدم أعاقة الحركة فى أكثر من شارع وفى اقل مده ممكنه .

<u>أعتبارات لبرنامج المراقبة</u>

أثناء تنفيذ شبكات تجميع الصرف الصحى يجب التأكد من أن فريق يراعى الآتـــى :

- اتباع أجراءات السلامة طبقا للكود المصرى .
- تعميق الحفر وأجراء عملية أحلال التربة فى حالة وجود التربة الطينية المنتفشه .
- الابلاغ عن الآثار أثناء عملية الحفر أن وجدت .
- يكون برنامج اعمال التنفيذ يكون أقصر ما يمكن فى حالة التنفيذ فى الشارع الواحد لتفادى أختناقات فى المرور .
- الحد من اثارة الغبار اثناء التنفيذ بحيث لا يزيد على المعدل الطبيعى للمناطق الصحراويه .

أثناء تنفيذ محطات معالجة الصرف الصحى يجب التأكد من أن فريق التنفيذ يراعى بالآتى:

- اتباع أجراءات السلامة طبقا للكود المصرى .
- تعميق الحفر وأجراء عملية أحلال التربة فى حالة وجود التربة الطينية المنتفشه .
- الابلاغ عن الآثار أثناء عملية الحفر أن وجدت .
- التركيب السليم لطبقة العزل لتقليل امكانية التسريب من احواض المعالجه الى باطن الأرض.
- التحكم فى الغبار الناتج عن عمليات الأنشاء خصوصا فى حالة وجود مشاكل صحية لفريق العمل أو المقيمين بجوار محطة المعالجة .

أثناء مرحلة لتشغيل المحطه : نظام المراقبة السنوية يجب مراعاة الأمور التالية :

- الشكوى من زيادة الرائحة أو الضوضاء من محطات الرفع .
- الشكوى من زيادة الرائحة أو الضوضاء من محطة المعالجة وخصوصا فى قرية بلاط والمحاطه على بعد بمناطق زراعيه وبعض المساكن المحدودة.
- أى شكوى من وجود حشرات أو بعوض او ذباب نتيجة وجود بحيرات الأكسدة .
- وجود وإحصاء الحالة الصحية العامه لانواع الطيور الت قد ترد ببحيرات الأكسدة .
- معدل حركة الكثبان الرمليه نحو محطة المعالجة بالمنيره .
- نوعيات ومدى تجانس التحاليل الدوريه لعينات الصرف الصحى التى تتم بموقع محطة المعالجة او اى معامل اخرى .
- التأكد من أن الصرف الصحى النهائي المعالج يتم أستخدامه لرى الأشجار الخشبية أو تخزينه او اى استخدام اخر بشكل آمن .

كلمة نهائيـــــة

الخبرات السابقة خلال ٢٠ سنة لمحطات المعالجه بنظام بحيرات الأكسدة الطبيعيه وخبرات الوادى الجديد او فى اى مناطق أخرى بمصر معظمها ايجابيه، وبعيدا عن مشاكل تواجد الرائحة بالبحيرات الزائدة الحمل عليها وتأثير بعض المبانى المجاورة نتيجة تسرب خطوط الصرف الصحى نتيجة التربه الطينيه المنتفشه وتعد قليله و محدودة جدا.

والرساله الحقيقيه أن أهالي الوادى الجديد وممثليهم فى أنتظار حار وترحيب شديد للكثير من مثل هذه الخدمات.

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT
ENVIRONMENTAL ASSESSMENT

NEW VALLEY GOVERNORATE

EL-MOUNIRA and NASER EL THOWRA VILLAGES, KHARGA OASIS
BALAT, EL GEDIDA and TANIDAH VILLAGES, DAKHLA OASIS

ENVIRONMENTAL ASSESSMENT REPORT

1 Introduction

The USAID-funded Egypt Infrastructure Improvements Project is preparing to implement recommendations to install sewerage and build a wastewater collection system and treatment facility in El Mounira Village, El-Kharga Oasis, and to furnish an enlarged and improved wastewater treatment plant in Balat Village, Dakhla Oasis, both in Egypt's New Valley (Wadi Gedid, Figure 1). Three additional villages may be incorporated into the project scope should funds be available. They are Naser El Thowra in the Kharga Oasis and El Gedida and Tanidah in the Dakhla Oasis and each receive a sewerage system, a pump station, a force main and the new stabilization pond wastewater treatment plant. The wastewater treatment technology chosen is "stabilization ponds," a reliable, low-cost, low-maintenance system of a type that is already in use in many locations in Egypt. The effluent from the wastewater plant will presumably be pumped (by others) to irrigate forest land.

Although many villages have legitimate needs for wastewater collection systems, there are presently funds to build systems for only two villages in the New Valley but should additional funds become available during the life of the project then three additional villages would be implemented. The Environmental Assessment Reports for the villages chosen, El Mounira and Balat, and those of Naser El Thowra, El Gedida and Tanidah are combined in this one volume. Following discussion of some common issues, the two selected villages are presented separately while the three potential villages are presented together.

These projects in the New Valley Governorate are to be implemented for the Government of Egypt (GOE) through the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the United States Agency for International Development (USAID).

Background data and information for the proposed remedial activities were gathered and reported in the New Valley Feasibility Study (NVFS) prepared for USAID and NOPWASD (CDM, August, 2006). The NVFS considered all five (5) village locations to provide water and/or wastewater improvements. The five villages are Balat, El Gedida and Tanidah in the Dakhla Oasis and El Mounira and Nasr El Thowra in the Kharga Oasis.

The Scoping Statement that preceded this Environmental Assessment Report was prepared specifically for El Mounira and for Balat. However, subsequent to the USAID approval of the Scoping Statement, an Amendment to the Scoping Statement to include the additional three villages was approved by USAID. The approval of the Amendment was based on the fact that the Scoping Session held on 11 April 2007 in the New Valley Governorate was attended by representatives and residents of all five of the villages. Additionally, the scope of the work for each of the three villages is fundamentally identical and the environmental conditions to be experienced and mitigation measures in the villages of Naser El Thowra, El Gedida, and Tanidah are similar. As a result, this Environmental Assessment has been prepared for the five villages in the New Valley Governorate with the understanding that additional funds would be required to implement the works in the three villages.

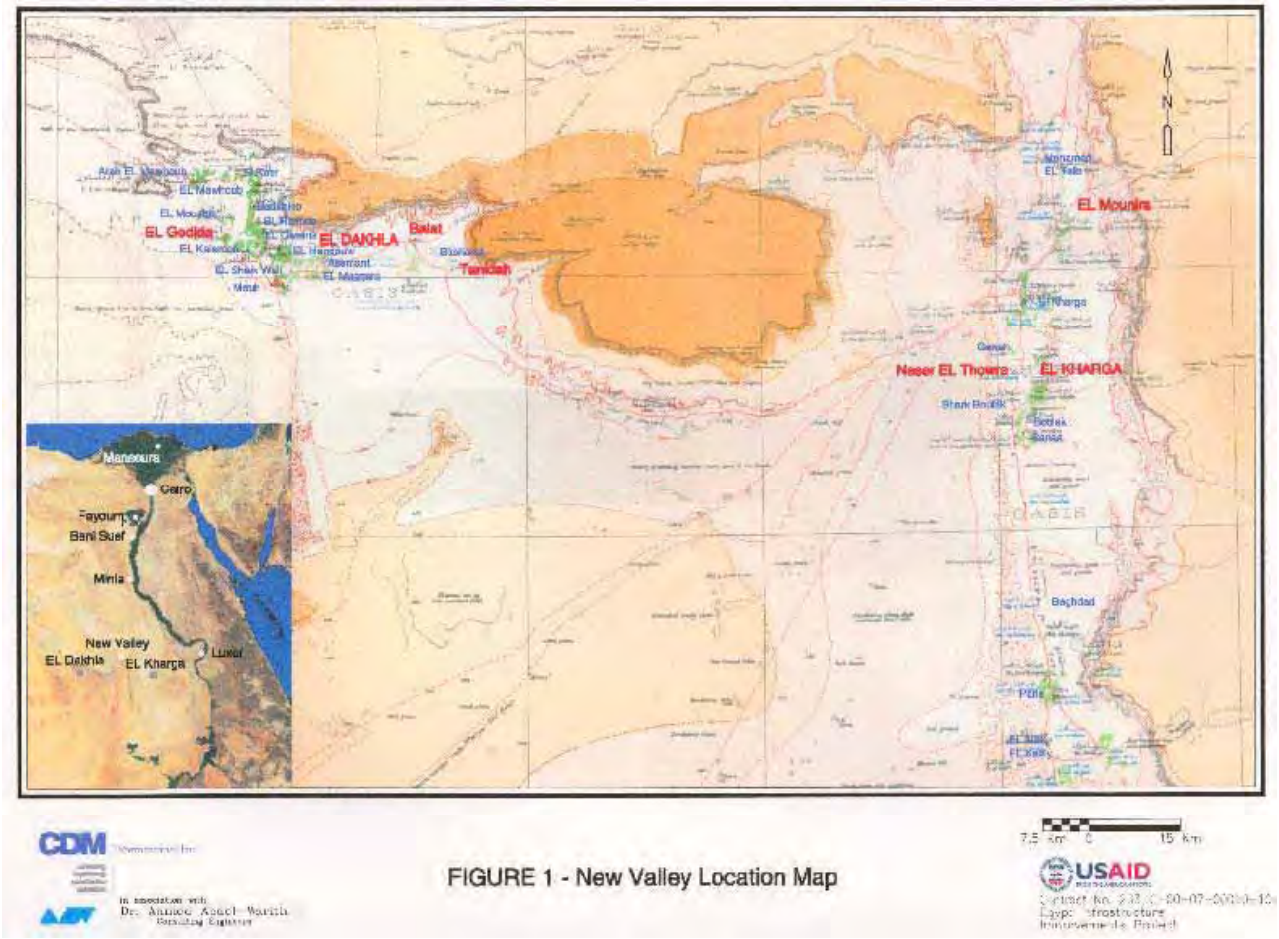

FIGURE 1 - New Valley Location Map

2 The Environmental Assessment Process

For every USAID project there must be an Environmental Assessment (EA). The EA is a process used to identify and predict the environmental consequences of a newly planned activity and to assist in planning appropriate measures to reduce the adverse effects, and to maximize environmental benefits, before permitting the activity to proceed. The process follows the environmental compliance procedures set out in Title 22, CFR 216 (USAID, 1980).

The EA is a practical and valuable means for guiding decision makers in charge of project implementation. It provides the decision makers with reasonably accurate information concerning existing environmental conditions, potentially significant environmental impacts and possible mitigation measures, monitoring programs, opportunities for environmental enhancement and environmental management plans.

The fundamental steps in the Environmental Assessment of a project are the Scoping Session, the Scoping Statement, the Environmental Assessment Report, and environmental monitoring of the project.

For a proposed project, "Scoping" is an EA activity which:

- identifies those attributes of the environment for which there are concerns; and
- provides a plan that enables the EA team to focus on those attributes.

Scoping is a shared responsibility in which the proponent government agencies, the New Valley Governorate, NOPWASD, USAID, and the public, all have a role. The Scoping Session is part of this process.

The Scoping Session is a meeting of key individuals involved with the project, including representatives from:

- the funding agency (USAID),
- the implementing agency (NOPWASD)
- the funding agency's engineers,
- appropriate Egyptian national ministries (e.g. Housing, Agriculture),
- the Governorate,
- the Markaz,
- the Village,
- and interested local persons such as farmers, landowners, and businesspeople.

In the Scoping Session, usually held early in the project time schedule, the engineers tell what they intend to design and build, for whom, and where. The engineers also list the environmental impacts, good and bad, that can be anticipated, and to be dealt with properly. The other attendees are invited to add their own concerns and observations to the list, and so bring them to the attention of the government, the funding agency, and the engineers.

The **Environmental Scoping Statement** summarizes the proceedings of the Scoping Session (i.e. who was invited, who attended, and the environmental issues presented, raised, and discussed). The Scoping Statement sets the direction for the full EA report.

The Scoping Statement is formally reviewed by USAID. Once it is approved, engineering work on the project can begin, and the Environmental Assessment team can proceed to develop the full Environmental Assessment Report.

This **Environmental Assessment Report** shall describe these projects, and their beneficial and adverse impacts upon the local environment and upon the health and

well-being of the local residents. Based on the technical information gathered in past and present studies, and on the comments and questions raised in the Scoping Session, the Environmental Assessment Report is to:

- rate the environmental issues according to their importance,
- investigate further those issues deemed most important,
- recommend ways to minimize or at least mitigate the most significant of the foreseen adverse impacts, and
- recommend ways to take advantage of the beneficial impacts.

Environmental monitoring. The Environmental Assessment Report is also to list issues to be monitored, during construction and during subsequent operation of the facilities.

Appendix A is a list of the preparers of this report. The proceedings from the Scoping Session are presented in Appendix B. Relevant Egyptian environmental legislation is summarized in Appendix C.

3 New Valley: Environmental Setting

3.1 Recent History of the New Valley

The Kharga and Dakhla Oases contain about 0.2% of Egypt's population, while the New Valley Governorate covers about 44% of Egypt's land. Construction and reclamation of the New Valley began in 1959. The governorate itself was established in 1961. Access to the area is primarily by road over the desert: 345 km from Luxor to Kharga, and 232 km from Kharga to Assiut. Service by train is limited to a weekly trip to Luxor. Air transport is in the beginning stages. Security concerns at present limit access to the two oases.

Agriculture, the principal development activity, must rely on irrigation water provided from deep wells driven into the Nubian sandstone aquifer. More than 24,000 feddans (10,000 ha) of irrigated area have been developed in Dakhla Oasis, and 3000 feddans (1300 ha) in Kharga Oasis.

The towns are connected by paved highways, and some side streets are paved in the project villages. The major towns of Kharga and Mout have urban amenities developed to a high standard, to the extent that four-lane highways and streetlights extend well beyond the presently-settled areas. Much of the housing consists of relatively new one-storey houses, with ancient mud-brick houses abandoned in place within many of the villages. In 18 New Valley towns and villages there is a local ruling body, which oversees the town itself and smaller outlying villages.

Differences in the economies and population characteristics among the several villages in the New Valley could cause differences in growth rate over the planning period. The increasing cost of water for irrigation (as groundwater levels fall) could either limit the population growth or require a reorientation of the economy away from farming and toward tourism or other sources of income.

In the longer term, the potential for developing tourism to see the available antiquities seems limited compared to elsewhere in Egypt. However, so long as the population remains relatively low, the potential revenues *per resident* from tourism may well be comparable to elsewhere in Egypt.

3.2. Physical Environment

Climate. The eastern Sahara is part of the most arid region in the world. There is essentially no precipitation. Winds are predominantly from the north. The temperature ranges from 5C to 26C in winter and from 23C to 41C in summer. The monthly temperature range for the 2.5, 17, 83, and 97.5 percentile values, and the mean values, are plotted by month for two calendar years in Kharga in Figure 2.

Egypt receives fewer than eighty millimeters of precipitation annually in most areas. The areas south of Cairo receive only traces of rainfall. Some areas will go years without rain, and then experience sudden downpours that result in flash floods.

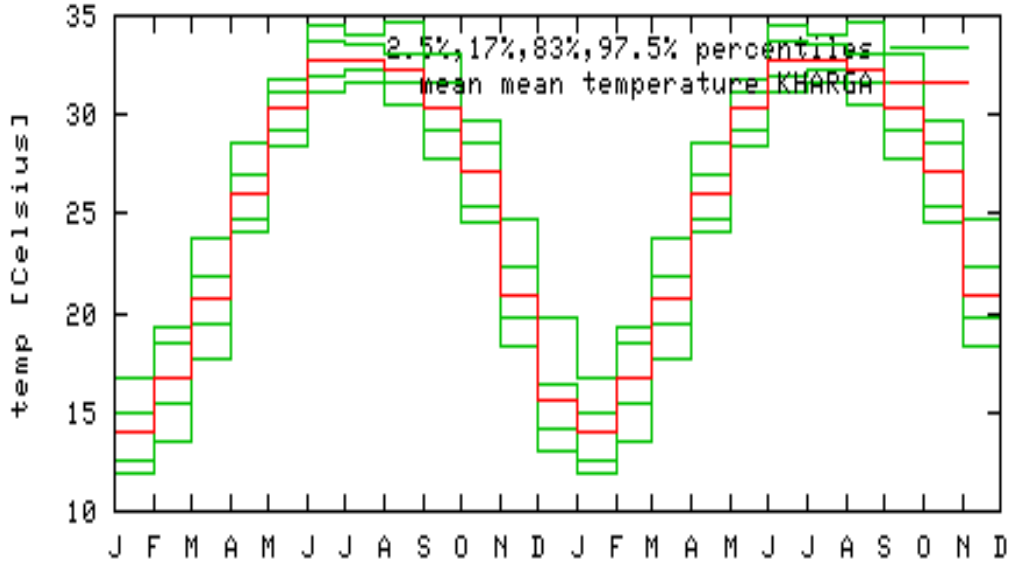

Figure 2. Monthly temperature range at Kharga (Climate Explorer)

Evaporation is at a maximum in June and a minimum in December and January. The mean daily potential evaporation in Egyptian oases ranges from 6.5 to 13.0 mm/day.

Geology. The **Nubian sandstone aquifer** underlies a large part of Egypt and neighboring Sudan, Chad and Libya, covering about 1.65 million km^2. The aquifer is up to 4000 m thick, and extends downward to 2000 m below sea level in the Kharga Oasis, and to 500 – 1000 m below sea level in the Dakhla Oasis.

Expansive soils, which swell when wetted, are a geologic property found in many arid parts of Egypt. When such soils near or under a structure are wetted due to leaks from water or wastewater piping, significant damage to the structure may result (Figure 3).

Figure 3. Structural damage to a wall from soil expansion due to a sewer leak.

Sand drifts are a common feature in the New Valley. The predominant north winds drive fine sand southward, drifting across roads and into agricultural areas. In some places, the sand drifts form long, narrow windrows in the lee of fixed objects. Such windrows can extend for hundreds, even thousands of meters, downwind from the fixed objects.

Sand can also accumulate in croissant-shaped "barchan" dunes, which can be hundreds of meters across and tens of meters high, and which can move several m per year in the direction of the prevailing wind (Figure 4). A barchan dune is an arc-shaped sand ridge, comprised of well-sorted sand. This type of dune possesses two "horns" that face downwind, with the slip face (the downwind slope) at the angle of repose, or approximately 34 degrees. The upwind side is packed by the wind, and stands at about 15 degrees. Simple barchan dunes may stretch from meters to a hundred meters or so between the tips of the horns (Wikipedia entry, under "Barchan Dune").

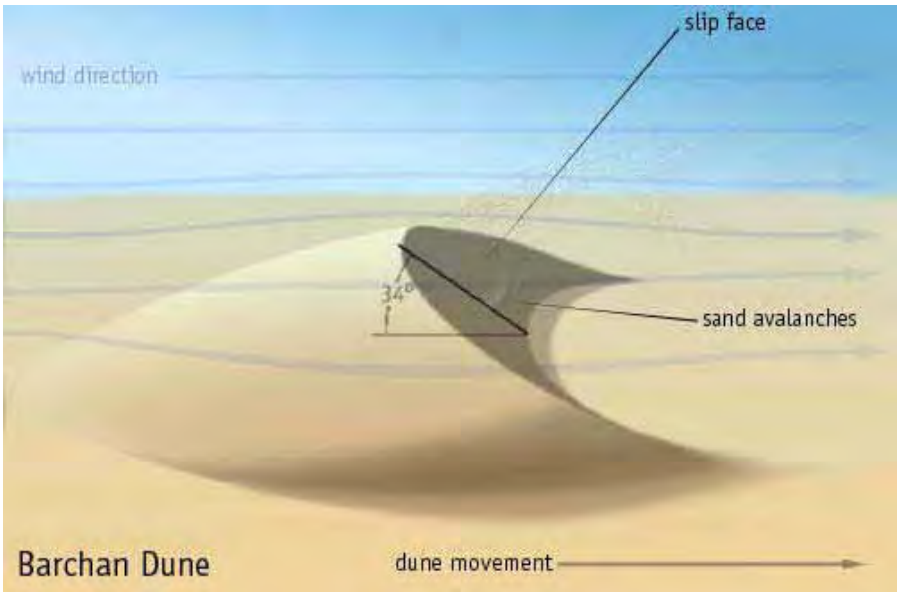

Figure 4. Definition sketch of a barchan dune (Wikipedia).

