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Report No: PAD1425

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT PAPER

ON A

PROPOSED ADDITIONAL LOAN

IN THE AMOUNT OF EUR 16.20 MILLION
(US$ 18 MILLION EQUIVALENT)

AND RESTRUCTURING OF THE ORIGINAL LOAN

TO THE

OFFICE NATIONAL DE L'ASSAINISSEMENT

WITH THE GUARANTEE OF THE
REPUBLIC OF TUNISIA

FOR THE

TUNISIA NORTHERN TUNIS WASTEWATER PROJECT

August 10, 2016

WATER GLOBAL PRACTICE
MIDDLE EAST AND NORTH AFRICA REGION

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2016)

Currency Unit	=	Tunisian Dinar (TND)
EUR 0.89718285	=	US$1
US$ 1.1146	=	EUR 1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
BER	Bid Evaluation Report
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CRDA	Regional Committee for Agricultural Development *Commissariat Régional de Développement Agricole*
EIB	European Investment Bank
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
GEF	Global Environment Facility
GEO	Global Environmental Objective
GOT	Government of Tunisia
ISDS	Integrated Safeguards Data Sheet
ISR	Implementation Status and Results Report
IP	Implementation Progress
LAP	Land Acquisition Plan
MARHP	Ministry of Agriculture, Water Resources and Fishery *Ministère de l'Agriculture, des Ressources Hydrauliques et de la Pêche*
MTR	Mid-Term Review
ONAS	National Sanitation Utility *Office National de l'Assainissement*
PDO	Project Development Objective
SONEDE	National Water Supply Utility *Société Nationale d'Exploitation et de Distribution des Eaux*
TWW	Treated Wastewater
WWTP	Wastewater Treatment Plant

Vice President:	Hafez Ghanem
Country Director:	Marie Françoise Marie-Nelly
Acting Senior Global Practice Director:	Jennifer Sara
Practice Manager/Manager:	Steven N. Schonberger
Task Team Leader:	Richard Abdulnour

TUNISIA
Tunisia Northern Tunis Wastewater Additional Finance (P154713)

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ADDITIONAL FINANCING DATA SHEET

Tunisia

Tunisia - Northern Tunis Wastewater Project Additional Finance (P154713)

Basic Information – Parent			
Parent Project ID:	P117082	Original EA Category:	A - Full Assessment
Current Closing Date:	30-Jun-2017		

Basic Information – Additional Financing (AF)			
Project ID:	P154713	Additional Financing Type (from AUS):	Cost Overrun and Restructuring
Regional Vice President:	Hafez Ghanem	Proposed EA Category:	A - Full Assessment
Country Director:	Marie Françoise Marie-Nelly	Expected Effectiveness Date:	31-Dec-2016
Senior Global Practice Director:	Jennifer Sara	Expected Closing Date:	31-Dec-2019
Practice Manager/Manager:	Steven N. Schonberger	Report No:	PAD1425
Team Leader(s):	Richard Abdulnour		

Borrower

Organization Name	Contact	Title	Telephone	Email
Office National de l'Assainissement (ONAS)	Habib Omrane	Président Directeur General	(216-71) 343-200	PDG@onas.nat.tn

Project Financing Data - Parent (Tunisia Northern Tunis Wastewater Project-P117082) (in USD Million)

Key Dates

Project	Ln/Cr/TF	Status	Approval Date	Signing Date	Effectiveness Date	Original Closing Date	Revised Closing Date
P117082	IBRD-79170	Effective	17-Jun-2010	07-Oct-2010	14-Apr-2011	31-Dec-2015	30-Jun-2017
P118131	TF-96891	Closed	17-Jun-2010	07-Oct-2010	14-Apr-2011	31-Dec-2015	30-Jun-2016

Disbursements

Project	Ln/Cr/TF	Status	Currency	Original	Revised	Cancelled	Disbursed	Undisbursed	% Disbursed
P117082	IBRD-79170	Effective	USD	52.00	39.40	12.60	7.79	31.61	20
P118131	TF-96891	Closed	USD	8.03	8.03	0.00	7.06	0.97	88

Project Financing Data - Additional Financing Tunisia - Northern Tunis Wastewater Project Additional Finance (P154713)(in USD Million)

[X] Loan [ ] Grant [ ] IDA Grant

[ ] Credit [ ] Guarantee [ ] Other

Total Project Cost:	23.00	Total Bank Financing:	18.00
Financing Gap:	0.00		

Financing Source – Additional Financing (AF)	Amount
Borrower	5.00
International Bank for Reconstruction and Development	18.00
Total	23.00

Policy Waivers

Does the project depart from the CAS in content or in other significant respects?	No
Does the project require any policy waiver(s)?	No

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Richard Abdulnour	Team Leader (ADM Responsible)	Senior Water & Sanitation Specialist		GWADR
Jean-Jacques Verdeaux	Procurement Specialist	Lead Procurement Specialist		GGODR
Shirley Foronda	Financial Management Specialist	Financial Management Specialist		GGODR
Andrianirina Michel Eric Ranjeva	Team Member	Financial Officer		WFALA
Arbi Ben Achour	Safeguards Specialist	Consultant	Social Safeguards Specialist	GSURR
Claudine Kader	Team Member	Program Assistant		GWADR
Jean-Charles Marie De Daruvar	Counsel	Senior Counsel		LEGAM
Markus Vorpahl	Safeguards Specialist	Senior Social Development Specialist	Social Safeguards Regional Coordinator	GSURR
Mohamed Ghourabi	Environmental Specialist	Consultant	Environmental Safeguards Specialist	GENDR
Shingira Samantha Masanzu	Counsel	Counsel		LEGAM
Taoufiq Bennouna	Environmental Specialist	Sr Natural Resources Mgmt. Spec.	Environmental Safeguards Regional Coordinator	GENDR

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

Tunisia	Governorate of Ariana	Raoued		X	
Tunisia	Governorate of Ariana	Borj et Touil		X	Adjoining Irrigation Perimeter

Institutional Data

Parent (Tunisia Northern Tunis Wastewater Project-P117082)

Practice Area (Lead)

Water

Contributing Practice Areas

Cross Cutting Topics

[X] Climate Change

[ ] Fragile, Conflict & Violence

[ ] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Wastewater Collection and Transportation	95		
Public Administration, Law, and Justice	Public administration-Water, sanitation and flood protection	5		
Total		100		

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Environment and natural resources management	Pollution management and environmental health	100
Total		100

Additional Financing Tunisia - Northern Tunis Wastewater Project Additional Finance (P154713)

Practice Area (Lead)

Water

Contributing Practice Areas

Cross Cutting Topics

[X] Climate Change

[ ] Fragile, Conflict & Violence

[ ] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Wastewater Collection and Transportation	100	30	
Total		100		

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Environment and natural resources management	Pollution management and environmental health	70
Environment and natural resources management	Water resource management	30
Total		100

I. INTRODUCTION

1. This Project Paper seeks the approval of the Executive Directors to provide an additional loan in an amount of EUR 16.20 million (US$18 million equivalent) to the **Tunisia: Northern Tunis Wastewater Project** (Loan 7917-TN).

2. The proposed additional financing (AF) would help finance the cost overrun associated with the construction of a six kilometer long submarine outfall, a critical component of the transfer system to provide an environmentally safe disposal system for the treated wastewater in the North of Tunis. The additional loan would close on December 31, 2019, thereby extending the duration by 30 months to allow sufficient time for the outfall and project activities to be completed.

3. Concurrently with the AF, the project will be restructured to: (i) simplify the PDO and update the Results Framework; (ii) revise the project description of activities; (iii) update financial covenants; (iv) reallocate the proceeds of the Loan; and (v) extend the closing date of the original Loan by thirty months, to December 31, 2019.

II. BACKGROUND AND RATIONALE FOR ADDITIONAL FINANCING

A. Project background

4. Tunisia remains one of the most advanced countries in the MENA region in terms of water management policies. The country has achieved remarkable results in water supply and sanitation, with all of the urban population and 90 percent of the rural population having access to potable water, and 85 percent of the urban population having access to improved sanitation services. Its two national utilities for water supply and sanitation services have historically provided satisfactory standards of services to the population, and established themselves among the best performers in the region. The country also made considerable efforts to mobilize its limited water resources, including through the promotion of innovative techniques such as aquifer recharge and wastewater reuse.

5. However, this system, particularly the sanitation sector, has come under increasing strain in recent years. As of 2015, although 86 percent of the volume of wastewater collected (96 million cubic meters) was treated in the existing wastewater treatment plants (WWTPs) of Greater Tunis (around 2.3 million inhabitants), the infrastructure did not allow for proper treatment and disposal of the effluents. This has mainly been due to:

(a) Increasingly strained human and financial resources due to years of under-staffing and insufficient recruitment, as well as constraints to increase tariffs to an adequate level;

(b) Several of the existing plants are chronically overloaded, and do not include nitrogen and phosphorus removal in the current treatment processes, with limited resources to rehabilitate or upgrade them. Projects to build additional capacity to alleviate the strain on existing WWTPs have suffered significant delays and have not yet come online (see 6(b));

(c) Lack of appropriate solutions for efficient disposal of treated wastewater (TWW), as comprehensive efforts to promote reuse are nonetheless far from sufficient to address the entire volume of TWW, while only a limited number of submarine outfalls have been built to date.

6. The coastal and marine ecosystems in Tunisia are therefore, increasingly threatened by the combination of (sometimes untreated) wastewater discharges as well as diffuse pollution from agricultural drainage. As the Gulf of Tunis is by far the biggest pollution "hot spot"[1] in the country, resulting in significant adverse economic and environmental impacts, ONAS developed a master plan for wastewater collection, treatment and discharge for Greater Tunis which includes:

(a) The transfer of the treatment load of approximately 700,000 inhabitants in Tunis West from the existing Northern Tunis WWTP system to a large new WWTP, situated at El Attar, which came partially online in January 2016[2] after significant delays, and is now scheduled to be fully completed in 2017;

(b) The upgrade and rehabilitation of a number of existing WWTPs, including the critical Choutrana I and II WWTPs, to increase the current system's performance (currently planned to be completed by 2016);

(c) The construction of a submarine outfall in the North of Tunis to discharge the 70 million cubic meters of wastewater treated by its system of WWTPs in an environmentally safe manner, complemented by the rehabilitation of the upstream TWW transfer section located between the existing WWTPs and the pumping station of Borj Touil (financed by the European Investment Bank (EIB), currently planned to be completed by 2018).

7. In that regard, the Government of Tunisia (GOT) also made it a national priority to develop the use of treated wastewater as a non-conventional source of water for agriculture and, wherever feasible, groundwater recharge[3], mainly as an alternative resource to cope with increasing water scarcity, but also aiming at minimizing treated wastewater discharge in the Mediterranean Sea. In 2010, TWW was being reused for the irrigation of 9,000 hectares of land, including 760 hectares of golf courses, and 340 hectares of parks – significant results when compared with the rest of the region, yet far from its full potential. The development of TWW reuse was bolstered by the adoption in 2010 of a national program aiming to rehabilitate existing irrigation areas and develop new areas reusing TWW in agriculture. The objective of this program was to increase the national rate of TWW reused in agriculture from the initial 30 percent to 50 percent of the volume of TWW produced in Tunisia. The first tranche of investments under this program included the rehabilitation (3,200 hectares) and extension (400 hectares) of the Borj Touil irrigation perimeter,

[1] The Tunisian coast has been identified as a pollution "hot spot" for priority investments under the Mediterranean Sea Large Marine Ecosystem Strategic Partnership, a joint initiative of the countries of the Mediterranean Sea basin to address shared environmental problems.

