Office National de l'Assainissement (ONAS)
The Republic of Tunisia

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR CONSTRUCTION OF ADVANCED WASTE WATER TREATMENT PLANT IN GABES IN THE REPUBLIC OF TUNISIA

December 2023

JAPAN INTERNATIONAL COOPERATION AGENCY

JAPAN TECHNO CO., LTD.
JAPAN INTERNATIONAL COOPERATION SYSTEM
NIPPON KOEI CO., LTD.

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Preface

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to Joint Venture consists of Japan Techno Co., Ltd., Japan International Cooperation System and Nippon Koei Co., Ltd.

The survey team held a series of discussions with the officials concerned of the Government of the Republic of Tunisia, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Tunisia for their close cooperation extended to the survey team.

December, 2023

Takahiro Morita
Director General,
Global Environment Department
Japan International Cooperation Agency

Summary

Summary

1. Country Overview

The Republic of Tunisia (hereinafter referred to as "Tunisia") has a semi-arid region in its southern half, with low average annual precipitation. The groundwater on which the country depends for about 2/3 of its water demand is threatened with depletion. Almost all of the water resources available from surface water and groundwater have been used, leading to an absolute shortage of water. Furthermore, the water supply and demand in southern Tunisia, including Gabes governorate, is particularly restrictive, as 74% of surface water is concentrated in the northern part of the country and the average annual precipitation is less than 190 mm (World Climate Guide, 1991-2020). In addition, the demand for drinking water and industrial water is expected to increase across Tunisia from 497 million m^3 (2010) to 694 million m^3 (2030) in the future due to population growth and industrial development (World Bank, 2009).

Against this backdrop, the promotion of the use of treated sewage water is an urgent issue in Tunisia from the perspective of strengthening water resource management. The Government of Tunisia has set a target of using more than 50% treated sewage water in its "Five-Year National Development Plan (2016-2020)" and has identified the promotion of the use of treated sewage water as a priority issue in its "Water Reuse 2050" sewage sector development plan, which is under development. Currently, 125 wastewater treatment facilities are in place in the administrative districts and regions with a population of 3,000 or more under the jurisdiction of the Tunisian Sewage Maintenance Corporation (Office National de l'Assainissement; "ONAS"). However, only 28 of these facilities are equipped with tertiary treatment facilities such as filters and ultraviolet light treatment. Wastewater treatment facilities that do not have tertiary treatment facilities produce low quality secondary water, which means that only about 21% of the total treated sewage water is recycled for environmental protection, agriculture, irrigation, and other uses. The majority is discharged into rivers and other bodies of water (ONAS, 2021).

2. Background and Outline of the Project

(1) Background and history of grant aid
The governorate of Gabes is home to the chemical industry, including phosphoric acid products, one of the country's major exports. This governorate has a high demand for high-quality water resources with low salinity for industrial use. On the other hand, the governorate relies on groundwater for about 93% of its water resources (Ministry of Agriculture, Water Resources and Fisheries, 2010) and 90% of the country's groundwater has a high salinity concentration of 1.5

g/L or higher (AFD, 2016), obligating the use of expensive tap water for industrial use, which has become a challenge for industrial development. In addition, since the policy of the Government of Tunisia is to prioritize the use of tap water for drinking water and other purposes, companies face the challenge of securing alternative water sources for industrial use. In view of the above, there is a need to develop facilities that can treat wastewater to a level that allows its use as industrial water (Advanced Waste Water Treatment Plant; (hereafter referred to as "A-WWTP").

Against this background, in order to construct an A-WWTP, grant aid for operation and maintenance rights (hereafter referred to as "grant with exploitation rights") was provided for efficient facility development, operation, maintenance and management utilizing Japanese technology, knowledge, and funds. The Government of Tunisia made a request to the Government of Japan for "the Project for Construction of Advanced Sewage Treatment Plant in Gabes" (hereinafter referred to as the "Project").

(2) Summary of request

A summary of the request is shown in the table below.

Table 1 Summary of Request

Objective.	This Project aims to utilize treated sewage water as industrial water in the Gabes governorate, located in southern Tunisia, where securing water resources is a serious issue, by installing an A-WWTP alongside the existing wastewater treatment facility in the Gabes wastewater treatment plant and supporting efficient operation, maintenance, and management. This will contribute to the conservation of the country's water resources.
Contents	Facilities, equipment and other details: A-WWTP (desalination capacity 6,000 m^3 /day; membrane treatment) Consulting services include: Bidding assistance, construction supervision, etc. (if required as a result of the study), soft components Methods of procurement, construction, and Project operation: Procurement through a unified proposal for the detailed design, construction, operation and maintenance of the facility Areas Covered: Gabes, Ghannouch, Tunisia

3. Outline of the Survey Results and Contents of the Project

At the request of the Government of Tunisia, the Government of Japan decided to conduct a schematic design of the project, and the Japan International Cooperation Agency (JICA) dispatched a preparatory survey team to Tunisia to conduct the first survey for 32 days from May

27 to June 28, 2021, the second survey for 65 days from September 10 to November 13, 2021, and the third survey for 16 days from February 5 to February 20, 2022. A second survey was conducted for 65 days from September 10 to November 13, 2021, and a third survey was conducted for 16 days from February 5 to February 20, 2022. Based on the results, a 10-day draft outline design briefing survey was conducted from August 29 to September 7, 2023.

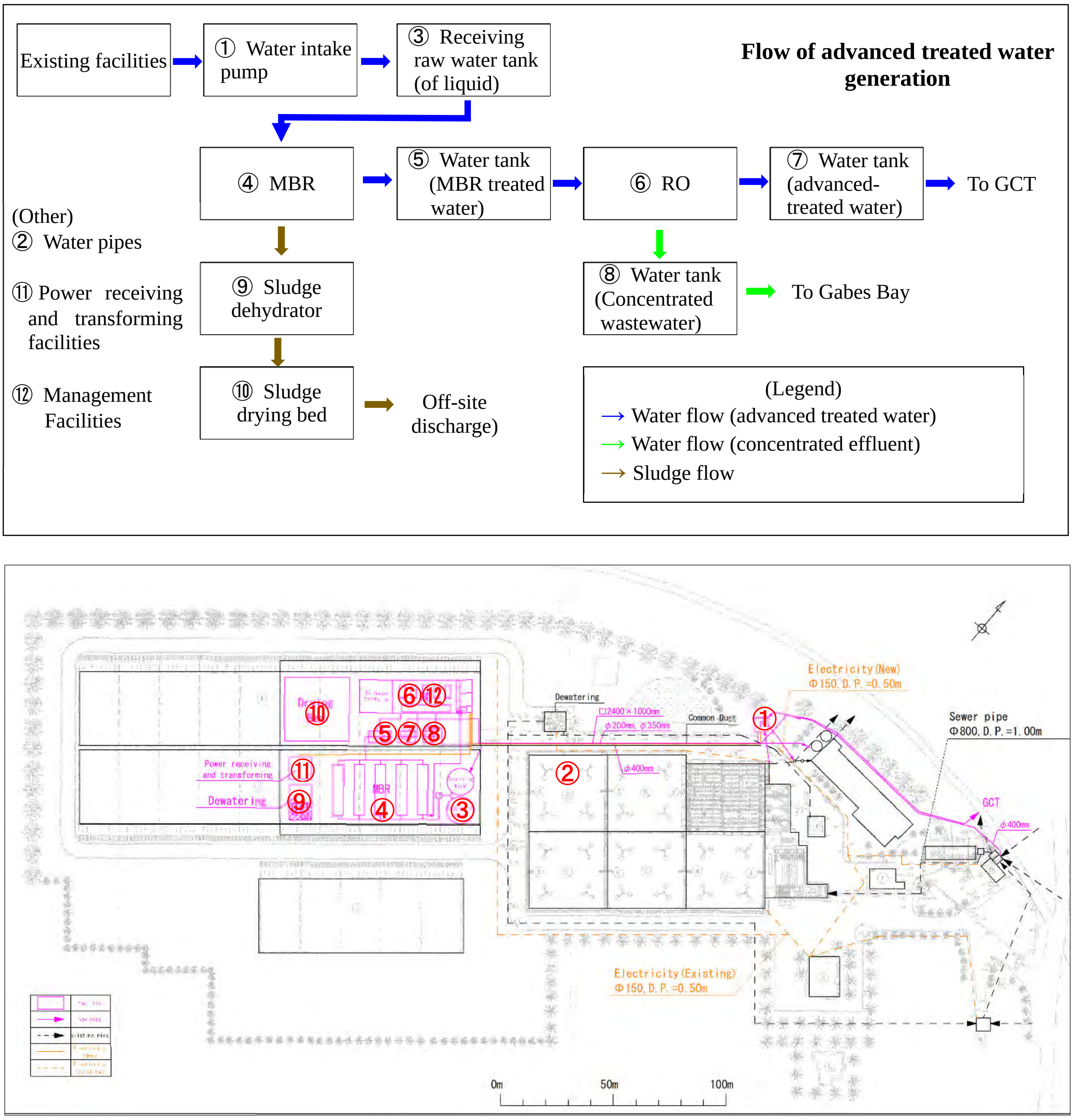
This project is located in Ghannouch, Gabes Province, and consists of the construction of an advanced sewage treatment facility alongside the existing sewage treatment facility at the Gabes Sewage Treatment Plant, followed by a 10-year operation and maintenance period. A summary of the schematic design is shown below.

(1) Facility plan

Table 1 Facility Composition of the Project

Facility	Contents
Water intake facility	(Permanent) Water intake pipes - Water intake pump facilities - Transmission pipe - Receiving tanks for raw water
	(Emergency) (Inflow well) - Intake pump facilities – (the above transmission pipe)
A-WWTP	Pretreatment-MBR-RO, complementary facilities
Water supply facilities	Advanced treated water storage tank - Water pump – Transmission pipe
	(in GCT factory) Transmission pipe - Receiving tank (*Responsibility of GCT)
Drainage system	Concentrated wastewater storage tank, discharge flow meter, discharge pipe
Sludge treatment	Sludge dehydrator - sun-drying bed
Power receiving facility	Transformer substation
	Switchboard

Source: Survey Team



Source: Survey Team

※ ONAS：Office National de l'Assainissement）
GCT：Groupe Chimique Tunisien
MBR：Membrane Bio Reacto
RO：Reverse Osmosis

Figure 1 Layout of advanced waste water treatment plant

Table 3 Overview of Advanced Waste Water Treatment Processes

(1) Process	− The water will be taken from secondary treated water from the Gabes sewage treatment plant under the jurisdiction of ONAS. − Below (3) Adopt a desalination method using an RO process that will ensure the quality of treated water in the advanced sewage treatment facility. − An MBR using microfiltration (MF) membranes (microfiltration membranes) is installed in the pretreatment of the RO process to remove pollutants (BOD, SS, ammonia/nitrogen, phosphorus) in secondary treated water. The system will also respond to fluctuations in the quality of water flowing into existing sewage treatment facilities and the treatment of sludge generated at the MBR facility.
(2) Water intake facilities	
water intake facility	Secondary treated water from the Gabes sewage treatment plant (inflow water in case of emergency) is taken and sent to the raw water receiving tank.
Raw water receiving tank (Receiving water tank)	Since the volume of treated water at the Gabes sewage treatment plant fluctuates with time, a receiving water tank will be installed to adjust for the time variability of the water supply to the advanced sewage treatment facility.
(3) A-WWTP supply water volume	10,000 m^3/day
Supply water quality	ONAS Gabes WWTP treated water BOD<90mg/L, SS<150mg/L, TN<39mg/L, TP<3mg/L, TDS<3,000mg/L, temperature 17-30℃, pH 7.5
(4) A-WWTP Treated Water Volume	6,000 m^3/day, distributed via water pipeline to the adjacent GCT Gabes plant
Treated water quality	Colorless, odorless, sterile, TDS 300 mg/L or less, pH 6.5-8.5
(5) RO concentrated water volume	4,000 m^3/day, dumped into the ocean through existing ocean dumping pipes/waterways
(6) Number of series	MBR : 5 trains (5 trains in regular use x 2,000 m3/day) RO : 5 lines (4 permanent lines x 1,500 m3/day)
(7) Intermediate water tank	The intermediate tanks (MBR tank 200 m^3, advanced treatment tank 125 m3, and concentrated drainage tank 85 m3) are planned to have a capacity equivalent to the difference between the pump capacity and the inflow water volume for 2 hours (with a margin of 2.5 hours of storage), taking into account the life of the sequencer that controls pump operation. In addition, the system is basically divided into two tanks to allow for cleaning and maintenance.
(8) Sludge treatment	Sludge generated in the process of MBR sewage treatment is dewatered by a multiple plate screw press dehydrator, which is durable, odor resistant, easy to maintain, and has a proven track record. After dewatering, the dewatered sludge is dried and reduced to about 1/5 of its original volume.
(9) Reserve	① MBR operates in 5 regular trains (2,000 m^3/day/train) and filters 10,000 m3/day. When one train is stopped for maintenance or cleaning, it will be operated in four trains, each train producing 2,500 m^3/day.

	② RO is operated in four regular trains (1,500 m^3/day/train). The production capacity will be 6,000m^3/day. There is one spare series. One train will be stopped periodically for planned maintenance. ③ Two important water pumps are operated at all times. Designed with 3 units/location with 1 spare unit. ④ One RO high-pressure pump is stored in the warehouse.

(2) Equipment plan

Table 4 Main Equipment

Equipment Name	Unit	Purpose of Usage
MBR/RO membrane treatment system	1	Advanced waste water treatment will be performed using MBR and RO membranes for treated water brought from the existing waste water treatment Plant in Gabes..
Sludge dewatering machine	1	The sludge generated by the above-mentioned advanced waste water treatment will be dewatered.
Activated carbon deodorizing device	1	The odor generated during the above dewatering process will be treated.

(3) Overall project implementation structure and contract type

The overall implementation structure and contractual arrangements for the Project are shown in the figure below.

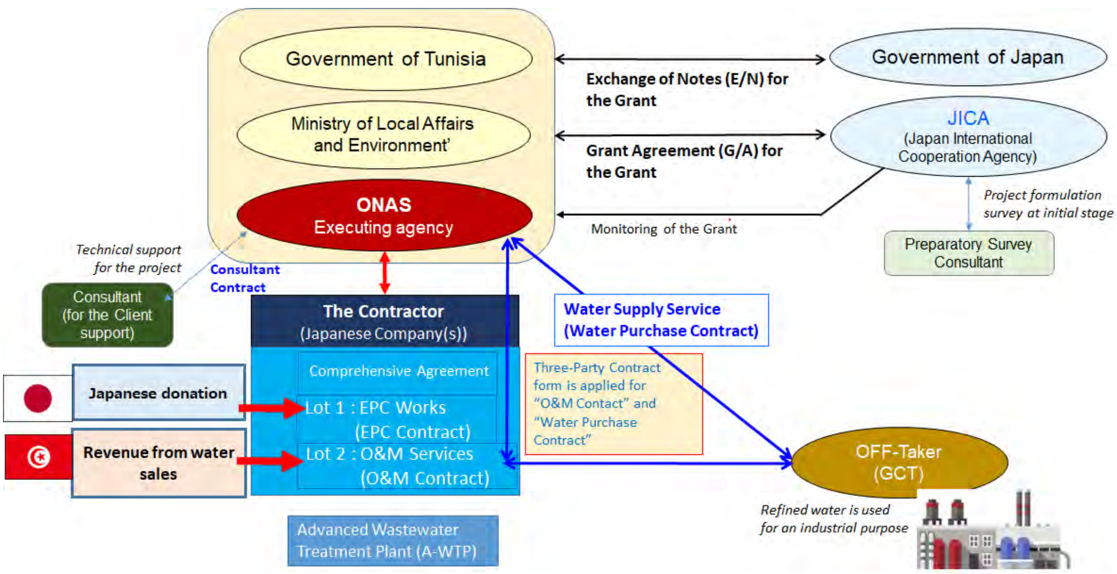


Figure 2 Overall Implementation Structure and Contract Type for the Project

4. Implementation Schedule of the Project

The implementation schedule for the project is expected to last approximately 37.0 months, including approximately 12 months from the conclusion of the G/A to the start of the detailed design survey by the operator, approximately 4 months as the detailed design survey period, and approximately 21.0 months for the actual construction of the main construction.

5. Project Evaluation

(1) Relevance

The implementation of this Project through grant assistance from Japan is judged to be highly appropriate from the following points of view.

(i) Beneficiaries and needs
The Gabes Governorate relies on groundwater for about 93% of its water resources (Ministry of Agriculture, Water Resources and Fisheries, 2010), but 90% of groundwater in Tunisia has a high salinity of more than 1.5 g/L (AFD, 2016), forcing the use of expensive drinking water for industrial use, which is a challenge for industrial development. In addition, since the policy of the Government of Tunisia is to prioritize the use of tap water for drinking water and other purposes, companies face the challenge of securing alternative water sources for industrial use. In particular, Gabes is home to the chemical industry that produces, among other things, phosphoric acid products, one of the country's major exports, including the plant of the Tunisian National Chemical Company (GCT). Therefore, there is a high demand for low-salinity, high-quality water resources for industrial use. In view of the above, there is a strong demand for advanced wastewater treatment facilities in Gabes that can treat wastewater to a level that can allows its use as industrial water.

(ii) Contribution to the Tunisian Development Plan
With a semi-arid southern region, Tunisia receives only a small amount of average annual precipitation and uses almost all of its water resources, both surface water and groundwater, which are suitable for use. Therefore, promoting the use of treated wastewater is an urgent issue in Tunisia from the perspective of strengthening water resource management. Under these circumstances, the Tunisian government has set a target of using more than 50% of treated sewage water in its Five-Year National Development Plan (2016-2020), and has identified the promotion of treated sewage water usage as a priority issue in Water Reuse 2050, its sewage sector development plan, which is currently being formulated.

Therefore, in Tunisia, where securing water resources has become a serious issue, especially in the Gabes region located in the south, this Project will contribute to the conservation of water resources in Tunisia by utilizing treated sewage water as industrial water.

(iii) Contribution to SDGs

The maintenance of sewerage facilities and improvement of wastewater discharge will improve and preserve the quality of public waters, which is the basic role of sewerage systems. The implementation of this Project will also contribute to the improvement of access to drinking water, as drinking water will no longer be used for industrial purposes. This, in turn, will contribute to SDG 6, “Clean water and sanitation for all," as well as the targets listed in the table below.

Table 5 SDGs to which this project will contribute

SDGs	Target
6. Clean water and sanitation for all – Ensure availability and sustainable management of water and sanitation for all.	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

(iv) Consistency with Japanese assistance policy

Japan's "Country Assistance Policy for Tunisia (September 2019)" lists "improvement of the living environment and promotion of local industries to correct regional disparity" as a priority area (medium-term goal). Specifically, it mentions the "improving the living environment in rural areas by developing social infrastructure such as water supply and sewage systems in inland areas and other rural areas that lack sufficient social infrastructure compared to urban areas.” This is highly consistent with this Project.

(2) Effectiveness

The following section summarizes the quantitative and qualitative effects expected from the implementation of this Project. The indicators and associated SDG monitoring indicator numbers currently anticipated are listed below.

(i) Quantitative effects

Table 6 Quantitative Effects Expected from the Project

Indicator	Standard value (Actual results for 2022)	Target value (2028) (3 years after project completion)	SDGs
Treated water discharge (m^3 /day)	20,000	10,000	Compatible with 6.3
Amount of treated waste water used as industrial water (m^3 / day)	0	6,000	Compatible with 6.3

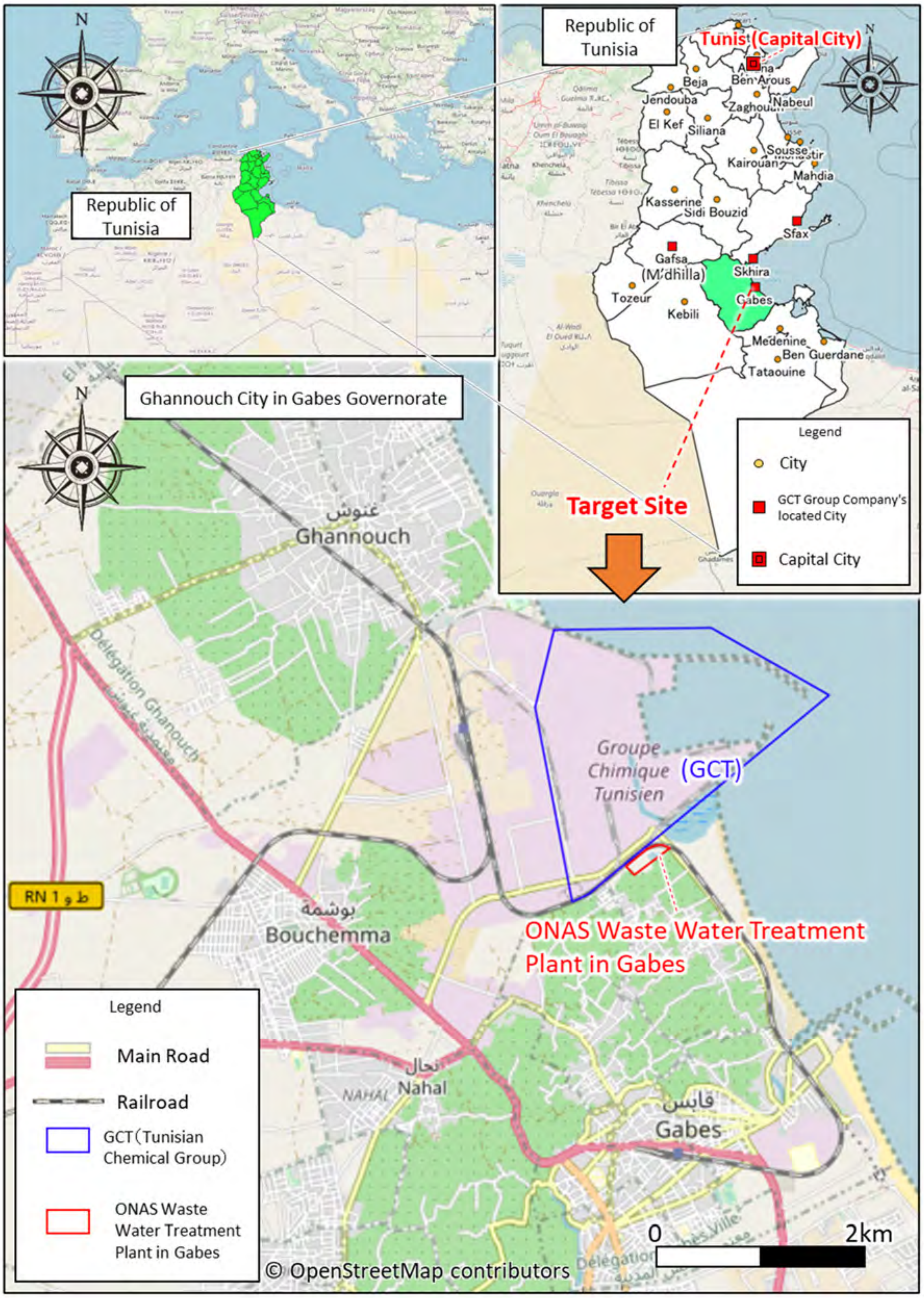
(ii) Qualitative effects

Table 7 Expected Qualitative Effects of the Project

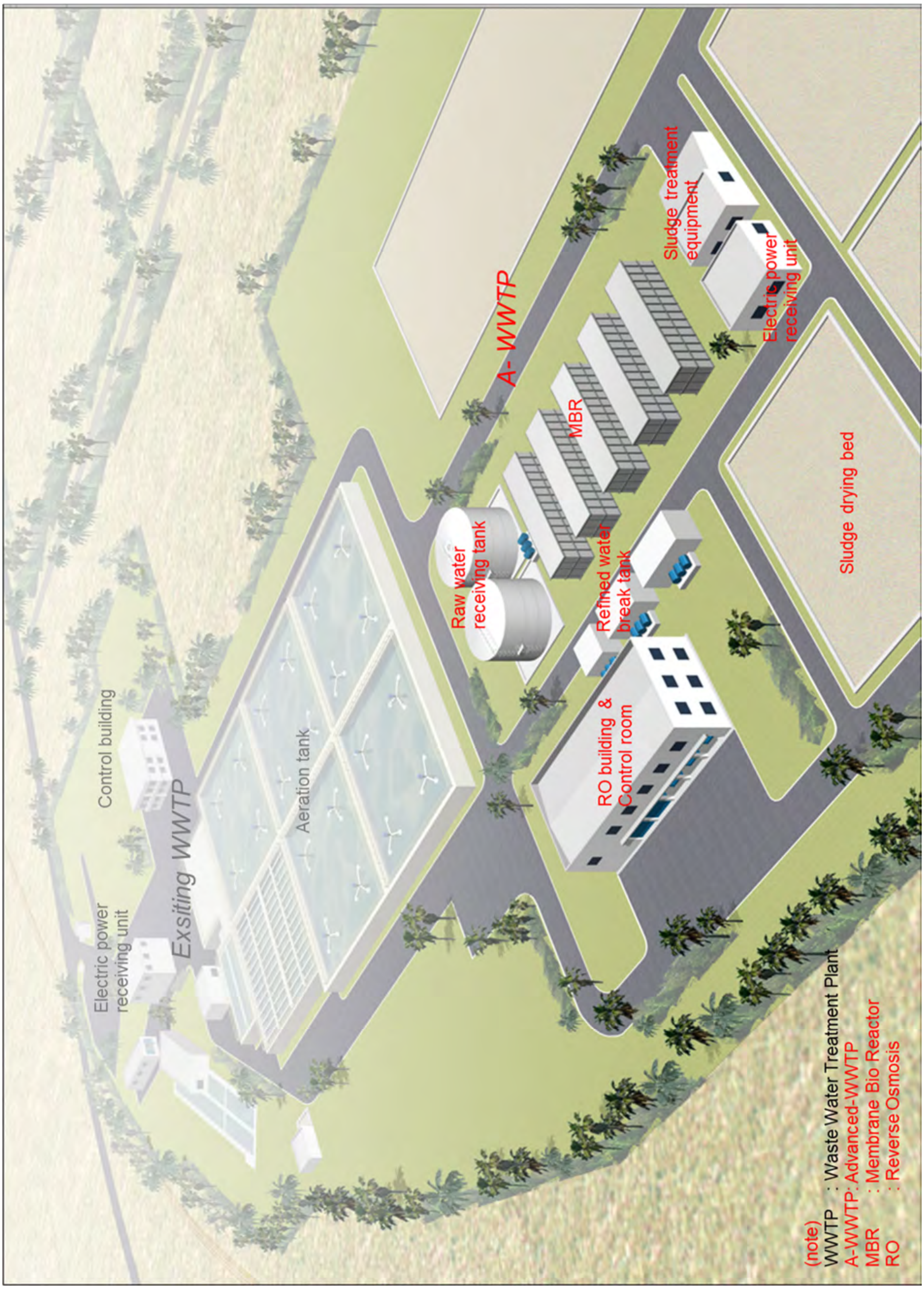
Qualitative effects	Summary	SDGs
Development of alternative water resources	Urban water supply in Gabes Province is dependent on groundwater (fresh and brine), and withdrawals of groundwater are increasing due to the increase in the population served and per capita water use. The treated water supplied to GCT by the A-WWTP will replace the tap water supplied by SONEDE, thereby saving tap water and providing an alternative water source. Industrial water (TDS 300mg/L or less, 6,000m^3/day) with lower salinity than tap water and groundwater (TDS 2,000-3,000mg/L) will be supplied.	Compatible with 6.4
Use of new recycled water technologies by ONAS	MBR, RO and other advanced wastewater treatment facilities such as the A-WWTP is a new recycled water technology for the Gabes region and, by extension, for Tunisia, and will contribute to the future development of recycled water use.	Compatible with 6.a
Groundwater conservation	Reducing water withdrawals with an alternative source to groundwater is expected to prevent the lowering of the groundwater table and the intrusion of seawater.	-

As mentioned above, the needs of the Gabes Governorate are high and the Project contributes to the Tunisian development plan. The quantitative (reduction of untreated water discharge, etc.) and qualitative (use of new recycled water technology, etc.) effects of the Project indicate that the implementation of grant assistance is highly appropriate and highly effective. The Project is expected to be highly effective.

Contents



Location Map



Perspective

List of Figures and Tables

[Figures]

[Tables]

Abbreviations

A/P	Authorization to Pay
A-WWTP	Advanced Waste Water Treatment Plant
B/A	Banking Arrangement
CNSS	Caisse nationale de sécurité sociale
CRDA	Commissariat Régional au Développement Agricole
DAP	Diammonium Phosphate
DB	Design Build
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
E/N	Exchange of Notes
G/A	Grant Agreement
GCT	Groupe Chimique Tunisien
IGPPP	Instance Générale des Partenariats Public-Privé
JICA	Japan International Cooperation Agency
LCS	Legal Counselor Services
MBR	Membrane Bio Reactor
MoE	Ministry of Environment
MoIEM	Ministry of Industry, Energy and Mines
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
ONAS	Office National de l'Assainissement
PE	Permanent Establishment
PPP	Public Private Partnership
PQ	Pre-qualification
RC	Reinforced Concrete
RO	Reverse Osmosis
SDGs	Sustainable Development Goals
SONEDE	Société Nationale d'Exploitation et de Distribution des Eaux
STEG	Société Tunisienne de l'Electricité du Gaz
VAT	Value Added Tax
TSP	Trisodium Phosphate
WB	World Bank
WHT	With Holding Tax

Chapter 1　Background of the Project

Chapter 1 Background of the Project

1-1 Background, History and Outline of Grant Aid

(1) Background and history of grant aid

The Republic of Tunisia (hereinafter referred to as "Tunisia") has a semi-arid region in its southern half, with low average annual precipitation. The groundwater on which the country depends for about 2/3 of its water demand is threatened with depletion. Almost all of the water resources available from surface water and groundwater have been used, leading to an absolute shortage of water. Furthermore, the water supply and demand in southern Tunisia, including Gabes governorate, is particularly restrictive, as 74% of surface water is concentrated in the northern part of the country and the average annual precipitation is less than 190 mm (World Climate Guide, 1991-2020). In addition, the demand for drinking water and industrial water is expected to increase across Tunisia from 497 million m^3 (2010) to 694 million m^3 (2030) in the future due to population growth and industrial development (World Bank, 2009).

Against this backdrop, the promotion of the use of treated sewage water is an urgent issue in Tunisia from the perspective of strengthening water resource management. The Government of Tunisia has set a target of using more than 50% treated sewage water in its "Five-Year National Development Plan (2016-2020)" and has identified the promotion of the use of treated sewage water as a priority issue in its "Water Reuse 2050" sewage sector development plan, which is under development. Currently, 125 wastewater treatment facilities are in place in the administrative districts and regions with a population of 3,000 or more under the jurisdiction of the Tunisian Sewage Maintenance Corporation (Office National de l'Assainissement; "ONAS"). However, only 28 of these facilities are equipped with tertiary treatment facilities such as filters and ultraviolet light treatment. Wastewater treatment facilities that do not have tertiary treatment facilities produce low quality secondary water, which means that only about 21% of the total treated sewage water is recycled for environmental protection, agriculture, irrigation, and other uses. The majority is discharged into rivers and other bodies of water (ONAS, 2021).

The governorate of Gabes is home to the chemical industry, including phosphoric acid products, one of the country's major exports. This governorate has a high demand for high-quality water resources with low salinity for industrial use. On the other hand, the governorate relies on groundwater for about 93% of its water resources (Ministry of Agriculture, Water Resources and Fisheries, 2010) and 90% of the country's groundwater has a high salinity concentration of 1.5 g/L or higher (AFD, 2016), obligating the use of expensive tap water for industrial use, which has become a challenge for industrial development. In addition, since the policy of the Government of Tunisia is to prioritize the use of tap water for drinking water and other purposes, companies face the challenge of securing alternative water sources for industrial use. In view of the above, there is a need to develop facilities that can treat wastewater to a level that allows its use as industrial water (Advanced Waste Water Treatment Plant; (hereafter referred to as "A-WWTP").

Against this background, in order to construct an A-WWTP, grant aid for operation and maintenance rights (hereafter referred to as "grant with exploitation rights") was provided for efficient facility development, operation, maintenance and management utilizing Japanese technology, knowledge, and funds. The Government of Tunisia made a request to the Government of Japan for "the Project for Construction of Advanced Waste Water Treatment Plant in Gabes" (hereinafter referred to as the "Project").

(2) Summary of request

A summary of the request is shown in the table below.

Table 1-1 Summary of Request

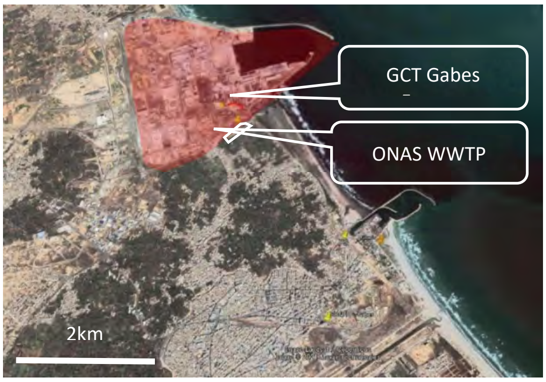
Objective.	This Project aims to utilize treated waste water as industrial water in the Gabes governorate, located in southern Tunisia, where securing water resources is a serious issue, by installing an A-WWTP alongside the existing wastewater treatment facility in the Gabes wastewater treatment plant and supporting efficient operation, maintenance, and management. This will contribute to the conservation of the country's water resources.
Contents	Facilities, equipment and other details: A-WWTP (desalination capacity 6,000 m^3 /day; membrane treatment) Consulting services include: Bidding assistance, construction supervision, etc. (if required as a result of the study), soft components Methods of procurement, construction, and Project operation: Procurement through a unified proposal for the detailed design, construction, operation and maintenance of the facility Areas Covered: Gabes, Ghannouch, Tunisia

1-2 Target Sites

(1) Current status of the target site

The A-WWTP will be located within the Gabes Wastewater treatment plant. The area around the proposed site is surrounded by roads, railroads, rivers, and private land (agricultural land).

The Gabes plant of GCT, a potential off-taker, is the company’s main plant and it uses large amounts of water for the production of sulfuric acid and phosphoric acid, trisodium phosphate (TSP), and diammonium phosphate (DAP), which are made from phosphate ore.



GCT Gabes Plant

Gabes Wastewater treatment plant and planned A-WWTP

Figure 1-1 Target sites (Gabes Wastewater treatment plant and GCT Gabes Plant)

(2) Background to selection of target sites

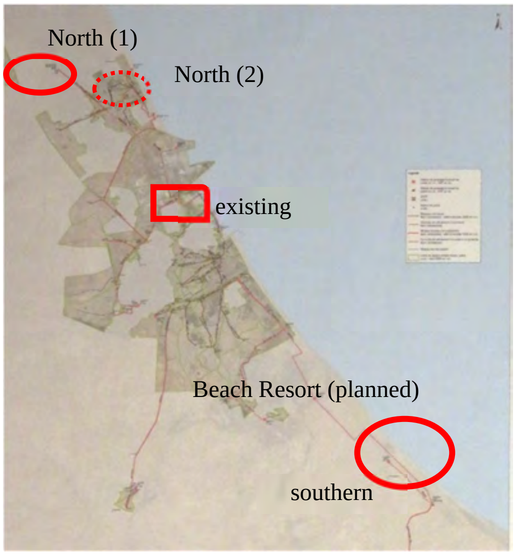
In the original request (2018), the project site was the Gabes Wastewater treatment plant, but in the first meeting with ONAS for the first field study (June 4, 2021), a proposal was made to change the site to Gafsa, which is located in a desert area and has a strict agricultural and domestic water supply from ONAS, and to build new wastewater treatment plants in Gabes (the current Gabes wastewater treatment plant will be discontinued and new wastewater treatment plants will be built to the north and south of the Gabes treatment plant).

Thereafter, discussions were held with relevant Tunisian agencies, including the Ministry of Environment ("MoE"), the GCT, an off-taker candidate, and others. The project team then held discussions with relevant Tunisian organizations, including the Ministry of Environment (MoE) and GCT, an off-taker candidate, and decided to conduct a Site Comparison Study to compare the original project site (Gabes wastewater treatment plant) with the new candidate sites (Gafsa wastewater treatment plant and Gabes new south and north wastewater treatment plants) to determine the project site.

Table 1-2 Summary of Candidate Project Sites

No.	Candidate waste water treatment plant	Summary
1	Gabes Wastewater treatment plant	The facilities are deteriorating rapidly. The flowmeter is not able to measure and display the amount of treated water, the aeration machine has failed due to a rupture caused by aging, and the proper operation and control of water treatment is not being carried out. Portable equipment for emergency use has been installed for the temporary sludge dewatering.

2, 3	Gabes (north-south) New Wastewater treatment plant Candidate Sites	In the Sewerage Master Plan, the plan is to locate the northern and southern Gabes wastewater treatment plants to collect and treat sewage from the urban area of Gabes/Ghannouch and the established urban and beach resorts in the north and south. The current proposed treatment plant sites are bare land (the second site in the north is agricultural land). The wastewater treatment plants are located approximately 8 km and 25 km away from the Gabes wastewater treatment plant, respectively. They will be served by pumping stations and water pipes.
4	Gafsa Wastewater treatment plant	Located in the southern part of the oasis city of Gafsa (population 101,000 (2015 statistics)), an activated sludge (anaerobic-oxic (AO) operation) treatment plant has been built adjacent to the lagoon-method wastewater treatment plant for the start of operations in 2020. Located 7.5 km upstream from Gafsa's GCT plant (approximately 10 km water pipe extension), the plant is situated in a location where treated water can be supplied by a natural flow system (partially by pressure pipe).



Gabes Existing and New Sites

Gafsa Wastewater treatment plant

Gafsa GCT Plant

Figure 1-2 Candidate Project Sites

(3) Site Selection Results

(i) Comparison of project implementation sites

In response to a request from ONAS in the first round of field surveys, an agreement was reached with Tunisian officials to conduct a comparison study of candidate project sites (Site Comparison Study). Based on this agreement, the comparison method, scoring criteria, etc. were discussed in Japan. The "Guidelines for Site Comparison" were sent to the Tunisian side in advance at the end of August 2021 to compare the points from the perspectives shown in the following figure. These were explained to the steering committee on September 24, 2021 as the second phase of the first round of the survey, and the comparison method, including the point distribution method, was approved at this meeting.

(ii) Evaluation method

The evaluation method is shown in the table below.

Primary evaluation: Comparison of 4 sites

As a primary evaluation, compare the six perspectives from (1) to (6). At this stage, the number of locations will be narrowed down to two.

[Assessment Item].

(1) Raw water related

Is a stable amount of water available?

Is stable water quality available?

(2) Can a site for the proposed facility be secured?

Is there sufficient land available for construction?

Is it available for long-term use?

(3) Is power supply available?

(4) Will environmental assessment cause problems?

Do you think there will be any environmental problems?

A - Is the waste generated from the WWTP acceptable?

(5) Is it easy to distribute water to off-takers?

(6) Can construction begin immediately?

Secondary evaluation: Comparison of two sites

As a secondary comparison, the two selected locations will be compared, taking into account simple cost estimation data.

[Assessment Item].

(1) Comparison of approximate equipment costs

(2) What about social issues?

(3) What is the interest of Japanese companies?

Site Determination

Figure 1-3 Target site evaluation method

(ⅲ) Determination of target sites

After a field survey that included Gafsa, the Tunisian agencies agreed at the steering committee on October 1, 2021, that the Gabes wastewater treatment plant, which secured the highest evaluation score, would be the project site.

1-3 Environmental and Social Considerations

1-3-1 Business components with environmental and social impacts

(1) Outline of the Project

In Tunisia, the promotion of the use of treated sewage water is an urgent issue from the perspective of strengthening water resource management. Wastewater treatment facilities are under the jurisdiction of the Office National de l'Assainissement ("ONAS"), the Tunisian sewage maintenance company, which has 122 wastewater treatment facilities in Tunisia. The wastewater treatment facility in Gabes Governorate is the subject of this Project. Although the facility has secondary treatment facilities, they have deteriorated, and, despite carrying out renovation work, the quality of the secondary water has not improved.

Gabes is also home to the chemical industry, including phosphoric acid products, one of the country's major exports. There is a strong demand in Gabes for low-salinity, high-quality water resources for industrial use. However, the high salinity of the country's groundwater has forced the use of expensive tap water for industrial use, which has become a challenge for industrial development. In addition, the Government of Tunisia has a policy of prioritizing the use of tap water for drinking water and other purposes, so companies face the challenge of securing alternative water sources for industrial use.

In light of the above, there is a need to develop facilities that can treat wastewater to a level that allows it to be used as industrial water (Advanced Waste Water Treatment Plant (hereafter referred to as "A-WWTP")). An overview of the existing Gabes wastewater treatment plant is shown below alongside an overview of the A-WWTP planned for this Project.

Table 1-3 Overview of ONAS Gabes wastewater treatment plant

Process	Water treatment: Activated sludge method (surface aeration method) Sludge treatment: Thickening - belt press (temporary installation) (sun-drying floor and centrifugal dehydrator not used)
Throughput	22,100 m^3 /day
Start of operation	1995

Source: ONAS

Table 1-4 Summary of the Project (A-WWTP)

Process	Water treatment: MBR-RO Sludge treatment: Thickening - belt press (temporary installation) (sun-dried floor and centrifugal dehydrator not used)
Throughput	6,000 m^3 /day
Facility Details	Water intake facilities (pumping facilities), water treatment facilities (MBR method), water purification facilities (RO membrane) Water pipelines, water supply pipelines, drainage pipelines, sludge dewatering machine, sludge drying bed, administration building, water receiving tank

Source: Survey Team

(2) Project site

The Project site is the ONAS wastewater treatment plant located in the city of Ghannouch, Gabes, in southern Tunisia.