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From these slopes one can calculate that the peak height of a barchan dune is about 0.19 times the length, measured from the most upwind part of the upwind toe to the most upwind part of the downwind toe, i.e. the upwind-downwind length measured on the dune centerline. The four barchan dunes visible just east of El Mounira in Figure 5 have lengths ranging from 300 to 600 m; therefore the heights of these dunes are of the order of 60 m or more. All three sand drift features: invasion of agricultural land, linear windrow dunes, and barchan dunes can be detected in Figure 5.

Hydrology and water use. Economic development in the New Valley must rely on groundwater resources. The groundwater from potable-supply wells in the New Valley generally meets all of the Egyptian water quality standards, except those for iron and manganese.

Figure 5. Satellite view of El Mounira, exhibiting sand invasion, windrow dunes, and barchan dunes.

As there is essentially no precipitation in the New Valley, there is no local groundwater recharge to the Nubian sandstone aquifer. Recharge elsewhere moves only very slowly toward the New Valley. Therefore economic and agricultural development of Kharga and Dakhla Oases must rely on mining of the groundwater, a practice considered sustainable for at least the next 100 years. Recent groundwater modeling indicates that the aquifer contains about 135,000 billion m^3 of water, but that only a small portion can be exploited economically with presently available technologies. In planning for water supply and wastewater facilities for villages in the

two oases, the forecast of the population to be served must take into account the number of people who may migrate from the crowded Nile areas.

The effect of any large local drawdown of the aquifer would be to increase the pumping heads for irrigation water to an uneconomical level. However, per capita potable water demands are very moderate compared with irrigation demands. By shifting the type of work away from irrigated agriculture toward "dry" industries such as tourism, handicrafts, or manufacturing, the aquifer could sustain a population of several million for many generations.

Since the New Valley is a hydrologically closed basin it is important to prevent or at least mitigate water pollution, especially from wastewater as a major source.

From this point forward, the two selected projects are discussed separately while the three potential village wastewater systems will be discussed collectively.

4 El Mounira Village, El Kharga Oasis

4.1. Socio-economic environment

El Mounira Village, located about 25km north of El Kharga City, has a brief history dating only from 1970. It has a population of about 2,300, with an additional 800 people in the suburban village of El Ktarah located about 1 km south of El Mounira. It also has a smaller suburban village, Ezbet El Taieb, which lies about 9km to the north and contains about 300 people. The population is projected to grow to 10,000 by the year 2030.

According to the 1996 census, 19 percent of the population is illiterate, 21 percent is literate, and the remaining 60 percent are in school. Of the population, 13 percent are farmers; 14 percent are teachers, and 18 percent are in commerce. El Mounira has relatively fewer people in farming, and more in commerce, than elsewhere in the New Valley.

El Mounira has a professional town manager and has undertaken an activist stance toward development in several respects, e.g. special computer education is provided for advanced students.

The potable water system contains a well and iron-removal treatment plant with a capacity of 200 m^3/hour operated up to 15 hours per day. Metered customers include 573 domestic, 112 commercial, and 27 governmental customers. An additional 360 customers are expected to be served within the next 3 years from houses where house lots have been sold or construction is underway. The water supply system currently serves the entire population, through a network of pipes ranging from 4-inch to 8-inch diameter.

4.2. Aesthetic and cultural environment

An ethnographic museum has been developed showing traditional kitchen and farmyard implements. A handicrafts center is in operation, specialized in making and selling unglazed carved pottery and various types of carpets.

Known Antiquities. North of Kharga City on the road to the village of El Mounira is the Temple of Hibis, a VIII Dynasty ruin and ancient settlement that prospered under the Persians (in the Sixth Century BC) and the Ptolemies. This temple is reported to be the best-preserved temple in the western desert of Egypt. The Bagawat Necropolis is also nearby, having 263 mud-brick chapels. It is among the oldest Christian cemeteries in Egypt. Mounira is also within 1 km of a fortress, Ed-Deir, which contains 12 towers, a gallery and many rooms.

4.3. Project Description

Wastewater Collection System. Wastewater will be collected from the homes, shops, and other buildings of El Mounira via the sewerage network shown in Figure 6. About 13.2 km of gravity sewer will be required, of which 11.5km will be the minimum size of 200mm diameter. Flows will be by gravity to a single pump station located near the main highway.

Figure 6 shows that the proposed sewerage system, while serving essentially all existing buildings, does not reach into anticipated new development on the eastern side of the village. A 200mm force main, 2900m long, will carry the sewage to the wastewater stabilization ponds. The projected wastewater flow rate is 2000 m^3/day, or about 23 L/sec.

Wastewater Treatment Works. The alignment of the force main route, and the approximate site boundary of the WWTP, is shown in Figure 5 above. A layout of the ponds for the preliminary design can be seen in the lower right corner of Figure 6. The size of stabilization ponds (anaerobic, facultative and maturation) for El Mounira have been selected using the basis of design discussed in Section 3.5 of the NVFS (CDM, August 2006). The pond dimensions for the preliminary design are summarized in Table 1.

All the ponds will contain a membrane liner, protected by a layer of soil or gravel, and a layer of riprap near the water surface to protect against wind-driven waves. The liner is to prevent excessive leakage of water needed for irrigation reuse, and to prevent movement of nutrients from the ponds into the groundwater aquifer.

Table 1. Preliminary Design of Stabilization Ponds, El Mounira

Item	Anaerobic Ponds	Facultative Ponds	Maturation Ponds	Totals, Averages
Design Flow, m^3/day	2,000	2,000	2,000	2,000
Number of Ponds	3	4	3	10
Detention Time, days	3	15	15	33
Water Volume, m^3	6,000	30,000	30,000	66,000
Water Depth, m	4.0	1.5	1.5	1.59
WS Area at Mid-depth, m^2	1,500	20,000	20,000	41,500
Length/Width Ratio	1	2.50	3.00	
Length at Mid-Depth, m	22.4	111.8	141.4	
Width at Mid-Depth, m	22.4	44.7	47.1	
Side Slope, H:V	3.0	3.0	3.0	
Length at Full-Pond Depth, m	34.4	116.3	145.9	
Width at Full-Pond Depth, m	34.4	49.2	51.6	
Area at Full-Pond Depth, m^2	3,542	22,898	22,606	49,047
Freeboard, m	1	1	1	
Length at Top of Dike, m	**40.4**	**122.3**	**151.9**	
Width at Top of Dike, m	**40.4**	**55.2**	**57.6**	
Area at Top of Dike, m^2	4,887	27,015	26,270	58,172
Sludge Storage Depth, m	1.0	0.3	0.0	
Length at Pond Bottom, m	4.4	105.5	136.9	
Width at Pond Bottom, m	4.4	38.4	42.6	
Area at Pond Bottom, m^2	57	16,214	17,515	33,787

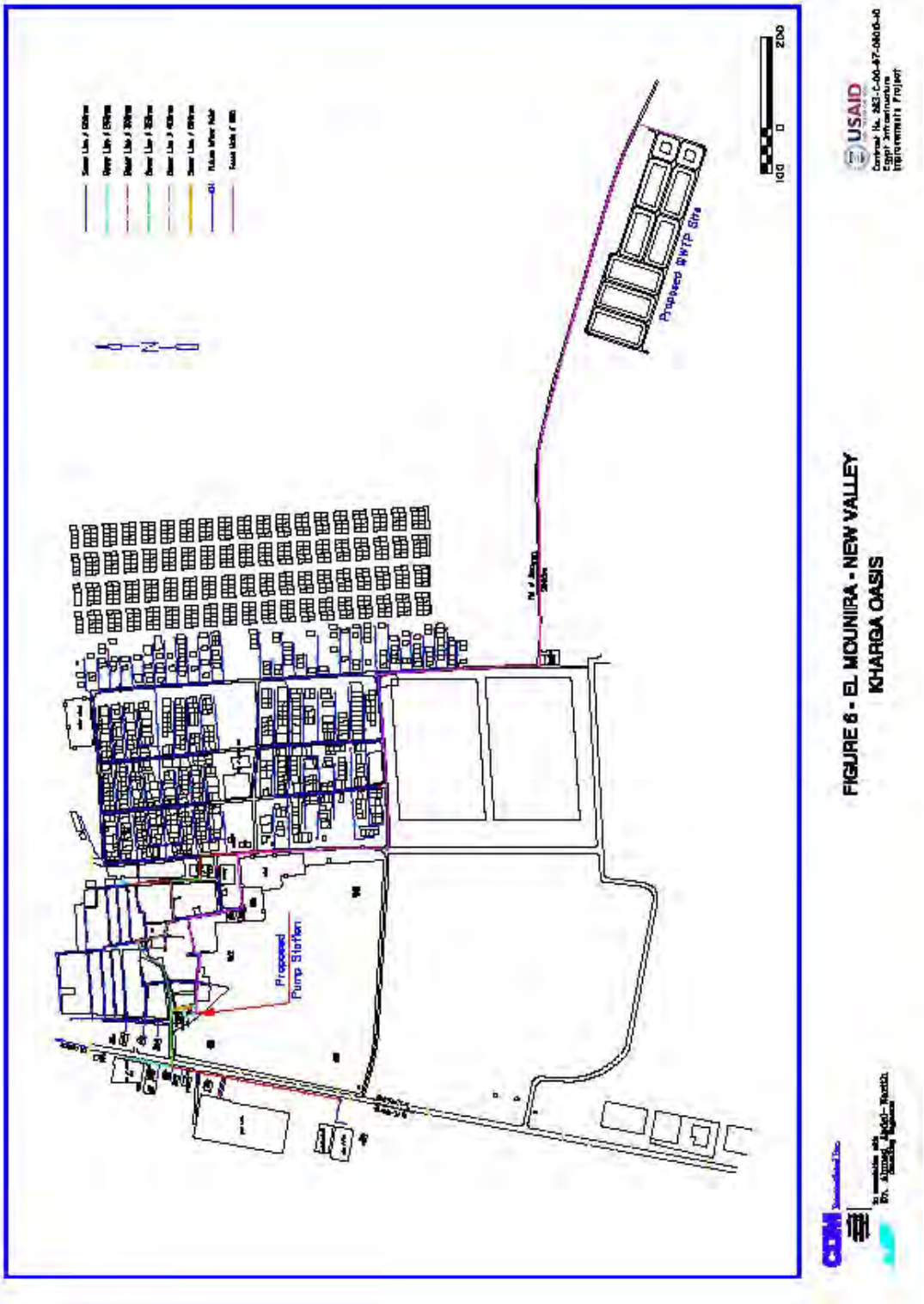

FIGURE 6 - EL MOUNIRA - NEW VALLEY
KHARGA OASIS

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Effluent Disposal and Reuse. The scope of work proposed in the NVFS for the stabilization ponds includes an effluent pump station and short length of force main. Effluent reuse to grow trees for wood was assumed for the feasibility study, with none of the associated costs to be funded by USAID or NOPWASD. Irrigation of small forest plantations has been successful at many other such installations, such as Balat (see Figure 8, below). It is assumed that the villagers could provide the drainage ditches and seedlings required to absorb the effluent.

Previous studies and designs. A detailed ground survey of El Mounira was developed under the feasibility study, including ground elevations and locations of streets, houses, barns and irrigated green areas. The results of the ground survey for El Mounira are included in Appendix C of the NVFS.

A geotechnical survey for El Mounira included 25 borings to 10m depth within the service area of the proposed sewer system, 1 boring near the proposed pump station, and 6 borings at the site of the proposed wastewater stabilization ponds. The geotechnical report for El Mounira is available as an annex to the NVFS. The borings indicate a general prevalence of sandy soil, with traces of silt and gravel. This soil is very suitable as a foundation for sewer pipe, and excavated material can be used to backfill the sewer trenches. Some locations in the southern portion of the village—through which the force main passes (Figures 5, 6)—contain silty clay layers, which have a moderate swelling potential that can cause damage to sewers and manholes if moistened by sewage or irrigation drainage (recall Figure 3). This problem can be minimized by over-excavation of 0.5m to 1.0m, and replacement of the clay soil by clean sand. One of the six borings at the WWTP site also contains silty clay susceptible to swelling; such areas will require over-excavation and replacement of the clay soil with clean sandy soil. The previously-proposed sewage pump station is on a former dumpsite, and will require excavation of the trash to create a good foundation for the pump station.

4.4 Project Alternatives

4.4.1 Treatment Alternatives

The alternatives for providing wastewater collection and treatment systems for the proposed New Valley villages are generally limited to the selection of the appropriate treatment technology. As stated in the NVFS, the Secondary Cities Project Design Criteria Report developed at the beginning of the project in 1997 ranked wastewater stabilization ponds as the best alternative for small communities in Egypt, in preference to trickling filters, aerated lagoons and waste activated sludge. In our judgment, this same ranking is still applicable 10 years later, and for the same reasons: minimal simple requirements for operation and maintenance; minimal cost for construction and operation; stable performance; minimal requirements for energy and chemicals and in general are sustainable.

In the New Valley region, these reasons are even more pertinent than in the Nile delta and Nile valley. For example, the inability to staff a water/wastewater laboratory within the governorate is an indication of the scarcity of specialized skills in O&M (Operations and Maintenance) of mechanical / electrical treatment equipment. Land is available in the desert and in close proximity to each village. Additionally, the New Valley villages with wastewater systems have standardized on stabilization pond WWTPs. The New Valley is familiar with operation of stabilization pond systems and effluent reuse for growing trees in these areas where canals and drains do not exist has proven effective.

4.4.2 No Action Alternative

Local officials of the village see an urgent need for sewers and wastewater treatment. The village currently relies on poorly constructed soakaways and other onsite systems for disposal of wastewater. At present, septage is dumped into wadis, creating a nuisance and health risk. Intermittent water supply (caused by insufficient treated-water storage and pumping when the wells and WTP are not operated) creates a health hazard from sewage leaking into empty leaky water mains. Continued reliance on these types of wastewater systems results in increased human contact and health risks.

The proposed actions (project) are seen to promise distinct benefits to the overall level of sanitation and public health therefore in no instance is the no action alternative a viable option.

4.5 Environmental Assessment

4.5.1. The Scoping Session and Scoping Statement

The proceedings of the joint Scoping Session held in Kharga City on April 11, 2007, are reported in Appendix B. The major and minor environmental issues identified by project staff prior to that meeting, and those contributed by people attending the meeting, are listed therein. The significant issues emerging from the scoping process, and proposed means to address them and monitor them, are discussed below.

4.5.2. Significant Environmental Issues Identified for El Mounira

Positive aspects of the proposed measures include:

- The wastewater systems will give the villages a more healthful and attractive environment.

- The stabilization pond technology proposed has been implemented with good results and without significant negative effects at Luxor, Darawo, the Canal cities, and some 20 sites in the New Valley.

- The ponds are to be located at a distance, and generally downwind, from the densely-settled area of El Mounira.

- The ponds are to be lined to limit the loss of water, and contamination of the aquifer, due to infiltration.

Aspects requiring special attention during design, construction, and operation include:

- *The need to handle the treated effluent either by reuse or the provision of a treated effluent disposal area.*

  The effluent will be suitable for irrigation of woodland plantation and of certain crops. The choice of what is to be irrigated, as well as observance of seasonal requirements and limitations, is to be negotiated between NOPWASD and the Ministry of Agriculture and Land Reclamation. A working arrangement among these two agencies and the local governments is to be developed in the design phase to ensure that a coordinated process is established and implemented for handling the treated effluent.

- *There is potential for uncovering antiquities. While there are few if any known antiquities near the proposed construction sites, it is quite possible that buried antique objects may be unearthed during construction, and should be handled in a manner that conserves them while not unduly delaying the construction schedule.*

  Provisions of the Antiquities Law will be incorporated into contract documents to ensure that antiquities if located during construction will be handled as required.

- *The operation of a wastewater system, even a small and simple one, requires a certain level of water quality sampling and analysis. Due to limited laboratory facilities within the New Valley, one needs to ensure that a reliable wastewater laboratory facility will either be available locally, or arrange prompt transport of samples to an existing laboratory elsewhere.*

  This need could be met at the wastewater plant in Kharga, the regional capital, particularly if its wastewater laboratory is sized and equipped to serve all the wastewater plants in the oasis.

- *Some houses and other sources of wastewater may lie or be newly built beyond the range of the sewerage system, and have to use on-site disposal, with occasional septage pumping.*

  It would be best to install sewerage in developing areas along with other utilities such as water and electric lines, before residents and businesses move in. This would eliminate the need for installing on-site wastewater facilities, which in any case have proven inadequate to maintain healthful conditions in densely settled areas.

  However, if onsite systems are used, it would be wise to make it simple and attractive for pumpers to dispose of septage properly. To this end, it would be well to design manholes at the extremities of the sewerage system—hence close to the unsewered areas—to be well adapted to accept septage. Such design would include placing the manhole(s) to the side (not the middle) of a street, with enough

parking space for one or two septage wagons or trucks, with walls as needed to screen the site from neighboring residences or shops. The size of the manhole, the design of the cover, and the size and grade of the sewer should also be considered for this application.

- *In El Mounira, the proposed stabilization pond site may be threatened by the advance of several barchan dunes a short distance to the north. The prevailing winds drive these dunes south at a rate not yet determined, but burial by such dunes would clearly shorten the life of the pond system.*

  Precise location of the WWTP site should, if at all possible, include consideration of the presumed southward path and rate of advance of such dunes. It would be wise to site the WWTP out of the dune path (to the west, or to the north of it), or sufficiently far south that the facility has a reasonably long life before being buried.

  Dune stabilization methods such as planting or fencing on the upwind slope may be able to slow dune movement, but should not be counted upon to stop it altogether.

- *In sewer and pond construction, the problem of expansive soils,* where found, is to be addressed by proven techniques of over-excavation and backfill with inert sand and gravel.

- *From time to time the ponds, particularly the anaerobic ponds, will need to be dredged of sludge.* An item for longer-term planning for the whole oasis would be provision of a remote sludge-handling site. The stabilized sludge is valuable as a soil builder for woodland and certain crops.

- *Sewer installation will unavoidably block streets* (compare Figures 7 and 8, which show that the width of the excavated trench plus that of the side-cast excavate will effectively block a street of typical width). Where there must be over-excavation of expansive soils, the obstruction will be even greater. If antiquities are unearthed, there will be delays in construction. Sewer installation must therefore be scheduled to occupy any one section of a street for the least possible duration, and not block more than one street at a time in any one small area.

Figures 7, 8. Typical street, El Mounira; sewer installation, Nile Delta village.

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4.5.3. Monitoring

During sewer construction. Monitoring should ensure that the construction crews:

- Observe Egyptian safety regulations.
- Overexcavate trenches as needed when expansive soils are encountered.
- Are alert for antiquities encountered during excavation.
- Schedule work so as to block any one street for as short a time as possible.
- Limit the amount of dust raised, to be not much more than is typical of a desert setting.

During wastewater treatment plant construction, monitoring should ensure that the construction crews:

- Observe Egyptian safety regulations.
- Overexcavate as needed where expansive soils are encountered.
- Are alert for antiquities encountered.
- Properly install the liner that is to minimize seepage from the ponds.
- Control dust generation if it is an issue for the health and safety of construction crews and nearby residents or property.