[2] The El Attar WWTP was financed under the Tunis West Sewerage Project, Loan 7397-TN, which closed on June 30, 2015, as works on the WWTP had been suspended for several years and not completed on-time. Works resumed in September 2016 under GOT financing, and the WWTP is progressively coming online as they are completed. Treatment capacity reached an estimated 40,000 cubic meters per day in June 2016.

[3] Tunisia XIth National Development Plan (2007 - 2011)

and of other irrigation perimeters located in the South of Tunis. In Borj Touil, farmers already reused a small portion (around 5 percent) of TWW from Northern Tunis WWTPs, but with very low intensification rates, as drainage and irrigation infrastructure have aged. At the time of appraisal of the Northern Tunis Wastewater project in 2010, a parallel project was being prepared by the Ministry of Agriculture, to finance the rehabilitation and extension of the Borj Touil irrigation perimeter, under the responsibility of the Ministry and its local agencies. The objective was to afford the project a strong demand base for reuse of its treated wastewater as well as the opportunity to develop effective coordination mechanisms between ONAS (the National Sanitation Utility) and the Ministry of Agriculture, however the project never materialized.

8. Since 2011, neither the development of reuse of treated wastewater, nor the modernization of the irrigation sector have made any significant progress. There have been recurring problems with the quality and timely availability of the TWW to irrigation perimeters, resulting in significant resistance from farmers to increase its usage. The integration of treatment station projects and irrigated perimeters has remained poor, and coordination between ONAS and the departments within the Ministry for Agriculture in charge of irrigation has been insufficient.

9. The Greater Tunis area continues to face significant challenges in the implementation of an ambitious strategy to improve its wastewater treatment infrastructure, promote the reuse of TWW in agriculture, and safely manage its wastewater seashore discharge in the Gulf of Tunis. Presently, polluted discharges at the Raoued Beach continue to increase adverse social and environmental impacts to the approximately 50,000 neighboring inhabitants, while constraining opportunities for growth and jobs through increased tourism and economic development.

B. Current Project description

10. The Northern Tunis Wastewater Project was approved on June 17, 2010, and became effective on April 14, 2011. The original project funds amounted to US$60.03 million (US$52 million under Loan 7917-TN, and US$8.03 million under GEF Grant TF096891), which, with the addition of US$8.6 million in taxes financed by ONAS, amounted to a total project cost of US$68.63 million. Current project funds amount to US$47.43 million (US$39.4 million under Loan 7917-TN[4], and US$8.03 million under GEF Grant TF096891), which, with the addition of US$5.57 million of taxes financed by ONAS, amounts to a total project cost of US$53 million. Detailed project costs are presented in Annex 2. The original closing date was December 31, 2015; the original Loan (7917-TN) was extended once to June 30, 2017, while the GEF Grant was extended once to June 30, 2016 and is now closed.

11. The original Project Development Objectives (PDO) were: to (a) provide an environmentally safe disposal system for the treated wastewater which will not be reused in agriculture in the North of Tunis, and (b) increase the quantity and quality of treated wastewater made available to farmers to encourage its reuse in agriculture in the Borj Touil area. Similarly, the Project's Global Environment Objective (GEO) was to support increasing the reuse of treated wastewater in agriculture, thereby reducing treated wastewater discharge from Greater Tunis into the Gulf of Tunis, an environmentally sensitive area of the Mediterranean Sea.

[4] The Project was restructured in May 2014, including the cancellation of US$ 12.6 million of Loan proceeds (see para 18).

12. The existing system of WWTPs in the North of Tunis is currently saturated, and discharges 70 million cubic meters of low quality TWW into the open air El Khelij canal. As it flows through the canal, it is mixed with storm water, irrigation drainage, local discharge of untreated wastewater, and unregulated solid waste disposal, which have increased since 2011. TWW quality thereby further deteriorates, as biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended solids and fecal coliforms levels in the TWW flow significantly exceed acceptable thresholds, resulting in adverse social and economic impacts. The canal then flows along the residential areas of the increasingly urbanizing city of Raoued, before reaching the shoreline and discharging immediately into the Gulf of Tunis at Raoued Beach, which is now heavily contaminated and where informal fishing and animal grazing are still active.

13. The project is designed to remedy this situation through the construction of a 12 kilometer transfer system for the 70 million cubic meters of TWW from the Northern Tunis urban area. The main component of this system is a six kilometer submarine outfall, the size and length of which are unprecedented in Tunisia, and on par with complex international marine infrastructure projects.

14. Nevertheless, in order to reduce as much as possible the flow of TWW discharged through the outfall, the project seeks to increase the reuse of TWW prior to its discharge, in particular by farmers in the contiguous Borj Touil area, as well as developers and municipalities. To achieve this, the project aims to tap into unmet demand for better quality and reliability of TWW; though farmers have been reusing this TWW for many years, they have complained repeatedly about the poor quality of TWW, in particular in terms of suspended solids, as it damages irrigation equipment. The project design therefore includes a segregation mechanism to allow farmers or other potential users to access only TWW which is of acceptable quality, and a small-scale reuse pilot in the Sidi Amor area to test coordination mechanisms among stakeholders involved in TWW at a local scale (ONAS, Regional Agriculture District, farmers) and create the conditions for increased uptake by farmers.

15. The Project, implemented by the national sanitation utility (ONAS), therefore, consists of the following:

(a) Part A: transfer of treated wastewater to increase its reuse in agriculture (initially US$23 million, revised to US$11 million in 2014, including taxes and contingencies). This component focuses on the investments necessary to transfer the TWW from its existing discharge point close to the El Kehlij agriculture drainage canal, through a double pipeline of 1800mm of diameter, up to a 160,000 cubic meter compartmented storage basin from which better-quality TWW will be made available for reuse in agriculture. It also includes a TWW reuse pilot in the Sidi Amor area.[5]

(b) Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea (initially around US$40 million including taxes and contingencies). This component includes (i) one pipeline which will convey the TWW for about 5 km from the storage basin to the Raoued beach following the North side of the El Hissiène Oued; and (ii) a submarine outfall about 6 km long which will discharge the TWW at a depth

[5] This sub-activity was previously included under part C, aiming to strengthen coordination mechanisms among agencies involved in wastewater reuse, in particular ONAS and the Ministry of Agriculture – see section III.

of about 20 meters. The length, depth and point of discharge of the submarine outfall were confirmed by the results of a dispersion modelling study aimed at optimizing the design in order to maximize dilution and mixing of the TWW with the sea water at the point of discharge.

(c) Part C: monitoring and capacity strengthening (initially around US$4 million, including taxes and contingencies). This component includes technical assistance for supervision of works and environmental and water quality monitoring systems in the Project area; consultant services for the reinforcement of human and technical resources, and design studies for a future WWTP in the North of Tunis, or a future transfer of TWW in the South of Tunis.

16. The Project's environmental, economic, and health benefits are therefore highly relevant to the population and environment of the Gulf of Tunis. The Project is expected to directly benefit inhabitants of the Raoued and Ghar el Melah areas, as well as tourists (domestic and foreign), who use the beach and seashore areas for leisure. It is also expected to benefit fishermen and financial harbor investors, workers, inhabitants, and visitors, who may otherwise be negatively impacted by low quality seawaters close to this prime economic development area. Farmers currently irrigating reusing TWW within the Borj Touil Irrigation Perimeter will also benefit from the project, while other potential uses of TWW continue to be explored.

C. Implementation record

17. **Implementation record prior to restructuring.** Immediately upon effectiveness, and during the first years of implementation, project activities suffered from significant delays. These were due in large part to the events of the Arab Spring in 2011 and the ensuing institutional stalemate, combined with the difficult process to initiate the modeling for the submarine outfall, systematic multiplication of national procurement reviews, and exceptionally long delays in the judicial process for the acquisition of one plot of land for the irrigation and regulation basin. Three years into project implementation, in June 2013, the project was in problem status as commitments and disbursements stood respectively at 7 percent and 4 percent, lagging far below initial estimates. ONAS intensified efforts to improve project performance, agreeing on a set of actions and firm, time-bound commitments to: (i) sign all contracts and lift any remaining barriers to works on the ground portion; (ii) finalize the submarine outfall modeling and prepare bidding documents in record time; (iii) finalize the design of activities under the GEF grant to ensure completion by the original December 31, 2015 closing date; and (iv) effectively implement the environmental and social management plan.

18. **Midterm review.** The midterm review (MTR) was conducted in February 2014, and concluded that ONAS had succeeded in implementing corrective actions. The review nevertheless identified a set of adjustments that were deemed necessary for the project to successfully achieve its objectives. In particular, the review noted significant savings on the ground portion, in the amount of US$12.6 million, as contracts were progressively signed and costs came in on average around 50 percent lower than initial estimates. These savings were proposed for cancellation as it was deemed unwise to finance additional activities that could have drawn resources away from the project's core activities, thereby jeopardizing its ongoing recovery. Funding allocated to the marine portion was preserved, and corresponding contingencies were increased to account for an

important level of uncertainty as marine infrastructure is a complex undertaking. As a result, the Project was restructured (Level 2) in May 2014, including a reallocation of proceeds between Grant and Loan-funded activities, an 18 month extension of the closing date to June 30, 2017, and the partial cancellation of unallocated Loan proceeds in the amount of US$12.6 million.

19. **Implementation record following restructuring.** Close monitoring of project implementation following the restructuring showed that there had been demonstrable progress, resulting in an upgrade of project ratings in June 2014. Following the MTR in February 2014 and project restructuring in May 2014, as well as a confirmation of a sustained recovery of project implementation, Implementation Progress (IP) and Development Objective (DO) ratings were upgraded to "moderately satisfactory" in the Implementation Status and Results Report (ISR) of June 8, 2014. Several critical implementation milestones were met:

(a) All contracts for the ground portion (goods, works, and technical assistance) were signed by March 2014, and previously intractable impediments were resolved by May 2014 as a result of ONAS proactivity, as exceptionally long processes outside of ONAS control were concluded. This was quickly followed by a start of works on the upstream transfer pipelines and regulation basin (both financed under the GEF grant), and the downstream pumping station and supply of pipes;

(b) Regarding the submarine outfall, the modeling of outfall discharge, including wave modeling, was mostly concluded in March 2014 and largely confirmed the appropriateness of project design. The prequalification process was conducted in parallel, leading to the selection of three firms qualified to bid. Modeling conclusions were quickly integrated into bidding documents, enabling ONAS to launch the bidding process for the submarine outfall in early June 2014, in accordance with the agreed MTR timeline, thereby confirming that the project was back on track towards successful achievement of objectives;

(c) Implementation of environmental and social safeguards remained satisfactory, as the technical assistance for the supervision of the environmental management plans for the ground and marine portions is fully mobilized.

20. **Recent implementation record of activities financed under the GEF Grant.** In December 2015, the GEF Grant's closing date was extended to June 30, 2016. Corresponding activities, aiming to foster TWW reuse, have been completed by the revised closing date, with 90 percent disbursed, most of it achieved in the past 18 months. This includes the upstream double pipelines (approximately 15 percent of Grant commitments), the storage and regulation basin (approximately 60 percent of Grant commitments), and delivery of maintenance equipment (approximately 15 percent of Grant commitments). The reuse pilot, which was designed, contracted, and initiated in record time, has already successfully fostered coordination between stakeholders (ONAS, Ministry of Agriculture, farmers, etc.), and is now pending final testing.

