

Arab Republic of Egypt

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT

EGYPTIAN UTILITIES MANAGEMENT

Environmental Assessment

Environmental Assessment Report

For

FAYOUM GOVERNORATE

HAWARRAT EL MAQTA VILLAGE

QASR EL JABALI VILLAGE

**Fayoum Drinking Water and Sanitation Company
(FWWCO)**

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

CDM *International Inc.*

In association with



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Consulting Engineers



USAID
FROM THE AMERICAN PEOPLE

July 2007



Three residents of Qasr El Jabali.

Fayoum Environmental Assessment

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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
FWWCO	Fayoum Drinking Water and Sanitation Company
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	Vitrified 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
Feddān	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
°C	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

Fayoum 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 Fayoum Oasis: Hawarrat El Maqta and Qasr El Jabali. Each is to receive a sewerage system, a pump station, and a force main to existing wastewater treatment plants. These projects in Fayoum Governorate are to be implemented for the Government of Egypt (GOE) through the Fayoum Drinking Water and Sanitation Company (FWWCO) and the United States Agency for International Development (USAID).

The FWWCO, other Fayoum Governorate authorities, and USAID identified needs both for improved and expanded wastewater treatment capacity, and for improved and expanded wastewater conveyance capacity, in villages throughout the Fayoum.

Treatment plants are capital intensive. Conveyance improvements, on the other hand, are more amenable to incremental upgrades through smaller capital expenditures, and can be constructed by local contractors. Recognizing this, FWWCO requested assistance for construction of a wastewater treatment plant having a capacity of 60,000 m³/day, more than needed for now by Fayoum City itself, with service to some suburbs to be added incrementally by local contractors as funds become available. Similarly, the GOE constructed a WWTP for the Ibshaway City and surrounding villages.

The projects considered in this EA are among the planned incremental improvements to the wastewater conveyance systems, collecting wastewater from outlying villages and conveying it to existing urban treatment plants with capacity to handle the suburban flows.

Environmental setting. The Fayoum Region is one of the oldest agricultural areas of the world. It is an oasis, but unusual in that its water comes not from springs but from the nearby Nile River via a canal which originally was a natural distributary of the Nile. The Fayoum Depression forms a closed drainage basin with no outlet.

The Fayoum is rich in archaeological resources. Most sites lie at higher elevations. In antiquity the population centers were distributed at sites around the edges of the ancient Lake Moeris, whose elevation was roughly at sea level.

Agriculture remains the dominant activity and land use of the Fayoum Region. Villages and hamlets lie within or adjacent to the agricultural areas. Other activity includes agricultural processing industries (refineries, mills, gins, slaughterhouses, and tanneries), brick making, ceramics, and other lesser service industries that cater to the needs of the local community.

Satellite photographs of the subject villages show a development pattern common to most Egyptian farm villages: essentially all construction is encapsulated within a relatively tight perimeter, with negligible sprawl beyond it. The pattern defines clear limits for the areas to be

sewered; on the other hand, it results in narrow streets and alleys, difficult of access for sewer construction and for residents and businesses in the streets where sewers are being laid.

Water and wastewater. Much of the arable land in the Fayoum suffers from a high water table. Surface pooling is common in and around low-lying areas and is problematic near many settlements where ponded groundwater and wastewater pose potential human and environmental health risks.

Reticulated wastewater collection and centralized wastewater treatment facilities service some of the cities, but is still rare in smaller villages and farm estates where most of the rural population resides. Most of this population relies upon privately maintained onsite “soakaway” and septic tank systems. Field surveys have revealed that the onsite systems are generally poorly constructed and maintained, and are prone to failure, resulting in seepage of untreated wastes into groundwater, and surface overflow, with subsequent pooling of untreated wastes in and around dwellings and commercial buildings.

Furthermore, septic tanks must be pumped frequently, particularly in areas having a high water table. Often, septic waste evacuated by commercial and private tank trucks is illegally discharged to vacant areas, drains, and even canals serving as water supplies for potable and agricultural use. Unmanaged septic wastes often result in increased exposure of the population to untreated wastewater, greatly increasing potential human and environmental health risks.

Hawarrat El Maqta Village lies near the southeast end of the Fayoum. Gravity sewers will collect wastewater for pumping to the Kohafa Wastewater Treatment Plant, whose effluent in turn is discharged to the Batts Drain and conveyed to Lake Qarun. **Qasr El Jabali Village** lies in the markaz of Yousseff Sedek along the western boundary of Ibshaway markaz, on the western part of the Fayoum Governorate. Gravity sewers will collect wastewater in two areas of Qasr El Jabali separated by a canal and convey the wastewater to the respective pump stations. From there the wastewater will be sent through a force main to the Ibshaway WWTP, the principal wastewater plant serving Ibshaway City. Its effluent is discharged to the Wadi Drain, which in turn flows to Lake Qarun.

For these two wastewater improvement projects there are few if any issues of environmental controversy. Sewerage is to be provided to farming villages that do not yet have it, and the wastewater collected is to be pumped to regional wastewater treatment works that, by design, have installed capacity adequate to treat these flows to legal standards. Sewerage should largely eliminate the dysfunctional on-site soakaway systems.

The villagers certainly welcome the service, but also express concerns about ensuring the quality of the product, e.g.: Where will the effluents go? Will they harm the water quality in the drains or in Lake Qarun? Will they meet Egyptian regulatory requirements? What assurance is there that the quality of construction will be good, with no leaks of raw wastewater into the canals or drains? Will the pump stations operate, and continue to operate, with minimal odor and noise?

To meet these and other expectations and concerns, environmental management of the project must address the following items during planning, design, construction, and the ensuing years of operation.

During Planning and Design:

- **Anticipate development of new areas**, and plan to install sewerage before buildings are erected and residents and businesses move in.
- **Anticipate extension of the sewerage system into existing developments.** Try to size and slope sewers to anticipate their extension into adjacent future service zones.
- **Provide septage-accepting manholes at current sewerage limits** – hence close to not-yet-sewered areas—to encourage septage haulers to dispose of septage properly.
- **Pay compensation for land taking** according to established Ministry of Agriculture and Land Reclamation (MALR) rates and guidelines.
- **Antiquities.** Follow the Supreme Council on Antiquities procedures upon encountering any artifacts.

During Construction, and Monitoring of Construction:

- When writing the contract specifications, include line items that itemize, to the greatest precision and detail feasible, the quality control and quality assurance procedures to be followed during construction, including environmentally-oriented tasks such as safety procedures at all times, spill control, and site cleanup during decommissioning. The resident engineer is assigned and empowered to monitor the contractor's compliance with each item in the specifications. Specific environmental contract issues include:
 - **Stream crossings;**
 - **Antiquities;**
 - **Compliance with Egyptian occupational safety and health regulations;**
 - **Consideration for public safety, traffic control, and interruptions of passage;**
 - **Alertness for other utility lines (gas, electricity, water, telephone);**
 - **Dust control as needed;**
 - **Construction scheduling to minimize street closures.**

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

- **Any inappropriate septage discharge practices**, e.g. to canals, drains, or empty lots, rather than to approved discharge points;
- **Excessive odor or noise** from the pump stations;
- **Leaks in the force mains**, and the promptness and quality of repair of such leaks.

Routine monitoring would be by FWWCO as the local operating agency.

Institutional Resources. At the national level, there are several ministries directly and indirectly involved in water quality activities for planning, operations, research, monitoring and regulation. The Ministry of Water Resources and Irrigation is the central institution for water quality management. The main instrument for water quality management is Law 48. International aid agencies such as USAID provide funding and technical support through the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and FWWCO, a part of the Ministry of Housing, Utilities, and New Communities.

FWWCO leadership and responsibility. To provide sewerage to villages, and to pump the collected wastewater to treatment plants that have capacity to take it, are projects with relatively little environmental controversy. Still, there is significant challenge in planning, designing, constructing, operating, and maintaining these systems in a manner that is both structurally and environmentally sound.

Our knowledge of the receiving wastewater treatment plants, Kohafa and Ibshaway, is that these facilities are capable of receiving the flows from these villages, as well as from their current service areas, and treating them to the required standard. All effluents flow, eventually, to Lake Qarun. For the sake of Lake Qarun and its water quality, it is FWWCO's responsibility to ensure that this working knowledge is valid.

Through the planning, design, and construction stages there will be support and guidance from USAID, FWWCO, and numerous other national ministries and agencies.

However, throughout their gestation and life, the projects' functional and environmental success will depend most directly and heavily on the skills, initiative, and financial resources of the Fayoum Governorate wastewater agency, the FWWCO.

مشروع تطوير البنية التحتية فى مصر الملخص التنفيذى

يعد مشروع تطوير البنية التحتية فى مصر والممول من قبل الحكومة الأمريكية والذي يشمل مشروعات تحسين خدمات الصرف الصحى لعدد قريتين بمحافظة الفيوم وهما هواره المقطع وقصر الجبالي ، حيث أنه من المقرر تزويد القريتين بشبكات صرف صحى ومحطات رفع وخطوط طرد لتصل الى محطات المعالجة القائمه .

وتدعم هذه المشروعات المقرر تنفيذها بمحافظة الفيوم جمهورية مصر العربية وذلك من خلال شركة الفيوم لمياه الشرب والصرف الصحى ممثل الحكومة المصرية بالتعاون مع الوكالة الأمريكية للتنمية الدولية USAID ممثل الحكومة الأمريكية .

وقد حددت شركة الفيوم لمياه الشرب والصرف الصحى مع جهات معنية أخرى بالمحافظة وكذلك الوكالة الأمريكية للتنمية الدولية USAID الأحتياج الى تحسين والتوسع فى خدمة معالجة الصرف الصحى وذلك بالتحسين والتوسع فى شبكات الصرف الصحى لقرى جديدة بمحافظة الفيوم .

تعتبر محطات المعالجة من الأعمال ذات التكلفة الرأسمالية المرتفعة ، الا انه من ناحية أخرى فإنه يمكن التحكم فى تطوير وتحسين شبكات الصرف الصحى وذلك بتنفيذها على مراحل من خلال توفر تكلفة رأسمالية محدودة نسبيا مع امكانية تنفيذها من خلال مقاولين محليين . واخذا ذلك فى الاعتبار فإن شركة الفيوم لمياه الشرب والصرف الصحى قد طلبت المعاونة فى إنشاء محطة معالجة لمدينة الفيوم بطاقة ٦٠٠٠٠ م^٣/يوم وهذه الطاقة أكثر من أحتياج المدينة الحالية مع امكانية خدمة بعض التجمعات المجاورة التى يمكن ربطها بهذه الخدمة على مراحل من خلال استخدام مقاولين محليين طبقا لتوفر التمويل اللازم. وبتطبيق نفس الاسلوب فقد قامت الحكومة المصرية بإنشاء محطة معالجة للصرف الصحى بمدينة أبشواى لخدمتها والقرى المحيطة بها .

تعد المشروعات المعنية والتي يتضمنها هذا التقرير للتقييم البيئى ضمن أعمال التطوير المخطط لها لأنظمة تجميع ونقل الصرف الصحى من هذه القرى وربطها بمحطة معالجة قائمه تسمح سعتها بأستقبال ومعالجة تصريفات قرى أخرى مجاورة .

بيئية المشروع :

يعتبر إقليم الفيوم من أقدم المناطق الزراعية فى العالم وهى عبارة عن واحة حيث أن مصدر المياه لا يعتمد على ينابيع أو آبار ولكن على نهر النيل عبر ترعة بحر يوسف والتي كانت مجرى قناة طبيعية فى الأصل علما بأن الفيوم حوض جوفى مائى مغلق ليس له أى مخارج .

وتعتبر منطقة الفيوم من المناطق الغنية بالآثار القديمة والتي تقع غالبا بأماكن ذات منسوب مرتفع نسبيا ، وتقع كثير من الآثار فى المناطق الأهلة بالسكان حول حواف حوض البحيرة القديمة "موريس " والتي كان تقع تقريبا على منسوب سطح البحر .

مازال نشاط الزراعة هو النشاط الأقتصادي الغالب على استخدام الأرضى بأقليم الفيوم ، وغالبا ما تقع القرى والعزب بجوار الأراضى الزراعية بالإضافة لوجود أنشطة أخرى مرتبطة بالزراعة مثل صناعة العربله وطحن الغلال وتربية الدواجن وصناعة الطوب والسيراميك والأنشطة المرتبطة بخدمات المجتمع .

وتوضح صور الأعمار الصناعية أن تطور هذه القرى العمرانى لها نفس طبيعة قرى المجتمع المصرى حيث المباني متلاصقة فى محيط منطقة محدودة وفي الأساس يمتد التوسع فى منطقة ضيقه حول محيط القرى .

وتعد طبيعة حدود التكوين العمرانى للقرى واضح المحدوديه وهي مماثلة للقرى التى سوف يتم خدمتها بشبكات صرف صحى داخل القرية حيث سوف تمر المواسير بشوارع ضيقة وتكون هناك صعوبة لحركة انتقال الافراد المقيمين بها أثناء فترات التنفيذ لمسارات شبكة الصرف الصحى.

أعمال المياه والصرف الصحى:

تعانى معظم الأراضى الزراعية بالفيوم من ارتفاع منسوب المياه الجوفية وجود العديد من البرك التى تتجمع بها المياه فى المناطق المنخفضة والتى تشكل مصدر للأزعاج للتجمعات السكانية وتمثل مصدر لمخاطر على البيئة ومخاطر على الصحة العامة .