During the years of plant operation, annual monitoring should be alert to:

- Any complaints of excessive odor or noise from the El Mounira pump station, which is located within the village.
- Any complaints of excessive odor from the stabilization ponds.
- Any complaints of insect pests such as mosquitoes or flies, attributed to the stabilization ponds.
- The presence, numbers, general health, and species of birds on the ponds.
- The rate of barchan dune advance toward the stabilization ponds.
- The quality and consistency of routine sampling at the wastewater plants, and analysis of the samples on site or at the analytical laboratory, wherever located.
- Whether disposal operations are proceeding satisfactorily, with effluent flowing from the plant and being used productively for irrigation, or being stored, or used in another acceptable manner.

5 Balat, Dakhla Oasis

5.1. Background

The proposed project in Balat is to replace an existing stabilization pond WWTP with a larger, better one in essentially the same location. In Figure 9 one can see the existing set of ponds in a patch of desert land surrounded by irrigated fields. The

white polygon overlay shows, approximately, the site boundary of the proposed new WWTP. Balat Village itself is visible in the northeastern corner of the figure.

Figure 9. Aerial view of Balat, showing the ponds of the existing WWTP and the site boundary of the proposed new WWTP (white polygon).

Socio-economic environment. Balat is located about 30 km east of Mout, the principal town in the Dakhla Oasis. For planning purposes, the area of the village is divided into the main village and 8 small suburban or satellite villages, all of which are served by the water supply system, and all of which could potentially be served by the sewer system.

Balat's population, which includes the 8 satellite villages, was about 5100 in 1996, and about 6,500 in 2006. It is projected to grow to 10,000 by 2030. According to the 1996 census, 37 percent of the population is illiterate, 17 percent is literate, and the remaining 46 percent are in school. Thirty-four percent of the population are farmers; 18 percent are teachers, and 13 percent are in commerce.

Known antiquities. Balat contains modern developments which screen the older hilltop settlement of covered streets, and the governor's seat "Palace of the Lord" dating from the Old Kingdom. Balat prospered from trade with Nubia (or Kush). Five mud-brick mastabas (step pyramids) mark the tombs of governors from the VI Dynasty, one of which was discovered as recently as 1977.

5.2. Existing water and wastewater systems

Water supply. Balat has an extensive potable water network, containing 40 km of water mains. A water treatment plant for iron and manganese removal was built in 1997. Its rated capacity is 3,888 m^3/day, although the actual capacity is estimated at 2,592 m^3/day.

Wastewater. A sewer system and wastewater stabilization ponds were built in the late 1980s. The sewer system contains about 24 km of sewers and force main, and 5 small sewage pump stations. The sewer system serves an estimated 90% of the existing population. The estimated inflow rate to the ponds is 700 m^3/day; the estimated effluent rate is 600 m^3/day. The discrepancy between influent and effluent flows can be attributed in part to evaporation from the water surface of the ponds, and in part to the visible overflows onto the ground near the anaerobic ponds, caused by a blockage or other restriction in the flows from the anaerobic ponds to the facultative ponds.

Visual inspection of the ponds indicates that the treatment being provided is inadequate, with anaerobic effluent (devoid of oxygen) being discharged from the facultative ponds and maturation ponds. The effluent is applied to irrigation of wood trees on 5 feddans of land.

Figure 10. The existing Balat WWTP: An anaerobic pond, a larger facultative pond beyond it, and an irrigated grove of casuarina trees.

5.3. Project description

The existing overloaded stabilization-pond wastewater plant is to be replaced by a new system of larger ponds, sized to accommodate flows from a future served population of about 10,000. Expanded demand is expected to be due to extension of

sewerage in Balat (by others), and to connection of other villages' wastewater systems (by others) to this treatment plant. The footprint area of the present set of ponds is about one ha; the footprint area of the set of new ponds is to be nearly 8 ha.

Possible expansion of the existing wastewater stabilization ponds is the only potential improvement under consideration in this feasibility study. Since improvements to the sewer system and water system are not being considered here, details on housing, streets, and land-use planning within the village are not within the immediate scope of this study,

Previous Studies and Designs. A detailed ground survey of the Balat WWTP site, including ground elevations and locations of the existing stabilization ponds, is included in Appendix C of the New Valley Feasibility Study (NVFS). A geotechnical survey carried out at the Balat WWTP site included 8 borings (to depths of 8m to 15m) extending over the existing pond area and the adjacent land needed for the proposed expansion to the wastewater stabilization ponds. The Balat geotechnical report is available as an annex to the NVFS. All of the borings show silty clay having a moderate swelling potential that can cause damage to structures if moistened by sewage or irrigation drainage. This problem can be minimized by over-excavation of 0.5m to 1.0m, and replacement of the clay soil by clean sand. The additional cost for soil replacement has been included in the cost estimates.

Proposed Wastewater Treatment Works. The sizes of stabilization ponds (anaerobic, facultative and maturation) for Balat have been selected using the basis of design discussed in Section 3.5 of the NVFS. The pond dimensions for the preliminary design are summarized in Table 3, assuming that new ponds are built to treat all of the wastewater. A layout of the ponds for the preliminary design is shown in Figure 11, in which the existing ponds are shown within the same general site.

All the ponds will contain a membrane liner, protected by a layer of soil or gravel, and a layer of riprap near the water surface to protect against wind-driven waves. The liner is to prevent excessive leakage of water needed for irrigation reuse, and to prevent movement of nutrients from the ponds into the groundwater aquifer.

A comparison of the dimensions and area of the existing ponds, with the total area of new ponds required, is shown in Table 3. It can be seen that the design forecasts adopted in this study will require new ponds with substantially more capacity than the existing ponds, by a factor of 6 to 12 times as much capacity. The existing ponds could be incorporated into the design of an expanded system, but given the insignificant size of the existing ponds, a completely new set of ponds is proposed as the preferable solution, based on a number of factors.

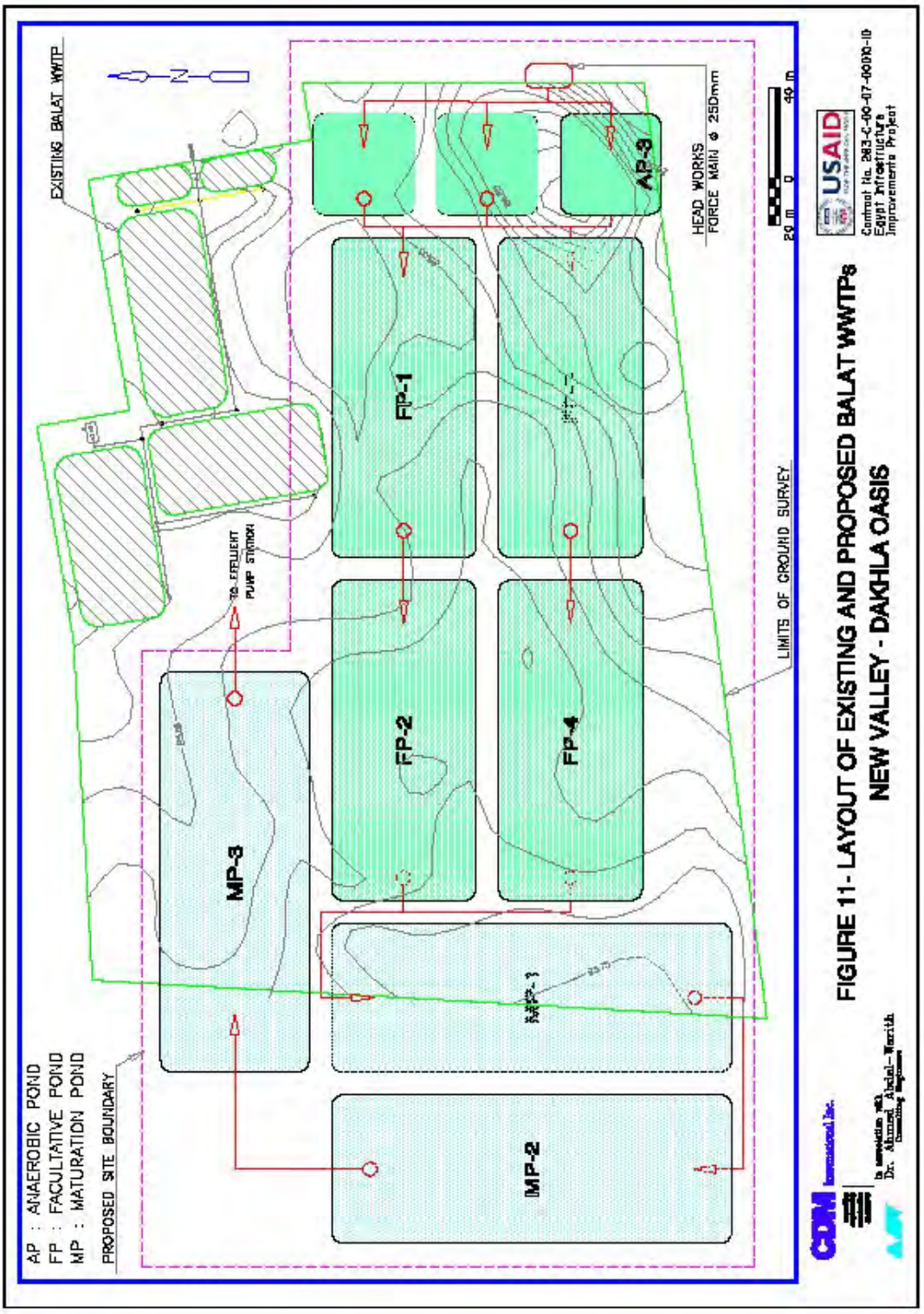
EXISTING BALAT WWTP
N
AP : ANAEROBIC POND
FP : FACULTATIVE POND
MP : MATURATION POND
PROPOSED SITE BOUNDARY
TO EFFLUENT PUMP STATION
AP-3
HEAD WORKS
FORCE MAIN ø 250mm
FP-1
FP-2
FP-4
MP-3
MP-2
LIMITS OF GROUND SURVEY
0 20 m 40 m
USAID
Contract No. 263-C-00-07-00010-10
Egypt Infrastructure Improvements Project
CDM International Inc.
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FIGURE 11- LAYOUT OF EXISTING AND PROPOSED BALAT WWTPs
NEW VALLEY - DAKHLA OASIS

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Table 2. Preliminary Design of New Wastewater Stabilization Ponds, Balat

Item	Anaerobic Ponds	Facultative Ponds	Maturation Ponds	Totals, Averages
Design Flow, m^3/day	2,700	2,700	2,700	2,700
Number of Ponds	3	4	3	10
Detention Time, days	3	15	15	33
Water Volume, m^3	8,100	40,500	40,500	89,100
Water Depth, m	4.0	1.5	1.5	1.59
WS Area at Mid-depth, m^2	2,025	27,000	27,000	56,025
Length/Width Ratio	1	2.50	3.00	
Length at Mid-Depth, m	26.0	129.9	164.3	
Width at Mid-Depth, m	26.0	52.0	54.8	
Side Slope, H:V	3.0	3.0	3.0	
Length at Full-Pond Depth, m	38.0	134.4	168.8	
Width at Full-Pond Depth, m	38.0	56.5	59.3	
Area at Full-Pond Depth, m^2	4,328	30,355	30,018	64,701
Freeboard, m	1	1	1	
Length at Top of Dike, m	**44.0**	**140.4**	**174.8**	
Width at Top of Dike, m	**44.0**	**62.5**	**65.3**	
Area at Top of Dike, m^2	5,803	35,079	34,232	75,114
Sludge Storage Depth, m	1.0	0.3	0.0	
Length at Pond Bottom, m	8.0	123.6	159.8	
Width at Pond Bottom, m	8.0	45.7	50.3	
Area at Pond Bottom, m^2	191	22,576	24,103	46,870

Table 3. Comparison of Existing and Proposed New Stabilization Ponds, Balat

Item	Existing Ponds				Proposed, New Ponds				Area Ratio %
	Length m	Width m	No.	Area m^2	Length m	Width m	No.	Area m^2	
Anaerobic Ponds	33	15	2	1,003	44.0	44.0	3	5,808	579%
Facultative Ponds	89	33	1	2,946	140	63	4	35,000	1188%
Maturation Ponds	70	39	2	5,389	175	65	3	34,243	635%
Totals			5	9,338			10	75,051	804%

Effluent Disposal and Reuse. Effluent reuse to grow trees for wood, as currently practiced at Balat, has been assumed for this feasibility study, with none of the associated costs to be funded by USAID or NOPWASD. It is felt that the villagers could provide the drainage ditches and seedlings required to absorb the effluent. This practice appears to be satisfactory, at Balat and elsewhere in Egypt, so no major problems are anticipated.

5.4 Project Alternatives

5.4.1 Treatment Alternatives

The alternatives for providing treatment systems for the proposed New Valley villages are generally limited to the selection of the appropriate treatment technology. As stated in the NVFS, the Secondary Cities Project Design Criteria Report developed

at the beginning of the project in 1997 ranked wastewater stabilization ponds as the best alternative for small communities in Egypt, in preference to trickling filters, aerated lagoons and waste activated sludge. In our judgment, this same ranking is still applicable 10 years later, and for the same reasons: minimal simple requirements for operation and maintenance; minimal cost for construction and operation; stable performance; minimal requirements for energy and chemicals and in general are sustainable.

In the New Valley region, these reasons are even more pertinent than in the Nile delta and Nile valley. For example, the inability to staff a water/wastewater laboratory within the governorate is an indication of the scarcity of specialized skills in O&M (Operations and Maintenance) of mechanical / electrical treatment equipment. Land is available in the desert and in close proximity to each village. Additionally, the New Valley villages with wastewater systems have standardized on stabilization pond WWTPs. The New Valley is familiar with operation of stabilization pond systems and effluent reuse for growing trees in these areas where canals and drains do not exist has proven effective.

5.4.2 No Action Alternative

Visual inspection of the existing ponds indicated that the treatment being provided is inadequate, with anaerobic effluent (devoid of oxygen) being discharged from the facultative ponds and maturation ponds. The planned expansion of these ponds during the last 17 years was not implemented resulting in overloaded facilities. Additionally, overflowing of the anaerobic basins was occurring. This village will continue to pump their wastewater to this unreliable treatment facility resulting in poor sanitation conditions not only at the facility but also in the wooded area where the 'treated effluent' is disposed.

The proposed actions (project) are seen to promise distinct benefits to the overall level of sanitation and public health therefore in no instance is the no action alternative a viable option.

5.5. Balat: Environmental Assessment

5.5.1. The Balat Scoping Session and Scoping Statement

The proceedings of the joint Scoping Session for El Mounira and Balat, held in Kharga City on April 11, 2007, are reported in Appendix B. The major and minor environmental issues identified by project staff prior to that meeting, and those contributed by people attending the meeting, are listed therein. The significant issues emerging from the scoping process, and proposed means to address them and monitor them, are discussed in the next section.

5.5.2. Environmental issues identified

Environmentally significant aspects of the proposed systems are:

- The systems will give the villages a more healthful and attractive environment.

- The ponds are to be located at a distance, and generally downwind, from the densely-settled areas.

- The ponds are to be lined to limit the loss of water, and contamination of the aquifer, due to infiltration.

- In sewer and pond construction, the problem of expansive soils, where found, are to be addressed by proven techniques of over-excavation and backfill with inert sand and gravel.

- The effluent will be suitable for irrigation of woodland plantation and of certain crops, and landscaping. NOPWASD in coordination with Ministry of Agriculture and Land Reclamation is to (MALR) manage the treated effluent, and the effluent from the proposed WWTP will be reused through schemes managed by MALR. The choice of what is to be irrigated, as well as observance of seasonal requirements and limitations, is to be negotiated between NOPWASD and the MALR.

  Another possibility is that the New Valley Governorate would invite investors for better use of the treated effluents.

- The operation of a wastewater system, even a small and simple one, requires a certain level of water quality sampling and analysis. This need could be met at the wastewater plant in Mout, the regional capital of Dakhla Oasis, with a wastewater laboratory sized and equipped to serve all the wastewater plants in their regions.

- From time to time the ponds, particularly the anaerobic ponds, will need to be dredged of sludge. An item for longer-term planning for the whole region would be provision of a remote sludge-handling site. The stabilized sludge is valuable as a soil builder for woodland and certain crops.

- Consider the potential impact of construction activities on antiquities. There are few if any known antiquities near the proposed construction site, but it is quite possible that buried antique objects will be unearthed during construction, and should be handled in a manner that conserves them while not unduly delaying the construction schedule.

5.5.3. Monitoring

During wastewater treatment plant construction, monitoring should ensure that the construction crews:

- Observe Egyptian safety regulations.

- Overexcavate as needed where expansive soils are encountered.

- Are alert for antiquities encountered.

- Properly install the liner that is to minimize seepage from the ponds.

- Control dust generation if it is an issue for the health and safety of construction crews and nearby residents or property.

During the years of plant operation, annual monitoring should be alert to:

- Any complaints of excessive odor from the stabilization ponds, since at Balat they are surrounded, at a distance, by irrigated fields and some residences.

- Any complaints of insect pests such as mosquitoes or flies, attributed to the stabilization ponds.

- The presence, numbers, general health, and species of birds on the ponds.

- The quality and consistency of routine sampling at the wastewater plants, and analysis of the samples on site or at the analytical laboratory, wherever located.

- Whether disposal operations are proceeding satisfactorily, with effluent flowing from the plant and being used productively for irrigation, or being stored, or used in another acceptable manner.

6 Naser El Thowra Village, El Kharga Oasis and Villages of El Gedida and Tanidah, Dahkla Oasis

6.1. Socio-economic environment

Naser El Thowra, Kharga Oasis

Naser El Thowra is located about 20 km south of El Kharga. The village was established in 1959 when the first settlers moved from El Kharga, and contained 3200 people in 2006 in the two contiguous villages of Naser and El Thowra. Several areas have been designated for future development. The area currently under rapid development is to contain 1000 housing units (4 persons/unit) on house lots of 150-200m^2; the house lots are on sale now, and the village expects this area to be fully developed by 2007. A visit to the area showed construction was underway on about 50 of the 1000 housing units. There is an existing hotel of 58 rooms and a new hotel of 50 rooms and a golf course are planned. Areas for future development of

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industry and commerce have also been designated.

Figure 12. Naser El Thowra WTP

The existing water supply system consists of two wells and a water treatment plant (WTP) that treats the water from one of the wells. The well and WTP are operated at a rate of 54 m^3/hour up to 15 hrs/day, usually from 6:00 AM to 9:00 PM. The second non-potable well is operated, also at 54 m^3/hour, for 7 hrs/day to meet peak mid-day demands, between 10:00 AM and 5:00 PM. The total maximum daily water use of 1188 m^3/day, and the existing population of 3211, indicates a per capita water use of 370 lpcd. This seems high, but pipe leakage is high, and watering of gardens and livestock is relatively common. The flow from each well is throttled to reduce the flow from the rated capacity of about 200 m^3/hour to 54 m^3/hour.

There is no bulk water metering on the wells or WTP. There are 627 domestic customers, and 28 governmental customers. City officials estimate that 800 houses are under construction and will receive water supply soon. Water testing is carried out by a hospital in Kharga. Customer water meters are read at irregular intervals of 2 or 3 months, and so annual totals for the system as a whole are not determined. Local officials of the village see an urgent need for sewers and wastewater treatment. At present, septage is dumped into wadis, creating a nuisance and health risk. They reported 20 recent cases of typhoid, and that the groundwater is being contaminated. Intermittent water supply (caused by insufficient treated-water storage and pumping when the wells and WTP are not operated from 9:00 PM to 6:00 AM) creates a health hazard from sewage leaking into empty leaky water mains.