21. **Recent implementation record of activities financed under the IBRD Loan, including the signing of the contract for the submarine outfall.** The construction of the pumping station, the supply, and the installation of 4.2 kilometers of pipes downstream of the basin and upstream of the coast, are ongoing**.** Bidding for the submarine outfall took place in 2014. On September 9,

2014, ONAS received two bids. The lowest bid, around TND 67.5 million (exclusive of taxes), was above initial estimates. ONAS proceeded to evaluate the bids, and determined in particular that the significant increase compared with its original estimate was due to a combination of factors, including: (i) for its initial estimate, ONAS used cost ratios based on average costs of domestic production of pipes observed during construction of recent, yet much smaller outfalls built in Tunisia, (ii) extensive consultations during the review of the submarine outfall modeling and design, led to more stringent environmental and technical constraints than expected, and (iii) market variability during the period of time between the appraisal of the original project (2010), and the bidding for the submarine outfall (2014). During appraisal of this additional financing, the Bank reviewed the cost analysis provided by ONAS, and confirmed that the projected cost of the submarine outfall was reasonable and in line with international benchmarks. A lengthy and complex evaluation process ensued. The Bank gave its no-objection to the recommendation for award on February 24, 2016. The contract was subsequently signed by ONAS on May 20, 2016.

D. Project performance

22. **Current implementation status.** As of June 30, 2016, project commitments stood at 100 percent, whereas overall physical progress stood around 33 percent, and disbursements stood at 32 percent (US$14.9 million). More specifically:

(a) Activities financed under the GEF grant have been completed and are expected to be fully-disbursed by the end of the disbursement period on October 31, 2016.

(b) Activities financed under the IBRD Loan have been fully committed since the signing of the submarine outfall contract on May 20, 2016, which represents 70 percent of current Loan allocations. These activities are 20 percent completed and disbursed (US$7.8 million) since outfall construction works have not started yet.

23. **Current assessment of Project performance.** The Project is currently rated "moderately satisfactory" for IP and DO. In particular, ONAS has signed the contract for the submarine outfall on May 20, 2016, thereby demonstrating the client commitment to implement the project. Implementation of all other Project activities has continued to progress satisfactorily. Nonetheless, the ISR sub-rating for Procurement was rated "moderately unsatisfactory", while the signing of the outfall contract was pending between November 2015 and April 2016, and was upgraded to "moderately satisfactory" in the next ISR since the contract was signed. The borrower has an overdue statutory audit report covering fiscal year 2015, which was due June 30, 2016. During negotiations it was agreed that ONAS will submit an overdue statutory audit report by September 30, 2016. There is otherwise general compliance with remaining key loan covenants, including project audit and financial management reporting requirements.

E. Rationale for Additional Financing

24. **The transfer infrastructure is at risk of not being completed under current Project financing.** Based on ONAS' bid evaluation report (BER) and revised procurement plan, the total cost of the submarine outfall exclusive of taxes would be around TND 67.5 million (equivalent to

US$33 million using current exchange rates[6]) compared with an original estimate, excluding taxes, of TND 36 million (US$17.6 million), leading to an estimated cost overrun of US$15 million. An additional financing for US$18 million was requested to cover this cost overrun, without which ONAS would be unable to complete the submarine outfall. In addition, the continued economic justification of the Project was confirmed as the updated economic analysis shows that the Project remains economically justified with a net present value (NPV) of about TND 101 million over 25 years (using a 8 percent discount rate), a Present Value (PV) benefit/cost ratio of about 210%, associated with an economic rate of return (ERR) of 17.5 percent (See Appraisal Summary for further details on technical and economic appraisal).

25. **The Project would not achieve its developmental objectives without the AF.** The Project's main aim is to provide an environmentally safe disposal system for the treated wastewater in the North of Tunis. Overall, it will contribute to the strategic goals of ending extreme poverty and boosting shared prosperity in a sustainable manner as it will: (i) reduce adverse social and environmental impacts in the poorer areas of Northern Tunis, while also (ii) providing significant opportunity for economic growth through increased tourism and economic development. To achieve these objectives, the submarine outfall is a critical component of the transfer system financed under the Project, as without it treated wastewater would continue to be discharged at the Raoued Beach causing serious additional health and environmental damage. The AF is therefore essential to the achievement of the project's developmental objectives and higher-level objectives as it is the only alternative available to ONAS to fund the contract for the design, supply and construction of the submarine outfall. Furthermore, such unmet expectations, exacerbated by the delayed completion of the critical El Attar wastewater treatment plant in Tunis West[7] (now expected to be completed in 2017), could fuel negative local perceptions, at a time of great need and demand for improved sanitary and environmental conditions in the Greater Tunis area.

26. **Estimate of resources needed and government commitment.** In February 2015, ONAS requested additional financing in the amount of US$25 million. This amount was revised downward during appraisal and negotiations, to US$18 million (consisting of the US$15 million cost overrun, in addition to US$3 million in contingencies, exclusive of taxes[8]), as the cost overrun and undisbursed contract payment amounts were adjusted downwards due to the substantial depreciation of the Tunisian dinar since May 2015, as well as changes to the implementation timeline. The closing date is being extended to December 31, 2019. ONAS has now signed the contract for the design, supply and construction of the submarine outfall, which should enable smooth and successful completion of the transfer infrastructure.

27. **Continuity of Safeguards instruments.** The project is a Category A operation. The Additional Financing would not trigger new safeguards policies, change safeguard categories or raise safeguard-related issues compared to the parent project. The existing instruments continue to be adequate, and overall safeguards requirements are complied with and there has been no deviation of safeguards during implementation (see Appraisal Summary). In particular, (i) in compliance with OP 4.01, the Environmental and Social Impact Assessment (ESIA), as revised

[6] TND has depreciated around 20 percent since appraisal. The TND/US$ exchange rate stood at 1.65 when the Project was appraised, 1.8 at the time the request was submitted, and 2.05 as of August 1, 2016.
[7] The El-Attar WWTP was financed under the Bank's Tunis West Sewerage Project (Loan 7397-TN), which closed unsatisfactorily in June 30, 2015, due in particular to complex contractual issues (see Report No: ICR00003586)
[8] Taxes are financed by the Borrower – see table of costs in Annex 2 for more detail.

upon completion of the dispersion modeling studies per article C.4 of Section II of Schedule 2 of the legal agreements, is implemented satisfactorily; and (ii) in compliance with OP 4.12 and in accordance with the Land Acquisition Plan (LAP), a single plot of privately-owned land was taken in 2014 for the site for the storage and regulation basin. While the current land owners have not yet been compensated as the resolution of an ongoing title dispute follows due process, with close monitoring by ONAS and support by the Bank, final access to compensation is expected to be completed by December 31, 2016, while the full compensation amount is in escrow (see Appraisal Summary).

28. **Sustainability of the transfer infrastructure.** The sustainability of the transfer infrastructure built under the project is contingent on the continued broader performance of ONAS. The level of cost recovery of the operation and maintenance (O&M) costs of ONAS, which draws its revenues mainly from the sanitation tariff collected through water bills, has remained steady in recent years. As the updated financial analysis shows (see Appraisal Summary), full cost recovery is reached thanks to the Government's commitment to cover the remaining operating deficit through an annual transfer of funds. The Bank closely monitors the financial sustainability of ONAS, as its working and current ratios remain compliant with specific financial covenants, while continuing to engage with ONAS on its long-term strategy, and the potential of its resources to achieve its vision and objectives. In particular, the Bank is currently supporting ONAS under Tunisia's strategic shift towards public-private partnerships as the most efficient and sustainable way to upgrade, improve and properly manage its wastewater collection and treatment system, and is exploring the possibility of supporting its strategic update for 2035.

29. **Sustainability of the environmental impacts of the project.** The materialization of the intended economic benefits of the Project (described in para 16 and in Annex 3) is contingent on the continued successful implementation of its master plan for wastewater collection (described in para 6), as it increases its collection and treatment capacity, rehabilitates its current infrastructure, and mitigates any residual impacts from TWW through the project. In addition, a diagnostic of other, minor sources of pollution is underway, and aims to identify complementary remediation actions, to fully-leverage the expected elimination of TWW discharge in the project area. Implementation of these actions will be coordinated with other institutions (environmental monitoring agency, coastal protection agency, among others) under the active inter-institutional consultation process of the Environmental and Social Management Plan (ESMP). Such actions would also minimize the risk that beneficiaries misperceive the impact of the project, as the expected positive impacts of reduced TWW could be overshadowed by even minor sources of pollution outside of the purview of ONAS.

30. **Sustainability of the promotion of reuse.** Increasing water scarcity puts the spotlight on treated wastewater reuse, which can only be leveraged through increased inter-institutional coordination and reduced regulatory constraints. Efforts to date under the project have led to: (i) demonstration of potential for treated wastewater reuse, including awareness raising of farmers; (ii) constructive dialogue between agriculture services and ONAS to leverage infrastructure being built for large-scale experimentation and policy dialogue; and (iii) improved prospects for the rehabilitation of existing irrigation perimeters in the vicinity of ONAS WWTPs. ONAS will continue to expand its purview in order to contribute to reducing the institutional constraints to the establishment of a more conducive enabling environment for reuse. More attention will continue

to the broad sector dialogue with multiple institutional partners (Agriculture, Environment, Health, and others).

31. **Risk assessment (SORT).** Overall implementation risk is high, driven mainly by Implementing Agency fiduciary capacity risks due to complex procurement and inherent design risks linked to the sensitive nature of the submarine outfall infrastructure, as well as substantial political and governance risks, environment and social, and stakeholder risks (see Section III – Risks, and Appraisal Summary). The main mitigation measures include consistent strategic and technical support, including utility modernization, through public-private partnerships, broad sector dialogue on complex treated wastewater reuse issues, and effective implementation of environmental and social management plans.

III. PROPOSED CHANGES

Summary of Proposed Changes	
ONAS requested an Additional Financing of US$ 18 million, and a 30 month extension of the closing date, to December 31, 2019. The proposed AF would help finance the cost overrun associated with the construction of a 6 kilometer long submarine outfall in the North of Tunis. The related extension would allow sufficient time to complete and operate the transfer infrastructure. A project restructuring is being processed concurrently with the Additional Financing to: (i) simplify the PDO and update the results framework, (ii) revise the description of project activities, (iii) harmonize legal covenants on maintaining adequate financial ratios, (iv) re-allocate Loan proceeds to reflect the changes to the components' costs, and (v) extend the closing date of the original Loan by 30 months, to December 31, 2019.	
Change in Implementing Agency	Yes [ ] No [X]
Change in Project's Development Objectives	Yes [X] No [ ]
Change in Results Framework	Yes [X] No [ ]
Change in Safeguard Policies Triggered	Yes [ ] No [X]
Change of EA category	Yes [ ] No [X]
Other Changes to Safeguards	Yes [ ] No [X]
Change in Legal Covenants	Yes [X] No [ ]
Change in Loan Closing Date(s)	Yes [X] No [ ]
Cancellations Proposed	Yes [ ] No [X]
Change in Disbursement Arrangements	Yes [ ] No [X]
Reallocation between Disbursement Categories	Yes [X] No [ ]
Change in Disbursement Estimates	Yes [X] No [ ]
Change to Components and Cost	Yes [X] No [ ]
Change in Institutional Arrangements	Yes [ ] No [X]
Change in Financial Management	Yes [ ] No [X]
Change in Procurement	Yes [X] No [ ]
Change in Implementation Schedule	Yes [X] No [ ]
Other Change(s)	Yes [X] No [ ]

Development Objective/Results
Project's Development Objectives
Original PDO
The project development objectives of the Project are to: (a) provide an environmentally safe disposal system for the treated wastewater which will not be reused in agriculture in the North of Tunis; and (b) increase the quantity

and quality of treated wastewater made available to farmers to encourage its reuse in agriculture in the Borj Touil area.