يعد نظام شبكة تجمع الصرف الصحى المركزية هو النظام الغالب لخدمة المدن ولكن نادر ما يخدم القرى الصغيرة التى يقطنها معظم ساكنى الريف ومعظم أهالى تلك القرى لديهم نظام خاص محلي للصرف الصحى وذلك بأستخدام خنادق لتجميع الصرف الصحى ثم يتم نزح هذه الخنادق بعربات كسح ويتضح من الزيارات الميدانية أن هذا النظام يسبب الكثير من المشاكل للمجتمع والبيئة المحيطة ، حيث أنه يتم تنفيذه بطريقة رديئة حيث يسمح للصرف الصحى بالرشح للمياه الأرضية والجوفية وأحيانا يتسبب بالطفح ليغمر أجزاء كبيرة من المباني والشوارع المحيطة.

ويتم كسح خنادق الصرف الصحى بعربات خاصة او عامه وصرفها بشكل غير قانوني على اماكن فضاء او الى أقرب مصرف والذى فى الغالب يخلط بمياه الترعى والتي تستخدم أحيانا للاستخدامات الأداميه أو يتم أستخدام مياه الصرف الزراعى المخلوط بالصرف الصحى مباشرة لرى الأراضى الزراعية ويتم ذلك فى حالة نقص المياه بالترعى وأثناء فترات المناوبة وبذلك تزداد المخاطر على الصحة العامة للمجتمع .

قرية هواره المقطع:

تقع قرية هواره المقطع بالقرب من حدود الفيوم من ناحية الجنوب الشرقي حيث يتم تزويدها بخطوط صرف بالأنحدار الطبيعي ثم ضخها عن طريق محطات رفع الى محطة معالجة الصرف الصحي القائم به بحافة والتي تصرف المياه المنقاة على مصرف البطس ومنه الى بحيرة قارون .

قرية قصر الجبالي:

تقع القرية بمركز يوسف صديق على الحدود الغربية لمركز أبشواى بالجزء الغربي لمحافظة الفيوم ،حيث من المقرر تزويدها بشبكة تجميع بالأنحدار الطبيعي والتي تجمع الصرف الصحي من منطقتي بقصر الجبالي التي يفصلهما ترعة ، ثم يتم ضخ الصرف الصحي خلال محطات رفع بواسطة خطوط الطرد حتى تصل الى محطة المعالجة بأبشواى القائم والتي تخدم مدينة أبشواى بصورة أساسية و تصب المياه المنقاة على مصرف الوادي الذي يصب على بحيرة قارون فى النهاية .

ومن المتوقع أن تكون المشاكل البيئية المختلفة بالمشروعات المقترحة لهتين القريتين محدودة جدا ، حيث أن المشروعات المقترحة سوف تقدم خدمة الصرف الصحي لقرى لم تحصل على تلك الخدمة من قبل ، يصب الصرف الصحي للقريتين فى محطة معالجة مركزية لديها القدرة على أستيعاب ومعالجة مياه الصرف المجمع من القرى المقترحة وبهذا سوف تحد من المشاكل الواقعة نتيجة أستخدام نظام خنادق الصرف الصحي .

وبالتأكيد أن هذا التحسن فى الخدمة مجال ترحيب وأهتمام من كل أهالي القريتين ولكن هناك بعض المخاوف من بعض الأمور مثل :

- أين سيصرف مياه الصرف المنقاة المجمعة من القريتين .
- هل هذا سوف يؤثر بالسلب على نوعية المياه بالمصرف المستقبل لهذه المياه أو على بحيرة قارون .
- هل هذا النظام سوف يتوافق مع القوانين واللوائح المصرية .
- هل من تأكيدات أن تنفيذ المشروع سوف يتم بصورة جيدة مع عدم وجود تسريب ورشح من نظام الصرف الصحي .
- وهل سوف يتم تشغيل محطات الرفع مع الحد الأدنى عن أنبعاث روائح كريهة وضوضاء

وللتعامل مع كل تلك المخاوف فإن ذلك يجب أن يأخذ فى الأعتبار من خلال إدارة المشروع من الناحية البيئية من خلال التخطيط والتصميم والتنفيذ والتشغيل لسنوات عديدة .

أثناء التخطيط والتصميم :

- الأخذ فى الأعتبار مناطق الأمتداد العراني لتخطيط موقع شبكة الصرف وذلك قبل أنشاء المباني .
- الأخذ فى الأعتبار السعة والميول والأقطار المناسبة لخطوط المواسير وذلك للأستخدام الحالي ولأى توسع مستقبلي .

- السماح لبعض التجمعات التي تستخدم الخنادق بالصرف على غرف التفتيش المناسبة على أن تكون قريبة من تلك التجمعات الغير مخدومة .
- صرف التعويضات اللازمة للأراضي التي يحتاجها المشروع أو تعويضات عند اتلاف أى زراعة بسبب المشروع حسب لوائح و إرشادات وزارة الزراعة .
- أتباع إرشادات الهيئة العامة للآثار فى حالة وجود أى آثار أثناء التنفيذ .

أثناء التنفيذ والإشراف ومراقبة التنفيذ:

يجب عند أعداد كراسة الشروط والمواصفات الخاصة بالمقاول أن تشمل بنود للتأكد من شروط الجودة أثناء التنفيذ وأن تشمل إجراءات السلامة طبقاً للكود المصرى والحفاظ على كل مواقع العمل التي قد تتأثر وأعادتها على الحالة السابقة للتنفيذ والحد من التلوث بقدر الأمكان نتيجة استخدام المعدات في التنفيذ ويجب أن يعطى المهندس المشرف الأمكانية والصلاحيات للتأكد من أن المقاول ينفذ تلك البنود بدقة للحفاظ على البيئة والحد من الآثار السلبية المتوقعة من جراء عملية تنفيذ المشروع .

وتشمل الأعتبارات الخاصة بالبيئة لما يلي :

- العديات للترع والمصارف .
- الآثار.
- اتباع كل إجراءات الأمن والسلامة طبقاً للكود المصرى .
- مراعاة السلامة العامة وحركة المرور لساكنى القرىتين .
- مراعاة عدم التأثير على البنية التحتية القائمه مثل خدمات الغاز والكهرباء والتليفون والمياه .
- التحكم فى الغبار الناتج عن عملية الأنشاء .
- مراعاة التنفيذ طبقاً للبرنامج الزمنى .

وخلال فترة سنوات من تشغيل المشروع:

يجب أن يتم مراقبة الآتي :

- تقادى صرف الصرف الصحى الغير معالج على الترع والمصارف .
- تقادى الشكوى من الروائح والضوضاء .
- التسريب او الرشح من خطوط الطرد وضرورة إصلاح أسباب التسريب فوراً.

وأن تتم أعمال الرقابة والمتابعة الدورية من خلال شركة الفيوم للمياه والصرف الصحى .

دور الدعم المؤسسى:

يوجد على المستوى القوى عدة وزارات وهيئات لها دور في أنشطة إدارة نوعية المياه بمصر وتشمل مجالات التخطيط والتشغيل والأبحاث والمتابعة وأصدار القوانين . وتعد وزارة الموارد

المائية والرى هى الجهة المنوط لها الدور الرئيسى فى إدارة الموارد المائية بمصر ويعتبر قانون ٤٨ لسنة ٨٢ هو المنظم لأدارة نوعية المياه. وتقدم المؤسسات العالمية ومنها الوكالة الأمريكية للتنمية الدولية الدعم المالى والفنى خلال الهيئة القومية لمياه الشرب والصرف الصحى وشركة الفيوم للمياه الشرب والصرف الصحى ممثلين عن وزارة الأسكان والمرافق والتنمية العمرانية .

تعتبر شركة الفيوم لمياه الشرب والصرف الصحى هى المسئول بمحافظة الفيوم عن تقديم خدمات الصرف الصحى للقرى وربطها بمحطات معالجة يكون لها طاقة تسمح بأستيعاب تصرفات من قرى أخرى مجاورة و لايزال هناك تحديات كثيرة فى التخطيط والتصميم والتنفيذ والتشغيل ليكون المشروع متوافق بيئيا .

ويعتمد هذا المشروع المقترح على أساس أن محطتى المعالجة بقحافة وأبشواى القائمتين قادرتين على أستيعاب ومعالجة الصرف الصحى المتوقع من القرى المقترحة طبقا للقانون ومن المعروف أن كل أنواع صرف صحى الفيوم يصل فى النهاية الى بحيرة قارون ذات الأهمية الأقتصادية والأجتماعية لمحافظة الفيوم .

وعلى شركة الفيوم لمياه الشرب والصرف الصحى التأكد من كل الأحتياجات الضرورية للتعامل مع المشروع وذلك للحفاظ بقدر الأمكان على بحيرة قارون من أى تلوث .

وسوف يكون هناك دعم وأرشاد خلال العمل بالمشروع من الوكالة الأمريكية للتنمية الدولية وشركة الفيوم لمياه الشرب والصرف الصحى وجهات أخرى عديدة ووزارات ومؤسسات عالمية معنية .

يعتمد نجاح المشروع بصورة مباشرة ولضمان عمله بكفاءه خلال فترة عمره الأفتراضى على الدعم والقدرات والمهارات الفنية والنواحى المالىة المباشرة لشركة الفيوم لمياه الشرب والصرف الصحى.

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT ENVIRONMENTAL ASSESSMENT

FAYOUM GOVERNORATE

HAWARRAT EL MAQTA VILLAGE QASR EL JABALI VILLAGE

ENVIRONMENTAL ASSESSMENT REPORT

1 Introduction

The USAID-funded Egypt Infrastructure Improvements Project is preparing to implement improvements to wastewater facilities in two villages in Egypt’s Fayoum Oasis. The project villages are Hawarrat El Maqta and Qasr El Jabali. Each is to receive a sewerage system, a pump stations, and a force main to convey wastewater to an existing wastewater treatment plant. These projects in Fayoum Governorate are to be implemented for the Government of Egypt (GOE) through the Fayoum Drinking Water and Sanitation Company (FWWCO) 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.

Figure 1 is a map of the Fayoum, showing the locations of the two subject villages. The Fayoum lies approximately 100 km south by southwest of Cairo, and 30 km west of the Nile city of Beni Suef.

The background data and information for the proposed remedial activities set out in the following sections are based largely on the report, “Middle Egypt Water and Wastewater Master Planning Project: Environmental Assessment of First Stage Investment Program, Governorate of Fayoum, Egypt” (Harza, 2001a). That report was the Environmental Assessment (EA) for Water and Wastewater Master Plan prepared for USAID by Harza Environmental Services and its associates Camp, Dresser, McKee International, Environmental Quality International, and Engineering Consulting Group, in cooperation with the Fayoum Economic and General Authority for Water and Sanitation (FEGAWS; Harza 2001b). The organization FEGAWS was restructured in 2005 and is now known as the Fayoum Drinking Water and Sanitation Company (FWWCO).

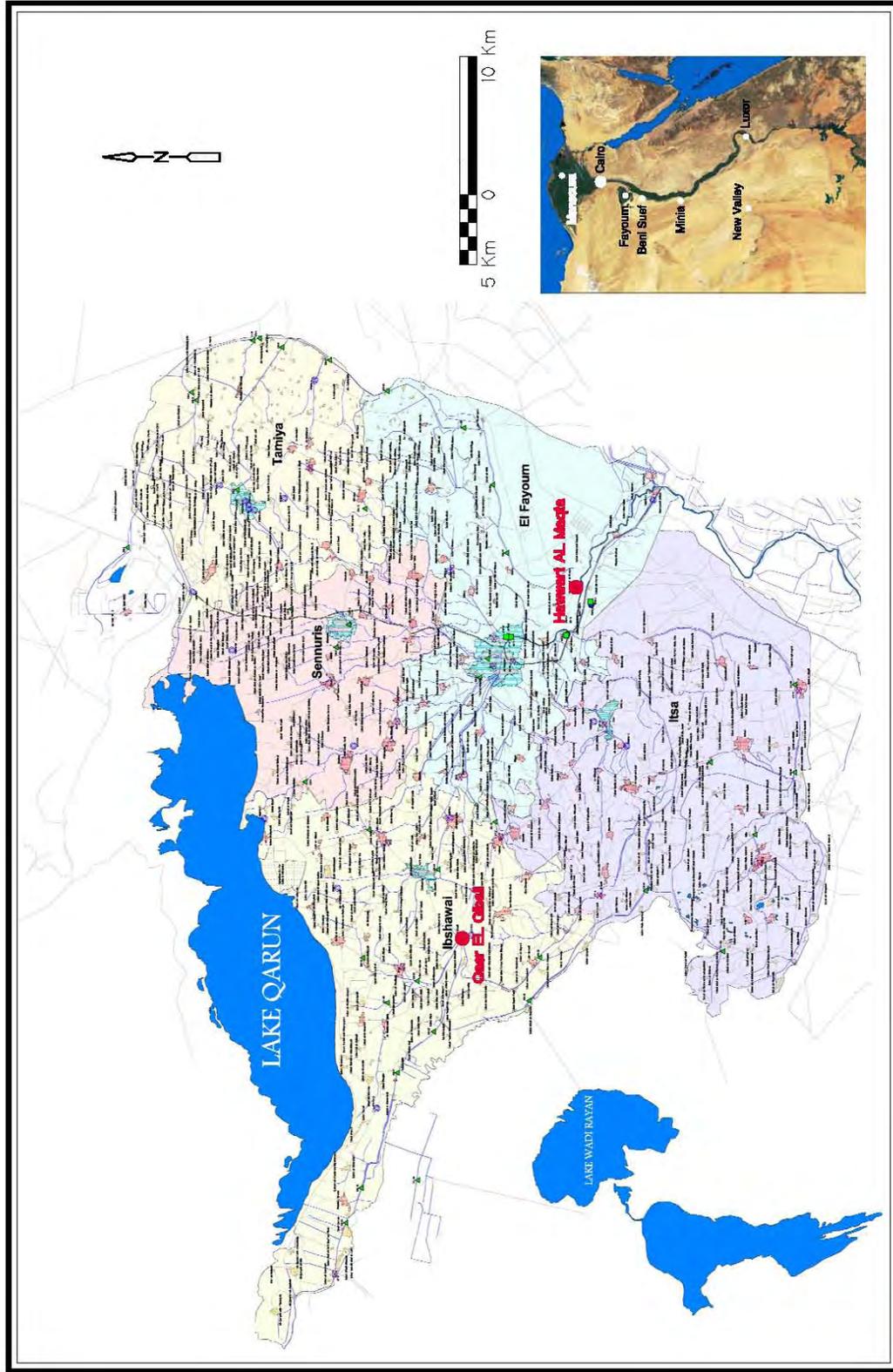


FIGURE 1. - LOCATION MAP FAYOUM GOVERNORATE

FWWCO, Fayoum Governorate authorities and USAID identified needs both for improved and expanded wastewater treatment capacity, and for improved and expanded wastewater conveyance capacity, in villages throughout the Fayoum Governorate.

