Arab Republic of Egypt

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT

SECONDARY CITIES

Environmental Assessment

Environmental Assessment Report

for

GOVERNORATE OF DAQAHLIYA

Mehalet Engak and Busat Kareem El-Deen Villages in Sherbein Markaz;

Telbana, Koum El-Derbey and Kafr Telbana Villages in Mansoura Markaz

National Organization for Potable Water and Sanitary Drainage (NOPWASD)

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

CDM International Inc.

in association with

AAW Consulting Engineers

USAID FROM THE AMERICAN PEOPLE

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ENVIRONMENTAL ASSESSMENT REPORT

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Frontispiece: In Telbana

Daqahliya 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
DDWSCO	Daqahliya Drinking Water and Sanitation Company
EA	Environmental Assessment
ED/CM	Engineering Design and Construction Management
EIS	Environmental Impact Statement
FM	Force Main
HCC	House Connection Chamber
ID	Identification Number
HHS	Households
LE	Egyptian Pounds
MH	Manhole
PS	Pump Station
RCP	Reinforced Concrete Pipe
RR	Railroad
uPVC	Unplasticized Polyvinyl Chloride
VC	Virtified Clay
WTP	Water Treatment Plant
WWISP	Water and Wastewater Institutional Support Project
WWWTP	Wastewater Treatment Plant
$	United States Dollars

Weights and Measures

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

Executive Summary
Daqahliya Environmental Assessment

The USAID-funded Egypt Infrastructure Improvements Project is preparing to implement improvements to wastewater facilities in two village clusters in Egypt's Daqahliya Governorate. These projects are to be implemented for the Government of Egypt (GOE) through its implementing agency, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the United States Agency for International Development (USAID).

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

The project villages are Mehalet Engak and Busat Kareem El-Deen Villages in Sherbein Markaz; and Telbana, Koum El-Derbey and Kafr Telbana Villages in Mansoura Markaz. The village clusters lie close to Mansoura City, and approximately 110 km north of Cairo in the heart of the Nile Delta, east of the Damietta Branch of the Nile River. The Engak/Busat Villages lie on the east bank just across the Damietta Nile from Sherbein City, while the Telbana Villages lie a few km southeast of Mansoura City. The villages have developed in a pattern of dense residential and commercial development tightly encapsulated within a region that remains largely agricultural.

Both village clusters have been sewered to a considerable extent, but apart from some pumpage of raw wastewater to agricultural drains, there is not yet any conveyance to treatment, nor has treatment been provided. The proposed project is to provide such conveyance and treatment.

Environmental Setting

Temperature ranges from 6C in winter to 40C in summer. The annual rainfall depth is of the order of 400 mm, and occurs mostly in the winter months. The wind is predominantly from the northwest.

The soils of Daqahliya Governorate are generally alluvial silts deposited over millennia by the annual Nile floods. Water is conveyed to fields and villages by a system of canals, and away from fields and villages by drains. Groundwater is used to some extent. The physical relief of the countryside is extremely flat.

Population and Wastewater Loads

The population of the Mehalet Engak cluster is presently approaching 35,000, and is projected to grow beyond 50,000 by 2030. The wastewater BOD_5 loading, presently about 2000 kg/day, is projected to exceed 4,000 kg/day by 2030.

The population of the Telbana cluster is presently approaching 40,000, and is projected to grow beyond 60,000 by 2030. The wastewater BOD_5 loading, presently just over 2000 kg/day, is projected to approach 5,000 kg/day by 2030.

The wastewater is expected to continue to be primarily of domestic origin, with essentially no industrial contribution.

Existing sewerage. Mehalet Engak is approximately 90 percent sewered, and Busat Kareem El Deen is 95 percent sewered. To the extent that they already carry effluent, the Engak/Busat sewers simply discharge to the Alzahaira Drain, whether by gravity or pumping, obviously not meeting water quality standards, even for drains.

In the Telbana cluster, each village already has gravity sewers installed to some extent. The sewerage that has been installed leads to pump stations, some of which are in operation, if only to pump raw wastewater to the local El Nezam Drain.

Urgency for proper operation. In addition to water quality in the drains, there are several pressing reasons to put sewerage into proper operation in densely populated areas such as these village clusters. Until sewerage is operational, the population must rely upon on-site "soakaway" and septic tank systems. Field surveys have shown that onsite systems are generally poorly constructed and maintained, and thus are prone to failure, resulting in seepage of untreated wastes into groundwater, surface overflow, and subsequent pooling in and around dwellings and commercial buildings. The resulting high water table not only poses human and environmental health risks, but also can lead to structural damage to buildings.

Furthermore, septic tanks must be pumped frequently, particularly in areas having a high water table. Onsite systems are privately maintained. 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 greatly increased human and environmental health risks—as well as the cost of such services which must be borne by individual customers. Onsite systems are therefore inappropriate for densely settled villages.

Project Description

For Mehalet Engak and Busat Kareem El Deen, the present project is to furnish force mains from either existing or new pump stations in each village to convey the wastewater to the decreed treatment plant site, and to furnish and install the treatment plant. Treated effluent is to be discharged to the El Bilad El Bahr Drain (also known as El Zahaira Drain), which is tributary to the El Serwey Drain. The 2.1-feddan treatment plant site is not currently in agricultural use.

For the Telbana Villages, the present project is to furnish force mains from the existing or new pump stations in each village to convey the wastewater to the decreed treatment plant site, and to furnish the treatment plant. Treated effluent is to be discharged to El Nezam Drain. The 3.5-feddan treatment plant site is currently in agricultural use.

Treatment alternatives

The scarcity of good agricultural land in Egypt, relative to the population to be fed, is well known. The wastewater stabilization pond technology used successfully in cities and villages near open desert where space is generously available encounters severe space constraints in mid-Delta settings where every structure is bound to displace some agriculture. Normal land requirements for stabilization ponds, applied to the present and projected BOD loads from these village clusters, would exceed the allotted WWTP areas by more than an order of magnitude. Therefore alternative feasible treatment options for wastewater and the resulting sludge stream were sought.

Key criteria in the search for treatment alternatives were:

- Land-compact systems,
- Using technologies suitable for the region, i.e. easy-to-operate, simple, proven, and dependable systems,
- Of affordable initial and operational cost,
- That can be implemented under the prevailing local conditions.
- Operation and maintenance activities should be easily supported with locally available personnel.

Yet to meet the national effluent limits of 60 mg/L for BOD_5 and 50 mg/L for TSS, the WWTPs must have removal efficiencies of 88% and 92%, respectively, requiring biological treatment processes of high efficiency. (Nitrogen and phosphorus are not presently regulated for municipal effluent.)

The consultants examined several treatment processes that make intensive use of land, yet use feasible, affordable, and sustainable technologies:

- The sequencing batch reactor (SBR),
- The trickling filter (TF), and
- The STM-Aerotor,

each providing preliminary treatment, biological treatment, final clarification, and disinfection. Versions of each with, and without, primary treatment were examined.

For each alternative, the study sized the process units for the two village clusters, and estimated the costs. Layouts were developed for the two WWTP locations, wherever possible using compactly located rectangular process tanks (as opposed to circular ones), to make the best use of the limited space.

The STM-Aerotor option without primary clarification was recommended for implementation because, among the three options with and without primary clarification:

- It has the smallest footprint;
- It uses relatively simple equipment;
- It has the lowest present-value cost;
- Has been used in delta villages

Simple gravity sludge thickening, consisting of a hopper bottom tank with no mechanical raking, was selected for being highly cost-effective yet providing adequate thickening for application to drying beds. Mechanical thickening options that were evaluated provided no benefits simply because they did not reduce required sludge bed area.

Neither anaerobic nor aerobic sludge digestion was found to be suitable for this project; because of cost and complexity, and because the benefits are marginal, particularly with processes that do not produce primary sludge.

Sand filter sludge drying beds with underdrains were selected for their ability to thicken by filtering as well as by solar evaporation. They require less land than, say, concrete bottom beds with very limited filtering capability. More important, in Daqahliya's cool and rainy winter season, filtration will become the main dewatering mechanism.

To minimize the bed area required, the design loading adopted for the sludge beds (120 kg/m^2/year) is at the very high end of the range of typical values. *This loading is possible only with careful operation and maintenance of the sludge beds and timely removal and transport of dried sludge offsite.*

Despite these several efforts to reduce area, large sludge bed areas are still required.

Identify ultimate sludge disposal site or reuse location. The dried sludge would be removed after an average of 30 days and transported off-site for ultimate disposal or agricultural use. The ultimate disposal site or reuse location (and users) need to be identified in the planning stage.

More land is needed, particularly for the Mehalet Engak cluster. The presently proposed site for the Mehalet Engak WWTP affords only a fraction of the area needed for sludge drying beds.

The site for the Telbana WWTP is sufficient only to about year 2010, after which additional land will be needed to construct sludge drying beds.

Phased growth. Population growth and an increase in BOD concentrations will gradually increase loads on the WWTPs. That the rate of increase is gradual allows one to consider a phased implementation of certain units.

Potential phasing of the land intensive sludge beds is a major early planning issue, given that the land areas for the WWTPs are limited.

Environmental Assessment

Pumping wastewater to treatment plants is a project with little environmental controversy. The systems should give the villages a more healthful and attractive environment, and reduce damage to structures due to high water table. Still, there is challenge in planning, designing, constructing, operating, and maintaining these systems in a manner that is structurally, functionally, and environmentally sound.

To meet these and other expectations and concerns, this Environmental Assessment lists items to be monitored in the environmental management of the project, during planning and design, construction, and during the ensuing years of operation and maintenance. The list includes issues brought forward by the local community at the Scoping Session, and in writing by the Egyptian Environmental Affairs Agency.

In planning and design, effluent quality from the treatment plants must meet the regulations set out in Article 61 of Law 48**.** The EEAA must be asked for approval to discharge the effluents to drains. Sewage sludge must be disposed of safely, according to regulations for its reuse. Stream crossing design must consider all aspects and related decrees of Law 48. All approvals and acceptances for such a structure must be in place before construction. Provisions of the Antiquities Law will be incorporated into contract documents to ensure that any antiquities located during construction will be handled as required**.** If known antiquities lie within 3 km of a project site, a digging permit must be obtained from the Supreme Council on Antiquities.

In construction, quality control and quality assurance procedures are to be followed to the greatest precision and detail feasible. These apply to environmentally-oriented tasks as well as to straightforward construction tasks. Provisions of pertinent laws and regulations will be incorporated into contract documents to ensure that these issues will be handled as required during construction.

In preparing his bid, the contractor is to consider each specification carefully, and cost it out. At the core of the environmental management process, the developer's contract manager is assigned and empowered to monitor the contractor's compliance with each item in the specifications—and pay the contractor for it only when the item is completed to satisfaction.

Specific environmental contract issues include observance of Egyptian occupational safety and health regulations, public safety, traffic control and interruptions of passage; protection of buried and unburied utilities (gas, electricity, water, telephone;) antiquities**,** pest control, and dust control. spill control, and site cleanup during decommissioning.

During the years of **plant operation**, monitoring should be alert to health and safety for workers and community; any complaints of excessive odor or noise from the pump stations or treatment works; any complaints of insect pests such as mosquitoes

or flies attributed to the treatment works; safe and appropriate disposal of sludge, including regulation of sludge reuse (as to application to which crops, and rate of application, e.g. kg/ha/year); reports of leaks in the force mains, and the promptness and quality of repair of the leaks; and the quality and consistency of routine sampling at the wastewater plants, and analysis of the samples on site or at the analytical laboratory, wherever located.

Routine monitoring would be by DDWSC as the local operating agency, with oversight by NOPWASD at the national level.

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 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. International aid agencies such as USAID provide funding and technical support through NOPWASD.

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.

DDWSC 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 Daqahliya Drinking Water and Sanitation Company (DDWSC). As noted just above, operation and maintenance are the responsibility of regional and local authorities. NOPWASD's intention to conduct periodic inspections should be welcomed by DDWSC, but in practice the responsibility for satisfactory environmental service to the Governorate and its inhabitants rests with DDWSC.

الملخــص التنفيــذى

يعد مشروع تطوير البنية التحتية في مصر والممول من قبل الحكومة الأمريكية والذي يشمل تحسين خدمات الصرف الصحي لعدد مجموعتين من القرى بمحافظة الدقهلية. ومن المقرر أن يتم تنفيذ تلك الأعمال لصالح الحكومة المصرية من خلال الهيئة القومية لمياه الشرب والصرف الصحي بالتعاون مع الوكالة الأمريكية للتنمية الدولية.

ووفقا لمتطلبات الوكالة الأمريكية للتنمية الدولية رقم (22CFR216) يجب إعداد تقرير التقييم البيئي للمشروع والذي يحتوى على دراسة تفصيلية للتوقعات المنطقية للتأثيرات البيئية سواء المفيدة أو الضارة واتخاذ الإجراءات اللازمة لتعظم الإيجابيات النافعة والحد من التأثيرات الضارة السلبية.

يشمل المشروع قرى محلة انجاق وبساط كريم الدين بمركز شربين وقرى تلبانه وكوم الدربى وكفر تلبانة بمركز المنصورة والذى يقع بالقرب من مدينة المنصورة وعلى بعد ١١٠ كم من القاهرة تقريبا بمنطقة شرق الدلتا.

تقع قريتى محلة انجاق وبساط كريم الدين شرق النيل فرع دمياط بالقرب من مدينة شربين بينما تقع قرى تلبانه على بعد عدة كيلومتر جنوبي شرق مدينة المنصورة وتتميز تلك القرى بكثافة سكانية عاليه و غالبيه النشاط هو الزراعة.

وكلا من مجموعتي القرى المقترحة مخدومة بشبكات صرف صحى إلى حد كبير وتصرف مياه الصرف الصحى الخام الغير معالجة مباشرة على المصارف القريبة منها وحتى الآن لم يتم خدمتها بمحطات معالجة للصرف الصحي وتحتاج خطوط الطرد.

والمشروع المقترح سوف يقوم بتقديم تلك الإعمال الضرورية لمجموعتي القرى المشار اليها.

الوضع البيئى

تتراوح درجة الحرارة بين ٦ درجات بالشتاء وتصل إلى ٤٠ درجة بالصيف. ويصل معدل المطر السنوي إلى ٤٠٠ مللي خلال شهور الشتاء (ديسمبر إلى فبراير) واتجاه الرياح الغالب طول العام فى الأتجاه الشمالى الغربي.

وتتكون التربة بصفة عام لمحافظة الدقهلية من ترسيبات طميية طينية نتيجة فيضان النيل خلال العصور السابقة. يتم خدمة المناطق الزراعية والقرى بشبكة قنوات من ترع كما يتم صرف المياه من خلال شبكة مصارف مثل باقي محافظات دلتا نهر النيل . ويلاحظ وجود بعض استخدامات للمياه الجوفية. وتتميز محافظة الدقهلية بأنها ذات أرض منبسطة جدا.

السكان وأحمال الصرف الصحي

يصل تعداد مجموعة قرى محلة انجاق إلى ٣٥٠٠٠ نسمة ومن المتوقع أن يصل إلى ٥٠٠٠٠ نسمة في عام ٢٠٣٠. ويمثل حمل المواد العضوية من الصرف الصحي (الأوكسجين الحيوي الممتص BOD) ٢٠٠٠كجم/يوم ليزيد ٤٠٠٠ كجم/يوم فى عام ٢٠٣٠.

وتبلغ تعداد قرى تلبانة وتوابعها حاليا ٤٠٠٠٠ نسمة ومن المتوقع أن يصل إلى حوالي ٦٠٠٠٠ نسمة بحلول عام ٢٠٣٠. ويمثل حمل المواد العضوية من الصرف الصحي (الأوكسجين الحيوي الممتص BOD) ٢٠٠٠كجم/يوم ليصل في عام ٢٠٣٠ إلى ٥٠٠٠كجم/اليوم.

ويمثل الاستخدام المنزلي معظم الصرف الصحي حيث لا يوجد أنشطة صناعية تذكر بمنطقة المشروع.

الوضع الحالي لخدمات الصرف الصحي

تم خدمة قرية محلة انجاق بشبكات تجميع الصرف الصحي بنسبة حوالى ٩٠% تقريبا وقرية كريم بساط الدين بنسبة حوالى ٩٥% حيث يتم ضخ الصرف الصحي من خلال أما محطات رفع أو مباشرة بالأنحدارعلى مصرف الزهاره حيث لا تتوافق مع قانون ٤٨.

يتم حاليا تجميع الصرف الصحي لقرى تلبانة من خلال شبكة تجميع الصرف الصحي بالانحدار الطبيعي ليصل بعضها إلى محطتي رفع للصرف مباشرة على مصرف فرعى ومنه الى مصرف النظام.