Global Environmental Objectives

Original GEO (no change)

The global environmental objective of this project - a part of the Sustainable Med Program - is to support increasing the reuse of treated wastewater in agriculture, thereby reducing treated wastewater discharge from Greater Tunis into the Gulf of Tunis, an environmentally sensitive area of the Mediterranean Sea.

Change in Project's Development Objectives

Explanation:

The Project's major objective is to remediate the discharge of non-compliant treated wastewater in open canals towards the Mediterranean shoreline, which has resulted in heavily contaminated and unsanitary coastal areas, as captured under the first component of the PDO. It also aims to minimize volumes discharged by promoting the reuse of treated wastewater in the area, which is captured under the second component of the PDO, and the GEO. It is hereby proposed to simplify the latter part of the PDO, to better capture the expected outcome of the project.

The transfer infrastructure was designed to allow the reuse of a significant portion of the treated wastewater, mainly through the construction of a 160,000 cubic meter regulation basin at the junction with the Hissiene drainage canal. ONAS would thereby make additional treated wastewater available for reuse by farmers, in Borj Touil or beyond, as well as developers or municipalities willing to connect to the regulation basin, while leveraging the results of the pilot it is implementing in the Sidi Amor area, to demonstrate the combination of factors that can lead to improved coordination and increased farmer uptake.

Proposed New PDO - Additional Financing (AF)

The project development objective is to provide an environmentally safe disposal system for the treated wastewater in the North of Tunis and increase availability for its reuse in the Project Area.

Change in Results Framework

Explanation:

The Results Framework has been changed to reflect the PDO simplification and implementation to date, as detailed in Annex 1. The following revisions were introduced:
(i) The focus for the monitoring of efforts to promote reuse will be shifted to explore additional, alternative users for TWW and seek formal agreements with them, rather than measuring volumes reused. Volumes of treated wastewater made available will therefore be defined as nominal annual volumes subject to a formal agreement for their reuse, by farmers, developers or municipality in the vicinity of the Project. This is already the case as an agreement is being considered with the contiguous Financial Harbor project, which would reuse the TWW for irrigation of golf courses in a first phase. The target for this indicator will be set at 3,000,000 cubic meters by December 31, 2019 (the economic analysis shows that the project benefits are not highly sensitive to the achievement of the original intended targets for reuse, as the bulk of economic benefits of the Projects are derived from tourism and economic development);
(ii) The focus of the monitoring of environmental impacts of the project will be refined to target average measurements in addition to conformity wherever it is relevant, and will be revised to better align with the conclusions of the outfall modeling study and the marine ESMP initial-state analysis;
(iii) The number of direct project beneficiaries (mainly population of neighboring areas, and a smaller number of farmers in the Borj Touil area), including the percentage who are women (core indicators), will now be monitored as PDO indicators;
(iv) The percentage of grievances registered related to delivery of project benefits that are actually addressed, will now be monitored as intermediate indicators, in accordance with the Bank's goal to capture citizen engagement and feedback in all IPF projects.

Compliance

Covenants - Additional Financing (Tunisia - Northern Tunis Wastewater Project Additional Finance - P154713)

Source of Funds	Finance Agreement Reference	Description of Covenants	Date Due	Recurrent	Frequency	Action
IBRD	Schedule 2, Section V, Article 1	The Borrower shall maintain, for each of its full fiscal years occurring during the period of implementation of the Project a ratio of total operating revenues to total operating expenses of not less than 0.96. The Borrower shall, by December 31 each year, for each full fiscal year, occurring during the period of implementation of the Project: review whether it will meet the requirements set forth in paragraph (a) in respect of such year and the next following fiscal year; and furnish to the Bank a report, in form and substance satisfactory to the Bank, setting forth: (a) the results of such review, and (b) the actual ratio of total operating revenues to total operating expenses maintained for the preceding fiscal year.		☒	Yearly	Proposed
IBRD-	Schedule 2, Section V, Article 2	The Borrower shall maintain, for each of its full fiscal years, occurring during the period of implementation of the Project, a ratio of current assets to current liabilities of not less than 0.57. The Borrower shall, by December 31 each year, for each full fiscal year occurring during the period of implementation of the Project: (i) review whether it will meet the requirements set forth in paragraph (a) in respect of such year and the following fiscal year; and (ii) furnish to the Bank a report, in form and substance satisfactory to the Bank, setting forth: (A) the results of such review, and (B) the actual ratio of current assets to current liabilities, maintained for the preceding fiscal year.		☒	Yearly	Proposed

Covenants - Parent (Tunisia Northern Tunis Wastewater Project - P117082)

Explanation:

Financial ratios under Section V of Schedule 2 to the Loan and Grant agreements, namely the ratio of total operating revenues to total operating expenses (working ratio) and the ratio of current assets to current liabilities

(current ratio), continue to be relevant to monitor the financial sustainability of ONAS. However, they are currently limited to fiscal years up to and including 2015, limited to the forecast ratios of the fiscal year under consideration and the following one, and in practice reported in an ad hoc manner as reporting procedures were not clarified in the legal agreements. It is therefore proposed that, while keeping ratio definitions intact, the ratios be harmonized to (i) mandate a single threshold for each ratio for all fiscal years under the Project; (ii) mandate the reporting of the actual ratio for the year prior to the year under consideration in addition to the projections for the year under consideration and the following year; and (iii) mandate that the ratios be formally reported in a manner satisfactory to the Bank by December 31 of each year.

Ln/Cr/TF	Finance Agreement Reference	Description of Covenants	Date Due	Status	Recurrent	Frequency	Action
IBRD-79170	Schedule 2, Section I, Article C.4	Upon completion of the dispersion modeling studies, the Borrower shall update and submit to the Bank, for its review, the ESIA and shall publicly disclose the revised ESIA as approved by the Bank.		Complied with	☐		No Change
IBRD-79170		Schedule 2, Section V, Article 1: The Borrower shall maintain a ratio of total operating revenues to total operating expenses of not less than 0.83 for fiscal year ending December 31, 2011; 0.86 for 2012; 0.88 for 2013; 0.91 for 2014 and 0.96 for 2015. A review shall be furnished to the Bank by July 31 in each fiscal year.		Complied with	☐		Revised
IBRD-79170	Schedule 2, Section V, Article 1	The Borrower shall maintain a ratio of total operating revenues to total operating expenses of not less than 0.83 for fiscal year ending December 31, 2010; 0.86 for 2011; 0.88 for 2012; 0.91 for 2013 and 0.96 for 2014 and each fiscal year thereafter occurring during the period of implementation of the Project. The Borrower shall furnish by December 31 each year the review of this requirement in respect of such year and the following (forecast), as well as the previous year (actual).		Complied with	☒	Yearly	Proposed
IBRD-79170		Schedule 2, Section V, Article 2: The Borrower shall maintain a ratio of current		Complied with	☐		Revised

		assets to current liabilities of not less than 0.57 for fiscal year ending December 31, 2011; 0.57 for 2012; 0.59 for 2013; 0.57 for 2014 and 0.59 for 2015. A review shall be furnished to the Bank by July 31 in each fiscal year.					
IBRD-79170	Schedule 2, Section V, Article 2	The Borrower shall maintain a ratio of current assets to current liabilities of not less than 0.57 for fiscal year ending December 31, 2011; 0.57 for 2012; 0.59 for 2013 and 0.57 for 2014 and each fiscal year thereafter occurring during the period of implementation of the Project. The Borrower shall furnish by December 31 each year the review of this requirement in respect of such year and the following (forecast), as well as the previous year (actual).		Complied with	☒	Yearly	Proposed

Risk

Risk Category	Rating (H, S, M, L)
1. Political and Governance	Substantial
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	High
7. Environment and Social	Substantial
8. Stakeholders	Substantial
9. Other	*Not applicable*
OVERALL	High

Finance

Loan Closing Date - Additional Financing (Tunisia - Northern Tunis Wastewater Project Additional Finance - P154713)

Source of Funds	Proposed Additional Financing Loan Closing Date
International Bank for Reconstruction and Development	31-Dec-2019

Loan Closing Date(s) - Parent (Tunisia Northern Tunis Wastewater Project - P117082)

Explanation:

To achieve the PDO, the submarine outfall is a critical component of the transfer system financed under the Project, as without it treated wastewater would continue to be discharged at the Raoued Beach. Based on the updated implementation timeline of the contract for the design, supply and construction of the submarine outfall reviewed by the Bank, a thirty-month extension of the closing date to December 31, 2019 is necessary to allow for contract completion and the satisfying operation of the transfer infrastructure.

Ln/Cr/TF	Status	Original Closing Date	Current Closing Date	Proposed Closing Date	Previous Closing Date(s)
IBRD-79170	Effective	31-Dec-2015	30-Jun-2017	31-Dec-2019	30-Jun-2017
TF-96891	Effective	31-Dec-2015	30-Jun-2016	30-Jun-2016	30-Jun-2016

Change in Disbursement Estimates (including all sources of Financing)

Explanation:

Disbursement estimates were revised to account for changes in the implementation timeline of the submarine outfall contract in particular.

Expected Disbursements (in USD Million)(including all Sources of Financing)

Fiscal Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Annual	0.13	0	0.14	2.15	3.6	4.98	19	27.4	8	0
Cumulative	0.13	0.13	0.27	2.42	6.2	11	30	57.4	65.4	65.4

Allocations - Additional Financing (Tunisia - Northern Tunis Wastewater Project Additional Finance - P154713)

Source of Fund	Currency	Category of Expenditure	Allocation	Disbursement %(Type Total)
			Proposed	Proposed
IBRD	EUR	Goods, works, and consultants' services under the Project	16,159,500 *(USD 17,954,900 equivalent)*	100 (exclusive of taxes)
		Front-end Fee	40,500 *(USD 45,100 equivalent)*	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
		Total:	16,200,000 *(USD 18,000,000 equivalent)*	

Reallocation between Disbursement Categories

Explanation:

Original loan proceeds will be reallocated among the categories of expenditures to reflect modifications in project description, and existing categories of expenditures will be replaced with a single category for all activities under the project.

The proposed allocations for the existing Categories match the respective disbursement and outstanding commitment amounts for each category, thereby prohibiting any future disbursement against those henceforth void Categories.

Disbursement percentages are exclusive of taxes.

Ln/Cr/TF	Currency	Current Category of Expenditure	Allocation		Disbursement %(Type Total)	
			Current	Proposed	Current	Proposed
IBRD-79170	USD	GOODS	2,178,000	2,178,000	100	100
IBRD-79170		WORKS UNDER PARTS A.2 & A.3 *(Pro Memoria)*	0	0	100	100
IBRD-79170		WORKS UNDER PARTS B.1 & B.2 *(Pro Memoria)*	0	0	100	100
IBRD-79170		CS UNDER PART B.3 *(Pro Memoria)*	0	0	100	100
IBRD-79170		CS UNDER PARTS C.2 & C.3 *(Pro Memoria)*	0	0	100	100
IBRD-79170		GOODS Parts A1;A2;A3;B1 & B2 *(Pro Memoria)*	5,322,000	**1,160,000**	100	100
IBRD-79170		WORKS Parts A3;B1 & B2 of projects *(Pro Memoria)*	28,770,000	**572,100**	100	100
IBRD-79170		CONSULTING Services Parts B3;C3 &C5 *(Pro Memoria)*	3,000,000	**160,600**	100	100
IBRD-79170		Designated Account	0	0		
IBRD-79170		FRONT END FEE	130,000	130,000		
IBRD-79170		Goods, works, and consultants' services for the Project	0	**35,199,300**	0	100
		Total:	39,400,000	39,400,000		

Components

Change to Components and Cost

Explanation:

Project description was revised to: (i) update reuse-oriented activities and group them under Part A, and (ii) reinforce capacity-building activities under part C. Indeed, the range of reuse-oriented activities has evolved significantly since appraisal. In particular, during the May 2014 restructuring, the design of reuse coordination mechanisms was finalized to include a small-scale reuse pilot to lay the groundwork for an enabling environment for reuse.
Under this restructuring, Part A, which is the "Transfer of treated wastewater (TWW) to increase availability for its Reuse", would consist of:
A.1 - Installation of two (2) parallel pipelines to convey TWW from the current discharge point at the El Khelij Canal in the Project Area and along an existing road to a storage and regulation basin, and technical assistance for the supervision of installation.
A.2 - Construction of a two-compartment basin for storage of TWW, and technical assistance for the supervision of its construction.
A.3 - Strengthening the coordination mechanisms among stakeholders involved in wastewater reuse, including through designing and developing a reuse pilot in the Project Area, related dissemination activities, training, and technical assistance for the supervision of said pilot.
A.4 - Provision of equipment necessary to ensure the quality operation and appropriate maintenance of the pipelines and basin installed under this Part A of the Project.