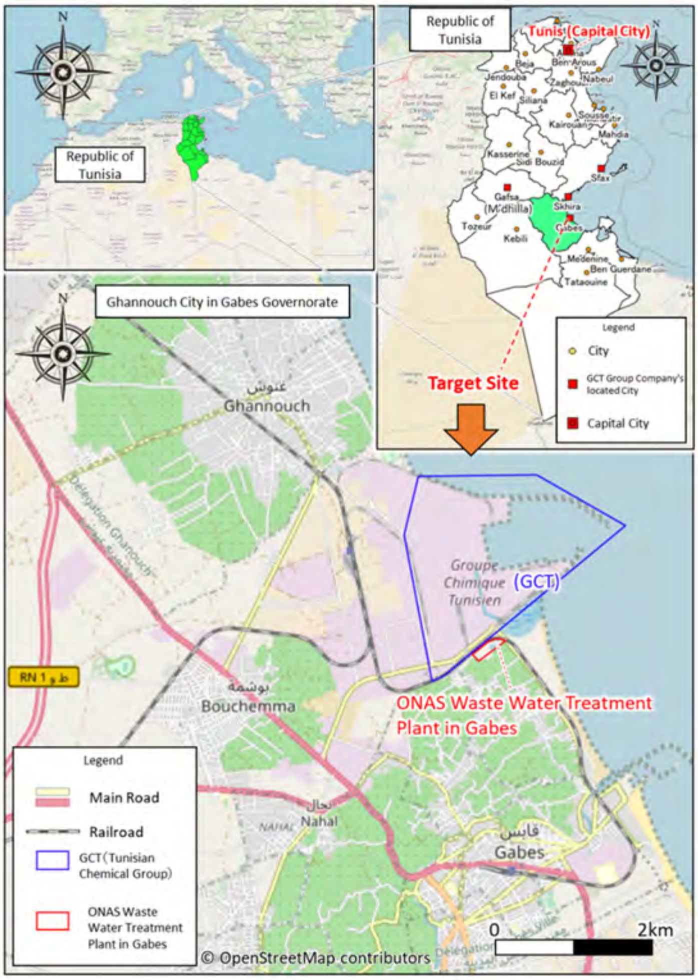
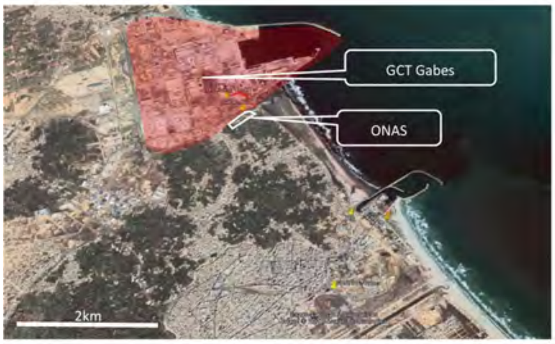


Figure 1-4 Surveyed area



Gabes wastewater treatment plant and GCT Gabes Plant

Gabes wastewater treatment plant

Source: Survey Team

Figure 1-5 Target sites

(3) Facility configuration of A-WWTP

The following table shows the configuration of the A-WWTP facilities.

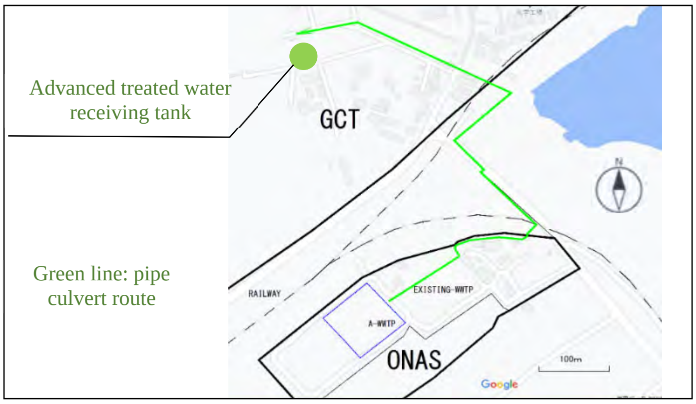
Table 1-5 Facility Composition of the A-WWTP

Business	Facility	Contents
EPC Business	Water intake facility	(Constant) Water intake pipes - Water intake pump facilities - Water transmission pipes - Receiving tanks for raw water
		(Emergency) Intake pump facilities - Water pipes
	A-WWTP*	Pretreatment-MBR-RO, complementary facilities
	Water supply facilities	Advanced treated water storage tank - Water pump - Water pipe
		Water pipe - Receiving tank (in GCT plant)
	Drainage system	Concentrated wastewater storage tank, discharge flow meter, discharge pipe
	Sludge treatment	Sludge dehydrator - sun-drying bed
	Power receiving facility	Transformer substation
		Switchboard

Source: Survey Team

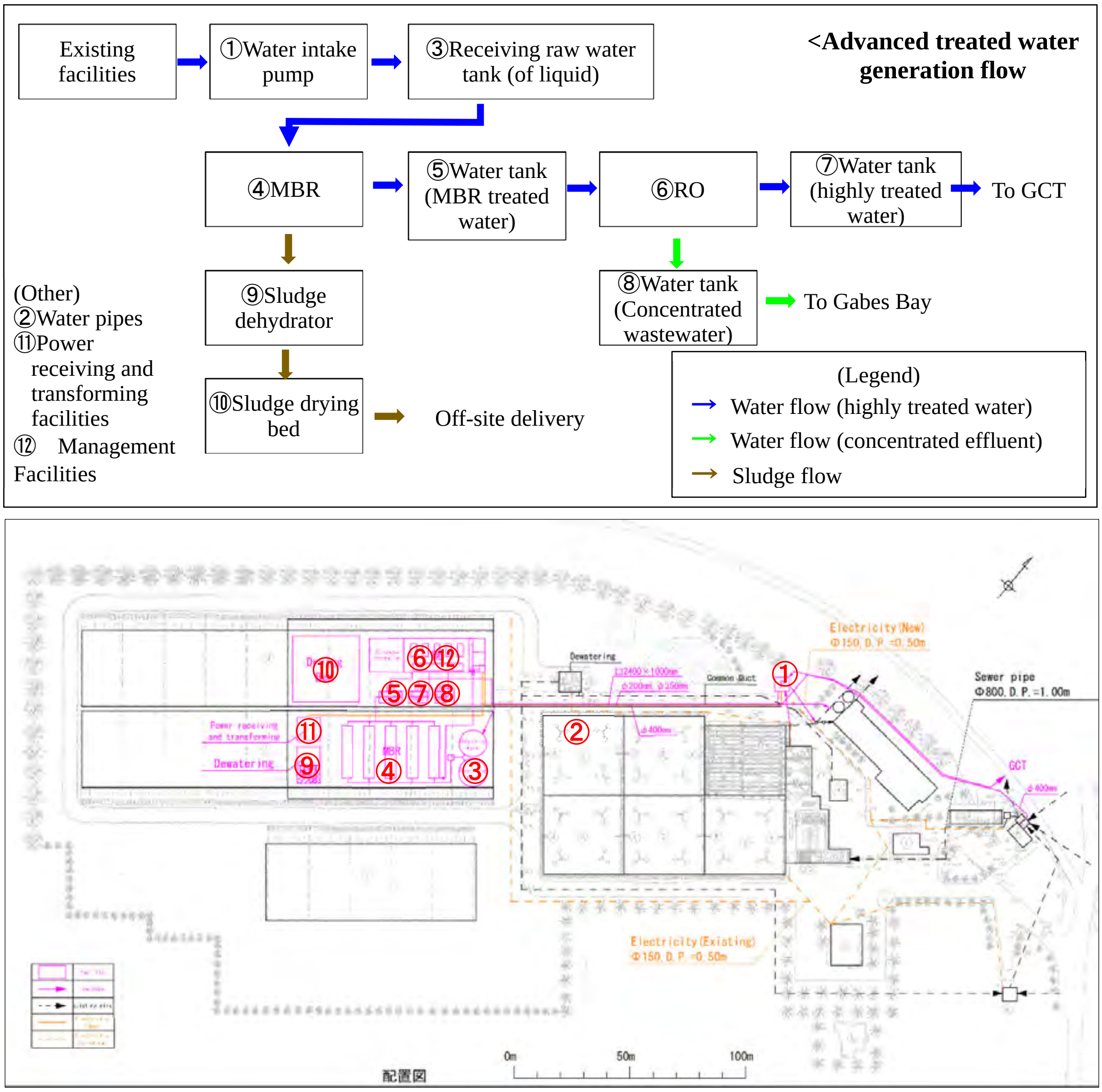
(4) Facility configuration of A-WWTP

In order to use the A-WWTP for the advanced treatment of water from the existing Gabes wastewater treatment plant and to pump it to the GCT plant, it will be necessary to construct various facilities within the ONAS wastewater treatment plant and the GCT plant, as well as public roads. The pipe and culvert routes and the Gabes wastewater treatment plant facility layout are shown below.



Source: Survey team added the route based on Google Maps.

Figure 1-6 Pipeline route



Source: Survey Team

Figure 1-7 Draft layout of the A-WWTP

1-3-2 Base environmental and social conditions

(1) Contamination control items

1) Air quality

Air pollution in Tunisia is stipulated in Law No. 2018-447 of 18 May 2018 with the following contents. The same law will be applied to this Project as well.

Table 1-6 Air Quality Standard (NT106.002)

	Unit	Limit Value		(Reference) WHO	
NO_2	μg/m³	hourly average	200	daily average	200
	μg/m³	annual average	40	annual average	10
SO_2	μg/m³	hourly average	350	10 minutes average	500
	μg/m³	daily average	125	daily average	40
CO	mg/m³	Continuous 8 hours average/day	10	24 hours average	4
	mg/m³	hourly average	40	—	—

Source: WHO 2021 Air Quality Guideline

2) Water quality

The standard for Tunisian effluent water quality is NT106.1, which is set by the Institut National de la Normalisation et de la Propriété Industrielle (hereinafter reffered to as "INNORPI"), supervised by the Ministry of Industry, Energy and Mines (hereinafter reffered to as "MoIEM"). Water quality is set according to the destination of its discharge, as shown in the following table, and in the case of this Project, the criteria for discharge into marine waters apply.

Table 1-7 Summary of Discharge Water Quality Criteria (NT106.002)

	Unit	Criteria for discharge to sewer facilities	Criteria for discharge from wastewater treatment plants to rivers	Criteria for discharge from wastewater treatment plants to the sea	(Reference) Criteria for discharge from wastewater treatment plants to the sea in Japan
pH	--	6.5<pH<9.0	6.5<pH<8.5	6.5<pH<8.5	5.0<pH<9.0
SS	mg/l	400	30	30	200
BOD	mg/l	400	30	30	160
COD	mg/l	1000	90	90	160
Na^+	mg/l	1000	300	-	-
Cl^-	mg/l	700	600	-	-

Source: INNORPI, 1989
Source: Ministry of the Environment: https://www.env.go.jp/water/impure/haisui.html

In addition, the Gabes wastewater treatment plant does not properly treat sewage and sludge due to deficiencies in the existing wastewater treatment facility. As a result, with regard to sewage treatment, the plant is unable to treat incoming sewage due to malfunctioning equipment and discharges sewage directly into public waters. As of June 2022, the treated water from the existing wastewater treatment facility at the Gabes wastewater treatment plant was not in compliance with environmental water quality standards at the time of discharge.

3) Waste

Tunisian regulations pertaining to the management of sludge and other waste generated from wastewater treatment plants include the following

(i) Provisions for waste management and disposal

Act No. 96-41 governs waste management and disposal. Act 96-41 defines waste as "any material or object that the owner disposes of or intends to dispose of," and classifies waste "according to its source into general waste and industrial waste, and according to its characteristics into hazardous waste, non-hazardous waste, and inert waste.” In addition, final disposal sites are classified into (1) disposal sites for hazardous waste, (2) disposal sites for general and non-hazardous waste, and (3) disposal sites for inert waste.

(ii) Classification of hazardous waste

Hazardous waste is listed in Decree No. 2000-2339 (October 10, 2000), and waste from the sewer industry is classified as hazardous waste.

(iii) Waste management

The National Agency for Waste Management ("ANGed") is responsible for waste management. It manages waste by dividing it into (1) general waste and similar waste, (2) non-hazardous industrial waste, and (3) hazardous waste. The entities responsible for the collection and treatment of each type of waste are shown in the table below. For non-hazardous industrial waste, local governments collect fees from waste generators for collection and treatment. On the other hand, local governments cannot collect hazardous waste, and waste generators must dispose of it or outsource disposal to specialized collectors and processors.

Table 1-8 Waste Collection and Disposal Entities

Waste	Collector	Processor
General and similar waste Non-hazardous waste from households (paper, plastic, food scraps, etc.)	Local government	Local government
Non-hazardous industrial waste Paper, plastic, food waste, etc. generated from business establishments	Local government	Local government
Hazardous waste Waste generated from mining, chemical, and steel industries	Emitter	Emitter

Source: ANGed

4) Soil contamination

The Gabes wastewater treatment plant does not properly treat sewage and sludge due to deficiencies in the existing wastewater treatment facility.

- Due to equipment malfunction, the incoming sewage cannot be treated and is discharged directly into public waters.
- Regarding the sludge generated in the sewage treatment process, the existing sludge dewatering machine is not in use due to significant deterioration due to age. As a result, sludge drying beds are not being used for the treatment of sludge generated in the sewage treatment process due to complaints from the surrounding community about odor problems, although some sludge drying beds are used for the treatment of dredged sludge.

Therefore, while inappropriate conditions are observed in sewage and sludge treatment, none are attributable to soil contamination.

5) Noise and vibrations

In Tunisia, the national standards for noise and vibration is stipulated in Decree No. 22/8/2000, which is shown in the following table. The same standard will be applied to this Project as well. In addition, the target site is located in an industrial area, only a few hundred meters from the GCT Gabes plant. There are no residential areas or commercial activities in the vicinity of the site. A field investigation by the Survey Team revealed that there is noise from the GCT Gabes plant.

Table 1-9 Tunisian Noise Standards

	Distance between sender and receiver			Japan (construction noise)
	50m	100m	200m	
Passage of heavy machinery (LAeq)	66 dBA	61 dBA	52 dBA	85 dBA
During construction (in loading) (LAeq)	—	78 dBA	75 dBA	
During construction (in unloading) (LAeq)	61 dBA	52 dBA	48 dBA	

(Acoustic energy average: LAeq)

6) Bad odors

The treatment of sludge generated in the sewage treatment process is required, but as indicated in section (3), above, the existing dehydrator is not in use due to significant aging. Sludge drying beds are partially used to treat dredged sludge, but are not used to treat sludge generated in the sewage treatment process due to complaints from the surrounding community about odor problems.

In addition, ONAS made the following request and shared the following information regarding sludge disposal.

- It is not possible to operate the dewatering machine properly and assistance is needed. (As of June 2022, the sludge is treated on a sun-drying bed instead of being dewatered to reduce excess sludge.)
- Residents in the vicinity have complained about the odors emitted from the sun-drying floor.

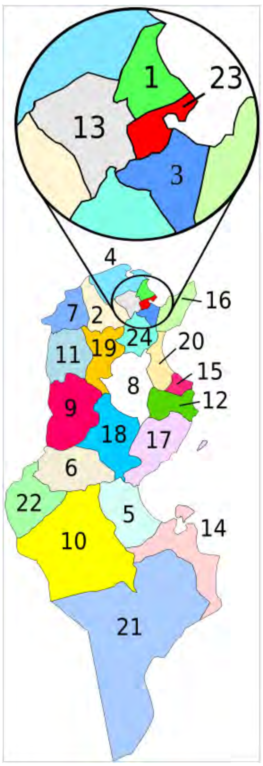
(2) Natural environment

1) Protected area

(a) Ramsar wetlands

There are 42 areas registered as Ramsar wetlands in Tunisia. One of the registered areas (No. 15, Ramsar No. 2076), Complexe des zones humides des Chhott el Guetayate et Sebkhet Dhreia et Oueds Akarit, Rekhama et Meleh, is located in Gabes Bay on the border between Sfax and Gabes governorates, about 25 km north of the project site.

Table 1-10 Tunisian Governorate Classification



No.	Governorate		No.	Governorate	
1	Ariana	North East	13	Manouba	North East
2	Béja.	North West	14	Medenine	South East
3	Ben Arous	North East	15	Monastir	Centre East
4	Bizerte.	North East	16	Nabeul.	North East
5	Gabes	South East	17	Sfax	Centre East
6	Gafsa	South West	18	Sidi Bouzid	Centre West
7	Jendouba	North West	19	Siliana	North West
8	Kairouan	Center West	20	Sousse	Centre East
9	Kasserine	Center West	21	Tataouine	South East
10	Kebili	South West	22	Tozeur	South West
11	Kef.	North West	23	Tunis	North East
12	Mahdia	Center East	24	Zaghouan	North East

Source: Wikipedia

Table 1-11 Registered Ramsar Convention Wetlands

No.	Ramsar No.	Registered Name	Location (Governorate)
1	1696	Ain Dahab (Dahab Spring)	Siliana
2	1697	Bahiret el Bidane (El Bibaan Lake)	Medenine
3	2017	Barrage de Sidi El Barrakx (Sidi El Barrakx Dam)	Béja
4	2018	Barrage de Sidi Saad (Sidi Saad Dam)	Kairouan
5	1698	Barrage Lebna (Lebna Dam)	Nabeul
6	2010	Barrage Merguellil (Merguellil Dam)	Kairouan
7	2077	Barrage Mlaabi (Mlaabi Dam)	Nabeul
8	2013	Barrage Oued El Hajar (El Hajar Dam)	Nabeul
9	2014	Barrage Oued Ermal (Ermal Waj Dam)	Zaghouan
10	2016	Barrage Sidi Abdelmoneemx (Sidi Abdelmoneemx Dam)	Nabeul
11	1699	Chott El Jerid (Salt Lake Jerid)	Kebili
12	2005	Chott Elguetar (Salt Lake Elketar)	Gafsa
13	2101	Complexe des zones humides de Barrage Ghdir El Goulla et Barrage El Mornaguia (Wetland complex of Ghdir El Goulla et Barrage El Mornaguia)	Manouba
14	2100	Complexe des zones humides de Sebkhet Oum Ez-Zessar et Sebkhet El Grine (Wetland complex of salt lakes Oum Ez-Zessar and El Grine)	Medenine
15	2076	Complexe des zones humides des Chhott el Guetayate et Sebkhet Dhreia et Oueds Akarit, Rekhama et Meleh (Wetland complex of Getayate Salt Lake, Doriya Subha, Akarit Wadi, Rekhama Wadi and Meleh Wadi)	Sfax, Gabes
16	2096	Complexe Lac de Tunis (Tunis Lake Complex)	Tunis
17	1700	Djerba Bin El Ouedian	Medenine
18	1701	Djerba Guellala	Medenine
19	1702	Djerba Ras Rmel (Cape Djerba Rmel)	Medenine
20	2447	Garâa Sejenane	Bizerte.
21	1703	Garaet Sidi Mansour (Sidi Mansour Basin)	Gafsa
22	2008	Golfe de Boughrara (Bay of Boughrara)	Medenine
23	0213	Ichkeul	Bizete
24	2012	Iles Kerkennah ou L'archipel de Kerkennah (Kerkennah Islands)	Sfax
25	1704	Iles Kneiss avec leurs zones intertidales	Sfax
26	1705	Lac et tourbière de Mejen Ech Chitan (Lake and swamp of Mejen Essitern)	Bizerte
27	1706	Lagune de Ghar el Melh et Delta de la Mejerda	Bizerte
28	1707	Lagunes du Cap Bon oriental	Nabeul
29	2009	Les Gorges de Thelja (Salja Valley)	Tozeur
30	1708	Les Tourbières de Dar Fatma (Dar Fatma Wetlands)	Jendouba
31	2007	Marais d'eau douce Garaet Douza (Douza Basin Freshwater Wetlands)	Gafsa
32	2011	Oued Dekouk (Docouk Wadi)	Tataouine
33	2220	Réserve naturelle de Saddine	Kef

No.	Ramsar No.	Registered Name	Location (Governorate)
34	2015	Salines de Monastir (Salt Lake Monastir)	Monastir
35	1709	Salines de Thyna (Salt Lake Thyna)	Sfax
36	2006	Sebkhet Halk Elmanzel et Oued Essed (Hulk Elmenzel and Essed Waj)	Sousse
37	1710	Sebkhet Kelbia (Kelbia Subha)	Sousse
38	1701	Sebkhet Noual (Moore Subha)	Sidi Bouzid, Sfax
39	1712	Sebkhet Sejoumi (Sejoumi Subha)	Tunis
40	2019	Sebkhet Sidi Elhani (Sidi Elhani Subha)	Sousse
41	1713	Sebkhet Soliman (Soliman Subha)	Nabeul
42	1714	Zones humides oasiennes de Kebili (Oasis Wetlands of Gubili)	Kebili

Source: https://rsis.ramsar.org/fr

(b) UNESCO World Heritage Site

There are eight UNESCO World Heritage sites in the region, seven cultural and one natural. All of them are located outside of Gabes Governorate, the project site.

Table 1-12 UNESCO World Heritage Sites

No.	Registered Name	Location (Governorate)	Classification
1	Amphitheatre of El Jem	Mahdia	Cultural heritage
2	Archaeological site of Carthage	Tunis	Cultural heritage
3	Medina of Tunis	Tunis	Cultural heritage
4	Ichkeul National Park	Bizerte	Natural heritage
5	Punic Town of Kerkuane and its Necropolis	Nabeul	Cultural heritage
6	Kairouan	Kairouan	Cultural heritage
7	Medina of Sousse	Sousse	Cultural heritage
8	Dougga / Thugga	Béja	Cultural heritage

Source: https://whc.unesco.org/en/statesparties/tn

(c) National Parks

National parks in Tunisia are listed in the table below. There are 17 national parks in Tunisia, all of which are located outside of the project site in the Governorate of Gabes.

Table 1-13 National Parks in Tunisia

National Park Name	Location (governorate) governorate
Bou-Hedma National Park	Gafsa, Sidi Bouzid
Boukornine National Park	Ben Arous
Chambi National Park	Kasserine
Dghoumes National Park	Tozeu

National Park Name	Location (governorate) governorate
El Feidja National Park	Jendouba
Ichkeul National Park	Bizerte
Jebel Chitana-Cap Négro National Park	Bizerte
Jebel Mghilla National Park	Kasserine
Jebel Orbata National Park	Gafsa
Jebel Serj National Park	Siliana, Kairouan
Jebel Zaghdoud National Park	Kairouan
Jebel Zaghouan National Park	Zaghouan
Jebil National Park	Kebili
Oued Zeen National Park	Jendouba
Sanghr Jabbess National Park	Tataouine
Sidi Toui National Park	Medenine
Zembra National Park	Medenine

Source: https://carthagemagazine.com/tunisia-national-parks/

(2) Ecosystem

(a) IUCN Red List

The Tunisian fauna includes 84 mammal species and 375 bird species, of which three Critically Endangered (CR), three Endangered (EN), nine Vulnerable (VU), and two Near Threatened (NT) mammal species are listed by the International Union for Conservation of Nature (IUCN). The major mammal species are listed in the table below.

Table 1-14 Fauna (mammal species) in Tunisia and IUCN Red List

	EW	CR	EN	VU	NT	LC	DD
Macroscelidea (elephant shrews)						1	
Rodentia (rats and mice)						1	1
Lagomorpha						1	
Erinaceomorpha (hedgehogs and gymnures)						1	1
Soricomorpha (shrews, moles, and solenodons)						1	
Chiroptera (bats)				2	1	1	1
Cetacea (whales)		1	2	3		1	1
Carnivora (carnivorans)			1		1	1	
Artiodactyla (even-toed ungulates)	1		2	2		1	

Source: https://www.iucnredlist.org/

Regarding the flora, Tunisia is composed of 2,828 species (2,526 native and 302 subspecies) across a wide variety that have a Mediterranean affinity. The main flora is shown in the table below.

Table 1-15 Flora in Tunisia and IUCN Red List

	EW	CR	EN	VU	NT	LC	DD
Ovate Goat Grass (Aegilops geniculate)						1	
Tifton Bur Clover (Medicago rigidula)						1	
Wild Celery (Apium graveolens)						1	
Sandarac (Tetraclinis articulate)						1	
Elantine Faux Alsine (Elatine alsinastrum)					1		
Plicate Sweet-grass (Glyceria notate)						1	
Spanish Iris (Iris xiphium)						1	
Needle Grass (Stipa tenacissima)				1			
Stately Dactylorhiza (Dactylorhiza elata)					1		

Source : https://www.iucnredlist.org/

Tunisia has 61 reptile species and 8 amphibian species on the IUCN Red List. The following table shows major reptiles and amphibians.

Table 1-16 Major Reptiles in Tunisia and IUCN Red List

	EW	CR	EN	VU	NT	LC	DD
Desert Horned Viper (Cerastes cerastes)						1	
(Trapelus boehmei)						1	
Elegant Gecko (Stenodactylus sthenodactylus)						1	
(Trapelus mutabilis)						1	
Javelin Sand Boa (Eryx jaculus)						1	
Common Leaf-nosed Snake (Lytorhynchus diadema)						1	
Blanc's Sand Racer (Psammodromus blanci)					1		
Leatherback (Dermochelys coriacea)				1			
Loggerhead Trutle (Caretta caretta)				1			

Resource: https://www.iucnredlist.org/

Table 1-17 Amphibians in Tunisia and IUCN Red List

	EW	CR	EN	VU	NT	LC	DD
(Hyla meridionalis)						1	
North African Fire Salamander (Salamandra algira)				1			
Common Toad (Bufo bufo)						1	

African Green Toad (Bufotes boulengeri)						1	
Algerian Ribbed Newt (Pleurodeles nebulosus)						1	
North African Green Frog (Pelophylax saharicus)						1	
Moroccan Toad (Sclerophrys mauritanica)						1	
Painted Frog (Discoglossus pictus)						1	

Resource: https://www.iucnredlist.org/

(b) Marine conservation

There are 19 areas rated Less Protected / Unknown by the Marine Conservation Institute's Marine Protection Atlas (MPA), totaling 761 km^2. Of these Less Protected/Unknown area, two are located at the northern and southern ends of Gabes Bay.

They are located in Gabes Bay on the border between Sfax and Gabes governorates, approximately 25 km north of the project site.

Table 1-18 Marine Conservation Areas

Ramsar No.	Local name	Notes
2076	Complexe des zones humides des Chott El Guetayate et Sebkhet Dhreia et oued Akarit Rekhama et Melah (Wetland complex of Chott El Guetayate and Sebkhet Dhreia, Wadi Akarit Rekhama and Melah)	Important Wetlands They are located on the border of Gabes and Sfax governorates, approximately 25 km north of the project site.
2100	Complexe des zones humides de Sebkhet Oum Ez-Zessar et Sbkkhet El Grine (Wetland complex of Sbkhet Oum Ez-Zessar and Sbkhet El Grine)	Important Wetlands The site is located within the Medenine governorate next to Gabes, approximately 50 km south of the project site.

Source: Marine Conservation Institute's Marine Protection Atlas (MPA)

(c) Birds

There are 308 bird species in Tunisia (including 14 endangered species), and 46 Important Bird and Biodiversity Areas (IBAs) in Tunisia registered by Birdlife International (BLI), all of which are located outside of the project site in Gabes governorate.

Table 1-19 Important Bird Habitats

No.	Important Bird Habitat Names	Location (governorate)	IUCN Red List Category
1	La Galite Archipelago	Bizerte.	LC (1), VU (2)
2	Ichkeul	Bizerte.	LC (13), EN (1), VU (2)、NT (2)
3	Islands of Zembra and	Nabul	LC (1), VU (1)

No.	Important Bird Habitat Names	Location (governorate)	IUCN Red List Category
	Zembretta		
4	Djebel El Haouaria	Nabul	LC (7)
5	Garaet Mabtouh	Bizerte.	LC (3)
6	Mlaabi Dam	Nabul	EN (1)
7	Mornaguia Dam	Tunis	EN (1), VU (1)
8	Sidi Abdelmoneem Dam	Nabul	EN (1)
9	Lake of Tunis	Ben Arous and Tunis	LC (4)
10	Sebkhet Sedjoumi	Tunis	LC (3)
11	Suleiman	Nabul	LC (1), VU (1)
12	Lebna Dam	Nabul	EN (1), VU (1), NT (1)
13	Zaghouan Aqueduct	Ben Arous	LC (1)
14	Korba Lagoon	Nabul	LC (2), VU (1)
15	El Masri Dam	Nabul	EN (1)
16	Sebkhet Sidi Khelifa	Sousse	LC (1)
17	Sebkhet Halk El Menzel	Sousse	LC (4)
18	Oued Sed	Sousse	VU (1)
19	Kairouan plains	Kairouan	LC (11), NT (1)
20	Sebkhet Kelbia	Sousse	LC (20), EN (1), VU (2)
21	Monastir saltworks	Monastir	LC (2)
22	Metbasta	Kairouan	VU (1)
23	El Houareb Dam	Kairouan	EN (1), VU (1), NT (1)
24	Sebkhet Sidi El Hani	Sousse	LC (3)
25	Chaambi	Kasserine	LC (10)
26	Kerkennah Islands	Sfax	LC (9)
27	Salt pans of Thyna	Sfax	LC (9), NT (1)
28	Bouhedma	Sidi Bouzid	LC (1), NT (1)
29	Garaet Douza	Gafsa	LC (1)
30	Gafsa	Gafsa	LC (15), VU (1)
31	Sebkhet Noual	Sidi Bouzid	LC (16), NT (1)
32	Kneiss.	Sfax	LC (20), NT (5)
33	Sebkhet Sidi Mansour	Gafsa	LC (19), EN (1), VU (3)
34	Sebkhet Dreiaa	Sfax	LC (2)
35	Chott Djerid	Kebili and Tozeur	LC (13), VU (2)
36	Bordj Kastil	Medenine	LC (2)
37	Gourine	Medenine	LC (4)
38	Boughrara	Medenine	LC (8)
39	Sebkhet Nouaiel	Kebili	VU (1)
40	Douz Laâla	Kebili	VU (1), NT (1)
41	snam	Kebili	VU (1)
42	Ghidma	Kebili	VU (2), NT (1)
43	jbil	Kebili	LC (18)
44	Bibane.	Medenine	LC (2)
45	Sidi Toui	Medenine	LC (13)

No.	Important Bird Habitat Names	Location (governorate)	IUCN Red List Category
46	El Feidja	Jendouba	LC (7)

Source: Birdlife International (BLI)

(d) Impact on rivers and other aquatic environments (impact on aquatic organisms, etc.)
As explained in "2. Base Environmental and Social Conditions," "(1) Pollution Control Items," and “(i) Water Quality," standards have been set for discharge into the sea in Tunisia by INNORPI. However, as of June 2022, treated water from the existing Gabes wastewater treatment plant is not in compliance with the environmental standards for water quality.

(3) Social environment

(i) Site acquisition and resettlement
There will be no resettlement caused by this Project. Site acquisition will not occur because the Project will use land within the existing ONAS wastewater treatment plant site.

(ii) Livelihood and living
The Project plans an existing wastewater treatment plant, and its implementation will not change the surrounding land use or water use. In addition, the Project site is in an industrial area and there are no residents nearby, so the Project will not adversely affect the lives of residents.

(iii) Cultural heritage
There are no cultural heritage sites in the vicinity of the Project site.

(iv) Landscape
The Project is for a facility within an existing wastewater treatment plant, and the water pipeline to the off-taker follows an existing public road; in addition, there will be no impact on the landscape because the road crossing will not be excavated (pipes will be laid without excavating the road surface).

(v) Minorities and indigenous peoples
No ethnic or indigenous minorities have been identified in the Project vicinity.

(vi) Working conditions
Tunisia’s labor laws are shown in the table below. It also has a social security system.

Table 1-20 Tunisian Labor Law and Social Security System

Labor law	Enacted in 1966 and amended in 1994 and 1996, it regulates labor standards and labor relations in the private and agricultural sectors. Labor laws govern all labor matters, including new hires, employment, employment of women and minors, labor relations, employment contracts, wages, working hours, vacations, working conditions, job safety, health, termination of contracts, severance pay, individual and collective labor disputes, labor tribunals, labor audits, penalties, foreign employees, collective agreements, labor unions, representation of hired workers, and gender equality. It also provides for all matters relating to labor, including wage equality and guarantees maternity and paternity leave.
Social security system	The following three funds have been established for social security: ・National Fund for Social Security for Workers: For both private and agricultural sector workers ・National Fund for Pension and Social Security Reserve: For public service and public sector workers ・Sickness Insurance Fund: Covers all workers

Source: https://www.jilaf.or.jp/rodojijyo/africa/north_africa/tunisia2019.html

1-3-3 Environmental and Social Consideration Systems and Organizations in the Partner Country

(1) Organizations related to environmental and social considerations in the partner country

The two organizations involved in environmental and social considerations in Tunisia will be:

(i) Ministère de l'Environnement (MoE)

The Ministry of Environment was established in 1991 from the Ministry of Environment and Sustainable Development (Ministére de l'Environnement et du Développement Durable). It is responsible for policy advocacy in the environmental field, as well as activities to improve the living environment and land planning. It is the supervising ministry of ONAS, the implementing agency for this Project.

(ii) Agence Nationale de Protection de l'Environnement (ANPE)

Established in 1988, the EIA was established under the MoE to implement environmental protection and pollution prevention in accordance with the Environmental Impact Assessment Decree (Decree No. 2005-1991, issued on July 11, 2005; hereinafter referred to as the "EIA Decree"). It is the supervisory authority for environmental and social considerations in Tunisia.

(2) Environmental and social consideration systems in the partner country

In Tunisia, the environmental impact assessment will be conducted in accordance with the EIA Decree, which divides projects into the categories shown in the table below according to the size of the project and the impact generated, which are subject to the implementation of environmental and social considerations studies or the submission of specifications. This Project falls under Category B. The contents of the environmental impact assessment study are specified in the sector-specific work instructions prepared by ANPE. Although no work order has been prepared by ANPE for the sewerage project as of July 2022, ONAS and ANPE confirmed that ONAS prepared a work order for a sewerage project in a previous project, which was approved by ANPE, and the survey team has decided to use it for the environmental impact assessment of this project.

Table 1-21 Tunisia Environmental and Social Considerations Categories and Approval Process

Environmental and Social Considerations Survey	Category	Approval process
Necessary	Category A	Facilities and projects for which ANPE raises an objection within 21 working days of receipt of the Environmental Assessment Report. If no appeal is filed by ANPE within this timeframe, consent is deemed to have been given for the project to be implemented.
	Category B	Facilities and projects for which ANPE raises an objection within 3 working months after receipt of the Environmental Assessment. If no objection is filed by ANPE within this period, consent is deemed to have been given for the project to be implemented.
Unnecessary	Specification submission	Submission of specifications for environmental measures
	Out of scope	No environmental impact assessment required

Source: http://www.anpe.nat.tn/Fr/etude-deimpact-sur-leenvironnement_11_165

(3) Gap analysis on EIA

A comparison was made between the aforementioned Tunisian system of environmental and social considerations, the EIA Decree, and the JICA Guidelines for Environmental and Social Considerations. The differences between the two are shown in the table below.

Table 1-22 Differential Analysis on EIAs

Subject matter	JICA Guidelines for Environmental and Social Considerations	Partner country system	Existence or non-existence of differences and policy for addressing them
Basic matter	- In implementing a project, the environmental and social impacts of the project shall be studied and examined as early as possible in the planning stage, and alternatives and mitigation measures to avoid or minimize such impacts shall be considered, the results of which shall be reflected in the project plan. (JICA Environmental Guidelines,	The EIA is a decision support tool for the various phases of a project. To ensure that the project does not harm the environment, it integrates economic, social, and environmental aspects to prevent pollution and environmental degradation, and moves toward solutions with the least impact.	Both the JICA guidelines and the partner country's system indicate the intention to minimize the impact of the project on environmental and social considerations. As a result, there are no differences.

Subject matter	JICA Guidelines for Environmental and Social Considerations	Partner country system	Existence or non-existence of differences and policy for addressing them
	Exhibit 1.1)		
Information disclosure	- The environmental assessment report (which may have a different name in some systems) must be written in the official or widely used language of the country where the project is to be implemented. It must be written in a language and style that can be understood by local people. - The Environmental Assessment Report is required to be publicly and freely available at any time in the country where the project will be implemented, including to local residents, and copies must be available for acquisition. (JICA Environmental Guidelines, Appendix 2)	The information in the EIA study should be presented in a concise manner to facilitate understanding.	There are no differences, to the point that an explanation of information disclosure is given in both the JICA guidelines and the partner country system. Since we could not find any clear description of information disclosure in the partner country's system, we shall follow the JICA guidelines.
Public consultation	- For projects that are considered to have a significant impact on the environment, in particular, it is necessary that information is disclosed to the public and that the results are reflected in the content of the project after sufficient consultation with local residents and other stakeholders from an early stage, such as when alternatives to the Project plan are being considered. (JICA Environmental Guidelines, Appendix 1, Social Agreement.1) - In preparing an environmental assessment report, sufficient information must be disclosed in advance, consultations must be held with local residents and other stakeholders, and records of consultations must be prepared. - Consultations with local residents and other stakeholders should be conducted as necessary throughout the preparation and implementation period of the project, but especially at the time of selection of environmental impact assessment items and drafting. (JICA Environmental Guidelines, Appendix 2. Environmental Assessment	Building public confidence in the EIA process and project implementation through stakeholder participation is a key element for success and sustainability, and will involve information exchange and consultation. Records of consultations will be kept and attached to the EIA report.	Both the JICA Guidelines and the partner country's system mention community consultation. However, it is desirable that consultations are held at the time of selection of environmental impact assessment items, in particular, and at the time of drafting. Since this point is not specified in the partner country's system, we will proceed in accordance with the JICA Guidelines.

Subject matter	JICA Guidelines for Environmental and Social Considerations	Partner country system	Existence or non-existence of differences and policy for addressing them
	Report required for Category A)		
Impact Assessment Items	- The scope of environmental and social considerations to be studied and reviewed includes impacts on human health and safety and the natural environment (including transboundary or global environmental impacts) through air, water, soil, waste, accidents, water use, climate change, ecosystems and biota, as well as social considerations of such matters as those listed below: Population displacement, including involuntary resettlement; local economies, including employment and livelihoods; land use and local resource use; social organizations, including social capital and local decision-making bodies; existing social infrastructure and social services; socially vulnerable groups such as the poor and indigenous peoples; equity in the distribution of damage and benefits and in the development process; gender, children's rights, cultural heritage, local conflicts of interest, HIV/AIDS and other infectious diseases, and the work environment (including occupational safety). (JICA Environmental Guidelines, Appendix 1. Scope of impacts to be considered) - The impacts to be studied and considered include not only the direct and immediate impacts of the Project, but also, to a reasonable extent, derivative and secondary impacts, cumulative impacts, and impacts of inseparable and integral parts of the Project. In addition, impacts over the life cycle of the Project should be considered. (JICA Environmental Guidelines, Exhibit 1, Scope of Impacts to be considered)	The EIA integrates and verifies environmental, social and economic aspects. Verification items include soil, air, groundwater, surface water, landscape, ecology, natural parks, cultural heritage, etc. for environmental aspects, and resettlement, local and indigenous communities, etc. for social aspects. EIAs are capable of assessing, evaluating and measuring direct and indirect impacts in the short, medium and long term.	Compared to the JICA guidelines, the partner country system is not very specific. Therefore, we will proceed in accordance with JICA guidelines.
Monitoring, complaint handling, etc.	- Efforts should be made to disclose the monitoring results to local stakeholders involved in the Project. (JICA Environmental Guidelines,	Prepare an EMP during the investigation phase. Eliminate, mitigate, compensate for, and monitor environmental impacts during	Monitoring is mentioned in both the JICA guidelines and the partner country system. In addition,

Subject matter	JICA Guidelines for Environmental and Social Considerations	Partner country system	Existence or non-existence of differences and policy for addressing them
	Appendix 1, Monitoring) - In the event that a third party or other party makes a specific suggestion regarding the insufficiency of environmental and social considerations, etc., a forum must be established for sufficient information disclosure with stakeholders involved in the Project to discuss and consider countermeasures, and efforts must be made to agree on a procedure to resolve the problem. (JICA Environmental Guidelines, Appendix 1, Monitoring)	the construction, implementation, and closeout phases.	the fact that compensation is also mentioned does not close the door to conversations with third parties. However, since we could not find any description in the Tunisian system regarding the publication of monitoring results to local stakeholders, we will proceed in accordance with the JICA guidelines.
Ecosystems and Biota	- Projects shall not involve significant conversion or significant degradation of critical natural habitats or critical forests.	If a protected area or a national park is affected, it automatically becomes Category B (of the Tunisian EIA).	In the partner country's system, it is stated that this category is subject to stricter screening, but it is not stated that it is not allowed. On the other hand, JICA guidelines do not allow projects to be implemented in protected areas. As a result, the JICA guidelines are adopted.
Indigenous peoples	- The impacts of the Project on indigenous peoples must be considered in every possible way and efforts must be made to avoid them. If avoidance is not possible after such consideration, effective measures for indigenous peoples must be taken to minimize impacts and compensate for losses.	Stakeholders will include indigenous communities. It will also consider possible measures to eliminate, reduce, or compensate for the project's harmful effects on the environment. These measures should be technically feasible, economically appropriate, and socially acceptable.	The avoidance of impacts on indigenous peoples in both JICA guidelines and partner country systems is explained. As a result, there is no gap.

1-3-4 Consideration of alternatives

The alternatives were compared regarding proposals in the case of not implementing this Project and alternatives for each water treatment method. As shown in the table below, the treatment method planned for this project was found to be reasonable.

Table 1-23 Comparative study of alternatives

Item		Alternative 1 (If not implemented)	Alternative 2 (If MBR is not installed)	Alternative 3 (This Project)
Wastewater treatment plant Facility Overview	Water treatment methods	Secondary treatment only at existing wastewater treatment facility	Secondary water is withdrawn from the existing wastewater treatment plant and then ・Water purification facilities: RO membrane treatment facilities	Secondary water is withdrawn from the existing wastewater treatment plant and then ・Water treatment facility: MBR treatment facility ・Water purification facilities: RO membrane treatment facilities
	Sludge Treatment Method	Sun drying floor and centrifugal dehydrator (out of order)	Multi-stage screw press sludge dehydrator	Multi-stage screw press sludge dehydrator
	Water treatment capacity	19,000 m^3 /day	19,000 m^3 /day Of which, RO membrane 6,000 m^3/day	19,000 m^3 /day (of which, MBR + RO membrane 6,000 m^3/day)
	Other	-	Water intake facilities, water delivery facilities, and Wastewater facilities, sludge treatment, and power receiving facility	Water intake facilities, water transmission facilities, and Wastewater facilities, sludge treatment, and power receiving facility
Technical side	Technical perspective	Treated water is not in compliance with water quality environmental standards.	The RO membrane will receive primary treatment level water (raw sewage) quality, which will cause the blockage of the RO membrane.	Primary treatment level water will be treated at water MBR treatment facility and then at the RO membrane treatment facility, which will operate properly.
	Project cost	-	Approx. 1.31 billion yen	Approx. 2.69 billion yen
Environmental and Social Considerations	Social environment	-	There will be no impact on resettlement, landscape, cultural heritage, etc.	There will be no impact on resettlement, landscape, cultural heritage, etc.
	Natural (physical) environment	・Primary treatment level water is discharged to the sea. ・Sludge is not properly treated.	・Primary treatment level water is discharged to the sea. ・The sludge for the treated water treated in the project will be properly disposed of.	・Treated water treated in the project will be discharged in compliance with water quality standards. ・The sludge for the treated water treated in the project will be properly disposed of.
Recommended optimal plan and rationale		Treated water is not recommended as an optimal proposal because it does not adhere to water quality standards.	Treated water is not recommended as an optimal proposal because it does not adhere to water quality standards.	The project will increase the amount of treated water that meets water quality standards and is recommended as the optimal proposal.