الاحتياج إلى خدمة أعمال التشغيل المناسبة

تؤدى الخدمة الحالية للصرف الصحي الغير متكاملة إلى تدهور نوعية المياه بالمصارف ،هذا بالإضافة إلى عديد من الأسباب التي تعجل من ضرورة استكمال منظومة خدمة الصرف الصحي بالأخص داخل القرى ذات الكثافة العالية السكان. ولحين استكمال خدمات الصرف الصحي فان أهالي تلك القرى مازالوا يستخدمون خنادق صرف صحى لتجميع الصرف الصحي المنزلي والذى بدوره يلوث المياه الجوفية نتيجة لتسرب الصرف الصحي الى باطن التربة. وكذلك كثيرا ما يحدث طفح لتلك خنادق صرف صحى مما يؤدى إلى تراكم الصرف الصحي بطرق وشوارع القرى. كل ذلك يؤدى إلى أرتفاع منسوب المياه الجوفية والتي تؤثر بطريقة مباشرة على قواعد واساسات المباني بالقرية كما تؤثر أيضا على حالة الصحة العامة لاهالى القرى.

هذا بالإضافة انه يلزم نزح خنادق الصرف الصحى بصفة دورية بالأخص بالمناطق ذات منسوب المياه الجوفية المرتفعة وضرورة صيانة خنادق الصرف الصحى والقيام بنزحها من خلال بعض العاملين وبصورة قانونية حيث يتم صرف عربات الكسح التى تقوم بنقل وصرف مياه الصرف الصحى الخام على المصارف العمومية المجاورة للقرية مباشرة. وهذا الوضع يمثل عبء اقتصادي على مستوى دخل المنازل والأسر والمقيمين بالمنازل وكذلك يزيد من مصادر مخاطر الصحة العامة لاهالى تلك القرى.

وصف أعمال المشروع

أولا: قرية محلة انجاق وقرية بساط كريم الدين

سوف يشمل المشروع المقترح خطوط طرد لمحطات الرفع لكل قرية إلى محطة معالجة الصرف الصحى المقترحة والتي بدورها تصرف على مصرف البحر الفرعي ومنه الى

المصرف العمومي. وتبلغ المساحة المخصصة لمحطة معالجة الصرف الصحى ١ر٢ فدان وهى غير مستخدمة فى الزراعة حاليا.

ثانيا : قرية تلبانة وتوابعها

سوف يشمل المشروع المقترح إنشاء خطوط طرد لمحطات الرفع لكل قرية والتى تصل الى محطة معالجة الصرف الصحى المقترحة والتى بدورها تصرف على مصرف النظام. وتبلغ المساحة المخصصة لمحطة المعالجة ٥ر٣ فدان مستخدمة حاليا فى أعمال الزراعة .

بدائل نظم المعالجة

تمثل الرقعة الزراعية الجيدة في مصر أهمية كبيرة والتى يتم الأستفادة من منتجاتها فى سد الفجوة الغذائية .

تستخدم أنظمة المعالجة باستخدام برك الأكسدة بصورة واسعة وناجحة بالمدن والقرى التى تقع بالقرب من ظهير صحراوي الأ أن عدم توافر الأرض وأرتفاع قيمتها يحد من إمكانية تنفيذ هذا النظام بدلتا نهر النيل فيما يخص. للأحمال الحالية والمتوقعة لسنة ٢٠٣٠ نجد أن متطلبات المساحات من الأراضى لنظام المعالجة ببرك الأكسدة يفوق بكثير الأرض المخصصة لمحطات المعالجة المقترحة. ولذلك يجب الأخذ في الاعتبار أنواع أنظمة معالجة أخرى تتوافق مع مساحة الأرض المخصصة لذلك .

وعناصر اختيار بدائل نظم المعالجة هى:

- مساحة الأرض اللازمة والمتوفرة
- تكنولوجيا سهلة التشغيل وبسيطة
- ذات تكلفة إنشائية وتشغيلية مقبولة
- أمكانية تنفيذها تحت الظروف المحلية وتشغيلها وصيانتها بالموارد المحلية.

وللتوافق مع حدود القانون ٤٨ لسنة ٨٢ يجب ان تكون المياه المعالجة السبب النهائي لمحطة المعالجة أن لا يتعدى الاوكسجين الحيوى لممتص (BOD) ٦٠ملليجرام/لتر والمواد العالقة الكلية (TSS) ٥٠ ملليجرام/ لتر ولهذا يلزم أن تكون كفاءة المعالجة ٨٨% و ٩٢% على التوالى الأمر الذى تتطلب معالجة حيوية عالية الكفاءة

ولقد قام الأستشارى بدراسة بدائل المعالجة التى يمكن أقامتها بمساحات الأراضى المحدودة المتاحة وأن تكون من النوع المكثف والذى أثبت كفاءة فى التنفيذ والتشغيل تحت الظروف المحلية وأن يكون ذات جدوى ومنها الأنظم التالية:

- نظام معالجة SBR .
- المرشحات الزلطية (البلاستيكية) .
- مزود الهواء بنظام STM .

وهذه الأنظمة تشمل مراحل معالجة أبتدائية وحيوية وأضافة الكلور وقد تم دراسة تطبيق تلك البدائل لخدمة مجموعتى القرى المقترحة وتحديد مساحة الأراضى اللازمـــة وكذلك التكلفـــة

التقديرية لأعمال التفيذ - و تم أعداد المخططات العامة لمحطة المعالجة لكل نظام ومحاولة أستخدام الأراضى المخصصة لكل نوع من محطات المعالجة .

حيث يوصى بأستخدام نظام مزود الهواء بنظام STM بدون وحدات أبتدائية علما بأنه من البدائل المناسبة المطروحة للأسباب التالية :

- الأحتياج الى أقل مساحة .
- يتم تشغيل النظام بمعدات بسيطة نسبية.
- أقل فى التكلفـــة .

وكذلك يوصى بأستخدام نظام تخفيض الحمأة البسيط دون أستخدام أعمال ميكانيكة والذى يعتبر ذات تكلفة أقتصادية وهو بديل جيد فى تجفيف الحمأة ، لأن أستخدام الأعمال الميكانيكة لا يؤدى الى توفير فى مساحة الأراضى اللازمة لمعالجة الحمأة .

وكذلك أستخدام المعالجة بنظام الأحواض الهوائية واللاهوائية غير مناسبة لمثل هذا المشروع وذلك للتكلفة العالية النسبية وأعمال التركيبات غير بسيط مع ملاحظة أن الفوائد المضافة محدودة .

تم أختيار أحواض تخفيف الحمأة ذات المرشحات الرملية لقدرتها على التجفيف وذلك للأستفادة بالطاقة الشمسية المتاحة بالمنطقة ولأنها تحتاج مساحة أقل ومناسبة لظروف محافظة الدقهلية فتعد عملية التخفيض بالترشيح أهم خطوات تجفيف الحمأة .

ولأختصار مساحة أحواض التجفيف ثم أستخدام حمل بمعدل ١٢٠ كجم/م٢/عام والذى يعتبر الحد الأقصى للمعدل المعتاد ويمكن تحقيقة من خلال أنضباط أعمال التشغيل والصيانة طبقا لخطة العمل المطلوبة.

وبالرغم من تلك المجهودات للحد من المساحة المطلوبة لأعمال معالجة الحمأة الأ أنه مازال النظام المقترح بحاجة الى مزيد من الأراضى عن المحددة لها .

تحديد مكان التخلص أو أعادة أستخدام الحمأة

يمكن أزالة الحمأة المجففة بعد حوالى ٣٠ يوم ونقلها الى مكان للتخلص منها أو أعادة أستخدامها لأغراض الزراعة على أن يتم تحديد أمكان التخلص النهائي من الحمأة المجففة أو أعادة الأستخدام وتحديد المستخدمين فى مرحلة التخطيط للمشروع .

الأحتياج لمزيد من الأراضى

ويجب الأنتباه أنه يلزم أضافة مزيداً من مساحة أراضى بالأخص لمحطة معالجة الصرف الصحى المخصصة لخدمة مجموعة قرى محلة أنجاق ، حيث أن الأراضى المتاحة لمحطة معالجة محلة أنجاق تكفى فقط لجزء من أحواض تجفيف الحمأة المطلوبة.

أما بالنسبة لموقع محطة معالجة الصرف الصحى لقرى تلبانة تكفى فقط لأحتياجات الخدمة حتى عام ٢٠١٠ وبعد ذلك يلزم أضافة مزيدا من الأراضى لموافاة أحتياجات أحواض تجفيف الحمأة المطلوبة.

مراحل النمو

مع الزيادة المطردة للسكان وزيادة تركيز المواد العضوية حيث يؤدى ذلك الى زيادة تدريجية للأحمال العضوية على محطات المعالجة ، علما بأن معدل الزيادة سوف يسمح بالتدرج فى زيادة وحدات المعالجة حسب الأحتياج .

الأ أنه يجب أن يؤخذ فى الأعتبار مراحل التخطيط الأولية لضرورة الأحتياج فى المستقبل لأضافة مساحة أراضى خاصة لمعالجة وتخفيف الحمأة بالأخص أن الأراضى المخصصة حاليا لمحطات المعالجة محدودة .

التقييم البيئى

تعتبر عمليات نقل الصرف الصحى الى مواقع محطة المعالجة ذات تأثير سلبى محدود مع البيئة الأ أن منظومة الصرف الصحى المتكاملة المقترحة تؤدى الى مساعدة المجتمع بصفة عامة وتوفير بيئة أفضل تؤدى الى تحسن الصحة العامة للمجتمع والحفاظ على المنشآت من التدهور نتيجة أرتفاع منسوب المياه الجوفية.

ولكن لا يزال هناك عدة تحديات فيما يخص التخطيط والتصميم والأنشاء والتشغيل والصيانة ليكون المشروع ذو مردود أيجابي على نواحى أنشائية وتشغيلية وبيئية جديده .

وللتأكد من هذه التحديات فأن ذلك التقيم البيئى يتناول العناصر التى يجب متابعتها خلال أدارة المشروع البيئية وذلك فى مرحلة التخطيط والتصميم والأنشاء والتشغيل والصيانة .

وتشمل تلك التحديات العناصر التى يتم عرضها من خلال المواطنين المعنين بالمشروع بأقامة ورشة عمل لمناقشة التأثيرات البيئية المتوقعة للمشروع والمراسلات مع جهاز شئون البيئة .

مرحلة التخطيط والتصميم

يجب أن تكون المياه المعالجة (السبب النهائي) متوافق مع القانون ٤٨ لسنة ٨٢ المادة ٦١ ، ويجب الطلب من جهاز شئون البيئة للموافقة على صرف مياه الصرف الصحى المعالجة على المصارف العمومية كذلك معالجة والتخلص من الحمأة بطريقة آمنة حسب اللوائح والقوانين المنظمة لعملية أعادة الأستخدام في الزراعة .

كما يجب مراعاة الشروط اللازمة أثناء تنفيذ عديات على المجارى المائية سواء ترع أو مصارف حسب القانون ٤٨ لسنة ٨٢ ، ويجب الحصول على الموافقات اللازمة لمثل تلك الأعمال الصناعية للعديات قبل التنفيذ من كافة الجهات المعنية.

ويجب أن تكون اللوائح الخاصة بالتعامل مع الآثار جزء من عقد التنفيذ للتأكد على أن المقاول سوف يتعامل مع الآثار حسب اللوائح الصادره بهذا الشأن أن وجدت عند تنفيذ الأعمال وفى

حالة وجود آثار فى مدى ٣ كيلو من موقع المشروع وسوف يتم الحصول على موافقة المجلس الأعلى للآثار قبل البدء فى أتمام أعمال الحفر .

مرحلة التنفيذ

أتباع نظم عملية تحقيق الجودة أثناء التنفيذ بالتفاصيل الممكنة شيىء ضرورى للغاية وهذا ينطبق على الأعمال التى تخص أى عوامل للحفاظ على البيئة أثناء مراحل التنفيذ كما يجب أن تشمل مستندات العطاء أو العقد الخاص بتنفيذ الأجراءات التنفيذية المطلوبة للحفاظ على البيئة.

وعلى المقاول أثناء أعداد عرضه الفنى والمالى الأخذ فى الأعتبار تلك الأعمال المطلوبة للحد من تأثير أعمال التنفيذ على البيئة ويجب على الجهة المشرفة على التنفيذ متابعة تنفيذ تلك الأعمال حسب العقد المبرم .

كما أن بعض العناصر الخاصة بالبيئة تشمل شروط السلامة والصحة للعاملين بالمشروع وكذلك السلامة العامة للمواطنين بمنطقة المشروع وكذلك مسارات حركة المرور وكذلك الحفاظ على البنية التحتية مثل شبكة الأمداد بالمياه والغاز والكهرباء والتليفونات والتحكم فى الغبار والضوضاء وفواقد الوقود ونظافة المواقع وضمان أخلائها بعد التنفيذ .

أثناء التشغيل

يجب متابعة عملية التشغيل من خلال برنامج مراقبة لمحطة المعالجة تشمل صحة وسلامة العاملين بالمحطة وكذلك مراعاة الشكوى من الضوضاء والروائح الغير مقبولة من محطات الرفع أو أعمال المعالجة وكذلك متابعة الشكاوى من وجود حشرات أو بعوض نتيجة أعمال المعالجة ، ويجب التحقق من التخلص الآمن من الحمأة ومراعاة القوانين المحددة لعملية أعادة أستخدام الحمأة فى الزراعة وكذلك التبليغ عن أى عملية تسريب من خطوط الطرد ومتابعة عملية الأصلاح وكفاءة الأصلاح وكذلك متابعة نوعية المياه المعالجة من خلال عمل عينات وتحليل معملى ودورى منظم حسب برنامج محدد للمنطقة .

ويجب أن تتم تلك البرنامج من خلال شركة الدقهلية لمياه الشرب والصرف الصحى مع الجهة أو الأدارة المسئولة عن التشغيل للمحطة ومتابعة دورية من الهيئة القومية لمياه الشرب والصرف الصحى لهذا البرنامج .

دور الدعم المؤسسى

يوجد على المستوى القومى عدة وزارات وهيئات لها دور فى أدارة نوعية المياه بمصر وتشمل عدة مجالات واتجاهات منها التخطيط والتشغيل والمتابعة والأبحاث وأصدار القوانين واللوائح . وتعد وزارة الرى والموارد المائية هى الجهة المنوط بها الدور الرئيس فى أدارة الموارد المائية بمصر ويعتبر قانون ٤٨ لسنة ٨٢ هو المنتظم لأدارة توعية المياه بمصر ، وتعتبر وزارة الرى والموارد المائية الجهة المسئولة عن توفير مياه لكل الأستخدامات بالأخص أحتياجات الرى ، والوزارة مسئولة أيضا عن أستخراج التصاريح اللازمة للصرف على المجارى المائية وعمل العدايات سواء صرف صحى أو صرف صناعى .

بينما تقع مسئولية التخطيط والتصميم والتنفيذ لمحطات الشرب وشبكات التوزيع وشبكات الصرف الصحى ومحطات معالجة الصرف الصحى على وزارة الأسكان والمرافق والتنمية العمرانية . والجهات الدولية المتاحة مثل الوكالة الأمريكية للتنمية الدولية التى تقدم الدعم المالى والفنى خلال الهيئة القومية لمياه الشرب والصرف الصحى .

وبمجرد الأنتهاء من تنفيذ أعمال المياه والصرف الصحى تقوم الهيئة لمياه الشرب والصرف الصحى بتنفيذ برنامج تدريبى لأدارة الأعمال علما بأن أدارة الأعمال تكون من خلال الهيئات المحلية ، وتقوم الهيئة القومية لمياه الشرب والصرف الصحى بالمتابعة وذلك بالتنسيق مع الهيئات بالمحافظات .

مسئولية شركة الدقهلية لمياه الشرب والصرف الصحى

تقع مسئولية تشغيل وصيانة الأعمال المقترحة ووضعها فى الصورة المفيدة للقرى على شركة الدقهلية لمياه الشرب والصرف الصحى ، حيث أن التشغيل والصيانة للأعمال المقترحة تقع على عاتق الجهات المحلية بالمحافظة .