Treatment plants are capital intensive. Conveyance improvements, on the other hand, are more amenable to incremental upgrades through smaller capital expenditures, and can be constructed by local contractors. Therefore, FWWCO requested assistance for construction of a new treatment plant to expand the capacity by 60,000 m³/day at the Kohafa WWTP site. Similarly the GOE constructed a 20,000 m³/day WWTP for Ibshaway City and surrounding villages. The conveyance improvements would be added incrementally by local contractors as funds become available.

The new Kohafa wastewater plant has been built next to the site of the old Kohafa WWTP, and began operation in the later part of 2005. The Ibshaway WWTP began receiving wastewater flow during 2007. The projects considered in this EA are among the planned incremental improvements to the wastewater conveyance systems, collecting wastewater from outlying villages and conveying it to existing urban treatment plants.

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 a guide to 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 Fayoum Governorate, FWWCO, 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 and operating agency (FWWCO)
- 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. Environmental management procedures are described in Appendix D.

3 Environmental Setting

The Fayoum Region is one of the oldest agricultural areas of the world. It is an oasis, a fertile, watered region surrounded by desert. Unlike most oases, however, its water comes not from springs but from the nearby Nile River via the Bahr Youssef (Joseph Canal), which originated as a natural tributary of the Nile.

The topographic and hydrologic boundaries are sharp. The desert rises from the irrigated land, except in the north-west where Lake Qarun fills the bottom of the depression. Land slopes from El Lahun, 25 m above MSL, to Lake Qarun, 43.40 m below MSL. The lake has no natural outlet and water leaves it only through evaporation.

The climate of Fayoum Governorate is typical of that of the hyper-arid Sahara – hot and dry with scanty winter rain, and bright sunshine throughout the year. Temperatures range from as high as 48.8°C to as low as -1.2°C. Average temperatures during winter are relatively mild with the minimum monthly average of 15°C occurring during January. Summers are hot with average temperatures of 29°C during July.

Table 1. Temperature and climate data for the Fayoum

Condition	Lake Qarun	Fayoum City
Mean Temp.	22.2 °C	22 °C
Average Summer Temp.	28.6°C	26.5°C
Average Winter Temp.	15.7°C	14.5 °C
Annual rainfall	9.22 mm	13.7 mm
Annual evaporation	1980 mm	2090 mm

Reference: DRI, Fayoum Year Book, Cairo, Egypt, 1997.

Annual rainfall averages 14 mm, and is rather irregular in time and place (Van Zon and Jeanes 1992a; also see Figure 2). The high evaporation rate coupled with the scanty precipitation makes the area one of the most arid in the world. Wind blows mostly from the north, northeast or northwest. Violent sand and dust storms locally known as *khamseen* occur regularly during the spring months.

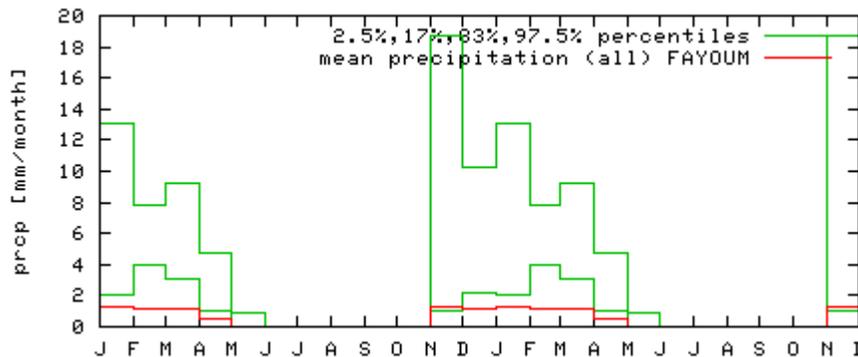


Figure 2. Monthly precipitation range at Fayoum (climex.kmnl.nl)

Geology. The Governorate of Fayoum occupies an area of the Western Desert of Egypt characterized by relatively simple topography. The two outstanding geomorphologic features of the Governorate are the Fayoum and Wadi Rayan depressions. The Fayoum depression, the larger of the two, is a 12,000 km², wind-excavated hollow in limestone, surrounded on all sides by high rocky walls. A northwest to southeast running, 24-m high, 15-km wide topographic saddle known as Gabal El Hadid separates the depressions (Abu Al-Ezz 1977).

The Fayoum depression has about 1,500 km² of cultivated area. The depression forms an internal (closed) drainage basin with no outlet (Abu Al-Ezz 1977, Said 1962, 1990). The floor of the depression slopes downward from a level of about 32 m above mean sea level (MSL) along its perimeter, to Lake Qarun, which lies in the northwestern part of the depression at a surface elevation of about - 43 m MSL.

North and northwest of that plain, the country is rugged and rocky, with Gabal Qatrani to the north and the Qaret Gahanam badland to the west. A rolling plateau covered with sand and desert pavement surface deposits (locally known as *serir*) lies in the areas west, south and east of the cultivated part of the depression (Abu Al-Ezz 1977, Said 1962, 1990). The eastern *serir* areas are within a few km of Hawarrat El Maqta.

In the past, the silt-laden water of the Nile flood, carried by Bahr Youssef, covered the floor of the depression with large quantities of Nile silt similar to that found in the Nile Valley and Delta. These surface deposits cover the lower part of the depression. Higher areas within the depression and at its periphery are covered with varying mixtures of sand and silt depending on the ground elevation. Lacustrine deposits dating back to the Neolithic Period are found in certain parts of the depression. The project village Hawarrat El Maqta is on the upper part of the depression, where soils are well drained and slightly saline. Qasr El Jabali is near the lower part of the depression, where soils are more saline and poorly drained, particularly around the shores of Lake Qarun (Van Zon and Jeanes 1992a).

The soils are excellent for agriculture, despite some soil salinity and sodicity (the amount of exchangeable sodium cations in water or in soil) in limited areas, especially around Lake Qarun. Soils in the area are mostly sandy with low organic content. Small field areas are often flood irrigated with manure piles of donkey or other livestock manure, and also receive mineral fertilizer.

Groundwater. There are three aquifers under the Fayoum. In the agricultural areas, a perched water table is maintained by infiltration from canals, drains and irrigated fields. Many of the springs in the Fayoum depression have their sources in this aquifer. Beneath this is a Quaternary aquifer of Eocene limestones and marls. This aquifer is salty and therefore unsuitable for potable or irrigation use. The Nubian sandstone aquifer is a very deep aquifer that underlies parts of the depression. However, the depth to this aquifer is too great to allow exploitation (Abd El Baky 1972).

Eocene limestones and marls are rock formations that generally contain no aquifers. Where permeable strata do occur, the water is likely to be highly saline. The breach in the limestone wall at the Hawarra gap accommodates an aquifer in the Pleistocene sediments. However, the

volume entering the basin as groundwater seepage by this route represents only about one thousandth of the surface flow.

Biological diversity is relatively high despite the intensity of human activity in the region. The major terrestrial habitats are agricultural land and desert. Wildlife is able to exploit the cultivated and fallow areas and the uncultivated riparian areas along canals and drains.

Aquatic habitats of the Fayoum region include freshwater canals, fresh and brackish drain ditches, and the saline Lake Qarun. Canals, drains, and Lake Qarun provide home to a variety of fish, amphibians, reptiles, wetland birds and mammals, and a variety of hydrophilic plants.

Flora. In the Fayoum today little is left of what could be called natural vegetation. The lush savannah which grew here in the Palaeolithic era gave way to more arid vegetation.

The Egyptian flora list includes a number of species occurring in the Fayoum which are considered rare, as presented in the following table. Some of these are native to the Fayoum.

Table 2. Rare plants occurring in the Fayoum

Species	Notes
Aizoon hispanicum	Salty area
Atriplex rosea	Salty area
Abutilon pannosum	Small herb
Alopecurus myosuroides	Grass
Echinochloa colonum	Grass
Najas pectinata	Submerged water plant
Miriophyllum apicatum	Water plant
Salix subserrata	Small tree
Tamarix	Small tree

Fauna. Nearly half of the 431 birds species recorded for Egypt can be found in the Fayoum. Three quarters of these are migratory. The Fayoum wetlands are important sites for passing and over-wintering migrating water birds.

New habitats have been created. The Wadi El Rayan lakes, for instance, are winter home to tufted duck, coot, pochard, and resident colonies of typical reed bed dwellers. Most of Egypt's 33 species of snake are found in the Fayoum. Fifteen reptile and amphibian species have been recorded in the Wadi El Rayan depression by the Azhar University.

Archaeological and cultural resources. The Governorate of Fayoum is rich in archaeological resources. The Environmental Profile of Fayoum (Van Zon and Jeanes 1992a) lists 24 significant sites. Most sites lie at higher elevations and around the periphery of the depression, where buildings and monuments were safe from rising lake waters. The distribution of lacustrine deposits indicates that ancient Lake Moeris had an elevation around sea level. Thus in antiquity the population centers was distributed at sites around the edges of the depression.

As noted in Appendix D, construction activities involving digging within three kilometers of a known antiquities site require permission from the Supreme Council on Antiquities. The Hawara pyramid lies within three kilometers of the village of Hawarrat El Maqta and the entire force main route to the Kohafa WWTP; the Deir El Azab Monastery lies within three kilometers of much of the force main route. Qasr El Jabali Village is more than 6 km from the desert land surrounding the oasis, where antiquities, if any, are most likely to be located. Still, there must be a due-diligence search for known antiquities within three kilometers of the village.

Socio-economic environment; land use. Agriculture remains the dominant activity and land use of the Fayoum Region. Developed areas (villages and hamlets) lie within or adjacent to the agricultural areas. Other activity includes agricultural processing industries (refineries, mills, gins, slaughterhouses, and tanneries), brick making, ceramics, and other lesser service industries that cater to the needs of the local community.

Satellite photographs of the subject villages (Figures 3 and 5) show a development pattern common to most Egyptian farm villages: essentially all construction is encapsulated within a relatively tight perimeter, with negligible sprawl beyond it. No doubt this results from the desire to maximize the area available for agriculture. The pattern defines clear limits for the areas to be sewered; on the other hand, it results in narrow streets and alleys, difficult of access for sewer construction and for residents and businesses in the streets where sewers are being laid.

As shown in Table 2 the total area in Fayoum governorate is 189,553 ha. The total cultivable area is 176,557 ha while the uncultivable area is 12,996 ha.

Table 3. Cultivated and uncultivated area in Fayoum Governorate during 2003-2005

District	Cultivable area,	Uncultivable area		Total area, Hectares
	Hectares	Housing, ha	Service, ha	
El Fayoum	32508	1586	768	34862
Senoris	23981	1125	714	25820
Tamia	33111	1246	401	34758
Atsa	44073	1904	1770	47747
Ibshaway	14300	540	943	15783
Yosef El Sedik	28584	524	1475	30583
Total	176557	6925	6071	189553

Reference: Agricultural department in Fayoum governorate, 2005

The rural population is more than twice the urban population, which indicates that the Fayoum Governorate is an agricultural community. This rural population lives mostly in villages like Hawarrat El Maqta and Qasr El Jabali.

Water and wastewater. The irrigation water for the Fayoum is diverted from the Nile into the Ibrahimiya Canal at Assiut. At Dairut, 284 km upstream of El Lahoun, flow is diverted from the Ibrahimiya Canal to the Bahr Youssef. The Fayoum Irrigation Department (FID) is responsible for management of the irrigation system. Until 1973-1974, the drainage water for the Fayoum used to flow to Lake Qarun. At that time, a drainage diversion to the Wadi Rayan depression became operational. The Ministry of agriculture decides upon the cropping pattern. The Ministry of Irrigation and Water Resources calculates the water requirements for a whole year in advance and the FID demands the water it needs accordingly.

Over 90 percent of the approximately 2,400 Mm³/yr of fresh water that enters the Fayoum through the Bahr Youssef Canal is used for irrigation. Much of the arable land in the Fayoum suffers from a high water table. High groundwater is largely a result of inefficient irrigation practices and the fact that the Fayoum lies over a shallow, relatively impermeable clay lens. The resulting water table lies within 1.5 meters of the soil surface in most areas. Surface pooling is common in and around low-lying areas and is problematic near many settlements where ponded groundwater and wastewater pose potential human and environmental health risks.