1-3-5 Scoping and Environmental and Social Considerations Survey TOR

(1) Scoping

Scoping was conducted to determine the scope of important and potentially important environmental and social considerations and survey methodology. The results are shown in the table below.

Table 1-24 Scoping

		Impact item	Evaluation: Before construction/ during construction	Evaluation: At the time of publication	Reasons for Evaluation
Countermeasures against pollution	1	Air quality	✓	✓	During construction: Temporary small-scale air pollution is expected due to vehicles and construction equipment. At the time of provision: A survey is planned because the status of sludge treatment is not known.
	2	Water quality	✓	✓	During construction: Possible water pollution due to wastewater from construction sites, heavy equipment, vehicles, and construction housing. At the time of provision: A survey will be conducted because the quality of the treated water from the existing wastewater treatment facility is not known.
	3	Waste	✓	✓	During construction: It is expected that construction debris and waste materials will be generated. At the time of provision: A survey will be conducted because the sludge treatment status is not known.
	4	Soil contamination	✓	✓	During construction: Possible soil contamination due to construction oil spillage, etc. At the time of provision: Subject to investigation because the method of discharging treated water is not known. In addition, there is no information on whether heavy metals are contained in sludge, etc., so this should be confirmed.
	5	Noise and vibrations		✓	During construction/provision: The subject site is an industrial site that is located away from residential areas, so noise and vibrations from the operation of construction equipment and vehicles are not expected to pose a significant risk. At the time of provision: It is expected that noise from pumping facilities and sludge dewatering machines will be generated.
	6	Land subsidence			During construction/provision: It is not anticipated that groundwater will be used in the Project, nor will there be other operations that would cause land

Impact item			Evaluation: Before construction/ during construction	Evaluation: At the time of publication	Reasons for Evaluation
					subsidence.
	7	Bad odors		✓	During construction: No work or other activities that would cause odors are anticipated from the construction details of this Project. At the time of provision: The sludge treatment method is not known, so it is subject to investigation.
	8	Sediment		✓	During construction: The work in this Project is not expected to affect the bottom sediment. At the time of provision: The discharge treatment method is not known, so it is subject to investigation.
Natural (physical) environment	9	Protected areas			During construction/provision: There are no protected areas, etc. in and around the Project site.
Natural (physical) environment	10	Ecosystem			During construction/provision: Since the Project will use the site of the executing agency and public land (road), no impact on the ecosystem is expected. In addition, no flora and fauna, including rare species, was confirmed to inhabit the project target site, so no impact on flora and fauna is expected.
Natural (physical) environment	11	Water Environment		✓	During construction: Work is not expected to cause changes in the water flow, riverbed or other bodies of water. At the time of provision: When a new drainage pipe is constructed in the river, the flow may be altered by the structure.
Natural (physical) environment	12	Topography, geology			During construction/provision: Since the project involves the construction of facilities on level ground and the installation of water pipes along the existing road, no large-scale cut and fill is planned. Therefore, no topographical or geological impacts are anticipated.
Social environment	13	Site acquisition and resettlement			During construction/provision: No new land acquisition will be involved, as the Project will be implemented on the implementing agency's premises and public land. In addition, there are no informal residents within the site or on public land, and no residents are engaged in economic activities in the area. Therefore, land

Impact item			Evaluation		Reasons for Evaluation
			Before construction/ during construction	At the time of publication	
					acquisition and relocation of residents are not expected to occur.
	14	Impoverished people			During construction/provision: No impoverished people have been identified in or around the Project site.
	15	Ethnic minorities and indigenous peoples			Before construction/at the time of provision: There are no ethnic minorities or indigenous peoples in or around the project site.
	16	Local economy, including employment and means of livelihood			During construction/provision: The implementation of the project may increase the income of local workers and temporarily improve their livelihoods.
	17	Land use and utilization of local resources			During construction/provision: The project will utilize the implementing agency site and public right-of-way (roads). No impacts on land use or local resource use are anticipated.
	18	Water usage			During construction/provision: There is no water use from rivers, etc. in the vicinity of the project site.
	19	Existing social infrastructure and social services	✓		During construction: Temporary traffic congestion is expected during construction. At the time of provision: No traffic congestion or other impact is expected after provision.
	20	Social institutions such as social capital and local decision-making institutions			During construction/provision: The Project will use the site of the implementing agency and public land (roads). No impact on social capital or local decision-making bodies is anticipated.
	21	Equality of benefits and losses			During construction/provision: The Project will utilize the site of the implementing agency and public land (roads). It is not expected to cause inequitable damage or inconvenience to the surrounding areas.
	22	Conflicts of interest within the community			During construction/provision: The Project will use the site of the implementing agency and public land (roads). It is not expected to cause a conflict of interest in the area.
	23	Landscape			During construction/provision: The Project will use the site of the implementing agency and public land

Impact item			Evaluation		Reasons for Evaluation
			Before construction/ during construction	At the time of publication	
					(roads). No landscape impacts are anticipated.
	24	Cultural heritage			During construction/provision: There are no historical sites or heritage sites in or around the Project site.
	25	Gender			During construction/provision: No specific negative gender impacts are expected from the Project.
	26	Children's rights			During construction/provision: No specific negative impacts on children's rights are expected from the Project.
	27	HIV/AIDS and other infectious diseases	✓		During construction: The influx of construction workers may spread infectious diseases. At the time of provision: No particular impact on infectious diseases is expected from the construction of the facility.
	28	Working conditions (including occupational safety)	✓		During construction: The working environment for construction workers needs to be considered. At the time of provision: No work is planned that could negatively impact workers during the in-service phase.
Other	29	Accidents	✓	✓	During construction: Accidents may occur. At the time of provision: Since the traffic volume is low, traffic accidents and other accidents are not expected during the service phase. Care should be taken to prevent falls from the Project facilities.
	30	Transboundary or global scale impacts and climate change			During construction/provision: The Project will use the site of the implementing agency and public land (roads). No cross-boundary impacts, climate change impacts, etc. are anticipated.

(2) TOR for environmental and social considerations survey

The TOR for the environmental and social considerations survey is shown in the table below.

Table 1-25 TOR of Environmental and Social Considerations Survey

Environmental items	Survey item	Survey method
Consideration of alternatives	(1) Examination of water treatment methods	(1) Information gathering from ONAS Gabes office (collection of existing data, etc.)
Air quality	(1) Assess the current status of air quality (exhaust gas and dust) (2) Impact during construction (3) Confirmation of sludge treatment method	(1) Survey of existing data and collection of information at relevant institutions (2) Confirmation of the nature, method, duration, location, extent, type of construction equipment, operating location, operating period, number of construction vehicles, duration, and travel routes of construction vehicles, etc. (3) Interviews with relevant organizations
Water quality	(1) River water quality (2) Marine water quality	(1) Survey of existing materials and information gathering at relevant institutions (2) Survey of existing data and information collection at relevant institutions (3) Water quality survey
Waste	(1) Construction waste disposal methods (2) Confirmation of sludge treatment method	(1) Interviews with relevant organizations, surveys of similar cases (2) Field visits and interviews with relevant organizations
Soil contamination	(1) Measures to prevent oil leakage during construction (2) Confirmation of sewage treatment water discharge method	(1) Confirmation of the nature, method, duration, type of construction machinery and equipment, and location of operation and storage of such equipment. (2) Interviews with relevant organizations (3) Water quality survey
Noise and vibrations	(1) Noise conditions in the surrounding area (2) Confirmation of noise control measures in design	(1) Field visits and interviews with relevant organizations
Bad odors	(1) Confirmation of sludge treatment method	(1) Field visits and interviews with relevant organizations
Sediment	(1) Confirmation of sewage treatment water discharge method	(1) Field visits and interviews with relevant organizations
Water environment	(1) Confirmation of sewage treatment water discharge method	(1) Field visits and interviews with relevant organizations
Existing social infrastructure and social services	(1) Confirmation of traffic conditions around the construction site	(1) Field visits and interviews with relevant organizations
HIV/AIDS and other infectious diseases	(1) HIV/AIDS incidence rate in the neighborhoods near the project sites	(1) Survey of existing data and interviews with relevant organizations
Working conditions (including occupational	(1) Occupational safety measures	(1) Investigation of similar materials and interviews with related organizations

Environmental items	Survey item	Survey method
safety)		
Accidents	(1) Confirmation of water pipeline route	(1) On-site inspections and interviews with relevant organizations

1-3-6 Results of environmental and social considerations survey (including forecast results)

The table below shows the results of the environmental and social considerations survey conducted based on the above TOR.

Table 1-26 Results of environmental and social considerations survey

Environmental Items	Results
Air quality	Air pollution is assumed to comprise exhaust fumes and dust from vehicles and construction equipment, and it is expected to be temporary and small-in scale. Regarding the sludge treatment method, it was confirmed that the sludge discharged from the Project facility will be sun-dried and treated instead of incinerated. Therefore, there is almost no impact on Air quality.

<table>
<tr><th>Environmental Items</th><th>Results</th></tr>
<tr><td>Water quality</td><td>
(i) Items related to MBR processing facilities
The following are the results of the investigation of the effluent and influent water quality (BOD, SS, TkN, TP) of the existing wastewater treatment plant.

・ BOD, SS
The treated water is not compliant with effluent standard values (BOD and SS) and must be treated as sewage. In the Gabes wastewater treatment plant, when the inflow water volume exceeds the capacity of the reaction tank, the water is bypassed from the first sedimentation tank to the outflow of the final sedimentation tank.

Table 1-27 Gabes wastewater treatment plant influent sewage and treated water quality results (BOD, SS) (2019.1-2020.12)
<table>
<tr><th rowspan="2"></th><th rowspan="2">Flow rate (m^3 /day)</th><th colspan="2">Inflow sewage (mg/L)</th><th colspan="2">Process water (mg/L)</th><th colspan="2">Standard value (mg/L)</th></tr>
<tr><th>BOD</th><th>SS</th><th>BOD</th><th>SS</th><th>BOD</th><th>SS</th></tr>
<tr><td>Average</td><td>20,426</td><td>369</td><td>421</td><td>74</td><td>134</td><td rowspan="3">30</td><td rowspan="3">30</td></tr>
<tr><td>Monthly average (Max)</td><td>25,905</td><td>519</td><td>663</td><td>254</td><td>332</td></tr>
<tr><td>Monthly average (Min.)</td><td>4,976</td><td>245</td><td>254</td><td>15</td><td>27</td></tr>
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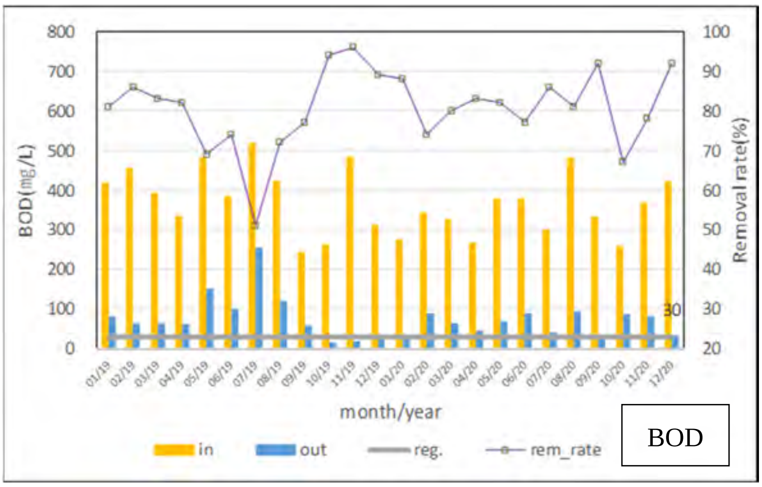

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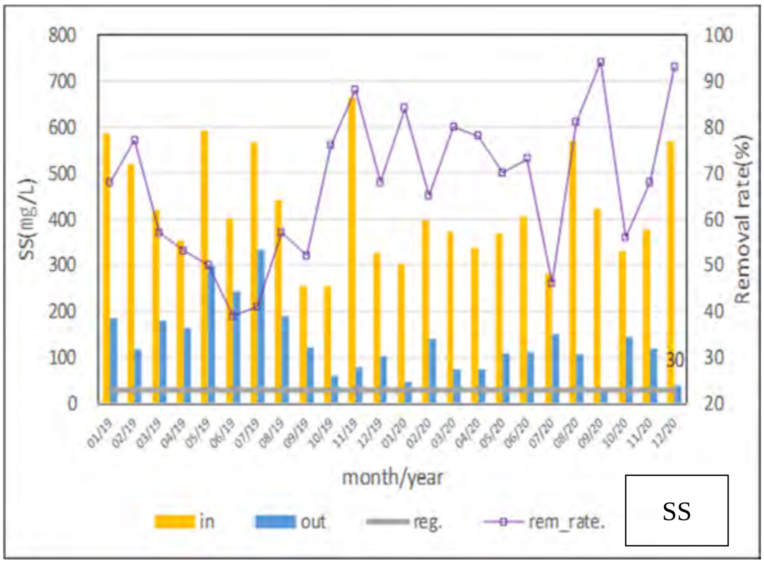
Environmental Items	Results



・ TkN, TP

Currently, the treated water does not correspond to the effluent standard values (TkN and TP), and it was determined that the treated water also needs to be treated as sewage.

In response, the plan for this Project is to install an oxygen-free tank in the MBR for nitrogen to achieve nitrification and denitrification, and to add phosphorus, a coagulant.

Table 1-28 Gabes wastewater treatment plant influent sewage and treated water quality results (TkN, TP) (2019.1-2020.12)

	Flow rate (m^3/d)	Inflow of sewage (mg/L)		Process water (mg/L)		Standard value (mg/L)	
		TkN	TP	TkN	TP	TkN	TP
Average	20,426	60	10.9	39	3.2	20	2
Monthly average (Max)	25,905	76	35.0	55	8.0		
Monthly average (Min.)	4,976	43	2.6	6	0.3		

<table>
<tr><th>Environmental Items</th><th>Results</th></tr>
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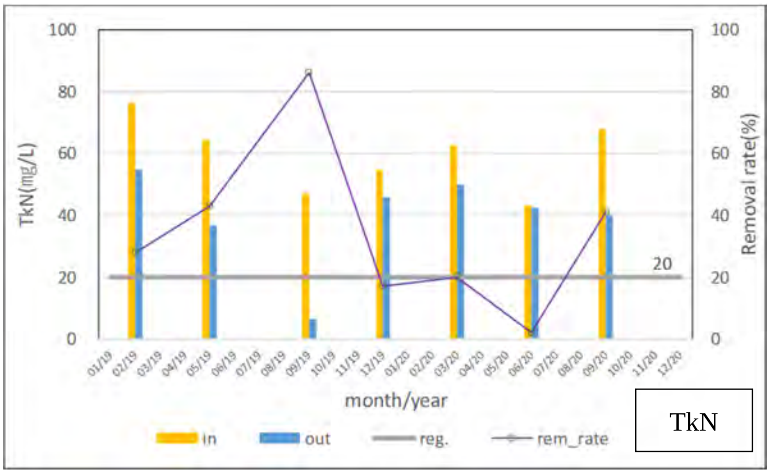

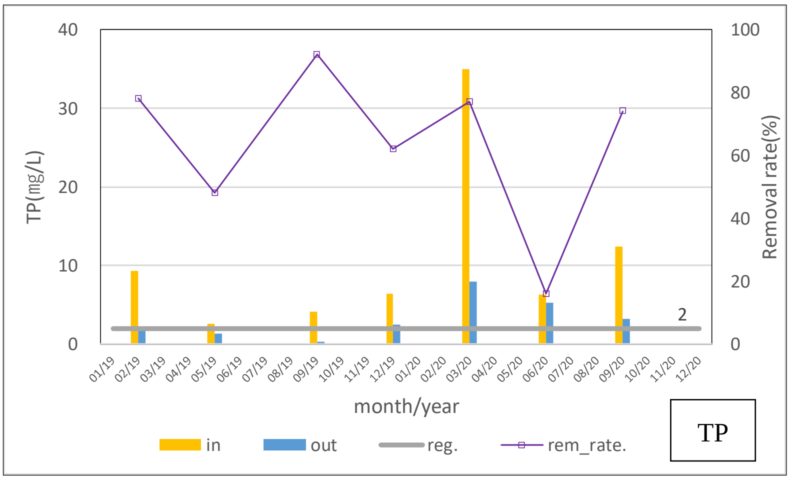

(ii) Items related to RO processing

・ Salinity

An examination was made of the impact of RO treatment, which produces pure water , as well as concentrated wastewater. The salinity of the influent sewage and the treated water were as follows. Even though the salinity of the sewage was four times higher than that of the treated water, the concentration was about 30% of the 35 g/L salinity of the sea area to which the water was discharged.

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Environmental Items	Results

Table 1-29 Gabes wastewater treatment plant influent sewage and treated water quality results (salinity) (2019.1-2020.12)

	Influent sewage (g/L)	Process water (g/L)	Reference value (%)
Average	2.83	2.80	1.1
Monthly average (maximum)	3.59	3.53	
Monthly average (min.)	2.08	1.96	

(iii) Heavy metals

The tests of the inflow and outflow water quality at the ONAS wastewater treatment plant were both below the effluent water quality standards, and almost no heavy metals, except Fe, were detected.

Table 1-30 Gabes wastewater treatment plant influent sewage and treated water quality results (heavy metals)

	Unit	ONAS (WWTP-in)		ONAS (WWTP-out)		Effluent water quality standard
		December 16, 2021				
		08:30	19:55	08:15	19:50	
Fe	mg/l	0,32	0,50	0,51	1,08	5
Mn	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	1
Cu	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	1
Zn	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	5
Ag	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	0.1
As	mg/l	< 0,001	< 0,01	< 0,001	< 0,001	0.1
Hg	mg/l	< 0,0005	< 0,0005	< 0,0005	< 0,0005	0.01
pb	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	1

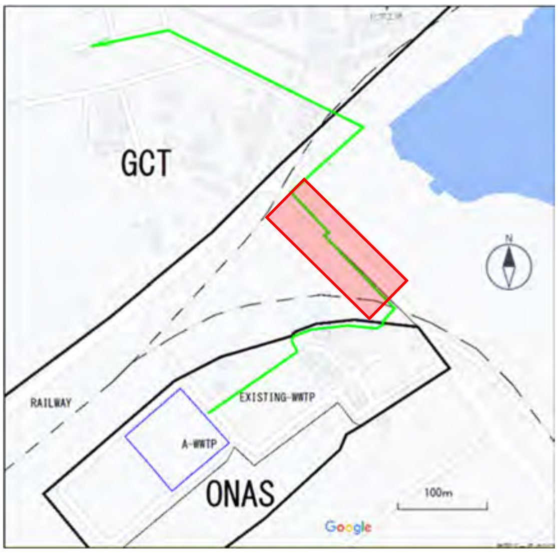
Environmental Items	Results
Waste	A minimum amount of overburden* will be generated during construction, which will be used for backfilling, and a minimum amount of waste material will be generated, which will be disposed of at a disposal site in the manner indicated in "Table 1-8: Waste Collection and Disposal Entities". * The overburden will be used to raise the proposed A-WWTP (sludge drying

Environmental Items	Results
	bed) for storm water drainage. The status of sludge generated in the process of sewage treatment and the plans for this Project are as follows. (i) Current status ・ Regarding sludge generated in the process of sewage treatment, the existing sludge dewatering machine has aged significantly and is not in use. ・ The sludge drying beds are partially used to treat dredged sludge, but there are complaints from the surrounding area about odor problems, and sludge drying beds are not used to treat the sludge generated in the sewage treatment process. ・ The sludge is transported to a cement plant in Gabes. (ii) Plan for this Project In order to avoid complaints from nearby residents about odor problems, sludge generated in the process of MBR sewage treatment will be dewatered and dried by a multiple-plate screw press dehydrator, which facilitates odor control and has high durability.
Soil contamination	Field investigations revealed that the Gabes wastewater treatment plant was not properly treating sewage and sludge due to deficiencies in the existing wastewater treatment facility. ・ Regarding sewage treatment, due to equipment malfunction, the incoming sewage cannot be treated and is discharged directly into public waters. ・ Regarding the sludge generated in the sewage treatment process, the existing sludge dewatering machine is not in use due to significant aging. As a result, sludge drying beds have not been used for the treatment of sludge generated in the sewage treatment process due to complaints from the surrounding community about odor problems, although some sludge drying beds are used for the treatment of dredged sludge. Thus, while inappropriate conditions are observed in sewage and sludge treatment, none are attributable to soil contamination. In addition, based on the field survey, the following items are anticipated during construction and provision.

Environmental Items	Results
	During construction: Oil leaks that occur during construction are expected to be temporary and minor. At the time of provision: Since the treated water from the existing wastewater treatment facility and the treated and concentrated water from the project facility were designed to be discharged to the sea through a waterway, no soil contamination is expected to occur. Specifically, the discharge culverts were planned to be 1) normal discharge culverts (which cannot be used because there is a culvert for agricultural use downstream), 2) discharge culverts for excess inflow, and 3) emergency discharge culverts, and it was decided to use culverts 3) for discharge due to its location.
Noise and vibrations	The results of the field survey showed that the subject site is located in an industrial area only a few hundred meters from the GCT Gabes plant, and that there is noise from the GCT Gabes plant. In addition, the following items are anticipated during construction as a result of the field survey. Noise and vibrations caused by the operation of construction equipment during construction. The following items have been planned for this Project. While the existing pumping facility (for pumping water from the existing wastewater treatment plant) is located outdoors, the underground pumping facility was designed to prevent noise from leaking outside. In addition, the sludge dewatering machine, which was expected to generate noise (the dewatering machine rotates slowly and generates little vibration), was installed inside the building to reduce noise. As a result, the noise and vibrations after the provision of the pumps will be maintained at a minimal level.
Bad odors	As a result of the field survey, the following matters were confirmed. The dehydrator at the existing wastewater treatment plant was renovated in 2016-2017, but has not been used since 2019 due to significant aging. Therefore, the sludge drying beds are partially used to treat dredged sludge, but are not used to treat sludge generated in the sewage treatment process due to neighborhood complaints about odor issues. As of June 2022, no such

<table>
<tr><th>Environmental Items</th><th>Results</th></tr>
<tr><td></td><td>complaints have been received.

Based on the above, the Project will adopt a multiple-plate screw press dehydrator that ensures sludge treatment, facilitates odor control, and is highly durable.</td></tr>
<tr><td>Sediment</td><td>The following has been planned for this Project.
To avoid impacting bottom sediments, the drainage water (concentrated water) from the A-WWTP to be constructed in the Project will be discharged through the discharge pit of the existing wastewater treatment facility and then channeled by a concrete drainage pipe to a channel at the site boundary for discharge into Gabes Bay.</td></tr>
<tr><td>Water environment</td><td>The following has been planned for this Project.
To avoid impacting the hydrology, the drainage water (concentrated water) from the A-WWTP to be constructed will be discharged through the discharge pit of the existing wastewater treatment facility and then channeled by a concrete drainage pipe to a channel at the site boundary for discharge into Gabes Bay.</td></tr>
<tr><td>Existing social infrastructure and social services</td><td>The following items are anticipated during construction.
Construction of the A-WWTP and installation of water pipes will cause traffic congestion and traffic restrictions. However, the impact on traffic congestion and traffic restrictions will be minimal due to the non-excavation method used for the construction of the water pipe.



Source: The Survey Team added the route based on Google Maps
Figure 1-8 Route of water pipe installation</td></tr>
</table>

Environmental Items	Results
HIV/AIDS and other infectious diseases	The HIV prevalence rate in Tunisia is 0.1%. (World Data Atlas, 2020) However, it is assumed that there is a possible risk of spreading infectious diseases due to the influx of workers from the outside.
Working conditions (including occupational safety)	The working environment for construction workers is protected under Tunisian labor law, and the Project will comply with national law and take the working environment into consideration so that no problems will arise. The Project also has a social security system. (See "Table 12: Labor Law and Social Security System in Tunisia" for (1) labor law and (2) the social security system in Tunisia.
Accidents	During construction: Since construction vehicles and trucks carrying construction materials and machinery will enter and exit the construction site, there is the possibility that traffic accidents may occur due to construction-related vehicles. During construction, appropriate safety protection such as stairs and handrails will be installed to reduce the risk of accidents during construction. At the time of provision: The plan shows that the Project facilities will be equipped with appropriate safety protection such as stairs and handrails to reduce the risk of accidents at the time of provision.

1-3-7 Impact assessment

The table below shows the results of the assessment of the environmental and social impacts of the Project based on the results of the environmental and social considerations survey.

Table 1-31 Table of Survey Results

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
Countermeasures against pollution	1	Air quality	✓	✓	B-	D	During construction: Temporary small-scale air pollution is expected due to vehicles and construction equipment. At the time of provision: The sludge discharged from the

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
							project facilities will be sun-dried instead of incinerated, so there will be almost no impact on air quality.
	2	Water quality	✓	✓	B-	B-	During construction: Wastewater generated during construction may temporarily muddy the waters of the adjacent river. At the time of provision: Treated water from the existing wastewater treatment plant does not meet effluent standards, and treated water from the Project facility will meet effluent standards, thereby reducing the discharge of treated water below effluent standards. In addition, the salinity of the concentrated water discharged into the ocean is much lower than the concentration of seawater, so there is little impact. However, the A-WWTP planned for this Project must function properly and treat the water so that it is below effluent standards.
	3	Waste	✓	✓	D	B-	During construction: A minimum amount of overburden will be generated during construction, which will be used for backfilling, and the minimum amount of waste material generated will be disposed of at a disposal site. At the time of provision: For the sludge, the Project plans to

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
							procure a multiple-plate screw press dehydrator that facilitates odor control and has high durability, which will be used for drying after dewatering. The waste will then be transported to a disposal site in accordance with Tunisian law, so no waste is expected to be generated that would affect the surrounding environment. However, the sludge dewatering machine planned for the Project must function properly and be transported to the waste disposal site.
	4	Soil contamination	✓	✓	B-	B-	During construction: Possible soil contamination due to construction oil spillage, etc. At the time of provision: Treated water from the existing wastewater treatment plant and treated/concentrated water from the Project facilities will be combined with treated water from the existing wastewater treatment plant and discharged through the existing discharge outlets and through channels to the sea, so no soil contamination is expected to occur. In addition, heavy metals are below the effluent water quality standards. However, treated water from the A-WWTP to be planned for this Project must be properly discharged.
	5	Noise and vibrations		✓	N/A	B-	At the time of provision: The pump facility was designed to be

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
							an underground facility to prevent noise from leaking outside. The sludge dewatering machine was installed inside the building to reduce noise. Therefore, the impact of noise and vibrations is extremely small. However, A-WWTP to be planned in this Project functions properly and does not generate noise or vibration due to failures.
	6	Land subsidence			N/A	N/A	
	7	Bad odors		✓	N/A	B-	At the time of provision: A multiple plate screw press dehydrator that facilitates odor control and has high durability will be adopted. Odors are not expected to be generated. However, the sludge dewatering machine planned for the Project must be functioning properly.
	8	Sediment		✓	N/A	D	At the time of provision: Treated and concentrated water from the Project facilities will be merged with treated water from the existing wastewater treatment plant and discharged through the existing discharge outlet and discharged through a channel to the sea area, so there will be no impact on bottom sediment.
Natural (physical) environment	9	Protected areas			N/A	N/A	
	10	Ecosystem			N/A	N/A	
	11	Water Environment		✓	N/A	D	At the time of provision: Treated and concentrated water from the project facilities will be merged with treated water from the existing wastewater treatment

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
							plant, and discharged through the existing discharge outlet to the sea. Therefore, it will not cause any changes in the water flow, riverbed or other bodies of water.
	12	Topography, geology			N/A	N/A	
social environment	13	Site acquisition and resettlement			N/A	N/A	
	14	Impoverished peoples			N/A	N/A	
	15	Ethnic minorities and indigenous peoples			N/A	N/A	
	16	Local economy, including employment and means of livelihood			N/A	N/A	
	17	Land use and utilization of local resources			N/A	N/A	
	18	Water usage			N/A	N/A	
	19	Existing social infrastructure and social services	✓		B-	N/A	During construction: Temporary traffic congestion may occur, requiring traffic regulation.
	20	Social institutions such as social capital and local			N/A	N/A	

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
		decision-making institutions					
	21	Equality of benefits and losses			N/A	N/A	
	22	Conflicts of interest within the community			N/A	N/A	
	23	Landscape			N/A	N/A	
	24	Cultural heritage			N/A	N/A	
	25	Gender			N/A	N/A	
	26	Children's rights			N/A	N/A	
	27	HIV/AIDS and other infectious diseases	✓		B-	N/A	During construction: the influx of workers from outside will increase opportunities for the spread of infectious diseases.
	28	Working conditions (including occupational safety)	✓		B-	N/A	During construction: There is a risk of accidents and injuries to construction workers.
Other	29	Accidents	✓	✓	B-	D	During construction: The contractor will submit a traffic management plan that includes measures to prevent traffic congestion and accidents during construction. At the time of provision: Since there is a risk of accidents such as intrusion into power receiving equipment and tripping on ladders during work, it is necessary to install appropriate safety protection devices such as fences and handrails as mitigation measures.

Classification.	No.	Impact item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for evaluation
			Before construction/ during construction	At the time of publication	Before construction/ during construction	At the time of publication	
	30	Transboundary or global scale impacts and climate change			N/A	N/A	

Rating: A+/-: Significant positive/negative impact expected
B+/-: Relatively significant positive/negative impact expected
C: Degree of impact is unknown. Assumptions can be made once facility geometry is clarified/needs detailed investigation.
D: Impacts are assumed to be minor or negligible. No further field survey is required.

1-3-8 Mitigation measures and costs of implementing mitigation measures

Discussions were held regarding the Mitigation measures and future actions for items rated A- and B- in the environmental assessment.

Table 1-32 Mitigation measures and costs of implementing mitigation measures

No.	Environmental Items	Mitigation measure	Responsibility	Supervisory agency	Cost
During construction					
1	Air quality	・ Use of properly maintained vehicles and machinery that can control emissions ・ Watering for dust suppression on site and surrounding roads	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
2	Water quality	・ Preventive maintenance of construction equipment and vehicles ・ Drainage management of construction accommodation	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
4	Soil contamination	・ Ensure safety of fuel and oil storage and disposal ・ Prevent oil leaks and other problems through proper inspection and maintenance of construction equipment	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
19	Existing social infrastructure and social services	・ Secure access routes for detours around the construction site ・ Notification by posting construction signs	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated

No.	Environmental Items	Mitigation measure	Responsibility	Supervisory agency	Cost
					for on-site supervision.
27	HIV/AIDS and other infectious diseases	・ Education and instruction of workers on infection prevention	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
28	Working conditions (including occupational safety)	・ Provide occupational health and safety guidance ・ Conduct periodic safety meetings for workers ・ Installation of safety signage	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
29	Accidents	・ Set speed limit (25 mph or less) ・ Restrict machine movement on designated haul routes ・ Appropriate safety signage to control on-site traffic	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
At time of provision					
2	Water quality	・ MBR membrane treatment and RO membrane treatment processes are incorporated into the Project plan.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
3	Waste	・ Project plan includes multiple plate screw press dehydrator that facilitates odor control and has high durability.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
4	Soil contamination	・ It is planned that the treated water from the existing sewage treatment facility and the treated water/condensed water from this project facility will be combined, discharged from the existing outlet, and discharged to the sea area through the waterway.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
5	Noise and vibrations	・ The pumping facility planned in this Project will be an underground type, and the sludge dewatering machine	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated

No.	Environmental Items	Mitigation measure	Responsibility	Supervisory agency	Cost
		will be installed inside the building to reduce noise.			for on-site supervision.
7	Bad odors	・ Project plan includes multiple plate screw press dehydrator that facilitates odor control and has high durability.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
29	Accidents	・ In this Project, it is planned to install a fence around the power receiving equipment to prevent intrusion. ・ In this project, it is planned to install handrails to prevent worker to fall down from the ladder when going up and down to the receiving tank.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.

1-3-9 Monitoring plan

A monitoring plan to verify the effectiveness of mitigation measures is shown in the table below.

Table 1-33 Monitoring Plan

No.	Environmental Items	Item	Location	Frequency	Responsibility	Supervisory agency	Cost
During construction							
1	Air quality	Existence of exhaust gas and dust from construction	Around the construction site	1 time/month	Contractor	ONAS	Included in construction costs
2	Water quality	pH, SS, BOD, COD	River adjacent to construction site	1 time/month	Contractor	ONAS	Included in construction costs
4	Soil contamination	Leakage of fuel, oil, etc. into the soil	Around the construction site	1 time/week	Contractor	ONAS	Included in construction costs
19	Existing social infrastructure and social services	・ Visual inspection of construction site detour access routes and construction signage markings	Construction site neighborhood	1 time/month	Contractor	ONAS	Included in construction costs

No.	Environmental Items	Item	Location	Frequency	Responsibility	Supervisory agency	Cost
		・ Listen to complaints from local residents					
27	HIV/AIDS and other infectious diseases	・ Records of diseases and infections ・ Interviews regarding the health status of workers	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
28	Working conditions (including occupational safety)	Status of implementation of occupational health and safety guidance and periodic safety meetings	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
29	Accidents	・ Whether or not an accident occurred ・ Installation status of safety facilities such as protective fences, warning signs, etc.	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
At time of provision							
2	Water quality	pH, SS, COD, BOD	A-WWTP Drainage Facility	1 time/month	Contractor	ONAS	Included in operating expenses
3	Waste	Dredging conditions of waste	Sludge drying bed	1 time/month	Contractor	ONAS	Included in operating expenses
4	Soil contamination	Drainage conditions of treated water	Outlet of treated water	1 time/week	Contractor	ONAS	Included in construction costs
5	Noise and vibrations	Operation of pumping facilities and sludge dehydrator	Pump facility and sludge dehydrator room	1 time/month	Contractor	ONAS	Included in operating expenses
7	Bad odors	Sludge dehydrator in operation	Sludge dehydrator room	1 time/month	Contractor	ONAS	Included in operating expenses
29	Accidents	Installation conditions of safety equipment such as fences and handrails	Power receiving equipment and receiving tank.	1 time/month	Contractor	ONAS	Included in construction costs

1-3-10 Implementation system

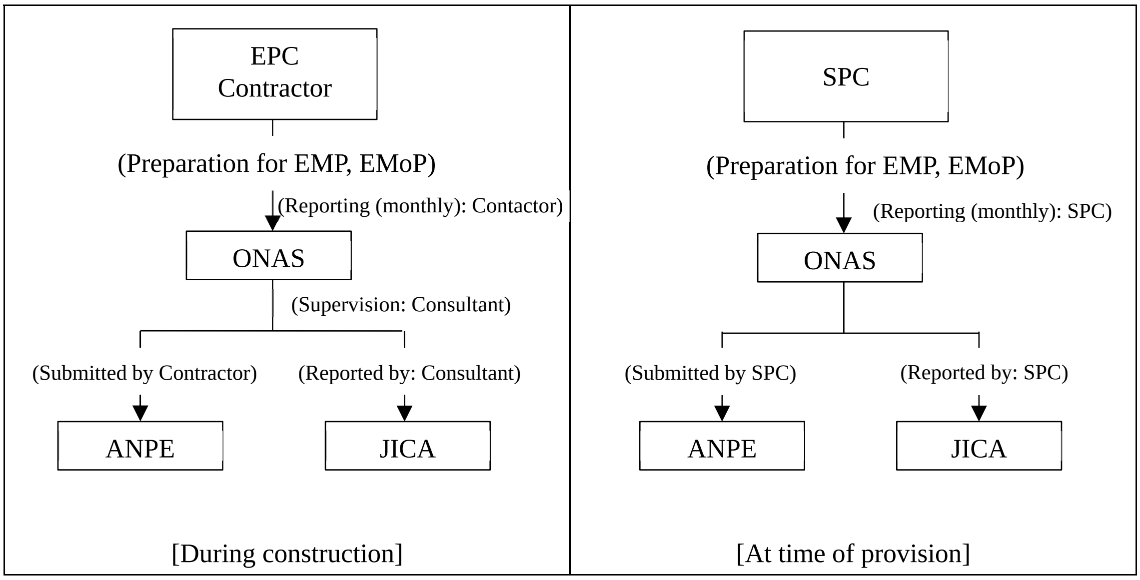
(1) During construction

Based on the results of the cooperative preparatory study, the Project operator shall prepare an Environmental Management Plan (hereafter referred to as "EMP") and an Environmental Monitoring Plan (hereafter referred to as “EMoP”) based on the results of the cooperative preparatory study. The EMP and EMoP are prepared and reported to ONAS, the implementing agency, which will confirm the contents. The Project operator then submits the plan to ANPE for approval. Based on the approved EMP and EMoP, the Project operator will conduct monitoring during normal work under ONAS supervision. Reporting method and frequency will be determined after ANPE approval.

(2) At the time of provision

Based on the results of the cooperative preparatory study, the SPC prepares an EMP and EMoP and reports them to ONAS, which will confirm the contents. ONAS will then submit the EMP and EMoP to ANPE for approval. Based on the approved EMP and EMoP, SPC will conduct monitoring during normal work under the supervision of ONAS. Reporting method and frequency will be determined after ANPE approval.

For the implementation system, please refer to "2-4 Contract Type/Bidding" and "2-4-1 Contract Type".



Source: Prepared by the survey team

Figure 1-9 Environmental monitoring implementation system

1-3-11 Stakeholder Meeting

A stakeholder meeting was conducted on the following topics.

(1) Stakeholder meeting plan
The following plan for conducting stakeholder meeting was made.

- Targeted participants:
  Local government with jurisdiction over the Project site in the Governorate of Gabes, the organization that will need the construction permit, and ONAS Gabes and GCT Gabes, the off-taker that will manage the subject facility.
- Number of times held:
  Because of the limited timing for all parties involved to come together, it was decided to have one meeting.

(2) Date, time, place, and method of notification
The notification of the stakeholder meeting was formally announced on July 18, 2022 by phone and email after consulting with the implementing agencies, the Governor of Gabes, and the relevant agencies since April 2022 on the timing and method of implementation. The stakeholder consultation was held on Friday, July 22, 2022 from 9:30-10:30 a.m. in an online meeting.

(3) Methods of considering socially vulnerable groups
To avoid bias in the selection of participants, the Tunisian side consulted a wide range of organizations involved in the Project. The meeting was held online without any travel involved.

(4) Participants
Participants in the consultation are listed below.

Table 1-34 Stakeholder Consultation Participants

Organization	Agency
First Delegate	Gabes Governorate
General Secretary	Gabes Governorate
President	Gabes District
Representative	Gabes Municipality
Regional Director	ONAS Gabes
Regional Director Charged of Environment Assessment	GCT Gabes
Director of the Sea Water desalination project	GCT Gabes
Coordination Director	Equipment Directorate of Gabes

Organization	Agency
Director	National Rail Ways of Gabes
CEO	APAL Gabes (Agency for the Protection and Development of the Coastal Line)
EIA Expert	SCET Tunisia
EIA Expert	SCET Tunisia
Survey Assistant	JICA Survey Team

(5) Details of discussions

The stakeholder meeting began with a presentation by SCET Tunisia regarding the Project, its positive socio-environmental impacts, and the results of the EIA, which was followed by a Q&A session and comments.

(6) Questions and answers

Questions and answers from the stakeholder consultation are listed below.

- A question was raised as to whether the Project would generate odors and, if so, whether measures were being taken to reduce them. In response, the respondent answered that the A-WWTP will not generate odors or dust, and that the A-WWTP will reduce odors from the existing wastewater treatment facility.
- A question was raised about noise and dust during the EPC project phase. In response, it was explained that mitigation measures are being taken for noise and dust during the EPC project and that noise and dust will be taken into consideration during construction.
- A question was raised about the energy consumption of the facility (especially RO). It was explained that although the Project will produce water with low TDS concentrations, energy consumption is low compared to seawater desalination.
- GCT confirmed that the Project will reduce the boron concentration in the treated water. GCT responded that it would consider whether the Project could address this issue.
- The timing of the start of the EPC project was confirmed.
- The participants expressed their support for the results of the environmental impact assessment of the Project and their support regarding groundwater conservation and alternative water resources.
- The participants expressed the strong interest of the people of Gabes for the implementation and success of the Project and their readiness to support the Project.
- As a result, there was no significant opposition to the implementation of this Project.

(7) Results of reflecting on the comments in plans and projects

The comments received were generally favorable. Discussions will be held with GCT regarding boron in treated water.

(8) Follow-up with relevant persons who were unable to participate in the consultation
Key stakeholders were included in this consultation. If information needs to be provided, it will be made through the Governor of Gabes.

(9) Public consultation to be conducted in the future
Stakeholder meeting has been completed at this time.

1-3-12 Draft monitoring form

A draft monitoring form to be used by the executing agency in the Project to report monitoring results to JICA during construction and during servicing is shown below.