Part B, which is the "Improvement of the discharge of TWW in the Mediterranean Sea", would consist of construction of infrastructure for the discharge of TWW in the Mediterranean Sea, including through:
B.1 - Construction of a pumping station and installation of one (1) pressure pipeline to convey TWW, following the north bank of the El Hissiène Oued in the Project Area, to the location of the submarine outfall referred to in paragraph 2 below.
B.2 - Construction of a submarine outfall in the Mediterranean Sea of approximately six (6) kilometers in length to discharge TWW at a depth of approximately twenty (20) meters.
B.3 - Conducting a detailed review of the design of the submarine outfall and provision of technical assistance for the supervision of its construction.

Part C would comprise all capacity building consultant services and studies, including continuation of the development of the IT billing system and financial model which were financed under the Tunis West Sewerage Project (P099811), which closed on June 30, 2015. Part C will now be composed of:
C.1 - Strengthening the environmental monitoring systems in the Project Area.
C.2 - Designing and implementing capacity-building activities, including the development of an information system for water and sanitation customer management and billing, a financial modeling tool and carrying out of other institutional strengthening activities.
C.3 - Preparing detailed designs for a submarine outfall in the south of Tunis for the discharge of wastewater and a new wastewater treatment plant in the north of Tunis.

Compared with initial Project description, the main changes are:
(i) Strengthening reuse coordination mechanisms is switched from Part C (previously C.2 and C.4) to Part A under A.3.
(ii) Construction of a pumping station is switched from Part A (previously A.3) to Part B under B.1, as it is not oriented towards reuse.
(iii) Capacity-building activities previously financed under the Tunis West Sewerage Project, including the customer and billing system, are included in Part C under C.2.

(iv) Parts C.4 (previously reuse, now under A.3) and C.5 (previously implementation support, now under each respective activity), are consequently voided.

Current Component Name	Proposed Component Name	Current Cost (US$M)	Proposed Cost (US$M)	Action
Part A: transfer of treated wastewater (TWW) to increase its reuse in agriculture	Part A: transfer of treated wastewater (TWW) to increase availability for its reuse	11.00	12.00	Revised
Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea	Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea	37.50	55.00	Revised
Part C: monitoring and capacity strengthening	Part C: monitoring and capacity strengthening	4.50	6.00	Revised
	Total:	53.00	73.00	

Other Change(s)

Change in Procurement

Explanation:

The Procurement and Consultant Guidelines published in January 2011 and revised in July 2014 would be used for any new tender initiated after signing of the Loan Agreement for the additional financing. The Procurement and Consultant Guidelines published in May 2004 and revised in October 2006 and May 2010, which were in effect for the original Loan, would continue to be used for ongoing contracts or tenders initiated, prior to signing of the additional loan.

Change in Implementation Schedule

Explanation:

The implementation schedule has been updated to reflect the submarine outfall contract's new timeline and the new closing date. The contract was signed in May 2016. Works on the ground portion, as well as overseas production of pipes would start in the fall of 2016. Pipes would then be transported to Tunisia by sea, and installation of the submarine pipeline would effectively start in the summer of 2017 and be completed by end of 2018 (when accounting for some weather-related contingency, as marine works are complex, and installation is highly sensitive to weather conditions). Subsequent testing and full commissioning would be completed by the new project closing date of December 31, 2019.

Other Changes

Explanation:

The Project Area will now be defined as the Governorates of Tunis, Ariana, Manouba, and Ben Arous, and the adjacent maritime waters to the Governorates of Tunis, Ariana, and Ben Arous, extending up to twelve (12) nautical miles and comprising territorial waters of the Republic of Tunisia.

IV. APPRAISAL SUMMARY

Economic and Financial Analysis

Please describe the change and explain the reason for change:

The Economic and Financial Analysis of the Project was updated to assess the continued economic and financial justification of the Project, despite the increased cost of the submarine outfall.

The updated economic analysis shows that the Project remains economically justified as it yields a net present value (NPV) of about TND 101 million over 25 years with an 8 percent discount rate (similar to the discount rate used for the initial economic analysis), a Present Value (PV) benefit/cost ratio of about 210 percent, associated with an economic rate of return (ERR) of 17.5 percent, which is consistent with ERR at appraisal (15.4 percent in the base case scenario). Project benefits are driven mainly by increased tourism revenue (increased hotel activity), increased number of beachgoers in the area, increased fishing production, improved quality of life, reduced water-borne illnesses, and increased agricultural production. Project therefore impacts a wide range of beneficiaries, including residents of the project area, farmers, fishermen, local tourism industry, as well as Tunis population at large.

A sensitivity analysis was conducted to test the viability of the project. Considering the same increase in cost, the project remains viable with an ERR of 12 percent when the benefits are decreased by 35 percent. In addition, when using a discount rate of 4 percent which recent literature recommends as better suited for projects impacting natural assets, NPV would be multiplied more than twofold.

In addition, the analysis of the financial situation of ONAS was revised in 2014 to take into account its financial statements for fiscal years 2008 to 2012 and update financial projections based on recent evolutions since 2010, namely the 7 percent annual tariff increase that was adopted until 2016. This analysis showed that this increase has only partially slowed down the deterioration of its financial balance prior to government subsides, which have reached TND 79 million (US$48 million) in 2012. Projections under various tariff increase scenarios show that (i) a return to a standard 5 percent annual increase in 2017 would stabilize the subsidy level around TND 120 million (US$73 million) in 2024, (ii) maintaining a 7 percent annual increase would reduce the subsidy level to TND 51 million (US$31 million) in 2024, and (iii) further increasing tariffs by 9 percent annually would virtually eliminate the need for government subsidies in 2024.

Two key indicators remain particularly relevant to monitor the evolution of the financial situation of ONAS, namely a ratio of total operating revenues to total operating expenses (working ratio, excluding depreciation) and a ratio of current assets to current liabilities (current ratio). As the various scenarios demonstrate, cost recovery is highly dependent on adjustment of tariffs, finding additional resources and closely monitoring, planning and controlling the investment program and the operating costs of ONAS. These two ratios will remain as covenants as referred to in Section V of Schedule 2 of the legal agreements.

Technical Analysis

Please describe the change and explain the reason for change:

Submarine outfall:

On September 9, 2015, ONAS received the bids for the design, supply and construction of the submarine outfall. The evaluation conducted by ONAS showed that the total cost of the submarine outfall would be around TND 67 million compared with an original estimate of TND 36 million, leading to an estimated cost overrun of TND 31 million (excluding taxes and contingencies), i.e. around US$15 million using current exchange rates. Further analysis showed that the unit cost proposed for the submarine outfall, around US$6,000 per linear meter, is consistent with construction costs of similar submarine outfalls built

recently in other countries (such as Morocco, Portugal, Senegal, and others), as well as with industry standards. In addition, ONAS analyzed the factors which could explain the discrepancy between the initial estimate and proposed cost. ONAS had based its estimates on its own experience, which is limited to small, local submarine outfalls. Marine infrastructure is complex, and longer outfalls with wider diameters can generate significant cost increases that are difficult to estimate precisely. Moreover, ONAS did not fully account for changes in scope and timing, namely the cost of a deeper pressure chamber requiring thicker and deeper sheet piling, additional environmental mitigation measures such as longer buried length or more protection structures, different work site conditions (30 km farther than initially thought possible), higher equipment mobilization costs and insurance costs, and higher costs of imported pipes. During appraisal of the additional financing, the Bank reviewed the cost analysis in detail, and confirmed that, despite the significant increase compared with the original estimate, the projected cost of the submarine outfall was reasonable, and the factors leading to the significant increase since the appraisal of the parent project were acceptable.

IT billing system:
The implementation of a new joint ONAS-SONEDE IT billing system plays a critical role to modernize the currently outdated revenue collection system of both the water supply and sanitation sectors, a critical step towards strengthening the financial sustainability of both sectors. It is therefore critical to the sustainability of ONAS and its satisfactory implementation is addressed at the highest level of sector dialogue. This activity is jointly implemented by ONAS and SONEDE, under two separate contracts, one for SONEDE, and another for ONAS, with the same contractor, financed under both SONEDE and ONAS Bank-financed projects. This complex set-up resulted in several bidding and implementation delays, as only the first out of four phases were completed by June 30, 2015. The contracts are now progressing towards the pilot phase, and remain closely monitored by the Bank, with the support of a dedicated IT expert for ad hoc reviews in addition to regular implementation support.

Fiduciary Analysis

Please describe the change and explain the reason for change:

The Bank performed a financial management capacity assessment of ONAS's financial management arrangements to support project implementation. This assessment confirmed that the existing financial management arrangements are considered acceptable to the Bank since they are capable of recording all project's transactions and balances, supporting preparing of regular and reliable financial statements, safeguarding the entity's assets and are subject to external auditing reviews acceptable to the Bank.

The proposed AF will be implemented using the same financial management arrangements agreed for the original project, i.e.: budgeting, accounting, internal controls, funds flow, financial reporting and auditing. Therefore oversight for the implementation of financial management arrangements under the AF will remain ONAS's responsibility, as already established for the parent loan. ONAS has wide experience managing Bank-financed projects as well as other international donor funds, and has broad knowledge of Bank's fiduciary requirements as it has successfully managed a number of Bank financed loans and grants. Furthermore, current available information indicates that ONAS financial management performance for the original loan has been systematically rated moderately satisfactory. This is mainly due to shortcomings related to the quality and timeliness of project financial reports which if not properly addressed, could affect the client capacity to provide timely and reliable information required to manage and monitor proper project implementation. Particularly ONAS statutory audit reports for 2012, 2013 and 2014 were regularly submitted to the Bank with important delays and with a qualified opinion related to the inventory of assets. ONAS has updated the action plan to remediate the auditor's findings, which was reviewed and found satisfactory to the Bank. The action plan is already in place and will be closely monitored.

Statutory and project audit reports covering fiscal year 2015 for both the Northern Tunis and Tunis West projects, which were due on June 30, 2016 according to the loan agreements, have not yet been submitted to the Bank. In its letter dated July 18, 2016, ONAS informed the Bank they have not been able to close ONAS annual financial management statements due to factors outside of their control. In fact, figures and balances related to sanitation fees (which represent the main component of ONAS' income statement) and accounts receivable are directly derived from data provided by the national water utility, SONEDE, which relies on an outdated commercial and billing system - dating from the 1980s - which does not allow for timely gathering and consolidation of financial information, notably from commercial agencies. During negotiations the Bank and Tunisian delegations agreed that the statutory audit report would be submitted by September 30, 2016.