El Gedida in Dakhla Oasis

El Gedida is located about 15km to the northwest of Mout in the Dakhla Oasis. The main village of El Gedida contained 5,400 people in 2006, while 3 suburban villages - Ghargor, El Moshia, and Ezbet El Moshia (all lying to the north of the main village) see Figure 13 - contained about 3,800 people, bringing the total to 9,200. El Gedida (including Ghargor) and El Moshia (including Ezbet El Moshia) are served by separate water treatment plants. The preliminary plan is for a proposed sewer system and stabilization ponds to serve the main village, but with sufficient capacity provided in the trunk sewers to allow the 3 suburban villages to be served in the future. However, the trunk sewers, branch sewers, house connections and sewage pump station(s) to serve the 3 suburban villages would not be included in the first-phase sewer system.

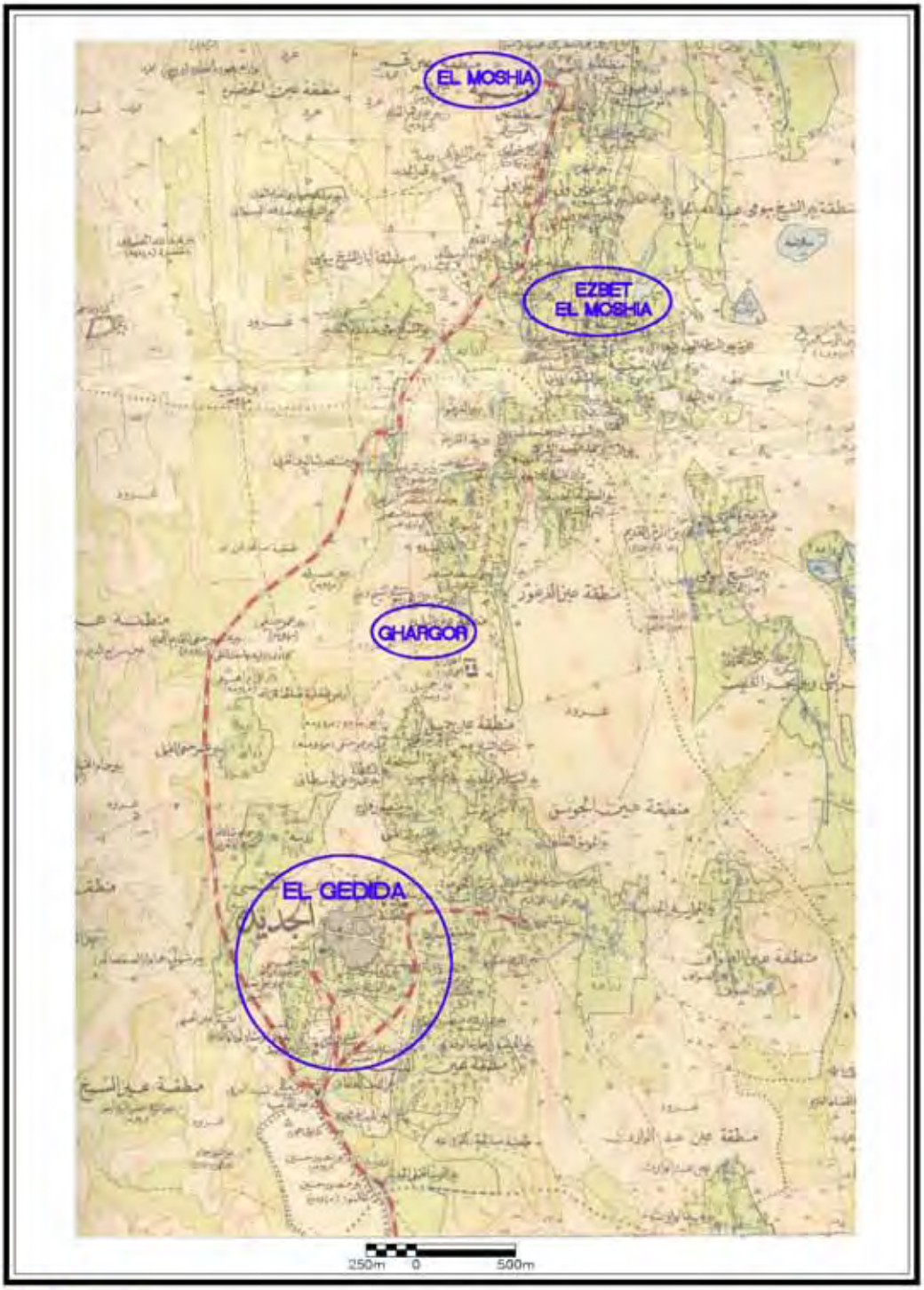

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FIGURE 13 - EL GEDIDA VILLAGE AND ITS SATELLITE VILLAGES

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Tanidah in Dakhla Oasis

Tanidah is located about 40 km east of Mout, the principal town in the Dakhla Oasis, on the main road from Kharga Oasis. The reported population in 2006 is 6,100 persons for Tanidah and its 8 satellite villages – see Figure 14. All of the population is served by the public potable water system. Tanidah has no sewer system. A sewer system and wastewater stabilization ponds are being considered.

The potable water system is served by 2 wells: a 150 m^3/hour well which supplies a water treatment plant required for iron removal; and a 200 m^3/hour well which supplies water directly to the system without treatment. The filtered supply serves 1330 customers in Tanidah and 5 satellite villages, while the unfiltered supply serves 903 customers in 3 satellite villages. Currently a new treatment plant is under construction to supply these 3 satellite villages with filtered water.

6.2. Aesthetic and cultural environment

The Kharga Oasis is notable primarily for a string of deserted Roman forts, and descendents of Mamluke soldiers, that mark the ancient Forty Days Road (a slave-trafficking route until 1884) and other desert trade routes. Egypt's rulers banished troublemakers into exile at Kharga, from the Fourth Century through very recent times including incarceration at Kharga Prison. The project village of Naser El Thowra is within 5 km of Qasr al-Zayn, which lies at an elevation of 18m below sea level, the lowest point within the Kharga Oasis.

In the Dakhla Oasis, the district capital of Mout was reported to be a fortified citadel as recently as 1909, and contains a development of narrow twisting passageways suitable for defense. There are ruins in the vicinity of the project village of El Gedida (meaning "new", established only 200 years ago) and satellite village of El Moushia.

6.3. Project Description

Figure 15. Typical Naser El Thowra Street

Wastewater Collection System. The Naser El Thowra layout of the sewer system is shown on Figure 16, in which the routes and sizes of the sewers are shown. The sewage pump station (P.S.) is located near the center of the village, and requires a 200mm-diameter force main of length 2.5 km from the pump station to the stabilization ponds. The layout allows a gravity sewer to be laid under the railway to serve areas of the village lying to the East of the railway; much of this area is still un-developed aside from a small hotel. Portions of the future flows must be pumped to reach the point of connection to the gravity sewer, but nearby areas could be served by gravity.

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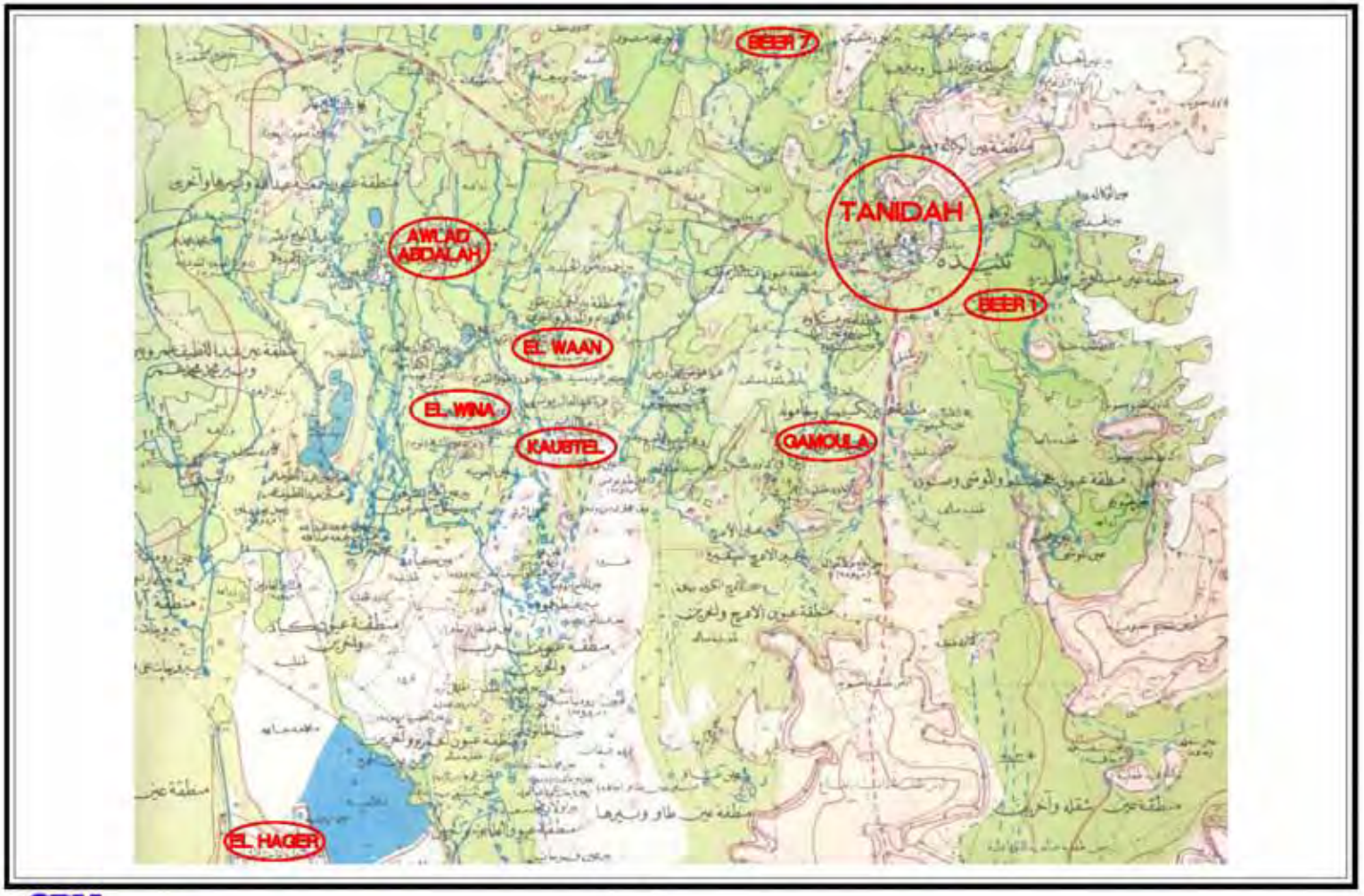

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300m 0 600m

Figure 14 - TANIDAH VILLAGE AND ITS SATELLITE VILLAGES

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Egypt Infrastructure Improvements Project

FIGURE 16 - NASER EL THOWRA - NEW VALLEY
KHARGA OASIS

Figure 17. Typical El Gedida Street

The proposed sewer system for El Gedida is shown on Figure 18. About 10 km of gravity sewer will be required, of which 7 km will be the minimum size of 200mm diameter. Flows will be collected by gravity to two pump stations located at the low points in the village. The secondary pump station which is located east of the village will carry the flow to the main pump station through a 200mm force main 1500m long. All the flow will be carried through a 250mm force main 2500m long from the main pump station (located at the center of the village) to the wastewater stabilization ponds.

The proposed sewer system for Tanida is shown on Figure 19. About 8.6km of gravity sewer will be required, of which 7.2km will be the minimum size of 200mm diameter. Flows will be collected by gravity to a single pump station located near the main highway. A 150mm force main, 3600m long; will carry the sewage to the wastewater stabilization ponds, which is proposed to be located along El-Hager village road. Trunk sewers have been placed to receive flows from Beer (1) satellite village of Tanida. While the pump station will be designed to receive the flows of Beer (7) Gamoula satellite villages in addition to the flows of Beer (1) and Tanidah itself by the year 2030.

Wastewater Treatment Works. All the ponds will contain a membrane liner, protected by a layer of soil or gravel, and a layer of riprap near the water surface to protect against wind-driven waves. The liner is to prevent excessive leakage of water needed for irrigation reuse, and to prevent movement of nutrients from the ponds into the groundwater aquifer.

Figure 20. El Gedida WWTP Site

Effluent Disposal and Reuse. The scope of work proposed in the NVFS for each of the stabilization ponds includes an effluent pump station and short length of force main. Effluent reuse to grow trees for wood was assumed for the feasibility study, with none of the associated costs to be funded by USAID or NOPWASD. It is assumed that the villagers could provide the drainage ditches and seedlings required to absorb the effluent.

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FIGURE 18 - EL GEDIDA - NEW VALLEY
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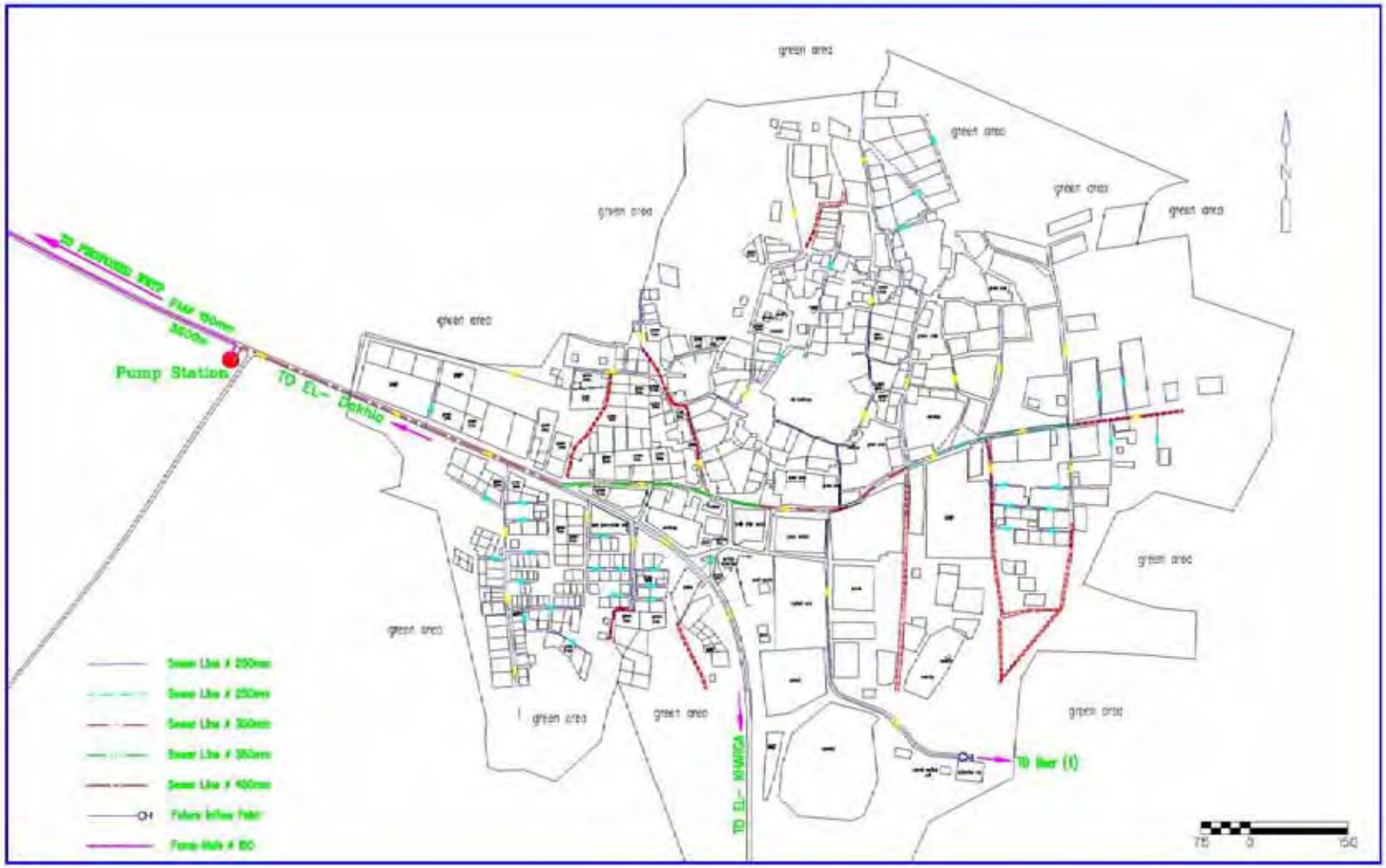

FIGURE 14 - TANIDAH - NEW VALLEY
DAKHLA OASIS

Previous studies and designs. A ground survey of each village was developed under the feasibility study, including ground elevations and locations of streets, houses, barns and irrigated green areas. The results of the ground survey for each of the three villages are included in the Appendices of the NVFS.

A geotechnical survey included 25 borings within the Naser El Thowra village and WWTP site, 39 borings in the villages of El Gedida and Ghargour and at the WWTP site and 20 borings within the village of Tanidah and the surrounding satellites. The geotechnical reports are annexed to the NVFS. The borings indicate a general prevalence of sandy soil, with traces of silt and gravel. Some locations contain silty clay layers, which have a moderate swelling potential that can cause damage to sewers and manholes if moistened by sewage or irrigation drainage. This problem can be minimized by over-excavation of 0.5m to 1.0m, and replacement of the clay soil by clean sand.

6.4. Project Alternatives

6.4.1 Treatment Alternatives

The alternatives for providing wastewater collection and treatment systems for the proposed New Valley villages are generally limited to the selection of the appropriate treatment technology. As stated in the NVFS, the Secondary Cities Project Design Criteria Report developed at the beginning of the project in 1997 ranked wastewater stabilization ponds as the best alternative for small communities in Egypt, in preference to trickling filters, aerated lagoons and waste activated sludge. In our judgment, this same ranking is still applicable 10 years later, and for the same reasons: minimal simple requirements for operation and maintenance; minimal cost for construction and operation; stable performance; minimal requirements for energy and chemicals and in general are sustainable.

In the New Valley region, these reasons are even more pertinent than in the Nile delta and Nile valley. For example, the inability to staff a water/wastewater laboratory within the governorate is an indication of the scarcity of specialized skills in O&M (Operations and Maintenance) of mechanical / electrical treatment equipment. Land is available in the desert and in close proximity to each village. Additionally, the New Valley villages with wastewater systems have standardized on stabilization pond WWTPs. The New Valley is familiar with operation of stabilization pond systems and effluent reuse for growing trees in these areas where canals and drains do not exist has proven effective.

6.4.2 No-Action Alternative

Local officials of these villages see an urgent need for sewers and wastewater treatment. The villages currently rely on poorly constructed soakaways and other onsite systems for disposal of wastewater. At present, septage is dumped into wadis, creating a nuisance and health risk. Intermittent water supply (caused by insufficient treated-water storage and pumping when the wells and WTP are not operated) creates

a health hazard from sewage leaking into empty leaky water mains. Continued reliance on these types of wastewater systems results in increased human contact and health risks.

The proposed actions (project) are seen to promise distinct benefits to the overall level of sanitation and public health therefore in no instance is the no-action alternative a viable option.

6.5. Environmental Assessment

6.5.1. The Scoping Session and Scoping Statement, Issues, and Monitoring

The proceedings of the joint Scoping Session held in Kharga City on April 11, 2007, are reported in Appendix B. The major and minor environmental issues identified by project staff prior to that meeting, and those contributed by people attending the meeting, are listed therein. The significant issues emerging from the scoping process, and proposed means to address them and monitor them during the planning, design, construction and operations phases, have been discussed above in Sections 4.4 and 5.4. Additionally, the project alternatives are as discussed for El Mounira in Section 4.6. The various issues are similar for these three New Valley villages, especially as they relate to El Mounira, and therefore will not need to be repeated here.

7 Final words

Experience with the 20 or so existing stabilization pond systems in New Valley, and those elsewhere in Egypt, has been mostly positive. Aside from odor problems at some overloaded ponds, and some damage to buildings due to sewer leaks in areas of expansive soils, the problems appear to be few. The principal message from New Valley citizens and their representatives is that they are impatient to receive more such systems.