(1) During construction

1) Pollution control measures
1.1) Air pollution

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Vehicle exhaust gas, dust	Around construction site, once/month, check vehicle operation and maintenance records, visual inspection (check for smoke and dust)

1.2) Water quality

Item (units)	Measured value (average value)	Measured value (maximum value)	Local standard (INNORPI)	Remarks (measurement location, frequency, method, etc.)
pH			6.5<pH<8.5	River adjacent to construction site, 1 time/month
SS			30mg/l	River adjacent to construction site, 1 time/month
BOD			30mg/l	River adjacent to construction site, 1 time/month
COD			90mg/l	River adjacent to construction site, 1 time/month

1.3) Soil contamination

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Whether fuel, oil, etc. has leaked into the soil	Visual inspection (check for leaks of fuel, oil, etc.) once a week around the construction site

(3) Social environment

3.1) Existing social infrastructure and social services

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Secure access routes for construction site detours and complaints from local residents	Around construction site, 1 time/month, site perimeter survey

3.2) HIV/AIDS and other infectious diseases

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Health status of workers	Construction sites, 1 time/week, health records and interviews with workers

3.3) Working conditions

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Working conditions	Construction site, 1 time/week, interviews with workers, visual check of working conditions

3.4) Accidents

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Accidents during construction	Around construction site, 1 time/week, record of accidents, survey around site

(2) At the time of provision

1) Pollution control measures

1.1) Water quality

Item (units)	Measured value (average value)	Measured value (maximum value)	Local standard (INNORPI)	Remarks (measurement location, frequency, method, etc.)
pH			6.5<pH<8.5	A-WWTP waste water facility, 1 time/month
SS			30mg/l	A-WWTP waste water facility, 1 time/month
BOD			30mg/l	A-WWTP waste water facility, 1 time/month
COD			90mg/l	A-WWTP waste water facility, 1 time/month

1.2) Waste

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Dredging status of waste	Sludge drying bed, 1 time/month, visual inspection

1.3) Soil contamination

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Drainage conditions of treated water	Outlet of treated water, 1 time/week, visual inspection

1.4) Noise and vibrations

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Operation of pumping facilities and sludge dehydrator	Pump facility, sludge dewatering machine, 1 time/month, noise meter

1.5) Bad odors

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Sludge dehydrator during operation	Sludge dehydrator, 1 time/month

(3) Social environment

3.4) Accidents

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Installation conditions of safety equipment such as fences and handrails	Power receiving equipment and receiving tank, 1 time/month, confirmation of present conditions

1-3-13 Environmental checklist

The environmental checklist is shown in the following table.

Table 1-35 Environmental checklist

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for “Yes/No,” rationale, mitigation measures, etc.)
(1) Licensing and consultation	(1) Environmental assessment and environmental permit	(a) Has an environmental assessment report (EIA report) or similar been prepared?	(a) Y	The EIA report was officially sent to Ministry of Environment (MoE) in 4th September, 2023. The EIA report was submitted to ANPE from MoE in September 2023.
		(b) Have the EIA reports, etc. been approved by the government of the country concerned?	(b) N	EIA report will be submitted after the draft outline design is explained and then approved.
		(c) Does the approval of the EIA report, etc. involve ancillary conditions? If there are ancillary conditions, are they satisfied?	(c) N/A	It will be known at the time of approval.
		(d) In addition to the above, have	(d) N/A	None in particular.

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for “Yes/No,” rationale, mitigation measures, etc.)
		environmental permits and approvals been obtained from the local competent authorities, if necessary?		
	(2) Explanation to local stakeholders	(a) Have local stakeholders been adequately briefed on the Project and its impacts, including information disclosure, to ensure their understanding?	(a) Y	The main local stakeholders (implementing agency (ONAS) and off-takers (GCT)) have been briefed. Additionally, a stakeholder consultation was held on July 22, 2022 to obtain their understanding of the Project.
		(b) Have comments from residents and others been incorporated into the Project details?	(a) Y	Comments are reflected.
	(3) Consideration of alternatives	(a) Have multiple alternatives to the project plan been considered (including environmental and social items during the review)?	(a) Y	A comprehensive review of alternatives, including environmental and social impacts, was conducted and presented in the "Comparative Study of Alternatives" section of the report.
2) Pollution control measures	(1) Water quality	(a) Are items such as SS, BOD, COD, pH, etc. in the effluent after sewage treatment consistent with the discharge standards of the country concerned?	(a) Y	The design meets the effluent quality standards set by INNORPI in Tunisia.
		(b) Does the untreated water contain heavy metals?	(b) N	No heavy metals are present; Fe is present but in amounts below effluent quality standards.
	(2) Waste	(a) Are sludge and other waste generated as a result of the operation of the facility properly treated and disposed of in accordance with the regulations of the country concerned?	(a) Y	Waste management and disposal are defined in Law No. 96-41, which specifies the classification of waste, which is then treated and disposed of accordingly.
	(3) Soil contamination	(a) If sludge, etc. is suspected to contain heavy metals, will measures be taken to prevent soil and groundwater contamination by leachate leakage from the waste?	(a) N/A	No heavy metals are present; Fe is present but in amounts below effluent quality standards.
	(4) Noise and vibrations	(a) Do noise and vibrations from sludge treatment facilities, pumping facilities, etc. meet the relevant national standards, etc.?	(a) Y	In Tunisia, there are no national standards for noise and vibrations, and environmental management standards are based on WHO guidelines or EU standards. The Project was designed with reference to EU standards, with underground pumping facilities and a sludge dewatering machine (the

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
				dewatering machine rotates slowly, so there is little vibration) installed inside the building to minimize noise.
	(5) Bad odors	(a) Will measures be taken to prevent odors from sludge treatment facilities, etc.?	(a) Y	A multiple plate screw press dehydrator that facilitates odor control and has high durability will be used. No odor is expected to be generated.
Natural environment	(1) Protected areas	(a) Is the site and treated water discharge destination located within a protected area as defined by the laws of the country concerned and international treaties? (b) Will the Project affect a protected area?	(a) N	There are no protected areas in or around the Project site.
	(2) Ecosystem	(a) Does the site and treated water discharge include primary forests, natural tropical forests, and ecologically important habitats (e.g., coral reefs, mangrove swamps, tidal flats)?	(a) Y	Not included in Project site. The treated water is discharged to Gabes Bay, and there are protected areas 25 km and 50 km away from the discharge site. However, the Project is designed to meet effluent quality standards through its implementation.
		(b) Does the site contain habitats of valuable species that require protection under the laws of the country concerned, international treaties, etc.?	(b) N	The Project does not include habitats for valuable species.
		(c) If significant ecological impacts are a concern, will measures be taken to reduce ecological impacts?	(c) N	No impact on the ecosystem by the project is expected.
		(d) Will the Project affect the aquatic environment, such as rivers? Will measures be taken to reduce impacts on aquatic organisms?	(d) N	The wastewater (concentrated water) from the A-WWTP to be constructed under the Project will be discharged via a discharge pit at the existing wastewater treatment facility into a channel at the site boundary via a concrete drainage pipe and discharged into Gabes Bay, thus having no impact on the aquatic environment.
Social environment	(1) Resettlement	(a) Will involuntary resettlement occur as a result of Project implementation? If so, will efforts be made to minimize the impact of resettlement?	(a) N/A	The Project will utilize the implementing agency site and public land (roads). No land acquisition or resettlement is expected to occur.

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
		(b) Will the residents to be relocated be adequately briefed on compensation and livelihood restoration measures prior to relocation?	(b) N/A	Not applicable.
		(c) Will a resettlement study be conducted and a resettlement plan developed that includes compensation at reacquisition price and restoration of livelihoods after resettlement?	(c) N/A	Not applicable.
		(d) Will compensation payments be made prior to relocation?	(d) N/A	Not applicable.
		(e) Has a written indemnification policy been developed?	(e) N/A	Not applicable.
		(f) Does the plan give appropriate consideration to socially vulnerable groups among the relocated residents, especially women, children, the elderly, the poor, and ethnic and indigenous minorities?	(f) N/A	Not applicable.
		(g) Will there be a pre-relocation agreement on the relocated residents?	(g) N/A	Not applicable.
		(h) Will a system be in place to properly implement the resettlement? Will adequate implementation capacity and budgetary measures be put in place?	(h) N/A	Not applicable.
		(i) Is monitoring of the impact of the relocation planned?	(i) N/A	Not applicable.
		(j) Has a grievance mechanism been established?	(k) N/A	Not applicable.
	(2) Livelihood and living	(a) Will the implementation of the Project adversely affect the livelihoods of residents by changing the surrounding land use and water use?	(a) N	The plan is for the Project to be a facility within an existing wastewater treatment plant, and its implementation will not change the surrounding land use or water use. In addition, the project site is in an industrial area and there are no residents nearby, so the Project will not adversely affect the lives of residents.
		(b) Will there be adverse impacts from the Project on the livelihoods of residents? If necessary, will consideration be given to mitigate those impacts?	(b) N/A	Not applicable.
	(3) Cultural heritage	(a) Is there a risk that the Project may damage archaeological, historical, cultural or religious heritage, historical sites, etc.? (b) Is the Project likely to	(a) N	There are no archaeological, historical, cultural, or religious sites of archaeological, historical, or religious value in

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
		damage archaeological, historical, cultural, or religious heritage or historic sites, and will measures prescribed by the national law of the country be taken into account?		or near the Project site.
	(4) Landscape	(a) Will there be an adverse impact on the landscape, if any, that should be given special consideration? If so, will necessary measures be taken?	(a) N/A	There are no landscapes in or around the Project site that require special consideration.
	(5) Minorities, indigenous peoples	(a) Has consideration been given to reducing the impact of the Project on the culture and lifestyle of minorities and indigenous peoples in the country?	(a) N/A	There are no ethnic minority or indigenous cultures or lifestyles on or near the Project site.
		(b) Are the land and resource rights of minorities and indigenous peoples respected?	(b) N/A	Not applicable.
	(6) Working conditions	(a) Are the country's applicable labor and environmental laws being observed in the Project?	(a) Y	Tunisia has a labor law and a social security system. The survey team will request the Project sponsors to comply with the right laws and systems at the time of distribution of bidding documents.
		(b) Are measures taken to provide hard safety considerations for Project-related personnel, such as the installation of safety equipment and control of hazardous substances related to the prevention of occupational accidents?	(b) Y	During construction, appropriate safety protections, such as stairs and handrails, will be installed to reduce the risk of accidents during construction. At the time of provision, the Project facilities will be equipped with appropriate safety protection such as stairs and handrails to reduce the risk of accidents during service.
		(c) Will soft measures be planned and implemented for Project-related personnel, such as the development of a health and safety plan and safety training for workers and others (including traffic safety and public health)?	(c) Y	The influx of workers from the outside may pose a risk of spreading infectious diseases. This risk can be reduced by providing appropriate health guidance to workers.
		(d) Will appropriate measures be taken to ensure that security personnel associated with the Project do not infringe on the safety of Project personnel and local residents?	(d) Y	Relevant personnel will be educated on the subject matter during safety instruction.

1-3-14 Facilities and Projects Subject to the Approval Process and Category

The facilities and projects subject to the approval process and category is shown in the following table.

Table 1-36 Facilities and Projects Subject to the Approval Process and Category

Category	Equipment and projects subject to the approval process
Category A	Response Policy Facilities and projects to which ANPE raises an objection within 21 working days of receipt of the Environmental Assessment Report. If no appeal is filed by ANPE within this timeframe, consent is deemed to have been given for the Project to be implemented. Facilities and projects subject to the program: (1) Facilities and projects related to the management of household waste or food waste with a capacity not exceeding 20 tons/day (2) Facilities and projects related to the processing and manufacture of construction materials, ceramics and glass (3) Facilities and projects related to the manufacture of pharmaceutical products (4) Facilities and projects related to the manufacture of non-ferrous metals (5) Facilities and projects related to metal processing and surface treatment (6) Facilities and projects related to oil and natural gas exploration and extraction (7) Industrial quarries of aggregates and sand, and quarries of clay and marble, not exceeding 300,000 tons/year (8) Facilities and projects related to the manufacture of sugar and baking powder (9) Facilities and projects related to dyeing of textiles, yarns and clothing, and production and fading of jeans (10) Projects to develop industrial districts not exceeding 5 hectares in area (11) Urban residential projects from 5 to 20 hectares in area (12) Tourist district development projects with an area of 10 to 30 hectares (13) Facilities and projects related to the manufacture of mineral fibers (14) Facilities and projects related to food production, processing, packaging, and preservation (15) Slaughterhouses (16) Facilities and projects related to the production or assembly of automobiles, trucks or motorcycles (17) Shipyard plans (18) Facilities and projects related to aircraft production and maintenance (19) Facilities and projects related to edible shellfish aquaculture (20) Facilities and projects related to desalination in industrial or tourist facilities (21) Facilities and projects related to seawater therapy and mineral spring utilization (22) Facilities and projects related to accommodations with 300 or more beds (23) Facilities and projects related to paper and corrugated packaging production (24) Facilities and projects related to the manufacture of elastomers (synthetic rubber) or peroxides

Category	Equipment and projects subject to the approval process
Category B	Response Policy Facilities and projects to which ANPE raises an objection within three (3) working months after receipt of the Environmental Assessment. If no appeal is filed by ANPE within this timeframe, consent is deemed to have been given for the Project to be implemented. Facilities and projects subject to the program 01) Facilities or projects related to petroleum refining and carbon or oil shale liquefaction and gasification facilities of at least 500 tons/day or more 02) Power generation facilities and projects of at least 300 MW/day 03) Facilities and projects for the management of household or food waste with a capacity of at least 20 tons/day or more 04) Facilities and projects related to hazardous waste management 05) Facilities and projects related to the manufacture of cement, lime or gypsum
Specification Submission	The units listed in Annex 2 of this Decree shall be subject to specifications of the environmental measures to be respected by the owner or the petitioner that have been approved by order of the Minister in charge of the environment. Equipment and projects subject to the program 01) Urban residential projects not exceeding 5 hectares in area and tourist areas not exceeding 10 hectares in area 02) Educational institution development projects 03) Construction of water transmission system 04) Transmission projects that do not belong to Annex 1 and do not pass through natural or vulnerable areas (areas subject to legal protection) 05) Coastal improvement projects not belonging to Annex 1 06) Facilities and projects related to olive crushing (oil mill) 07) Facilities and projects related to the extraction of vegetable or animal oils 08) Facilities and projects classified as animal production 09) Facilities and projects related to the textile industry that do not belong to Annex 1 10) Facilities and projects related to pressing and cutting of large metal pieces 11) Facilities and projects related to the storage and distribution of hydrocarbons and gas stations that wash cars and change oil 12) Facilities and projects related to starch production 13) Traditional quarry 14) Facilities and projects related to storage of gases or chemical products 15) Metal container manufacturing, water storage facility construction, steel plate manufacturing 16) Laundry areas where water is used to wash clothes and blankets 17) Hill Dam 18) Facilities and projects related to the manufacture of pharmaceutical supplements
Out of scope	No environmental impact assessment required

Chapter 2　Contents of the Project

Chapter 2　Contents of the Project

2-1 Basic Concept of the Project

This Project aims to utilize treated sewage water as industrial water in the Gabes governorate, located in southern Tunisia, where securing water resources is a serious issue, by installing an A-WWTP alongside the existing wastewater treatment facility in the Gabes wastewater treatment plant and supporting efficient operation, maintenance, and management. This will contribute to the conservation of the country's water resources.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

The basic policy and study contents relating to the cooperation project are shown below.

2-2-1-1 Basic policy

This Project aims to utilize treated wastewater for industrial use and to contribute to the conservation of water resources in Gabes, located in the southern part of Tunisia, where securing water resources is a serious issue, by installing an A-WWTP alongside the existing Gabes sewage treatment plant and by supporting efficient operation, maintenance and management. Based on a request from the Government of Tunisia and the results of the field survey and discussions, a plan was formulated based on the following policies.

① The amount of advanced treated water to be delivered to the off-takers shall be at least 6,000 m^3/day and shall comply with the water quality requirements of the off-takers. In addition, 10,000 m^3/day of raw water shall be taken from the existing sewage treatment facility to secure the above supply volume.

② The treated water from the existing sewage treatment facility at the Gabes Sewage Treatment Plant does not meet the environmental standard for water quality (NT 106.02), and it has been determined that direct water purification (treatment with reverse osmosis (RO) membranes) would cause RO membrane blockage, so sewage treatment (membrane bioreactor (MBR)) shall be performed as a preliminary step.

③ Discharge water generated from water purification treatment (treatment with RO membranes) shall comply with the environmental standard for water quality (NT 106.02).

④ Since there have been complaints from neighboring residents about odors from sludge treatment, odor countermeasures shall be taken for the sludge dewatering facility. The final disposal of the sludge shall be off-site after drying.

⑤ Pipe installation locations under public roads, waterways, and railroads should be set in consideration of the physical simplicity of installation, ease of maintenance and management, and the social environment, such as landowners and occupancy permits.

⑥ For treated water discharged to the water quality environment (marine areas), SPC shall be responsible for discharges from the A-WWTP and ONAS shall be responsible for discharges from the existing sewage treatment plant.

⑦ The facility shall be capable of supplying advanced treated water after the completion of this Project.

2-2-1-2 Natural environmental conditions

① Temperature and precipitation

Gabes is located in south-central Tunisia and is classified as a subtropical desert climate (BWh: hot desert climate). Gabes is one of the few coastal oasis cities in the world, and is rich in water resources for a desert area. In recent years, however, the city has been faced with a declining groundwater table due to over-pumping of groundwater and the intrusion of seawater into the aquifer. Advanced treated water is expected to be a new water resource for Gabes that will contribute to the challenges of groundwater conservation.

The daily precipitation in Gabes is about 20 mm/day for 2 to 5 days per year. 3The sewerage system in Gabes is a pseudo-separate type of pipeline facility designed primarily for drainage of sewage and rainwater in the urban area, and rainwater from residential areas and roads flows into the sewage pipes. The A-WWTP is not affected by water volume fluctuations due to stormwater because it takes in a fixed volume of sewage (10,000 m /day), but diluted sewage inflows are expected during rainfall.

② Geology

Soil tests conducted on site (at the Gabes sewage treatment plant and in the GCT plant) showed a soft clay/silt layer at the surface and an occupied and consolidated layer at a depth of around 2 to 10 meters. The existing sewage treatment plant has a direct foundation (solid foundation), and no unequal settlement effects were observed in the water treatment plant. This project will also be designed with the above-mentioned conditions in mind.

③ Wind direction and wind force

The area around the proposed A-WWTP site is not subject to natural disasters such as earthquakes, tsunamis, floods, and landslides, but it is located in a low-lying coastal area and is strongly affected by solar heat, ultraviolet rays, salt damage, and sand and dust. In designing the project, the above-mentioned conditions should be taken into consideration, and construction methods and durable materials and equipment should be selected.

2-2-1-3 Policy for Socioeconomic conditions

① Lifestyle, historical and cultural traditions, religion, etc.

Gabes has been a port town since Carthaginian-Roman times, and the port is operated by a commercial port and a fishing port adjacent to the GCT plant. Therefore, due attention shall be paid to the quality of water discharged into the sea. In addition, since this is a Muslim town, the Islamic calendar and lifestyle shall be followed during construction and O&M of the project.

② Progress of urbanization

The province of Gabes has a high concentration of chemical industries such as phosphoric acid products, one of the country's major exports, including GCT's factories, and there is a high demand for low-salinity, high-quality water resources for industrial use. On the other hand, the province relies on groundwater for about 93% of its water resources (Ministry of Agriculture, Water Resources, and Fisheries, 2010), but since 90% of the country's groundwater has a high salinity of 1.5 g/L or more (AFD, 2016), it is forced to use expensive tap water for industrial use, which is one of the challenges for industrial development. In addition, the Tunisian government has a policy of prioritizing the use of tap water for drinking water and other purposes, so companies face the challenge of securing alternative water sources for industrial use. Therefore, this project will develop facilities that can treat treated sewage water to a level where it can be used as industrial water.

In addition, Gabes has plans for urban development, Eco Park, and beach resort development, and further reuse of treated wastewater is expected in the future.

③ Water supply

In the urban areas of Gáves province, water supply is 100%. Water consumption has increased by 3.25%/year, which is three times the population growth rate (1.08%/year). This is mainly due to the diffusion of water supply and the increased consumption of water for residential use due to population growth. The stable supply of water is an important issue for the region, and the advanced sewage treatment facility to be developed in this project, which will use treated sewage water for industrial use, will help to solve this issue.

2-2-1-4 Policy for construction situation/procurement situation or industry specific circumstances/business practices

In Tunisia, there are no design standards or guidelines for facility design or underground piping, etc., and projects in Tunisia have customarily applied the French standards or modified them to suit Tunisian circumstances. In light of the fact that this Project is a Japanese grant project with exploitation rights, the Japanese standards for planning and designing water supply and sewerage facilities will basically be applied. However, in order to avoid any obstacles to the local application and approval procedures, the above-mentioned French standards will also be taken into account in the design.

The main components of the A-WWTP planned for this Project are the MBR treatment facility, RO membrane facility, sludge dewatering machine, deodorization equipment, and associated peripheral equipment (pumps, blowers, control panels, etc., system piping, ducts, etc.). Other equipment should be treated as procured equipment, since they are considered to be facilities and equipment. Japan has the most advanced technology in the global membrane market. From the viewpoint of the future overseas expansion of technology and companies, the above equipment and materials for the plant will be procured from Japan.

Materials required for the construction of civil structures, piping, and buildings will be procured on a local basis since they are produced or distributed in Tunisia.

Table 2-1 Procurement Policy (Local Procurement)

Materials	Procurement Policy
Cement, ready-mixed concrete, aggregates, fixtures, etc.	Since there is a manufacturing plant in the city of Gabes, the project site, it is assumed that procurement will take place in Gabes.
HDPE pipes, steel materials, cables, electrical equipment (transformers, distribution boards, etc.), valves, water analysis equipment, etc.	The capital city of Tunis has factories for HDPE pipes, steel products, cables, and electrical equipment (transformers, distribution boards, etc.), and there are distributors for valves and water quality analysis equipment manufactured in third countries. The overland transportation route from Tunis to the implementation site in Gabes is well paved and the distance is about 400 km, which takes about 5 hours.

Permits and approvals include building permits, land use permits (no permit is required for the ONAS sewage treatment plant site), and occupancy permits for roads and other uses. The policy for all of these is to apply for and obtain permission in advance. Further details are explained in "2-2-4-2 Construction/Procurement Considerations" and "(3) Application for permits and approvals".

Tunisia has a labor law and a social insurance system. The labor law, enacted in 1966 and amended in 1994 and 1996, regulates labor standards and labor relations in the private and agricultural sectors. Three social security funds have been established: The National Fund for Social Security for Workers, the National Fund for Pension and Social Security Reserve, and the Sickness Insurance Fund. This Project will take into account these labor laws and social insurance systems.

In addition, since Tunisia has a large Muslim population, it is necessary to take into consideration Islamic annual events such as Ramadan and the rhythm of life and work in terms of business customs.

2-2-1-5 Policy for the use of local contractors (construction companies and consultants)

The Project includes soil work such as site preparation (concrete pavement) for the new advanced wastewater treatment facility, construction of structures such as intake pump stations, steel tanks, building foundations and buried piping, and concrete work to construct concrete structures such as water distribution tanks, water receiving tanks and machine rooms.

It is assumed that all types of work will be performed by Tunisian domestic contractors under the management of the main contractor, a Japanese company. The policy includes actively utilizing the Project to revitalize the local economy, create employment opportunities, and promote technology transfer. However, it is essential to include management by Japanese firms, as there is insufficient awareness of quality management, safety management, and process management.

2-2-1-6 Policies for utilization of Japanese companies

The Project will primarily consist of equipment procurement and will include civil and construction work. The majority of the equipment procurement will be for membrane treatment (MBR + RO) facilities. As mentioned above, Japan has the most advanced technology in the global membrane market, so the Project will mainly utilize Japanese companies. (See Table 2-36 Procurement Clacification in 2-2-4-6 Procurement Plan) In addition, there are several companies in Japan that can procure the relevant membrane treatment, and the policy is that membrane treatment procurement companies and civil engineering and construction companies can participate in the bidding process together.

2-2-1-7 Policy for operation and maintenance

(1) Initial operational and operational guidance for implementing agencies
During the implementation of this project, a trial run will be conducted. During this trial run, the plan is to provide initial operational and operational guidance to the implementing agency, ONAS. However, after handover, the operator will establish a project company on site, and the project company will operate the project for 10 years.

(2) Policy for operation and maintenance
Since the project is free of project rights, the operation and maintenance of the planned advanced sewage treatment facility will be carried out by the operator. As the implementing agency, ONAS is in a position to supervise the proper operation and maintenance of the facility, including whether the operator's operations for selling the advanced treated wastewater to off-takers are properly conducted in accordance with the contract.

In addition, the advanced sewage treatment facility applied in this project will be the first for ONAS to apply membrane treatment technology (MBR + RO), and in addition, it will be the first to offer project rights free of charge.

Since ONAS has operated and maintained its own sewage treatment plant and has not sold recycled water to date, an operation and maintenance contract ("O&M contract") such as this project and water sales contracts, the Company will need to acquire the ability to supervise these contracts. In addition, although technical know-how is not a major issue in the scope of this project, considering the possibility that ONAS will operate and maintain advanced sewage treatment facilities on its own after the project, it is also necessary for ONAS to acquire know-how in the operation and maintenance of advanced sewage treatment facilities from the perspective of sustaining the effects of grant assistance. In this case, it is necessary for ONAS to acquire know-how on the operation and maintenance of advanced sewage treatment facilities.

Based on the above, ONAS will be supported by a soft component for the management of O&M and water sales contracts for the A-WWTP for the first year of the operation and maintenance phase.

2-2-1-8 Policies for setting grades of facilities and equipment, etc.

The following policies shall apply with respect to the grade of facilities and equipment.

① The main components of the advanced wastewater treatment facility to be installed in this Project, such as the MBR treatment facility, RO membrane facility, sludge dehydrator, deodorizer, and associated peripheral equipment (pumps, blowers, control panels, etc., piping in the system, ducts, etc.) will be handled as equipment to be procured. Japan is at the forefront of the global membrane market, and this project is a Design Build Operate (hereafter referred to as "DBO"). Therefore, from the viewpoint of the future overseas expansion of technology and companies, the above equipment and materials that make up the plant will be procured from Japan as a basic rule.

② In principle, the construction/procurement contractor responsible for the quality of the mechanical equipment components and systems, as well as the quality of materials and equipment for civil engineering and construction work, shall be responsible for the design of the facility through to project operation.

③ For materials and equipment related to civil engineering and construction work other than machinery and equipment, specifications shall be determined based on the assumption that spare parts, etc. can be procured locally or from neighboring countries at low cost with respect to operation and maintenance, and, in principle, shall be procured from manufacturers and suppliers that have obtained certification under international standards or French national standards.

2-2-1-9 Policies for construction method/procurement method and construction period

(1) Policies related to construction methods

In addition to general construction and civil engineering work, the Project requires the use of the HDD method as a non-invasive method for pipe installation, installation of steel tanks, and lightweight steel prefabrication for buildings. For each of these methods, through market surveys, we have confirmed that local contractors have sufficient construction capabilities and track records. Construction equipment such as backhoes and truck cranes will be procured locally, as it is possible to procure such equipment in Tunisia. The plan is to carry out concrete placement using pump trucks from a concrete plant located near the site.

(2) Policy on procurement methods

Japan is a top donor in the water and sanitation field and has a large presence in the global membrane market. This Project is a DBO scheme, and from the viewpoint of overseas development of technologies and companies, the awarded company will utilize Japanese products for the equipment (MBR, RO membrane, sludge dehydrator, etc.) that will make up the plant in this Project.

It is thought that an MBR treatment facility and RO membrane facility will satisfy the required water purification effect as a single facility. Therefore, procurement for the plant should include peripheral equipment (pumps, blowers, control panels, system piping, ducts, etc.) associated with each facility unit, such as MBR/RO membrane water purification systems, sludge dewatering machines, and deodorization equipment.

Water quality analysis equipment can be procured through local distributors of third-country products and will therefore be locally procured. Office equipment can also be procured through local mass merchandisers.

(3) Policies related to construction period

In order to complete the Project within the specified construction period and achieve the expected results, it is necessary to develop a process plan that takes into account various procedures such as tax exemptions and construction approvals. This Project is a combination of equipment procurement and civil engineering work, and the critical parts of the overall construction schedule are the site survey and design, equipment fabrication at the Japanese factory, transportation, and installation work by the project sponsor. The plan is for civil works to be completed during the fabrication and transportation of the equipment after the site survey and design.

The critical civil engineering work is the construction of steel tanks, including raw water receiving tanks ($850m^3$ x 2 tanks). Therefore, in order to complete the work within the specified construction period, attention should be paid to the development of a process plan with consideration for efficient team organization, inland transportation routes and methods, and various other procedures.

While concrete is the work that is most affected by the weather, it can be placed during the rainy season by ensuring proper curing and other measures. Piping work is less affected by rainfall because the construction cycle is easily adjustable.

2-2-1-10 Policies for construction supervision

The civil engineering and construction work for this Project will include the construction of the intake facility, the installation of water pipes and site preparation, as well as the foundation work for each facility, all of which are to be carried out simultaneously. Permanent construction supervisors are required to supervise these works while also participating in various meetings, and it will be insufficient to have just one permanent construction supervisor. Therefore, a local civil engineer will be hired to supplement the construction supervision work. The assistant construction supervisor will be responsible for site supervision in the absence of the Japanese national.

In addition, since the construction of several steel tanks and prefabricated buildings is concentrated in the latter half of the construction period, one more construction supervisory assistant will be assigned from the start of the installation of the steel tanks. In addition to these, a clerk, office worker, and driver will be hired for the necessary period.

2-2-1-11 Policy for safety measures

Policies related to safety measures are shown in the table below.

Table 2-2 Policies Related to Safety Measures

Item	Policy
Construction in ONAS sewage treatment plant	It will be necessary to post guides at vehicle entrances and exits. In addition, safety measures for working at heights are required because such work will be required during the construction of the water receiving tank and the advanced treated water storage tank.
Construction outside ONAS sewage treatment plant	・ Since water pipe installation work is to be carried out under public roads, traffic guides will be deployed to provide guidance for passing vehicles. Particular attention should be paid to preventing pedestrians and passing vehicles from falling into the shafts in open-cut and unexcavated sections. ・ With the open-cut method, appropriate earth retention should be provided due to the risk of ground collapse.

Construction vehicles	Ensure safe driving at all times, including for commuting vehicles and vehicles bringing in materials.
General construction	Attention should always be given to safety measures during on-site construction, and special attention should be paid to third-party damage since the work will be carried out in an urban area.

2-2-1-12 Policy for bidding and contracting relating to the grant aid project with exploitation rights

① In this Project, the design and construction of facilities funded through grant aid (hereinafter referred to as "EPC work") and the 10-year period of operation and maintenance work (hereinafter referred to as "O&M") of the facilities constructed by the EPC work will be carried out by a firm selected through a bidding process. ONAS will then enter into a contract with the selected operator for both services. Based on the similarities with the DBO method used for public works projects in Japan, the method used for ordering and selecting the contractor will be the performance ordering method and the general evaluation bidding method, which are commonly used in the DBO system in Japan.

② The O&M operations of the Project will include the production of advanced treated water from secondary treated water discharged from the existing sewage treatment plant in Gabes. In addition, ONAS will be responsible for supplying the produced advanced treated water to, and receiving water sales fees from, the off-taker based on a contract with the off-taker ("Water Sales Operations"). Thus, since ONAS will enter into contracts for closely-related O&M operations and water sales operations with the operator and off-taker under this Project, the Three Party Contract (O&M Contract and Water Purchase Contract) that combines both operations into a single contract shall be introduced.

③ When bidding for the selection of the contractor responsible for this Project, the contents of the work to be undertaken by each contractor and the terms and conditions of the contract shall be arranged so that bidding and contracting are conducted in a fair and transparent manner.

2-2-2 Basic Plan (Construction Plan/Equipment Plan)

In Section 2-2-2, the basic plan (Construction plan/Equipment plan) is described in the following order.

2-2-2-1 Off-taker selection results and requirements
2-2-2-2 Status of existing sewage treatment facilities
2-2-2-3 A-WWTP plan
2-2-2-4 Facility overview
2-2-2-5 Design specifications
2-2-2-6 A-WWTP water treatment capacity
2-2-2-7 Facility plan/equipment plan
2-2-2-8 Instrumentation plan
2-2-2-9 Operation monitoring plan

Figure 2-1 Structure of 2-2 Basic Plan (Facility Plan/Equipment Plan)

2-2-2-1 Off-taker selection results and requirements

2-2-2-1-1 Off-taker selection results

(1) Subjects for consideration

Water Reuse 2050, which is being formulated, promotes the reuse of treated waste water in the phosphorus industry, irrigation water, watering green spaces in golf courses and urban development areas, and substituting or mixing groundwater. Regarding users of advanced treated waste water, commercial facilities currently in operation was investigated. As the result of this, the following areas were considered as the companies/uses for possible off-takers: (1) Agricultural organizations, (2) urban water use, and (3) industrial water use.

① Agricultural irrigation water

The Gabes sewage treatment plant supplies secondary treated water for irrigation to agricultural lands in the area surrounding Gabes. The main crops in the agricultural lands are limited to fruit trees for processing and fodder for livestock that is not consumed by humans.

Table 2-3 Status of agricultural irrigation water

Existing supply facilities	Irrigated agricultural land in Diassa Agriculture Area (about 7 km from the city)
Irrigated area	150 ha (expansion to 300 ha planned)
Amount of water used	1,500-3,500 m3/day
Crops	Olives, figs, wolfberries, corn (for feed)
Water supply method	Use of irrigation canals and pumps maintained and operated by the Regional Office of Agriculture Development (CRDA), a regional agency of the Ministry of Agriculture, Water Resources and Fisheries
Purchase price	Supplied to farmers free of charge from the perspective of the reuse of resources and local economic support

The results of the study of agricultural irrigation water off-takers of in the area surrounding Gabes City are shown below.

Table 2-4 Considerations regarding Agricultural Water Use Off-takers

Target facilities	Irrigated agricultural land within a few kilometers of Gabes city
Demand	Thousands of cubic meters, depending on the area of irrigated agricultural land of the agricultural operator
Initial capital investment	Burying of pipelines to irrigated agricultural land under public and municipal roads, and maintenance and installation of irrigation canals, pumps, etc.
Purchase price	・ A case study in Sousse Governorate shows efforts to promote irrigation water use by charging a fee of USD 5/year per household (Source: Wastewater and biosolids for fruit trees (Tunisia)_2018), Pay Drechsel and Munir A.Hnjra) ・ The selling price in cases of agriculture in Tunis is extremely low at 0.02 TND/m3 (about 0.8 yen/m3), which is not enough to cover the operation and maintenance costs of water pumps, etc.
Consideration of off-taker possibilities	Projects with agricultural businesses as off-takers are very difficult to implement because the purchase price in the agricultural water sector can be very low. Furthermore, the high initial capital investment burden is a disincentive to the implementation of projects in Gabes. (In and around Gabes, there has been a gradual increase in tomato greenhouse farming (agricultural factories) with high unit sales prices targeting the EU using circulating water from groundwater, etc., but at this time, the factories of each operator for crop exports are small and have little potential as off-takers).
Results of investigation	Currently, there seems to be no potential in terms of price.

	
Irrigation water tanks (treated water from the first sedimentation tank and secondary treated water)	Farmland irrigated with treated water (water delivery stopped)
	
Irrigation water tank (out of order) and pump facilities	Sand filtration facility for irrigation (out of function)

Source: JICA survey team

Figure 2-2 Irrigation water delivered from the Gabes sewage treatment plant

② Urban water use

The City of Gabes has been developing a master plan for the use of advanced-treated sewage water as urban water, or established plans for the development of related facilities that are under consideration. At present, the candidate off-takers are private companies and the City of Gabes that are responsible for commercial buildings and public facilities (water for cooling air conditioning equipment, miscellaneous water for toilets, etc.), sprinkling water in green areas, and washing water for fishing boats and ships, where it is assumed there is a potential demand.

The results of the study of off-takers in urban water use are as follows.

Table 2-5 Considerations relating to Urban Water Use Off-takers

Target facilities	Commercial buildings and public institutional facilities (water for cooling air conditioning equipment, miscellaneous water for toilets, etc.), sprinkling water in green areas, fishing boats and ships (washing water)
Demand	Although Gabes has a population of about 100,000, there are few large facilities that could be candidates for off-takers, and there is a low awareness regarding off-takers, so there is not expected to be a huge demand for urban water use.
Initial capital investment	Installation of a buried pipeline network from the Gabes sewage treatment plant to the subject facility in the city, as well as dedicated gray water pipes leading into the building.
Purchase price	Although there is no precedent for this project in the country and there are no references for the purchase price, based on examples from other countries, the rates are expected to be much lower than tap water rates.
Consideration of off-taker possibilities	It is very difficult to implement the project with private operators and the City of Gabes as off-takers because the purchase price is low compared to water rates. Furthermore, the initial capital investment required for the piping network and gray water pipes, which will be borne by the City of Gabes, and the aversion to advanced-treated water due to religious views about avoiding contact between excrement and the skin are major disincentives to implementing the project.
Results of investigation	Currently, there is no possibility in terms of price and demand.

③ Industrial water use

As Gabes City is an industrial city where various industries besides GCT are developing, factories located in Gabes City can be positioned as potential off-taker candidates.

Table 2-6 Considerations relating to Industrial Water Use Off-takers

Target facilities	GCT Gabes plant (chemical plant), cement plant, brick manufacturing plant, and oil refinery located in Ghannouch city
Demand	・ The plant that uses the most industrial water by far is the GCT Gabes plant. ・ Field interviews did not identify any requests for the new introduction of advanced treated water for industrial use at other plants.
Initial capital investment	Maintenance of buried piping network from Gabes sewage treatment facility to the subject facility, as well as water receiving tanks, etc. at the facility
Purchase price	If the water is used for industrial purposes (mainly as a substitute for the current water supply by SONEDE) in each GCT Gabes plant, the water price (1.620 TDN/m3, about 64.8 yen/m3) is generally expected to be less than the price of SONEDE.
Consideration of off-taker possibilities	The Project will be expensive if the purchase price is in the range of the price of the water supplied by SONEDE for the off-taker of the plant. However, the initial capital investment burden is a disincentive to implementing the Project.
Results of investigation	The GCT Gabes plant is promising. Currently, the other off-takers are mostly small and medium-sized companies, and there is no prospect for off-takers in this sector, both in terms of demand and in terms of transportation distance.

(2) Results of off-taker selection study

Considering the overall results of the above study, the steering committee has determined that it is appropriate to focus the study on the GCT Gabes plant, which has shown a positive attitude toward purchasing in this Project. The financial soundness of the off-taker was confirmed based on GCT's financial statements and other financial information. (See "2-7-2-2-2 Financial Analysis of GCT.")

2-2-2-1-2 General overview of off-takers

This section provides an overview of GCT as the off-taker candidate.

(1) Overview of GCT

As Tunisia's state-owned chemical company, GCT is the 10th largest phosphate producer in the world as of 2019, producing 85% of the country's phosphoric acid and phosphorus fertilizers. The process of producing phosphoric acid from phosphate ore requires large amounts of water for the sulfuric acid and phosphoric acid production processes.

GCT owns four major plants (Gabes, Gafsa, Sfax, and Skira (including joint ventures)), and plans to build additional phosphate-related plants in Tosur, Rukev, and Kasselin.

The Gabes plant is GCT's main plant, and plans have been presented to construct a seawater desalination facility in Gabes to reduce groundwater intake and water purchased from SONEDE. There is also a plan to construct a seawater desalination facility at the Scylla plant to supply water to Gafsa, and to construct a pipeline to supply industrial water to Gafsa and to transport Gafsa products to Scylla after they are dissolved (slurried) in water.

(2) GCT Gabes Plant

① Main products

The company has four production lines for phosphoric acid-related chemicals and five production lines for sulfuric acid-related products. Currently, the company uses drinking water from SONEDE and its own groundwater, which has a TDS level of approximately 2,000 mg/L. The company needs water with a lower TDS level to produce sulfuric acid products, but it does not have its own desalination plant, so it has no choice but to use the current high-concentration water. The 300 mg/L water quality requested by SPC for this project is based on the current and future production of high value-added phosphorus products for use in cosmetics and other products.

② Forecast of GCT water demand

GCT's water demand projections are shown below.

- Originally, 25 million m3/year (=68,500 m^3/day) was required, but due to the inability to manufacture high value-added phosphorus refined products and for other reasons, operations are currently declining and only 10 million m3/year (=27,400 m^3/day) of industrial water is being used. However, as the quality of phosphorus refined products improves in the future, the amount of industrial water used is expected to increase.

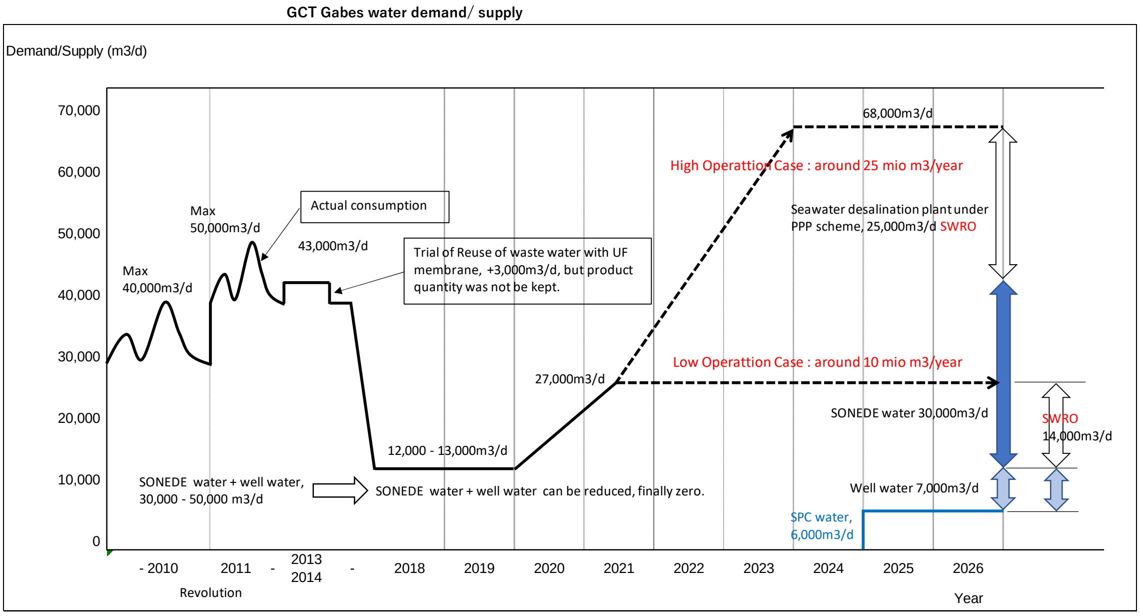
- In the future, after the realization of the desalination project and this Project, the plan is to reduce the SONEDE water supply equivalent to the 6,000 m^3 /day increased due to the Project and even to reduce the amount of well water, as shown below. (See "Table 2-7 GCT Gabes Water Demand Projections and Water Source Measures" and "Figure 2-3 GCT Gabes Demand History and Future Projections.")
- Water produced by the Project will be used on a priority basis.