According to the 1996 census, about 73 percent of the rural population of Fayoum lives in village houses. Virtually all the water for domestic consumption is provided through the water network. Only about one percent of the governorate population use pumps or other sources for potable water. About 45 percent of rural buildings and 48.5 percent of the population in the governorate had connections to the public water network in the building in which they lived.

Reticulated wastewater collection and centralized wastewater treatment facilities service the capital cities and selected urban centers. Fayoum City has a relatively high level of sewer connection (85 percent of the population).

However, reticulated wastewater collection is still rare in smaller villages and ezbas (farm estates) where most of the rural population resides. The vast majority of this population relies upon privately maintained onsite “soakaway” and septic tank systems.

Field surveys have revealed that onsite systems are generally poorly constructed and maintained. As such, these systems are prone to failure. Failure of onsite systems results in seepage of untreated wastes into groundwater, surface overflow, and subsequent pooling of untreated wastes in and around dwellings and commercial buildings.

In a number of villages in Fayoum, pooling of wastewater from onsite systems occurs in depressions where high groundwater breaks through to the surface. Pools of untreated wastewater are a source of odors, provide breeding areas for mosquitoes, and represent a significant reservoir of human pathogens. Pooling water also can damage foundations of buildings and other material property.

Furthermore, septic tanks must be pumped frequently, particularly in areas having a high water table. Often, septic waste evacuated by commercial and private tank trucks is illegally

discharged to vacant areas, drains, and even canals serving as water supplies for potable and agricultural use. Unmanaged septic wastes often result in increased exposure of the population to untreated wastewater, greatly increasing potential human and environmental health risks.

Onsite systems are therefore inappropriate for densely settled villages such as Hawwarat El Maqta and Qasr El Jabali.

4 Project Description: Hawarrat El Maqta Village

4.1 Description

Hawarrat El Maqta Village has a population that is projected to grow to 30,000. As shown in Figure 1, Hawarrat El Maqta lies near the southeast end of the Fayoum. Figure 3 is a satellite image with the village limits outlined in the southeast corner of the image. Gravity sewers will convey wastewater to a pump station at the northwest corner of the village. From there the wastewater will be pumped through a force main to the Kohafa Wastewater Treatment Plant (WWTP), outlined at the northwest corner of Figure 3. The force main route, shown by a single white line, follows established roads. The village and the entire force main route lie within 3 km of the Hawara Pyramid.

The Kohafa WWTP is the principal wastewater plant serving Fayoum City. Its effluent is discharged to the Batts Drain, which in turn flows to Lake Qarun. The rated capacity of the Kohafa WWTP was recently expanded to accommodate not only increased flows from Fayoum City, but also flows contributed from outlying villages such as Hawarrat El Maqta. Therefore, at least until the current planning horizon, the wastewater from Hawarrat El Maqta is expected to be treated adequately to meet Egyptian wastewater discharge standards.

Figure 4 shows the proposed sewerage layout, and indicates that most of the proposed sewerage lies north of the Bahr Youssef Canal. However, Figure 3 suggests that significant development already lies south of the Bahr Youssef Canal, and even south of the Hassan Wassef canal. Wastewater disposal in those areas would therefore still use on-site systems, requiring frequent septage pumping. Presumably sewerage would eventually be extended to those areas, with wastewater conveyed north across the canals to the rest of the collection system.



Figure 3. Satellite view of Hawarrat El Maqta, the Kohafa WWTP, and the force main route in between.

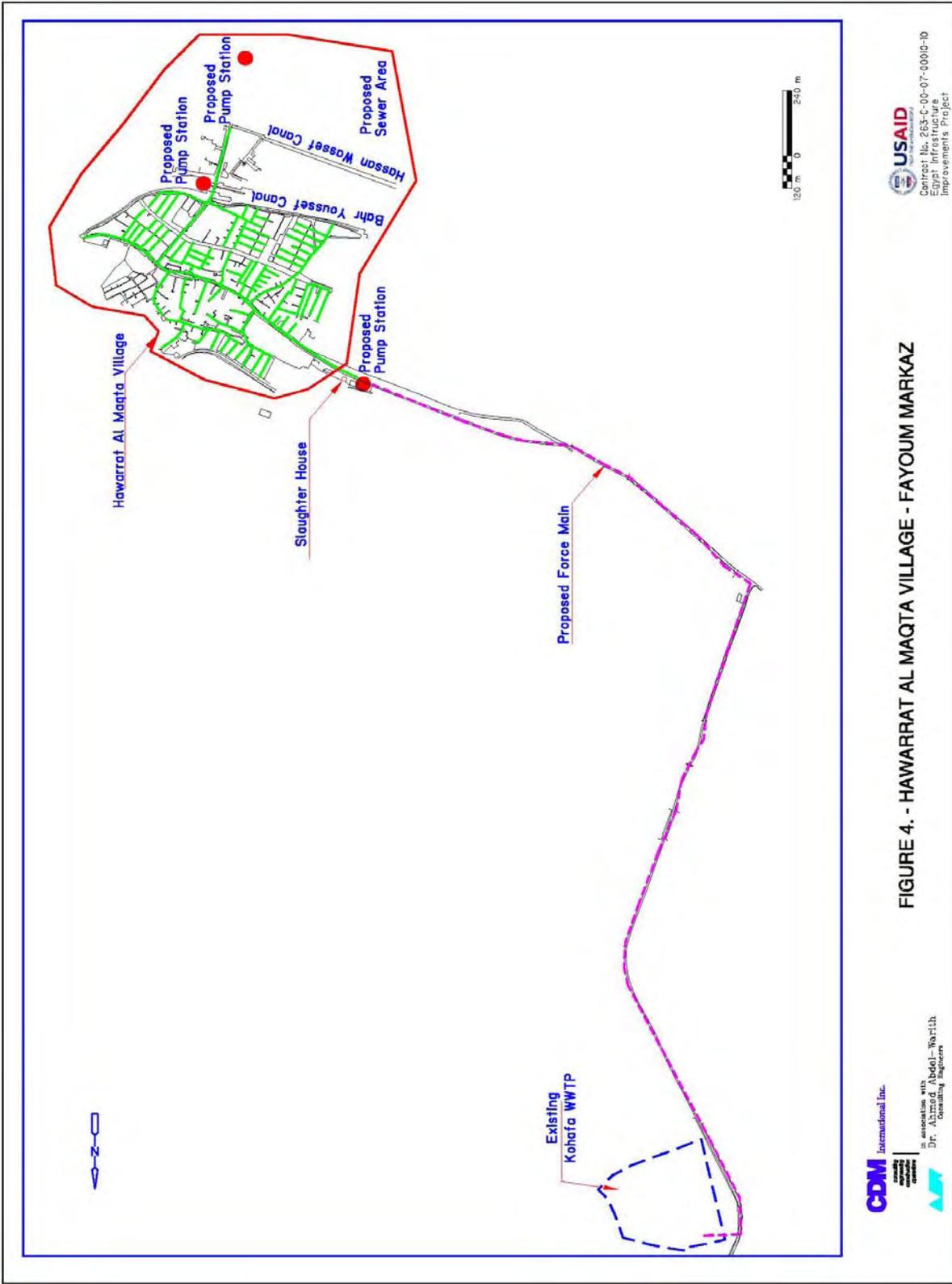


FIGURE 4. - HAWARRAT AL MAQTA VILLAGE - FAYOUM MARKAZ

USAID
 Contract No. 263-C-00-07-00010-10
 Egypt Infrastructure
 Improvements Project

CDM International Inc.
 is associated with
 Dr. Ahmed Abdel-Warith
 Consulting Engineers

4.2 Project Alternatives

4.2.1 Alternatives

Other than the no-action alternative, no other alternatives were identified for construction of the wastewater collection and conveyance system in Hawarrat Al Maqta.

4.2.2 No-Action Alternative

The no-action alternative is to not construct the wastewater collection and conveyance system in Hawarrat Al Maqta. As population and density in the village increase more residents would rely on soakaways and other on site systems resulting in an increase in the number and density of on site wastewater systems. Volumes of wastewater generated will increase further causing increased human and environmental health risks as a result of the poorly constructed and failing on site systems.

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 Project Description: Qasr El Jabali Village

5.1 Description

Qasr El Jabali Village has a population that is projected to grow to 37,000. As shown in Figure 1, Qasr El Jabali Village lies on the eastern side of the markaz of Yousseff Sedek along the western boundary of Ibshaway markaz, in the western part of the Fayoum Governorate. Figure 5 is a satellite photo with the village limits outlined on the western side of the image. Gravity sewers will collect wastewater from the two areas of Qasr El Jabali that are separated by a Nazla Canal and convey the wastewater to respective pump stations. From there the wastewater will be sent through a force main to the Ibshaway WWTP, the principal wastewater plant serving Ibshaway City, outlined to the east of the village in Figure 5.

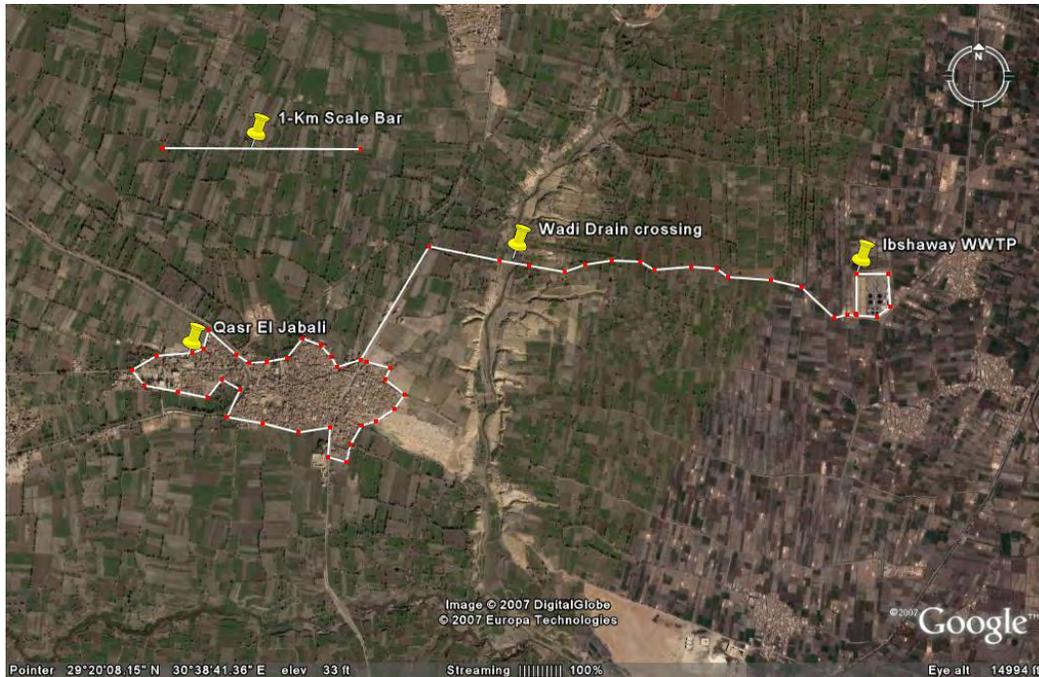


Figure 5. Qasr El-Jabali Village is to the left, and the Ibshaway WWTP is on the right (rectangular site with circular tanks). Between them is a deep-cut wadi which the force main must cross.

The Ibshaway WWTP is the principal wastewater plant serving Ibshaway City. Its effluent is discharged to the Wadi Drain, which in turn flows to Lake Qarun. The rated capacity of the Ibshaway WWTP is sufficient to handle the flows from Qasr El Jabali as well as those from Ibshaway City and meet Egyptian wastewater discharge standards.

The force main route, shown by a single white line, follows an established road for the first 600 m from the village, but then goes across fields and across the Wadi Drain. From the east bank of the Wadi Drain it is proposed to locate the force main in an alignment already established and occupied by the outfall pipe from the Ibshaway WWTP to the Wadi Drain.

Figure 6 shows the proposed sewerage layout. Comparison of Figures 5 and 6 indicates that the proposed sewerage will serve much of the developed area of the village.