8 References

- **New Valley Feasibility Study Report**, prepared for the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the U.S. Agency for International Development, USAID PROJECT No. 263-0236, USAID Contract No. GHA-I-00-04-00006-00, Task Order No. 03. CDM International, Inc. in Association with Dr. Ahmed Abdel-Warith, Consulting Engineers, August 2006.

- **"Managing Water for Peace in the Middle East,"** United Nations University Press: Chapter 4: The Nile River.

- **Hurst, H. E., The Nile,** London, Constable, 1952, 325 pp.

- **Climate Explorer, Royal Netherlands Meteorological Institute (www.knmi.nl)**

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- **Wikipedia entry (May 2007) for "Barchan,"** which in turn cites:
    - Schwämmle, V., and H. J. Herrmann (2003). "Solitary wave behaviour of sand dunes," *Nature* **426** (Dec. 11); pp 619-620.
    - H. Elbelrhiti, P. Claudin, and B. Andreotti (2005). "Field evidence for surface-wave-induced instability of sand dunes". *Nature* **437** (Sep. 29): 720-723.
- **USAID, "Environmental Compliance Procedures,"** brochure describing Title 22, Code of Federal Regulations, Part 216 (1980). Available online at: www.usaid.gov/our_work/environment/compliance/22cfr216.htm.

APPENDIX A

List of EA preparers

This report was prepared by Jonathan A. French, Ph.D., of CDM, with valuable support from Ashraf El-Sayed Ismail, Ph.D., of the National Water Research Center Drainage Research Institute; Moustafa Tayeb of CDM; Stephen B. Nielson, P.E., of CDM; and Richard E. Minkwitz, P.E., the CDM Project Director.

APPENDIX B

Proceedings of the Scoping Process and Scoping Session

B.1. List of government agencies consulted by the environmental team during scoping and/or the Feasibility Study

- New Valley's Office of the Governor
- NOPWASD
- New Valley Village Mayors and their representatives
- New Valley Water and Wastewater Operating Entity
- Representative from the Ministry of Housing for Local Development
- National Research Institute
- Representatives of the respective Markaz

B.2. List of Invitees to Scoping Session

The Office of the Governor through the New Valley's General Secretary invited attendees by telephone calls to the various senior representatives who then passed along invitations to others within the organization or the community.

B.3. List of Participants at the Scoping Session

List of Participants included at end of this Appendix.

B.4. Scoping Session

The scoping session was held on 11 April 2007 at 8:30 pm in the Conference Room of the Governorate Building in Kharga City of Kharga Oasis. Copies of the Environmental Scoping Meeting agenda was prepared in English and Arabic and distributed to participants at the meeting. The presentation was delivered predominately in Arabic, and English presentations were translated into Arabic. The meeting was opened by CDM Project Manager, Rick Minkwitz, who described the Egypt Infrastructure Improvements Project and the purpose of the Environmental Assessment process. CDM/AAW Deputy Project Manager, Moustafa Tayeb, and EA Specialist, Dr Ashraf gave a powerpoint presentation describing the New Valley projects, the EA process and the potentially significant environmental issues. Comments, all verbal, were received following the presentation and have been summarized herein. The Scoping Session meeting was closed by the New Valley Governorate's General Secretary, Saad Abu Elela.

B.4.1. Environmental Issues Mentioned in the Presentation

Potential environmental effects that have been identified, whether positive or negative, are listed below.

General

- There will be an improvement in public health.
- There will be a reduction in the cost and effort to dispose of wastewater: a positive socioeconomic impact on the villagers.
- Employment opportunities will be created for skilled, semiskilled and unskilled laborers during construction and operation & maintenance.
- The system will produce an effluent of adequately good quality to support the irrigation of trees and non-consumed crops.
- Consider the potential impact of construction activities on antiquities.
- Due to requirements for monitoring of wastewater influent and effluent, there will be increased demand for local laboratory services.

Construction of the new wastewater collection system, El Mounira

- There will be improvement in the form of a lowered water table within the residential area of El-Mounira.
- Consider public safety, traffic control and interruptions during construction including interruptions of water or electric utility services.
- Be aware of locations where the sewerage system may pass through deposits of expansive clays, which swell when wetted. In such locations, take measures to minimize the probability of leakage from the sewer into this soil, and replace such soil with sand to the extent necessary.
- If it happens that unsewered areas remain adjacent to sewered areas, provide manhole access in the sewers nearest such areas for the convenience of septage haulers who need to discharge their loads.
- Where new pump stations are to be located, the impacts on land use, energy consumption and traffic control must be assessed.
- Consider operation and maintenance activities at these new pump stations, e.g. problems of noise, odors and disposal of screenings.

Construction of Stabilization Pond Wastewater Treatment Systems, El Mounira and Balat

- Consider the location of the new stabilization pond sites, and problems of associated land acquisition.

- There will be improvement in the quality of effluent used for irrigation.

- Determine whether there are limitations to how much effluent can be accepted for irrigation, from season to season.

- Consider public safety, traffic control and interruptions during construction including interruptions of water or electric utility services.

- After several years of operation, it may be necessary to remove and dispose of sludge accumulated in stabilization ponds. If possible, adequate land should be acquired for drying and treating the sludge, and stockpiling it on site unless or until it can be taken away for appropriate agricultural use.

B.4.2. Summary of Comments Received

The following comments were received during the meeting. The comments include expressions of the interest of the representatives of the other villages in the Feasibility Study to have wastewater service as soon as possible, as well as environmental impacts.

Location of WWTP at El Mounira villages

Comment: The location of the proposed Wastewater Treatment Plant (WWTP) should be far enough from the present residential area and any further development.

Response: The proposed WWTP is located at least 1 km away from any future development.

Nuisance from the proposed WWTP at El Mounira village

Comment: Operation of the WWTP should not cause any remarkable nuisances in terms of odor and noise to the village residents

Response: The location of the WWTP of El Mounira is southeast of the residential area by 1.5 km and the treatment plant will have only minor mechanical works. In addition, the prevailing wind is from northwest. The proposed WWTP will not cause significant odor problems. Therefore it is expected that there will be negligible odor and noise problems for the village residents.

USAID support allocated to the New Valley Governorate

Comment: The USAID support allocated to the New Valley Governorate is relatively low and the community expects more support.

Response: Although the budget allocated this year can cover only two villages, there is a possibility that in the future the USAID would support the proposed activities for one or more of the three other villages.

Comment: What are the selection criteria of the two villages?

Response: It is one for Dakhla Oasis and one for Kharga Oasis where the rest of the five villages will be handled in the new program with total fund of 20 Billion LE covering the whole rural area of Egypt.

Comment: The involvement of local community in running the projects is missing, unlike other programs, such as the Swiss Fund.

Response: There are other programs run by USAID that allow for the involvement of the local community, such as the Small Enterprise Program.

Comment: Do the funds allocated for the proposed projects for the two villages cover all activities including the treatment works?

Response: USAID confirms that the fund will covers the whole proposed activities for the two villages, including the WWTP.

Coordination between USAID and NOPWASD

Comment: There is a need to have full cooperation between USAID and NOPWASD to handle the rest of the proposed activities for the other three villages.

Response: There is coordination between USAID and NOPWASD for any upcoming projects.

Other villages subject to subsurface water problems

Comment: El Gedida and Tenidah Villages suffer from subsurface water problems and stagnant water in the residential areas. They, too, need to have wastewater collection systems as soon as possible.

Response: The villages are of the villages that have a priority in the NOPWASD program for rural areas of Egypt.

Reuse of effluents

Comment: The project should include reuse of treated effluents.

Response: NOPWASD in coordination with Ministry of Agriculture and Land Reclamation (MALR) manage the treated effluent, and the effluent of the both proposed WWTPs will be reused through schemes managed by MALR. Another possibility is that the New Valley Governorate would invite investors for better use of the treated effluents. The reuse scheme would include planting trees for wood production and landscaping.

Appreciation from the project area (proposed served villages Balat and El Mounira villages)

The communities within the villages of the project area appreciate the proposed activities supported by USAID and NOPWASD.

B.4.3 Written Statements Received

All comments were provided verbally at the meeting; there were no written statements.

B.5. Public NGO Correspondence

B.6. Meetings with Government Agencies

B.7. Significant Issues to be Addressed in the Environmental Assessment

The significant issues to be addressed in the Environmental Assessment include:

- In each of the villages, provisions need to be made for handling the treated effluent either by reuse or the provision of a treated effluent disposal area.

- Although sites where the work will proceed have been used by the respective villages for many years, consideration must be given to the potential for uncovering antiquities.

- Due to limited laboratory facilities within the New Valley, consideration needs to be given to providing for or determining that a reliable wastewater laboratory is available.

Egypt Infrastructure Improvements

Environmental Assessment Scoping Session

Wednesday: 11 April 2007

Venue: New Valley

Meeting Attendance

Ser	Name	Organization	Telephone
1	Richard Minkwitz	CDM	010 1933030
2	Stephen Nielson	CDM	010 6694247
3	Ashraf Ismail	CDM/AAW	012 7835558
4	Moustafa Mohamed El Tayeb	CDM/AAW	010 1444609
5	Ashraf Abdullah Ata Allah	Local city Council for El-Kharga City and Markaz - Technical Surveyor	7923240
6	Sayed Mohamed Ahmed Younies	Urban Planning Department - at El Kharga Markaz -	012 7259577
7	Giehan Hosien Mohamed	Radio / Broadcasting - News reporter -	7933607
8	Naser Mohamed Omar Saied	Engineering Department- Mounira Village Local city Council	7960097
9	Yehia Abda Mohamed	Project Specialist in the Governorate	7933723
10	Hosni Sadek Gharsaa	Wastewater Technician at Kharga Markez	012 9372815
11	Mansour Abdalla Gabr	Wastewater Technician at Kharga Markez	7924432
12	Gharieb Ibrahim El Sawi	USAID	012 2176314
13	Amani Loka	USAID	012 6868797
14	Sabr Ahmed Mohamed Sakr	The Chief of Balat village & Dakhla Markez	012 7636337
15	Anwar Ahmed Kenawy	Head of Engineering Department of Balat Village	012 9451698
16	Khdr Abdalla Mohamed	Head of Development department - El Gedida Village Local Council	010 2871209
17	Mohamed Abdel Sayed Mohamed	Head of Engineering Department of El Gedida Village	7746351
18	Nabila Hasan Saied	Water Department Manager	010 5463351
19	Namat Ayied Saied	Water Treatment Plants Engineer	010 9469148
20	Omyma Ali Talab	Water Wells Maintenance Engineer	012 4424178
21	Mansour Mohamed Saied	Urban Planning Technician	012 9897623
22	Sayed M. Abdalla	Chief of of El Gedida Village Local Council	N/A
23	Yousef Hamouda Abdalla	Chief of El Mounira Village Local Public Council -	N/A
24	Mansour Mohamed Wahd	Chief of El Gedida Village Local Public Council	N/A
25	Ghdr Hosien Mohamed	Secretary of El Gedida Village Local Council	N/A
26	Mansour Mohamed Abdel Malek	Senior Technician of the Utility Department - Dakhla	N/A
27	Sayed Saad Ryad	Tecnation of the Utility Department - Dakhla	N/A
28	Anwar Ibrahim Hanaa	Utility Department Engineer - Dakhal	N/A
29	Mohamed Ali Abdel Kawi	Senior Technician -Water Supply Network - Kharga	N/A
30	Ahmed Hosien Ahmed	Senior Technician - W. T.P - Kharga -.	N/A
31	Ibrahim Mohamed Yknown	Senior Technician - W.T.P. Kharga	
32	Mahmoud Tartwsh Abdel Moniem	Senior Technician of the WW. Department - Kharga	

Ser.	Name	Organization	Telephone
33	Tallat Zaraa Hassan	Gen. Manager of Agriculture Department	N/A
34	Salah Abdel Hamied Mahmoud	Manager of Planting and Environmental - Agriculture Department	N/A
35	Ali Abdalla	The Chief of of Nasr El Thawra Village Local Council	N/A
36	Moustafa Khalil Masry	Nasr El Thawra Village Local Council	N/A
37	Abdel Hady Thabet	Nasr El Thawra Village Local Council	N/A
38	Mona Mohamed Ali Abdel Hamied	Manager of Urban Planning Department - Kharga	N/A
39	Mahmoud Gharieb Mohamed	New Valley Irrigation Department -	N/A
40	Salah El Dien Hananien	Production General Department	N/A
41	Ahmed Mohamed Ibrahim	Planning and Follow Up General Department	N/A
42	Abdel Aziz Abu El Hasan Hosien	NV. Governorate Urban Planning Department -	N/A
43	Vector Roshdy Shardien	General Manager of the Engineering Department - Kharga	N/A
44	Sayed Ahmed Abdel Sayed	Villages Development Authority	7923864
45	Mohamed Abdel All Abdel Aziz	Chief of the Wastewater Utility Department	N/A
46	Saied Hasan Mohamed	Manager of Land Fund Box	7922141
47	Hamad Frghaly Ahmed	Chief of El Mounira Village .	
48	Walied Hosien M. Abdalla	General Department of Groundwater	7935033
49	Saber Mohamed Ismail	EL Mounira Village Local Council - - Development responsible	7960070
50	Mohamed Modaa Abdalla	EL Mounira Village Local Council - Driver	7960439
51	Shokry Abdel Kalek Shaban	Planning and Follow Up General Department Office Manger	7925447
52	Adel Abdel Nabi	General Manager of the ARABESC Workshop - Village Urban Development Authority	7929835
53	Mohamed Soliman Ahmed	General Manager of the Housing Department-	7921148
54	Khaled Ismail Zaki	Desert Research Center	5103872
55	Fawkia Abdel Galil Khater	Kharga Local Council Markaz	79929707
56	Ahmed Abdel Rahman Ahmed	Manager of the Agriculture Advising	7920754
57	Salah El Din Sayed Hamad	General Manager of Production General Department	7925446
58	Ragab Yousef Mohamed	Land reclamation fund Box	7927234
59	Mawad Galal Mohamed	General Manager of Local Councils	220 7925446
60	Fatma Mohamed Mahfouz Ali	N.V. Governorate Information Center Gen. Manager	7924127
61	Mohamed El Tayeb Sayed Roha	Secretary of Balat Village Local Council.	7703013
62	Abu El Hasan Sayed Sakr	Chief of Balat Village Local Public Council	7703062
63	Abu Bakr Ibrahim Ali	Information Center	7920735
64	Aziza Hosien Othman	Manager of the Investment Sector	7920294
65	Adel Khdr Ibrahim	General Manager of Planning Department .	7925446
66	Ahmed Ali Abdel Kariem	Chief of the Governorate Media Office	7926926
67	El Saied Ahmed Abdel Rahman	Sn. Deputy of the El- Kharaga Markaze Chief	7821308
68	Zakria Hosien Mohamed Mansour	Secretary of Taneda Valley Local Council	7630001
69	Abdel Waha Abdel Salam Moaaz	Chief of Taneda Markz	7630001
70	Mohi EL Dein Ali Mohamed	Chief of Taneda Village Local Public Council	7630001
71	Ahmed Monier Saied	Engineer Department at Tanida Village Local Council	7630073
72	Mohamed Ahmed Ali	Development Specialist - Tanida Village	7630185
73	Radwan Braka Mohamed	Advisor of Education Sector	3200077
74	Mahmoud Ali Mohamed El Asrawy	Governorate Legal Department General Manager	926175
75	Abdel Hakiem Gebali	General Manager of the Public Works	N/A
Ser.	**Name**	**Organization**	**Telephone**

76	Ibrahim Basheir	Chief of Kharga Water Utility Department	N/A
77	Ahmed Sayed Ghalil	Manager of Administration & Financial General Department in New Valley Governate	N/A
78	Khalaf Mhmoud Abdel Kariem	Farmer	N/A
79	Sad Abdel Kariem	Farmer	N/A
80	Saleh Ibrahim Saleh	Farmer	N/A
81	Ahmed Abu Rehab Maghy	Farmer	N/A
82	Abdel All El Sayed Ahmed	Farmer	N/A
83	Gharieb Mahmoud Srhan	Farmer	N/A
84	Abou El Ftoh Mahmoud Abdel Kader	Farmer	N/A
85	Sad Awad Godaa	Farmer	N/A
86	Aied Abdel Warth Khalil	Farmer	N/A
87	Ali Abdel Moiz Hamied	Farmer	N/A
88	Dawood Soliman Kandil	Deputy Chief of Kharga Local Council	N/A
89	General Maged	Chief of Kharga City & Markaz	N/A
90	Ahmed Hosien Marzouk	Manager of Follow Up at Kharga City & Markaz	
91	Amed Sayed Abdel Moula	New Valley Governorate	930755
92	Saad Ismail	New Valley Governorate Administration Manager	7921337
93	Assam Younis Mohamed	Governorate Public Relation	N/A
94	Salah Gabal	Governorate Public Relation	N/A
95	Abdel Kader Mohamed Abas	Governorate Public Relation	N/A
96	Mohamed Mahmoud Kasiem	Governorate Public Relation	N/A
97	Mahdy Saied	Governorate Public Relation	N/A
98	Gen. Sad Abu El Ola	N.V Governorate General Secretary - New Valley	N/A

APPENDIX C

Egyptian Environmental Law

C.1 Policy and Legal Framework

This Appendix identifies the major policies that bear on the environmental components of infrastructure improvements projects, and institutional bodies with direct water quantity and quality management responsibilities, as well as the regulatory framework within which they operate.

C.1.1 Background

The Ministry of Water Resources and Irrigation (MWRI) is formulating a national water policy to address the problem of water scarcity and water quality deterioration. The policy's objective is to utilize conventional and non-conventional water resources to meet the country's socioeconomic and environmental needs. Under law No. 12 (1984), MWRI retained overall responsibility for the management of all water resources, including available surface water resources of the Nile system, irrigation water, drainage water and groundwater.

The central organization for environmental protection is the Egyptian Environmental Affairs Agency (EEAA), which advises the prime minister on environmental matters. It prepared the 1993 Environmental Action Plan for Egypt, which is presently being updated. The State Minister of Environment heads the agency. According to Law 4, it has enforcement authority with respect to environmental pollution with the exception of fresh water resources. Through Law 48/1982, the MWRI remained the enforcement authority for the inland water compartment. In cooperation with the MWRI, an action plan was implemented in 1999 to reduce industrial pollution in the Nile.

Law 4 gives the EEAA an array of tools for implementing and enforcing these provisions, including traditional regulatory controls (e.g., emission standards for air pollutants), economic instruments, compliance monitoring (e.g., record keeping requirements), inspection, and enforcement (e.g., penalties, closures, and imprisonment). The EEAA must be notified of any expansions or renewals to the existing facility or any work which might result in an adverse impact on the environment or workers.

The Ministry of Land Reclamation (MALR) develops policies related to cropping patterns and farm production. With respect to water quality management issues, policies on the use and subsidy reduction of fertilizers and pesticides are important.

C.1.2 Legal and Administrative Egyptian Framework

The Egyptian institutional and legal framework for water quality management has been described as extremely complex, mainly because of the large number of government agencies with related responsibilities for water quality management activities, each of which is guided by its set of laws, decrees and operating policy. This section of the report establishes a baseline identification of the major policies that bear on the environmental component of water and wastewater projects, the institutional bodies with direct water quality management responsibility (highlighting the area of water quality management mandated), as well as the regulatory framework within which each agency operates.

C.1.2.1 Legal Framework

A legal basis for controlling water pollution, especially from municipal and industrial effluents, already exists through several laws and decrees. The most important are Law 48/1982 and Law 4/1994. Table C.1 is an inventory of the important laws, decrees and regulations for the proposed project.

Water Quality is addressed separately by two laws and three decrees. The most significant are Law 48 of 1982 and Law 93 of 1962. Further, Law 4 of 1994 plays a significant role in the management and protection of water quality. These laws are discussed in some detail below.