The Disbursement arrangements that were in effect for the original Loan have been satisfactory for project implementation and would continue to be used.

Social Analysis

Please describe the change and explain the reason for change:

Land take has been minimized to the extent possible in accordance with Tunisian law, which requires public infrastructure projects of any nature to make maximum use of public lands and only to resort to expropriation when there is no alternative. Care has been taken to avoid affecting existing structures in the project area, in particular living quarters, farms, cultural heritage zones, religious sites or other areas of public value.

As a result, of all the sites of the project, only the site for the storage and regulation basin and the pumping station requires the acquisition of a single plot of privately-owned land, of a total area of around 9 hectares. During parent project appraisal, this single plot jointly belonged to 171 co-owners and was not divided into individual and identifiable lots. The acquired land is halophyte, thus cannot sustain any agricultural and livestock activities. Therefore, the project does not lead to physical displacement, either residential or commercial, of local habitants, nor does it pose any threats to income or livelihoods, or create/intensify poverty or vulnerability.

Therefore, a Land Acquisition Plan (LAP) was prepared to ensure that land acquisition is properly conducted, with due compensation of current owners, and that potential adverse impacts are mitigated, in compliance with OP4.12. The LAP was received by the Bank on February 16, 2010, then disclosed in-country on February 16, 2010, and to the Infoshop on February 19, 2010. The LAP made references to both the Tunisian legislation and regulations and OP 4.12. In essence, the acquisition and compensation processes were conducted exclusively by applying Tunisian regulations. All remaining project sites for the transfer pipelines are situated on public domain, with no people living or working on these lands. Access to these areas follows administrative regulations, and ONAS has obtained the necessary authorizations by the appropriate authorities to access public domain for the execution of the project.

In 2010, ONAS went through the process of seeking willing-buyer willing-seller agreements, which resulted in a compensation offer in accordance with the resettlement plan and at full replacement cost based on prevailing market prices. Given the complex ownership status and documentation limitations, and after extensive consultations with the owners, some of whom rejected the compensation offer, ONAS proceeded with expropriation in the interest of the owners to ensure the transparency of their access to compensation. An expropriations decree was published in October 2012, after a prolonged process due do the 2011 revolution in Tunisia, and ONAS set aside the agreed compensation amount in an escrow account consigned under the Tunisian treasury for that specific purpose. The judicial process for the compensation of the owners of the land was initiated in July 2013 under the jurisdiction of the independent Tribunal of

Ariana. This process experienced several delays, due mainly to frequent hearing adjournments, of up to a month at a time, to allow parties to respond to any new elements of information.

In May 2014, the relevant judicial authority determined that there was no opposition to the project, and that the main reason for these delays were that many owners have difficulty assembling basic ownership documentation or are difficult to reach, delaying transfer of ownership and payment of any compensation. It therefore instructed ONAS to take possession of the land, while it continued its proceedings to resolve the title dispute concerning the clarification of ownership in a timely and equitable manner, helping the owners assemble missing documentation and access their compensation. ONAS proceeded as instructed, taking formal ownership of the land, and works on the basin and pumping station site started in August 2014. Works on the basin were completed by June 30, 2016.

More recently, the main step remaining under the judicial process consisted of mobilizing a panel of independent experts to reevaluate the value of the land. This step took longer than initially estimated, and the work of the experts was only completed in October 2015. The panel recommended that the unit price of land be multiplied by a factor of five. ONAS has responded in writing that it does not contest the findings of the panel and stands ready to top-up the escrow account with the amount corresponding to the differential in value. A hearing took place on April 25, 2016, but the court did not reach a decision as part of the owners were not present or were not represented. A temporary decision was taken by the court on June 26, 2016, to allow sufficient time to ensure that all measures are taken to include absentees in the procedure.

Furthermore, ONAS identified two owners who had been consolidating ownership of the land. However registration of these sales has not been finalized, mainly because the resolution of titling issues requires a separate judicial process under a real estate tribunal, which can only be initiated once the expropriation is completed. Therefore, once the final judicial decision is made public, and the total compensation amount is put in escrow, access to this compensation will either be given to the two owners by name, or to affected parties at large. In the former case, access to compensation is expected to be concluded by December 2016. In the latter case, the two owners would have to complete the registration process prior to accessing their compensation, which could take anywhere between one to two years before it is concluded.

As this independent judicial process follows its course, in compliance with OP 4.12, ONAS and the Bank have agreed on the following set of actions that will ensure that the rights of affected parties are not infringed upon:

(i) Final judicial decision (by the Tribunal of Ariana) – estimated December 2016,
(ii) Top up of escrow account (by ONAS) - estimated January 2017,
(iii) Access to compensation, either directly by the two owners if they are named in the judicial decision – estimated by December 2016 - or after completion of a registration process with the Real Estate Tribunal (by owners' lawyer, with ONAS support) – estimated not before end of 2017.

ONAS continues to monitor and fully document the process, providing assistance in any manner it can to the owners and their representatives, and reporting regularly to the Bank on its progress. In particular, ONAS has committed to closely monitor the final judicial decision which triggers subsequent steps, and update the action plan and keep the Bank informed accordingly.

The borrower's capacity to plan and implement this land acquisition action plan is considered to be strong. ONAS has a "Division Patrimoine et Assurance" (Asset and Insurance Division) with a "Service des Affaires Foncieres" (Land Acquisitions Service Unit) staffed with competent personnel with in-depth knowledge about land acquisition issues and the applicable Tunisian legislation.

Environmental Analysis

Please describe the change and explain the reason for change:

Article C.4 of Section I of Schedule 2 of the Loan and Grant agreements mandates that upon completion of the dispersion modeling studies, the Borrower would update the ESIA and publicly disclose it as approved by the Bank. The dispersion modeling studies largely confirmed project design and did not alter any of the ESIA findings and mitigation measures. The ESIA was therefore updated to reflect this conclusion as well as include a grievance redress mechanism. The revised ESIA was publicly disclosed on ONAS's website on March 10, 2015, and to the Infoshop on March 11, 2015. The corresponding environmental and social management plan is currently being implemented in a manner satisfactory to the Bank.

Risk

Please describe the change and explain the reason for change:

Risk assessment was extensively reviewed during the first project restructuring in 2014, and updated in 2016. Overall implementation risk is now "high", driven mainly by:

(i) Political and governance risks, rated as "substantial": the main risk for Tunisia is the possibility of renewed political instability due to unmet political and social aspirations and from instability in neighboring Libya. In addition, popular perceptions of the state and the bureaucracy remain negative.

(ii) Implementing Agency risks, rated as "substantial": mainly because like other implementing agencies in Tunisia, there is an increasing inability to improve project implementation since the 2011 Revolution, which led to recent unsatisfactory project closings, despite ONAS and GOT recovery efforts since restructuring in 2014. It is not upgraded higher as there are no known fraud and/or corruption risks.

(iii) Fiduciary capacity risks, rated as "high": mainly due to procurement risk, as a result of Tunisia's recurrent duplication of procurement procedures (national legislation and Bank rules), which led in particular to a significant delay over the evaluation of bids for the construction of the submarine outfall.

(iv) Inherent technical design risks linked to the sensitive nature of the submarine outfall infrastructure, rated as "substantial": the construction of a 6 km long, 1,800 mm wide submarine outfall is a complex undertaking.

Additional risks have emerged since restructuring in 2014 and have been flagged for further monitoring:
(i) Sector strategies and policies risk has been increased to "moderate" to reflect shifts in GOT's strategy regarding TWW reuse in the Borj Touil irrigation perimeter. The Bank will continue to monitor project implementation to bolster reuse through alternative mechanisms, such as the reuse pilot being developed in the Sidi Amor area, as well as the establishment of reuse contracts with alternative users such as developers or municipalities.
(ii) Environment and social risk has been increased to "substantial":
(ii)(a) In the case of Environment risk, this is to better reflect the infrastructure's classification as category A. Although the project will improve the current state of the natural and socio-economic environment, potential negative impacts may be significant given the nature and size of proposed works, the complexity of their implementation, the nature and quantity of treated wastewater (70 million m3/year) involved, and the project influence area that goes beyond the location of the outfall into the Gulf of Tunis. The project ESMP accordingly includes extensive and appropriate mitigation measures.
(ii)(b) In the case of social risk, this is to better reflect the risks pertaining to compensation of land owners for the basin, as detailed in the social analysis section of the Appraisal Summary. Although the independent judicial process follows its course in compliance with OP 4.12, and ONAS and the Bank have agreed on the following set of actions that will ensure that the rights of affected parties are not infringed upon, the compensation of owners may experience further delays. Delays could arise should for example current court

proceedings be postponed for external reasons (holidays or summer recess, as has happened in the past), or should the final determination require additional delay for the registration of the land by the owners. ONAS continues to monitor and fully document the process, providing assistance in any manner it can to the owners and their representatives, and reporting regularly to the Bank on its progress and any foreseeable delays that could arise.

Overall, the risk rating could be decreased to "moderate" as soon as (i) ESMP measures are implemented in a satisfactory manner, and (ii) owners are compensated
(iii) Stakeholder risk has been increased to "substantial" as without the submarine outfall, treated wastewater continues to be discharged at the Raoued Beach. Though this does not have any incremental impact on the baseline situation, current adverse social and environmental impacts to the approximately 50,000 neighboring inhabitants are not remediated, and opportunities for growth and jobs through increased tourism and economic development have not materialized yet. Such unmet expectations could fuel negative local perceptions, at a time of great need and demand for improved sanitary and environmental conditions in the Greater Tunis area.

V. WORLD BANK GRIEVANCE REDRESS

32. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

ANNEX 1: RESULTS FRAMEWORK AND MONITORING

Project Development Objective

Original Project Development Objective - Parent:

The project development objectives of the Project are to: (a) provide an environmentally safe disposal system for the treated wastewater which will not be reused in agriculture in the North of Tunis; and (b) increase the quantity and quality of treated wastewater made available to farmers to encourage its reuse in agriculture in the Borj Touil area.

Proposed Project Development Objective - Additional Financing (AF):

The project development objectives are to provide an environmentally safe disposal system for the treated wastewater in the North of Tunis, and increase availability for its reuse in the project area.

Results

Core sector indicators are considered: Yes | Results reporting level: Project Level

Project Development Objective Indicators

Status	Indicator Name	Core	Unit of Measure		Baseline	Actual(Current)	End Target
New	Direct project beneficiaries	☒	Number	Value	0	0	50,000
				Date	31-Dec-2010	31-May 2016	31-Dec-2019
				Comment	Target set based on ONAS estimate in March 2015.		
New	Percentage of beneficiaries who are female	☒	Percentage	Value	0	0	50
				Date	31-Dec-2010	31-May 2016	31-Dec-2019
				Comment			
Revised (Scope, target date)	Average annual volume of TWW made available to farmers, developers or municipalities in the vicinity of the Project	☐	Cubic Meter(m3)	Value	0	0	3,000,000
				Date	31-Dec-2010	31-May 2016	31-Dec-2019
				Comment	Nominal annual volumes, subject to an agreement for their reuse from the regulation basin, by farmers, developers or municipalities in the vicinity of the Project.		