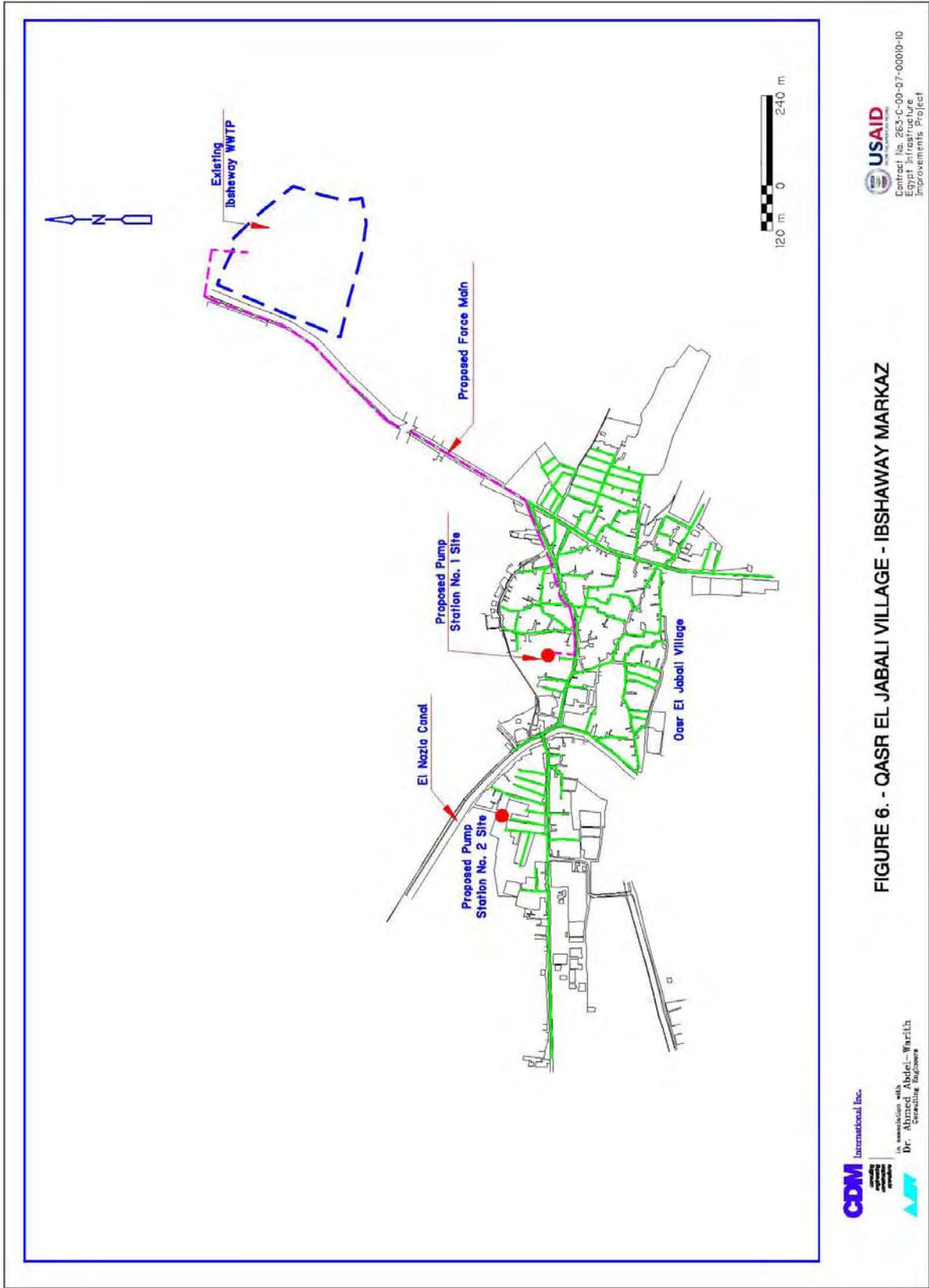


FIGURE 6. - QASR EL JABALI VILLAGE - IBSHAWAY MARKAZ

5.2 Project Alternatives

5.2.1 Alternatives

Other than the no-action alternative, no other alternatives were identified for construction of the wastewater collection and conveyance system in Qasr El Jabali.

5.2.2 No-Action Alternative

The no-action alternative is to not construct the wastewater collection and conveyance system in Qasr El Jabali. As population and density in the village increase more residents would rely on soakaways and other on site systems resulting in an increase in the number and density of on site wastewater systems. Volumes of wastewater generated will increase further causing increased human and environmental health risks as a result of the poorly constructed and failing on site systems.

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 Environmental Management of Wastewater Services

6.1 Introduction

The proceedings of the joint Scoping Session for Hawarrat El Maqta and Qasr El Jabali, held in Fayoum City on May 2, 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 the proposed means to address them and monitor them, are discussed below.

For these two wastewater improvement projects there are few if any issues of environmental controversy. Sewerage is to be provided to farming villages that do not yet have it, and the wastewater collected is to be pumped to regional wastewater treatment works that, by design, have installed capacity adequate to accept these flows. Sewerage should largely eliminate the expense of building and maintaining on-site soakaway systems, as well as the unhealthful, unsightly, and inconvenient pooling of wastewater on the surface in many places. The villagers welcome the service. The greatest complaint, perhaps, concerns the delay in delivering such service to other villages that need it.

To be noted, however, the villagers and their representatives have expressed concerns about ensuring the quality of the product. In the Scoping Session, the engineering team heard questions such as: Where will the effluents go? Will they harm the water quality in the drains or in Lake Qarun? Will they meet Egyptian regulatory requirements? What assurance is there that the

quality of construction will be good, with no leaks of raw wastewater into the canals or drains? Will the pump stations operate, and continue to operate, with minimal odor and noise?

To meet these and other expectations and concerns, this Environmental Assessment lists items to be addressed in the environmental management (EM) of the project, during the planning and design stage, and then by close monitoring of the construction, and then in periodic monitoring of operation and maintenance during the ensuing years of use.

The Assessment concludes with a discussion of the institutional requirements to ensure that all happens as it should.

In the following sections, an issue or concern is presented *in italics*, and proposed mitigation measures are then discussed.

6.2 During Planning and Design

In the not-too-distant past, the amount of water imported to rural villages—and urban districts that strongly resemble them in form and flavor—was limited to what could be carried on women’s heads from the Nile, from a canal, or from a well, so the amount of wastewater was also limited. With the advent of water treatment and pumping, it was found that water supply lines are relatively easy and affordable to install (sometimes by do-it-yourself resident enterprise; CDM 2000), so the incoming water now flows freely.

In sharp contrast, the cost to remove, treat, and properly dispose of a liter of wastewater has been shown to be several times as great as the cost to pipe that liter to a house or tap (Gunnerson and French, 1996). Understandably, the appropriate collection, treatment and disposal of a community’s wastewater often lags the advent of piped water, sometimes by years. As an unfortunate result, Egyptian farm villages and the urban districts that resemble them often suffer from pooled surface water that is unsightly, inconvenient, a danger to buildings, and a risk to public health.

The proposed infrastructure improvement measures proposed for Hawarrat El Maqta and Qasr El Jabali are to remedy this situation. Yet one can mention here several measures to improve it still further:

Anticipate development of new areas. Where city planning can manage to keep ahead of actual construction, plan to install sewerage (along with other buried utilities) before buildings are erected and residents and businesses move in.

Anticipate extension of the sewerage system into existing developments. To the extent feasible, anticipate which areas are next to be seweraged. If it can be determined that the new sewerage will be by extension of the sewers to be laid in a program currently in design, then the sewers in current design should be sized and sloped to anticipate their future extension into the adjacent development.

Septage manholes at the sewerage limits. *Significant portions of Hawarrat El Maqta appear to lie beyond the planned range of the sewerage system. Those areas must therefore continue to use on-site disposal, with occasional septage pumping. Often, at least elsewhere, the septage pumpers discharge their loads at the nearest site convenient for them—even if totally inappropriate environmentally, e.g. to a drain or even a canal.*

To make it simple and attractive for pumpers to dispose of septage properly, it would be well to design manholes at the extremities of the sewerage system—hence close to the not-yet-sewered 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.

Compensation for land taking. *It was noted in the Scoping Session that some of the agricultural land along pipeline alignments will be subject to damage, with an adverse impact on its crop production, and that there is a need to compensate the farmers for loss of crops due to implementation of the proposed work.*

The Ministry of Agriculture and Land Reclamation (MALR) defines the compensation rate per unit for each crop. Accordingly the compensation can be paid for each impacted farmer. Such transactions should be foreseen and planned for in the design stage.

Antiquities. *If known antiquities lie within 3 km of a project site, a digging permit must be obtained from the Supreme Council on Antiquities.*

It is known that the Hawara Pyramid lies within 3 km of Hawarrat El Maqta Village and the force main route to the Kohafa WWTP. A planning-stage task for Qasr El Jabali will be to determine whether any known antiquities lie within 3 km of that village and the force main route.

6.3 Construction, and Monitoring of Construction

General quality of construction. *Participants in the Scoping Session specifically raised the issue of construction competence and quality generally. They noted that of previous sanitation projects implemented over the past 6 years, several were constructed poorly, and that the community is afraid of having such a case for the new proposed projects.*

There are many measures to assure that the work proceeds according to the defined implementation schedule and the signed contract. For example, Appendix D contains a detailed discussion of environmental management techniques, including contract specifications that itemize, to the greatest precision and detail feasible, the quality control and quality assurance procedures to be followed during construction. Among these are environmentally-oriented tasks such as observing safety procedures at all times, spill control, and site cleanup during decommissioning. In preparing his bid, the contractor is to consider each specification carefully, and cost it out.

The resident engineer is assigned and empowered to monitor the contractor's compliance with each item in the specifications—and pay the contractor for the item only when it is completed to satisfaction.

In this regard, it is helpful that the invited contractors will all be private companies. Because many contractors are not yet fully familiar with the specified QA/QC procedures, and often not with the environmental management procedures, the resident engineer should be prepared to be patient, understanding, and communicative with the contractors on these matters, even while keeping line-item payments strictly contingent on satisfactory performance.

Specific environmental contract issues include:

Stream crossings. *In the Scoping Session there was particular reference to stream crossings, where a poorly constructed force main could leak raw wastewater into a drain, canal, or river. The stream-crossing concern is relevant at Hawarrat El Maqta, where at least one sewer pipe is planned to cross the Bahr Youssef, and perhaps the Hassan Wassef Canal as well. For Qasr El Jabali, one force main within the village will cross under the Nazla Canal while the force main to the Ibshaway WWTP must cross the Wadi Drain.*

Before implementation and during design, all aspects and related decrees of Law 48 are considered in the design of the crossing structure. All approvals and acceptances for such a crossing structure must be in place before construction. It is normal procedure to have a monitoring panel that includes representatives from the Ministry of Water Resources and Irrigation and the FWWCO.

Normally, the crossing will be underneath a canal to avoid any pollution due to possible leakage from the force main.

Risk of accidents. *During the construction phase of all project components, there may be an increased risk of accidents involving local populations, especially children. These may result from one or a combination of the following:*

- *Unauthorized access to a construction site.*
- *An absence of control over access to construction sites,*
- *Conflict with construction vehicles,*
- *Poor site safety,*
- *Inadequate site management.*

Observe Egyptian occupational safety and health regulations and specification requirements; consider public safety, traffic control, and interruptions of passage; be alert for other buried and unburied utilities (gas, electricity, water, telephone); control dust as needed. Provisions of pertinent laws and regulations will be incorporated into contract documents to ensure that these issues will be handled as required during construction.



Figure 7. Street, Hawarrat El Maqta.



Figure 8. Street, Qasr El Jabali.



Figure 9. Sewer installation (Nile Delta village).

Schedule construction to minimize street closures. *Sewer installation will unavoidably block streets. Compare the street scenes in Figures 7 and 8 with the sewer installation scene in Figure 9. The width of the trench itself, plus that of the pile of side-cast excavate, plus the space required for men and equipment to move along the trench, will severely constrict the space available for residents and commercial customers to pass, if not obstruct passage altogether.*

Sewer installation must 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.

Antiquities. *While there are few if any known antiquities near the proposed construction sites, it is still 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 any antiquities located during construction will be handled as required.

Noise and vibration. *Heavy machines, plants and construction traffic will make vibration and noise. Such impact is expected to be limited and local along the proposed sewerage system. The nuisance to the community will be transient and good work practice should curb it. The noise level of the heavy construction equipment is high, but is limited to the immediate vicinity of the worksite.*

6.4 Operation, and Monitoring of Operation

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

- Any reports of inappropriate septage discharge practices, e.g. discharge to canals, drains, or empty lots, rather than to approved septage discharge points;

- any complaints of excessive odor or noise from the pump stations;
- Reports of leaks in the force mains, and the promptness and quality of repair of the leaks.

Routine monitoring would be by FWWCO as the local operating agency.

6.5. Institutional Resources

The preceding paragraphs show that even a relatively simple improvement project such as sewers, pumps, and force mains involves complex government machinery.

At the most local level is the villagers, who, along with their representatives, have indicated a clear desire for an improved living environment in their villages and in the Fayoum as a whole.

At the national level, there are several ministries directly and indirectly involved in water quality activities for planning, operations, research, monitoring and regulation (Appendix C). The main ministries and agencies are:

- Ministry of Water Resources and Irrigation (MWRI)
- 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 (MHUNC)
 - NOPWASD, which is within the MHUNC
- Ministry of Local Development, Organization for the Restructure and Development of Egyptian Villages (ORDEV)
- Supreme Council of Antiquities

The MWRI is the central institution for water quality management. The main instrument for water quality management is Law 48. The MWRI is responsible for providing suitable water to all users, but with an emphasis on irrigation. The ministry is responsible for issuing licenses for domestic and industrial discharge.

Within the Ministry of Housing, Utilities and New Communities, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) is responsible for planning, designing and constructing municipal drinking water purification plants, distribution systems, sewage collection systems, and municipal wastewater treatment plants. In the case of this project, the Fayoum Drinking Water and Sanitation Company (FWWCO) will be the responsible implementing agency and ultimately the operating agency for these facilities. International aid agencies such as USAID provide funding and technical support through FWWCO.

Once facilities have been constructed, NOPWASD organizes training, but operation and maintenance are the responsibility of regional and local authorities. NOPWASD intends to

inspect each plant regularly, but in practice this depends upon the cooperation of the various governorates.

FWWCO leadership and responsibility. The job of putting the national machinery to work for the benefit of the subject villages will fall largely to agencies at the Governorate level. The principal agency is the FWWCO. As noted just above, implementation, operation and maintenance are the responsibility of the FWWCO as well as for satisfactory environmental service to the Fayoum and its inhabitants for this project.

For environmental monitoring in general and to handle specific environmental issues that arise, the FWWCO may wish to convene a committee comprised of Governorate-level representatives of the national agencies, and relevant other Fayoum agencies, and of the villages involved, as well as the contractors. The committee could meet in person several times a year to establish working relationships among the members of the many different agencies. Once “working friendships” have been established, much of the necessary communication can be by telephone and email.