Table 2-7 GCT Gabes Water Demand Projections and Water Source Measures

(Unit: million m^3/year)

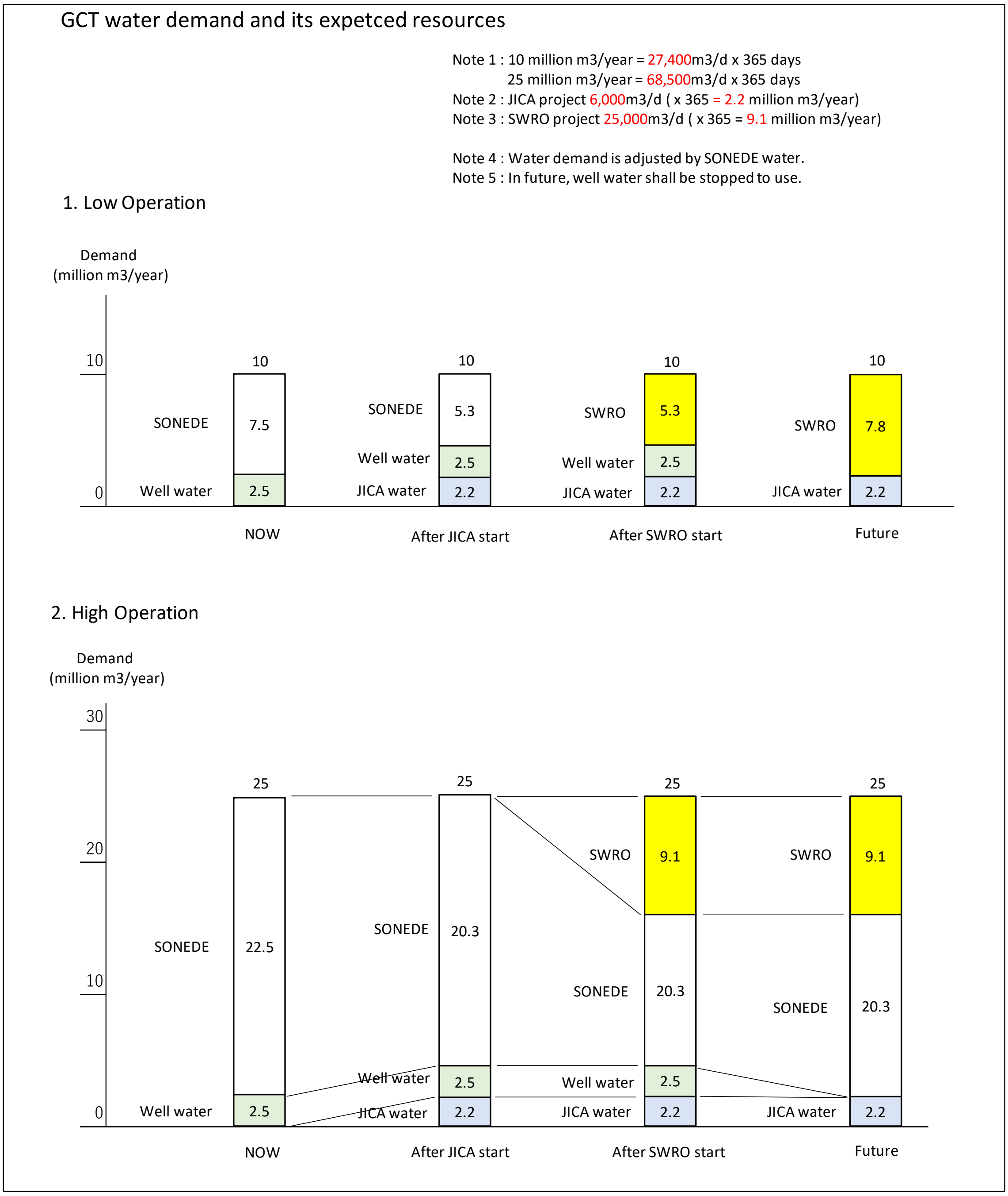
Factory location		Gabes						
Situation		Current status	Original	After this Project		After construction of desalination facility		Future inland migration
				Current status	Original	Current status	Original	
Water for fire-fighting		Seawater usage						This water is also to be prepared
Treatment demand		10	25	10	25	10	25	
Supply	Desalination	-	-	-	-	5.3	9.1	25,000m^3/day x 365 days = 9.1 million m^3/year
	SONEDE	7.5	22.5	5.3	20.3	0	11.2	In the future, this will be zeroed out.
	Well water	2.5	2.5	2.5	2.5	2.5	2.5	We also want to eliminate well water (up to 2.5 million m^3/ year).
	This Project	0	0	2.2	2.2	2.2	2.2	6,000m^3/day x 365 days = 2.2 million m^3/year
	Plan	10	25	10	25	10	25	

Source: Prepared by survey team based on Ministry of Industry data.



Source: Survey team based on GCT and Ministry of Industry data.

Figure 2-3 GCT Gabes Demand History and Future Projections



Source: Prepared by survey team based on Ministry of Industry data.

Figure 2-4 GCT Gabes Water Supply Projections by Source

2-2-2-1-3 Requirements for off-takers

The GCT Gabes plant uses advanced treated water for the production of phosphoric acid, phosphoric acid products, sulfuric acid, and other products. Since water is used for chemical reactions and the production of high value-added phosphoric acid products is the subject of technological development, there is a major need for good quality water with few impurities. The following table shows the required standards.

Table 2-8 Off-taker (GCT) Requirements

Quantity or volume of water	6,000 m^3/day or more
Water quality	Colorless, colorless, sterile, TDS_300 mg/L or less
Price	Price that is competitive against SONEDE water prices

Source: survey team interviews

2-2-2-2 Status of existing sewage treatment facilities

(1) Status of existing facilities

Sewage and sludge are not properly treated at the Gabes plant due to deficiencies in the existing sewage treatment facility.

- Sewage treatment is not possible because of the malfunctioning pumping facility that pumps sewage to the reaction tanks, and sewage is discharged directly into public waters from emergency discharge culverts installed at relay pumping stations located in the city center and at the Gabes sewage treatment plant inflow culvert.
- The excess sludge generated in the process of sewage treatment that should be discharged is not being drawn off because the existing sludge dehydrator has aged significantly and is not being used.
- The sludge drying beds are not used to treat the sludge generated in the sewage treatment process due to complaints from the surrounding area about odor problems, although sludge dredged from the sewage pipes on a regular basis is collected by vacuum trucks and used partially for that treatment. Excess sludge that should be discharged from the treatment facility is circulated within the treatment system or it is contained in the treated water.

	
Water pump (1 unit failed)	Discharge of untreated sewage
	
Centrifugal sludge dehydrator (out of function)	Belt press sludge dehydrator (temporary)

Source: Survey Team

Figure 2-5 Challenges at Gabes Sewage Treatment Plant (influent and sludge treatment)

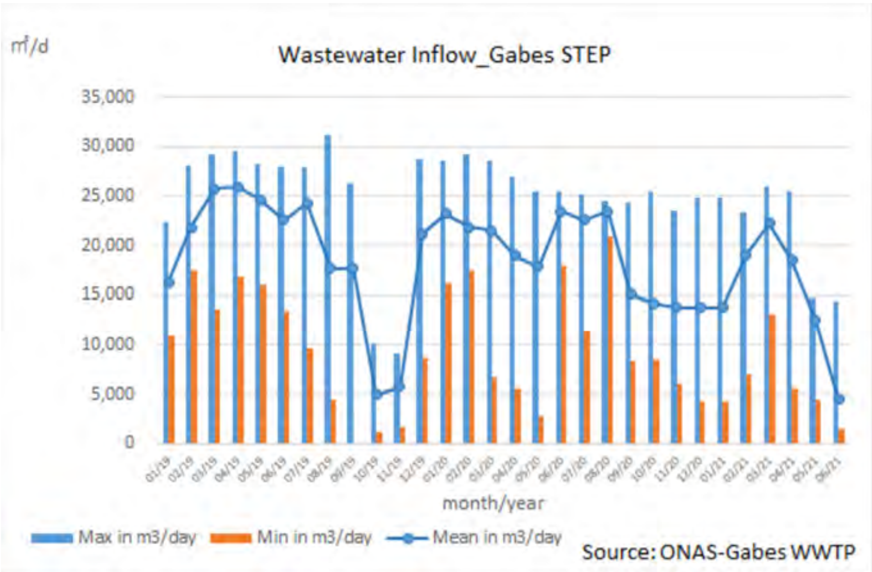
(2) Treatment plant influent sewage volume

In order to continuously supply a certain amount of advanced treated water to GCT (GCT was selected as the off-taker; see "2-2-2-1 Off-taker selection results and requirements"), the Gabes Sewage Treatment Plant has sufficient capacity. The premise is that sufficient sewage volume is secured at the Gabes Sewage Treatment Plant. Therefore, a study was conducted regarding the volume of sewage entering the Gabes sewage treatment plant, as measured by a flow meter installed just before the discharge culvert after the final settling basin at the existing treatment facility.

① Average daily sewage

The Gabes sewage treatment plant treats an average of approximately 20,000 m3/day of sewage, and it is thought that the 10,000 m3/day of sewage required to supply the GCT Gabes plant (estimated at 6,000 m3/day) will come from the treatment area. However, due to the condition of the treatment facilities, sewage is discharged directly to Gabes Bay from the influent culvert landing wells of the sewage treatment plant and from the pumping stations in the treatment area, and, on some days, the amount of treated water is less than 10,000 m3/day. The following figure shows the actual sewage inflow (minimum, maximum, and average) at the treatment plant for each month in 2019 and 2020. The low volume of treated water in October and November 2019 is due to the failure of the pumping facility in the treatment plant, which could not treat sewage.

Currently, based on a concession agreement with a private company, there are plans to rehabilitate and increase the capacity of the pumping facilities in the treatment plant and the relay pumping station in the treatment area, and in the future, the Gabes sewage treatment plant is expected to have a stable inflow of 22,100 m^3/day, which is the capacity of the treatment plant.

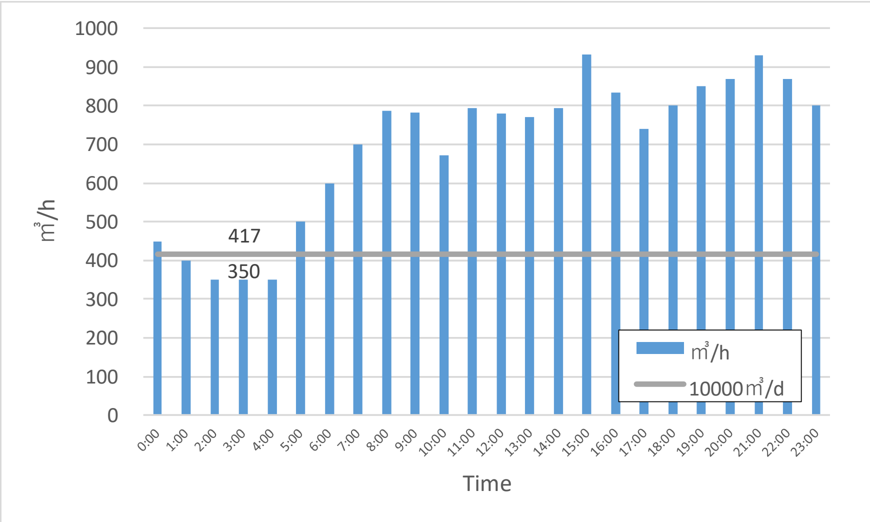


Source: ONAS Gabes Sewage Treatment Plant

Figure 2-6 Gabes Sewage Treatment Plant Treated Water Volume (January 2019 - December 2020)

② Time variation

The flow fluctuations shown in the following figure were inferred from the data on the temporal variation of the rate of flow of wastewater into the Gabes sewage treatment plant (October 21, 2021, 8:00-17:00) and from interviews with the respondents, “late at night (2:00-5:00), the water flow rate drops to 350 m3/day, but never to 0 m3/hour.”



Source: ONAS Gabes Sewage Treatment Plant

Figure 2-7 Gabes Sewage Treatment Plant Treated Water Volume (October 21, 2021)

Since it is difficult to have a uniform intake of 417 m^3/h (10,000 m^3/day) of raw water throughout the day, it is necessary to store raw water to equalize the fluctuation in water volume.

(3) Water quality of influent wastewater from treatment plants and treated water

Raw water quality is a major factor in designing an A-WWTP that satisfies the required quality of advanced treated water. Therefore, an investigation was conducted into the quality of the influent wastewater and treated water at the Gabes sewage treatment plant.

① BOD, SS, TN, TP

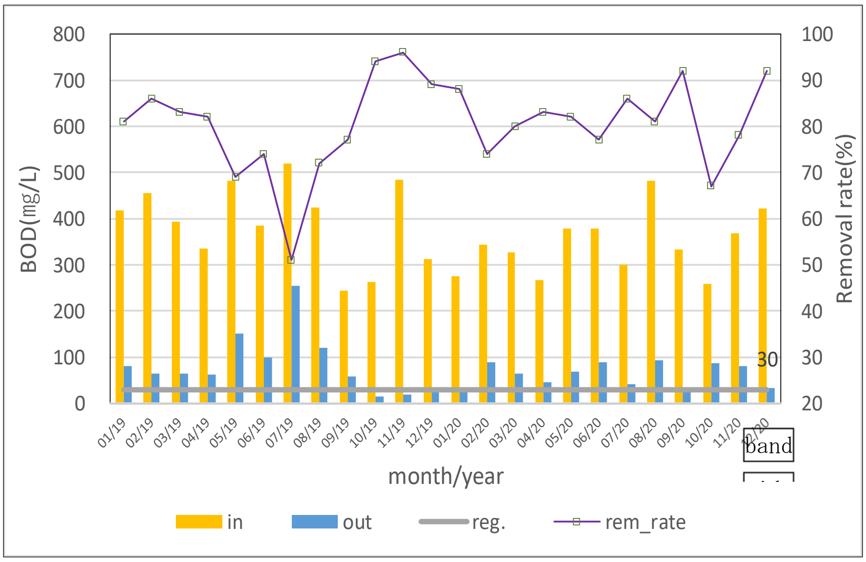
The results of the investigation of influent and treated water quality (BOD, SS, TN, TP) at the existing treatment plant are shown below.

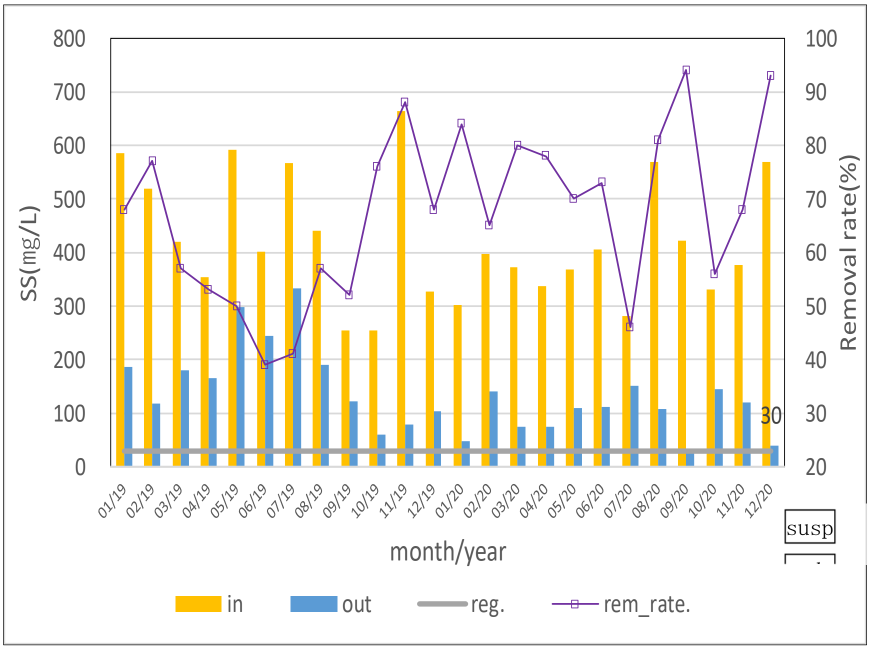
i) BOD, SS

The treated water did not meet the effluent standard values (BOD and SS), and it was determined that treatment equivalent to sewage treatment would be required to produce advanced treated water.

The relationship between the quantity and quality of influent and treated water at the Gabes sewage treatment plant confirmed that the larger the quantity of influent sewage, the worse the quality of treated water tends to be, confirming that the existing facility is overloaded, and is not capable of operating at this level.

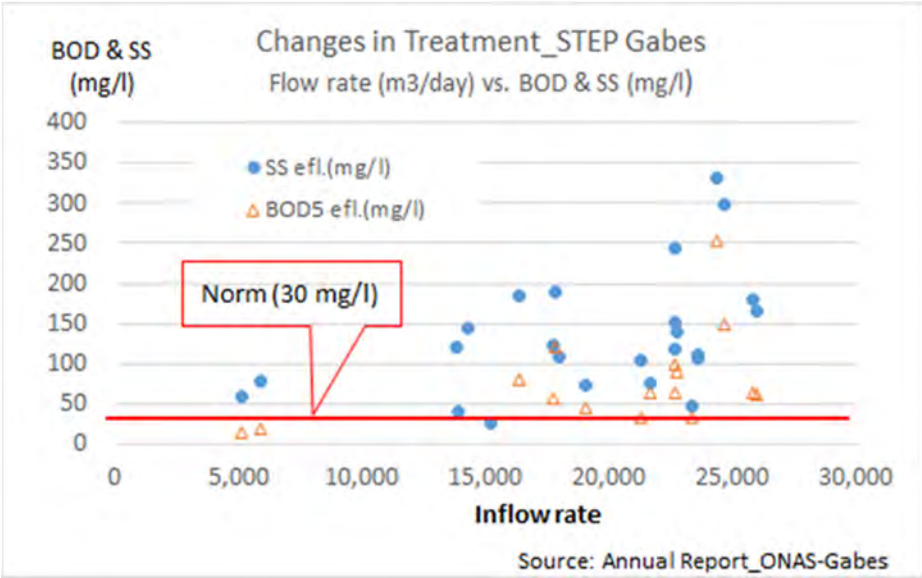
	Flow rate (m^3/day)	Inflow sewage (mg/L)		Treated water (mg/L)		Standard value (mg/L)	
		BOD	SS	BOD	SS	BOD	SS
Average	20,426	369	421	74	134	30	30
Monthly average (maximum)	25,905	519	663	254	332		
Monthly average (minimum)	4,976	245	254	15	27		



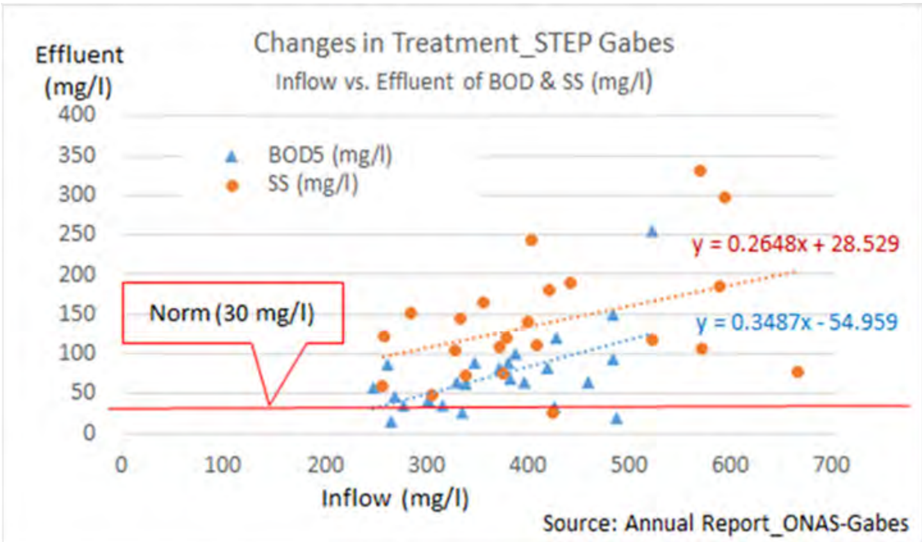


Source: ONAS Gabes Sewage Treatment Plant

Figure 2-8 Gabes sewage treatment plant influent sewage and treated water quality results (BOD, SS) (January 2019 - December 2020)



Relationship between treated water volume and treated water quality (BOD, SS)



Relationship between influent and treated water quality (BOD, SS)

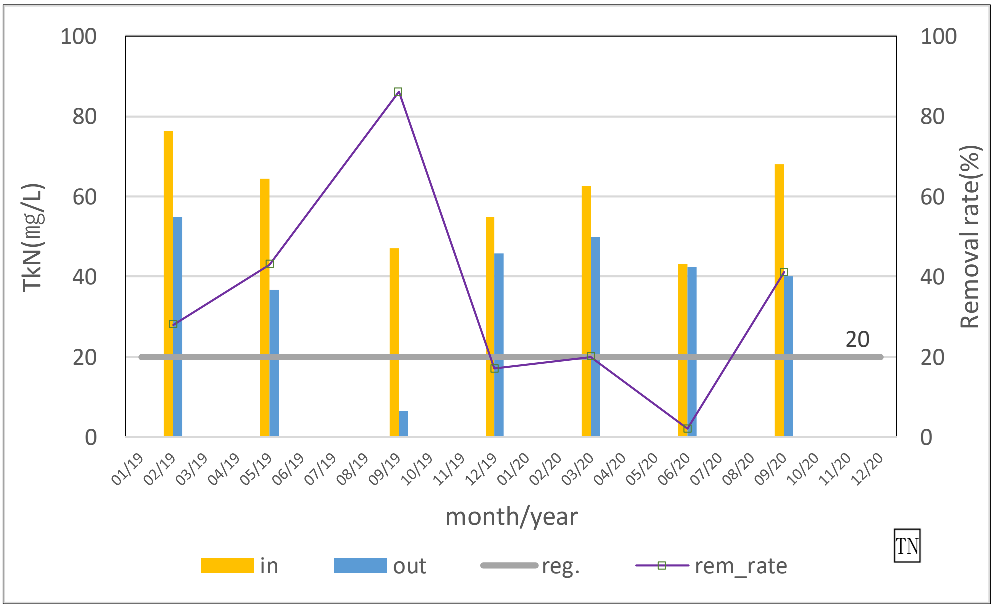
Source: ONAS Gabes Sewage Treatment Plant

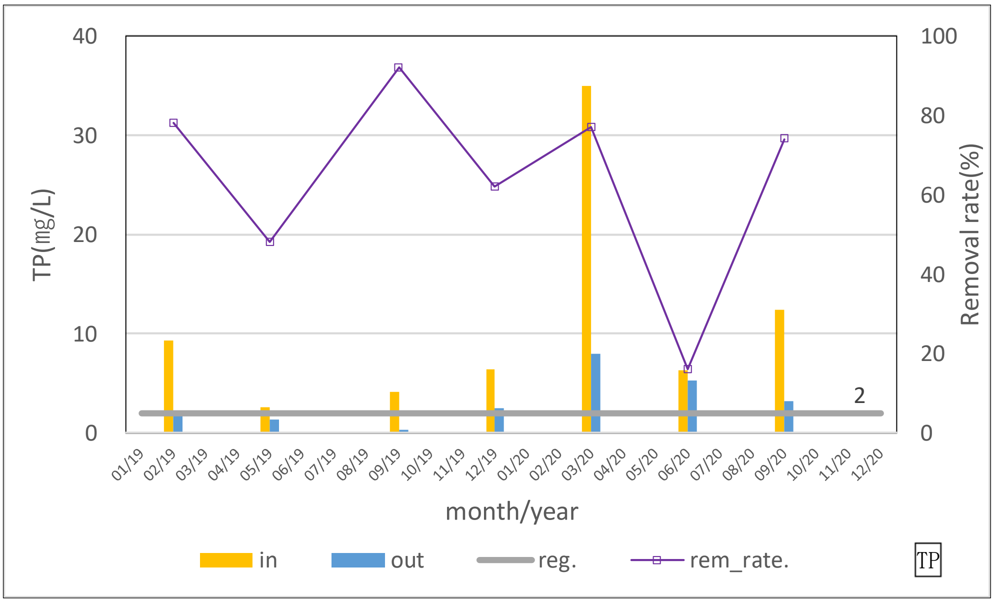
Figure 2-9 Relationship between water quantity and water quality (BOD and SS) at Gabes sewage treatment plant (January 2019 - December 2020).

ii) TN, TP

It was determined that the treated water at the Gabes sewage treatment plant did not meet effluent standards (TN and TP) and that advanced treatment equivalent to that of sewage treatment would be required to produce advanced treated water.

	Flow rate (m3/day)	Influent sewage (mg/L)		Treated water (mg/L)		Standard value (mg/L)	
		TN	TP	TN	TP	TN	TP
Average	20,426	60	10.9	39	3.2	20	2
Monthly average (maximum)	25,905	76	35.0	55	8.0		
Monthly average (minimum)	4,976	43	2.6	6	0.3		





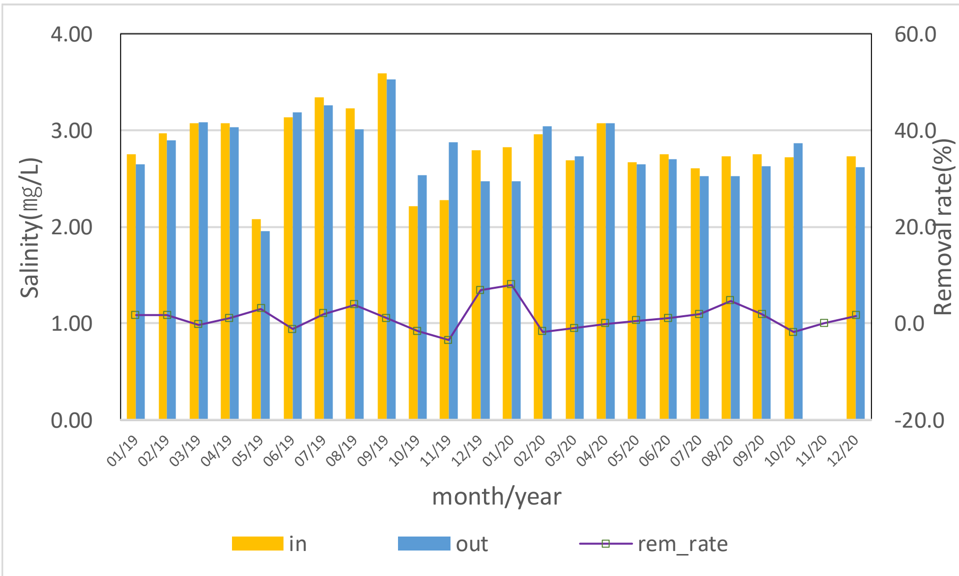
Source: ONAS Gabes Sewage Treatment Plant

Figure 2-10 Gabes sewage treatment plant influent sewage and treated water quality results (TN, TP) (January 2019 - December 2020)

② Salinity

As the influent sewage from the Gabes sewage treatment plant has a high salinity that cannot be removed by sewage treatment using activated sludge, it is discharged into Gabes Bay without decreasing the saline concentration. However, the salinity of the sewage is lower than that of Gabes Bay to which the sewage is discharged, and the level of salinity is judged to be unaffected.

	Inflow sewage (g/L)	Treated water (g/L)	Removal rate (%)
Average	2.83	2.80	1.1
Monthly average (maximum)	3.59	3.53	
Monthly average (minimum)	2.08	1.96	



Source: ONAS Gabes Sewage Treatment Plant

Figure 2-11 Gabes sewage treatment plant influent sewage and treated water quality results (salinity) (January 2019 - December 2020)

2-2-2-3 A-WWTP plan

Based on facility operation from 2019 to early 2021, the treated water quality of the Gabes sewage treatment plant is expected to be 90 mg/L BOD, 150 mg/L SS, 39 mg/L TN, 3 mg/L TP, and 3,000 mg/L TDS, according to ONAS. In order to be able to divert this treated water to industrial use, especially when supplying it to GCT, the off-taker, the water quality requirement is "no odor, no color, no fungi, and no more than 300 mg/L TDS." Therefore, RO treatment has become indispensable because MF, UF, and NF membranes normally used in MBRs cannot remove color, ion, or molecular-level substances. An MBR sewage treatment facility has been incorporated as a pre-treatment step because the direct feeding of the RO membrane from the Gabes sewage treatment plant would cause blockage of the RO membrane.

2-2-2-4 Overview of facilities

2-2-2-4-1 Composition of facilities

The facilities that make up the A-WWTP include water receiving facilities (pumping facilities and water tanks), water transmission pipes, MBR treatment facilities, RO membrane treatment facilities, storage tanks for advanced treated water and concentrated wastewater, sludge treatment facilities, power receiving and transforming facilities, power distribution panels, and an administration building (which also serves as the RO membrane treatment facility building).

Table 2-9 Facility Composition of the A-WWTP Development Project

Business	Facility	Contents
EPC Business	Water intake facility	(Permanent) Water intake pipes - Water intake pump facilities - Water transmission pipes - Receiving tanks for raw water
		(Emergency) (Inflow well) - Intake pump facilities – (the above transmission pipe)
	A-WWTP	Pretreatment-MBR-RO, complementary facilities
	Water supply facilities	Advanced treated water storage tank - Water pump - Water pipe
		(in GCT factory) Transmission pipe - Receiving tank (*Responsibility of GCT)
	Drainage system	Concentrated wastewater storage tank, discharge flow meter, discharge pipe
	Sludge treatment	Sludge dehydrator - sun-drying bed
	Power receiving facility	Transformer substation
		Switchboard

Source: Survey Team

2-2-2-4-2 Overall flow

The facility will be designed to convey treated sewage from the existing Gabes sewage treatment facility to the A-WWTP to be constructed under the Project, and then to deliver the water that undergoes further treatment at the facility to the off-taker (GCT Gabes). The overall flow is shown in "Figure 2-31 A-WWTP Process.”

Table 2-10 A-WWTP Process Overview

(1) Process	− The water will be taken from secondary treated water from the Gabes sewage treatment plant under the jurisdiction of ONAS. − Below 3) Adopt a desalination method using an RO process that will ensure the quality of treated water in the advanced sewage treatment facility. − An MBR using microfiltration (MF) membranes (microfiltration membranes) is installed in the pretreatment of the RO process to remove pollutants (BOD, SS, ammonia/nitrogen, phosphorus) in secondary treated water. The system will also respond to fluctuations in the quality of water flowing into existing sewage treatment facilities and the treatment of sludge generated at the MBR facility.
(2) Water intake facilities	
water intake facility	Secondary treated water from the Gabes sewage treatment plant (inflow water in case of emergency) is taken and sent to the raw water receiving tank.
Raw water receiving tank (Receiving water tank)	Since the volume of treated water at the Gabes sewage treatment plant fluctuates with time, a receiving water tank will be installed to adjust for the time variability of the water supply to the advanced sewage treatment facility.
(3) A-WWTP supply water volume	10,000 m^3/day
Supply water quality	ONAS Gabes WWTP treated water BOD<90mg/L, SS<150mg/L, TN<39mg/L, TP<3mg/L, TDS<3,000mg/L, temperature 17-30℃, pH 7.5
(4) A-WWTP Treated Water Volume	6,000 m^3/day, distributed via water pipeline to the adjacent GCT Gabes plant
Treated water quality	Colorless, odorless, sterile, TDS 300 mg/L or less, pH 6.5-8.5
(5) RO concentrated water volume	4,000 m^3/day, dumped into the ocean through existing ocean dumping pipes/waterways
(6) Number of series	MBR : 5 trains (5 trains in regular use x 2,000 m^3/day) RO : 5 lines (4 permanent lines x 1,500 m^3/day)
(7) Intermediate water tank	The intermediate tanks (MBR tank 200 m^3, advanced treatment tank 125 m^3, and concentrated drainage tank 85 m^3) are planned to have a capacity equivalent to the difference between the pump capacity and the inflow water volume for 2 hours (with a margin of 2.5 hours of storage), taking into account the life of the sequencer that controls pump operation. In addition, the system is basically divided into two tanks to allow for cleaning and maintenance.
(8) Sludge treatment	Sludge generated in the process of MBR sewage treatment is dewatered by a multiple plate screw press dehydrator, which is durable, odor resistant, easy to maintain, and has a proven track record. After dewatering, the dewatered sludge is dried and reduced to about 1/5 of its original volume.

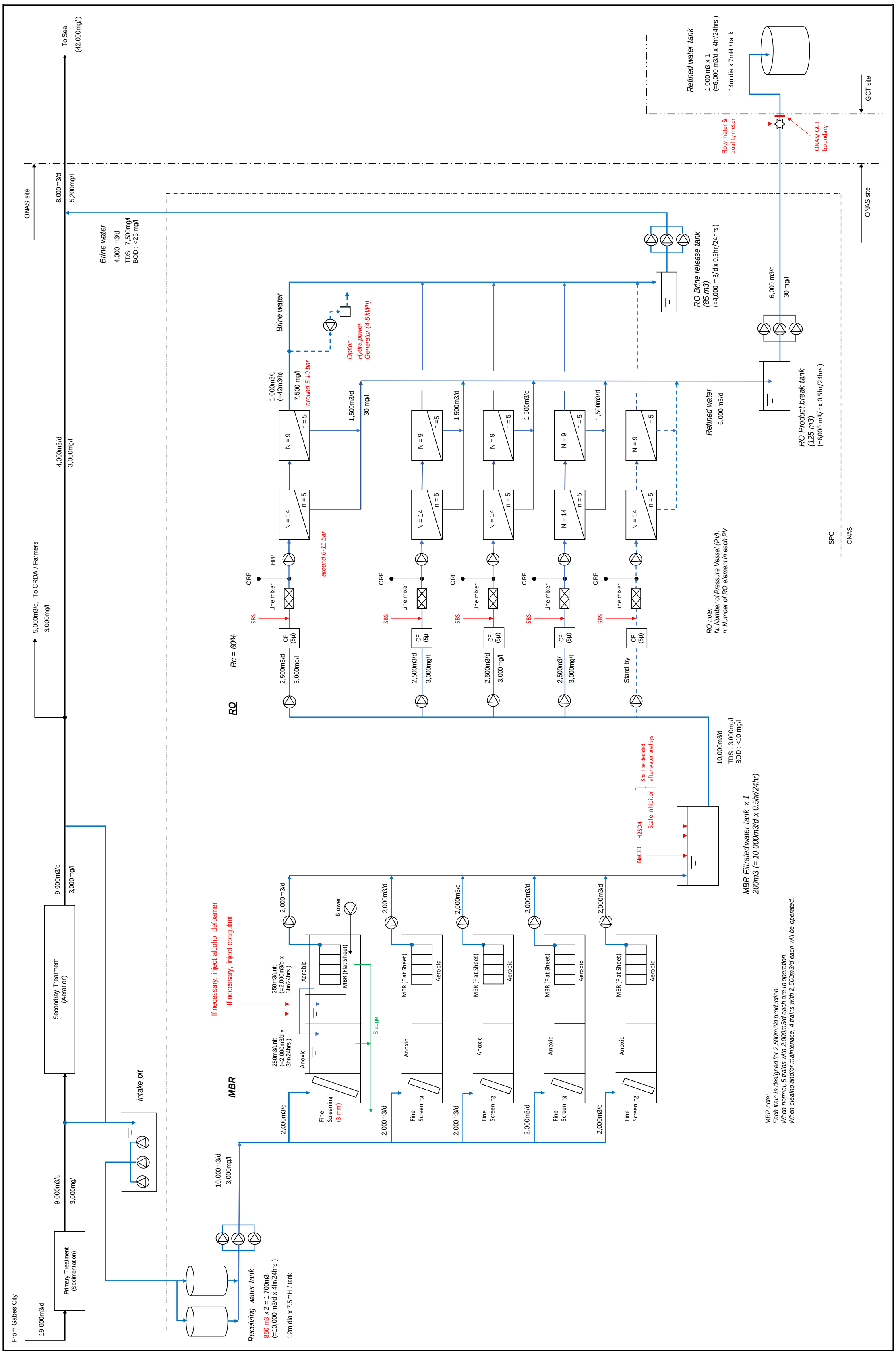


Figure 2-12 A-WWTP Process

(2) Individual facilities

Next, the individual facilities of the A-WWTP are described in the table below. Details are explained in "2-2-5 Design specifications.”

Table 2-11 Summary of Individual A-WWTP Facilities

Equipment	Policy
(1) Water intake	Since the actual primary treated water outlet merges with the secondary treated water outlet, the decision was made to conduct water from that point to the A-WWTP via the intake pit that will be newly prepared for this Project. See location ③ in Figure 2-15. Interference with existing sewage treatment facilities is to be avoided as much as possible.
(2) Receiving water tank	Considering the decrease in water supply during the night, a 4-hour water tank was installed. The water tank was divided into two units for cleaning, etc.
(3) MBR	1) Membrane type Global MBR membrane performance is divided into the flat sheet (FS) method and the hollow fiber method. In Japan, about 70% are FS type. The FS type, which facilitates the avoidance of membrane contamination and has a good track record worldwide, was chosen as the basis for this study. Since a Japanese company will adopt the FS type in the next grant aid project, the FS type, which is familiar to Japanese companies, was used in the study. Several Japanese companies are currently producing and operating the FS type in Japan.
	2) Tank capacity and main ancillary equipment ・Taking raw water quality into consideration, MBR tank capacity, etc. shall consists of two tanks, an oxygen-free tank and an aerobic tank (residence time in each tank is considered to be 3 hours). ・The MBR membrane is immersed in a section of the aerobic tank and a clean air blower is installed to prevent contamination of the membrane surface. ・Nitrifying solution circulation pumps are also installed to allow nitrification and denitrification of the water to be treated in the tank as needed. ・The oxygen-free tank is constructed with a circulation pump to promote circulation within the tank. ・A pump was installed to draw the membrane filtered water out of the system, but since the suction pressure is about 0.5 m, a suction system using the siphon effect instead of a pump can also be employed. This reduces electricity consumption.
	3) Material Considering the fact that this facility will not be a permanent facility (since the possibility remains of relocation to another location after the 10-year period has ended), the tank material shall be steel plate, which is easier and less expensive to relocate than concrete.
	4) Membrane area: 4,200 m2 per series (Note) This is an example in the case in which the volume of permeated water per membrane area is generally set at 0.5 m/day; actual planning is at the discretion of the EPC manufacturer.
	5) Installation location

Equipment	Policy
	Basically, installed outdoors, except for electrical instrumentation and other equipment.
	6) Predicted filtered water quality TDS: 3,000 mg/L
(4) RO	1) Reason for adopting RO process Among the specifications required by the off-taker, GCT, NF membranes can be used for the production of "sterile" water, but RO membranes are essential to obtaining treated water with "no color, no odor, and TDS 300 mg/L." The 8-inch spiral membrane, which is used in more than 90% of the world market, was selected as the membrane.
	2) Recovery rate The recovery rate (the ratio of produced water volume to raw water volume; see below) was set at 60% for the following reasons. a) Because the RO raw water is treated sewage water, the desire is to increase the amount of concentrated water to prevent contamination by increasing the membrane surface flow velocity. b) Since the raw water TDS is 3,000 mg/L, as the concentration increases, an increase in operating pressure (higher electricity costs) can be expected due to an increase in the average concentration on the feed water side. c) Since BOD and TP, etc. in raw water are concentrated in the RO, consideration must be given to keeping them below the effluent standard even after concentration.
	3) Number of membranes used 115 8-inch spiral membranes per series
	4) Predicted water quality Colorless, odorless, sterile, TDS<25-45 mg/L
	5) Predicted operating pressure: 9 to 12 bar
	6) Transfer method Consideration should be given so that RO produced water and concentrated water can be transferred to the RO produced water tank and concentrated water release tank using the water level difference since the use of pumps is not planned after the RO outlet.
	7) Installation location The installation shall be indoors.
(5) RO concentrated water	1) Drainage method After the pressure release of RO concentrated water in the concentrated water release pit, it will be disposed of to the sea via the existing ocean dumping pipe. After secondary treatment at the existing WWTP, the existing disposal pipe divides into two lines, one for the Commissariat Régional au Développement Agricole (hereafter referred to as "CRDA") and the other for sea disposal. There is a direct connection to the ocean dumping pipe downstream of the branch pit to avoid impacting the CRDA. See position ④ in Figure 2-15.
	2) Water quality BOD: 13-25 mg/L, SS: 0 mg/L, TN: several mg/L, TP: several mg/L, TDS:

Equipment	Policy
	approx. 7500 mg/L
	3) Residual pressure Since the pressure loss in the RO membrane section is less than 1 bar, the concentrated water at the RO outlet still has a residual pressure of 8 to 11 bars. The current plan is to release this to the atmosphere at the concentrated water release pit, but a proposal has also been made to install a mini-hydroelectric generator in this area. This is a matter for future consideration.
(6) Means of securing raw water in an emergency	A temporary line from the raw sewage intake pit introduced into the Gabes WWTP should be installed to continue operation of the A-WWTP in the event that the existing WWTP becomes inoperable for some reason. See location ⑤ in Figure 2-15.
(7) Sludge treatment	Sludge generated from raw water with SS of 150 mg/L shall be treated.