وسوف تقوم الهيئة القومية لمياه الشرب والصرف الصحى بالمتابعة الدورية بالتنسيق مع شركة الدقهلية لمياه الشرب والصرف الصحى ولكن أستيفاء الأعتبارات البيئية هى مسئولية مشتركة مع جهات عديدة داخل المحافظة والمجتمع المحلى

EGYPT INFRASTRUCTURE IMPROVEMENTS PROJECT
ENVIRONMENTAL ASSESSMENT

DAQAHLIYA GOVERNORATE

Mehalet Engak and Busat Kareem El-Deen Villages in Sherbein Markaz, Telbana, Koum El-Derbey and Kafr Telbana Villages in Mansoura Markaz

ENVIRONMENTAL ASSESSMENT REPORT

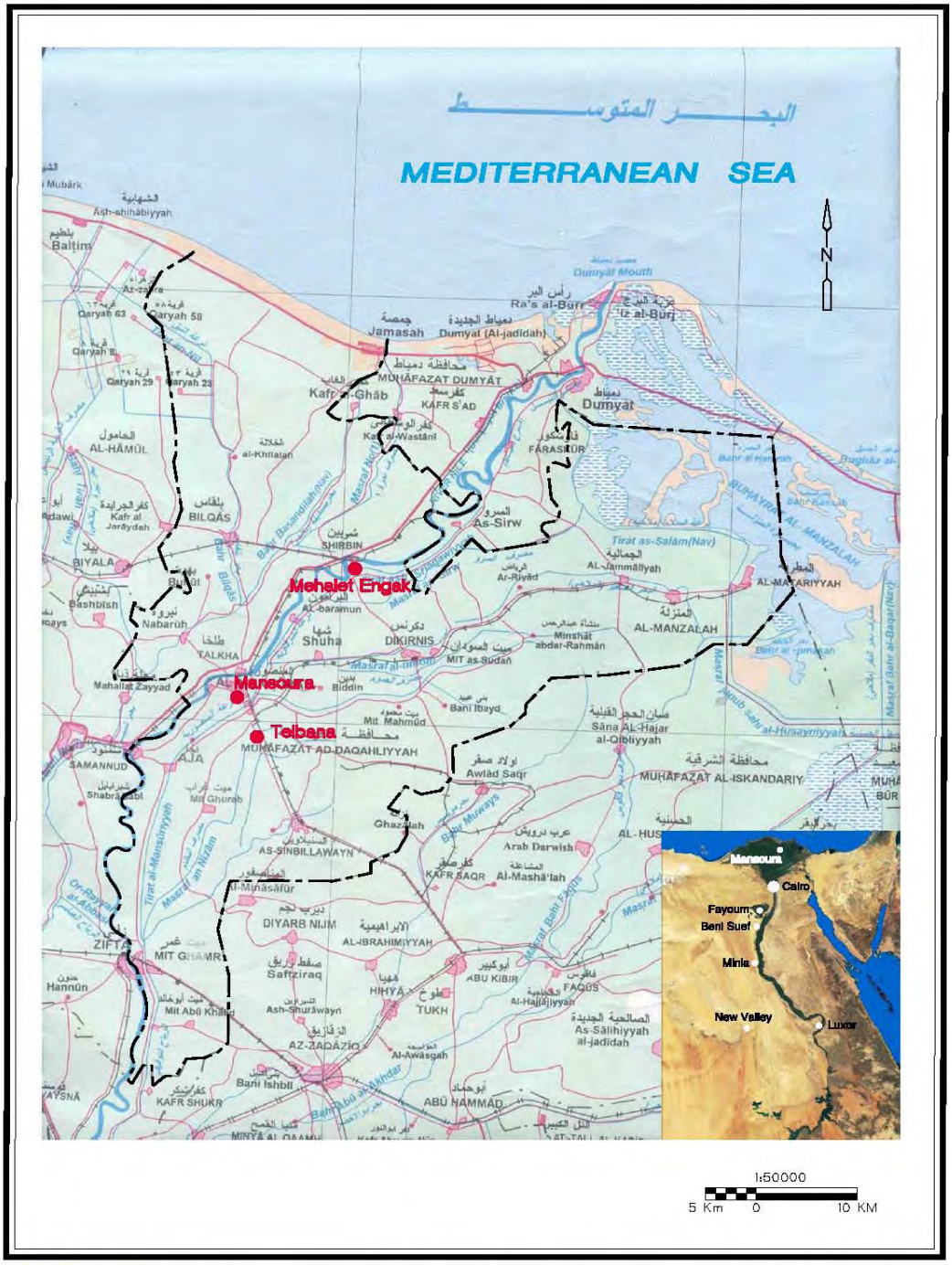
1 Introduction

The USAID-funded Egypt Infrastructure Improvements Project is preparing to implement improvements to wastewater facilities in two village clusters in Egypt's Daqahliya Governorate. The project villages are Mehalet Engak and Busat Kareem El-Deen Villages in Sherbein Markaz; and Telbana, Koum El-Derbey and Kafr Telbana Villages in Mansoura Markaz. Both village clusters have been sewered to a considerable extent, but apart from some pumpage of raw wastewater to agricultural drains, there is not yet any conveyance to treatment, nor has treatment been provided. The proposed project is to provide such conveyance and treatment.

These projects are to be implemented for the Government of Egypt (GOE) through its implementing agency, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the United States Agency for International Development (USAID).

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

Figure 1 shows the locations of the two subject village clusters relative to Mansoura City, the capital of Daqahliya Governorate. Mansoura City and the villages lie approximately 110 km north of Cairo in the heart of the Nile Delta, east of the Damietta Branch of the Nile River. The Engak/Busat Villages lie on the east bank just across the Damietta Nile from Sherbein City, while the Telbana Villages lie a few km southeast of Mansoura City. The villages have developed in a pattern of dense residential and commercial development tightly encapsulated within a region that remains largely agricultural.



CDM International Inc.
In association with Dr. Ahmed Abdel-Warith Consulting Engineers

FIGURE 1. - LOCATION MAP
DAQHLIYA GOVERNORATE

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

Both village clusters have been sewered to a considerable extent, but apart from some pumpage of raw wastewater to agricultural drains, there is not yet any conveyance to treatment, nor has treatment been provided. The proposed project is to provide such conveyance and treatment.

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 Daqahliya Governorate, NOPWASD, USAID, and the public, all have a role. The Scoping Session is part of this process.

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

- the funding agency (USAID),
- the implementing agency (NOPWASD),
- the funding agency's engineers,
- appropriate Egyptian national ministries (e.g. Housing, Agriculture),
- the Governorate and its wastewater management agency, the Daqahliya Drinking Water and Sanitation Company (DDWSC),
- 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. Details of the Scoping Session held in Mansoura City on 24 May 2007 may be found in Appendix B.

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 government agencies consulted in preparation of this report. The proceedings from the Scoping Session are presented in Appendix B. Relevant Egyptian environmental legislation is summarized in Appendix C. Appendix D describes some environmental management measures. Appendix E lists the individuals who prepared this report.

3 Environmental Setting

Climate. Temperature ranges from 7C in winter to 35C in summer. The annual rainfall depth is of the order of 60 mm, and occurs mostly in the winter months. The winter season is influenced by meteorological events in the Mediterranean Sea which contribute to the rainfall. The surface wind is predominantly from the northwest. The annual evaporation is approximately 1700 mm ranging from 2.5 mm/day in winter to 7.1 mm/day in the summer.

The soils of Daqahliya Governorate are generally alluvial silts deposited over millennia by the annual Nile floods. During the Quaternary Period, the Nile built a series of sand, gravel, silt and clay deposits over the area downstream of where Cairo is located. At depths of 10 to 40 meters late Pleistocene fluviatile deposits occur

consisting of clays and fine grained sand mixed with medium coarse grained sand layers. Beneath this lense is a layer of loose coarse sands and clay. This thick layer contains a major water-bearing formation which is connected to the Nile River, irrigated areas, and the drains and canals system. Water is conveyed to fields and villages by a system of canals, and away from fields and villages by drains. Groundwater is used to some extent. The physical relief of the countryside is extremely flat.

Five borings were taken at each of the WWTP sites under a soil investigation program during July 2007. In Telbana, the first 8 meters identified a stiff silty clay overlaying a 1 to 2 meter thick layer of peat which covered a stiff silty clay and graded sand layers. The groundwater is approximately 1.5 meters below ground surface. In Mehalet Engak, the first 5 meters were stiff silty clay overlaying a soft silty clay and sand layer to about 10 meters and then a medium to coarse sand layer. The groundwater is approximately 1.7 meters below ground surface.

Layout, location, and population. Figure 2 is an overhead view of Mehalet Engak, Busat Karim El Deen, and the decreed treatment plant site in between. The Damietta Nile can be seen flowing from west to east just north of the villages. Sherbein City lies on the north bank of the river, across from Mehalet Engak. Flowing parallel to the Nile, and through both villages, and past the proposed WWTP site, is the El Sharawia Canal while a major Nile River intake to connect the canal can be seen running through the Busat village. Approximately 1.5 km south of the Sharawia Canal is the El Bilad El Bahr Drain (or El Zahaira Drain) which will receive the treated effluent. This drain connects to the El Serwey Drain, which in turn drains to the coastal Lake Manzala. The projected combined population of these two villages is 60,000 in 2030.

Figure 2. Overhead view of Mehalet Engak, Busat Kareem El Deen and the proposed WWTP site.

Figure 3 is an overhead view of the villages of Koum El Derby, Telbana, Kafr Telbana, and the proposed WWTP site. The three villages lie to southeast of Mansoura City, the capital city in Daqahliya Governorate. The projected combined population of this village cluster is 55,000 in 2030. The proposed WWTP site is located on the El Nezam Drain that will be used for treated effluent discharge.

Figure 3. Overhead view of Koum El Derby, Telbana, Kafr Telbana, and the proposed WWTP site.

Wastewater will be primarily of domestic origin, with essentially no industrial contribution. In Table 1, Section 6 below, projections of population, per capita flow rates and BOD5 rates, and BOD5 mass loadings are provided. Appendix F provides information regarding wastewater influent strengths at various WWTPs within the Daqahliya Governorate. The higher than normal wastewater strengths being considered for the WWTPs is the result of residents discharging livestock wastes into the system which is considered to be a normal practice in the delta region.

Existing sewerage. The Mehalet Engak cluster consists of the villages of Mehalet Engak and Busat Kareem El Deen. Mehalet Engak is reported to be approximately 90 percent sewered while Busat Kareem El Deen is 95 percent sewered (Figure 4).

Figure 4. Manhole in a sewered street in Busat Kareem.

One pump station is operational in the village of Mehalet Engak as of year 2000 and the discharge is conveyed to the El Bilad El Bahr Drain through a PVC force main that crosses beneath the Sharawia Canal.

The main population center for Busat Kareem El Deen exists on the Nile side of the Sharawia Canal. Two pump stations have been constructed in this area of Busat; The main pump station serves the major population center on the eastern side of the village while a smaller station is located to the west of the canal that provides water directly from the Nile. Both stations are operational with the smaller station flows conveyed to the main pump station for discharge to the El Bilad El Bahr Drain or through a bypass to the nearby canal. A third pump station is located on the southern side of the Sharawia Canal however at present it does not contain any pumps and is not operational. The main pump station went into operation in year 2000 and is shown in Figures 5 and 6.

Figures 5, 6. Interior and exterior of operating main pump station in Busat Kareem El Deen.

To the extent that they already carry effluent, the Engak/Busat sewers simply discharge through a bypass to the Canal by gravity (Figure 7) or is pumped to the El Bilad El Bahr Drain (Figure 8), obviously not meeting water quality standards for canals or drains.

Figure 7. Gravity Discharge to Canal.

Figure 8. Pumped Discharge to Drain

The situation is similar in the **Telbana cluster** in that each village is reported to have gravity sewers installed to some extent (Telbana 25 percent, Kafr Telbana 90 percent, Kom El Derby 98 percent). In the village of Telbana, there are two pump stations – one has been operational since year 2006 while the other is still under construction. They are both located along the El Nezam drain where the effluent is discharged.

Figure 9. Pump Station, Telbana (not operational)

Construction of gravity sewer pipelines is ongoing in Telbana village as can be seen in Figures 10, 11 and 12.

Figure 10. Manhole cover in sewered street in Telbana.

Figure 11. Manhole for sewer under construction, Telbana

Figure 12. Typical trench for buried pipeline installation, Telbana, indicating the degree of temporary disturbance to be expected of such an operation.

In the village of Kafr Telbana the only pump station began operation in 2007 and effluent is pumped to the nearby El Baqliyyah Drain which connects to the larger El Nezam Drain.

In the Koum el Derby, one pump station collects all wastewater flow and discharges the effluent into the Bahr Tanah El Ala Drain on the northside of the village.

Urgency for proper operation. In addition to water quality in the drains, there are several pressing reasons to put sewerage into proper operation in densely populated areas such as these village clusters. Until sewerage is completely operational, portions of the the population must rely upon on-site "soakaway" and septic tank systems. Field surveys have revealed that onsite systems are generally poorly constructed and maintained, and thus 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 (Figure13), posing potential human and environmental health risks.

Figure 13. A pool of stagnant water near residential buildings, due to a high water table (Telbana).

High water table can also lead to structural damage to buildings. Figures 14 and 15 show how a high water table has led to decomposition of the mortar and many of the bricks of a building, for more than 2 m above the ground level.

Furthermore, septic tanks must be pumped frequently, particularly in areas having a high water table. Onsite systems are privately maintained. 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. Such exposure greatly increases potential human and environmental health risks—as well as the cost of such services which must be borne. Onsite systems are therefore inappropriate for densely settled villages.

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Figures 14 and 15. Structural Damage due to a High Water Table (Telbana).

Additionally, the subject villages are in urgent need of treatment facilities since the current collection systems are being conveyed to pump stations where the untreated wastewater is pumped directly to drains or by gravity directly into the canal and drain network.

4 Project Description: Mehalet Engak and Busat Kareem El Deen Villages

For Mehalet Engak and Busat Kareem El Deen, the present project is to furnish force mains from either new or existing pump stations in each village to convey the wastewater to the decreed treatment plant site (Figure 2), and to furnish and install the treatment plant. Treated effluent is to be discharged to the El Bilad El Bahr Drain (or El Zahaira Drain), which is tributary to the El Serwey Drain. The 2.1-feddan treatment plant site (Figure 16) is not currently in agricultural use.

Figure 16. The 0.88-ha WWTP site, between Mehalet Engak and Busat Kareem El Deen

5 Project Description: Telbana Village Cluster

For the Telbana Villages, the present project is to furnish force mains from either existing or new pump stations in each village to convey the wastewater to the decreed treatment plant site (Figure 3), and to furnish and install the treatment plant. Treated effluent is to be discharged to the El Nezam Drain. The 3.5-feddan treatment plant site (Figure 17) is currently in agricultural use.

Figure 17. The 1.47-ha wastewater treatment plant site, Telbana

6 Project Alternatives

6.1 Introduction

The scarcity of good agricultural land in Egypt, relative to the population to be fed, is well known. The wastewater stabilization pond technology used successfully in cities and villages near open desert where space is generously available encounters severe space constraints in mid-Delta settings where every structure is bound to displace some agriculture. Therefore, the selection of appropriate wastewater treatment technology alternatives was required to maximize the use of available land area and to provide sustainable systems. The sites for the two WWTPs were centrally located and already selected and decreed so that alternatives to the sites could not be considered. Conveyance systems, pump stations and force mains, from each of the villages to the respective treatment facilities will need further review during the implementation phase.

6.2 Treatment Alternatives

Population projections for the village clusters, and wastewater flow and load estimates based on the 2004 Egyptian Code for Designing and Executing Water Lines and Sewers, are summarized in Table 1.

Table 1. Population and Wastewater Load Projections

Village Cluster/Year	2006	2010	2015	2020	2025	2030
Telbana Population	36,103	40,260	45,457	50,653	55,850	61,046
Per capita flow, lcpd	160	160	160	160	160	160
BOD_5	350	375	406	438	469	500
BOD_5, kg/day	2,022	2,416	2,955	3,546	4,189	4,884
Mehalet Engak Population	31,912	35,375	39,703	44,032	48,360	52,689
Per capita flow, lcpd	160	160	160	160	160	160
BOD_5	350	375	406	438	469	500
BOD5, kg/day	1,787	2,122	2,581	3,082	3,627	4,215

A typical BOD_5 loading rate for stabilization ponds is 100 kg/ha/day. Dividing this rate into any of the values for BOD in Table 1 shows that the space requirement—for net stabilization pond area—ranges between 18 and 49 hectares, more than an order of magnitude greater than the 2.1 feddans = 0.88 ha at the Mehalet Engak WWTP site, or than the 3.5 feddans = 1.47 ha available at the Telbana WWTP site.

To treat the wastewater from Telbana's 60,000 people on only 3.5 feddans, and Engak/Busat's 55,000 people on only 2.1 feddans, to the standard required by Egyptian environmental regulations, is a challenge addressed in part by a study of alternative treatment processes ("Basis of Design & Technology Selection for Village Wastewater Treatment Plants, Daqahliya Governorate," Final Report, July 2007). Essential points from that study are summarized below.

Key Process Selection Factors and Criteria

Land Requirements: Balancing land requirements for simple but land-extensive systems versus land-compact but mechanically more complicated systems are the major consideration. This is true not only for the wastewater treatment stream but also for sludge conditioning and management.

Performance and Reliability: Technologies should be suitable for the social and economic conditions in the region. They should be easy-to-operate, simple, proven and dependable systems.

Costs: Operational cost is a major consideration to assure sustainability in addition to the initial capital investment concerns.

Ease of Implementation: The project should be able to be implemented under the prevailing local conditions. Operation and maintenance activities should be easily supported with locally available personnel.

Performance: Wastewater characteristics and related regulatory effluent limits also determine process selection. The national effluent limits of 60 mg/L for BOD_5 and 50 mg/L for TSS translate to removal efficiencies of 88% and 92%, respectively. The practical implication of the required BOD_5 removal rate (based on ultimate 2030 loads) is that biological treatment processes of high efficiency are needed. (Nitrogen and phosphorus are not presently regulated for municipal effluent.)

Further characterization of the BOD_5 and TSS in terms of inert and organic content is useful in developing the design basis for treatment processes and estimating sludge production on a rational basis. There being no analytical data available, it was assumed:

- that 40% of the 500 mg/l BOD, or 200 mg/L, will be in soluble form while the remaining 60% (300 mg/L) will be associated with solids that can be removed by filtration;

- that the 600 mg/L TSS consists of 60% (or 360 mg/L) volatile suspended solids (VSS) and 40% (or 240 mg/L) inert solids.