The committee chair, a FWWCO officer, would be the central point of contact for all formal communications, and would be ultimately responsible for acquisition and archiving of monitoring data, and the resolution of problems that arise.

Such a model has been often used elsewhere to facilitate communication and collaboration among disparate, even competing, agencies.

7 Final words

Providing sewerage to villages that sorely need it, and pumping the collected wastewater to treatment plants that have capacity to take it, are projects with relatively little environmental controversy.

Still, there is significant challenge in planning, designing, constructing, operating, and maintaining these systems in a manner that is both structurally and environmentally sound.

Our knowledge of the receiving wastewater treatment plants, Kohafa and Ibshaway, is that the facilities are capable of receiving the flows from these villages, as well as from their current service areas, and treating them to the required standard. All effluents flow, eventually, to Lake Qarun. For the sake of Lake Qarun and its water quality, it is FWWCO’s responsibility to ensure that this working knowledge is valid.

Through the planning, design, and construction stages there will be support and guidance from USAID, FWWCO, and numerous other national ministries and agencies.

However, throughout their gestation and life, the projects' functional and environmental success will depend most directly and heavily on the skills, initiative, and financial resources of the FWWCO.

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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

FOR HAWARRAT EL MAQTA AND QASR EL JABALI

B.1. List of government agencies consulted by the environmental team during scoping process

The following government agencies were consulted by the team during this environmental process and/or during the study phase:

- Fayoum's Office of the Governor
- FWWCO Office of Chairman and representatives
- The Fayoum Village representatives
- Representatives of the Fayoum Drinking Water and Sanitation Project
- Representatives from the Ministry of Water Resources and Irrigation

B.2. List of Invitees to Scoping Session

The Office of the Governor through the Fayoum's General Secretary invited attendees via 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

The list of participants is included at the end of this Appendix.

B.4. Scoping Session

The scoping session was held on 2 May 2007 at 11:00 am in the Conference Hall of the Fayoum Governorate Building in Fayoum City. Copies of the Environmental Scoping Meeting agenda were prepared in English and Arabic and distributed to participants at the meeting. The presentation was delivered predominately in Arabic; English presentations were translated into Arabic. The General Secretary Etman Mohamed Etman and the Fayoum Drinking Water and Sanitation Company Chairman, Mahmoud Massoud, provided introductory comments to open the meeting. The CDM Project Manager, Rick Minkwitz, then 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 El-Sayed Ismail gave a powerpoint presentation describing the Fayoum Wastewater Village projects, the EA process and the potentially significant environmental issues. Comments, all verbal, were received following the presentation and have been summarized herein. During the comment portion of the program, the Fayoum Governor, Mohamed Magdy Kupasi, joined the session and provided comments with respect to the village wastewater projects as well as impressing on all parties the

importance of the Lake Qarun Watershed work. The Scoping Session meeting was closed by the Governor.

B.4.1. Environmental Issues Mentioned in the Presentation

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

- The project is intended and expected to provide a more healthful and attractive residential environment.
- 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.
- Consider the potential impact of construction activities on antiquities and on other services.
- Consider public safety, traffic control and interruptions during construction including interruptions of water or electric utility services.
- Where new pump stations are to be located, assess the impacts on land use, energy consumption and traffic control.
- Consider operation and maintenance activities at these new pump stations, e.g. problems of noise.

B.4.2. Comments Received at the Scoping Session

Coordination between USAID and FWWCO

Comment: There is need to have full cooperation between USAID and the Fayoum Water and Wastewater Company (FWWCO) to maximize the benefits of environmental management for Fayoum Governorate, which has a priority as a closed basin.

Response: There is coordination between USAID and the Fayoum Water and Wastewater Company for the current project and any upcoming projects.

Other villages subject to subsurface water problems

Comment: Other 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 to be seweraged have been given a priority in the NOPWASD program of 20 billion LE over 5 years for rural areas of Egypt.

Water bodies receiving wastewater effluent

Comment: What would be the receiving water bodies of the wastewater effluents from both villages?

Response: Hawarrat Al-Maqa will receive a wastewater system with gravity sewers, house connections, pump stations, and a force main which will convey its wastewater directly to the Kohafa Wastewater Treatment Plant that serves Fayoum City. The effluent from the Kohafa WWTP will discharge into El-Batts drain.

Qasr El-Jabali is to receive gravity sewers, house connections, pump stations and a force main. A decision still must be made as to whether the force main would convey the raw effluent to the Shwashna WWTP or to the Ibshaway WWTP. In either case, the treatment plant effluent will discharge into the Wadi drain.

The wastewater treated and disposed into the drainage system will therefore meet the quality required by Law 48.

Concerns about crossing irrigation canals

Comment: As the proposed route of the force main will have to cross irrigation canals such as the Bahr Youssef and Hassan Wasef Canals, there is a potential for leakage into and pollution of the irrigation canals by wastewater.

Response: Before implementation and during design, all aspects and related decrees of Law 48 are considered in the design of the crossing structure. All approvals and acceptances for such a crossing structure must be in place before construction.

The implementation of the force main crossing the irrigation canal should follow the required procedures. Normally, the crossing will be underneath the canal to avoid any pollution due to possible leakage from the force main.

Comment: The hydraulic structure used for force main to cross the irrigation canals should be monitored by a panel from Ministry of Water Resources and Irrigation and Fayoum Water and Wastewater Company.

Response: It is normal procedure to have a monitoring panel that includes representatives from the Ministry of Water Resources and Irrigation and the Fayoum Water and Wastewater Company.

Quality of the treated effluents

Comment: We should be sure that the quality of the treated effluents meets the requirements of Egyptian regulations.

Response: There is a regular program to monitor the quality of the treated effluents at both wastewater treatment plants.

Compensation for loss

Comment: Some of the agricultural land will be subject to damage, with an adverse impact on its crop production. There is a need to compensate the farmers due to loss of crops due to implementation of the proposed work.

Response: The Ministry of Agriculture and Land Reclamation (MALR) define the compensation rate per unit for each crop. Accordingly the compensation can be paid for each impacted farmer.

Concerns about bad construction

Comment: Of previous sanitation projects implemented over the past 6 years, three suffered evidences and complaints of bad construction. The community is afraid of having such a case for the new proposed projects.

Response: The invited contractors will be private companies. No governmental companies will be invited. There are many measures to assure that the work proceeds according to the defined implementation schedule and the signed contract.

Priority for Lake Qarun

Comment: Lake Qarun plays an important role for the Fayoum region. Many industries and economic activities depend heavily on the quality of Lake Qarun. Improving the environmental condition of the lake should take a high priority in the program.

Response: Other activities have been proposed to improve the water quality of Lake Qarun. These activities include construction of instream wetland systems at three sites in major Fayoum drains.

B.4.3. Written Statements Received

There were no written statements, comments, or questions received.

B.5. Significant Issues to be Addressed in the Environmental Assessment

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

- There will be an improvement in public health.
- There will be improvement in the form of a lowered water table within the residential areas.
- Consider the potential impact of construction activities on antiquities.
- Consider public safety, traffic control and interruptions during construction including interruptions of water or electric utility services.
- Where sewer or force main routes cross streams, canals, or drains, ensure that the design and the quality of construction minimize the possibility of leakage into the water body.
- If it happens that unsewered areas remain adjacent to sewer areas, provide manhole access in the sewers nearest such areas for the convenience of septage haulers who need to discharge their loads.
- Construction permits for both temporary and permanent construction activities will need to be established to ensure the project is viable and to address periods when cultivation will not be possible.

B.6. Issues to be Eliminated from Further Consideration

Issues that can be eliminated from further consideration include:

- Economic benefits from employment during construction and operation/maintenance of facilities, as well as the benefit of having a new wastewater system rather than individual onsite systems, will be very limited.
- Sufficient land for the required pump stations is available and their impact both during construction and operation on the surrounding areas will be negligible.

B.7. Schedule for Preparing the Environmental Analysis

The Environmental Assessment process will commence with the issuance of this Scoping Statement.

B.8. Proposed Approach to Address Significant Issues

- Coordination among NOPWASD, FWWCO, the contractors, and other participants will be established during the design phase to determine areas of conflict between construction and other land use to determine permit requirements.
- Provisions of the Antiquities Law will be incorporated into contract documents to ensure that any antiquities located during construction will be handled as required.

List of Participants at Scoping Session

Attendance Sheet for Scoping Session

Meeting Date : 2 May 2007

Venue : Fayoum Governorate

	Name	Job Title	Signature
	Mohamed Magdy Kupasi	His Excellency the Governor of Fayoum	
1	Hamdy Mohamed A.Abdul Rehman	Local Council Secretary, Hawart El-Makta	
2	Wagieh Helmi Khalil	Maintenance Chief, Hawara	
3	Ragab Abdul Megied	Procurement Rep, local Council	
4	Atif Abdul Tawab	Youth Admin, Hawart El-Makta	
5	Samia Marouf Ali	Public Awareness Dep. Manager, FWWCo.	
6	Mohamed Roubi El-Sayed	Wastewater General Dep., Fayoum	
7	Ahmed Marzouk Abdel Fattah	Wastewater General Dep., Fayoum	
8	Nawal Wissa Ghatas	Environmental Affairs' Manager, Sanoris	
9	Wagieh Nagieb	FWWCo.	
10	El-Amir Riyad Mohamed	Utility Manager, Local Council, Hawara	
11	Attia Abdel Hai Ahmed	Finance Manager, Local Council, Hawara	
12	Hassan Ahmed Abd Rabou	GM, Information Center	
13	El-Sayed Abdel Aal	Chief, \Manzala Village	
14	Mahir Nagieb	Local Council Secretary	
15	Afkar El-Rouby	Public Relation, Fayoum Governorate	
16	Wissam Farahat Shakir	Researcher, Governorate Production Dep	
17	Ahmed Shawki Osman	Researcher, Governorate Production Dep	
18	Mohamed H. Abdel Tawab	Environmental Manager, Abshowai	
19	Ahmed Abdel Fdeel Sawi	GM, Wastewater Tech Support	
20	Sayed Diab Ali	Branch Environmental Manager, El-Nazla	
21	Abdulla Mohamed Abdulla	Citizen	
22	Sayed Abdul Sattar Gouda	Senior English language Teacher	
23	Mohamed Abul Basit	Citizen	
24	Tarek El-Sayed	Public Relation	
25	Waleed Ramadan Mohamed	Teacher	
26	Awad Kamel Ahmed	Local Council Member	
27	Abdel Muez Abdul Moniem	Driver	
28	Esam Yousef Mahmoud	Council Member	
29	Mohamed Abdel Sattar	Teacher	
30	Saad Embab	Environment & Seashores, Police Chief	
31	Ibrahim Farg Alla	Local Council Staff	

	Name	Job Title	
32	Samia Galal	Agriculture Eng, Fayoum Drainage	
33	Alla El-Din Saad Sulaiman	Dutch Project Manager	
34	Hamad Ibrahim Ali	Citizen, Kasr El-Gebali	
35	Abdulla Serag Mohamed	Legal Marriage Authority, Kasr El-Gebali	
36	Nasr El-Din Abdalla	Mosque leader, Kasr El-Gebali	
37	Gamal Hassan Ahmed	Environment Authority, Hawara	
38	Mohamed Ahmed Abdel Hafiz	Engineering Dep., Hawara	
39	Badr El-Din Ahmed Abdel Aal	Land Acquisition Dep, Hawara	
40	Saleh Salem Ahmed	Land Acquisition Dep, Hawara	
41	Gamal Nagi Abdul Hamid	Maintenance Tech, Local Council , Hawara	
42	Hossam Shabaan Mohamed	Environment Evaluation, Envi. Dep. Governorate	
43	Ahmed El-Sayed mahmoud	Agriculture Eng, Fayoum Drainage	
44	Ahmed Bakr Ali	GM, FWVCo.	
45	Abdel Nabi Ismail	Under Secretary, Colleague of Science	
46	Mohamed Anwar Ahmed	Plant Section Head, Colleague of Science	
47	Shabaan Ahmed Ali	Public Relation, Governorate	
48	Asem Mohamed Abdel Megied	Public Relation, Governorate	
49	Moustafa Mahmoud Yousef	Qaroun Fishing Community Chief	
50	Mohamed Wadie Mohamed	GM, Fishing Dep.	
51	Ahmed Fouad Ahmed	GM, Fayoum Irrigation Authority	
52	Owais Said Abdalla	Dep. Manager, Governorates Environment	
53	Hassan Mohamed Hussein	Deputy Ministry of Agriculture	
54	Saber Ramadan Abdel Halim	Building Construction Technician, Hawara El-Makta	
55	Eisa Hassan Hussein	Industrial Security Manager, FWVCo.	
56	Hashim bakri Abdel Tawab	Trench Evacuator, Local Council, Hawart El-Makta	
57	Mohamed Ali Fouad	Pavement Section Manager, Hawara El-Makta	
58	Atif Mohamed Abdel Tawab	Youth Community, Hawara El-Makta	
59	Ayman Gamal	Information& Decision Support Center	
60	Ali Sayed Shabaan	FWVCo.	
61	Zaidan Osman Zaidan	GM, Wastewater Treatment, FWVCo.	
62	Hussein Eid Morsi	Operation Sector Manager, FWVCo.	
63	Sabah \Ahmed Ramadan	Projects Execution Dep. Manager	
64	Farag Ali Ahmed	GM, Tech Support, Fayoum Potable Water Co.	
65	Nagwa Ahmed	GM, Financial Directive	
66	Mohsen Amin Mousa	Chief, Local Council Hawart El-Makta	
67	Shabban Abdel Naeem	Local Council Staff	
68	Mohamed Ahmed Abdel Baqi	Responsible, Cultivated Land Violation	
69	Abdel Hamid Mohamed	Labor	
70	Saber Salama	Citizen	
71	Mohamed Abdel Tawab	Labor	
72	Abdel Hamid Sayed Mohamed	Labor	
73	Halim Labib	Labor	
74	Nadi Ibrahim	Labor	

	Name	Job Title	
75	Hussein Abou Taleb, Dr.	Health Manager	
76	Salah Nadi Abdel Rahman	GM, Wadi El-Nil Fishing Region	
77	Younis El-sayed Abdel Salam	Deputy, Ministry of Irrigation, Fayoum	
78	Enas Mohamed Abdel Aziz	TV Reporter	
79	Mahmoud Masoud	Chairman, FWWCo.	
80	Etman Mohamed Etman	General Secretary, Fayoum Governorate	
81	Hussein Moharam	Governorate Consultant, EIIP project Coordinator	
82	Jeremy Gustafson	USAID	
83	Atif Abdel Sayed	USAID	
84	Richard Rousseu	USAID	
85	Mosutafa Mohamed El-Tayeb	CDM/AAW	
86	Richard Minkwitz	CDM/AAW	
87	Ashraf El-Sayed	CDM/AAW	
88	Philip Farag Mechael	CDM/AAW	

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 Egyptian Legal and Administrative 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. Among these are failure to immediately reduce a discharge presenting an immediate danger of pollution, and 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 m³/day above and below the Delta barrages
- Discharges less than 1,000 m³/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.