Revised (Definition, target)	Average annual concentration of suspended solids in TWW made available at the El Hissiène basin	☐	Milligrams per liter (mg/l)	Value	120	TBC	30
				Date	31-Dec-2015	31-May 2016	31-Dec-2019
				Comment	Change from conformity to actual measurement of TWW quality. Target is a lower threshold value, corresponds to Tunisian norm NT106.03. Value based on weekly measurement by ONAS under the ESMP. Baseline value is estimated based on historic data monitored by regional agriculture district, on quality of TWW which farmers currently use. Current value cannot be assessed until the basin is online, once transfer system is completed.		
Revised (Definition, target, previously intermediate indicator)	Percentage of seawater samples at Raoued Beach complying with imperative norms in total coliforms and fecal coliforms (respectively 10,000 TC/100ml and 2,000 FC/100ml).	☐	Percentage	Value	80	TBC	90
				Date	31-Dec-2015	31-Dec 2016	31-Dec-2019
				Comment	Scope and target correspond to Class B bathing areas according to MedPol program (EU standards), i.e. of average quality. Calculation will use average of all surface measurements in the beach area under the marine ESMP. Baseline value is estimated based on data from ESMP baseline report, to be re-confirmed once second year of data is available.		
Revised (Definition, target)	Average annual count of fecal coliforms in seawater samples in the surrounding of the outfall	☐	Count per 100 milliliters (Nb/100ml)	Value	200	TBC	2,000
				Date	31-Dec-2015	31-Dec 2016	31-Dec-2019
				Comment	Change from conformity to actual measurement of seawater quality. Surrounding of the outfall is understood as within 2 km. Target is set so that seawater quality remains within Tunisian norm NT106.02 despite outfall discharge. Value based on average of all measurements within 2 km of the outfall under the marine ESMP. If fecal coliforms are not available, e.coli counts will be used as a direct proxy. Baseline value is estimated based on data from ESMP baseline report, to be re-confirmed once second year of data is available.		

Intermediate Results Indicators							
Status	Indicator Name	Core	Unit of Measure		Baseline	Actual(Current)	End Target
New	Grievances registered related to delivery of project benefits addressed (%)	☒	Percentage	Value	0	0	75
				Date	31-Dec-2010	31-May 2016	31-Dec-2019
				Comment			
New	Average annual concentration of suspended solids in TWW made available at the Sidi Amor reuse pilot	☐	Milligrams per liter (mg/l)	Value	120	TBC	30
				Date	31-Dec-2010	31-Dec 2016	31-Dec-2019
				Comment	Target is a lower threshold value, corresponds to Tunisian norm NT106.03. Value based on measurements at the pilot laboratory. Baseline value is estimated based on historic data monitored by regional agriculture district, on quality of TWW which farmers currently use. Current value cannot be assessed until the pilot is running for a few months (by December 2016).		
New	Average annual concentration of suspended solids in TWW at the entry point of the transfer system	☐	Milligrams per liter (mg/l)	Value	120	TBC	30
				Date	31-Dec-2010	31-Dec 2016	31-Dec-2019
				Comment	Target is a lower threshold value, corresponds to Tunisian norm NT106.02. Baseline value is estimated based on historic data monitored by regional agriculture district, on quality of TWW it pumps for farmers. Baseline and current value will be confirmed with stakeholders based on more recent measurements, which have not been made available yet.		

New	Average annual count of fecal coliforms in seawater samples at Raoued beach	☐	Count per 100 milliliters (Nb/100ml)	Value	450	TBC	100
				Date	31-Dec-2015	31-Dec 2016	31-Dec-2019
				Comment	Target is a lower threshold value, corresponds to Tunisian norm NT09.11. Value based on average of all surface measurements in the beach area under the marine ESMP. If fecal coliforms are not available, e.coli counts will be used as a direct proxy. Baseline value is estimated based on data from ESMP baseline report, to be re-confirmed once second year of data is available.		
Revised (Scope, target, previously PDO indicator)	Percentage of TWW (not reused) from Northern Tunis WWTP discharged at the submarine outfall	☐	Percentage	Value	0	0	95
				Date	03-May-2010	31-May 2016	31-Dec-2019
				Comment			
Revised (target date)	Length of pipe installed	☐	Meter(m)	Value	0	2,500	12,000
				Date	03-May-2010	31-May 2016	31-Dec-2019
				Comment			
Marked for deletion (redundant)	*Volume (in m3 per year) of TWW available for potential reuse in agriculture*	☐	*Cubic Meter(m3)*	*Value*	*0*	*0*	*30,000,000*
				Date	*03-May-2010*	*31-Mar 2015*	*30-Jun-2017*
				Comment			
Marked for deletion (does not measure result)	*Volume (in m3 per year) of TWW discharged into the submarine outfall at the regulation basin*	☐	*Cubic Meter(m3)*	*Value*	*0*	*0*	*70,000,000*
				Date	*03-May-2010*	*31-Mar 2015*	*30-Jun-2017*
				Comment			

ANNEX 2: REVISED ESTIMATE OF PROJECT COSTS

Initial situation (2010)

US$ million	L **Original Loan**	G **Grant**	F = L + G **Bank Financing**	T **Taxes**	C = F + T **Total Cost**	D (∑C = ∑D) **Total Cost w. cont.**
Part A: transfer of treated wastewater (TWW) to increase its reuse in agriculture	11.80	6.80	18.60	2.14	20.74	23.16
Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea	32.85	-	32.85	4.90	37.75	41.94
Part C: monitoring and capacity strengthening	2.10	0.43	2.53	0.71	3.24	3.53
Contingencies (10%)	5.25	0.80	6.05	0.85	6.90	
TOTAL	**52.00**	**8.03**	**60.03**	**8.60**	**68.63**	**68.63**

Restructuring (2014)

US$ million	ΔL **Cancelled**	L' = L + ΔL **Revised Loan**	G' **Grant**	F' = L' + G' **Bank Financing**	T' **Taxes**	C' = F' + T' **Total Cost**	D' (∑C' = ∑D') **Total Cost w. Font.**
Part A: transfer of treated wastewater (TWW) to increase its availability for reuse	*(9.16)*	2.64	6.60	9.24	0.71	9.95	11.00
Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea	*(2.44)*	30.41	-	30.41	4.12	34.53	37.50
Part C: monitoring and capacity strengthening	*0.25*	2.35	1.03	3.38	0.24	3.62	4.50
Contingencies (10%)	*(1.25)*	4.00	0.40	4.40	0.50	4.90	
TOTAL	***(12.60)***	**39.40**	**8.03**	**47.43**	**5.57**	**53.00**	**53.00**

Additional Financing (2016)

US$ million	L' **Revised Loan**	A **Additional Loan**	G' **Grant**	F"= L' + A + G' **Bank Financing**	T" **Taxes**	C" = F" + T" **Total Cost**	D" (∑C" = ∑D") **Total Cost w. cont.**
Part A: transfer of treated wastewater (TWW) to increase its availability for reuse	2.59	-	8.03	10.62	0.38	11.00	12.00
Part B: improvement of the discharge of the remaining TWW in the Mediterranean Sea	25.86	15.00	-	40.86	6.14	47.00	55.00
Part C: monitoring and capacity strengthening	3.95	-	-	3.95	1.05	5.00	6.00
Contingencies	7.00	3.00	-	10.00	-	10.00	
TOTAL	**39.40**	**18.00**	**8.03**	**65.43**	**7.57**	**73.00**	**73.00**

ANNEX 3: ECONOMIC ANALYSIS

NPV: TND 101 million (8% discount rate); **ERR: 17.5%**

1. The economic analysis of the Project has been updated for the base-case scenario using a similar cost-benefit approach as the initial economic analysis, based on improved valuation techniques, updated resource degradation costs and sectoral data. The situation after the Project has been completed, and the various expected benefits have materialized, is compared with the current situation i.e. "without Project". The economic value of each benefit identified is estimated being using the methodology best adapted to each case (Willingness-To-Pay, Avoided-Cost or another suitable approach as explained in the text below).

2. Under base case scenario, **the ERR of the proposed Project stands at 17.5%** - which remains a **very satisfactory value for an environmental Project which also generates many positive externalities** which have not all been accounted for in the calculations, because of data and methodological limitations.

Overview of current situation and benefits of the Project

3. The current discharge of wastewater (situation "without Project"), through an open canal which opens into the Raoued beach in the North Tunis area, has a considerable negative impact on public health and the environment. The local population living in the vicinity of the open canal and Raoued beach (about 50,000 people) suffers from bad odors and a higher risk of public health hazards, especially skin and respiratory diseases. The high contamination of the Raoued beach has serious negative impact on tourism, fisheries and the marine environment in the North Tunis area, with significant impact on the water quality of the Gulf of Tunis – the most important pollution hot-spot in the Tunisian coast. In addition, the degradation of the treated wastewater quality that currently takes place in the open canal, as well as the lack of storage infrastructure necessary to properly segregate the treated wastewater based on quality, has hampered the reuse of wastewater by farmers in the nearby Borj Touil irrigated perimeter, resulting in a low rate of intensification – many farmers preferring to rely on lower-yield rain fed agriculture instead of using wastewater of poor and unreliable quality.

4. The wastewater infrastructure (pipes for transportation, storage basin and submarine outfall) which will be built by the proposed Project will considerably improve the situation, through a twofold contribution: (i) improved environmental conditions of seawater in the North Tunis area, and (ii) fostering increased reuse of treated wastewater in agriculture in the Borj Touil irrigated perimeter which is located nearby the new sewerage infrastructure. This translates into a series of important benefits as outlined below, many of which have been quantified for the purpose of estimating the economic return of the proposed Project. In a broader manner, the Project will also generate intangible benefits by supporting adaptation to climate change, which are significant even though they have not been quantified and included in the calculation of the specific economic return of the Project.

5. The **improvement of seawater quality in the North Tunis area** will generate five categories of benefits which have been analyzed and estimated in the economic analysis of the Project: (i) benefits for local tourism (reduction in transport costs of local population to more distant

beaches), (ii) benefits from international tourism (with foreign tourists spending more nights in the Gammarth area), (iii) increased revenues from fisheries (due to overall improvement in marine biotopes), (iv) reduction in public health hazards (due both to poor quality of seawater in the North Tunis area, and contamination of local population living nearby the currently open sewage canal), and (v) improvement of the quality of life and landscape surrounding the Raoued beach, where the wastewater is currently discharged (as measured by an increase in real estate rental costs in the area). The improvement in seawater quality due to the Project will also generate significant in term of both biodiversity of the marine and tidal ecosystems in the North Tunis area, but this last benefit, although significant, has not been included in the calculation of the economic return because of methodological difficulties.

6. The **increased reuse of treated wastewater in the Borj Touil area** (about 3,200 existing hectares) which the Project will make possible will generate economic benefits. The new sewage infrastructure build by the Project will result in a significant improvement in the quality and availability of treated wastewater for irrigation purpose, thereby increasing the economic value of the treated wastewater for farmers. This will result in an increase in the volume of wastewater reused in the existing Borj Touil irrigated perimeter, and allow farmers to increase agricultural productivity and potentially switch to higher income crops. Other reuses have not been included in the analysis.

7. In addition to these direct benefits, the **Project will also generate significant intangible benefits by promoting adaptation to climate change**. As Tunisia is expected to be seriously affected by climate change, improving water resources management is becoming a national priority, in a context of already existing water scarcity in many parts of the country. The promotion of wastewater reuse is one of the major pillars identified by the Government to foster efficient management and conservation of water, but experience has shown that the reuse of treated wastewater is a practice which takes a lot of time to be accepted by farmers, and thereby requires significant efforts in capacity building and support to farmers. In this context, the development of wastewater reuse under the project, including the Sidi Amor reuse pilot which, will generate benefits way beyond this specific Project, by: (i) providing a window for farmers elsewhere in the country to see how wastewater reuse in agriculture can be successful providing the right infrastructure and systems are in place, and (ii) allowing to draw valuable lessons for the implementation of future wastewater reuse Projects elsewhere in the country (and even in the MENA region in general). Although very significant, these benefits have not been included in the calculation of the NPV and ERR of the proposed Project, because of methodological difficulties. Yet their contribution significantly reinforces the rationale for the proposed Project, being an important element in a broader national strategy to promote sustainable water management in the context of adaptation to climate change.