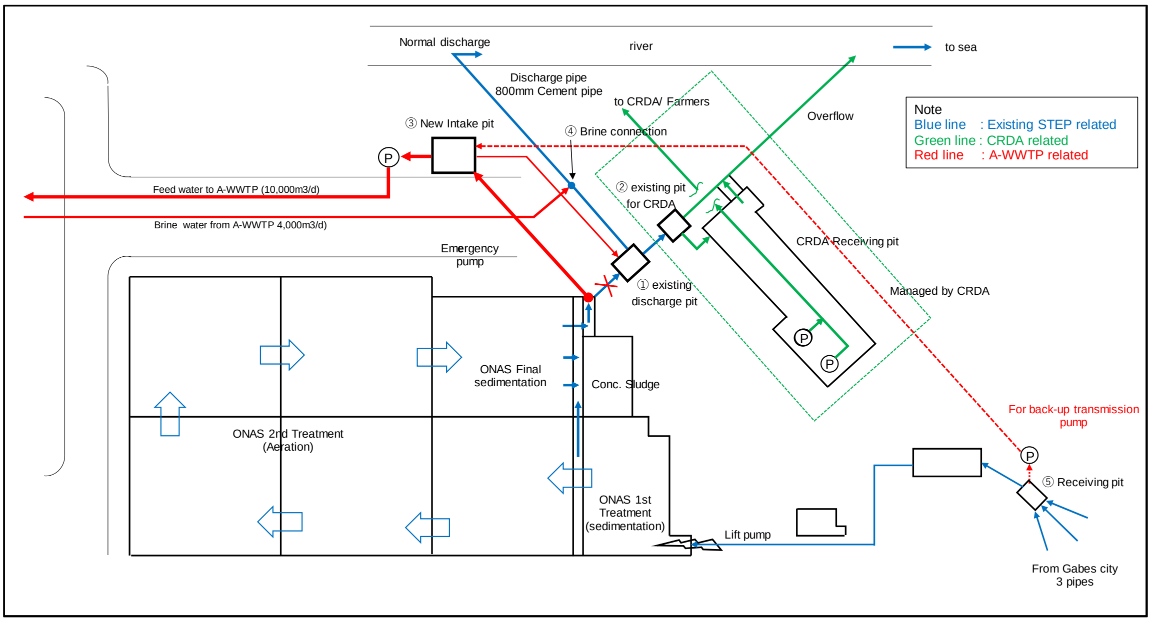
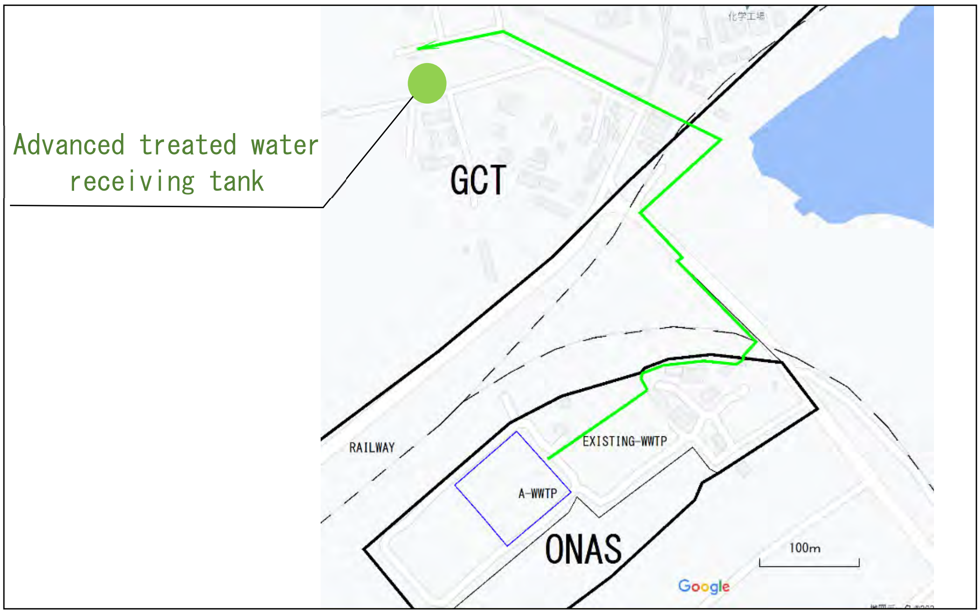


Figure 2-13 Piping connection with existing facility

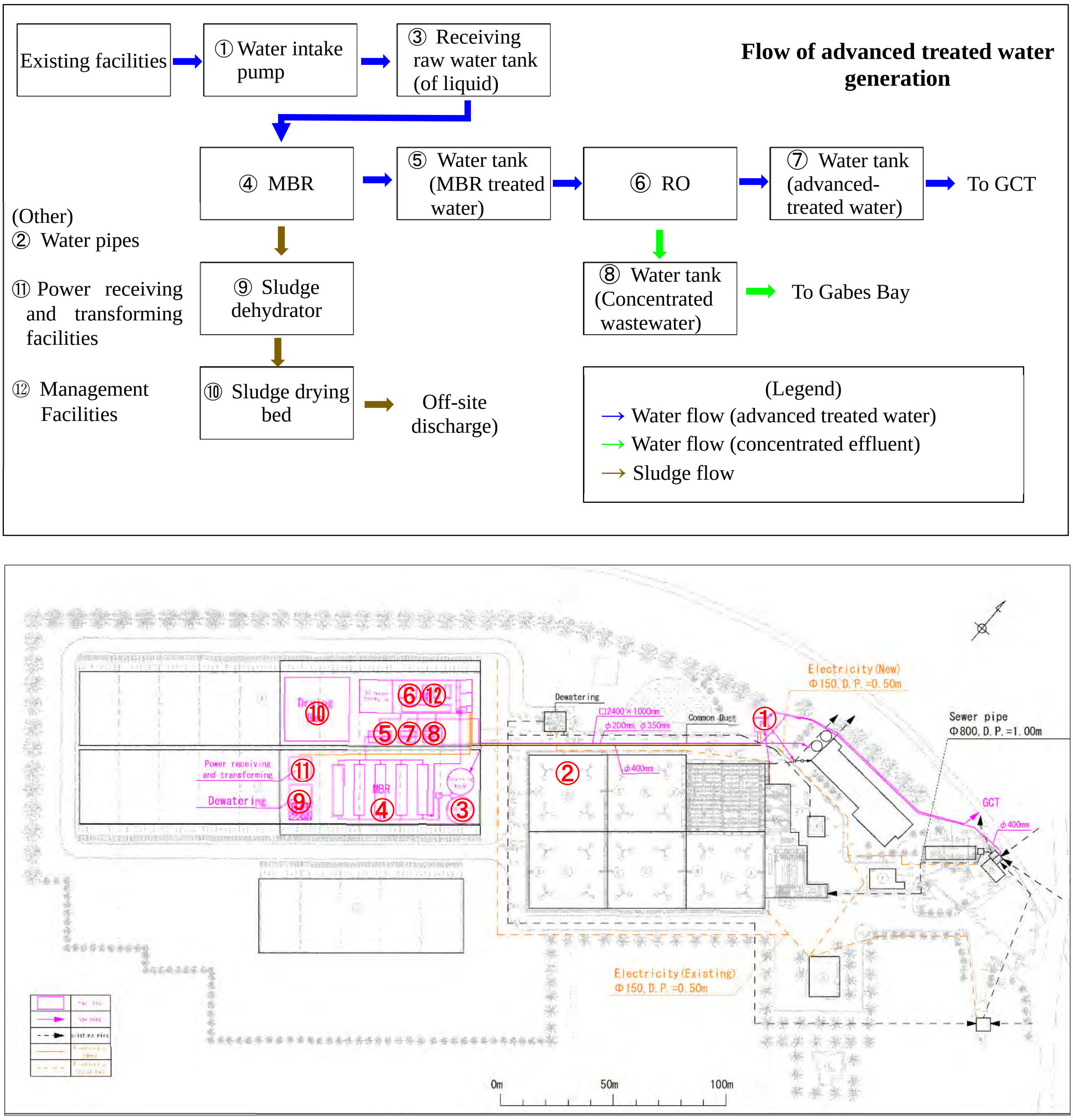
2-2-2-4-3 Pipe culvert routes and A-WWTP layout

In order to use the A-WWTP for the advanced treatment of treated water from the existing Gabes sewage treatment plant, and to deliver the treated water to the GCT plant, it will be necessary to construct various facilities within the ONAS sewage treatment plant, within the GCT plant, and on public roads. Proposals are made below for the pipe and culvert route and the layout of the Gabes sewage treatment plant.



Source: Survey Team

Figure 2-14 Draft Pipe Culvert Route



Source: Survey Team

Figure 2-15 Layout of the A-WWTP

2-2-2-5 Design specifications

The design specifications for the A-WWTP are shown below.

Table 2-12 Design Specifications for A-WWTP

Item	Parameters
1. Raw water (A-WWTP supply water)	
Raw water	Treated water from Gabes sewage treatment plant
Raw water intake	10,000 m^3/day (Amount of water required based on GCT's water requirements and agreed with ONAS.)
Raw water planned water quality	BOD (90 mg/L), SS (150 mg/L), TN (39 mg/L), TP (3 mg/L), TDS (3000 mg/L), water temperature 17°C to 30°C, pH 7.5 (Water quality presented by ONAS based on most recent operations)
Maximum raw water quality	BOD (250 mg/L), SS (330 mg/L) (Maximum monthly treated water quality at existing facilities in 2019-2020)
2. Volume of advanced-treated water	
Water supply destination (off-taker)	GCT Gabes Plant
Volume of water	6,000 m^3/day
Water quality	Colorless, odorless, sterile, TDS 300 mg/L or less (Water quality demanded by GCT based on the water quality required by the factory)
3. Concentrated water	
Concentrated water volume	4,000 m^3/day
TDS	Approx. 7,500 mg/L (The amount varies with temperature and time.) Mixed with 3,000 mg/L in raw water and discharged to the sea at about 5,200 mg/L
BOD	Approx. 25 mg/L or less (30 mg/L or less in the standard for discharge to marine waters)
4. Operation period	10 years (2026-2035)

2-2-2-6 A-WWTP water treatment capacity

(1) MBR wastewater treatment

In addition to meeting the water quality requirements of GCT, the A-WWTP must comply with environmental standards for the concentrated wastewater it discharges. The discharged wastewater is the remaining 4,000 m^3/day after 6,000 m^3/day of advanced-treated water has been produced from 10,000 m3/day of MBR treated water, making the concentration 2.5 times (=

10,000/4,000) that of the MBR sewage treated water.

With this in mind, an investigation was made as to whether the treated water (water quality items: BOD, SS, TN, and TP) in the MBR treatment stage could meet the standard for discharge water quality if it becomes concentrated effluent. As a result, with regard to BOD, SS, and TP, it was determined that the treated water quality of "Circulation type nitrification-denitrification membrane bioreactor (coagulant added)" would satisfy the effluent standard values in the "Sewage Facility Planning and Design Guidelines and Commentary - 2019 Edition" (hereinafter referred to as "Sewage Design Guidelines") and "Sewage Agency Design Guidelines," but the standards for TN would not be satisfied. Therefore, it was deemed necessary to control the operation method.

Note that dissolved salts (TDS) cannot be removed in the MBR, so they are treated in the RO at a later stage. For details, see "(2) RO Membrane Treatment" below.

Table 2-13 A-WWTP discharged water quality and discharged water quality criteria

(Unit: mg/L)

Item	MBR treated water	RO concentrated water	Discharged water quality standard*	Remarks
BOD	10.0	25.0	30.0	Sewage Design Guideline
SS	10.0	25.0	30.0	Sewage Agency Guidelines
TN	10.0	25.0	20.0	Sewage Design Guideline
TP	0.5	1.3	2.0	Sewage Design Guideline

Since the effluent quality standard for TN is NO_3_90 mg/L, it has been converted to 20 mg/L for $N\text{-}NO_3$

Operating Methods to Improve Discharge Water Quality (TN)

For nitrogen removal, since the denitrification rate of denitrifying bacteria is the dominant factor in the capacity for nitrogen removal, the method of operation that allows denitrifying bacteria to live in the activated sludge is to be set. The MLSS concentration to obtain the required denitrifying bacteria shall be set with respect to the TN concentration of the treated water.

The required TN concentration of treated water in an MBR is less than 8 mg/L, in which case the MLSS concentration is calculated as follows.

① Denitrification reaction rate

From the influent water quality, the denitrification rate is calculated as follows

$$KDN(mgN/gMLSS/h)=6.2\times \frac{BODin\ (mg/L)}{MLSS\ concentration\ (mg/L)\ \times residence\ time\ (Anoxic+Aerobic)\ (h)} +0.5$$

② Required denitrification reaction rate

The denitrification rate required based on the geometry of the facility is calculated as follows.

$$KDN'(mgN/gMLSS/h)=\frac{(CTNin-CTNeff-Cssin\times\xi\times Nx)\times 10^3}{TDN\times X}$$

CTNin: TN concentration in influent (39 mg/L)

CTNeff: TN concentration in influent (8 mg/L)

Cssin: SS concentration in influent (150 mg/L)

ξ: Sludge generation rate (0.70)

Nx: Activated sludge nitrogen content (0.07 kg N/kg MLSS)

Qin: Raw water quantity (m3/day)

TDN: Anoxic tank residence time (h)

X: MLSS concentration (mg/L)

③ Calculation of required MLSS concentration

For the above calculation, the minimum **MLSS concentration,** (1) > (2), is calculated to be **12,000 mg/L**.

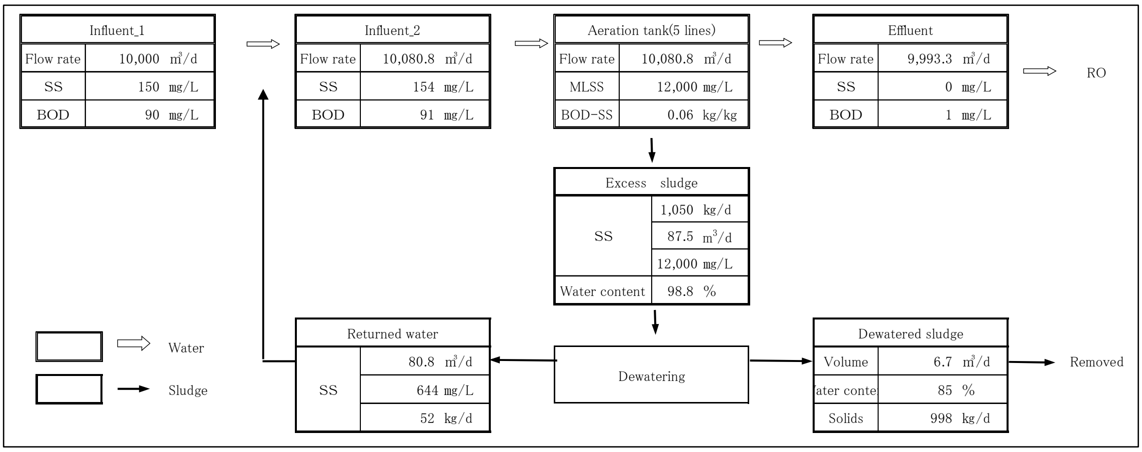
① (0.686) > ② (0.650)

④ Simulation of operation method (material balance calculation)

Since sewage treatment is not stable at the Gabes sewage treatment plant, the following material balance calculations are shown for the design of water quality and in the case that water quality deteriorates or improves.

i) Designed water quality

When operated with the inflow of designed water quality (BOD 90 mg/L, SS 150 mg/L) with an MLSS concentration of 12,000 mg/L that is required for nitrogen removal, the BOD-SS load is 0.06 kg/kg, which is a low load according to the description in the "Sewage Design Guidelines.”

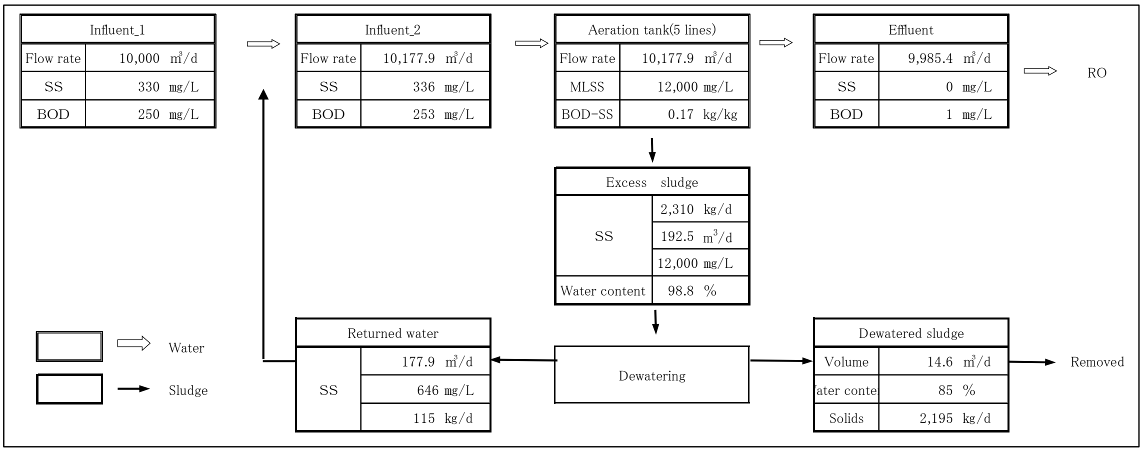


Source: Survey Team

Figure 2-16 Example A-WWTP (MBR) material balance calculation (designed water quality)

ii) When raw water quality deteriorates

When operated with the inflow of deteriorated raw water (BOD 250 mg/L, SS 330 mg/L) with an MLSS concentration of 12,000 mg/L, which is required for nitrogen removal, the BOD-SS load is 0.17 kg/kg, which is a high load according to the description in the "Sewage Design Guidelines."

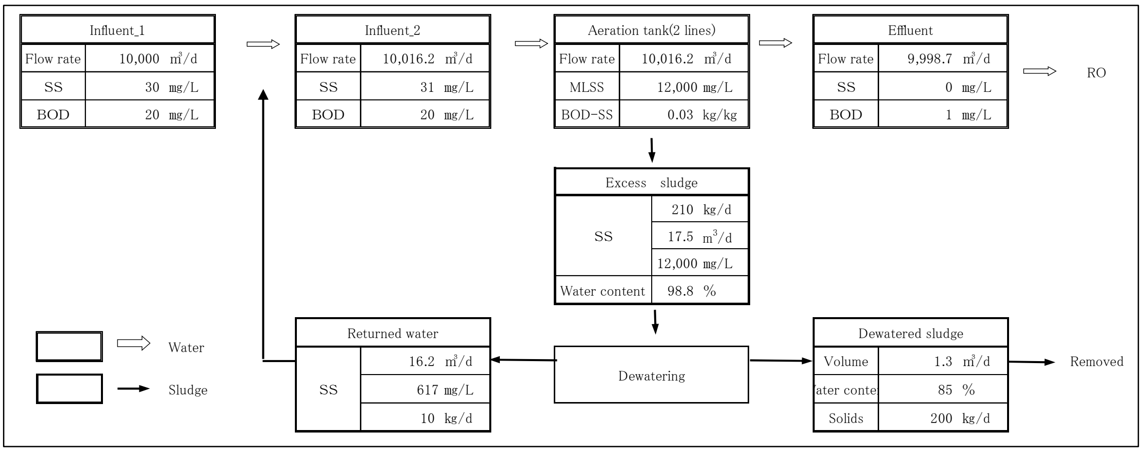


Source: Survey Team

Figure 2-17 Example A-WWTP (MBR) material balance calculation (raw water quality deterioration)

(iii) When raw water quality improves

When operated with the inflow of improved raw water (BOD 20 mg/L, SS 30 mg/L) with an MLSS concentration of 12,000 mg/L, which is required for nitrogen removal, the operation of two series will make a BOD-SS load of 0.03 kg/kg, which is a low load according to the description in the "Sewage Design Guidelines."



Source: Survey Team

Figure 2-18 Example A-WWTP (MBR) material balance calculation (raw water quality improvement)

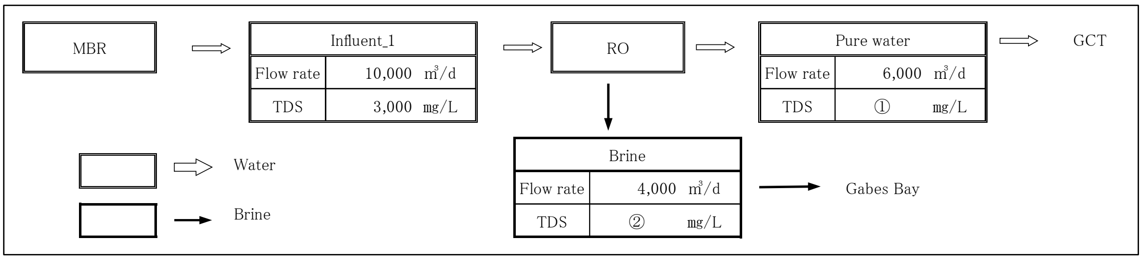
(2) RO membrane treatment

RO membrane treatment involves the filtration of raw water that has been biologically treated in an MBR. The water quality item measured at the treatment plant is salinity, but the value of the effluent in the case of ocean disposal is not specified. In the current Project, the discharge destination is Gabes Bay (salinity: 40,000 mg/L), so the concentrated water (salinity: 7,500 mg/L; 5,200 mg/L after mixing with raw water) will have no impact on the environment. The salinity of the concentrated wastewater is 2.5 times (=10,000/4,000) higher than that of the raw water (10,000 m3/day) because 4,000 m3/day of concentrated wastewater is generated after producing 6,000 m3/day of advanced-treated water.

Removal performance using RO membranes varies depending on the raw water temperature and operation time (elapsed time). Table 2-17 shows the predicted water quality (TDS) in terms of supply pressure, permeate water and concentrated water in each case.

Table 2-14 RO permeate water quality

Item	Unit	Design value				Remarks
Raw water quantity	m3/day	2,500				Per series
Raw water concentration	mg/L	3,000				
Water temperature	℃	17		30		
Period of operation	Year	0	4	0	4	
Operating pressure	Bar	9.5	11.5	7.3	8.6	
Concentrated hydraulic power	Bar	8.7	10.8	6.8	8.0	
Permeate water volume	m3/day	1,500				Per series
Permeate water quality	mg/L	14	24	25	43	Next figure (1)
Concentrated water volume	m3/day	1,000				Per series
Concentrated water quality	mg/L	7,480	7,464	7,463	7,436	Next figure (2)



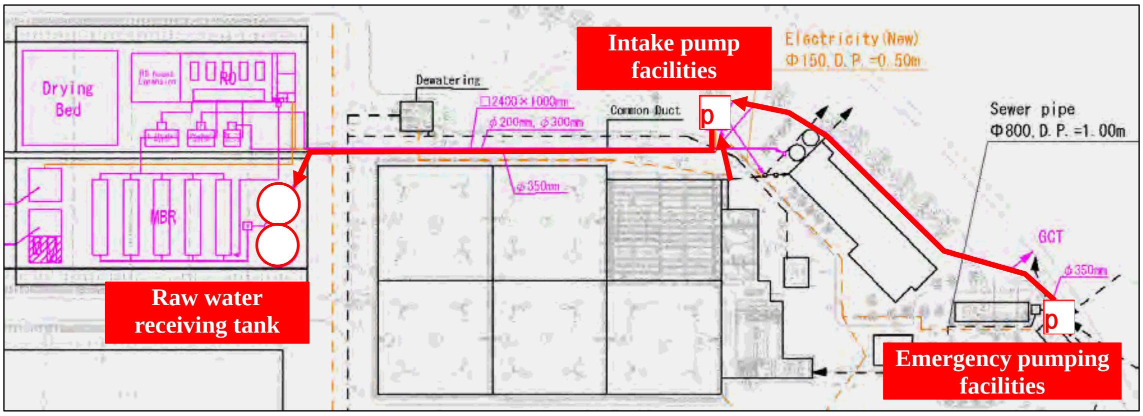
Source: Survey Team

Figure 2-19 A-WWTP (RO) Material Balance Calculation

2-2-2-7 Facility plan/equipment plan

2-2-2-7-1 Water receiving facilities (intake pump facilities, raw water receiving tanks, emergency pump facilities)

In order to perform advanced treatment at the A-WWTP, it is necessary to maintain a constant membrane permeate flow rate (flux) in the MBR sewage treatment and RO membrane treatment processes. Therefore, a facility has been designed that equalizes the time fluctuation of the raw water flow rate. Specifically, based on the information that the raw water flow rate is low during the 4 hour-period late at night mentioned in the previous section, a water intake pumping facility and a raw water receiving tank were designed so that raw water can be supplied to the A-WWTP in a stable manner even during that time period. In addition, as a countermeasure against being unable to obtain treated water due to the failure of the existing sewage treatment facility, a pump was designed to intake sewage water from the influent culvert landing well and pump it to the intake pump, so that sewage water can always be obtained by pumping it to the treatment plant even if the existing treatment facility fails.



Source: Survey Team

Figure 2-20 Water Receiving Facilities Plan (draft)

(1) Water intake pump facilities

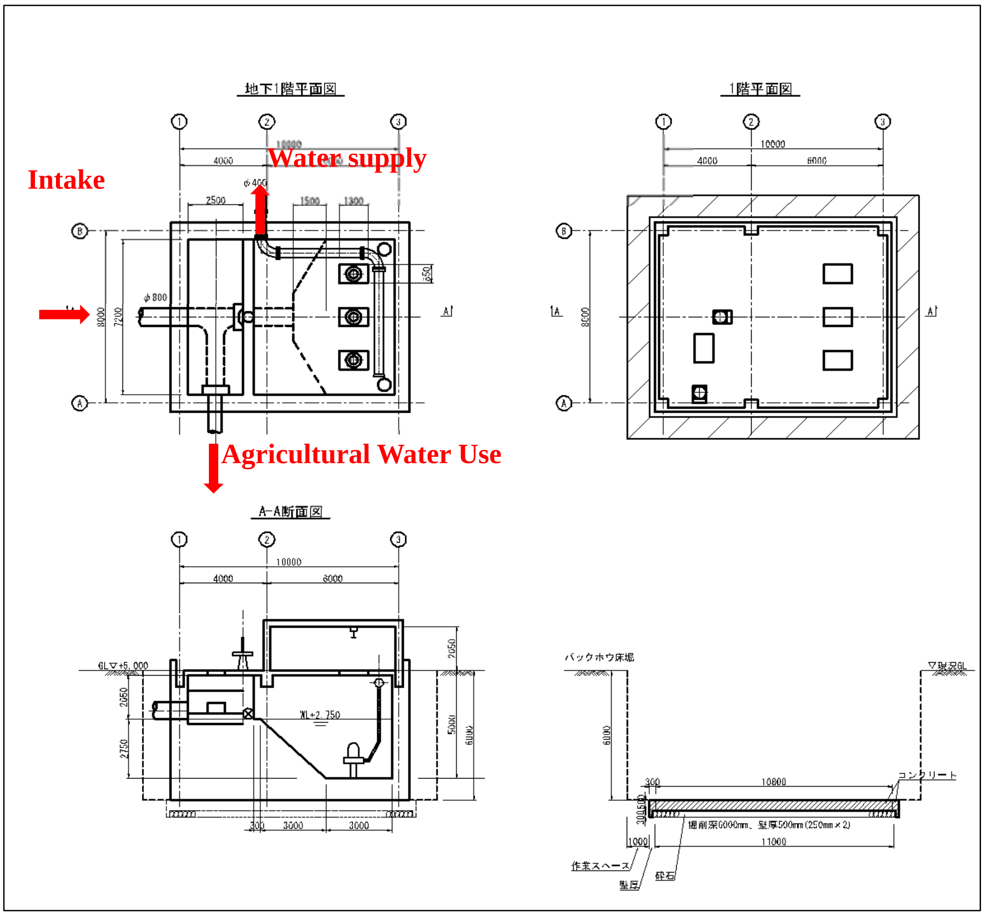
This facility has been designed to be capable of delivering 10,000 m^3/day of raw water to the A-WWTP even when there is a low raw water flow rate during the 4-hour late night period. An overview of the pumping facilities is shown below.

Pump capacity: $10{,}000\ m^3/day \times \frac{24h}{20h} = 12{,}000\ m^3/day \fallingdotseq 8.3\ m^3/minute$

Facility overview: Submersible pumps

Bore 250mm x Pumping capacity 4.2m^3/min x Head 15m x Output 15.0 ㎾ x 3 units

(one of which is a spare)



Source: Survey Team

Figure 2-21 Intake pumping facility (draft)

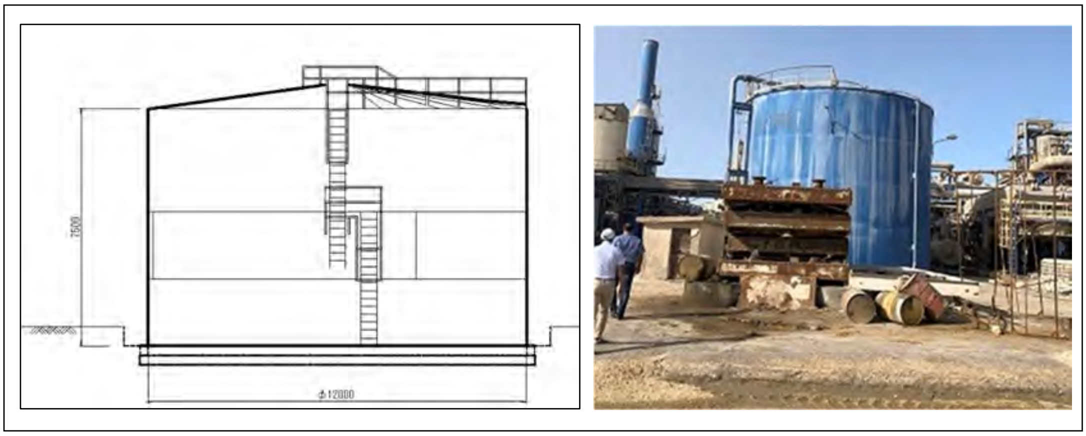
(2) Raw water receiving tank

In view of the fact that the size of the raw water receiving tank is determined in accordance with the "Membrane Bioreactor Design Guidelines" of the Japan Sewage Works Agency, which states, "The capacity of the flow adjustment tank should be determined so that the adjusted fluctuation ratio is 1.0, taking into consideration the maximum daily sewage flow rate and the daily inflow fluctuation pattern," and the information about the decrease in the sewage flow rate during the 4 hour-period late at night, it was assumed that the raw water during that time period would be stored. The calculation of the required water storage volume is shown below. In consideration of maintenance work, two tanks are to be used so that one of the tanks can be used at any time.

$$\text{Required raw water storage volume (4 hours)} = 10{,}000\ m^3/\text{day} \times \frac{4h}{24h} = 1{,}666\ m^3 \rightarrow 1{,}700\ m^3$$

Facility overview: φ12.0m x 7.5m x 2 units (effective capacity: 850m3 x 2 units)

A schematic of the raw water receiving tank and a photograph of the actual water storage tank in use at the site are shown below.



Source: Survey Team

Figure 2-22 Raw water receiving tank (draft)

(3) Simulation of intake pump operation and storage volume of raw water receiving tank

The results of the simulation of the number of pumps in operation, raw water receiving tank inflow, outflow, and storage are shown below.

[Intake pump operating conditions]

Water level control: The intake pump stops when the volume of water in the raw water receiving tank reaches 1,700 m^3.

Time control: For 4 hours late at night, the number of water intake pumps in operation is set to 1.

Based on the interviews, the late-night raw water flow rate is about 350 m^3/hour, but since this figure varies depending on the day, calculations were made for the following two cases.

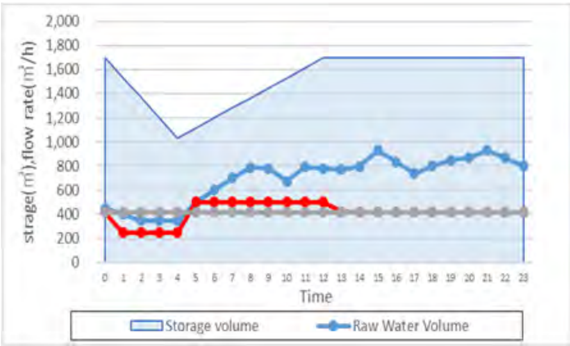
CASE 1: Raw water inflow of 350 m^3/hour for 4 hours late at night

CASE 2: Raw water inflow of 25 m^3/hour for 4 hours late at night

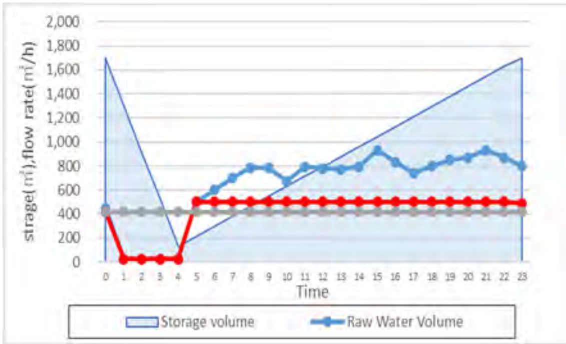
As a result of the above study, it was determined that a water storage tank with a storage capacity of 1,700 m^3 and two pumps operating at 4.2 m^3/min would be able to uniformly deliver raw water at 417 m^3/hour even when the inflow water volume is almost zero during the four late-night hours.

Time	CASE 1					CASE 2				
	Raw Water Volume	Pump	Raw Water Storage Tank			Raw Water Volume	Pump	Raw Water Storage Tank		
		No. of Pumps in Operation	Inflow Volume	Outflow Volume	Storage volume		No. of Pumps in Operation	Inflow Volume	Outflow Volume	Storage volume
	m³/h	Unit	m³/h	m³/h	m³	m³/h	台	m³/h	m³/h	m³
0:00	450	2	417	417	1,700	450	2	417	417	1,700
1:00	400	1	250	417	1,533	25	1	25	417	1,308
2:00	350	1	250	417	1,366	25	1	25	417	916
3:00	350	1	250	417	1,199	25	1	25	417	524
4:00	350	1	250	417	1,032	25	1	25	417	132
5:00	500	2	500	417	1,115	500	2	500	417	215
6:00	600	2	500	417	1,198	600	2	500	417	298
7:00	700	2	500	417	1,281	700	2	500	417	381
8:00	788	2	500	417	1,364	788	2	500	417	464
9:00	782	2	500	417	1,447	782	2	500	417	547
10:00	672	2	500	417	1,530	672	2	500	417	630
11:00	793	2	500	417	1,613	793	2	500	417	713
12:00	780	2	500	417	1,696	780	2	500	417	796
13:00	770	2	421	417	1,700	770	2	500	417	879
14:00	795	2	417	417	1,700	795	2	500	417	962
15:00	932	2	417	417	1,700	932	2	500	417	1,045
16:00	834	2	417	417	1,700	834	2	500	417	1,128
17:00	740	2	417	417	1,700	740	2	500	417	1,211
18:00	800	2	417	417	1,700	800	2	500	417	1,294
19:00	850	2	417	417	1,700	850	2	500	417	1,377
20:00	870	2	417	417	1,700	870	2	500	417	1,460
21:00	930	2	417	417	1,700	930	2	500	417	1,543
22:00	870	2	417	417	1,700	870	2	500	417	1,626
23:00	800	2	417	417	1,700	800	2	491	417	1,700

*One pump operates for 4 hours late at night (1:00-5:00) when the raw water flow rate is reduced.



CASE 1



CASE 2

Source: Survey Team

Figure 2-23 Simulated storage volume of raw water receiving tank

(4) Emergency pump facility

An overview of the facility is shown below.

Pump capacity: 10,000 m^3/day ≒ 7.0 m^3/min

Facility overview: Injection pumps

Diameter 250 mm x Pumping capacity 7.0 m^3/min x Head 5 m x Output 22.0 kW x 1 unit

2-2-2-7-2 Pumping and drainage facilities

(1) Status of existing water supply facilities

Although not currently in use, a water pipe (150 mm diameter) has been installed from the Gabes sewage treatment plant to the GCT Gabes plant. This water pipe was installed on a trial basis (as a tentative plan) and will become unnecessary with the installation of the new water pipe, and it will need to be removed to make room for the new pipe. The existing water pipe route and the status of pipe installation are shown below.

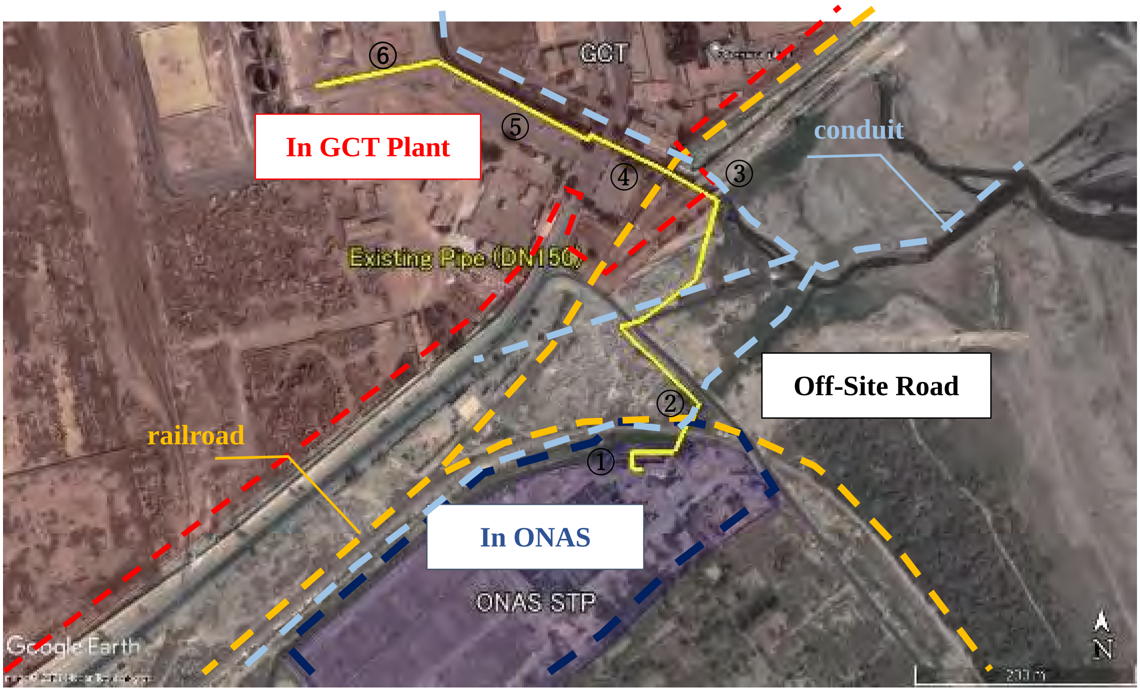


Figure 2-24 Existing water pipe route

(1) Existing water pipe in Gabes sewage treatment plant (irrigation pond)

(2) Existing water supply pipe channel crossings

<table>
<tr>
<td>
(3) Status of existing water pipes at railroad crossings and waterways</td>
<td>
(4) Existing water pipes (canal section) in GCT Gabes plant</td>
</tr>
<tr>
<td>
(5) Existing water pipes in GCT Gabes plant (aboveground section)</td>
<td>
(6) Existing water pipe in GCT Gabes plant (at the pier)</td>
</tr>
</table>

Figure 2-25 Existing Water Pipe Installation Status

(2) Scope of study of water pipe route

Since the water pipe route affects the required capacity of the water pumps, a study was made regarding a series of facilities from the advanced treated water storage tank to the water receiving tank in the GCT plant, which is the longest route in this plan.

Notes regarding the study of water pipe routes are explained in ① through ③.

① In GCT Plant

In principle, the water pipeline and receiving tanks in the GCT plant are to be installed by GCT. In this case, due to the congestion of the existing buried pipes in the GCT plant, they will be removed and replaced with the water pipes. For the elevated section, the existing support structure and strength will be checked, and bridge girders will be added.

② Off-Site roads

The existing water conveyance pipes have been laid between the Gabes sewage treatment plant and the GCT Gabes plant using waterway crossings, roadside underground piping, and in-canal piping. In addition, there are two locations where railroad crossings are required. The existing water pipes cross under the railroad bridges, with supports installed under the railroad bridges that cross the waterway at both locations. Due to the need to secure land for piping and to consult with related departments (roads, rivers, railroads, etc.), the piping in this Project will be laid using the open cut method or using channel piping along the existing route, and using the non-open cut method to cross waterway and railroad sections.

③ In the ONAS treatment plant

The piping will be laid in a common trench along with the intake pipe and the drainage pipe from the A-WWTP, taking into consideration the piping conditions in the sewage treatment plant, workability with respect to securing the functions of the existing sewage treatment facility and O&M implementation, and compatibility with the layout plan of A-WWTP and on-site piping to be installed in this Project.

Table 2-15 Status by Segment

Interval	Status and considerations
In GCT plant	・ The existing water pipes are channel piping or elevated piping. ・ There is a lot of buried piping on-site. ・ Buried piping is not allowed according to the instructions of GCT Gabes plant management. ・ Existing water pipes need to be replaced (removal + new construction).
Off-Site roads	・ Existing piping is channel piping or buried underground. ・ Railroad crossing locations: 2. ・ Waterway crossing locations: 2 locations. ・ In the case of piping by open cut or channel piping utilizing the existing route, it is necessary to consider removing the existing pipe in order to securing space.
In ONAS treatment plant	・ The existing water pipeline is above-ground piping from the irrigation reservoir to the railroad crossing. ・ The piping plan should be coordinated with the piping plan for the A-WWTP. ・ The existing on-site roads have limited routes, so the layout and construction plan should be such that the on-site roads can be used during the construction of this Project (without affecting the operation and management of the treatment plant).

(3) Results of comparative study of water pipe routes

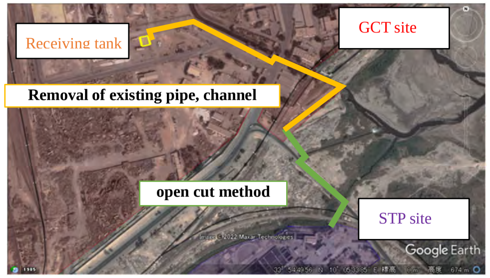
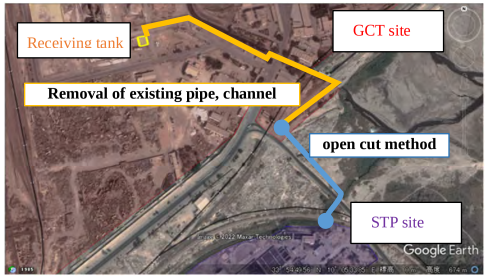
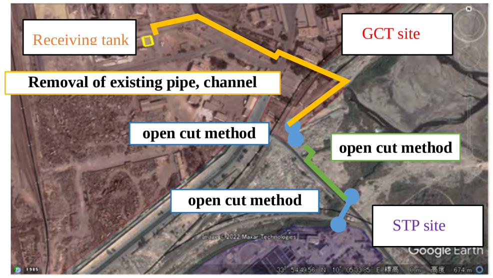
The routes for the water pipe were studied with respect to the route inside the ONAS sewage treatment plant and the construction method for the off-site road section. For the route inside the GCT plant, the existing water pipe route will be used and the existing piping will be rerouted.

① Study of construction methods in GCT plant and off-site road section

A study was conducted regarding the construction method for the off-site road section leading to the ONAS sewage treatment plant. The construction method can be either open cut (channel piping) or non-open cut, or a combination of open cut and non-open cut methods. Although the off-site road section is relatively short in distance (approximately 675 m), there are waterways and railroads that cross the culvert route. With consideration for the coordination with related parties, construction period and workability, economic efficiency, and O&M due to these circumstances, the decision was made to adopt a construction method combining the open cut (underground piping) and non-open cut methods. Regarding the reinforcement of the elevated section in the GCT plant, it was determined that the existing conditions could be addressed by increasing the number of bridge girders.