These assumed values are within the range of typical values.

Process Trains and Layouts

The consultants examined several treatment technologies that make more intensive use of land:

- The sequencing batch reactor (SBR),
- The trickling filter (TF), and
- The STM-Aerotor.

All three processes were examined with, and without, primary treatment. In the comparisons, there was emphasis on practical design and implementation issues, particularly space and land requirements.

Wastewater treatment trains

Each of the process trains has the following main components:

- **Preliminary treatment** consists of static bar screens followed by a hopper-bottom grit removal tank, and a flow meter;

- **Primary treatment** (when used) would reduce the load to the biological treatment stage and its size; on the other hand it would increase the volume

of raw primary sludge with a high concentration of pathogens. To be sure, primary sludge can be thickened more easily. The actual benefit trade-offs depend on the individual process trains.

- **Biological treatment** components vary in technology, and define the options to a great extent.

- **Final clarification** is standard in all cases. Except that SBR decant tanks inherently have final clarification capability. However, this advantage is partially offset by the need to provide an effluent equalization basin to reduce high flow rates to the disinfection stage and to the receiving waters.

- **Disinfection** in a contact tank providing 15 minutes of detention.

Following the sizing of the process units, layouts were developed for the two WWTP locations. Wherever possible, compactly located rectangular process tanks (as opposed to circular ones) were used to make the best use of the limited space available.

The STM-Aerotor option without primary clarification is recommended for implementation because, among the three options with and without primary clarification:

- It has the smallest footprint;

- It uses relatively simple equipment that is generally available locally and is supported by local equipment representatives and/or manufacturers;

- It has the lowest present-value cost.

- Has been used in Nile delta villages with success

Sludge Management and Disposal

Estimates of sludge quantities were based on a rational method of determining typical levels of inert solids, organic solids and soluble solids in the influent, as well as the soluble BOD level. This allows a more precise estimate of sludge quantities from various process trains and sludge treatment options, compared to "rule-of-thumb" assumptions.

For sludge thickening, a simple gravity process consisting of a hopper bottom tank with a mechanical raking mechanism was selected for being highly cost-effective yet providing the adequate thickening for application to drying beds. Mechanical thickening options that were evaluated provided no benefits for the simple reason that they did not bring a reduction in required sludge bed area.

Sludge digestion, both anaerobic and aerobic**,** was considered, not only for its stabilization benefits, but also as a means to reduce sludge quantities. However, it

was found that digestion options are not attractive for this project not only because of cost and complexity, but also because the benefits are marginal, particularly with processes that do not produce primary sludge.

Sludge drying beds provide a dry sludge product suitable for transport to the ultimate disposal site. The conceptual design and layout of the beds received particular attention because of the large land area required to accommodate the beds. The quantities of sludge to be produced by the process options were estimated on the basis of the inert and organic soluble and non-soluble fractions of the waste load and the corresponding typical sludge yields.

Mechanical dewatering devices were eliminated from further consideration because of complexity and high energy requirements and chemical cost.

Sand filter drying beds with underdrains were selected because of their inherent ability to thicken by filtering as well as by atmospheric drying. They thus require less land than beds that have very limited filtering capability such as concrete bottom beds. In fact, dewatering by filtration will become the main dewatering mechanism in Daqahliya's cool and rainy winter season.

It should be noted that to minimize the bed area required, the design loading adopted for the sludge beds (120 kg/m^2/year) is at the very high end of the range of typical values. *This loading is possible only with careful operation and maintenance of the sludge beds and timely removal and transport of dried sludge offsite.* Excess sludge must be loaded to cleaned beds every day or two. Otherwise, sludge layers will build up and beds will turn into storage basins of only a few months' capacity.

Despite these efforts to reduce bed area, large bed areas are still required.

Need to identify ultimate sludge disposal site or reuse location

The dried sludge would be removed after an average of 30 days and transported off-site for ultimate disposal or agricultural use. The ultimate disposal site or reuse location (and users) need to be identified, and to conform to Law 48.

Need to acquire more land

The combination of population growth and an increase in BOD concentrations will gradually increase loads on the WWTPs. That the increases are expected to be gradual allows one to consider a phased implementation of certain units.

Potential phasing of the land intensive sludge beds is a major early planning issue, given that the land areas for the WWTPs are limited.

Availability of additional land, particularly for the Mehalet Engak cluster, needs to be determined. The presently proposed site for the Mehalet Engak WWTP affords only a fraction of the area needed for sludge drying beds.

The site for the Telbana WWTP is sufficient in the short term, after which additional adjacent land is needed to construct sludge drying beds.

6.3 No-Action Alternative

Under certain circumstances, the option of taking no-action at all must be weighed against more assertive proposals for action, usually when such proposals have evident and potentially serious adverse environmental impacts. However, the proposed actions, as described herein, are seen to promise distinctive benefits with only minor adverse effects during the project implementation.

As population and density within the villages increase more residents would rely on either site systems or the wastewater collection system currently installed or under construction within each of the villages. The volumes of wastewater will increase and the current practice to dispose of the collected wastewater to drains and canals will continue to cause health and environmental risks throughout the area. Without proper treatment facilities to receive and discharge treated effluent appropriately, the aesthetic quality of the drains and canals will continue to deteriorate and generate nuisance odor problems. The reuse of untreated wastewater that enters the drains and canals for irrigation and domestic uses will further result in serious health problems for residents and livestock not only within the village areas but also to villages downstream of the wastewater discharge locations.

Although construction activities for facilities of this type will cause short term and intermittent impacts to the surrounding area, they can be mitigated through proper practices on site and through contract monitoring.

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

7 Environmental Management of Wastewater Services

7.1 Introduction

For these two wastewater improvement projects there are few if any issues of environmental controversy. Sewerage has been installed throughout most of these outlying villages. The wastewater collected now has to be pumped to wastewater treatment works. In each of the two village clusters, a site has been selected for a wastewater treatment plant (WWTP). Once put into operation, the 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, and the disintegration of buildings. The villagers welcome the service.

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

The proceedings of the joint Scoping Session for the Daqahliya village clusters, held in Mansoura on May 24, 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, and in writing from the Egyptian Environmental Affairs Agency, are listed therein. The significant issues emerging from the scoping process, and the proposed means to address them and monitor them, are discussed below.

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.

7.2 During Planning and Design

Effluent quality from the treatment plants must meet the regulations set out in Article 61 of Law 48**.** The EEAA must be asked for approval to discharge the effluents to drains. Sewage sludge must be disposed of safely, according to regulations for its reuse.

Stream crossing design must consider all aspects and related decrees of Law 48. All approvals and acceptances for such a structure must be in place before construction.

Provisions of the Antiquities Law will be incorporated into contract documents to ensure that any antiquities located during construction will be handled as required**.** If known antiquities lie within 3 km of a project site, a digging permit must be obtained from the Supreme Council on Antiquities.

7.3 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, 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. To the greatest precision and detail feasible, the quality control and quality assurance procedures to be followed during construction, including environmentally-oriented tasks. Specific environmental contract issues include observance of Egyptian occupational safety and health regulations, public safety, traffic control and interruptions of passage; protection of buried and unburied utilities (gas, electricity, water, telephone;) antiquities**,** pest control, and dust control. spill control, and site cleanup during decommissioning. Provisions to address requirements of pertinent laws and regulations will be

incorporated into contract documents to ensure that these issues will be handled as required during construction.

In preparing his bid, the contractor is to consider each specification carefully, and cost it out. At the core of the environmental management process, the developer's contract manager is assigned and empowered to monitor the contractor's compliance with each item in the specifications—and pay the contractor for it only when the item is completed to satisfaction (Appendix D).

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 contract manager 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.

Stream crossings may be of concern, in that a poorly constructed force main could leak raw wastewater into a drain, canal, or river. At Telbana, for example, the proposed WWTP site is across the El Nezam Drain from the service areas. More importantly the proposed WWTP site for Mehalet Engak is located along a canal that will require crossings to convey wastewater to the treatment facility from the villages.

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.

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

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.

7.4 Operation, and Monitoring of Operation

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

- health and safety for workers and community;
- any complaints of excessive odor or noise from the pump stations or treatment works;

- any complaints of insect pests such as mosquitoes or flies attributed to the treatment works;

- safe and appropriate disposal of sludge, including regulation of sludge reuse (as to application to which crops, and rate of application, e.g. kg/ha/year);

- reports of leaks in the force mains, and the promptness and quality of repair of the leaks;

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

Routine monitoring would be by DDWSC as the local operating agency, with periodic oversight by NOPWASD at the national level.

7.5 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 levels are the villagers, who, along with their representatives, have indicated a clear desire for an improved living environment in their villages and in the area 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
    - Operating entity, DDWSC
- 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 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. International aid agencies such as USAID provide funding and technical support through NOPWASD.

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.

DDWSC leadership, DDWSC 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 at the local level is the Daqahliya Drinking Water and Sanitation Company (DDWSC). As noted just above, operation and maintenance are the responsibility of regional and local authorities. NOPWASD's intention to conduct periodic inspections should be welcomed by DDWSC, but in practice the responsibility for satisfactory environmental service to the Governorate and its inhabitants rests with DDWSC.

For environmental monitoring in general and to handle specific environmental issues that arise, the DDWSC may wish to convene a committee comprised of Governorate-level representatives of the national agencies, representatives of DDWSC and relevant 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 DDWSC 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.

8 Final words

Pumping the collected wastewater to treatment plants that have capacity to take it is a project with relatively little environmental controversy. Still, there is significant challenge in planning, designing, constructing, operating, and maintaining these systems in a manner that is structurally, functionally, and environmentally sound.

Appropriate treatment technology. Elsewhere in rural Egypt (and in the Canal Cities as well), stabilization pond WWTPs have been working well. Their operation is stable, and operation costs are low, and maintenance requirements are minimal.

In the intensely cultivated Nile Delta, however, the space required for stabilization ponds is not affordable. The space available at each of the Daqahliya village cluster sites is far too small for stabilization ponds. Therefore, following a study of feasible

alternative treatment processes that require less land per capita, the plan is to use the STM-Aerotor system.

More land for treatment. The treatment process chosen can be fit onto the land allotted for treatment, but more land is needed, particularly for Mehalet Engak/Busat Kareem El Deen, for proper sludge thickening and dewatering.

Responsibility rests with the DDWSC. Through the planning, design, and construction stages there will be support and guidance from USAID, NOPWASD, and numerous other national ministries and agencies. Thereafter some support and guidance from NOPWASD will remain.

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 DDWSC.

9 References

"Basis of Design & Technology Selection for Village Wastewater Treatment Plants, Daqahliya Governorate," Final Report, July 2007.

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"Daqahliya Village Wastewater Conveyance System—Conceptual Evaluation," CDM/AAW, July 2007.

"Final Environmental Assessment Report for Mansoura: Water distribution, wastewater collection & conveyance, and water treatment," prepared for USAID by Camp Dresser & McKee International Inc., with Dr. Ahmed Abdel-Warith, Consulting Engineers, Project No. 263-0236-3-940024 &A.I, March 1997.

APPENDIX A

LIST OF GOVERNMENT AGENCIES AND OTHER ORGANIZATIONS CONSULTED BY THE ENVIRONMENTAL TEAM

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

- Daqahliya's Office of the Governor
- NOPWASD Office of Chairman and representatives
- Daqahliya Drinking Water and Sanitation Company, the operating entity
- The various Village representatives
- Representatives from the Ministry of Water Resources and Irrigation

APPENDIX B

THE SCOPING SESSION

B.1 Presentation of the Project

The scoping session was held on 24 May 2007 at 11:00 am in the Conference Room of the Ramada Hotel located in Mansoura 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 Tawfik Abdel Meged Tawfik, on behalf of the Governor, 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 Daqahliya Wastewater Village projects, the EA process and the potentially significant environmental issues. Comments, both verbal and written, were received following the presentation and have been summarized herein. The Scoping Session meeting was closed by the General Secretary.

B.2. List of Invitees to Scoping Session

The Office of the Governor through the Daqahliya'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 in the Scoping Session

FAIR TRANSLATION

Dakahlia Governorate
National Organization for Potable Water and Sanitary Drainage
Study Workshop for the Environmental Affects
Wastewater Works, Dakahlia

Attendance Sheet

Minutes of Meeting Date 24-May-07
Venue Mansoura Ramada Hotel

S.N	Name	Firm/ Organization	Tel. No
1	Sherin Mohamed Osman	Deputy City Council, Sinblawin	016 390 3530
2	Tawfik Samieh Tawfik	Petro Jet, Telbana City Inspection	050 201744
3	Samir Marawn	Consulting Engineer	2231519
4	Mohamed El-Arnaouty Abdel Ghani	Akrad City Mayor, Mansoura	2295888
5	Zidan Mohamed Saad El-Din	Health Department, Mansoura	2013057
6	Adel Dardier	City National Party	1205016
7	Wafik Abdel Sadek Ibrahim	Chief, Local Council, Kom El-Derby	2034301
8	Abdel Muniem Abdel Salaam	Environmental Div., Kom El-Dris	2061438
9	Ahmed Mahmoud Abou El-Maaty	Teacher, Holy Azhar	2191317
10	Mahmoud Abdul Aziz Ibrahim	Staff, First Police, Mansoura	2012500
11	Fawzia Mohamed El-Sayed	Sherbin Irrigation, Dakahlia	2312387
12	Mahmoud El-Gohary Salem	NOPWASD	3023047
13	Ihab Mohamed El-Baz	NOPWASD	2255014
14	Ali Fatouh Abbas	Political Committee, Mansoura	012 784 3909
15	El-Sayed El-Iraqi	Citizen, Akrad Village	2012946
16	Abdel Kader Shawki Ibrahim	Teacher, Tech Council, Kom El-Derby	2012413
17	Souma Abdel Basit Abdel Hamid	Women Div. Met El-Akrad	2012413
18	Ibrahim Fawazi Hafiz	Environmental Manager, Sherbin	010 831 3447
19	Hamid Ibrahim Awad	GM, Wastewater Tech Support	010 432 1400
20	Mraghi Abdel Atti Nasar	Personal Affairs Manager, Dakahlia	010 400 3149
21	El-Sayed Fahim Ramadan	Deputy Mayor, Met El-Akrad, Mansoura	2010487
22	Hamid Mohamed Hamid	Member, Local Council, Kom El-Derby	2010651
23	Awad Mohamed El-Morsy	Senior Researcher, East Delta Sector	2251113
24	Muawad Mohamed El-Sayed	Electricity Works Manager	2153256
25	Mohamed Ragab El-Amin	Procurement Sector Manager	2241046
26	Mamdouh Ahmed Hafiz	Sector Manager	2312320
27	Mohamed Raied Abdel Salaam	Lab. Manager, Dakahlia Potable Water Co.	2268112
28	Zainab Mahmoud Abdel Latif	Central Wastewater Lab Manager	2244311
29	Hisham Abdel Razik El-Sayed	Deputy, Wastewater Dep. Mansoura	2372873
30	Nagy Hassan Habib	Deputy, Ministry of Health	22173394
31	El-Diety El-Diety El-Hadidy	Wastewater Manger, MOF Housing	2070084
32	Sabry Ba-Ali Ahmed	National Party, Kom El-Derby	2010609

FAIR TRANSLATION

Dakahlia Governorate
National Organization for Potable Water and Sanitary Drainage
Study Workshop for the Environmental Affects
Wastewater Works, Dakahlia