Economic costs of the Project

8. The total economic cost of the investment, detailed in the table below, now stands at about TND 104.2 million (compared with TND 83.2 million in the initial economic analysis), to be expended progressively by 2017. The annual average operating cost of the wastewater infrastructure has been estimated at TND 0.71 million per year (compared with TND 0.5 million in the initial analysis).

Investment costs (TND million)	*TOTAL*	2013	2014	2015	2016	2017
Ground portion (upstream transfer, basin, pumping station, downstream transfer, technical assistance and ESMP)	*32.9*	2.1	8.7	18.2	3.9	0.0
Marine portion (pressure chamber, 6 km submarine outfall, technical assistance and ESMP)	*71.3*	0.1	0.2	18.2	43.2	9.5
TOTAL INVESTMENT COSTS	***104.2***	**2.2**	**8.8**	**36.4**	**47.1**	**9.5**

Economic benefits due to improved seawater quality

9. The **benefits from local tourism** have been estimated through the avoided-cost method. The current contamination of the Raoued beach, and negative impact on seawater quality in the broader North Tunis area, results in many local residents preferring to travel to other beach areas for bathing, principally the Hammamet and Bizerte areas. This results in additional transportation costs for the economy, as well as added energy consumption and emissions of CO2 in the atmosphere. Based on the most recent study available (ONTT, 2005), it is estimated that the additional transportation costs due to the low quality of the seawater in the North Tunis area stands at approximately **TND 7 million per year**[9], considering that the Project will make a strong contribution to improving the quality of seawater in the North Tunis area.

10. The **benefits for international tourism** were estimated by evaluating the additional earnings of the tourism industry. Although the Gulf of Tunis area does have a significant hotel capacity in the North Tunis (Gammarth) area (15,190 beds in 2013), it is no match for the 3 main tourist areas of Hammamet, Sousse-Monastir and Djerba. Occupancy rates in Northern Tunis vary on average (based on 2013 data) from 45% in June or September to 30% in July or August, whereas in the Nabeul-Hammamet area it varies from 65% to 85% (according the the national tourism office – ONTT), which shows that the latter area drains a significant amount of potential tourists from the Northern Tunis area in the peak summer period. An improvement of the bathing quality of seawater in the North Tunis area would most likely result in an increase in the average number of days spent by foreign tourists. For the purpose of this analysis, it is estimated that improvement of the quality of bathing water would close half the gap in occupancy rates, leading to an additional 186,500 tourists annually[10] (progressing over 5 years). According to the Ministry of Tourism, the added-value of the tourism industry stands at TND 331 per tourist in 2013. According to a recent study (Essayem, 2011), the profit margin of the industry is estimated to be 33%, i.e TND 115 per tourist. This gives an estimate of the additional earnings of tourism generated by the improved seawater quality brought about by the Project of **TND 18 million per year**.

[9] For the purpose of calculating the avoided cost, assumptions are: (i) transportation cost by car at 0.5 TND per km for 4 people, (ii) hotel cost per night and person at 15 TND, (iii) length of stay of 2.3 nights per person, (iv) estimate of 106,000 inhabitants travelling farther due to low seawater quality (12% of Northern Tunis population).

[10] The potential addition of 110,000 residents in the contiguous Financial Harbor project was not taken into account in this analysis.

11. Regarding the **benefits for fisheries**, the loss of production due to marine pollution is evaluated by looking at the difference between the production in the Raoued area and the Kalaat El Andalous area which is similar in size and type of fishing, but not polluted by the TWW discharge. The difference in production and sales between the two areas is approximately 40% less on average in Raoued, a difference which is stable from 2012 to 2013. The profit loss due to marine pollution is therefore estimated at 40% of approximately TND 1.2 million annual fishing sales in Kalaat Andalous. The benefits from increased fisheries revenues have been estimated conservatively to be in the range of **TND 0.5 million per year**.

12. The **benefits derived from a reduction in public health hazards** are difficult to estimate, in the absence of epidemiological data and given the multiplicity of diseases (diarrhea, skin and respiratory diseases) potentially affecting the population living in the vicinity of the open sewer canal and Raoued beach. These benefits are nonetheless significant given the size of the population concerned (about 50,000 people), a large proportion of them being low-income families. A Bank study (2004) estimated the costs induced by diarrhea alone in Tunisia stood between 11 and 56 million TND per year. Overall, the benefits derived from the Project through improvement in public health have been estimated conservatively to be approximately **TND 1.9 million per year**.

13. The **benefits from increased real estate value** can be derived from the difference between the average real estate value in the vicinity of the open sewage canal and Raoued beach compared with similar non-polluted areas. The area where values are depressed due to negative impacts from the canal or polluted sweater is estimated to be 0.9 million square meters[11]. With 2 habitations per 500 square meters, this would amount to 3,600 habitations, which is a little bit more than 10% of the number of habitations in the Raoued administrative unit. Based on a survey of real estate agents, in the impacted area, these habitations can be rented out at TND 250 per month, compared with TND 450 per month in the vicinity of the Raoued road, farther from the nuisances of the canal or the polluted beach. It is conservatively estimated that a quarter of the price difference is the implicit willingness to pay for better environmental quality, i.e. TND 50 per month, equivalent to TND 600 per year. Therefore, the benefits of the Project through increasing real estate values can be estimated at **2.2 million TND per year**.

14. The **benefits for biodiversity and the environment** have not been specifically estimated in the analysis, even though they are significant. The sewage discharge at Raoued beach has considerably affected the marine and tidal biotopes, with the disappearance of most benthic species. It is expected that, thanks to the Project, the original environment at Raoued beach will be gradually restored, but quantifying this specific benefit is difficult. The benefits on the environment have been, however, duly incorporated in the calculation of the economic return through the indirect benefits on tourism, fisheries and public health.

Economic benefits due to increased reuse of wastewater

15. The existing Borj Touil irrigated perimeter (3,200 hectares) was developed several decades ago with the objective of reusing in agriculture a portion of the treated wastewater transported through the open canal to the Raoued beach. In practice however, most farmers have been reluctant to use treated wastewater, because of its poor quality and reliability. Less than a third of the land in

[11] 100 meter width x (5 km canal + 3.8 km beach) = 880,000 square meters

the Borj Touil perimeter has been using treated wastewater, on a sporadic basis, with farmers practicing instead low yield rainfed agriculture, or using the land for pasture. In recent years it is estimated that only about 3% of the sewage flow in the canal has been reused by farmers in the Borj Touil area, and the irrigation infrastructure has gradually deteriorated.

16. The proposed Project, by replacing the open sewer canal with a piped network, and by building a storage basin which will allow the segregation of treated wastewater according to its quality, will significantly improve the quality and reliability of wastewater made available for farmers. This will coincide with an expected improvement, over the next 3-5 years, of the overall quality of the treated wastewater produced at the various wastewater treatment plants (WWTP) of the North Tunis area. Overall, it is therefore expected that farmers in the Borj Touil irrigation perimeter could increase their consumption of treated wastewater over future years, as a result of both the proposed Project and the other ONAS Projects currently implemented to improve the compliance of WWTP of the Tunis area with treatment standards. Currently, the volume of treated wastewater reused by farmers at the Borj Touil perimeter is on average of about 6 million m3 per year (as communicated by the Ariana agricultural agency). Based on the existing crops pattern, it is estimated that the actual demand from farmers for treated wastewater – provided it was of adequate quality – could increase to 10 million m3 per year. For the purpose of this analysis, three scenarios were tested, a BAU scenario (no additional TWW reused), a mid-range scenario where an additional 1 MCM is used per year, and a high-range scenario where an additional 4 MCM is used per year (per the project's GEO target). The benefits from increased wastewater reuse in agriculture to be derived specifically from the Project can be estimated through the expected improvement in agricultural production in the Borj Touil due to higher consumption of better quality treated wastewater made available thanks to the Project - considering that the crop pattern, level of intensification and soil fertility will remain the same as it is now (i.e. without rehabilitation and drainage works). Farmers' benefits shall come from both a higher consumption of treated wastewater, as well as from the fact that they will be less dependent on rainfalls. A study completed by the Ministry of Agriculture (MARHP) in 2009 has estimated that the economic value of treated wastewater for farmers, given prevailing conditions in Borj Touil, was in the range of TND 0.10-0.15 per m3, compared to a tariff of treated wastewater for farmers is TND 0.02 per m3. This is consistent with the findings of a study completed in 2003 (Abu Madi et al) which surveyed farmers in Tunisia and Jordan and found that their willingness to pay to reuse TWW is around TND 0.12 per m3, which will be used for the purpose of this analysis. Based on this, the benefits due to increased reuse in the Borj Touil area, thanks to the proposed ONAS Project, can therefore be estimated in the range of **TND 0.1 to 0.5 million TND per year**. This demonstrates mainly that the economic benefits of the project cannot be significantly increased thanks to TWW reuse without further modernization and extension of the Borj Touil irrigation perimeter.

17. It is important to keep in mind that this result underestimate the actual benefits from TWW reuse in two manners:

a. this calculation considers only the benefits through increased agricultural revenues for farmers in the Borj Touil perimeter. Increased wastewater reuse also generates additional environmental benefits, since it results in less wastewater being discharged in the Gulf of Tunis. These additional benefits, though, are difficult to calculate and have not been included in the study;

b. it is essential to keep in mind that **the size of these agricultural benefits is constrained by the current situation of the Borj Touil perimeter**, with deteriorated irrigation infrastructure and land being used mostly for low yield crops, or let idle for pastures. According to Van Acoleyen, M., and Baouendi, A. 2011, the agricultural value-added of intensive irrigation could reach TND 0.4 per m3, yielding additional benefits of TND 1.6 million in the high range scenario, all else remaining equal. These benefits are not included in the calculation.

Calculation of NPV and Economic Rate of Return (ERR) of the Project

18. The following table summarizes the estimates of the various benefits of the proposed Project which amount to approximately TND 30 million per year.

Benefit category	Nature of benefit	Base case (TND per year)
National tourism	Reduced transportation costs	**7**
International tourism	Increased revenues from tourism	**18**
Fisheries	Increased revenues for fishermen	**0.5**
Public health	Reduction in public health hazards	**1.9**
Real estate	Increased real estate value in the Raoued beach area	**2.2**
Biodiversity	Restoration of original tidal and benthic biotopes of Raoued beach	**--**
Increased TWW reuse	Increased revenues for farmers in Borj Touil perimeter	**0.1 to 0.5**
TOTAL		**~ 30**

19. The NPV and ERR of the Project have been calculated over a horizon of 25 years, using the same discount rate (social rate of return) as the initial economic analysis for sake of comparison, i.e. 8%. The NPV and ERR have also been estimated for discount rates of 4%[12] or 10%[13], as summarized in the table below.

[12] Recommended for environmental projects - The economics of ecosystems and Biodiversity (TEEB, 2010); Centre d'Analayses Stratégique in France, Various World Bank studies on Coastal degradation (2007) or watershed management (2010).
[13] Most frequently employed.

20. The table below provides the estimated values for the NPV and ERR in the base case scenario, as well as various estimates for different rates of return. These results demonstrate that the project remains economically profitable.

Discount rate	**NPV (TND million)**	**ERR**	**Benefit / Cost ratio**
4%	*215*		*310%*
8% Base Case	**101**	**17.5 %**	**210%**
10%	*66.5*		*180%*

21. A sensitivity analysis shows that were benefits reduced by 35%, ERR would be at 12%, which remains acceptable from an economic perspective, notwithstanding the fact that significant intangible benefits are not included in the calculation.