The adoption of the propulsion method or the horizontal directional drilling (HDD) method was examined for the non-open cut method. According to the results of soil investigation, the target area of this Project is normal soil with a low groundwater table. Therefore, it is not necessary to use a propulsion method that can handle groundwater (a mud or muddy soil method, or a special method for drilling through hard soil). Therefore, in this Project, the horizontal directional drilling (HDD) method will be adopted, which is the most commonly used and inexpensive method in the area.

Table 2-16 Comparative Study of Water Pipe Construction Methods Outside ONAS Sewage Treatment Plant

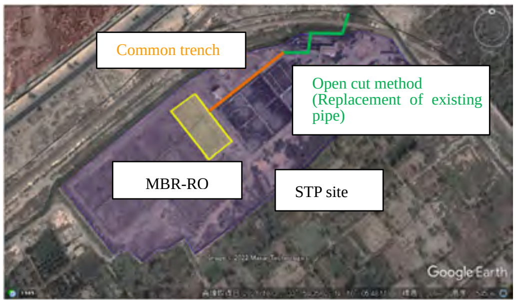
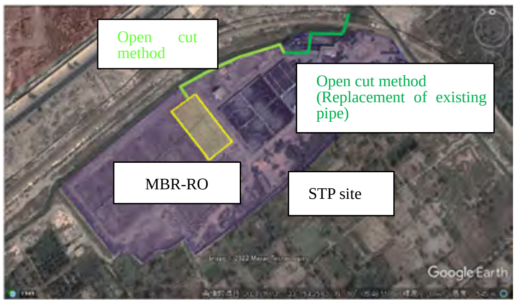
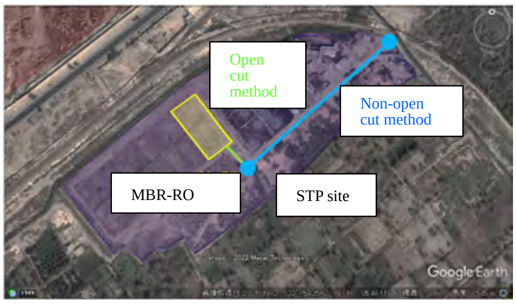
Item \ Plan	Proposed off-site water pipe route 1 Open cut method, waterway piping	Proposed off-site water pipe route 2 Non-open cut method	Proposed off-site water pipe route 3 Open cut method + non-open cut method
			
Summary	・Existing pipe routes, the open cut construction method, and waterway piping, etc. will be used.	・A non-open cut method will be used at the road section and the railroad crossing adjacent to the sewage treatment plant. ・The non-open cut method will be used in two locations, one in the sewage treatment plant and the other on a site owned by the GCT Gabes plant.	・The non-open cut method will be used at the railroad crossings. ・The open cut method will be used in other areas.
Construction extension	・Open cut method 675m	・Open cut method 500m ・Non-open cut method 175m	・Open cut method 620m ・Non-open cut method 55m
Coordination with officials	Crossing or occupying a waterway, road, or railroad section requires consultation with the road superintendent, railroad company, and river superintendent.	Since the project crosses or occupies a road or railroad section, consultation with the road administrator and railroad company is required. (Not required for river administrators)	Since the project crosses or occupies a road or railroad section, consultation with the road administrator and railroad company is required. (Not required for river administrators)
	△	○	○
Construction period workability	・Approx. 1.5 months (including re-connection to the GCT site) ・This is not a critical path because it will be done in parallel with the construction of the water tank and building.	・About 1.5 months ・This is not a critical path because it will be done in parallel with the construction of the water tank and building.	・About 1.5 months ・This is not a critical path because it will be done in parallel with the construction of the water tank and building.
	○	○	○
Economizing	The most economical, since only open cut work is required. (100)	The non-open cut method is used, which is expensive. (If route 1 is 100, about 120)	Slightly more expensive due in part to the use of non-open cut methods. (If route 1 is 100, it is about 110)
	○	△	○
O&M	There are long, extended exposed piping locations outside of the STP and GCT sites.	No particular problem.	No particular problem.
	△	◎	◎
Selection result	Although economical, it requires consultation with the river administrator, and there are long, extended exposed piping locations.	Although more expensive, it eliminates the need for consultation with river administrators and avoids exposure of piping.	Although slightly more expensive, it eliminates the need for consultation with the river administrator and avoids exposure of the piping.
	△	○	◎

(*)The connection to the water pipes in the ONAS treatment plant will be made by an open cut method. In this study, connection piping was not considered to avoid complicating the results of the study.

② Study of water pipe route in ONAS sewage treatment plant

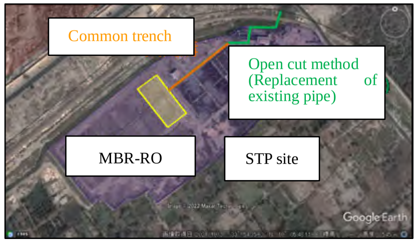
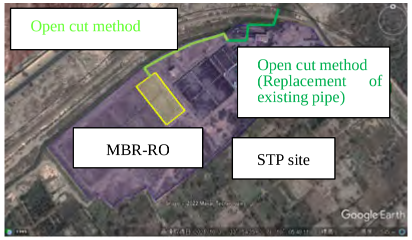
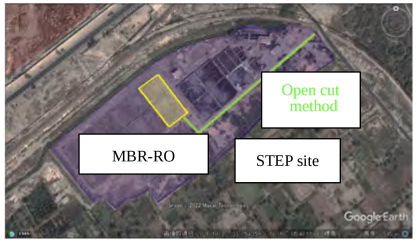
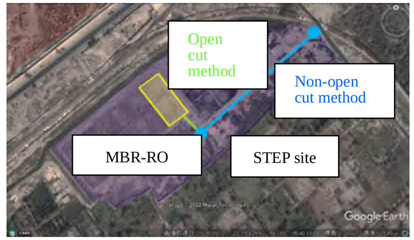
Based on the space available for pipe culvert installation, studies were made of two routes for installing water pipes in the ONAS sewage treatment plant, one route for installing the pipe culvert on the north property boundary wall, and four possible construction methods. These routes and proposed construction methods were compared and examined for their impact during construction, construction period and ease of construction, economic efficiency, and O&M. As a result, the route for installation in the same trench as the water culvert was adopted, which is economical, easy to maintain and manage, and can effectively utilize the space in the plant.

Table 2-17 Proposed Water Transfer Pipe Route (in ONAS Sewage Treatment Plant)

	
Proposed water pipe route (in ONAS sewage treatment plant) 1 The same route (shared trench) as the water pipeline will be used, and the existing water pipeline will be replaced in the vicinity of the chlorine mixing pond.	**Proposed water pipe route (in ONAS sewage treatment plant) 2** An above-ground line to the vicinity of the planned water intake facility will be constructed on the railroad side (northwest side) boundary.
	
Proposed water pipe route (in ONAS sewage treatment plant) 3 The line will be constructed on the southeast side of the reaction tank using an open cut method.	**Proposed water pipe route (in ONAS sewage treatment plant) 4** The line will be constructed on the southeast side of the reaction tank using a non-open cut method.

(*) The connection with the water pipe outside of the site will be made by an open cut method. In this study, connection piping was not considered to avoid complicating the study results.

Table 2-18 Comparison of water pipe routes (within ONAS sewage treatment plant)

Alternative / Items for consideration	Proposed water pipe route 1 Use of common trenches (Installation in a common trench)	Proposed water pipe route 2 Use of railroad-side land (Open cut method)	Proposed water pipe route 3 Use of the southeast side of the reaction tank (Open cut method)	Proposed water pipe route 4 Use of the southeast side of the reaction tank (Non-open cut method)
				
Summary	・Existing pipe routes, the open cut construction method, and waterway piping, etc. will be used. ・The same route (common trench) as the water pipeline will be used, and the existing water pipeline will be replaced in the vicinity of the chlorine mixing pond.	・Existing pipe routes, the open cut construction method, and waterway piping, etc. will be used. ・The site on the railroad side (northwest side) boundary will be used to install water pipes on the ground up to the vicinity of the planned intake facility.	・Existing pipe routes will not be used. ・The tank will be laid on the southeast side of the reaction tank.	・Two shafts will be installed in the sewage treatment plant from the road inside the plant southeast of the reaction tank using a non-open cut method. ・The route would be the same as "Proposed route 3."
Construction extension	・Open cut method (replacement of existing water pipeline) 130m ・Common trench 125m	・Open cut method 165m ・Open cut method (replacement of existing water pipeline) 130m	・Open cut method 270m	・Open cut method 40m ・Non-open cut method 230m
Impacts during construction	A portion of the road on the northwest side of the sewage treatment plant will be closed to traffic, but there will be no impact as the on-site road on the southeast side will be usable. There are no site constraints.	A portion of the road on the northwest side of the sewage treatment plant will be closed to traffic, but there will be no impact as the on-site road on the southeast side will be usable. There are no site constraints.	Both the northwest and southeast roads in the sewage treatment plant will be impassable and a temporary road will need to be built. There are no site constraints.	In-place roads can be used, eliminating the need for temporary roads.
	◎	◎	△	○
Construction period workability	・Approx. 1.2 months (including re-construction work) ・This is not a critical path because it is done in parallel with the construction of the water tank and building.	・Approx. 1.2 months (including re-construction work) ・This is not a critical path because it is done in parallel with the construction of the water tank and building.	・About 1 month ・This is not a critical path because it is done in parallel with the construction of the water tank and building.	・About 1.5 months ・It takes a long time to set up a shaft.
	○	○	◎	△
Economizing	Includes rehabilitation of existing water pipelines, but is the most economical because it has the shortest construction length and is installed in a common trench. (100, same level as Route 3)	The project includes the replacement of existing water pipelines, and the length of the project is long. (130 if Routes 1 and 3 are set to 100)	The most economical because it uses the open cut method only. (100, same as Route 1)	The most expensive because it employs a non-open cut method. (180 if Routes 1 and 3 are set to 100)
	◎	○	◎	△
O&M	Easy to manage in the same common trench as existing sewage treatment plant treated water and RO treated wastewater.	The work area is small due to its proximity to the property boundary wall.	No particular problem.	Maintenance is complicated due to the deeper burial.
	◎	△	○	△
Selection result	・The most economical. ・Can be managed in the same common trench as the existing treated water and wastewater system.	・The longest construction extension. ・This is more expensive than Routes 1 and 3.	・The most economical. ・Open cut work within the site will not be a particular impediment to traffic.	・The most expensive. ・Open cut work within the site will not be a particular impediment to traffic.
	◎	△	○	△

(4) Drainage facilities

The drainage facilities from the A-WWTP, as shown in Figure 2-34 below, will be laid out in the common trench of the conduit and water conveyance pipes to connect to the existing drainage system, and then connected to the existing discharge culvert.

(5) Equipment specifications for water supply and drainage facilities

The discharge and water supply facilities to be installed in the Project are shown below.

Table 2-19 Equipment Specifications for Water Supply and Drainage Facilities

Item	Specifications
Existing sewage treatment facilities → Receiving pit (water pump)	Pipe type and diameter HDPE φ800mm, soil cover 1.2m, extension 10m
Existing sewage inflow pit → Receiving pit (water pump) for emergencies	Pipe type and diameter HDPEφ400mm, exposed piping
Receiving pit (water pump) → A-WWTP	Pipe type and diameter HDPE φ400 mm, installed in a common trench
A-WWTP → Existing drain	Pipe type and diameter HDPE φ200 mm, installed in a common trench
A-WWTP → GCT Plant	Pipe type and diameter HDPE φ300 mm, extension: approx. 1 km (DP 1.2 m, exposed pipe, 125 m installed in a common trench)

(6) Outline of construction

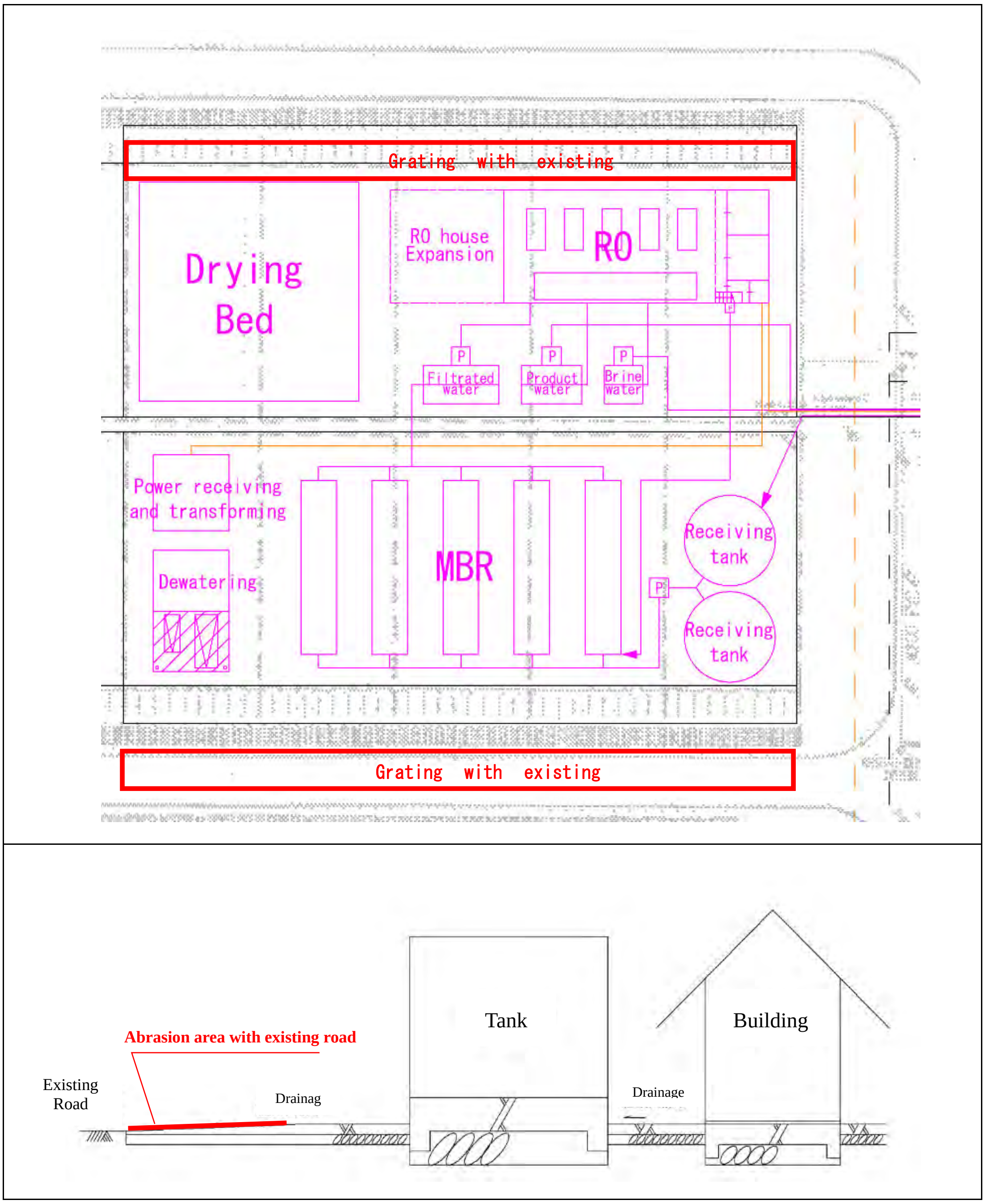
A summary of the construction of the water supply and drainage facilities is shown below.

Table 2-20 Construction Summary of Water Supply and Drainage Facilities

Item	Outline of Construction
Multipurpose underground utility conduit	A joint trench (φ2400 x 1000 mm) shall be installed on the road alongside the pipe culvert on the north side of the ONAS sewage treatment plant, and the pipe culvert shall be laid in the trench.
Open cut method	To be adopted in the ONAS sewage treatment plant and in the off-site road section.
Non-open cut method (HDD method)	In the Project, this method will be employed at two railroad crossings along the water transmission pipe installation route (advanced sewage treatment facility to GCT plant).
Exposed piping	Exposed piping shall be used in the water pipe route in the GCT plant.

2-2-2-7-3 A-WWTP Site Development

The A-WWTP is to be installed on an existing sludge drying bed. In consideration of the entry of maintenance vehicles and the drainage of rainwater, a concrete pavement 10 cm higher than the existing road is to be used. The A-WWTP site will be cut down to allow access from the existing road, and the drained rainwater will be discharged from the surrounding road drainage system. The following figure shows the proposed site preparation for the A-WWTP construction site.



Source: Survey Team

Figure 2-26 Proposed Site Preparation for A-WWTP Construction Site

2-2-2-7-4 Foundation structure

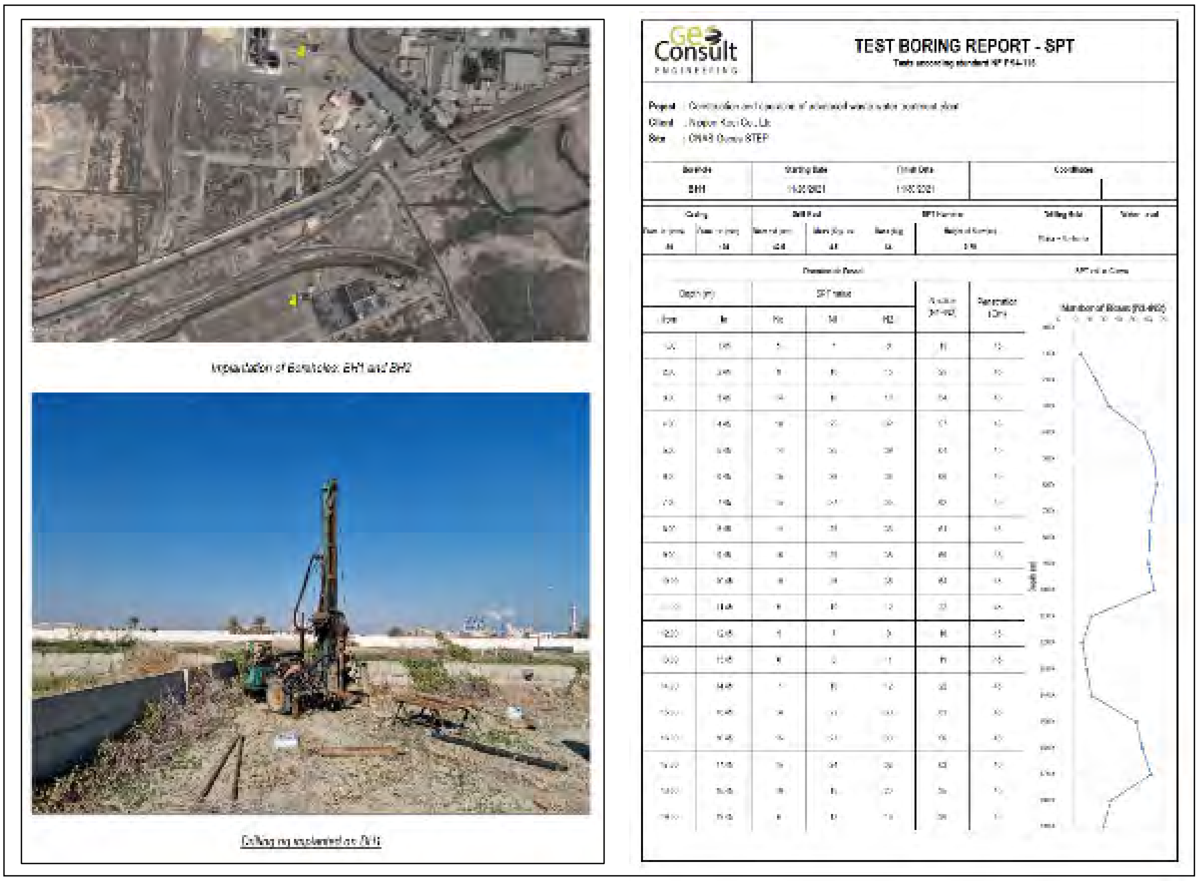
In order to construct the A-WWTP, a borehole investigation was conducted at the proposed site, which is an existing sludge drying bed, in order to study the foundation structure of each facility.

(1) Boring investigation

The results of the borings at the A-WWTP and the calculation of the ground bearing capacity are as follows.

1 to 2 m average N-value = $1\frac{15+25}{2} = 20$

Ground bearing capacity = N value x 10 kN/m2 = 200 kN/m^2



Source: Survey Team

Figure 2-27 Boring data for the A-WWTP construction site

(2) Required ground bearing capacity

(i) Necessity of pile foundation

Since the height of the water storage tank in the facility is approximately 5 to 8 m, the required ground bearing capacity was calculated as follows, and it was determined that the ground bearing capacity of the site (N=20, 200 kN/m2) was sufficient and that pile foundations were not necessary.

$9.8\text{kN/m}^3\times(5\text{-}8)\text{m}=49\text{-}79\text{kN/m}^2>200\text{kN/m}^2$

(3) Foundation structure

① Required base area

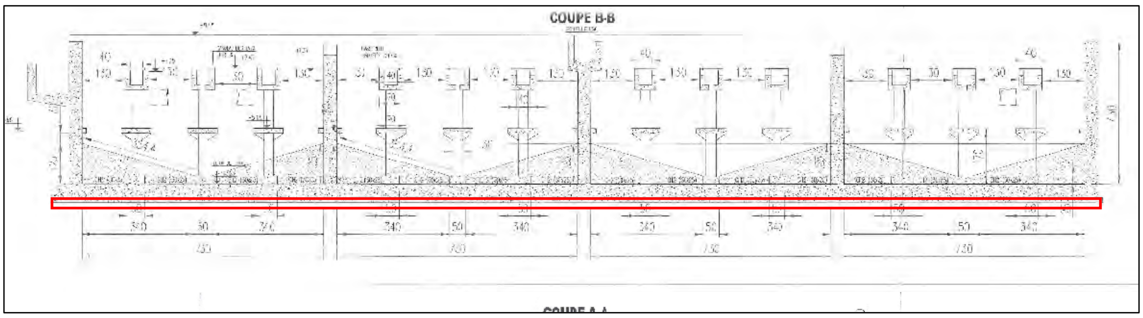
The structure of the foundation was studied based on the required ground bearing capacity (49-79 kN/m2) calculated in (2) by determining the required foundation base area.

Dividing the required ground bearing capacity by the ground bearing capacity of 200 kN/m2$\frac{49\sim79}{200}=1\frac{24.5\sim40}{100}$, this means that approximately 40% of the foundation base area is required in relation to the facility base area. In this case, a solid foundation is judged to be an appropriate structure because fabric or independent foundations would generate local loads and the ground bearing capacity would be insufficient.

In this study, a borehole investigation was also conducted within the GCT site, where the 1-2 m average N value was 55, confirming that it is not a soft layer.

② Foundation of existing facilities

The foundation structure of the existing facility is a solid foundation at a depth of approximately 4 m.



Source: ONAS

Figure 2-28 Foundation structure of existing water treatment facility

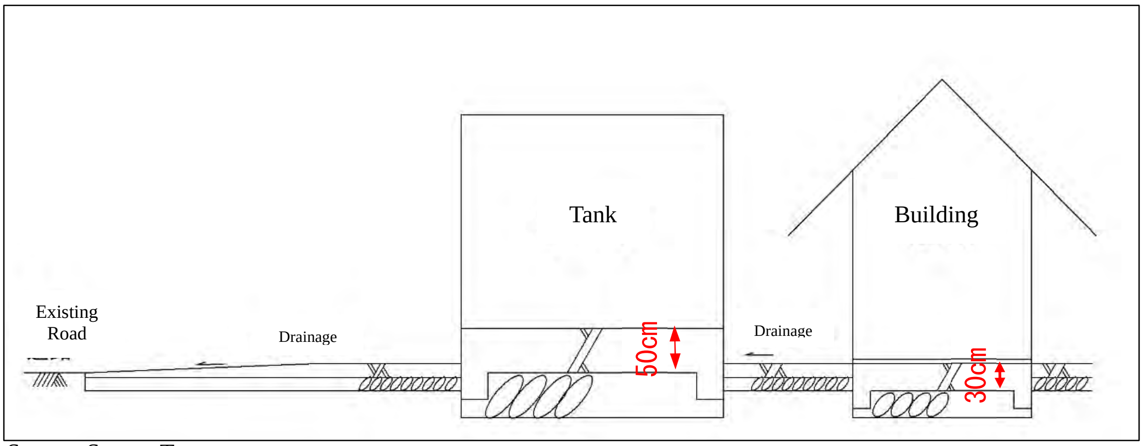
③ Determination of foundation structure

Given the expected ground bearing capacity and the fact that the existing water treatment facility (water depth of the reaction tank is approximately 4 m) uses a direct foundation, the advanced sewage treatment facility is assumed to have a foundation structure that will distribute the load of the water tank and MBR reaction tank.

A flat plate loading test is planned prior to construction of the A-WWTP (included in the project cost), but if defective soil is identified, it shall be replaced with good quality soil (sand and gravel).

④ Thickness of foundation

To avoid unequal settlement, the foundation thickness was set at 50 cm for the water tank and 30 cm for the machine room, with reference to existing facilities.



Source: Survey Team

Figure 2-29 Structure of the foundation of the structure (solid foundation) (draft)

2-2-2-7-5 MBR sewage treatment facility

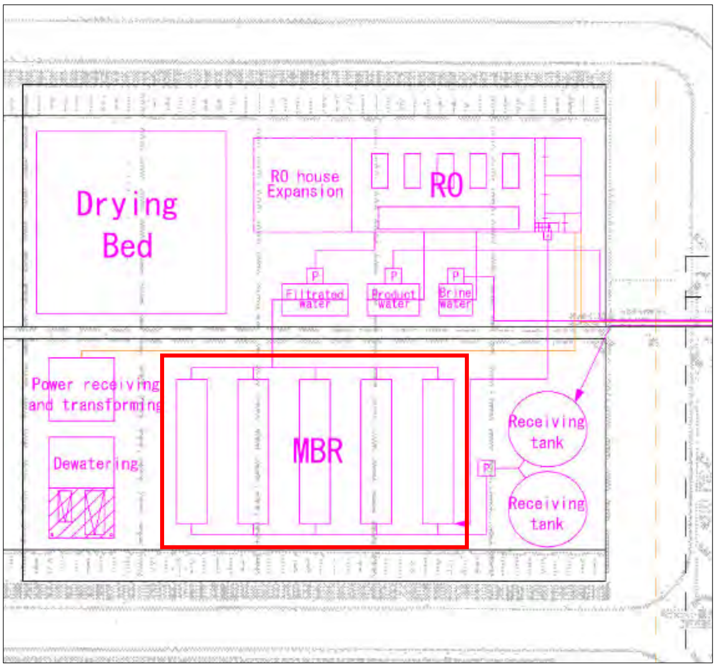
(1) Equipment specifications

Equipment specifications for the MBR sewage treatment facility are shown below.

Table 2-21 Equipment Specifications for MBR Sewage Treatment Facility

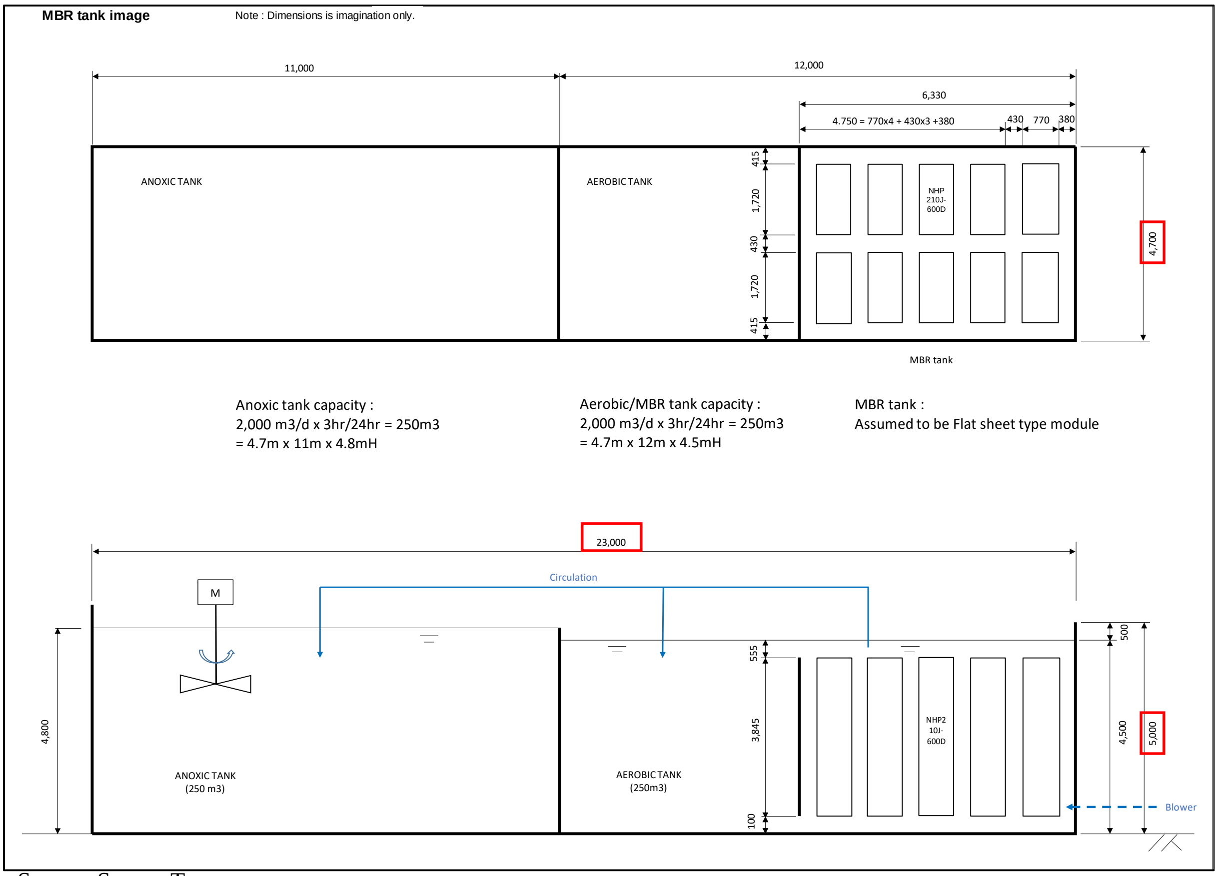
Item	Specification
Steel plate sewage treatment facility	2,000 m^3/day (W4.7m x L23.0m x H5.0m) x 5 units
Oxygen-free tank storage time	3 hours
Aerobic tank storage time	3 hours
Oxygen-free tank agitator	5 units
Membrane treatment unit	10 pcs/unit x 5 units = 50 pcs
Nitrifying solution circulation pump	5 units (circulation ratio 200%)

Next, the MBR sewage treatment facility location (dfaft) and MBR sewage treatment facility (draft) are shown.



Source: Survey Team

Figure 2-30 MBR sewage treatment facility location (draft)



Source: Survey Team

Figure 2-31 MBR sewage treatment facility (draft)

(2) Outline of construction

A summary of the construction of the MBR sewage treatment facility is shown below.

Table 2-22 MBR sewage treatment plant construction summary

Item	Outline of Construction
Public works	・ Foundation construction (solid foundation) ・ Prefabricated steel structure
Machinery works	Machinery and equipment installation
Electrical engineering	Power distribution

(3) Use of chemical agents

① Membrane cleaning agent

・ Sodium hypochlorite

2-2-2-7-6 RO membrane treatment facility (administration and general building)

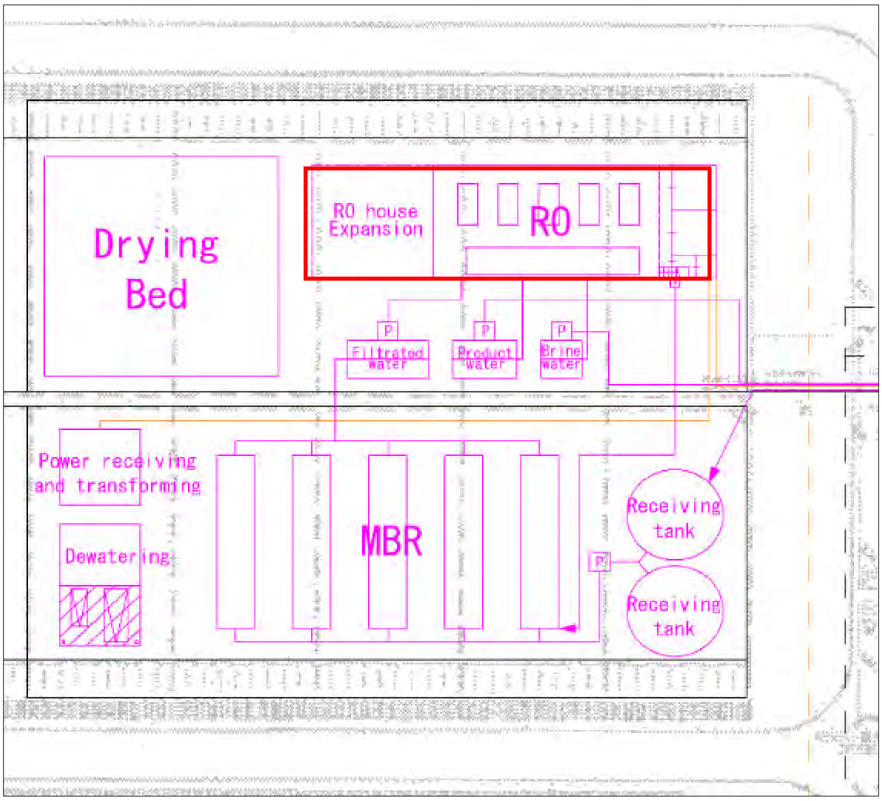
(1) Equipment specifications

Equipment specifications for the RO membrane treatment facility are shown below.

Table 2-23 Equipment Specifications for RO Membrane Treatment Facility

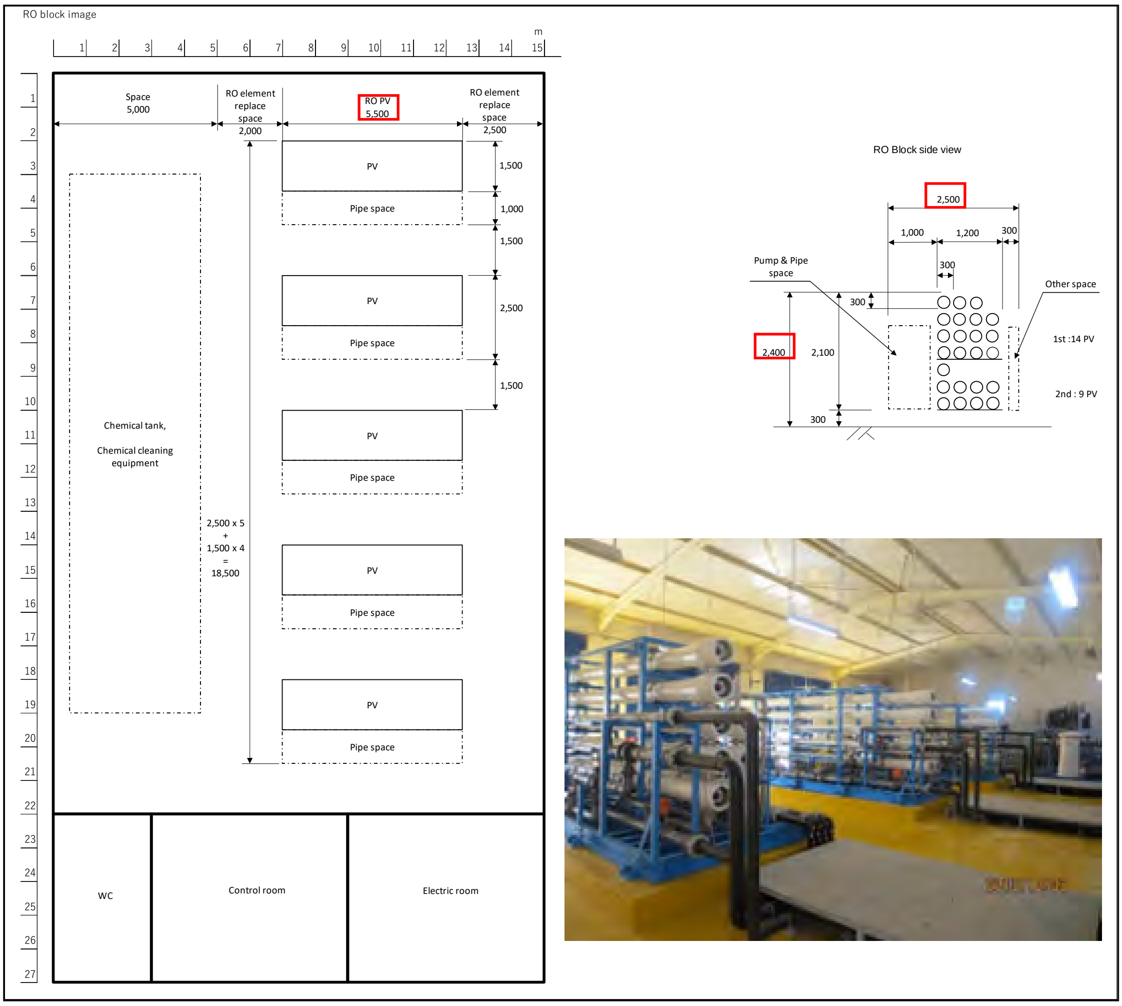
Item	Specifications
Equipment dimensions	1,500 m^3/day/unit (W2.5m x L5.5m x H2.4m) x 5 units
Membrane treatment unit	8-inch pressure unit: 23 pcs/unit x 5 units = 115 pcs 8-inch RO membrane: 115 pcs/unit x 5 units = 575 pcs

Next, the proposed RO membrane treatment facility location and the proposed RO membrane treatment facility installation are shown.



Source: Survey Team

Figure 2-32 Proposed RO Membrane Treatment Facility Location



Source: Survey Team

Figure 2-33 RO Membrane Treatment Facility (draft)

(2) Outline of construction

The RO facility is to be located within a prefabricated steel-frame structure to avoid the effects of wind, rain, sandstorms, and salt damage. The facility was also designed to include administrative functions to reduce construction costs and ensure efficient O&M. The required construction work is shown below.

Table 2-24 Construction Summary of RO Membrane Treatment Facility

Item	Outline of construction
Public works	Foundation construction (solid foundation)
Construction work	Prefabricated steel structure construction
Machinery works	Installation of RO membrane filtration facility
Electrical engineering	Power distribution Installation of switchboards

(3) Use of chemical agents

① Membrane cleaning agent

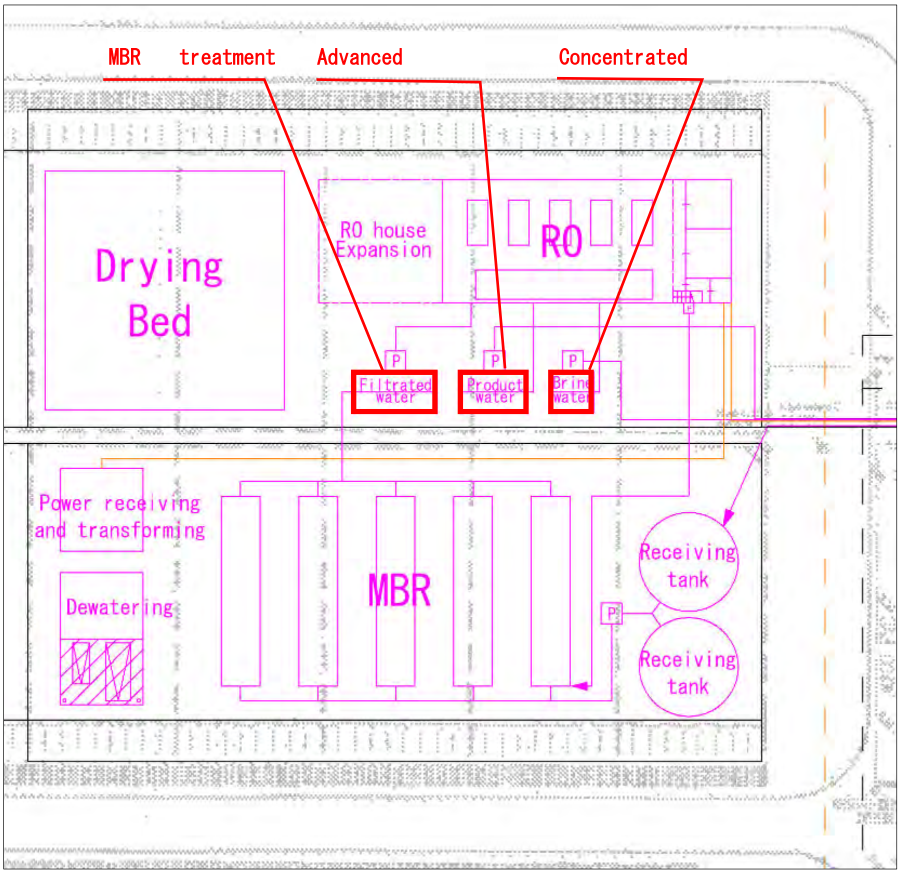
・ Sodium hypochlorite

2-2-2-7-7 Storage tanks (MBR treatment tanks, advanced treatment tanks, concentrated wastewater tanks)

The produced water and wastewater generated at each stage in the A-WWTP are temporarily stored in a water tank between the following processes in order to deal with problems at each successive stage of the treatment process and to avoid wider impacts.

① Between MBR sewage treatment facility and RO membrane treatment facility
② Between RO treatment facility and concentrated wastewater pipe
③ Between RO treatment facility and advanced treated water delivery pipeline

Next, the proposed locations of the various storage tanks are shown.



Source: Survey Team

Figure 2-34 Proposed locations of various storage tanks

(1) Equipment specifications

The pumps attached to the various tanks were designed to have a capacity of 1.2 times the inflow water volume in order to limit the number of departures and arrivals to 20,000 times/5 years (11 times/day/unit), and to be able to repeatedly pump water for 2 hours and stand-by for 0.5 hours. The capacities of the various tanks were set to be large enough to store the effective volume of water.

The equipment specifications for the various storage tanks are shown below.