Law 93/1962 concerns the construction of sewers and sewage treatment facilities and the allowed discharges of residential, commercial, and manufacturing facilities to sewers. Ministerial Decree 9/1989 revised the standards set out in this law. Although originally intended to control discharges to surface waters, Law 48/1982 removed this function from Law 93/1962. The revised standards cover discharges of industrial waste to sewers and the land application of treated sewage on clay and sandy soils. This law is implemented by the MHUNC. The significance of this decree is that it specifies less stringent standards for industrial facilities that discharge to sewers because of the additional treatment that would occur prior to discharge.

Law 48/1982 prohibits discharges to the Nile, canals, drains, and groundwater without a license issued by the MWRI. Licenses are issued to factories, sanitary sewage treatment plants, and river boats, upon application, as long as the effluents meet certain standards and other conditions. Discharging without a license or discharging in amounts or concentrations that exceed license limits is punishable by fine, jail sentence, or both. The fines range between Egyptian pound (LE) 500 and LE 2000 and the jail sentence are limited to one year. For a second violation, the penalties are doubled. However, imposing such penalties through the judicial system takes many years and is of limited effectiveness.

Other provisions of the law state that licenses may be withdrawn under several conditions, including failure to immediately reduce a discharge presenting an immediate danger of pollution or failure to install treatment yielding appropriate effluent quality within three months. The law gives MWRI administrative and police authority over implementation. The Ministry of Interior's Water Police also have police powers, and the Ministry of Health has a standard-setting and discharge-monitoring role.

Table (C. 1): Overview of water quality-related laws and decrees

Environmental law	Date	Authority	Decrees Regulations	Implementing Agency
Law 12 (and its supplementary Law 213/1994)	1984	Main legislation for irrigation and drainage	Has recently been revised and submitted to Parliament.	MWRI
Law No. 4 on Environment	1994	Establishment of EEAA and Environmental Trust Fund; requirement of EIA; regulation of air pollution, hazardous waste management and marine pollution	Decree No. 338 of 1995 (Executive Regulation)	MoEA; EEAA
Law No. 48 on Protection of Nile and its Waterways	1982	Control of pollution of surface waters	Decree No. 8 of 1983 (standards for wastewater discharges to surface waters) The law has recently been modified and sent to parliament for review	MWRI
Law No. 27 on Public Water Sources	1978	Protection of public water sources for drinking and domestic purposes	Decree No. 27 of 1966 (Supreme Committee Water) Appendix IV of 1975 (Standards for potable water)	MoHP; Supreme Committee for Water
Law No. 93 on Wastewater and Drainage	1962	Control of wastewater discharges and drainage to public sewers	Decree No. 643 of 1962 (Standards for wastewater discharges to public sewers)	MHUNC

Water quality standards are specified in the implementing decree for Law 48 (Decree 8/1983) for the following categories:

- The Nile River
- Treated industrial discharges to the Nile and canals
- Discharges greater than 1,000 m^3/day above and below the Delta barrages
- Discharges less than 1,000 m^3/day above and below the Delta barrages
- Treated industrial and sanitary waste discharges to drains, lakes and ponds
- Treated discharges from river vessels to the Nile and canals
- Drain waters to be mixed with the Nile or canals

Table (C. 2): Wastewater Effluent Standards for Discharge to Non-fresh Water

Parameter	Units	Stated Discharge Limit
5-day BOD	mg/L	60
Total Suspended Solids	mg/L	50
Total Dissolved Solids	mg/L	2000
Nitrate as N	mg/L	50
Coliforms	MPN/100ml	5,000
Dissolved Oxygen	mg/L	4

Note: from Ministerial Decree No. 8 of 1983; regulations for application of Law 48

Although the Law 48 is comprehensive, some elements need additional review. Some articles are inadequate, while others are inconsistent. Law 4 of 1994 concerning environmental protection gives the Ministry of Environment increased powers and duties. The implementation of Law 48 and Law 4 should be coordinated, as both laws have the same objective of water quality control and protection. Existing Water Quality Standards are very strict, resulting in the failure of many users to comply with the regulations.

Egypt's limited success with the enforcement of this statute signals the need for revising existing laws and decrees to develop a new regulatory framework with flexible performance approaches. Accordingly, a water quality committee was established by Ministerial Decree No. 88 of 1998. This high-level Inter-Ministerial Committee chaired by the chairman of the MWRI Irrigation Department has been formed with members from the Ministries of Agriculture and Land Reclamation, Health and Population, Environment, Housing and New Communities, Industry, and Water Resources and Irrigation. The main task of the committee is to review Law 48 to improve water quality control and protection on the Nile and its associated waterways. In view of the difficulties of enforcement, the law and its by-laws have been reviewed by the committee to accomplish the following objectives:

- Clearly define the roles of the relevant Ministries with respect to licensing procedures.

- Amend effluent discharge standards to be more realistic and to achieve better compliance.

- Amend articles under Chapter V in the law and the related Executive Regulations to remove gaps, inadequate aspects, and contradictions between articles, to ensure effective water quality control on irrigation and drainage watercourses.

Law 4/1994. The ministry of interior (MOI), Egypt's national police force, has for some time maintained the inland water police, a special police force for enforcement of law 48 and protection of the environment in general. The inland water police provide guidance to citizens and take enforcement actions for violations of environmental laws. Law 4/1994 provides additional authority for this environmental police force, specifying that the MOI shall form a police force specialized in environmental protection within the ministry and in its security departments in the governorates (article 65 of the executive regulations). In addition, the law prescribes the undertaking of administrative framework

C.1.2.2 Administrative Framework

Water quality management falls under the jurisdiction of several official bodies in Egypt. The relevant official bodies and the levels of involvement of each are described as follows:

Ministry of Water Resources and Irrigation (MWRI). The MWRI has sole legal responsibility for the planning and management of all water resources in Egypt. It is responsible for providing water of suitable quality to all users. To accomplish this goal, the Ministry has to ensure that appropriate measures are undertaken to protect both the quantity and the quality of Egypt's water resources. In practice, very little attention has been given to water quality management, which represents a relatively small portion of the overall activities, although priorities are now being reassessed. Law 48 for the protection of the Nile and its waterways assigns to MWRI legal responsibility over the following functions:

- Issue and cancellation of discharge permits into Egyptian waterways, which include the Nile, canals and drainage networks, lakes and groundwater reservoirs;
- Inspection of wastewater treatment facilities;
- Monitoring of intake sites for potable water treatment plants as well as municipal and industrial discharges;
- Ensuring that proper samples and analyses of discharges are carried out by the Ministry of Health; levying of fines for non-compliance;
- Setting regulations and specifications for discharges into water bodies;
- Issue and overseeing of licenses for new waste treatment units in floating vessels;
- Issue of licenses for the construction of any establishment that directly discharges into waterways.

The MWRI through its Water Quality Management Unit (WQMU) has delegated most of the water quality monitoring tasks of both surface and groundwater to the NWRC. NWRC and its Institutes are monitoring the water quality status on regional and national level at strategic locations.

Ministry of Health and Population (MoHP). The MoHP has been given a central role in water quality management, especially in setting standards for the quality of the following:

- Potable water sources (River Nile, canals and groundwater wells);
- Drain water that can be mixed with other water for drinking water;
- Industrial and sewage treatment plant discharges;
- Wastes discharged from river vessels.

Besides developing standards, the MoHP must sample and analyze all industrial and municipal effluents and all drinking water treatment plant influents and effluents as well.

Ministry of Environmental Affairs/ Egyptian Environmental Affairs Agency. At the national level, the recently established Ministry of Environmental Affairs (MoEA) has the portfolio for environment in the Egyptian Cabinet of Ministers. Within this Ministry, the EEAA has the responsibility for setting national policy for the environment and coordinating environmental management activities within the government. The EEAA's functions, as established by Law 4/1994, include:

- Conducting studies; formulating the national plan for environmental protection;
- Preparing legislation, decrees, and regulations as needed to protect the environment;
- Setting requirements for Environmental Impact Analyses of projects;
- Monitoring compliance with standards and norms;
- Coordinating enforcement actions; managing natural protectorates;
- Promoting environmental education.

Law 4/1994, the most recent and comprehensive law gives the EEAA the authority to regulate air pollution, manage hazardous wastes, and manage discharges to the marine environment. Furthermore, the law gives the EEAA an array of tools for implementing and enforcing these provisions, including traditional regulatory controls (e.g.. emission standards for air pollutants), economic instruments, compliance monitoring, inspection, and enforcement (e.g., penalties, closures, and imprisonment).

Thus the EEAA has significant authority over industry under this law, including the authority to require industries to keep records of the environmental impact of their activities, to collect and analyze samples to ensure that standards are being met, and in the case of a violation to shut down a facility within 60 days if the violation has not been corrected.

The EEAA has promulgated regulations (Executive Regulations, 1995) implementing the air pollution, marine discharge, and EIA provisions of the law and is in the process of completing regulations for the management of hazardous substances and wastes. The law granted industry a three-year grace period (until March 1998) to comply with the new standards. An additional two-year extension was available to those industries that submitted an application by August 1997 and prepared a Compliance Action Plan (CAP) by the end of 1997, demonstrating their progress in meeting the standards. However, the Prime Minister rejected this additional extension and the CAP activity was halted.

Ministry of Housing, Utilities, and New Communities (MHUNC). Within the Ministry of Housing, Utilities and Urban Communities (MHUNC), the National Organization for Potable Water and Sanitary Drainage (NOPWASD) has the responsibility for planning, design and construction of municipal drinking water purification plants, distribution systems, sewage collection systems, and municipal wastewater treatment plants. Once the facilities have been installed, NOPWASD organizes the training of staff, but the responsibilities for operation and maintenance are left to the regional or local authorities. NOPWASD has the intention to inspect each plant regularly, but in practice this very much depends on the cooperation of the various governorates. Many domestic wastewater treatment plants are currently in poor condition.

The Holding Company for Water and Waste was established by Presidential Decree number 135/2004, within the MUNHC. It has been entrusted with the general economic authorities and public sector companies for water and wastewater in Cairo, Alexandria, Behira, Damietta, Sharqia, Gharbia, Kafr El Sheikh, Dakahlia, Fayoum, Beni Suef, Minia and Aswan. Its judicial characteristics are shaped according to the provisions of Law 203/1991 and its executive regulation. The purpose of the company is to treat, transport, transmit and sell drinking water; and to collect, treat, and safely dispose of wastewater, by itself or by its subsidiary companies, as well as to establish, manage and rotate a portfolio to ensure financing bonds, stocks and any other financial tools or instruments.

Ministry of Industry and Mineral Wealth. Within the Ministry of Industry and Mineral Wealth (MIMW), the General Organization for Industrialization (GOFI) supervises pollution control, safety and health issues in industry through its General Department for Environmental Protection. It also ensures that new plants include industrial waste treatment units. MIMW decree No. 380 of 1982 requires compliance with all applicable environmental laws, regulations, and standards as a condition for granting industrial licenses. A clause to this effect is written into all industrial licenses granted by the MIMW, committing the industry to taking the necessary preventive measures, such as installing necessary control equipment. However, GOFI does not perform any inspections at industries and therefore does not monitor whether industries are actually in compliance with these license requirements.

Ministry of the Interior (MoI), Egypt's national police force, has maintained the Inland Water Police, a special police force for enforcement of Law 48 and protection of the environment in general. The Inland Water Police provide guidance to citizens and take enforcement actions for violations of environmental laws. Law 4/1994 provides additional authority for this environmental police force, specifying that the MoI shall form a police force specialized in

environmental protection within the ministry and in its Security Departments in the governorates (Article 65 of the executive regulations).

C.1.3 Institutional Arrangements

C.1.3.1 Existing Strategies and Policies

The Ministry of Water Resources and Irrigation has prepared a long term (until 2017) National Water Policy and Strategy. This policy has three major themes:

(i) optimal use of available water resources;

(ii) water quality protection and pollution abatement;

(iii) development of new water resources in cooperation with the Nile Basin riparian countries.

A number of organizations, ministries, government entities, and concerned stakeholders participated in the development of the policy, which was approved by the Cabinet of Ministers and the People's Assembly.

The current Egyptian water policy aims to fulfill the nation's water resources needs based on the principles of food security and equity. National projects such as the Salam Canal, which transports Nile water to the Sinai Peninsula and the development of large desert areas in the south (Toshka) attempt to meet this objective. To assure enough water while honoring international agreements on Nile water use, a 'reuse policy' encourages the optimal reuse of agricultural drainage water. The Salam Canal project in particular has resulted in a higher prioritization for water quality issues in government policies.

Furthermore, the Ministry of Agriculture and Land Reclamation has adopted a plan to reduce agricultural agrochemical use. Subsidies on fertilizers and pesticides were removed and some agricultural chemicals with long-lasting negative effects were banned. Biological and genetic engineering techniques were introduced as pesticide replacements. Among the achievements of this plan is a noticeable decline in the use of nitrogen and phosphorus fertilizers.

C.1.3.2 Responsibilities

Several ministries are directly and indirectly involved in water quality activities for planning, operations, research, monitoring and regulation. An inventory of these agencies has been prepared to identify their mandates, responsibilities, activities and facilities in connection with water quality. Figure (2.1) presents a schematic summary of this inventory.

The main ministries and agencies are:

- Ministry of Water Resources and Irrigation

- Egyptian Environmental Affairs Agency
- Ministry of Health and Population
- Ministry of Agriculture and Land Reclamation
- Ministry of Industry, General Organization for Industry (GOFI)
- Ministry of Scientific Research
- Ministry of Housing, Utilities and New Communities
- Ministry of Local Development, Organization for the Restructure and Development of Egyptian Villages (ORDEV).

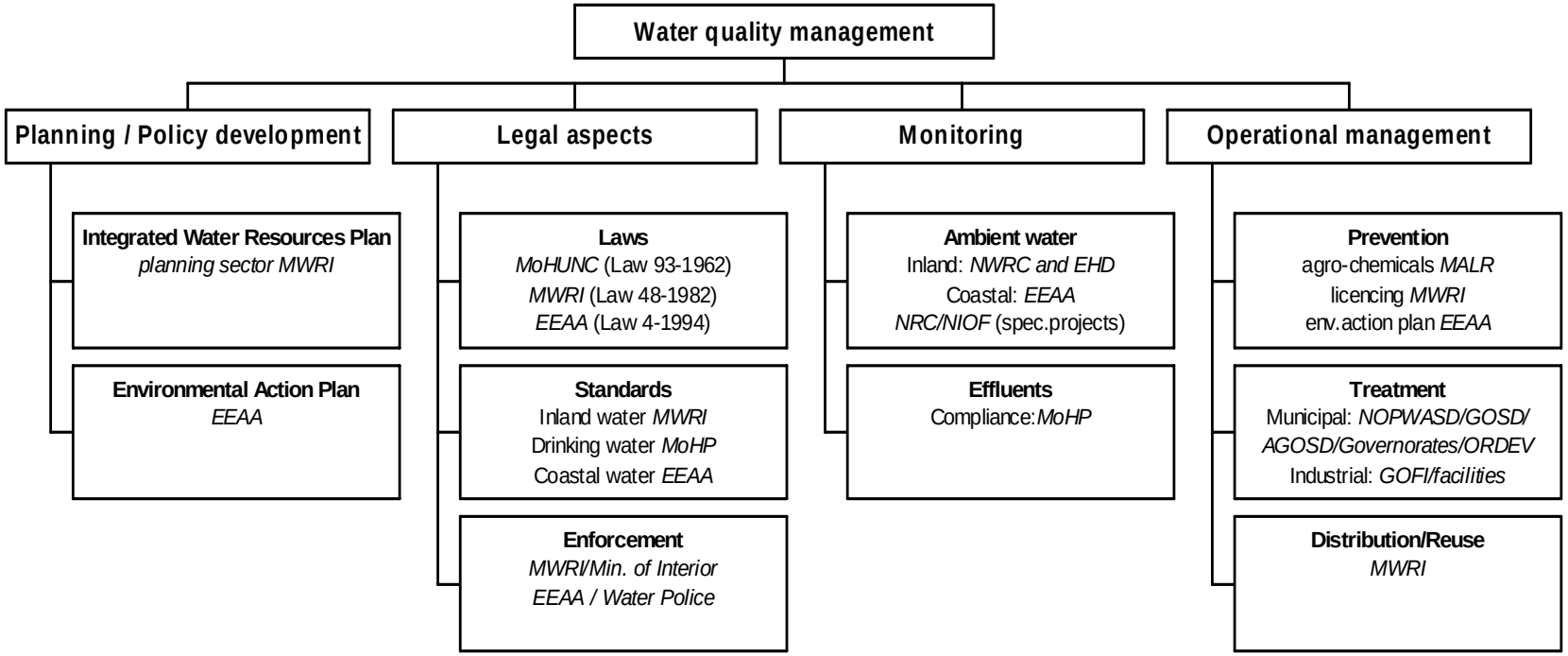

Figure (C.2.): Institutional framework for water quality management in Egypt

C.2 Law 4 of 1994

The title page and table of contents of this long document are included here. The full text in English is available at **www.eeaa.gov.eg/English/law4_text_en.doc.** The Arabic version is also available at ww.eeaa.gov.eg.

LAW NUMBER 4 of 1994

PROMULGATING

THE ENVIRONMENT LAW

EGYPT

Table of Contents

C.3. Law No. 48 of 1982 is presented hereunder in its entirety.

EGYPT

LAW NO. 48 OF 1982

CONCERNING POLLUTION PROTECTION OF THE RIVER NILE AND THE WATER CHANNELS

In the name of the People
The President of the Republic
By decision of the Peoples Assembly the following law has been issued:

Article 1

To be applied in what is considered water channels

a) The fresh water areas which include:
   1.- The River Nile and its 2 branches and canals
   2.- Canals with its different degrees

b) The non fresh water areas which includes:
   1.- Water channels with its different degrees
   2.- Lakes
   3.- Pools, water in closed system

c) Underground water reservoir

Article 2

It is forbidden to throw in the water channels solid, liquid, or gaseous wastes from: real estates, shops or commercial, industrial, touristic establishments or from the sanitary drainage, without a licence from the Ministry of irrigation which will issue a decree according to the Ministry of Public Health recommendation to fix the measures and specifications concerning each case separately.

Article 3

The Ministry of Public Health will carry out a periodical sample analysis of the treated liquid wastes produced from the establishments which have the permit to drain in the water channels in the fixed time, in addition to the request of the Ministry of Irrigation for a sample analysis at any time more than the periodical analysis.

The Ministry of Public Health is responsible to take samples for analysis on the account of the establishment having the licence. The establishment will deposit a cost amount in the ministry fixed according to wastes quality, for expenses of sampling, transportation and analysis. The Ministry of Irrigation and the concerned party will be advised of the analysis result. If the liquid wastes drained in the water channels do not meet with measures and specifications mentioned in the licence and has not a dangerous effect, the concerned party is requested within 3 months to take action by treating the wastes and testing the samples in order to meet with specifications and measures required. If treatment is not completed within 3 months and is not suitable the Ministry of Irrigation will withdraw the licence from the concerned and will stop drainage in the water channels.

If the analysis result does not meet with specifications and measures fixed in the law regulations and has a direct dangerous pollution effect on the water channels, the Ministry of irrigation will advise the

concerned to stop causes of pollution, otherwise the Ministry will carry out the operation on the concerned account or will stop drainage administratively.

Article 4

It is not allowed to give licence to establishments producing wastes to be discharged in the water channels. The Ministry of Irrigation is the only responsible - for the public interest - and when it is necessary, to give licence to establishments which will guarantee to establish a treatment unit for wastes according to specification and measures required and regulations of this law on condition that the operation of the treatment Unit starts as soon as the establishment starts working and benefits Regulations of this law will be applied.