The full text of the English version of Law 48 may be found in Section C.2 below.

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. The table of contents for the English version of Law 4 may be found in Section C.3 below.

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.2. Law No. 48 of 1982

(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 is 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.3 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

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(ARTICLES 102 to 104)

C.4. Institutional Arrangements

(Excerpt from “**Country Report on Water Quality Management and Potential METAP Interventions--Egypt,**” Mediterranean Environmental Technical Assistance Program [www.metap.org], November 2001.)

C.4.1 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.4.2 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 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, Organisation for the Restructure and Development of Egyptian Villages (ORDEV)

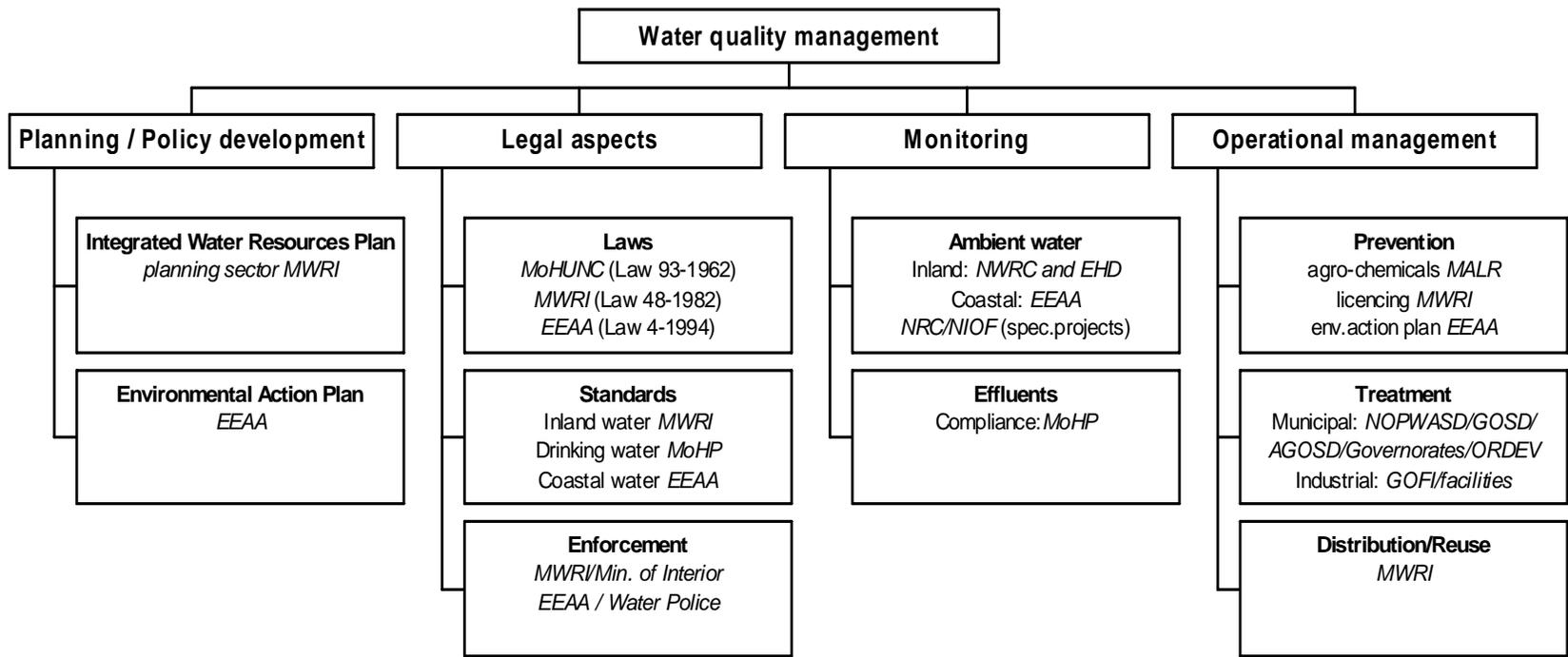


Table C-3. Institutional framework for water quality management in Egypt

C.4.2.1 Policy Development

The Ministry of Water Resources and Irrigation 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). This agency advises the prime minister and prepared the 1993 Environmental Action Plan for Egypt. This plan 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.

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.4.2.2. Operational Management

The MWRI is the central institution for water quality management. The main instrument for water quality management is Law 48. The MWRI is responsible for providing suitable water to all users but there is an emphasis on irrigation. The ministry is responsible for issuing licenses for domestic and industrial discharge.

Within the Ministry of Housing, Utilities and New Communities, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) is responsible for planning, designing and constructing municipal drinking water purification plants, distribution systems, sewage collection systems, and municipal wastewater treatment plants. Once facilities have been constructed, NOPWASD organizes training, but operation and maintenance are the responsibility of regional and local authorities. NOPWASD intends to inspect each plant regularly, but in practice this depends upon the cooperation of the various governorates. Many domestic wastewater treatment plants are currently in poor condition.

C.4.2.3. Monitoring

The responsibility for monitoring compliance, including licenses and the analyses of discharge, has been delegated to the Ministry of Health and Population (MoHP).

Within the NWRC three institutes (Nile Research Institute, Drainage Research Institute, Research Institute for Ground Water) focus on monitoring ambient water quality in the Nile, irrigation and drainage canals, and groundwater.

The EEAA is establishing an Egyptian environmental information system (EEIS) to give shape to its role as the coordinator of environmental monitoring. Additionally EEAA is monitoring coastal water and waste from Nile ships.

The Environmental Health Department (EHD) is responsible for monitoring potable water sources (Nile river and canals). The Nile is monitored each month to check water quality for suitability as a source of drinking water. Samples are taken upstream and downstream of each discharge point (103 locations). The findings are given to the prime minister and the governors of each governorate.

The MoHP further samples and analyzes all intakes and treated outflows from drinking water treatment plants. Also water from drinking water production wells is monitored. If drinking water quality is noncompliant with government regulations, especially with respect to bacterial contamination, the MOHP takes action.

Two research institutes of the Ministry of Higher Education and Scientific Research (MHESR), the National Research Center (NRC) and the National Institute for Oceanography and Fisheries (NIOF) collect samples for specific research projects.

C.4.2.4. Standard Setting

Surface water standards are set by a decree of the minister of MWRI after agreement is reached in a high committee chaired by the MoHP that includes other ministries. Standards exist for point sources for surface water and ambient concentrations in surface water as well as for drainage water reuse stations (mixing with canal water). The standards have not been adapted since the law was established in 1982.

Drinking water standards are set by the MoHP. Drinking water standards were adjusted in 1998.

C.4.2.5. Law Enforcement

In cases of noncompliance with discharge regulations, the MWRI generally takes action upon request of the MoHP. In practice only licensed discharges are monitored regularly, though the majority of facilities are unlicensed. Actual enforcement for cases involving public facilities (publicly owned industries and municipal discharge) which comprise the majority of all pollution sources is almost nonexistent due to a lack of funds and economic and employment considerations.

Presently, EEAA staff is being prepared to enforce environmental impact assessment (EIA) laws. Major industries are being visited due to noncompliance with wastewater treatment regulations. Compliance Action Plans (CAPS) are being agreed upon to obtain a grace period for compliance.

C.4.3 Legal and Regulatory Framework

A legal basis for controlling water pollution, especially from municipal and industrial effluents, already exists through several laws and decrees. The two most important are Law 48/1982 and Law 4/1994.

Law 93/1962 on wastewater disposal in sewage systems concerns the discharge of liquid waste into public sewerage systems. Related ministerial decrees 649/1962 and 9/1989 of the Ministry of Housing, Utilities and New Communities regulate the discharge of wastewater into public sewer systems. The part of decree 649/1962 that regulated drainage to watercourses was replaced by Law 48/1982.

Law 48/1982 deals specifically with discharge to water bodies. This law prohibits discharge to the Nile River, irrigation canals, drains, lakes and groundwater without a license issued by the MWRI. Licenses can be issued only for the discharge of effluents that meet government standards and each license specifies the quantity and quality permitted to be discharged. Fines are levied for unlicensed discharges. Licenses can be revoked under certain conditions. If, for example, the pollution level of a licensed discharge increases and a facility fails to install appropriate treatment within three months, the license can be revoked. Recently the minister of MWRI initiated an inter-ministerial committee to discuss water quality standards under Decree 8/1983 and Law 48/1982.

According to Law 4/1994 the EEAA prepares legislation and decrees to protect the environment in Egypt and is responsible for setting standards and monitoring compliance. The agency also participates in the preparation and implementation of the national program for environmental monitoring and data utilization (including water quality). The agency is also supposed to establish an “Environmental Protection Fund” to cover water quality monitoring. With respect to water pollution, the law states that all provisions of Law 48/1982 are not affected and it only covers coastal water and seawater.

Table C-4. Overview of water quality-related laws and decrees

Level of legislation	Number and Year	Topic
Law	93 1962	Drainage to sewer systems
Presidential Decree	421 1962	Ratification of Marpol Convention
Ministerial Decree MHUNC	649 1962	Implementation of law 93/1962
Presidential Decree MPWWR	2703 1966	High committee for water (Ministry of Health)
Law	38 1967	Bathing and washing in Streams
Law	72 1968	Prevention of oil pollution of seawater
Ministerial Decree MPWWR	331 1970	Executive committee of water
Law	74 1971	Clearance of weeds and dead animal disposal in streams
Presidential Decree	961 1972	Permanent committee for control of seawater pollution by oil
Law	27 1978	Control of potable water sources
Law	57 1978	Treatment of ponds, marshes and swamps
Ministerial Decree MOHP	7/1 1979	Specifications for potable water
Law	27 1982	Public water resources for drinking water and domestic use
Law	48 1982	Protection of Nile River from pollution
Ministerial Decree MPWWR	170 1982	Establishing High Committee of the Nile
Ministerial Decree MOI	380 1982	Technology and pollution
Presidential Decree	631 1982	Establishing an Environmental Affairs Authority under the presidency of the Council of Ministers
Ministerial Decree MPWWR	8 1983	Implementation of Law 48/1982
Law	12 1984	Irrigation and drainage and license of groundwater wells
Ministerial Decree MPWWR	43 1985	Regulation of drains and waterways
Prime Minister Decree	1476 1985	Executive committee for industrial drainage to the Nile River
Ministerial Decree MPWWR	9 1988	Amendment of provisions of decree 8/1983
Ministerial Decree MHUNC	9 1989	Drainage of wastewater (related to 93/1962)
Law	4 1994	Environmental Protection including tasks EEAA
Law	213 1994	Follow up to law 12/1984 on water user organizations
Law	256 1994	Wastewater quality guidelines for irrigation.

(In 1999 the MPWWR changed its name to MWRI)

APPENDIX D

ENVIRONMENTAL MANAGEMENT

D.1 Introduction

Development projects have potential impacts, direct and indirect, positive and negative in nature, temporary and irreversible in duration, localized and regional in extent, resulting in varying degrees of impact on existing environmental resources. To mitigate adverse environmental impacts, environmental management should be an integral part of the development process.

Environmental management procedures should be followed for all stages of development. While the purpose of the Environmental Assessment process is to identify potential negative impacts and recommend appropriate mitigation measures to minimize or offset the impacts, the agency charged with implementing the required mitigation measures needs to:

- Set up a strong and efficient organization able to monitor all environmental and social issues related to construction and operation activities and to enforce mitigation measures;
- Have a solid legal background for the enforcement of all the environmental obligations relevant to contractor responsibility;
- Specify compensation arrangements and rates for:
 - temporary or permanent land acquisition;
 - resettlement in case of involuntary displacement of residents;
 - the loss of a valuable ecological resource such as forest;
 - rehabilitation of sites degraded during works (camps, storage and borrow areas);
- Monitor the implementation program; and
- Report to designated institutions to establish accountability.

D.2 Contractual Background for Environmental Management

From experience, it has been observed that obtaining any specific task from a contractor requires first that the task be specified in the contract documents, with a specific payment allocated to that task. This is the basis for any construction contract that relies on detailed technical specifications and their related bills of quantities. To be effective, the environmental and social obligations of a contractor must be comprehensively specified and individually payable through the contract documents. Both actions work together because the payment system will influence the way specifications are displayed and prepared.