Attendance Sheet

Minutes of Meeting Date 24-May-07
Venue Mansoura Ramada Hotel

S.N	Name	Job Title	Tel. No.
33	Ahmed Mahmoud	Engineer	2013229
34	Mohamed Sulaiman Mohamed	Chief, Agriculture Community, Kom El-Derby	2012999
35	Mahmoud Abdou Mohamed	Kom El-Derby	2267560
36	Saad Mohamed Abdel Gawad	Deputy, Local Council, Sherbin	7920005
37	Hany Mohamed Abdel Hamid	Manager, Station No. 27	2375309
38	Abdul Fattah Abou El-Khair	Financial Dep Manager	2332100
39	Abdul Hakeem El-baz Mahmoud	Deputy Manager, Met Khamis Potable Water St.	2221347
40	El-Said Ismail El-Said	Member, Governorate Local Council	2011889
41	Samir Abdul Aziz El-Shafie	GM Water & wastewater East Region	
42	Ezzat Ibrahim El-Sayed	Mansoura Sector Manager	050 221 7702
43	Fekry Abdul Meteleb Ali	Manager, Mansoura Water Utility	050 221 7702
44	Raafat Mehrez	Manager, Station No. 11	050 2217702
45	El-Sayed Omer Hussein Eid	Deputy Manager, East Mansoura Water Station	050 2217702
46	Adel Erfan Shalby	Manager, Water & wastewater Plant	2313605
47	Ramadan Rashad	Potable Water Sector	
48	Ramadan Siam	Potable Water Sector	2215560
49	Nabieh Abou Fotouh Abdel Meteleb	Deputy, Mansoura Sector	2532299
50	Moustafa Samir Mohamed Ali	Health Department, Infecting Diseases	2349267
51	Zainab Abdel Hakim	Health Department, Environment Div.	2235379
52	El-Sayed Fawzi El-Sayed	National Party	2061179
53	El-Sayed Mahmoud Abdel Hak	Wastewater Sector Manager	010 6944679
54	Adel Abdel Salaam Osman	Water & Wastewater Co.	010 8193562
55	Antar Mohamed Ahmed	Water & Wastewater Co.	010 3120371
56	Hamdy Mohamed Ali El-Saraf	Water & Wastewater Co.	010 7052233
57	Mohsen Mohamed El-Hossainy	NOPWASD	010 3431122
58	Abdel Hamid Abel Azem	NOPWASD	010 5307807
59	Sulaiman Metwaly	NOPWASD	010 5277424
60	Abul Galil Abdul Galil	Local Council, Karim Besat El-Din	7928976
61	Gamal El-Nabawi Ibrahim	Local Council, Karim Besat El-Din	
62	Mohamed Abdel Ghafar	Local Council, Karim Besat El-Din	
63	Ahmed Abdel Megid El-Bakry	Local Council, Karim Besat El-Din	
64	Refaat Redwan Salaam	Local Council, Karim Besat El-Din	
65	Saad Abdel Baki Sayed	Local Council, Karim Besat El-Din	
66	El-Sayed Alaa Ibrahim	Wastewater Dep	2326269
67	Hassan Khalid Hamad	Member, Shoura Council	012 744 2427
68	Noha El-Maraghy	USAID	5226772
69	Moheb Anwar	Dep. Manager?	010 636 9683
70	Hassan Mohamed Ismail	Sherbin City Manager	010 424 2602

FAIR TRANSLATION

Dakahlia Governorate
National Organization for Potable Water and Sanitary Drainage
Study Workshop for the Environmental Affects
Wastewater Works, Dakahlia

Attendance Sheet

Minutes of Meeting Date 24-May-07
Venue Mansoura Ramada Hotel

S.N	Name	Job Title	Tel. No.
71	El-Sayed Nagi Ismail	Ministry of Irrigation, Dakahlia	010 380 0843
72	Ibrahim Mohamed Badr	GM. Southern Dakahlia Irrigation	010 444 1742
73	Hamdi Abdel Ghani Nasar	met El-Akrad	2013686
74	Tarek Fathi Abdel Hamid	Legal Researcher, West Mansoura	2012453
75	Mohamed Eid Murad	Admin Manager, Met El-Akrad School2011175	
76	Moheb Abdul Aziz	National Party, East	010 891 9280
77	Abdul Rahim Awad	Governorate Council Member, Sherbin	010 332 2553
78	Samir Mohamed Abdel Maksoud	Sherbin, Local Council Chief	010 578 5672
79	Mohamed El-Saad Zohry	Member, Local Council	010 344 8616
80	Nevin Mansoura Safaan	Public Relation Manager, Potable Water Co.	012 165 5600
81	Walaa El-Awad Abdel Hamid	Public Relation Dep., Potable Water Co.	
82	Raafat Wafaa Ismail	Ministry if Agriculture, Dakahlia	2244124
83	Fiad Mohamed Fiad	Researcher, Ministry of Agriculture, Dakahlia	010 413 5133
84	Abdul Aziz Abdul Aty	GM, Mansoura Water Treatment Plant	010 400 2403
85	El-Fouly Abdel Rahma	GM, Agriculture Dep. Sherbin	010 175 6850
86	El-Sayed Abou El-Naga Mohamed	Engineer, Agriculture Dep.	010 223 6893
87	Faisal Helmi Ahmed	GM, Chemical labs, Ministry of Health	010 416 1788
88	Samia Helmy El-Sayed	Health Dep. Mansoura	010 381 7990
89	Alla El-Din El-Bakry	Member, Local Council, Besat El-Din	010 686 3184
90	Ahmed Mohamed Ibrahim	GM, West Dakahlia Irrigation	050 2523087
91	Azza Fahmi	Manger, El-Wafd Newspaper, Mansoura	050 2310675
92	Abdel Hamid Abou El-Ainain	Middle east news Agency	2373986
93	Ahmed Mohamed Abbas	GM, Mansoura Irrigation	010 825 8358
94	Ekhlas Yousef	Manager, West Wastewater Station, Mansoura	012 782 0607
95	Ahmed Mohamed Nashid	Public Relation, Water & Wastewater Co.	012 016 5600
96	Heba Ali Mousa	Public Relation, Water & Wastewater Co.	012 016 5600
97	Yousef Mahfouz Yousef	Staff, West Wastewater Station, Mansoura	
98	Mamdouh El-Raee	Regional Manger	
99	Mohamed Gebriel	Wastewater Manager	
100	Mohamed Shaban	Wastewater Manager	
101	Ezzat El-Sayed	GM, Sector Mansoura Sector Manager	
102	El-Sayed Fathi El-Sherbiny	Agriculture Dep. Dakahlia	016 349 9370
103	Osama Mosaad Kamel	Agriculture Dep. Dakahlia	010 456 6332
104	Mohamed Mahmoud Abdel Rahman	Chief Technical Local Council, Governorate	
105	Mohamed Gamma El-Shahawy	Deputy, Governorate Local Council	

FAIR TRANSLATION

Dakahlia Governorate
National Organization for Potable Water and Sanitary Drainage
Study Workshop for the Environmental Affects
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Attendance Sheet

Minutes of Meeting Date 24-May-07
Venue Mansoura Ramada Hotel

S.N	Name	Job Title	Tel. No.
106	Mohamed Moustafa	Committee Chief, Water & wastewater Co.	
107	Mohamed Mahmoud	Chief, Local Council, Dakahlia	
108	Omer Zidan lashin	Wastewater	
109	Tarek Fathi Abdel Hamid	Water & wastewater Co.	
110	Salaam Mohamed Ahmed	Dakahlia Co.	
111	Mohamed Mohamed El-Said	Dakahlia Water Co.	
112	Sonia William	Dakahlia Water Co.	
113	Ibrahim Ismail ElSantawy	Dakahlia Water& Wastewater Co.	
114	Mohamed Fathi Nasar	Youth Center, Akrad	
115	Mansour Abou Maaty	Assistant GM, Governorate	
116	Hassan El-Sayed Ahmed	GM. Financial Affairs, Governorate	2527574
117	Mohamed Abdel Aaty	GM, Personal Affairs, Governorate	
118	Atif Ahmed El-Meniawy	GM, Environment, Dakahlia	23294724
119	Amira Maher El-Abd	Potable Water Co.	012 8821273
120	Imam Mahdy Tantawy	Potable Water Co.	
121	El-Sayed Galal Mahmoud	Chief, technical Local Council, ,Mansoura	012 3419887
122	Mohsen Saleh Qoura	School Manager	2010205
123	Kasem Ramadan	Senior Teacher, Telbana Primary School	2010405
124	Magdy El-Sayed Mohamed	Senior Teacher, Telbana Primary School	2013990
125	Mohamed Mohamed Moustafa	Deputy Manager, Telbana Primary School	2011992
126	Abdel Hady Mohamed Ali	Legal & laws, Telbana	2013506
127	Ahmed Abdin	Chairman, PEA, Dakahlia	010 3448510
128	Hiam Mohamed Shalby	NOPWASD	012 2375784
129	Munir Hassan Qoura	Member, Telbana Local Council	
130	Yousef Abdel Razik	GM, Health Dep. Dakahlia	012 2876362
131	Mamdouh Mohamed Mohamed	Chief, Technical Pool, Local Council	016 3464338
132	Hany Salah Ibrahim	Producer, Egyptian TV	012 2357080
133	El-Sayed Saad	NOPWASD	
134	Samira Nicola	NOPWASD	
135	Moustafa El-Tayeb	CDM/AAW	
136	Richard Minkwitz	CDM/AAW	
137	Ashraf El-Sayed	CDM/AAW	

The meeting headed by the General Sercretary, Dakahlia Governorate

B.4. Issues Presented at the Scoping Session

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.
- Consider operation and maintenance activities at these new pump stations, e.g. problems of noise.

B.5. Verbal Comments Received at the Scoping Session

Remarks from the Community are set in italics; the Consultant's responses are not italicized.

Land allocated and availability for the proposed treatment systems

The community contributed in providing land for the proposed WWTPs and is willing to support the project to cover the deficit in the collected data or any other related subject.

The allocated land might not be sufficient to accommodate non-mechanical treatment system for sludge. Using mechanical system to treat the sludge would need power, high relative running cost and high skilled staff which can not be afforded. So, it is recommended to use a non-mechanical treatment system for sludge, which will require another 2 to 3 feddans of land.

The community is willing to help in allocating more land for the most appropriate treatment system for sludge.

Appreciation from the project area (proposed served villages)
The community of the project area appreciates the proposed activities supported by USAID.

Quality of the treated effluents

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

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

Safety for workers and pest control

The project management should consider the safety of the workers and the community that live near by and to take mitigation measures for pest control at WWTP site.

The EIA study will include a chapter in the Environmental Management Plan (EMP) which will cover all types of mitigation measures related to the project activities to be considered during the construction and operation phases.

Concerns about bad construction

Some of the previous sanitation projects took six (6) years to fully implement and there was evidence and complaints of bad construction. The community is afraid of repeating these problems for the new proposed projects.

Previous projects were implemented under Direct Orders without sufficient funding to construct and manage the work effectively. The new Minister is not allowing for the use of Direct Orders and ensures that funding is appropriate for any new work. USAID projects are funded in advance of the work at levels that are sufficient for quality work and timely completion. All previous projects that USAID has funded with NOPWASD have been completed on or ahead of schedule.

Need for accurate data during the design phase

There is a need to have and use accurate data during the design phase to ensure an appropriate and effective treatment system.

Of course this is a very important issue and is currently being considered by all parties in the design phase. There is always a need to have a full cooperation between the design team and relevant authorities to:

- Have information about utilities and services provided in the project area;
- Be sure that the utilities within the project area will not be impacted by the project activities;
- Collect available data needed in the design phase.

USAID support allocated to the Daqahliya Governorate

The USAID support allocated to the Daqahliya Governorate is relatively low and the community would appreciate additional funding support.

It should be noted that previous USAID funding for water/wastewater work in Daqahliya during the period 2000 to 2005 amounted to approximately US$ 70 million. The budget allocated for this USAID funded Program can cover two cluster villages in the Daqahliya Governorate, so that other Governorates under the Program can receive appropriate funding as well. However, NOPWASD is implementing a national program for the sanitation of Egyptian villages in rural areas that will be funded by the Government of Egypt in the amount of 20 Billion LE to address wastewater issues within the Governorates.

What are the selection criteria of the two cluster villages?

The priority was made based on those villages which are currently served by a sewerage system and pump stations. Therefore, the need is great for the wastewater treatment plant to address the direct discharge of untreated wastewater into the drains.

Do the funds allocated for the proposed project for the two cluster villages cover all proposed activities?

USAID confirms that the fund will cover the proposed activities for the two cluster villages.

Other villages subject to subsurface water problem

Other villages suffer from subsurface water problems and stagnant water in the residential areas. Therefore, there is a need to have wastewater collection systems as soon as possible for other villages.

Other villages will be given a priority under the NOPWASD program for rural areas of Egypt.

Work Force

The construction contractors should employ local citizens and take advantage of local resources within the villages when implementing the proposed projects.

Contractors usually use local citizens and resources near the project sites to perform the work. The Governorate has indicated that they will work to make sure local citizens and resources are used to the maximum extent possible.

B.6. Comments received in writing

Fair Translation of a Letter (see following page) from the Environmental Affairs Agency to the Undersecretary of Daqahliya Governorate

Egyptian Environmental Affairs Agency
Central Unit for Environmental Impact Assessment

To: General Undersecretary - Daqahlyia Governorate

Reference to your letter dated 4th of August 2002 and the attached information on wastewater treatment system for Busat Kareem Eldeen of Sherbeen Daqahlyia.

EEAA would like to express his no-objection on the proposed WWTP conditionally that the project should follow all procedures and requirement for such project, law 4 for 1994 and its bylaw and committed to the followings:

- The maximum allowable limits for noise levels stated in annex (7) of the bylaw of law 4 for year 1994 for both construction and operation phases of the proposed project;
- Health and safety conditions for workers stated in annex (9) of the bylaw of law 4 for year 1994 for both construction and operation phases of the proposed project;
- Isolating the pond sides and bottoms to prevent any seepage from the treatment lagoons and not to pollute the subsurface water and groundwater;
- Safe disposal of treated sludge and ministerial regulation for handling the sludge and reuse;
- The treated effluents reuse should meet the requirement for Article 61 - law 48 of year 1982 and getting approval form Ministry of Water Resource and Irrigation for effluent disposal into the open drainage system (Upper Serw Drain);
- Mitigate pest at WWTP site;
- Conduct a regular following-up and monitoring program for the treated effluents;
- Having an environmental record for auditing at the WWTP

General Secretary Translation

General: Ali Abu Sedera

Arabic Letter

B.7. 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 sewered 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.8. 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.
- **Demographic and migration impacts—presence of the project facilities.** No appreciable impacts on the size or distribution of the population of the subject villages at present or in the future is anticipated. The improved living conditions may result in slight population increases.

B.9. Schedule for Preparing the Environmental Analysis

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

B.10. Proposed Approach to Address Significant Issues

Significant issues will be addressed as follows:

- Coordination among NOPWASD, DDWSCO, 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.

- Area for WWTP is limited……

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, including failure to immediately reduce a discharge presenting an immediate danger of pollution or failure to install treatment yielding appropriate effluent quality within three months. The law gives MWRI administrative and police

authority over implementation. The Ministry of Interior's Water Police also have police powers, and the Ministry of Health has a standard-setting and discharge-monitoring role.

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

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

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

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

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

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

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

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

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

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

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

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

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

C.1.2.2 Administrative Framework

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

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

- Issue and cancellation of discharge permits into Egyptian waterways, which include the Nile, canals and drainage networks, lakes and groundwater reservoirs;

- Inspection of wastewater treatment facilities;

- Monitoring of intake sites for potable water treatment plants as well as municipal and industrial discharges;

- Ensuring that proper samples and analyses of discharges are carried out by the Ministry of Health; levying of fines for non-compliance;

- Setting regulations and specifications for discharges into water bodies;

- Issue and overseeing of licenses for new waste treatment units in floating vessels;

- Issue of licenses for the construction of any establishment that directly discharges into waterways.

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

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

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

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

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

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

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

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

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

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

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

Ministry of Industry and Mineral Wealth. Within the Ministry of Industry and Mineral Wealth (MIMW), the General Organization for Industrialization (GOFI) supervises pollution control, safety and health issues in industry through its General Department for Environmental Protection. It also ensures that new plants include industrial waste treatment units. MIMW decree No. 380 of 1982 requires compliance with all applicable environmental laws, regulations, and standards as a condition for granting industrial licenses. A clause to this effect is written into all industrial licenses granted by the MIMW, committing the industry to taking the necessary

preventive measures, such as installing necessary control equipment. However, GOFI does not perform any inspections at industries and therefore does not monitor whether industries are actually in compliance with these license requirements.

Ministry of the Interior (MoI), Egypt's national police force, has maintained the Inland Water Police, a special police force for enforcement of Law 48 and protection of the environment in general. The Inland Water Police provide guidance to citizens and take enforcement actions for violations of environmental laws. Law 4/1994 provides additional authority for this environmental police force, specifying that the MoI shall form a police force specialized in environmental protection within the ministry and in its Security Departments in the governorates (Article 65 of the executive regulations).

C.1.3 Institutional Arrangements

C.1.3.1 Existing Strategies and Policies

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

(i) optimal use of available water resources;

(ii) water quality protection and pollution abatement;

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

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

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

Furthermore, the Ministry of Agriculture and Land Reclamation has adopted a plan to reduce agricultural agrochemical use. Subsidies on fertilizers and pesticides were removed and some agricultural chemicals with long-lasting negative effects were banned. Biological and genetic

engineering techniques were introduced as pesticide replacements. Among the achievements of this plan is a noticeable decline in the use of nitrogen and phosphorus fertilizers.