A period of one year from the starting date of work, is fixed to treat wastes of the establishment. Otherwise the licence will be withdrawn and the Ministry of irrigation will have the authority to stop drainage in the water channels and will apply penalty of the law.

Article 5

The owners of House-Boats or touristic House-Boats standing on the river Nile or its two branches are requested to find a system to treat or gather the wastes and discharge them in the sewage drain or in the sanitary drain. It is not allowed to throw wastes in the Nile or in the water channels. Periodical inspection of the House-Boats will be done by assigned engineers to apply regulation of the law. If it does not comply with regulations, a fixed period of 3 months is given to the House-Boat's owner to treat wastes and stop source of harm. If it is not achieved in the fixed period, the licence will be withdrawn.

Article 6

The Ministry of Irrigation if responsible to issue licences for the new House-Boats on the Nile and renewal of licences of existing ones and also issuing licence for any establishment producing wastes to be discharged in the water channels.

Article 7

It is forbidden for the Ferry-Boats Unit used for transportation, touristic or other, to discharge the fuel leakage used in the water channels.

Article 8

The sanitary drainage Facility will put a sample or more to the Treatment Units of vicious and liquid wastes produced from: Plants, Houses, establishments, House-Boats and Ferry-Boats Units on the River Nile, with specifications and measures fixed in the law regulations.

Article 9

It is requested from the Applicant for a licence to submit to the Ministry of Irrigation, a guarantee of establishing a Unit for wastes treatment and a certificate from the Sanitary Drainage Facility approving its suitability.

Article 10

Precaution is to be taken by The Ministry of Agriculture when choosing pesticides to abate agricultural pests, not to pollute the water channels, resulting from direct means during irrigation operations or mixed with drained water of irrigated agricultural lands or by washing the irrigation or pesticides equipments in the water channels, according to measures decided by the Ministries of Agriculture, Irrigation and Public Health.

Article 11

Precaution is to be taken by the Ministry of Irrigation when choosing herbicides to abate water herbs, not to pollute the water channels, before operation treatment, during, and after to prevent use of the drainage water which is under treatment until the effect of the chemical products disappears and the water is available to be used for all purposes.

Article 12

It is not allowed to reuse the water channels directly or mixed with fresh water for any purpose, unless it is proved valid for use. The Ministry of Irrigation will carry out the treatment of the water channels to be reused after consulting the Ministry of Irrigation.

Article 13

The water area Police under the Ministry of Interior will carry out continuous shift inspections along the water channels and will help the concerned to find out any abuse of the law and will stop sources of pollution and will report.

Article 14

A special budget account will be opened resulting from penalties or expenses due to law application and will be allocated to the following cases:

1.- Administrative moving for abusing of the law.
2.- Contribution to establishments for erecting Units for wastes treatments before drainage.
3.- Studies and Laboratory researches.
4.- Bonuses for dirrigeants and inspectors of crimes of the regulations law.

Article 15

The executive regulations of this law will fix due fees without exceeding the maximum amount mentioned in the attached statement and also will fix expenses for executing regulations of this law. It is possible by seizure.

Article 16

Without deviation from the regulations mentioned in the penalty law,, - Who will not follow the article 2 & 3 last item and 4, 5, & 7 of this law and its executive decrees will be imprisoned for a period not exceeding one year and a fine of not less than 500 Pounds and not exceeding 2000 Pounds or one of the 2 penalties. If the abuse of law is repeated, the penalty will double. A period is fixed by the Ministry of Irrigation to the concerned for correction, otherwise administrative actions will be taken on the account of the concerned and licence will be cancelled.

Article 17

The Ministry of Irrigation will issue the executive regulation of this law after consulting the concerned Ministries within 3 months of THE Law Publication.

Article 18

The articles 10, 11, 12, 16 & 19 are cancelled from law 93 of 1962 concerning liquid wastes discharge and also any regulation contradicting regulations of this law.

Article 19

A decree issued by the Minister of Justice in collaboration of the Minister of Irrigation will give legal authority to assigned Irrigation Engineers to implement the regulations of this law.

Article 20

This law will be published in the official newspaper and will be put into action after 3 months from date of publication. This law ill be stamped by the official State stamp and will be applicable as one of other laws.

Issued by the Presidency the 29 Shaaban 1402 (June 21st 1982)

(HOSNY MOBARAK)

C.4. Effluent Quality Criteria.

The source from which each table is drawn is indicated below the table.

Table C.4-1:Wastewater Standards for Discharge to Non-Potable Waters

Parameter	Units	Stated Discharge Limit
5-day BOD	mg/L	60
Total Suspended Solids	mg/L	50
Total Dissolved Solids	mg/L	2000
Nitrate as N	mg/L	50
Coliforms	MPN/100ml	5,000
Dissolved Oxygen	mg/L	4

Note: from Ministerial Decree No. 8 of 1983; regulations for application of Law 48

Table C.4-2. Effluent Guidelines by Ministry of Housing and Utilities

Parameter	Units	Primary Treatment	Secondary Treatment	Tertiary Treatment
5-day BOD	mg/L	300	40	20
COD	mg/L	600	80	40
Total Suspended Solids	mg/L	350	40	20
Intestinal Nematodes	MPN/100ml	5	1	1
Fecal Coliforms	MPN/100ml	N/A	1000	100
Total Dissolved Solids	mg/L	2500	2000	2000

Note: from Ministry of Housing and Utilities; excerpted from SCP 1996 Design Criteria Report

Table C.4-3. Guidelines on Crops, Precautions, and Soils for Irrigation Reuse

Wastewater Treatment	Crops	Precautions	Irrigation Method	Type of Soil
None	Wood trees, palms	Fencing, no direct contact, no cattle, health precautions	Furrow	Light consistency
Primary	Cotton, flax, flowers	Same as above	Furrow, drip with filters	Light consistency
Secondary	Fodder, dry seeds, grass, most fruits, cooked vegetables	Cattle for meat not milk; cook crops before eating	Furrow, drip	Light or medium consistency
Tertiary	Raw vegetables	None	All except sprinkler	All types

Note: from Ministry of Housing and Utilities; excerpted from the SCP 1996 Design Criteria Report

APPENDIX D

Process Train and Site Layout for Stabilization Ponds

Process train

The treatment system will consist of preliminary treatment, anaerobic ponds, facultative ponds, and maturation ponds, followed by effluent reuse and/or disposal.

All the ponds will contain a membrane liner, protected by a layer of soil or gravel, and a layer of riprap near the water surface to protect against wind-driven waves. The liner is to prevent excessive leakage of water needed for irrigation reuse, and to prevent movement of nutrients from the ponds into the groundwater aquifer.

Preliminary treatment will consist of flow measurement and manually-cleaned screens.

The **anaerobic ponds** remove a substantial portion of the TSS (total suspended solids) and the settleable portion of the BOD by sedimentation, and trap most of the floating oils and scum in the wastewater. Anaerobic ponds are devoid of oxygen and provide slow anaerobic digestion of the sludge in the bottom of the ponds. An individual pond can accumulate sludge for 3 to 5 years before sludge removal is required. At that point, a pond must be taken out of service for about 1 year, during which the liquid is removed, and the sludge allowed to drain and dewater prior to removal. As a result, 3 anaerobic ponds are needed in a pond system, to allow for 1 of the 3 ponds to be out of service continuously. A loading rate of 250 grams/m^3/day is proposed for sizing of the 2 ponds in service, and a minimum hydraulic detention time (HRT) of 2 days. A nominal water depth of 4m has also been adopted (plus an allowance of 1.0m for sludge storage). The BOD removal efficiency is estimated at 40% under these design conditions.

Facultative ponds remove BOD by a combination of two processes: aerobic digestion near the water surface, with the oxygen supplied primarily by algae and to a lesser extent by atmospheric re-aeration; and anaerobic digestion and settling of solids in the bottom of the pond. A detention time of 15 days is considered to be sufficient to obtain an adequate BOD removal. Other design parameters selected for the facultative ponds, in addition to detention time, include an allowance of 0.3m in depth for sludge accumulation, and a design effluent BOD concentration of 50 mg/L. Two trains of facultative ponds are proposed, so that one train can be taken out of service for sludge removal or maintenance. Within each train, two ponds of equal size are proposed, to promote the removal of faecal coliforms (as an indicator of water-borne disease-causing bacteria).

Maturation Ponds. Three ponds in series, each with a detention time of 5 days, are proposed to assure coliform removal. The objective is to achieve an effluent fecal coliform concentration of 300 MPN per 100ml, which would allow application of the effluent to essentially all types of irrigated crops. The maturation ponds would have a depth of 1.5m to allow good light penetration for disinfection, as well as polishing of the effluent by further removal of organics.

Effluent Reuse and/or Disposal. In the long term, the treated effluent from the stabilization ponds will be used for irrigation and other beneficial purposes. An effluent pump station and force main will be provided to support effluent reuse. Based on experience on the Secondary Cities Project in other areas of Egypt, it is considered unlikely that irrigation reuse facilities could be developed (under the aegis of the Ministry of Agriculture) in time to use all of the effluent in the early years of pond operation. The villages and Ministry of Housing officials have indicated a willingness to use the effluent, at least temporarily, to water trees grown only for wood. If this cannot be accommodated, disposal of the treated effluent by application to a dedicated disposal area may be found necessary. Within the disposal area, evaporation and percolation into the soil, rather than irrigation of crops, would be used for effluent disposal.

The effluent disposal area would be divided into six equal parcels, and the effluent would be applied to each parcel every six days. This would allow time for drying of the soil between applications, to avoid problems (ponding, mosquitoes, weeds, swampy conditions) that might occur with continuous application over the disposal area.

During several winter months, percolation into the ground will be used for disposal of a portion of effluent, in order to reduce the total size of the disposal area. A maximum infiltration rate of about 3 mm/day has been assumed. Under these assumptions, the disposal area required would have an area of 18 ha (180,000 m^2).

Site Development

The WWTP facilities will include a manual head works structure for screening and measuring flow, the process ponds, an administration/operations building, an effluent pump station, force main site lighting, standby generator, a protected potable water system for use in the administration building and as required for wash down.

The site layout design for the WWTPs and Pump Stations will include roadways, parking, site grading, and landscaping. One access will be provided to the sites. The WWTP sites will have a roadway system on the berms of the stabilization ponds for inspection and servicing the ponds. The Pump Station sites will be provided with sufficient access to service all mechanical equipment and depending on the land area decreed parking will be included.
The pump station site will be protected by a perimeter security fence constructed of sand brick within a concrete frame matching the materials of the pump station structures.

The necessity of a costly perimeter security fence at the WWTP will be reviewed by all parties during design.

Structural design will conform with UBC and local Egyptian requirements for wind and seismic loads. The AASHTO Specifications will be used in the development of vehicular loadings, impact, and lateral surcharges. Conditions for design of liquid containing structures will include cells full, empty or in any combination, with or without backfill.

Electrical Design. The New Valley Electrical Distribution Company (NVEDC) will supply electrical power to the facilities. Sufficient fuel storage will be provided to allow for a minimum of 48 continuous hours of generator operations.

APPENDIX E

Scoping Statement Approval

USAID
FROM THE AMERICAN PEOPLE

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
BUREAU FOR ASIA AND THE NEAR EAST
WASHINGTON, D.C. 20523

RECORD OF ENVIRONMENTAL DECISION

File No: ANE 07-93 Egypt SO16 ROD Scoping Statement for 2nd Cities-El Mounira & Balat

PROGRAM/ACTIVITY DATA:

Country Code-SO:	263-016
SO Name:	Environment for Trade and Investment Strengthened
Country or Region:	Egypt
Activity Name:	Record of Decision (ROD) for Scoping Statement for Environmental Assessment: Secondary Cities Project (263-0236); New Valley Governorate: El Mounira Village, Kharga Oasis and Balat Village, Dakhla Oasis

Funding Begin: FY 2007 **Funding End:** FY 2007 **LOP Amount:** $9,890,000

Approval Issue: **Scoping Statement for Environmental Assessment**

APPROVAL:

Bureau Environmental Officer: John O. Wilson Date: 5/18/07

Approved: ☒
Disapproved: ☐

OVERVIEW

The Environmental Threshold Decision (ETD) for the USAID Egypt Second Cities Project (263-0236) was approved on September 5, 2005 (ANE 05-201). It determined that major wastewater construction activities, such as the New Valley Governorate: wastewater collection system, pump station, and stabilization pond for El Mounira Village, Kharga Oasis and stabilization pond for Balat Village, Dakhla Oasis, qualify for **Positive Determination** per 22 CFR 216.3 (a) (2) (iii) because project components are presumed to have potential significant adverse impacts on the environment. As a result, an Environmental Assessment (EA) **scoping process** and **EA** are required, both involving stakeholder participation. The EA should address alternative analysis, project locations, affected environment, potential adverse environmental impacts, environmental mitigation measures, and monitoring for environmental mitigation activities. The project team consisting of CDM in association with Dr. Ahmed Abdel-Warith Consulting Engineers prepared an EA scoping statement with representatives of the Government of the Republic of Egypt, National Organization for Potable Water and Sanitary Drainage (NOPWSD), Egyptian National Ministries (Housing, Agriculture), the Governorate, the Markaz, the Village, and interested local farmers, landowners, business people, and others. The EA scoping process identified these most significant issues: potential nuisances such as odor and noise; management and reuse of treated wastewater; uncovered antiquities during construction; and sampling and local analysis of treated wastewater.

DECISION:

The USAID/Egypt Scoping Statement for the Environmental Assessment for the Secondary Cities Project (263-0236): New Valley Governorate: El Mounira Village, Kharga Oasis; Balat Village, Dakhla Oasis, prepared by CDM in association with Dr. Ahmed Abdel-Warith Consulting Engineers and dated April 2007, is approved.

File No: ANE 07-93 Egypt SO16 ROD Scoping Statement for 2nd Cities-El Mounira & Balat

DISTRIBUTION:

Mission Environmental Officer
IEE File

ANE 07-93 Egypt SO16 2nd Cities-El Mounira & Balat SS request

APPROVAL OF SCOPING STATEMENT

SO Name: SO-16, Environment for Trade & Investment Strengthened

Project Location: Egypt

Project Title/ID: Secondary Cities Project (263-0230);
New Valley Governorate: El Mounira Village, Kharga Oasis; Balat Village, Dakhla Oasis.

Fiscal Year and Amounts: FY 2007- FY 2007,

El Mounira $6,600,000
Balat $3,200,000
$9,800,000

Prepared by:

Ghareib El Sawi
PSDWW

Date:

Strategic Objective Team Leader's Concurrence: Date:

Jeremy Gustafson
Team Leader, PSDWW

Deputy Mission Director Concurrence: Date

John Groarke

6 May 2007

Decision of Bureau Environmental Officer,
Bureau for Asia and the Near East:

Approved: John O Wilson

Disapproved: _____

John O. Wilson

Date: 5/8/07

Clearances:

SHassanein, M&O/PSD _____ date _____

MDriver, LEG _____ date _____

RRousseau, PSD/OD _____ date _____

BACKGROUND:

Attached, for your approval, is the Final Scoping Statement for New Valley Governorate, which includes El Moumira Village in the Kharga Oasis, and Balat Village in the Dakhla Oasis. The activities in these villages are being funded under the Secondary Cities Project (263-0236). The two activities received a Positive Threshold Decision from the Bureau Environmental Officer in September 2005. (ANE 05-201)

A Scoping Session was held on April 11, 2007, in Kharga City - the capital of the New Valley Governorate. The session was attended by a large number of concerned parties (see Scoping Session in the attached report), and staff members from the USAID Water and Wastewater Office. The American Engineering firm Camp Dresser & McKee (CDM), the project designer and Construction Management Consultant (CMC), presented the project activities that USAID/Egypt is considering to finance in the New Valley. The activities consist of the following components:

(1) a wastewater collection system for El Mounira Village,
(2) a wastewater pump station for El Mounira Village,
(3) a stabilization pond for El Mounira Village, and
(4) a new stabilization pond for Balat Village.

During the scoping session, the Environmental Assessment CDM recorded all the concerns and issues raised by the attendees. These issues were then carefully reviewed and the relevant ones were taken into consideration in the Scoping Statement.

The most significant questions/issues raised by residents during the scoping were:

- Will the operation of the new stabilization pond generate any significant nuisances such as odor or noise for the El Mounira village residents?
- What are the plans for reusing the treated wastewater?
- What provisions will be established for handling the treated wastewater (e.g. possibly establishing a treated effluent disposal area)?
- What systems will be put in place to deal with any antiquities that might be uncovered during construction?
- How will the project ensure that reliable sampling and analysis of the treated wastewater is carried out? Will a facility be constructed locally, or will samples be transported to an existing laboratory elsewhere?

With regard to odors and noise, CDM pointed out that the location of the stabilization pond will be far downwind from the village, and the proposed treatement method has minor mechanical works. Therefore, the new stabilization pond will have negligible impacts on the village residents, in terms of foul odor and noise.

With regard to the reuse of treated water, The National Organization for Water and Sanitary Drainage (NOPWASD) the primary GOE implementation agency - and the Ministry of Agriculture and Land Reclimation (MALR), will manage the treated

wastewater effluent. Ultimately, the effluent generated by both proposed stabilization ponds will be reused through a scheme that will devised and managed by MALR in accordance with Egyptian and international codes guidelines .

With regard to handling treated effluent and uncovering antiquities during construction, these two issues will be mitigated by stringent construction specifications and close supervision by CDM. CDM has the prime responsibility for monitoring construction and ensuring adherenc to thorough mitigation measures.

With regard to water sampling during construction, the contractor will be required to carry out regular sampling and analysis. This will be a contractual obligation. An on-site lab will be constructed to ensure proper sampling and water quality analysis after the treatment plants are put into operation (post construction period).

DISCUSSION:

In conformance to 22 CFR, Part 216.3 (a)(4) "Scope of Environmental Assessment", the Scoping Statement for New Valley Governorate included:

(a) a determination of the scope and significance of issues to be addressed in the environmental assessment:
(b) identification and elimination of issues that are not significant;
(c) a schedule for preparing the environmental analysis: and
(d) a description of how the analysis will be conducted and the disciplines that will participate in the analysis.

CONCLUSION AND RECOMMENDATION:

The New Valley Governorate Scoping Statement conforms to the requirements of 22 CFR, Part 216.3 (a)(4) "Scope of Environmental Assessment", therefore, the Mission recommends that the ANE Bureau Environmental Officer approve this Scoping Statement.