Likewise, for effective implementation of environmental and social mitigation measures, detailed environmental and social specifications must be written into the legal document that establishes clearly the obligations of the Contractor, the quantities of work involved and the related cost of measures.

Past experience has shown that many construction contractors do not fully understand their obligations with respect to environmental mitigation measures. Most of the time, they do not make adequate provision for the work to be done during bid preparation and they find themselves without sufficient funds to fully implement the mitigation measures. This is unfortunately frequent for the works which come at the end of project construction and which often concern the rehabilitation of construction or disposal sites.

It is thus of utmost importance that the construction contract includes provisions to ensure that:

- The contractor clearly understands the environmental mitigation measures and its obligations;
- The mitigation measures are specified in sufficient detail that the contractor can make reasonable estimates of actual costs in its tender document;
- The project management has the legal and financial power to enforce the application of mitigation measures through the contractor; and
- The project management has the capability to monitor the contractor's performance in this regard.

In accordance with the Environmental specifications, the project management will monitor all aspects relevant to four sections of the specifications: Environmental Protection Measures, Labor camps and Worker Health Management, Safety Management, and Social Management.

For these four sections, the Developer will have to specify the indicators that will be monitored during the execution of the environmental supervision.

Most of the Contractor's environmental and social obligations are actually measurable. For these obligations, the indicator to be monitored will be a quantity and the Contractor will be paid only if this quantity is observed on site.

Some Contractor environmental and social obligations remain difficult to quantify. A typical example is the protection of areas adjacent to construction areas: It is not sensible to specify a penalty according to the number of trees cut at the wrong place or to measure and withdraw payment for any cubic meter of material cast aside the road. But it is sensible to specify methods aiming at limiting adverse impacts and to specify what would constitute a non-payment situation.

Environmental issues often include:

Spill prevention, control, and cleanup. Fuels, solvents and similar materials should be stored in locations away from surface water bodies, drains, sewers and wells. Storage areas should be well ventilated and have an impervious floor (i.e., concrete slab construction) with a sump or

retaining wall sufficient to contain spills. Materials and equipment should be provided to clean up and properly dispose of spilled materials. Vehicle fueling and maintenance areas should have impervious floors and materials for spill cleanup. When fuels or solvents are required in construction areas, they should be transported in small quantities sufficient to meet immediate needs only. Construction contractors should be required to prepare and follow a Spill Prevention and Management Plan. The Authority and its construction management contractor will be responsible for auditing compliance with the Spill Prevention and Management Plan. The contract documents should include penalties for repeated failure to comply with the plan.

Dust and Noise Abatement. At all projects, dust generation should be controlled by measures such as minimizing the area disturbed by construction at any one time, wetting down or using acceptable chemical treatment of unpaved roadways used by construction vehicles (in areas near dwellings), covering or wetting spoil piles adjacent to excavations. Noise abatement should be instituted by limiting construction activities to daylight hours only.

Undermining of existing structures. The foundations of all structures near excavated areas should be assessed to determine structural stability and potential impacts associated with undermining. Excavation in areas near building foundations should employ shoring techniques to preserve the structural integrity of existing structures. These mitigation measures should be included in the design construction tender and contract documents.

Mitigation and Monitoring of Cultural Impacts. Egyptian Law No. 117/1983 stipulates that any discovery of antiquities must be reported to the SCA. The law provides penalties for removing, damaging or destroying found antiquities. Construction activities involving digging within three kilometers of a known antiquities site require permission from the SCA. To prevent unnecessary disruption of archaeological resources during construction, construction crews must report to the SCA any archaeological material that may be uncovered during excavation. All work should be implemented in full cooperation with the SCA. The following are recommended mitigation measures:

- When the proposed infrastructure projects are implemented, construction crews must report to the Supreme Council of Antiquities any archaeological material that may be uncovered during excavation.
- All work should be implemented in full cooperation with the Supreme Council of Antiquities (SCA). During construction, a SCA inspector should observe all excavation work and alert construction crews and authorities if antiquities are uncovered.

Decommissioning refers to the dismantling, decontamination and removal of process equipment and facility structures, at the end of the construction stage, and to re-contouring the land and planting vegetation to prevent soil erosion as appropriate. Assuming there is no other use for field facilities, all structures and related infrastructure facilities are to be dismantled by the contractor.

The sites used temporarily by the contractor will be fully rehabilitated at the end of the construction stage and shall be returned to their initial use. These include areas for borrowing earth, for temporary access roads, for workers' camps and facilities, for material storage and for machinery parking and maintenance.

All these mitigation measures—for spill control and cleanup, dust and noise, undermining, antiquities, and decommissioning—should be included and priced in the construction contractor's tender and contract documents.

D.3 Monitoring Programs

Environmental monitoring programs are designed to provide the necessary feedback about the actual impacts of a project during its construction and operation stage. Monitoring helps judge the success of mitigation measures in protecting the environment. Monitoring is also used to ensure compliance of activities with existing standards. Monitoring programs are a proven way to ensure effective implementation of mitigation.

Monitoring construction activities. Through a regular and comprehensive review of the actual status of the environmental obligations of the Contractor, this monitoring aims at ensuring compliance of the Contractor's activities with his contractual commitments and the environmental regulations.

D.4 Summary

An effective environmental management procedure:

- describes in detail all requirements with regard to health, safety, and welfare of workers, nuisance to local villagers, and protection of the environment in the contractual Technical Specifications,
- then serves as the program management's guide to monitoring compliance with these details during construction,
- and serves as the governing authority's guide to monitoring environmental compliance during the ensuing years of operation.

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 07-110 Egypt SO16 ROD SS - Fayoum

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), Egypt Utilities Management Results Package (EUM, 263-0270), Scoping Statement (SS) for Environmental Assessment (EA), Mid-Egypt Governorate Component - Fayoum

Funding Begin: FY 2007

Funding End: FY 2009

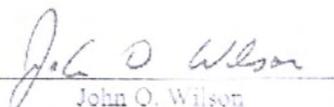
LOP Amount: \$6,000,000

Approval Issue:

Scoping Statement for Environmental Assessment

APPROVAL:

Bureau Environmental Officer


John O. Wilson

Date: May 31, 2007

Approved:

Disapproved:

OVERVIEW

The Environmental Threshold Decision (ETD, ANE 05-209) for the USAID/Egypt Egypt Utilities Management Results Package (EUM, 263-0270), Mid-Egypt Governorate Component - Fayoum was approved on September 9, 2005. The ETD determined that large-scale construction or construction on undeveloped land, such as the proposed wastewater control measures in two Governorate of Fayoum villages of Hawarrat El Maqta and Qasr El Jabali, 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 includes construction of a wastewater collection system, pump station, and force main for Hawarrat El Maqta village and the same construction works for Qasr El Jabali village.

The project team of CDM in association with Dr. Ahmed Abdel-Warith Consulting Engineers prepared an EA scoping statement (SS) from a public scoping session on May 2, 2007 in Fayoum City, capital of Fayoum Governorate. Attendees included approximately 90 concerned parties, USAID Water and Wastewater Team members, and representatives of the Fayoum's Office of the Governor, Fayoum Water and Wastewater Company (FWWCO), Fayoum Village, Fayoum Drinking Water and Sanitation Project, and Egypt Ministry of Water and Irrigation. The session identified these concerns: cooperation between USAID and the FWWCO; other villages with subsurface water problems and stagnant water in residential areas. The SS, dated 2007, is approved.

File No: ANE 07-110 Egypt SO16 ROD SS - Fayoum

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ANE 07-110 Egypt SO16 R&D Request-SS EUM-Fayoum
ANE 07- Egypt SO16 SS

APPROVAL OF SCOPING STATEMENT

263-016

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

Results Package Location: Egypt

Activity ID: Egypt Utilities Management Results Package (EUM, 263-0270),
Mid Egypt Governorate Component - Fayoum

Funding (Fiscal Year and Amount): FY07-FY09, Project total \$30 million
Fayoum Component \$6 million

Prepared By:

Date:

Ataf Abdel Sayed
PSDWW

1/11/07

Strategic Objective Team Leader's Concurrence:

Date:

Jeremy Gustafson
Team Leader, PSDWW

1/11/07

Deputy Mission Director Concurrence:

Date:

John Groarke

1/11/07

APPROVED FOR THE AMERICAN PEOPLE
BY THE USAID MISSION DIRECTOR

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

Approved: John O Wilson

Disapproved: _____

Date: May 31, 2007

Clearances:

SHassanein, MEO/PSD _____ date _____
MDriver, LEG M.D. date 30 May 07
RRousseau, PSD/OD _____ date _____

[Faint handwritten signature]

BACKGROUND:

Attached, for your approval, is the Final Scoping Statement for Fayoum Governorate, which includes Hawarrat El Maqta and Qasr EL Jabali Villages. The activities in these villages are being funded under the Egypt Utilities Management Project (263-0270). The two activities received a Positive Threshold Decision from the Bureau Environmental Officer in September 2005. *(ANE 05-209, approved September 9, 2005)*

A Scoping Session was held on May 2nd, 2007, in Fayoum City - the capital of the Fayoum 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 Team. 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 Fayoum. The program is comprised of the following activities:

- (1) a wastewater collection system, pump station, and Force Main for Hawarrat El Maqta Village, and
- (2) a wastewater collection system, pump station, and Force Main for Qasr EL Jabali Village.

During the scoping session, 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 nine most significant questions/issues raised by attendees during the scoping session are as follows:

1. There is a need for full cooperation between USAID and the Fayoum Water and Wastewater Company (FWWCO) to maximize the benefits of environmental management for Fayoum Governorate. CDM responded that there is currently very good coordination between USAID and the Fayoum Water and Wastewater Company for the current project.
2. Other villages suffer from subsurface water problems and stagnant water in residential areas. The people in these villages also need to have wastewater collection systems. CDM responded that many of the villages not included in the USAID program have been given priority in the Government of Egypt's new LE20 billion rural infrastructure program. Many villages are planned to receive wastewater services through this 5-year program.
3. What would be the receiving water bodies of the wastewater effluents from both villages? CDM responded that the wastewater from Hawarrat Al-Maqta will be conveyed directly to the Kohafa Wastewater Treatment Plant (WWTP), which serves Fayoum City. After being treated, the effluent from the Kohafa WWTP will then discharge into El-Batts drain. For Qasr El-Jabali, a decision still must be made as to whether the Force Main will convey the raw effluent to the Shwashna WWTP or to the Ibsaway WWTP. In either case, the treatment plant effluent will ultimately discharge into the Wadi agricultural drain. In all cases, the

wastewater treated and disposed into the drainage system will meet the water quality standards required under Egyptian Law.

4. As the proposed route of the Force Main will have to cross irrigation canals such as the Bahr Youssef and Hassan Wasef Canals, there is a potential for leakage and pollution of the irrigation canals by wastewater. CDM responded that before implementation and during design, all aspects and related decrees of Law 48 will be considered in the design of the crossing structure. All approvals and acceptances for such a crossing structure must be in place before construction. The Force Main will also be designed in compliance with all required procedures. In addition, crossings will be underneath the canals to avoid pollution resulting from possible leakage from the Force Main.
5. To cross the canals, the hydraulic structure used for the Force Main should be monitored by a panel from the Ministry of Water Resources and Irrigation and the Fayoum Water and Wastewater Company. CDM responded that having a monitoring panel was the normal procedure, and that such a panel would indeed be monitoring the new activities.
6. It should be assured that the quality of the treated effluents meets the requirements of Egyptian regulations. CDM responded that there is a program to regularly monitor the quality of the treated effluent at both wastewater treatment plants.
7. Some of the agricultural land will probably be damaged during construction, with an adverse impact on crop production. There is a need to compensate the farmers for any loss of crops. CDM responded that the Ministry of Agriculture and Land Reclamation (MALR) defines the compensation rate for each crop. Accordingly, the compensation will be paid for each farmer who is impacted.
8. Of previous sanitation projects implemented over the past 6 years, three suffered from poor construction quality. The community is afraid of having a repeat of this problem for the two new projects. CDM responded that many measures will be taken to assure that the work proceeds according to the defined implementation schedule and the signed contract.
9. Lake Qarun plays an important role for the Fayoum region. Many industries and economic activities depend heavily on the water quality in Lake Qarun. Improving the environmental condition of the lake should take a high priority in the program. CDM responded that other activities are currently being proposed to improve the water quality of Lake Qarun. These activities include construction of in-drain wetland systems at three sites which drain into Lake Qarun.

DISCUSSION:

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

- a. A determination of the scope and significance of issues to be analyzed in the Environmental Assessment or Impact Statement, including direct and indirect effects of the project on the environment.
- b. Identification and elimination from detailed study of the issues that are not significant or have been covered by earlier environmental review, or approved design considerations, narrowing the discussion of these issues to a brief presentation of why they will not have a significant effect on the environment.
- c. A description of:
 - 1) The timing of the preparation of environmental analyses, including phasing if appropriate.
 - 2) Variations required in the format of the Environmental Assessment, and
 - 3) The tentative planning and decision-making schedule; and
- d. A description of how the analysis will be conducted and the disciplines that will participate in the analysis.

CONCLUSION AND RECOMMENDATION:

The Fayoum 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.

DISCUSSION:

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- a. A determination of the scope and significance of issues to be analyzed in the Environmental Assessment or Impact Statement, including direct and indirect effects of the project on the environment.
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See ANE 07-05 Egypt ETD S016 EUM-Amendment 10-
Fayoum, approved April 27, 2007