C.1.3.2 Responsibilities

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

The main ministries and agencies are:

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

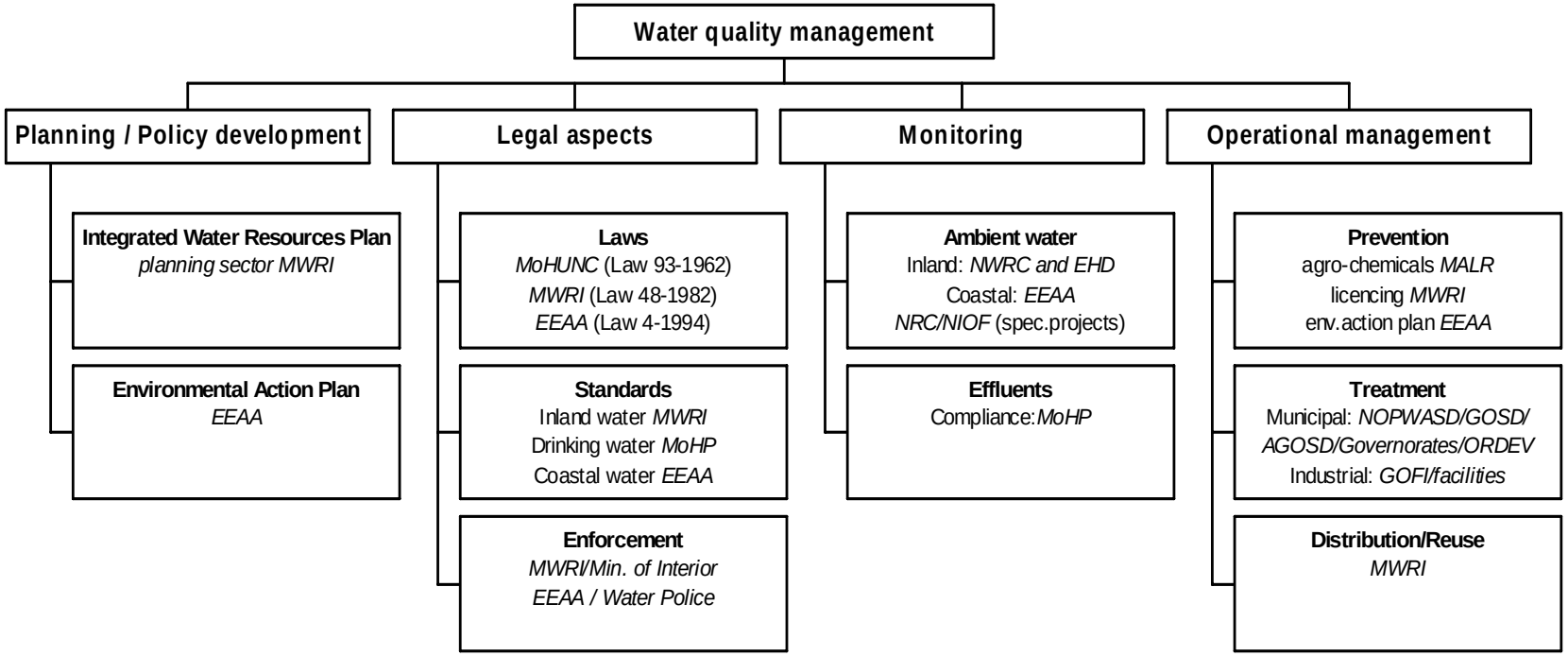


Figure (C.2.): Institutional framework for water quality management in Egypt

C.2 Law 4 of 1994

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

LAW NUMBER 4 of 1994

PROMULGATING

THE ENVIRONMENT LAW

EGYPT

Table of Contents

C.3. Law No. 48 of 1982

(presented hereunder in its entirety)

EGYPT

LAW NO. 48 OF 1982

CONCERNING POLLUTION PROTECTION OF THE RIVER NILE AND THE WATER CHANNELS

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

Article 1

To be applied in what is considered water channels

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

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

c) Underground water reservoir

Article 2

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

Article 3

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

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

If the analysis result does not meet with specifications and measures fixed in the law regulations and has a direct dangerous pollution effect on the water channels, the Ministry of irrigation will advise the concerned to stop causes of pollution, otherwise the Ministry will carry out the operation on the concerned account or will stop drainage administratively.

Article 4

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

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

Article 5

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

Article 6

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

Article 7

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

Article 8

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

Article 9

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

Article 10

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

the water channels, according to measures decided by the Ministries of Agriculture, Irrigation and Public Health.

Article 11

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

Article 12

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

Article 13

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

Article 14

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

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

Article 15

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

Article 16

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

Article 17

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

Article 18

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

Article 19

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

Article 20

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

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

(HOSNY MOBARAK)

C.4. 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.

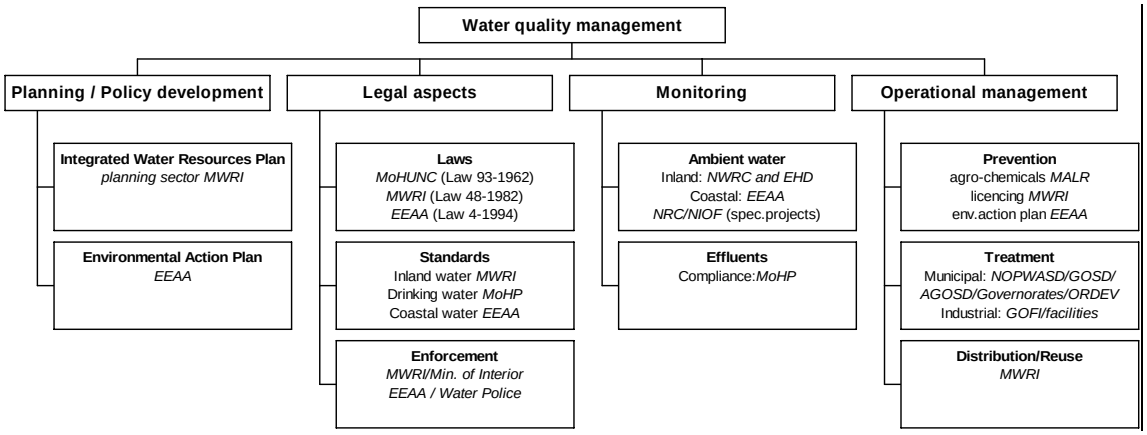
Furthermore, the Ministry of Agriculture and Land Reclamation has adopted a plan to reduce agricultural agrochemical use. Subsidies on fertilizers and pesticides were removed and some agricultural chemicals with long-lasting negative effects were banned. Biological and genetic engineering techniques 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).

Figure C.4.1. 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.4.2. 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
LIST OF EA CONTRIBUTORS AND THEIR DISCIPLINES

This report was prepared by:

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APPENDIX F

WASTEWATER INFLUENT QUALITY FOR VARIOUS WWTPS IN DAQAHLIYA

CDM International Inc.
consulting engineering construction operations
in association with
Dr. Ahmed Abdel-Warith
Consulting Engineers

FIGURE 1. - LOCATION MAP
DAQHLIYA GOVERNORATE

USAID
FROM THE AMERICAN PEOPLE

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

Dakahlia Water and Wastewater Co.
Reports for WWTP Averages Monthly Influent Parameters

Item	Description	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	AVR	MIN.	MAX.	STDEV.
	Mansoura WWTP																
1	Design Capacity (1000 m3 /Day)	135												135			
2	Actual Capacity (1000 m3 /Day)	145	145	137	137	137	138	138	138	138	138	138	138	139	137	145	3
3	BOD (mg/l)	230	284	247.5	283.83	288	282	327.6	307.8	273.8	345	309	239	285	230	345	35
4	TSS (mg/l)	193	244	228	235	235	244	270	209	269	265	276	266	245	193	276	26
	Aja WWTP																
1	Design Capacity (1000 m3 /Day)	10												10			
2	Actual Capacity (1000 m3 /Day)	4.75	4.75		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.55	4.5	4.75	0.1
3	BOD (mg/l)	224	309		354	331	284	329	257	316	280	340	180	291	180	354	53
4	TSS (mg/l)	226	256		245	377	311	345	307	245	185	235	250	271	185	377	57
	Batri WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	2.23	2.23	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.45	2.23	2.5	0.1
3	BOD (mg/l)	233	287	224	293	281	301	299	300	273	324	260	260	278	224	324	29
4	TSS (mg/l)	362	333	298	400	349	326	287	230	229	292	395	304	317	229	400	55
	Dammas WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	1.8	1.8		1.95		1.95	1.95	1.95	1.95	1.95	1.95		1.92	1.80	1.95	0.1
3	BOD (mg/l)	330	279		282		330	285	340	212	380	300		304	212	380	48
4	TSS (mg/l)	280	181		282		325	371	321	250	240	251		278	181	371	56
	Dakernis WWTP																
1	Design Capacity (1000 m3 /Day)	20												20			
2	Actual Capacity (1000 m3 /Day)	8.60	8.60	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.64	8.60	8.65	0.02
3	BOD (mg/l)	249	233	213	253	229	216	218	211	190	229	230	202	223	190	253	18
4	TSS (mg/l)	222	253	220	234	243	217	241	216	181	189	230	275	227	181	275	26
	Meet El Karma WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	2.0	2.035	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.67	1.60	2.035	0.17
3	BOD (mg/l)	326.7	228	257	244	316	262	343	332	460	350	240	227	299	227	460	69
4	TSS (mg/l)	459.3	337	292	348	299	239	349	309	298	410	410	343	341	239	459	61
	El Baramoun WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	2	2	2	2	2	2	2	2	2	2		2	2.00	2.00	2	0.00
3	BOD (mg/l)	264	264	320	304	392	374	329	312	312	265		220	305	220	392	50
4	TSS (mg/l)	281	281	261.3	274	308	291	410	293	360	251		230	295	230	410	51

Dakahlia Water and Wastewater Co.
Reports for WWTP Averages Monthly Influent Parameters

Item	Description	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	AVR	MIN.	MAX.	STDEV.
	Demowa WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	0.00
3	BOD (mg/l)	290	302	354	405	370	355	249	285	327	314	330	300	323	249	405	43
4	TSS (mg/l)	346	438	491	412	385	336	226	291	303	273	231	246	332	226	491	86
	Bedyia WWTP																
1	Design Capacity (1000 m3 /Day)	4.5												5			
2	Actual Capacity (1000 m3 /Day)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.70	1.70	1.7	0.00
3	BOD (mg/l)	230	377.5	332	292	308	289	250	194	294	288	230	200	274	194	378	55
4	TSS (mg/l)	415	317.5	288	322	312	295	285	438	280	268	176	210	301	176	438	73
	Salamoun WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	0.00
3	BOD (mg/l)	294.7	322	304.8	334	315	277	180	380	320	360	260	360	309	180	380	53
4	TSS (mg/l)	244.4	300.6	238.3	280	252.5	308.1	291	213	220	355	218	230	263	213	355	44
	El Nasima WWTP																
1	Design Capacity (1000 m3 /Day)	1												1			
2	Actual Capacity (1000 m3 /Day)	1.5								1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.00
3	BOD (mg/l)	345								420	390	290	350	359	290	420	49
4	TSS (mg/l)	400								880	415	281	334	462	281	880	240
	Meet Damceis WWTP																
1	Design Capacity (1000 m3 /Day)	2												2			
2	Actual Capacity (1000 m3 /Day)	1.1	1.1	1.1	1.1		2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.2	1.1	2.88	0.90
3	BOD (mg/l)	450	366	410	420		383	350	304	280	320	399	430	374	280	450	55
4	TSS (mg/l)	420	313	443	456		422	320	373	325	335	418	310	376	310	456	57
	Meet Fatek WWTP																
1	Design Capacity (1000 m3 /Day)			3										2			
2	Actual Capacity (1000 m3 /Day)			2	2	2	2	2	2	2	2	2	2	2.0	2.0	2	0.00
3	BOD (mg/l)			265	324	338	334	452	350	280	312	270	210	314	210	452	65
4	TSS (mg/l)			260	272	334	271	325	389	370	377	229	260	309	229	389	57
	Sammaha WWTP																
1	Design Capacity (1000 m3 /Day)						1							1			
2	Actual Capacity (1000 m3 /Day)						0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.00
3	BOD (mg/l)						210	410	292	311.3	270	235	187	274	187	410	75
4	TSS (mg/l)						297	334	272	319	282	256.3	248.7	287	249	334	32

شـــركة
مياه الشرب والصرف الصحى بالدقهلية

مركز المعلومات

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)
عن شهر يناير ٢٠٠٦

اسم المحطة	نظام المعالجة	طاقة التصميمية الف م٣/يوم	متوسط الطاقة الفعلية الف م٣/يوم	BOD للمياه الداخله جم/لتر	BOD للمياه الخارجه جم/لتر	الكفاءة %	TSS للمياه الداخله جم/لتر	TSS للمياه الخارجه جم/لتر	الكفاءة %	ساعات التشغيل م٣/شهر	ساعات التشغيل م٣/شهر	سعهلك الكهرباء كجم / شهر	ملاحظات
لمنصورة	ثنائية	١٣٥	١٤٥	٢٣٠	٣١	٨٦,٥٢	١٩٣	٢٤	٨٧,٥٦	٣٠	١٢٠	-	وحدة الكلور لم يتم استلامها وخارج الخدمة
ج	ثنائية	١٠	٤,٧٥	٢٢٤	٢٦	٨٨,٣٩	٢٢٦	٢٣	٨٩,٨٢	٢	١٥	-	غـــــــــر
طرة	ثنائية	٢	٢,٢٢٦	٢٣٣	٤٠	٨٢,٨٣	٣٦٢	٣١	٩١,٤٤	٠,٣	١	٥٠٠	غـــــــــر
نعاص	ثنائية	٢	١,٨	٣٣٠	٣١	٩٠,٦١	٢٨٠	٣٧	٨٦,٧٩	٤	٣١,٠	-	غـــــــــر ومتعطل
لكرنس	ثنائية	٢٠	٨,٥٩٥	٢٤٩	٢٠,٣٦	٩١,٨٢	٢٢٢	٢٧,٧	٨٧,٥٤	٦	٢٦	٨٠٠	غـــــــــر
ميت الكرما	ثنائية	٢	٢,٠٣٥	٣٢٦,٧	٣٥,٧	٨٩,٠٧	٤٥٩,٣	٣٩,٧	٩١,٣٦	٢,٥	٢,٥	٥٠٠	غـــــــــر
لمرامون	ثنائية	٢	٢	٢٦٤	٣٠,٨	٨٨,٣٣	٢٨١	٣١	٨٨,٩٧	١	١	-	غير كلوريت للتشغيل
دموه	ثنائية	٢	٢,٥٢	٢٩٠	٥٣,٥	٨١,٥٥	٣٤٦	٤٣	٨٧,٥٧	٠,٣٧	٣	٥٠	غير كلوريت للتشغيل
بدوار	ثنائية	٤,٥	١,٧	٢٣٠	٤٢	٨١,٧٤	٤١٥	٣٥	٩١,٥٧	٠,٦	٢	٢٠	غير كلوريت للتشغيل
سنامون	ثنائية	٢	١,٦٥	٢٩٤,٧	٢٦,٦	٩٠,٩٧	٢٤٤,٤	٢٠,٦	٩١,٥٧	-	٦	-	غير كلوريت للتشغيل
ميت مزاح	ثنائية	٣	٢	٢٦٥	٢٩	٨٩,٠٦	٢٥٠	٢١	٩١,٦٠	-	٣	-	غير كلوريت للتشغيل
لمدفعة	ثنائية	٢	١,٥	٢٧٤	٨٢	٧٠,٠٧	١٤٠	٥٢	٦٢,٨٦	٠,٢	١,٢٥	١٠٠	غير كلوريت للتشغيل
لنسيمة	ثنائية	١	١,٥	٣٤٥	٣٦	٨٩,٥٧	٤٠٠	٢٩	٩٢,٧٥	٣	٨	-	غير كلوريت للتشغيل
ميت دمسيس	ثنائية	٢	١,١	٤٥٠	٩٠	٨٠	٤٢٠	٤٧	٨٨,٨١	٠,٢	٤	٢٧	غير كلوريت للتشغيل

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)
عن شهر فبراير ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	الطاقة الفعلية	BOD للمياه الداخلة	BOD للمياه الخارجة	الكفاءة %	TSS للمياه الداخلة	TSS للمياه الخارجة	الكفاءة %	مخلفات المصافي م٣/شهر	الرواسب الرملي	مستهلك الكلور كجم/شهر	ملاحظات
المنصورة	ثنائية	١٣٥	١٤٥	٢٨٤	٣٢	٨٨,٧	٢٤٤	٣٢	٨٦,٩	٢٨	١١٨	-	[illegible]
اجا	ثنائية	١٠	٤,٧٥	٣٠٩	٣٧,٥	٨٧,٩	٢٥٦	٢٧	٨٩,٥٠	٢,١	١٧	-	غـــاز
بطرة	ثنائية	٢	٣,٢٢٦	٢٨٧	٦٠	٧٩,١	٣٣٣	٣٠	٩١,٠٠	٠,٠٠٣	٤,١	٥٠٠	غـــاز
دمحص	ثنائية	٢	١,٨	٢٧٩	٣٣	٨٨,٢	١٨١	١٨	٩٠,١٠	٣	٤,٠	-	غـــاز ومعطل
دكرنس	ثنائية	٢٠	٨,٥٩٥	٢٣٣	٢٠,٠٧	٩١,٤	٢٥٣	١٩,٤	٩٢,٣٠	٨	٢٤	٨٠٠	غـــاز
ميت الكرما	ثنائية	٢	٢,٠٣٥	٢٢٨	٢١	٩١	٣٣٧	٢٤,٣	٩٣,٠٠	٢	٢,٥	٥٠٠	غـــاز
البرامون	ثنائية	٢	٢	٢٦٤	٣٠,٨	٨٨	٢٨١	٣١	٨٩,٠٠	١	٢	-	هيبو كلوريت كالسيوم
موه	ثنائية	٢	٢,٥٢	٣٠٢	٥١,١	٨٣,١	٤٣٨	٥٢	٨٨,٠٠	٠,٠٤	٣	٥٠	هيبو كلوريت كالسيوم
بهواى	ثنائية	٤,٥	١,٧	٣٧٧,٥	٥٤,٣	٨٥,٦	٣١٧,٥	٣٢,٥	٨٩,٨٠	٠,٠٤	٢	٣٠	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣٢٢	٣٠,٣	٩١	٣٠٠,٦	٢٢,٩	٩٢,٠٠	١,٥	٦	-	هيبو كلوريت كالسيوم
ميت مزاح	ثنائية	٣	٢	٢٩٠	٢٥	٩١,٤	٣٠٠,٦	٢٢,٩	٩٢,٠٠	-	٣,٥	٤٥	هيبو كلوريت كالسيوم
نبروه	ثنائية	٢	١,٩٥	١٨٠	٣٠	٨٣,٣	١٤٢	١٥	٨٩,٥٠	٤	٣١	-	هيبو كلوريت كالسيوم
ميت دمسيس	برك الأكسدة هوائية	٢	١,١	٣٦٦	٩٥	٧٤	٣١٣	٣٦	٨٨,٥٠	٠,٣	٤,١	٢٨	هيبو كلوريت كالسيوم