USAID
FROM THE AMERICAN PEOPLE

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
BUREAU FOR ASIA AND THE NEAR EAST
WASHINGTON, D.C. 20523

RECORD OF ENVIRONMENTAL DECISION

File No: ANE 07-123 Egypt SO16 ROD SS 2nd Cities – Amendment 2

PROGRAM/ACTIVITY DATA:

Country Code-SO: 263-016

SO Name: Environment for Trade and Investment Strengthened

Country or Region: Egypt

Activity Name: **Record of Decision (ROD) for Scoping Statement (SS) for Environmental Assessment: Secondary Cities Project (263-0236); New Valley Governorate: El Mounira Village, Kharga Oasis; Balat Village, Dakhla Oasis, Amendment 2 for Villages of Tanidah, El Gedida and Nasr El Thowra**

Funding Begin: FY 2007 **Funding End:** FY 2007 **LOP Amount:** $23,000,000
Approval Issue: **Scoping Statement for Environmental Assessment**

APPROVAL:

Bureau Environmental Officer — John O. Wilson — Date: July 2, 2007
Approved: ☒
Disapproved: ☐

OVERVIEW

The Environmental Threshold Decision (ETD) for the USAID/Egypt Second Cities Project (263-0236) was approved on September 5, 2005 (ANE 05-261). It determined that major wastewater construction activities, such as the New Valley Governorate wastewater collection systems, house connections, pump station, force main, and stabilization pond for the **Villages of Tanidah, El Gedida and Nasr El Thowra**, qualify for **Positive Determination** per 22 CFR 216.3 (a) (2) (iii) because project components are presumed to have potential significant adverse impacts on the environment. As a result, an Environmental Assessment (EA) **scoping process** and **EA** are required, both involving stakeholder participation. The EA should address alternative analysis, project locations, affected environment, potential adverse environmental impacts, environmental mitigation measures, and monitoring for environmental mitigation activities. This amended SS amends the Record of Decision (ROD) for the scoping statement (SS) for similar wastewater infrastructure improvements at El Mounira Village, Kharga Oasis and stabilization pond for Balat Village, Dakhla Oasis (ANE 07-93, approved May 8, 2007). The approved SS included

participation of representatives of the **Villages of Tanidah, El Gedida and Nasr El Thowra** in anticipation of additional funding to allow expansion of the project to include these villages. This new amendment now includes the new villages which participated in the April 11, 2007 scoping meeting to produce the approved SS. The new proposed activities are of a similar nature to those that were proposed in the original villages, and the geographic, environmental, and cultural setting describes in the approved SS are representative of the three new villages as well. The project team consisting of CDM in association with Dr. Ahmed Abdel-Warith Consulting Engineers prepared an EA scoping statement with representatives of the Government of the Republic of Egypt, National Organization for Potable Water and Sanitary Drainage (NOPWSD), Egyptian National Ministries (Housing, Agriculture), the Governorate, the Markaz, the Village, and interested local farmers, landowners, business people, and others. The EA scoping process identified these most significant issues: potential nuisances such as odor and noise; management and reuse of treated wastewater; uncovered antiquities during construction; and sampling and local analysis of treated wastewater.

DECISION:

The USAID/Egypt Scoping Statement for the Environmental Assessment for the Secondary Cities Project (263-0236): New Valley Governorate: El Mounira Village, Kharga Oasis; Balat Village, Dakhla Oasis, now including **Villages of Tanidah, El Gedida and Nasr El Thowra,** prepared by CDM in association with Dr. Ahmed Abdel-Warith Consulting Engineers and dated April 2007, is approved.

File No: ANE 07-123 Egypt SO16 ROD SS 2[nd] Cities – Amendment 2

DISTRIBUTION:

Mission Environmental Officer
IEE File

USAID
FROM THE AMERICAN PEOPLE

REQUEST FOR AMENDENEMT OF APPROVED SCOPING STATEMENT FOR ENVIRONMENTAL ASSESSMENT: SECONDARY CITIES PROJECT(263-0236); NEW VALLEY GOVERNORATE; El MOUNIRA VILLAGE,KHARGA OASIS;BALAT VILLAGE DAKHLA OASIS (ANE 07-93)

ANE 07-123 Egypt Request for SSROD SO16 2nd Cities Amendment 2

SO Name: SO-16, Environment for Trade & Investment Strengthened
263-016
Project Location: Egypt

Project Title/ID: Secondary Cities Project (263-0236); New Valley Governorate: Villages of Tanidah, El Gedida and Nasr El Thowra. Amendment 2

Fiscal Year and Amounts: FY 2007– FY 2009.

Tanidah	$6,700,000
El Gedida	$7,500,000
Naser El Thowra	$8,800,000
	$23,000,000

Prepared by: **Date:**

Ghareib El Sawi
PSDWW

Strategic Objective Team Leader's Concurrence: **Date:**

Jeremy Gustafson
Team Leader, PSDWW

Acting Mission Director Concurrence: **Date**

John Groarke

Decision of Bureau Environmental Officer,
Bureau for Asia and the Near East:

Approved: John O Wilson

Disapproved: _____

Date: July 2, 2007

Clearances:

SHassanein, MEO/PSD _____ date
RRousseau, PSD/OD _____ date 6/22/07

BACKGROUND:

The purpose of this request is to amend the approved Scoping Statement for the two villages of El Mounira and Balat (File No. ANE 07-93 Egypt SO16 ROD, dated 8 May 2007), to include the three Villages of Tanidah, El Gedida and Nasr El Thowra. *

USAID and the Government of Egypt (GOE) agreed to increase funding and extend the Secondary Cities Grant Agreement No. 263-0236 through September 30, 2009 following the completion of USAID's large-scale water and wastewater infrastructure improvements in September 2006. The purpose of extending the Agreement is to construct several smaller-scale activities identified in the Master Plan for water and wastewater facilities, and accompanying Feasibility Studies performed under the Secondary Cities Project for the governorates of Luxor, Daqahliya and the New Valley.

Prior to September 2006, the American engineering firm Camp Dresser & McKee (CDM), prepared a feasibility study for water and wastewater infrastructure improvements in five villages located in the New Valley Governorate. The five villages included in the study were: Tanidah, Balat, and El Gedida in Dahkla Oasis; and El Mounira and Nasr El Thowra in the Kharga Oasis. Each of these villages are of a similar nature in that they have less than 10,000 persons, are generally remote from other villages within the oases, have on-site wastewater systems, and are fully served by water and electrical utilities. The wastewater infrastructure improvements proposed in the study for each village includes wastewater collection systems, house connections, a pump station, a force main, and a stabilization pond treatment system.

As the new project commenced in December 2006, NOPWASD (the GOE implementing agency), USAID, and CDM ranked the villages in order of priority and decided to implement activities in Balat and El Mounira. The selection was made to assure that each oasis would be included in the project. A Scoping Sesssion was held to address these two villages and the resulting Scoping Statement was approved by the Bureau Environmental Officer.

Following the approval of the Scoping Statement, counterparts in the GOE subsequently requested that USAID consider including the other three villages in the project. USAID/Egypt is therefore proposing to amend the original Scoping Statement to include all five villages. Approval of the amendment would mitigate the need to return to the EA process should funding become available to implement the proposed wastewater improvements in the three additional villages in the future.

The proposed activities that were identified in the approved New Valley Scoping Statement for the villages of El Mounira and Balat are of a similar nature to those that are proposed in the villages of Tanidah, El Gedida, and Nasr El Thowra. Additionally, the geographical, environmental and cultural setting described in the approved Scoping Statement is representative of the three new villages as well. Most importantly, representatives of not only El Mounira and Balat (the two original villages) but also representatives of Tanidah, El Gedida and Nasr El Thowra (the three villages for which

* Original IEE ANE 05-201, approved September 5, 2005

this amendment to the Scoping Statement is requested), actively participated in the scoping session held in the New Valley on April 11th, 2007.

CONCLUSION AND RECOMMENDATION:

The GOE implementing agency, NOPWASD, and senior representatives of the New Valley Governorate have expressed the need to include all five New Vally villages in the overall project scope. Therefore, an amendment to the approved Environmental Assessment Scoping Statement appears appropriate for the proposed infrastructure improvements in the three villages since they are similar to Balat and El Mounira, and all parties actively took part in the Scoping Session as required under 22 CFR. With an

APPENDIX F

Water and Wastewater Quality Data

Wastewater Quality

In order to supplement the data available from previous Secondary Cities stabilization pond designs, a water quality sampling program was conducted. Five (5) of the nine (9) existing pond systems in New Valley were targeted: the major towns in each oasis – El Kharga and Mout – the project village of Balat, and the smaller villages of El Rashda and Boulak. The results are shown in Table 3-5 from the Feasibility Study along with the results as submitted by the National Research Center:

Table 3-5: Water Quality Sampling of Stabilization Pond Systems in New Valley

Village WWTP	Location in WWTP	pH	BOD_5	BOD_5 filtered	Chloro-phyl "a"	Total Coliforms	Faecal Coliforms	TSS	TDS	COD	COD filtered	NH_4 as N	Nitrate as N	Total Organics	Adjusted [2]	
		-	mg/L	mg/L	ug/L	MPN/100mL	MPN/100mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	BOD mg/L	TSS mg/L
El Kharga	Influent	7.5	100	50	-	-	-	212	753	253	122	32	0.26	25		
El Kharga	Facultative	7.6	70	35	-	-	-	118	748	219	126	27	0.25	23		
El Kharga	Maturation	7.8	60	26	17	-	-	73	762	167	124	18	0.36	17	59	73
El Kharga	Effluent	7.4	50	22	8	1.1E+06	2.1E+05	55	768	119	106	9	0.44	14	49	55
Boulak [1]	Influent	6.8	200	82	-	-	-	336	876	340	189	28	0.20	29		
Mout	Influent	7.1	210	165	-	-	-	393	2680	544	220	38	0.02	22		
Mout	Facultative	7.7	150	120	-	-	-	106	2700	420	195	46	0.14	20		
Mout	Maturation	8.6	165	90	246	-	-	66	2658	340	166	43	0.19	26	149	66
Mout	Effluent	8.0	90	60	174	2.3E+05	1.1E+03	54	2661	98	63	36	0.21	15	78	54
Balat	Influent	7.3	165	120	-	-	-	194	558	354	155	69	0	91		
Balat	Facultative	7.7	150	120	-	-	-	178	523	325	153	49	0	30		
Balat	Maturation	8.0	90	75	78	-	-	56	628	250	127	72	0.06	25	85	56
Balat	Effluent	7.6	85	75	162	2.1E+04	2.3E+02	52	526	172	76	64	0	20	74	52
El Rashda	Influent	7.1	435	150	-	-	-	440	1018	490	286	55	0.05	130		
El Rashda	Facultative	7.6	150	105	-	-	-	400	964	387	265	54	0.12	73		
El Rashda	Maturation	7.4	120	90	2263	-	-	267	972	339	202	58	0.35	26	-31	265
El Rashda	Effluent	7.7	105	75	1489	2.8E+07	9.3E+04	132	962	169	191	29	0.35	29	6	131
Averages, 4 WWTPs																
	Influent	7.2	222	113				315	1177	396	194	44	0.11	59		
	Facultative	7.7	130	95				201	1234	338	185	44	0.13	37		
	Maturation	8.0	109	70	651			116	1255	274	155	48	0.24	24	65	115
	Effluent	7.7	83	58	458	7.3E+06	7.6E+04	73	1229	140	109	35	0.25	20	52	73
Averages, 3 WWTPs (excluding El Kharga)																
	Influent	7.1	253	129				341	1283	432	213	48	0.07	68		
	Facultative	7.7	150	115				228	1396	377	204	50	0.09	41		
	Maturation	8.0	125	85	862			130	1419	310	165	58	0.20	26	68	129
	Effluent	7.8	93	70	608	9.4E+06	3.1E+04	79	1383	146	110	43	0.19	21	53	79
Removal Efficiency, 4 WWTPs																
	Anaerobic		41%	16%				36%	-5%	15%	5%	1%	-20%	39%		
	Facultative		16%	26%				42%	-2%	19%	16%	-9%	-88%	36%		
	Maturation		24%	17%	30%			37%	2%	49%	30%	28%	-4%	17%		
Removal Efficiency, 3 WWTPs (excluding El Kharga)																
	Anaerobic		41%	11%				33%	-9%	13%	4%	-5%	-28%	40%		
	Facultative		17%	26%				43%	-2%	18%	19%	-16%	-131%	37%		
	Maturation		25%	18%	29%			39%	3%	53%	33%	25%	7%	17%		

Notes: [1] Boulak WWTP was closed for renovation at the time of the sampling
[2] BOD5 and TSS adjusted to exclude algae: BOD5 minus (Chlorophyl "a" / 0.015); TSS minus (0.8 x Chlorophyl "a")

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المركز القومى للبحوث
الوحدة الاستشارية للبيئة المائية

نتائج تحاليل مياه الصرف من محطة المعالجة بمدينة بولاق – الوادى الجديد

Boulak WWTP

Parameters	Unit	Influent
pH	-	6.8
Biochemical Oxygen Demand (BOD_5), Total	mg O_2/l	200
Biochemical Oxygen Demand (BOD_5), Filtered	mg O_2/l	82
Chlorophyll A	µg/l	NA
Total Colifrm	MPNI/100 ml	NA
Feacal Coliform	MPNI/100 ml	NA
Total Suspended Solids	mg/l	336
Total Dissolved Solids	mg/l	876
Chemical Oxygen Demand (COD), Total	mg O_2/l	340
Chemical Oxygen Demand (COD), Filtered	mg O_2/l	189
Ammonia (NH_4-N)	mg/l	28
Nitrite (NO_2-N)	mg/l	Nil
Nitrate (NO_3-N)	mg/l	0.2
Oil and Grease	mg/l	29

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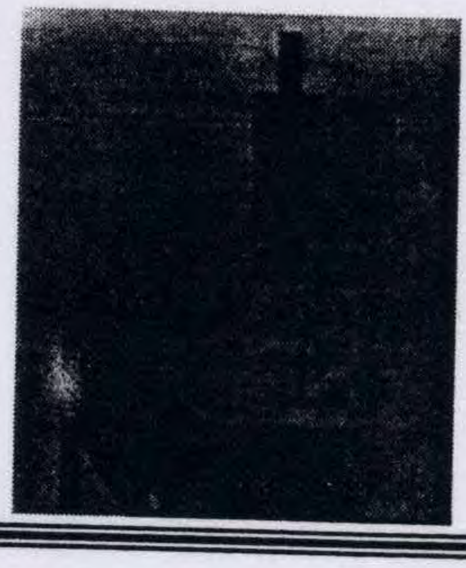

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الوحدة الاستشارية للبيئة المائية

نتائج تحاليل مياه الصرف من محطة المَعالجة بمدينة موط – الوادى الجديد

Mout WWTP

Parameters	Unit	Influent	Start Facultative	Start Maturation	Effluen
pH	-	7.1	7.7	8.6	8.0
Biochemical Oxygen Demand (BOD_5), Total	mg O_2/l	210	150	165	90
Biochemical Oxygen Demand (BOD_5), Filtered	mg O_2/l	165	120	90	60
Chlorophyll A	µg/l	NA	NA	246	174
Total Colifrm	MPNI/100 ml	NA	NA	NA	2.3 × 10
Feacal Coliform	MPNI/100 ml	NA	NA	NA	1.1 × 10
Total Suspended Solids	mg/l	393	106	66	54
Total Dissolved Solids	mg/l	2680	2700	2658	2661
Chemical Oxygen Demand (COD), Total	mg O_2/l	544	420	340	98
Chemical Oxygen Demand (COD), Filtered	mg O_2/l	220	195	166	63
Ammonia (NH_4-N)	mg/l	38	46	43	36
Nitrite (NO_2-N)	mg/l	Nil	Nil	Nil	Nil
Nitrate (NO_3-N)	mg/l	0.02	0.14	0.19	0.21
Oil and Grease	mg/l	22	20	26	15

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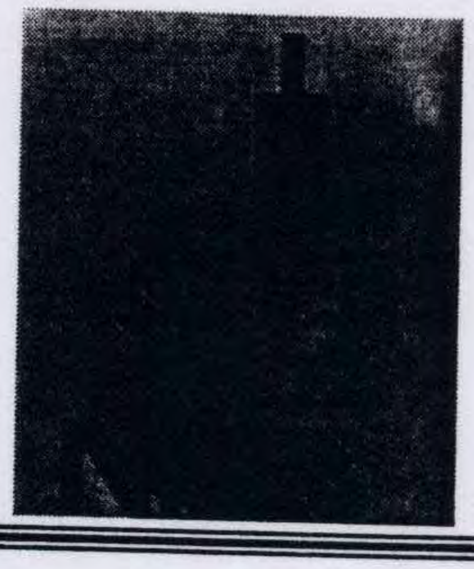

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نتائج تحاليل مياه الصرف من محطة المعالجة بمدينة بلاط – الوادى الجديد

Balat WWTP

Parameters	Unit	Influent	Start Facultative	Start Maturation	Effluent
pH	-	7.3	7.7	8.0	7.6
Biochemical Oxygen Demand (BOD_5), Total	mg O_2/l	165	150	90	85
Biochemical Oxygen Demand (BOD_5), Filtered	mg O_2/l	120	120	75	75
Chlorophyll A	µg/l	NA	NA	78	162
Total Colifrm	MPNI/100 ml	NA	NA	NA	2.1×10^4
Feacal Coliform	MPNI/100 ml	NA	NA	NA	2.3×10^2
Total Suspended Solids	mg/l	194	178	56	52
Total Dissolved Solids	mg/l	558	523	628	526
Chemical Oxygen Demand (COD), Total	mg O_2/l	354	325	250	172
Chemical Oxygen Demand (COD), Filtered	mg O_2/l	155	153	127	76
Ammonia (NH_4-N)	mg/l	69	49	72	64
Nitrite (NO_2-N)	mg/l	Nil	Nil	Nil	Nil
Nitrate (NO_3-N)	mg/l	Nil	Nil	0.06	Nil
Oil and Grease	mg/l	91	30	25	20

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نتائج تحاليل مياه الصرف من محطة المَعالجة بمدينة الراشدة – الوادى الجديد
El-Rashda WWTP

Parameters	Unit	Influent	Start Facultative	Start Maturation	Effluen
pH	-	7.1	7.8	7.4	7.7
Biochemical Oxygen Demand (BOD_5), Total	mg O_2/l	435	150	120	105
Biochemical Oxygen Demand (BOD_5), Filtered	mg O_2/l	150	105	90	75
Chlorophyll A	µg/l	NA	NA	2263	1489
Total Colifrm	MPNI/100 ml	NA	NA	NA	2.8×10^7
Feacal Coliform	MPNI/100 ml	NA	NA	NA	9.3×10^4
Total Suspended Solids	mg/l	440	400	267	132
Total Dissolved Solids	mg/l	1018	964	972	962
Chemical Oxygen Demand (COD), Total	mg O_2/l	490	387	339	169
Chemical Oxygen Demand (COD), Filtered	mg O_2/l	286	265	202	191
Ammonia (NH_4-N)	mg/l	55	54	58	29
Nitrite (NO_2-N)	mg/l	Nil	Nil	Nil	Nil
Nitrate (NO_3-N)	mg/l	0.05	0.12	0.35	0.35
Oil and Grease	mg/l	130	73	26	29

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Water Quality

The groundwater from potable-supply wells in the New Valley generally meets all of the Egyptian water quality standards, except those for iron and manganese. The concentrations of water quality parameters are shown for a series of water sources in Table 3-6, obtained from the Ministry of Water Resources and Irrigation. The concentration of iron usually exceeds the standard of 1.0 mg/L, and the concentration of manganese sometimes approaches the standard of 0.5 mg/L.

Water Quality of Potable Water Wells in Project Villages

Water Quality Parameter:			Na^+	K^+	Ca^{++}	Mg^{++}	Cl^-	NCO_3^-	$SO4^{--}$	Mn	Fe	pH	Hard-	TDS
Egyptian Standard (mg/L):			200	-	200	-	-	-	400	0.50	1.0	6.5-9.2	ness 500	1200
Oasis	**Village**	**Source**												
Dakhla	Balat	1	16	9.0	11	9	39	68	10	0.20	5.1	7.8	65	100
		2	12	10.0	23	5	35	80	10	0.14	7.2	8.0	78	100
		3	25	12.0	12	13	60	83	10	0.21	9.3	7.9	83	200
	El Gedida	1	11	7.0	16	13	39	76	20	0.46	6.2	7.9	93	100
		2	45	7.5	20	11	82	56	35	0.18	6.6	7.9	95	200
		3	19	5.5	21	10	66	51	15	0.26	1.9	7.7	94	200
		4	18	9.5	22	11	78	50	10	0.29	8.7	7.8	100	100
Kharga	El Mounira	1	90	28.0	17	12	100	205	10	0.01	1.5	6.7	92	376
		2	74	32.0	19	10	70	219	10	0.03	1.0	6.8	89	340
	Naser El Thowra	1	58	22.0	22	13	72	169	20	0.10	4.7	7.5	109	350
		2	71	42.0	44	31	180	66	100	0.30	2.8	6.2	238	550
		3	38	25.0	24	20	93	91	48	0.30	2.5	6.8	144	332

Note: Data provided by the Ministry of Water Resources and Irrigation