مصدر البيان : الإدارة العامة للصرف الصحي

التقرير الشهري لمحطات المعالجة بالشركة (المتوسطات)
عن شهر مارس ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/الشهر	مخلفات الرواسب الرملي م٣/الشهر	استهلاك الكلور كجم / شهر	ملاحظات
المنصورة	ثنائية	١٣٥	١٣٧	٢٤٧,٥	٣٧	٨٥,٠٥	٢٢٨	٢٥,٨	٨٨,٧	٣٠	١٢٠	-	وحدة الكلور [illegible]
المقاطعة	ثنائية	٣,٥	٣	٣٥٤	٢٨٢	٢٠,٣٤	٤٢٩	١٥٣	٦٤,٣	٠,٠٢	١,٥	٢٠	غــاز
بطرة	ثنائية	٢	٢,٥	٢٢٤	٢٢	٩٠,١٨	٢٩٨	٢٦	٩١,٣	٠,٠٠٣	١	٥٠٠	غــاز
تمى الأمديد	ثنائية	٢	١,٢	٢٧٠	٣٠	٨٨,٨٩	٩٩٩	٣١	٩٦,٩	٠,٠٢٥	٢,٠	٤٥	غــاز وسائل
دكرنس	ثنائية	٢٠	٨,٦٥	٢١٣	٢٠,٣١	٩٠,٤٦	٢٢٠	١٨,٦	٩١,٥٦	٧	٢٨	٨٠٠	غــاز
ميت الكرما	ثنائية	٢	١,٦	٢٥٧	٢٣	٩١,٠٥	٢٩٢	٢٨	٩٠,٤١	٠,٠٥	٢,٥	٥٠٠	غــاز
البرامون	ثنائية	٢	٢	٣٢٠	٤٧,٣	٨٥,٢٢	٢١١,٣	٢٩,٨	٨٨,٦٠	١	٢	-	هيبو كلوريت كالسيوم
دموه	ثنائية	٢	٢,٥٢	٣٥٤	٥١,٥	٨٥,٤٥	٤٩١	٥٥	٨٨,٨٠	٠,٠٧	٤	٥٠	هيبو كلوريت كالسيوم
بدواى	ثنائية	٤,٥	١,٧	٣٣٢	٤٤	٨٦,٧٥	٢٨٨	٣١	٨٩,٢٤	٠,٠٤	٢	٣٠	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣٠٤,٨	٣٣,٨	٨٨,٩١	٢٣٨,٣	٢٥,١	٨٩,٤٧	٠,٠٣٥	٦	٥٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٢٦٥	٢٥	٩٠,٥٧	٢٦٠	٢١	٩١,٩٢	٠,٠٣	٢	٢٠	هيبو كلوريت كالسيوم
ميت دمسيس	برك المدة هوائية	٢	١,١	٤١٠	٩٦	٧٦,٥٩	٤٤٣	٣٦	٩١,٨٧	٠,٠٣	٣	١٥	هيبو كلوريت كالسيوم

مصدر البيان : الإدارة العامة للصرف الصحي

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)

عن شهر ابريل ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية الف م٣/يوم	متوسط الطاقة الفعلية الف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات مستحلب م٣/شهر	مخلفات الترسيب الرملي م٣/شهر	مستهلك الكلور كجم / شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٧	٢٨٣,٨٣	٣١	٨٩,٠٨	٢٣٥	٢٤,٧	٨٩,٤٩	٣١	١٢٢	-	وحدة الكلور [illegible]
اجا	ثنائية	١٠	٤,٥	٣٥٤	٤٨	٨٦,٤٤	٢٤٥	٢٥	٨٩,٨٠	٢,١١	١٧,٥	-	غـــاز
بطرة	ثنائية	٢	٢,٥	٢٩٣	٣١	٨٩,٤٢	٤٠٠	٣٧	٩٠,٧٥	٠,٠٠٣	٠,١٢	٥٠٠	غـــاز
دماص	ثنائية	٢	١,٩٥	٢٨٢	٤٨	٨٢,٩٨	٢٨٢	٢٧	٩٠,٤٣	٠,٢٨	٣,٥	-	غـــاز وسعفر
دكرنس	ثنائية	٢٠	٨,٦٥	٢٥٣	٢٠,١١	٩٢,٠٥	٢٣٤	١٩,٧	٩١,٥٧	٧	٢٨	٨٠٠	غـــاز
ميت الكرما	ثنائية	٢	١,٦	٢٤٤	٢٢	٩٠,٩٨	٣٤٨	٣١	٩١,٠٩	٠,٠٤٥	٢,٤٥	٥٠٠	غـــاز
البرامون	ثنائية	٢	٢	٣٠٤	٤٩	٨٣,٨٨	٢٧٤	٣٣,٦	٨٧,٧٤	١,١	٢,٠١	-	هيبو كلوريت كالسيوم
دموه	ثنائية	٢	٢,٥٢	٤٠٥	٥٣,٦	٨٦,٧٧	٤١٢	٦٠	٨٥,٤٤	٠,٠٦	٤,٢	٥٠	هيبو كلوريت كالسيوم
بدواى	ثنائية	٤,٥	١,٧	٢٩٢	٣٥	٨٨,٠١	٣٢٢	٣٨	٨٨,٢٠	٠,٠٥	٢,١	٣٠	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣٣٤	٣٢	٩٠,٤٢	٢٨٠	٢٥	٩١,٠٧	٠,٠٣٤	٦,١	٥٠	هيبو كلوريت كالسيوم
ميت فلك	ثنائية	٣	٢	٣٢٤	٣٧	٨٨,٥٨	٢٧٢	٣١	٨٨,٦٠	٠,٠٢٥	٢,١	٢٠	هيبو كلوريت كالسيوم
ميت دمسيس	برك اكسدة هوائية	٢	١,١	٤٢٠	٧٢	٨٢,٨٦	٤٥٦	٨٠	٨٢,٤٦	٠,٢٩	٣,١	١٥	هيبو كلوريت كالسيوم

مصدر البيان قطاع [illegible] الصرف الصحي

شـــركة
مياه الشرب والصرف الصحي بالدقهلية

مركز المعلومات

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)

عن شهر مايو ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/شهر	مخلفات الرواسب الرملي م٣/شهر	استهلاك الكلور كجم / شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٧	٢٨٨	٣٤	٨٨,١٩	٢٣٥	٢٥,٧	٨٩,٠٦	٣٣	١٢٣	-	وحدة كلور [illegible]
اجا	ثنائية	١٠	٤,٥	٣٣١	٣٥,٣	٨٩,٣٤	٣٧٧	٢٢	٩٤,١٦	٢,١٣	١٧,٧	-	ـــــــ
بطرة	ثنائية	٢	٢,٥	٢٨١	٣٢	٨٨,٦١	٣٤٩	٢٦	٩٢,٥٥	٠,٠٠٤	٠,١٣	٥٠٠	ـــــــ
دكرنس	ثنائية	٢٠	٨,٦٥	٢٢٩	١٥,٣١	٩٣,٣١	٢٤٣	١٨,٤	٩٢,٤٣	٧,١	٢٨,٢	٨٠٠	ـــــــ
ميت الكرما	ثنائية	٢	١,٦	٣١٦	٢٧	٩١,٤٦	٢٩٩	٤٢	٨٥,٩٥	٠,٠٤٨	٢,٤٨	٥٠٠	ـــــــ
البرامون	ثنائية	٢	٢	٣٩٢	٤٦	٨٨,٢٧	٣٠٨	٣١,٨	٨٩,٦٨	١,٢	٢,٠٥	-	هيبو كلوريت كالسيوم
شوه	ثنائية	٢	٢,٥٢	٣٧٠	٤٣	٨٨,٣٨	٣٨٥	٤٦	٨٨,٠٥	٠,٥	٤,١	٧٠	هيبو كلوريت كالسيوم
بدواى	ثنائية	٤,٥	١,٧	٣٠٨	٣٢	٨٩,٦١	٣١٢	٣١	٩٠,٠٦	٠,٠٦	٢,١١	٣٠	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣١٥	٣٢	٨٩,٨٤	٢٥٢,٥	٢٩,٤	٨٨,٣٦	٠,٠٣٥	٦,١٢	٥٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٣٣٨	٣٥	٨٩,٦٤	٣٣٤	٣٥	٨٩,٥٢	٠,٠٣٦	٢,١٥	٢١	هيبو كلوريت كالسيوم

مصدر البيان: قطاع الدعم الفني للصرف الصحي

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)
عن شهر يونيه ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/شهر	مخلفات ترسيب الرمال م٣/شهر	حمولات الحمأة طن / شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٨	٢٨٢	٣٠	٨٩,٣٦	٢٤٤	٣٠	٨٧,٧٠	٣١	١٢٥	-	وحدة الكلور لا يتم استخدامها (مرفوع الحد ...)
اجا	ثنائية	١٠	٤,٥	٢٨٤	٢٨,٧	٨٩,٨٩	٣١١	١٣	٩٥,٨٢	٢	١٠	٨٠٠	غـــــاز
بطرة	ثنائية	٢	٢,٥	٣٠١	٣١	٨٩,٧	٣٢٦	٢٤	٩٢,٦٤	٠,٠٠٣	١	٥٠٠	غـــــاز
دكرنس	ثنائية	٢٠	٨,٦٥	٢١٦	١٦,٩	٩٢,١٨	٢١٧	١٧,٥	٩١,٩٤	٧,١	٢٨,٢	٨٠٠	غـــــاز
تماص	ثنائية	٢	١,٩٥	٣٣٠	٣٦	٨٩,٠٩	٣٢٥	١٢,٠	٩٦,٣١	٣	٤	-	غـــــاز
ميت الكرما	ثنائية	٢	١,٦	٢٦٢	٣١	٨٨,١٧	٢٣٩	٢٣	٩٠,٣٨	٠,٠٤٥	٢,٢٥	٤٥٠	غـــــاز
سماحة	ثنائية	١	٠,٦	٢١٠	٧٠	٦٦,٦٧	٢٩٧	٤٤	٨٥,١٨٥	٠,٠٣٥	٢,١	-	حوض تعقيم شمسي
السنبلاوين	برك أكسدة هوائية	٢٠	٤	٢١٠	٧٠	٦٦,٦٧	٢٥٤	٤٤	٨٢,٦٧٧	٦,٩	٢٦,٥	-	غـــــاز
البرامون	ثنائية	٢	٢	٣٧٤	٣٨	٨٩,٨٤	٢٩١	٣٦	٨٧,٦٣	١	١	-	هيبو كلوريت كالسيوم
دمره	ثنائية	٢	٢,٥٢	٣٥٥	٤٥,٤	٨٧,٢١	٣٣٦	٤٣	٨٧,٢٠	٠,٠٠٥	٢,٥	-	هيبو كلوريت كالسيوم
بنواى	ثنائية	٤,٥	١,٧	٢٨٩	٤٠	٨٦,١٦	٢٩٥	٣٢	٨٩,١٥	٠,٠٦	٢	٣٥	هيبو كلوريت كالسيوم
ميت دمسيس	برك أكسدة هوائية	٢	٢,٨٨	٣٨٣	٩١	٧٦,٢٤	٤٢٢	٤٤	٨٩,٥٧	٠,٣	٤	-	هيبو كلوريت كالسيوم
المقاطعة	ثنائية	٣,٥	٣	٤٨٠	٣٠٠	٣٧,٥	٥١٧	٣١١	٣٩,٨٥	٠,٠٢	١,٥	٢٠	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٢٧٧	٣٧	٨٦,٦٤	٣٠٨,١	٣٥	٨٨,٦٤	٠,٠٠٢٥	١	٥٠٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٣٣٤	٣٣	٩٠,١٢	٢٧١	٣١	٨٨,١٩	٠,٠٢	٢	٥٠	هيبو كلوريت كالسيوم

مصدر البيانات: الادارة العامة للصرف الصحي

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)

عن شهر يوليو ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/شهر	مخلفات ترسيب م٣/شهر	مستهلك الكلور كجم / شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٨	٣٢٧,٦	٦٤	٨٠,٤٦	٢٧٠	٢٧,٨	٨٩,٧٠	٣١	١٢٥	-	[illegible]
اجا	ثنائية	١٠	٤,٥	٣٢٩	٣٠	٩٠,٨٨	٣٤٥	١٥	٩٥,٦٥	٢	١٠	٨٠٠	غـــــاز
بطرة	ثنائية	٢	٢,٥	٢٩٩	٢٨	٩٠,٦٤	٢٨٧	٢٥	٩١,٢٩	٠,٠٠٣	١	٥٠٠	غـــــاز
تلبانة	ثنائية	٢٠	٨,٦٥	٢١٨	٢١	٩٠,٣٧	٢٤١	٢٧,٠	٨٨,٨٠	٨	٣٢	٨٠٠	غـــــاز
دماص	ثنائية	٢	١,٩٥	٢٨٥	٣٠	٨٩,٤٧	٣٧١	٢١,٠	٩٤,٣٤	٣	٤	-	غـــــاز
ميت الكرما	ثنائية	٢	١,٦	٣٤٣	٢٨	٩١,٨٤	٣٤٩	١٨	٩٤,٨٤	٠,٠٤٥	٢,٢٥	٤٥٠	غـــــاز
سمنحة	ثنائية	١	٠,٦	٤١٠	١٢٧	٦٩,٠٢	٣٣٤	٤٤	٨٦,٨٢٦	٠,٠٣٥	٢,١	-	حوض تعقيم شمسى
البرامون	ثنائية	٢	٢	٣٢٩	٧٠	٧٨,٧٢	٤١٠	٥٥	٨٦,٥٩	١	١	-	هيبو كلوريت كالسيوم
دموه	ثنائية	٢	٢,٥٢	٢٤٩	٤٨,٩	٨٠,٣٦	٢٢٦	٤٣	٨٠,٩٧	٠,٠٠٥	٢,٥	-	هيبو كلوريت كالسيوم
بدواى	ثنائية	٤,٥	١,٧	٢٥٠	٢٧	٨٩,٢	٢٨٥	٣٦	٨٧,٣٧	٠,٠٦	٢	-	هيبو كلوريت كالسيوم
ميت دمسيس	برك الأكسدة هوائية	٢	٢,٨٨	٣٥٠	١٠٠	٧١,٤٣	٣٢٠	٦٩	٧٨,٤٤	٠,٣	٤	-	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	١٨٠	٢٤	٨٦,٦٧	٢٩١	٢٣	٩٢,١٠	٠,٠٠٢٥	١	٥٠٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٤٥٢	٤٥	٩٠,٠٤	٣٢٥	٢٨	٩١,٣٨	٠,٠٢	٢	٥٠	هيبو كلوريت كالسيوم

مصدر البيان : قطاع الدعم الفني للصرف الصحي

شـــركة
مياه الشرب والصرف الصحي بالدقهلية

التقرير الشهري لمحطات المعالجة بالشركة (المتوسطات)

عن شهر اغسطس ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	[illegible]	[illegible]	[illegible]	[illegible]
المنصورة	ثنائية	١٣٥	١٣٨	٣٠٧,٨	٤٨,٣	٨٤,٣١	٢٠٩	٢٧,٣	٨٦,٩٤	٣١	١٢٥	-	وحدة الكلور تعمل بـ[illegible]
اجا	ثنائية	١٠	٤,٥	٢٥٧	٢٣	٩١,٠٥	٣٠٧	٢٨	٩٠,٨٨	٢	١٠	٨٠٠	غـــــــــاز
بطرة	ثنائية	٢	٢,٥	٣٠٠	٢٤	٩٢	٢٣٠	٢٦	٨٨,٧٠	٠,٠٠٣	١	٥٠٠	غـــــــــاز
دكرنس	ثنائية	٢٠	٨,٦٥	٢١١	١٩	٩١	٢١٦	٢١,٠	٩٠,٢٨	٨	٣٢,٥	٨٠٠	غـــــــــاز
...مص	ثنائية	٢	١,٩٥	٣٤٠	٣٨	٨٨,٨٢	٣٢١	١١,٠	٩٦,٥٧	٣	٤	-	غـــــــــاز
ميت الكرما	ثنائية	٢	١,٦	٣٣٢	٣٤	٨٩,٧٦	٣٠٩	٣٦	٨٨,٣٥	٠,٠٠٥	٢,٣	٤٥٠	غـــــــــاز
سماحة	ثنائية	١	٠,٦	٢٩٢	٦٧	٧٧,٠٥	٢٧٢	٤٣	٨٤,١٩	-	-	-	حوض تعقيم مسمى
البرامون	ثنائية	٢	٢	٣١٢	٦٣	٧٩,٨١	٢٩٣	٣٢	٨٩,٠٨	١	١	-	هيبو كلوريت كالسيوم
...موه	ثنائية	٢	٢,٥٢	٢٨٥	٤٢,٩	٨٤,٩٥	٢٩١	٤٤,٩	٨٤,٥٧	٠,٠٠٥	٢,٥	-	هيبو كلوريت كالسيوم
...بلواى	ثنائية	٤,٥	١,٧	١٩٤	١٢	٩٣,٨١	٤٣٨	٢٥	٩٤,٢٩	٠,٠٦	٢	-	هيبو كلوريت كالسيوم
ميت دمسيس	برك أكسدة هوائية	٢	٢,٨٨	٣٠٤	٤٤	٨٥,٥٣	٣٧٣	٣٣	٩١,١٥	٠,٣	٤	-	هيبو كلوريت كالسيوم
...سلامون	ثنائية	٢	١,٦٥	٣٨٠	٣٦	٩٠,٥٣	٢١٣	٢٤	٨٨,٧٣	٠,٠٠٢٥	١	٥٠٠	هيبو كلوريت كالسيوم
...ست فاتك	ثنائية	٣	٢	٣٥٠	٣٦	٨٩,٧١	٣٨٩	٢٦	٩٣,٣٢	٠,٠٢	٢	٥٠	هيبو كلوريت كالسيوم

مصدر البيان: قطاع الدعم الفني للصرف الصحي

شـــركة
مياه الشرب والصرف الصحي بالدقهلية

مركز المعلومات

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)
عن شهر سبتمبر ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/شهر	مخلفات ترسيب الرمال م٣/شهر	مستهلك الكلور كجم/شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٨	٢٧٣,٨	٤٦,٣	٨٣,٠٩	٢٦٩	٣٢,١	٨٨,٠٧	٣١	١٣٥	-	وحدة الكلور [illegible]
اجا	ثنائية	١٠	٤,٥	٣١٦	٢٦,٧	٩١,٥٥	٢٤٥	٢٩	٨٨,١٦	٢,٠١	١٠,١	٨٠٠	غاز
بطرة	ثنائية	٢	٢,٥	٢٧٣	٢٧	٩٠,١١	٢٢٩	٢٩	٨٧,٣٤	٠,٠٠٠٤	١,٠١	٥٠٠	غاز
دكرنس	ثنائية	٢٠	٨,٦٥	١٩٠	١٥	٩٢,١١	١٨١	١٧,٠	٩٠,٦١	٨,٥	٣٣	٨٠٠	غاز
دمص	ثنائية	٢	١,٩٥	٢١٢	٣٣	٨٤,٤٣	٢٥٠	٣٤,٠	٨٦,٤٠	٣,١	٤,١	-	غاز
ميت الكرما	ثنائية	٢	١,٦	٤٦٠	٣١	٩٣,٢٦	٢٩٨	٣٣	٨٨,٩٣	٠,٠٥٥	٢,٣٥	٤٥٠	غاز
سماحة	ثنائية	١	٠,٦	٣١١,٣	٤٩,٧	٨٤,٠٣	٣١٩	٣٨,٣	٨٧,٩٩	-	-	-	حوض تعقيم شمسي
البرامون	ثنائية	٢	٢	٣١٢	٤٥	٨٥,٥٨	٣٦٠	٣٥	٩٠,٢٨	١,١	١,١	-	هيبو كلوريت صوديوم
دموه	ثنائية	٢	٢,٥٢	٣٢٧	٤١,٣	٨٧,٣٧	٣٠٣	٤٤,٨	٨٥,٢١	٠,٠٠٦	٢,٥٥	-	هيبو كلوريت صوديوم
بدواى	ثنائية	٤,٥	١,٧	٢٩٤	٣٠	٨٩,٨	٢٨٠	٢٦	٩٠,٧١	٠,٠٧	٢,٠١	-	هيبو كلوريت صوديوم
ميت دمسيس	برك أكسدة هوائية	٢	٢,٨٨	٢٨٠	٤٠	٨٥,٧	٣٢٥	٢٥	٩٢,٣١	٠,٣١	٤,١	-	هيبو كلوريت صوديوم
شبروه	ثنائية	١٠	١٠	٣٢٠	٦٦	٧٩,٣٨	٢٠٠	٢٢	٨٩,٠٠	٤,٠١	٣١	-	هيبو كلوريت صوديوم
السليمة	ثنائية	١	١,٥	٤٢٠	٩٠	٧٨,٦	٨٨٠	١٤٠	٨٤,٠٩	٣,١	٨,١	-	هيبو كلوريت صوديوم
سلامون	ثنائية	٢	١,٦٥	٣٢٠	٤٥	٨٥,٩	٢٢٠	٣٠	٨٦,٣٦	٠,٠٠٢٨	١,٠١	٥٠٠	هيبو كلوريت صوديوم
ميت فاتك	ثنائية	٣	٢	٢٨٠	٣٠	٨٩,٢٩	٣٧٠	٣٠	٩١,٨٩	٠,٠٢٥	٢,٠١	٥٠	هيبو كلوريت صوديوم

مصدر البيان: الادارة العامة للصرف الصحي

شـــركة
مياه الشرب والصرف الصحي بالدقهلية

مركز المعلومات

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)

عن شهر أكتوبر ٢٠٠٦

اسم المحطة	نظم المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات الصندوق م٣/شهر	مخلفات ترسيب الرمل م٣/شهر	سبهات الكلور حجم/شهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٨	٣٤٥	٤٩,٣	٨٥,٧١	٢٦٥	٣١	٨٨,٣٠	٣١,٠١	١٢٥,٥	-	وحدة الكلور [illegible]
اجا	ثنائية	١٠	٤,٥	٢٨٠	١٤	٩٥	١٨٥	١٨	٩٠,٢٧	٢,١١	١٠,٢	٨٠٠	غـــاز
بطرة	ثنائية	٢	٢,٥	٣٢٤	٢٩	٩١,٠٥	٢٩٢	٢٥	٩١,٤٤	٠,٠١٤	١,١١	٥٠٠	غـــاز
دكرنس	ثنائية	٢٠	٨,٦٥	٢٢٩	٢٠	٩١,٢٧	١٨٩	١٧,٠	٩١,٠١	٨,٥١	٣٣,٠١	٨٠٠	غـــاز
تمامص	ثنائية	٢	١,٩٥	٢٨٠	١٤	٩٦,٣٢	٢٤٠	٣٦,٠	٨٥,٠٠	٣,١١	٤,١٥	-	غـــاز
ميت الكرما	ثنائية	٢	١,٦	٣٥٠	٣٠	٩١,٤٣	٤١٠	٢٨	٩٣,١٧	٠,٠١٤	١,٠٦	٤٥٠	غـــاز
سماحة	ثنائية	١	٠,٦	٢٧٠	٦٠	٧٧,٧٨	٢٨٢	٣٨	٨٦,٥٢	-	-	-	حوض تعقيم شمسي
البراموں	ثنائية	٢	٢	٢٦٥	٤٢	٨٤,١٥	٢٥١	٣١	٨٧,٦٥	١,٠٢	١,١٢	-	هيبو كلوريت كالسيوم
دموه	ثنائية	٢	٢,٥٢	٣١٤	٤٢,٦	٨٦,٤٣	٢٧٣	٤٤,٦	٨٣,٦٦	٠,٠١٦	٢,٦	-	هيبو كلوريت كالسيوم
بدواى	ثنائية	٤,٥	١,٧	٢٨٨	٥٤	٨١,٣	٢٦٨	٤٨	٨٢,٠٩	٠,٠٨	٠,٠٩	-	هيبو كلوريت كالسيوم
ميت لعسيس	برك الشدة هوائية	٢	٢,٨٨	٣٢٠	٦٤	٨٠	٣٣٥	٧٦	٧٧,٣١	٠,٣٢	٤,١١	-	هيبو كلوريت كالسيوم
شربرو	ثنائية	١٠	١٠	٢١٠	٢٠	٩٠,٤٨	٢٣٥	٢٢	٩٠,٦٤	٤,٠٢	٣١,٥	-	هيبو كلوريت كالسيوم
السنبلية	ثنائية	١	١,٥	٣٩٠	٧٤	٨١	٤١٥	١٩٥	٥٣,٠١	٣,١٢	٨,١٥	-	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣٦٠	٢٧	٩٢,٥	٣٥٥	٣٥	٩٠,١٤	٠,٠٠٣	١,٠٤	٥٠٠	هيبو كلوريت كالسيوم
ميت غمر	ثنائية	٣	٢	٣١٢	٣٢	٨٩,٧٤	٣٧٧	٢١	٩٤,٤٣	٠,٠٢٨	٢,٠٩	٥٠	هيبو كلوريت كالسيوم

مصدر البيان: قطاع التشغيل للصرف الصحي

التقرير الشهرى لمحطات المعالجة بالشركة (المتوسطات)

عن شهر نوفمبر ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م٣/يوم	متوسط الطاقة الفعلية ألف م٣/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات المصافي م٣/شهر	مخلفات الترسيب الرملي م٣/شهر	استهلاك الكلور كجم/الشهر	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٢٨	٣٠٩	٤٣,٣	٨٥,٩٩	٢٧٦	٣٣,٨	٨٧,٧٥	٣١,١	١٢٥,٦	-	وحدة الكلور [illegible]
اجا	ثنائية	١٠	٤,٥	٣٤٠	١٥	٩٥,٥٩	٢٣٥	٢٠	٩١,٤٩	٢,١٢	١٠,٢١	٨٠٠	غــــــاز
بطرة	ثنائية	٢	٢,٥	٢٦٠	٢٥	٩٠,٣٨	٣٩٥	٣٧	٩٠,٦٣	٢,٥	٠,٠١٥	٥٠٠	غــــــاز
دكرنس	ثنائية	٢٠	٨,٦٥	٢٣٠	١٩	٩١,٧٤	٢٣٠	٢١,٠	٩٠,٨٧	٨,٥٢	٣٣,٠٨	٨٠٠	غــــــاز
نماص	ثنائية	٢	١,٩٥	٣٠٠	٤٠	٨٦,٦٧	٢٥١	٣٩,٠	٨٤,٤٦	٣,١٢	٤,٨	-	غــــــاز
ميت الكرما	ثنائية	٢	١,٦	٢٤٠	١٥	٩٣,٧٥	٤١٠	٢٢	٩٤,٦٣	٠,٠٠٥	١,٠٣	٤٥٠	غــــــاز
سماحة	ثنائية	١	٠,٦	٢٣٥	٦٥	٧٢,٣٤	٢٥٦,٣	٦٨,٣	٧٣,٣٥	-	-	-	حوض تجفيف شمسي
دموه	ثنائية	٢	٢,٥٢	٣٣٠	٣٠	٩٠,٩١	٢٣١	٢٣	٩٠,٠٤	٠,٠١٨	٢,٧	-	هيبو كلوريت كالسيوم
بدواي	ثنائية	٤,٥	١,٧	٢٣٠	٤٠	٨٢,٦١	١٧٦	١٨	٨٩,٧٧	٠,٠٩	٠,٠١	-	هيبو كلوريت كالسيوم
ميت خميس	برك أكسدة هوائية	٢	٢,٨٨	٣٩٩	٦٤	٨٣,٩٦	٤١٨	٧٢	٨٢,٧٨	٠,٣٣	٤,١٣	-	هيبو كلوريت كالسيوم
نبروه	ثنائية	١٠	١٠	٢٤٠	٢٣	٩٠,٤٢	٢٤٢	٣٠,٥	٨٧,٤٠	٤,٠٢	٣١,٥	-	هيبو كلوريت كالسيوم
النسايمة	ثنائية	١	١,٥	٢٩٠	٣٠	٨٩,٦٦	٢٨١	١٧	٩٣,٩٥	٣,١٣	٨,١٦	-	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٢٦٠	٣٥	٨٦,٥٤	٢١٨	٤٩	٧٧,٥٢	٠,٠٠٤	١,٠٥	٥٠٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٢٧٠	١٥	٩٤,٤٤	٢٢٩	٢١	٩٠,٨٣	٠,٠٢٨	٦,٠٩	٥٠	هيبو كلوريت كالسيوم

مصدر البيان قطاع الدعم الفني للصرف الصحي

شـــركة
مياه الشرب والصرف الصحي بالدقهلية

التقرير الشهري لمحطات المعالجة بالشركة (المتوسطات)
عن شهر ديسمبر ٢٠٠٦

اسم المحطة	نظام المعالجة	الطاقة التصميمية ألف م³/يوم	متوسط الطاقة الفعلية ألف م³/يوم	BOD للمياه الداخلة جم/لتر	BOD للمياه الخارجة جم/لتر	الكفاءة %	TSS للمياه الداخلة جم/لتر	TSS للمياه الخارجة جم/لتر	الكفاءة %	مخلفات [illegible] م³/شهر	مخلفات الرواسب [illegible] م³/شهر	مستهلك الكلور [illegible]	نوع الكلور المستخدم
المنصورة	ثنائية	١٣٥	١٣٨	٢٣٩	٤٧,١	٨٠,٢٩	٢٦٦	٣٦,٣	٨٦,٣٥	٣١,٢	١٢٥,٨	-	وحدة الكلور [illegible]
اجا	ثنائية	١٠	٤,٥	١٨٠	١٨	٩٠	٢٥٠	٢٩	٨٨,٤٠	٧	٢٦,٥	٨٠٠	غـــاز
بطرة	ثنائية	٢	٢,٥	٢٦٠	٣٧	٨٥,٧٧	٣٠٤	٣٧	٨٧,٨٣	٠,٠٠٢	١,١٣	٥٠٠	غـــاز
دكرنس	ثنائية	٢٠	٨,٦٥	٢٠٣	١٨	٩١,٠٩	٢٧٥	٢٦,٠	٩٠,٥٥	٨,٥٢	٣٣,١	٨٠٠	غـــاز
السنبلاوين	ثنائية	٢	١,٩٥	٣٠٠	٤٠	٨٦,٦٧	٢٥١	٣٩,٠	٨٤,٤٦	٣,١٢	٤,٨	-	غـــاز
ميت الكرما	ثنائية	٢	١,٦	٢٢٧	٤٠	٨٢,٣٨	٣٤٣	٣٠	٩١,٢٥	٠,٠٠٦	١,١٣	٥٠٠	غـــاز
سماحة	ثنائية	١	٠,٦	١٨٧	٥٣	٧١,٦٦	٢٤٨,٧	٣٥,٣	٨٥,٨١	-	-	-	حوض تجفيف شمسي
الموه	ثنائية	٢	٢,٥٢	٣٠٠	٥١,٣	٨٢,٩	٢٤٦	٢٤	٩٠,٢٤	٠,٠١٩	٢,٧١	-	هيبو كلوريت كالسيوم
بدواي	ثنائية	٤,٥	١,٧	٢٠٠	٢٠	٩٠	٢١٠	٢٢	٨٩,٥٢	٠,١	٠,٠٢	-	هيبو كلوريت كالسيوم
ميت تمسيس	برك أكسدة هوائية	٢	٢,٨٨	٤٣٠	٧١,٢	٨٣,٤٤	٣١٠	٧٢,٥	٧٦,٦١	٢,٩	٠,٣٤	٤,١٥	هيبو كلوريت كالسيوم
البرامون	ثنائية	٢	٢	٢٢٠	٦٢	٧١,٨٢	٢٣٠	٢٦	٨٨,٧٠	١,٠٣	١,١٤	-	هيبو كلوريت كالسيوم
تمي الأمديد	ثنائية	٢	١,٢	١٥٠	٢٦	٨٢,٦٧	٢٣٥	٤٢	٨٢,١٣	٠,٠٢٦	٢,٠١	٤٥,٣	هيبو كلوريت كالسيوم
النسيمة	ثنائية	١	١,٥	٣٥٠	٤٨	٨٦,٢٩	٣٣٤	٤٣	٨٧,١٣	٣,١٣	٨,١٦	-	هيبو كلوريت كالسيوم
سلامون	ثنائية	٢	١,٦٥	٣٦٠	٩٥	٧٣,٦١	٢٣٠	٥٢	٧٧,٣٩	٠,٠٠٥	١,٠٦	٥٠٠	هيبو كلوريت كالسيوم
ميت فاتك	ثنائية	٣	٢	٢١٠	٢٢	٨٩,٥٢	٢٦٠	٣٤	٨٦,٩٢	٠,٠٣	٢,٢	٥٠	هيبو كلوريت كالسيوم

مصدر البيان: القطاع الداعم الفني للصرف الصحي