Table 2-25 Equipment specifications for various types of storage tanks

Item	Specification
MBR treatment tank (MBR to RO)	Pump capacity: Q (m^3/min) = 10,000 m3/day x 1.2 = 4.2 m^3/min x 3 units (one of which is a spare) Required effective capacity: V (m^3) = 10,000 m^3/day x (1.2 - 1.0) x$\frac{2}{24}$ =V(m3) = 167 m3 Shape: 10m x 3m x 4m (height) x 2 ponds = 240 m3 (>167 m^3)
Advanced treatment tank (RO → advanced treated water → GCT)	Pump capacity: Q (m^3/min) = 6,000 m3/day x 1.2 = 2.5 m^3/min x 3 pumps (1 of which is a spare) Required effective capacity: V(m^3) = 6,000 m^3/day x (1.2-1.0) x$\frac{2}{24}$ =V(m^3) = 100 m^3 Shape: 8m x 2.5m x 4m (height) x 2 ponds = 160 m^3 (>100 m^3)
Concentrated wastewater tank (RO → Drainage →Gabes Bay)	Pump capacity: Q (m3/min) = 4,000 m^3/day x 1.2 = 1.7 m^3/min x 3 pumps (1 of which is a spare) Required effective capacity: V(m3) = 4,000 m^3/day x (1.2-1.0) x$\frac{2}{24}$ =V(m3)=67m^3 Shape: 6m x 2.5m x 3.5m (height) x 2 ponds = 105 m3 (>67 m3)

(2) Outline of construction

The construction of the storage tanks is summarized below.

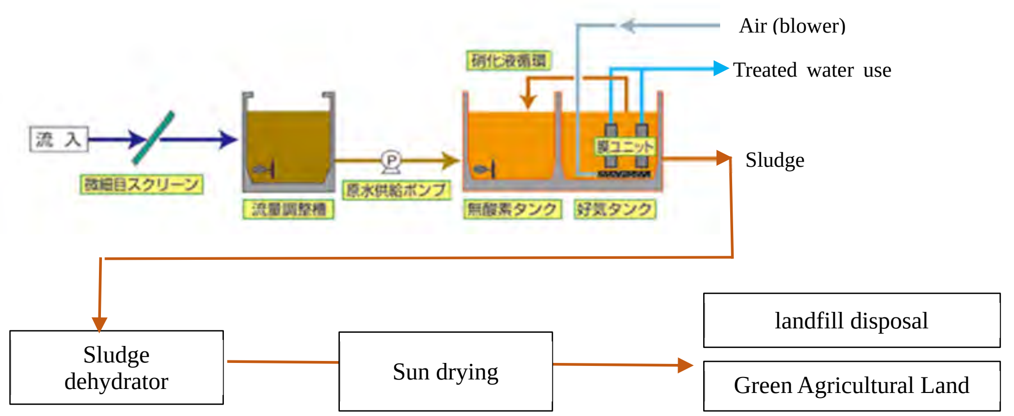
Table 2-26 Summary of construction of storage tanks

Item	Outline of Construction
Public works	・ Foundation construction (solid foundation) ・ Construction of the frame
Machinery works	Installation of pump facilities
Electrical engineering	Power distribution works

2-2-2-7-8 Sludge treatment facilities (dewatering)

The flow of sludge treatment is shown in the figure below.

Sewage and sludge treatment flow



Source: Survey Team

Figure 2-35 Sludge treatment flow and dewatering

Sludge at the existing facility shall be treated by means of sun-drying after mechanical dewatering. However, the sludge dewatering machine has not been operated due to a lack of operational control. Therefore, if the sludge generated from the A-WWTP is to be treated in the sludge drying bed without dewatering, it must be treated in the sludge drying bed together with excess sludge from the existing facility that is not dewatered, and the area of the said drying bed is insufficient.

If all the sludge generated from the Gabes sewage treatment plant were treated in a sun-drying bed without being dewatered, the area required would be about 53,900 m^2, and the available land for the sludge drying bed (about 9,000 m^2 after installation of the A-WWTP) would be insufficient.

Calculation of sludge drying floor area required if a dewatering device is not installed:

- Excess sludge generated at existing facilities

  22,100 m^3/day (inflow water volume) x (420-150) mg/L (SS concentration in existing facilities - planned SS concentration in raw water) x 0.75 = 4,480 kg/day

  Assuming a moisture content of 98.5%, 4,480 kg/day x$\frac{100}{100-98.5}$ = 299 m^3/day ≒ 109,100 m^3/y

- ・ Excess sludge generated from the A-WWTP 10,000 m^3/day (water intake) x 150 mg/L (average SS concentration in discharge from existing facilities) x 0.70 = 1,050 kg/day

  Assuming a moisture content of 98.5%, 1,050 kg/day x$\frac{100}{100-98.5}$ = 70 m^3/day ≒ 25,600 m3/year

- ・ Required drying floor area

  Assuming an annual moisture evaporation of 2.5 m/year, the required area is calculated as follows:

  Amount of sludge generated ÷ Annual water evaporation = (109,100 + 25,600) m^3 ÷ 2.5 m = 53,900 m^2 (> 9,000 m^2)

(1) Equipment specifications

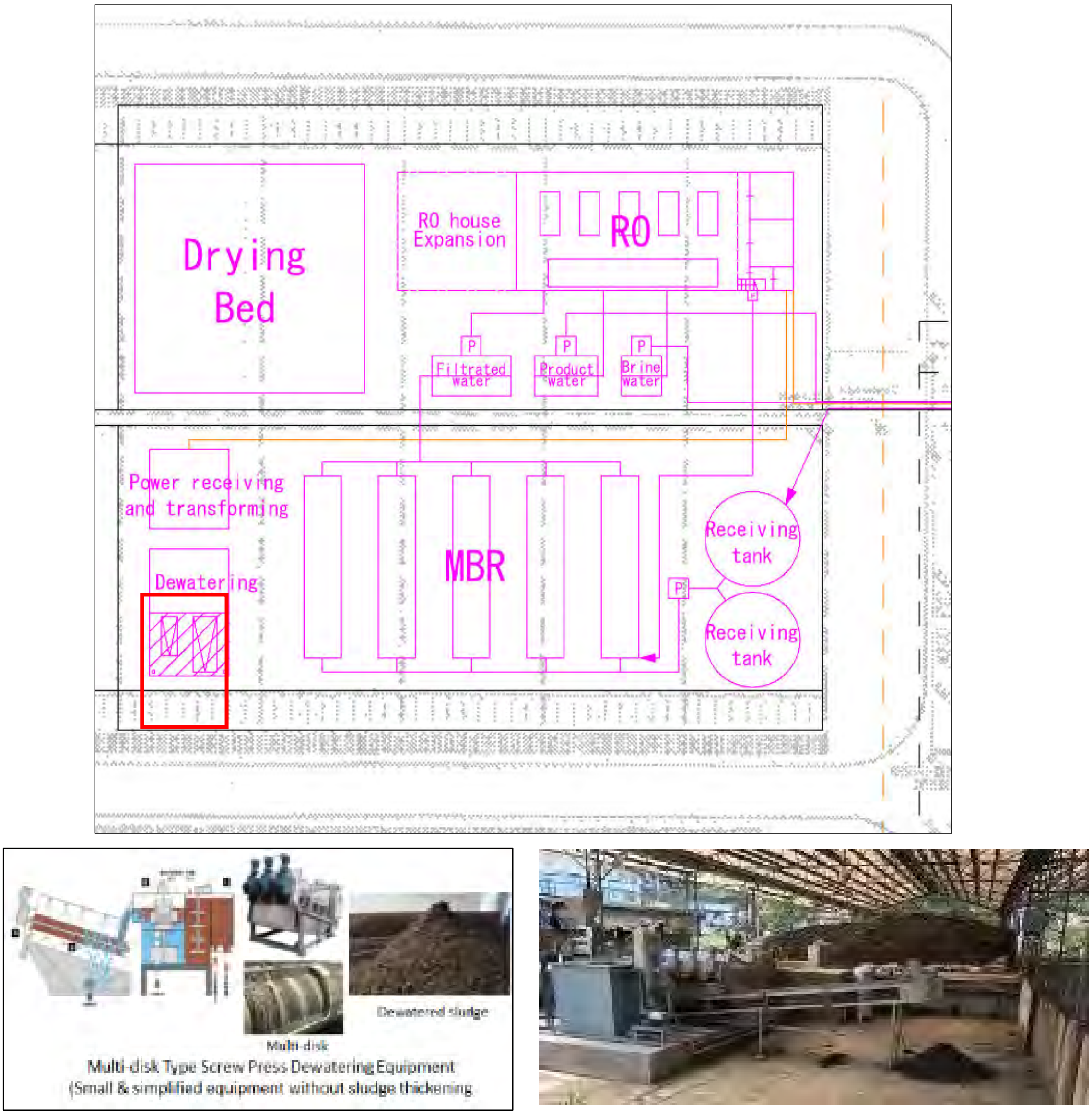
For the sludge dewatering device, a multi-disk screw press dewatering device is used because the sludge discharged from the MBR is stable and can be dewatered directly.

- ・ Water withdrawal x SS concentration x sludge conversion ratio (based on "Sewerage Design Guidelines", 0.70)

  = 10,000 m^3/day x 150 mg/L x 0.70 = 1,050 kg/day ≈ 43.75 kgDS/h
- ・ Multi-disk screw press dewatering device

  20kgDS/h/unit x 3 units
- ・ Prefabricated lightweight steel-frame building

The sludge sprinkler system location and images are shown below.



Source: Survey Team

Figure 2-36 Location and image of sludge dewatering facility

(2) Outline of construction

The construction of the sludge dewatering facility is summarized below.

Table 2-27 Summary of the Construction of the Sludge Dewatering Facilities

Item	Outline of construction
Public works	Concrete slab construction
Construction work	Prefabricated lightweight steel-frame building construction
Machinery works	Machine installation
Electrical engineering	Power distribution works

(3) Chemical agents used

① Coagulant

- Poly ferric sulfate, amphoteric polymer flocculant

2-2-2-7-9 Sludge treatment facilities (drying bed)

(1) Equipment specifications

The sludge drying bed was made of concrete slabs for ease of maintenance and management to allow the entry of sludge trucks and tractors. The results of calculating the required facility area are shown below.

・Required drying floor area:

Excess sludge amount 10,000 m3/day (water intake) x 150 mg/L (design water quality) x 0.70 = 1,050 kg/day

Assuming a moisture content of 83.0%, 1,050 kg/day $\times \frac{100}{100-83.0} = 6.2\ m^3/day \fallingdotseq 2{,}200\ m^3/year$

Assuming an annual moisture evaporation of 2.5 m/year, the required area is calculated as follows:

Amount of sludge generated ÷ Annual water evaporation = 2,200 m3 ÷ 2.5 m = **880 m2 (≒ 29 m × 29 m)**

・Dried sludge transporter

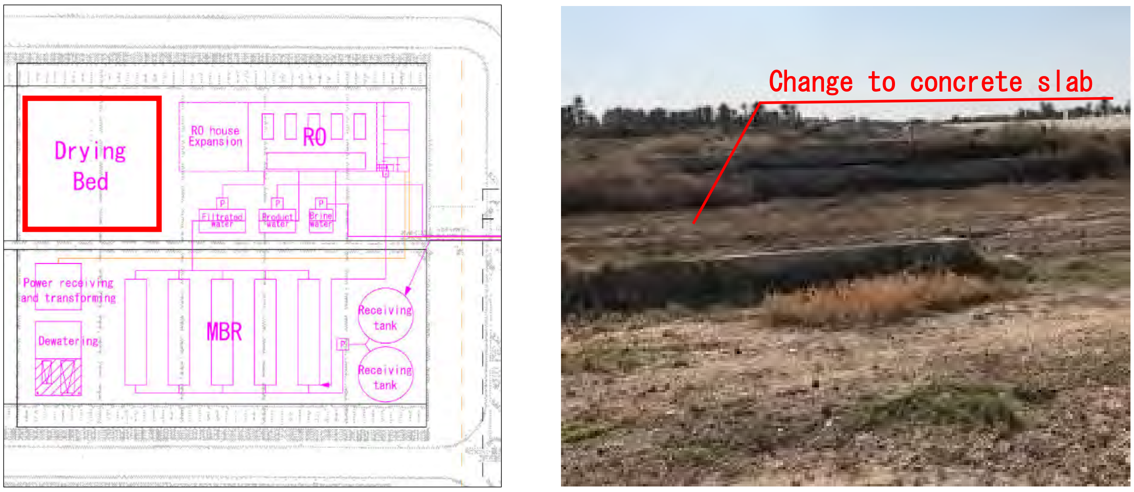
・Tractor for dried sludge

(2) Outline of construction

① Civil engineering

- Concrete slab and frame construction

The location (proposed) and current status (to be changes) of the sludge drying bed are shown below.

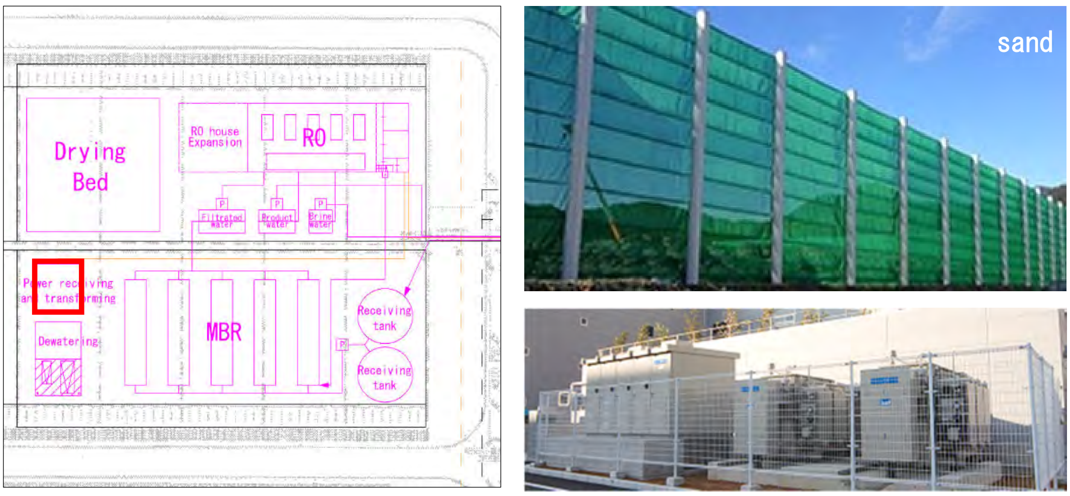


Source: Survey Team

Figure 2-37 Proposed location of sludge drying beds and current status (to be changed)

2-2-2-7-10 Power receiving and transforming facilities

The existing power receiving and transforming facilities shall be used for the existing sewage treatment plant, and new power receiving and transforming facilities shall be provided for the A-WWTP. The project team was informed by the electricity supplier, STEG (Société Tunisienne de l'Electricité du Gaz), that it would be possible to install a new power receiving and transforming facility on the ONAS site. In addition, it was determined that it would be necessary to surround the site with sand nets or other protective measures due to dryness of the site and the generation of dust during strong winds,.



Source: Survey Team

Figure 2-38 Proposed location of power receiving and transforming facilities and image

(1) Equipment specifications

The equipment specifications for power receiving and transforming facilities are shown below.

Table 2-28 Equipment specifications for power receiving and transforming facilities

Item	Specification
Number of units	2 units (1 of which is a spare)
Transformer substation	500kVA x 2 units
Frequency	50Hz
Electrical mode	Three-phase alternating current
Voltage	400V

(2) Outline of construction

The construction of the receiving and transforming facilities is summarized below.

① Foundation work

② Electrical work

- Installation of electrical equipment
- Power distribution construction

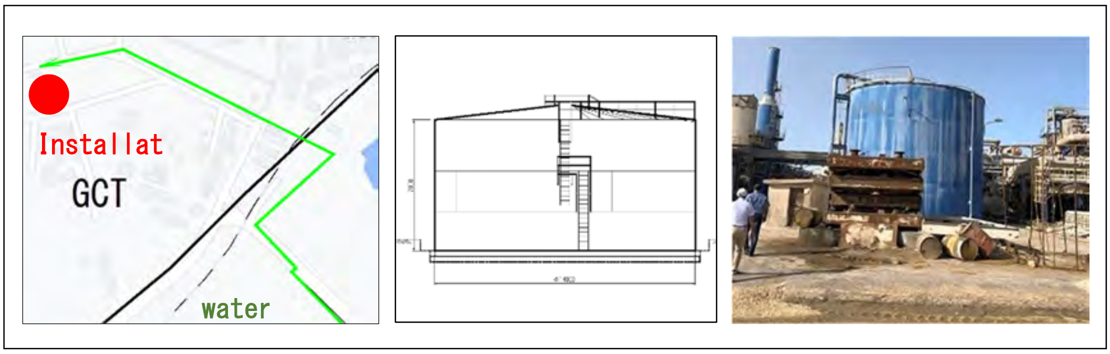
2-2-2-7-11 Advanced treated water receiving tank

The advanced treated water receiving tank is to be installed by GCT. With reference to the treatment tank in the GCT plant, the tank is supposed to store 4 hours of advanced treated water.

Required raw water storage volume (4 hours) = 6,000 m^3/day x$\frac{4h}{24h}$ =Required raw water storage volume (4 hours) = 6,000 m^3/day × 1,000 m^3

Facility outline: φ14.0m x 7.0m high x 1 unit (effective capacity: 1000m3 x 1 unit)

Next, a schematic of the advanced treated water receiving tank and a photograph of the actual water storage tank installed in the GCT plant are shown.



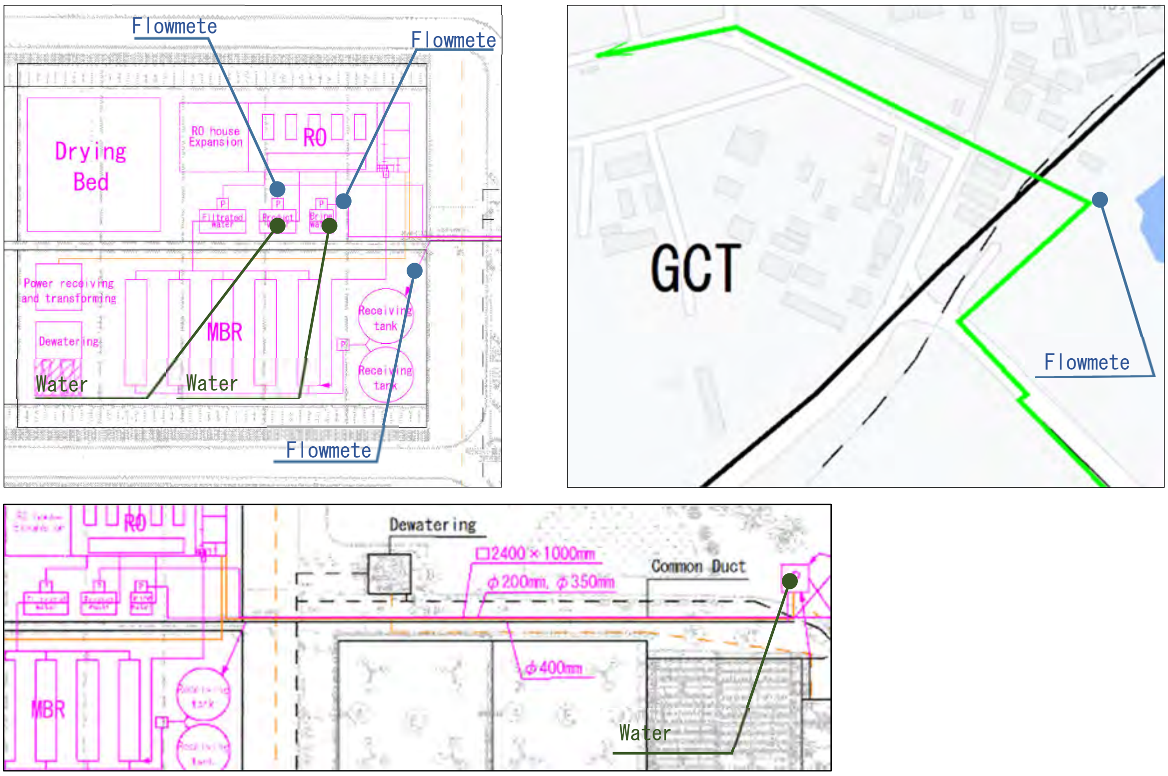
Source: Survey Team

Figure 2-39 Location and image of advanced treated water receiving tank

2-2-2-8 Instrumentation planning

The treated water from the existing sewage treatment plant is conventionally used for agricultural purposes, so the A-WWTP cannot have an excessive amount of water intake. In addition, since it is necessary to deliver 6,000 m^3/day of advanced treated water to GCT, a flow meter will be installed to measure the amount of raw water intake, the amount of advanced treated water delivered, and the amount of concentrated wastewater.

The water quality of raw water, advanced treated water, and concentrated wastewater will be measured to confirm that the A-WWTP's operational adjustments and water quality standards are being followed. The flow meter installation locations and water quality measurement sampling locations are shown below.



		Subject of investigation	Location
Planned amount	1	Measure raw water intake.	Inlet pipe of raw water receiving tank
	2[※1]	Measure the amount of advanced treated water delivered from the A-WWTP.	Advanced treated water supply pipe
	3	Measure the amount of concentrated wastewater.	Concentrated drainage pipe
	4[※1]	Measure the volume of advanced treated water received at GCT.	GCT site boundary
Water quality measurement	1[※2]	Check raw water quality.	Intake pump
	2[※2]	Check the quality of advanced treated water.	Advanced treatment tank
	3[※2]	Check the concentrated wastewater quality.	Concentrated wastewater tank

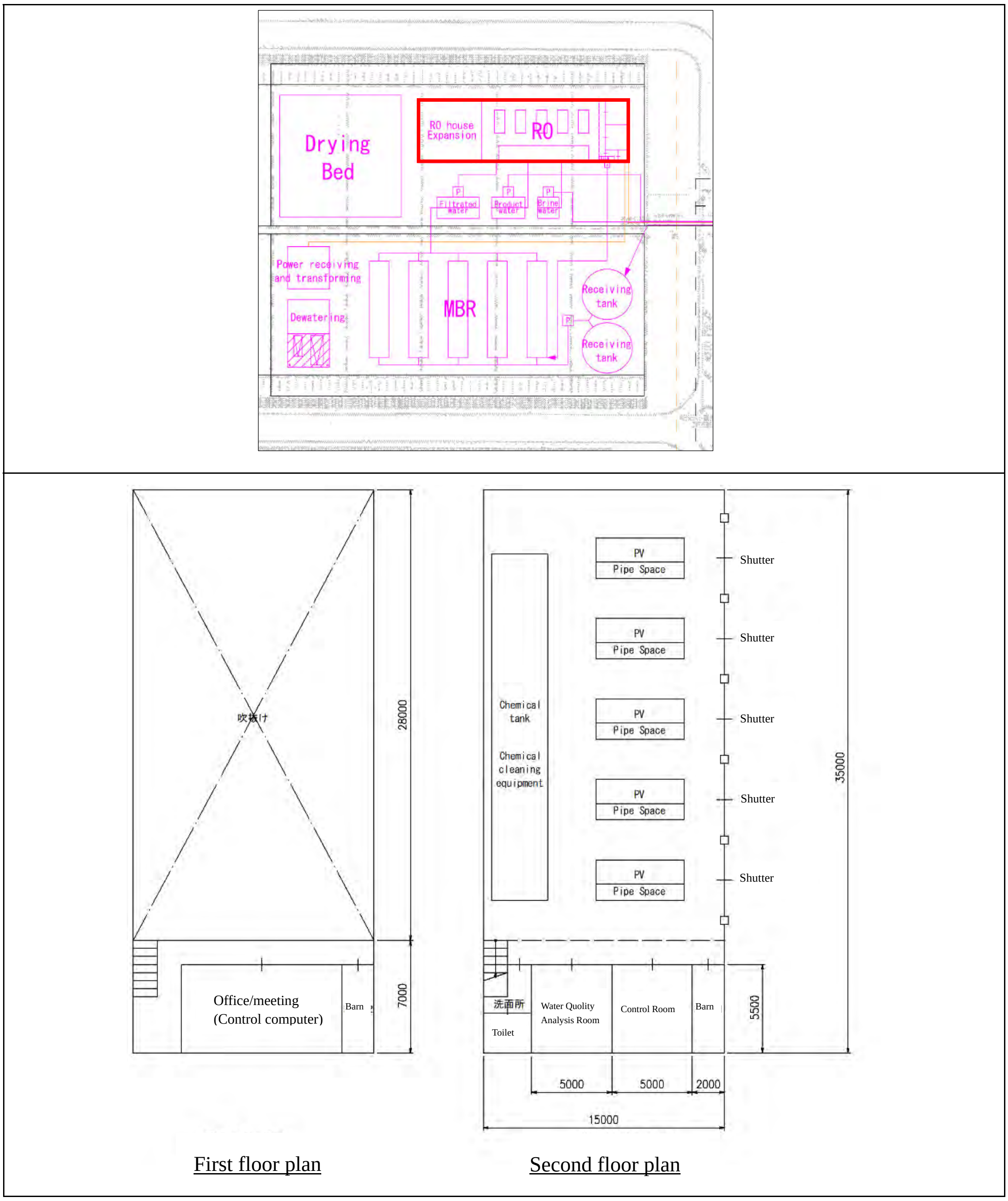
*1 The amount of advanced treated water delivered from the A-WWTP is compared with the amount received at the GCT to confirm there is no leakage.
*2 Check the water quality to adjust the operation method.

Source: Survey Team

Figure 2-40 Flow measurement locations and water quality measurement locations

2-2-2-9 Operation monitoring plan

To ensure efficient operation monitoring, an area in the RO building was designated as the operation control location. In terms of facility operation, individual facilities such as pipeline facilities, pump facilities, MBR sewage treatment facilities, and RO membrane treatment facilities can be monitored in the same way as before, but the operation of intake pumps must be linked to the storage volume of the raw water storage tank, and the intake pumps must be operated automatically according to the storage tank water level.



Source: Survey Team

Figure 2-41 Location and room assignment of the operation monitoring facility

2-2-3 Outline Design Drawing of Comparator Facility

The schematic design drawings of the comparator facility planned for this Project are summarized in the attached document. A list of the schematic design drawings is shown in the table below.

Table 2-29 List of Schematic Design Drawings

No.	Drawing
1	Layout of Gabes sewage treatment plant
2	Schematic diagram of layout of Gabes sewage treatment plant
3	A-WWTP water level diagram
4	Intake pump facility diagram
5	Raw water receiving tank facility diagram
6	Structural diagram of MBR sewage treatment plant
7	MBR treated water tank facility diagram
8	RO facility plan
9	RO facility diagram
10	Concentrated wastewater storage tank facility diagram
11	Advanced treated water storage tank facility diagram
12	Sludge dehydrator building facility diagram
13	Water pipe plan (1)
14	Water pipe plan (2)

2-2-4 Implementation Plan

2-2-4-1 Implementation policy

Since this Project will be implemented as a Grant Aid Project with Exploitation Rights, the main contractor will be a Japanese company. The main contractor will install the A-WWTP at the designated site within the specified period under the supervision of the Japanese consultant and in accordance with the EPC contract. In planning project implementation, it will be necessary to set up an appropriate project implementation structure and construction period, taking the general system for Grant Aid into full consideration. The following figure shows the project implementation structure (at the time of construction and procurement) for this Project.

In formulating the construction plan, the policy is to use locally available materials and equipment as much as possible on the premise that the prescribed quality will be ensured while taking cost reduction into consideration. On the other hand, while it is desirable to have a Japanese supervising engineer for the required quality, processes, and safety management, local human resources will be used to the extent possible in order to reduce costs, stimulate the local economy, create employment opportunities, and promote technology transfer. In addition, a construction plan should be developed that adopts appropriate and reasonable construction methods to ensure that the work can be carried out safely and economically within a reasonable construction period taking into account climatic conditions and the capabilities of local contractors. The main personnel and their tasks are described in "2-4-4 Construction supervision plan/procurement supervision plan".

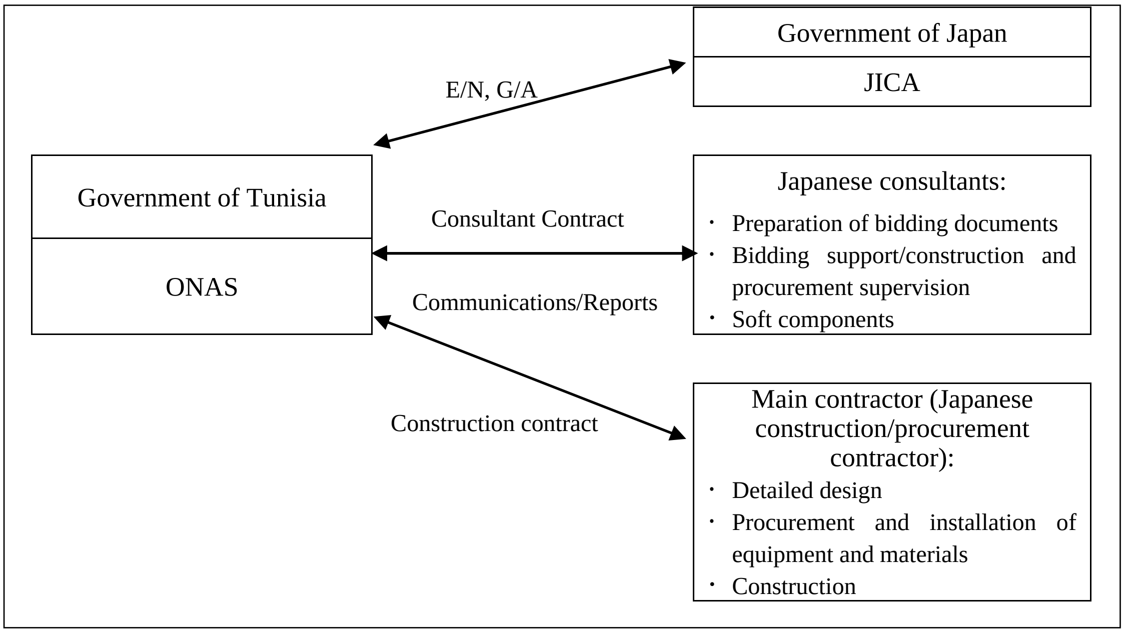


Figure 2-42 Project Implementation Structure Chart (during construction and procurement)

The implementing agency for this Project is ONAS. The Japanese consultant to be appointed for this Project will be recommended to Tunisia by JICA as the consulting firm for the final design and supervision of procurement and construction after the Exchange of Notes (E/N) is signed by the two governments and the Grant Agreement (G/A) is signed by the Tunisian government and JICA. The consultant will then contract the implementing agency, prepare bidding documents for the selection of the Japanese contractor, support the bidding process, and, based on the results of the bidding process, an EPC contract will be concluded and construction procurement supervision will be carried out.

2-2-4-2 Construction/procurement considerations

(1) Tax exemption procedures

When importing Japanese or third-country products, it is important for businesses to fully understand the laws pertaining to tax-free treatment and to follow the procedures promptly so that the Tunisian side can grant tax-free treatment without delay.

(2) Access roads

There is no impediment to the passage of large heavy machinery and vehicles along the main highway from Tunis to Gabes and to the ONAS Gabes sewage treatment plant, which is the project site, as the highway is paved with asphalt. However, the roads near the ONAS Gabes sewage treatment plant are narrow and are also served by a railroad. There is no large utility space between the city of Gabes and the ONAS Gabes sewage treatment plant, so construction and procurement plans must be prepared with this in mind.

(3) Application for permits and approvals

① Building permit

Buildings require a building permit from the Building Commission. A qualified and registered architectural engineer must be hired, an application for a building permit must be filed with the local city (Ghannouch) building department, and a final inspection and approval ("permis de récolement") must be obtained upon completion of construction.

② Permission to use land

No prior approval is required for any construction on the ONAS site or GCT site for this Project. The permitted conditions for use of the land for an advanced treatment facility and water transmission pipelines (including water meters) will be confirmed with the landowner.

③ Permission to occupy roads, etc.

Water pipes from the external ONAS to GCT will be buried under public roads (city roads) in this Project, so ONAS will submit a detailed design plan prepared by the operator to the City of Gabes for approval before implementing construction. Upon receiving the application for the detailed design plan, a committee of construction-related parties will be convened by the City of Gabes , including the owners and existing users of the property through which the water pipe will pass, that will give its approval after confirming that there are no obstacles to the contents of the detailed design plan. The main participants in this Project are as follows.

i) ONAS
ii) STEG: Tunisian Company for Electricity and Gas
iii) SONEDE: National Water Distribution company
iv) TELECOM: The national company for telecommunication
v) SCNFT: Railway company
vi) CRDA: Regional office for agricultural development, etc.

(4) Safety management

The basic safety measures are as follows.

① For transportation, a delivery plan should be drawn up in advance to avoid unreasonable loading, etc. In addition, since the environment is not conducive to safe nighttime driving due to inadequate street lighting, etc., it should be noted that, in principle, nighttime transportation should not be undertaken.

② When laying buried pipes, for the safety of third parties and to prevent theft of materials, a work plan will be formed for a work cycle that goes from open cut to the completion of backfilling. Traffic guides should be deployed when the pipe crosses a national highway, in particular, and consideration should be given to completing the work in the shortest possible time.

2-2-4-3 Scope of Works

The scope of the Works and the corresponding responsibilities of the Tunisia and Japan are shown in the table below.

Table 2-30 Sharing of responsibilities between the Japanese and Tunisian sides in terms of construction and equipment procurement/installation

Item	Tunisia	Japan
Supervision of construction and installation of facilities, supervision of equipment/material procurement		○
Procurement of advanced sewage treatment equipment		○
Transportation and insurance of equipment from the procurement site to the project site		○
Securing the necessary land for construction	○	
Procurement of materials and equipment for water supply facilities		○
Construction work related to water supply facilities		○
Primary power provision to the project site	○	
Assembly and installation of equipment		○
Dispatch of technicians for equipment inspection, initial operation instruction, etc.		○
Soft components		○
Ensure expedited customs procedures (including tax-free procedures)	○	
Tax exemption	○	
Dispatch of client supervisor during construction	○	

2-2-4-4 Consultant Supervision

(1) Consultant services

A consultant from a Japanese firm will be in charge of implementation design and procurement/construction supervision in the Project. Since this is a Grant Aid Project with Exploitation Rights and the Project is a DBO, the consultant will not conduct a detailed design study. During the field design period, the consultant will make a final confirmation of the plan, review equipment specifications (in Japan), prepare bidding documents based on the reference materials for bidding documents (in Japan), and carry out bidding-related work (in the field and in Japan). In addition, the soft component work will be supervised to ensure the proper operation and maintenance of the advanced wastewater treatment facilities to be developed under the Project. The details of the work are shown in the table below.

Table 2-31 Description of the Work of the Japanese Consultant in the Project

Stage		Duties
1	Pre-construction and pre-procurement phase	Final confirmation of plan Equipment specification review Preparation of bidding documents Bidding services representative Evaluation of bidding results Contracting assistant
2	Construction and procurement phase	Equipment procurement Supervision Construction supervision, materials and equipment procurement management Supervision of soft component activities Inspection and operational guidance Reporting, etc.

(2) Consultant personnel and main tasks

The table below shows the consultant personnel and the main tasks required in order to fulfil the tasks of the consultant described in the previous section. The description is divided into the implementation design phase and the construction procurement and supervision phase.

1) Consultant personnel and main tasks relating to implementation design

As mentioned above, since this Project is a DBO, a detailed design study will not be conducted by the consultant. During the detailed design period, the consultant will travel (to the site) to finalize the plan and consultancy contract, review equipment specifications (in Japan), prepare bidding documents (in Japan) based on the reference materials for bidding document preparation, and conduct bidding related-work (on site and in Japan).

Table 2-32 Consultant Personnel and Major Tasks Related to Execution Design (for Civil Engineering and Equipment)

Personnel		Grade	Tasks
1	Head of operations	2	As the general manager of this Project, the head of operations will lead and supervise the discussions with the executing agency, and conduct a detailed design survey (final confirmation survey) at the target site, design review, bidding document preparation, on-site document review, and bidding supervision. This person will also oversee the domestic analysis, preparation of design documents (drawings and specifications), and quantity calculation work, and will conduct a thorough review of the documents and calculations.
2	Legal and procurement planning	3	Mainly engaged in legal aspects of the EPC contract and the operation and maintenance contract, including reconfirmation

Personnel		Grade	Tasks
			of the reference materials used in the preparation of the bid documents at the time of the feasibility study, and making necessary revisions in accordance with the current status during the implementation design.
3	Mechanical and electrical design	3	Reviews the reference documents used for the preparation of the bidding documents at the time of the feasibility study, and makes necessary revisions to the documents in accordance with the current status at the time of the implementation design.
4	Civil engineer	3	Reviews the reference documents for the preparation of the bidding documents at the time of the feasibility study and makes necessary modifications to the current status at the time of the implementation design for the civil engineering and building construction portions of the EPC contract.
5	Operation and maintenance plan	3	Reviews the reference materials used to prepare the bidding documents at the time of the preparatory survey for the operation and maintenance contract, and makes any necessary revisions in accordance with the current status at the time of the implementation design.
6	Cost estimation/procurement planning	3	Conducts a survey to confirm the distribution status and prices of local materials and equipment, performs detailed design and cost estimation work, checks the equipment procurement plan, and prepares bidding documents.

2) Consultant personnel and main tasks related to procurement supervision (equipment procurement)

The consultant shall supervise the equipment and materials procurement by the proponent to ensure that quality and process control are properly carried out, and to confirm that the proper adjustment of equipment delivered to the site. The main tasks related to procurement supervision are as follows.

- Discussions with business operators
- Attendance at factory and pre-shipment inspections and supervise pre-shipment inspections
- Consultations and meetings with implementing agencies and related organizations
- On-site confirmation of items borne by the counterparty
- Confirmation of equipment procurement status
- Confirmation and follow-up of work progress related to customs clearance of equipment
- Attendance at equipment inspections and certificate issuance
- Submission of reports, etc.

As for staffing, personnel with expertise in machinery and equipment will be assigned as

procurement supervisory engineers for the required period. In addition, a commissioning engineer will be dispatched during the commissioning period.
The duties of each engineer and the period of assignment shall be as follows.

Table 2-33 Consultant Personnel for Procurement Supervision

Procurement supervisory personnel	Grade	Duties
Inspection technician	3	Inspection and verification of equipment drawings and related materials, factory pre-shipment inspections, and attendance at pre-shipment equipment verification inspections.
Head of operations	2	Support for installation start-up, consultation with implementing agencies, quality control meetings, acceptance inspection, and attendance at handover.
Procurement supervisory engineer	3	Supervision of installation, acceptance inspection, and delivery. Supervision of customs clearance procedures, etc.
Mechanical and electrical engineer	3	Interim inspection for interim payment
Commissioning engineer	3	Supervision of commissioning

3) Consultant personnel and main tasks related to construction supervision (civil engineering and construction)

The civil engineering and construction work for this Project will include the construction of water intake facilities, installation of water pipes, site preparation, and construction of the foundations of each facility in parallel. The resident construction supervisor will need to participate in various meetings and supervise these works, and, due to the shortage of personnel, a local civil engineer will be hired to supplement the work of the construction supervisor. The assistant construction supervisor will be in charge of site supervision in the absence of the Japanese personnel.

In addition,, a clerk, office worker, and driver will be hired for the required period of time.
The project manager will also support the construction supervisor at the start and completion of construction.

Table 2-34 Consultant Personnel for Civil Engineering and Construction Supervision

Personnel		Grade	Duties
1	Head of operations (start-up support)	2	・Dispatched to support the start of construction by handling various preparations for the start of construction, and the start of construction ceremony, etc.
2	Head of operations (quality control council)	2	・Organizes the quality control council and performs secretariat functions for the council. The head of operations will participate from Japan.
3	Construction supervisor	3	・Stationed on-site to provide general supervision of civil engineering construction and procurement of advanced sewage treatment facilities. ・Makes periodic reports to the implementing agency, hosts regular meetings with the operator, and supervises all aspects of quality, process, and safety management during the construction period, as well as providing periodic communications to Japan.
4	Construction supervisor (defect inspection)	3	・Based on the results of the completion inspection, visits the site one year after delivery and inspects the property for defects. ・Reports to the implementing agency and other relevant agencies.

2-2-4-5 Quality Control Plan

The quality control methods for each construction project are described below.

(1) Quality control and verification of materials and equipment, and tax exemption
The quality control of materials and equipment shall be carried out in the following sequence.

- The procurement manager of the prime contractor (the Japanese operator) shall place the order after confirming the quality of the materials and equipment.
- Immediately after placing an order, the necessary documents for tax exemption procedures shall be submitted to the implementing agency and a request for tax exemption shall be made.
- Upon arrival of the materials and equipment at the site, the on-site engineer of the main contractor will again conduct an inspection.
- The main contractor (the Japanese contractor) shall submit the necessary documents to the consultant, such as factory quality test data and strength tests for quality control of materials and equipment.
- The resident construction supervisor of the consultant will check the quality of these products prior to construction, placement, and installation, and determine whether they can be used.

(2) Concrete management

The design strength of concrete structures such as water distribution tanks, receiving tanks, and machine rooms, as well as the main locations and structures used, are shown in the table below.

Table 2-35 Concrete Design Strengths and Locations Used

Design strength	Main application areas
18 N/mm^2	Levelled concrete, unreinforced/small structures
21 N/mm^2	Reinforced concrete structure
24 N/mm^2	Watertight structure (intake pumping station)

Concrete placement will be performed by pump trucks from several ready-mixed concrete plants located near the target site. Since the soil in the construction area has a high sulfate concentration and the corrosion of the concrete foundations is a concern, as a general rule, HRS concrete made from sulfate-resistant cement will be used.

To check the concrete strength, six test pieces shall be taken from the field after each concrete placement, and three test pieces shall be tested for compressive strength for one week (7 days) and four weeks (28 days). The tests shall be performed by applying pressure with a testing machine to check the prescribed strength is reached based on the average value of the three pieces, and a record of the tests shall be kept.

Prior to concrete placement, the necessary scaffolding and formwork shall be set up by hand. After the formwork is set up, concrete is placed by pump truck and compacted by vibrator.

Slump tests shall be conducted for each specified placement amount and location to control the strength of the concrete. It shall be confirmed that chloride content in the concrete is below the standard specified amount.

・ Measures for hot-weather concrete

Since the average daytime temperature between June and September in Gabes City exceeds 25°C (77°F) on some days, it is standard practice to use hot-weather concrete for construction. Appropriate measures shall be taken at each stage of placing and curing to prevent deterioration of concrete quality due to high temperatures.

(3) Piping installation quality

Hydraulic tests shall be conducted to confirm that there are no harmful defects in the water tightness and durability of the installed pipe materials.

(4) Rebar quality

For the quality of the rebar material, the quality assurance certificate (mill sheet) for each rebar diameter is checked, or rebar tensile tests are conducted to confirm that the yield strength of the rebar conforms to the description in the design documents. In the rebar placement inspection, it shall be confirmed that the processed and assembled rebar has the shape, dimensions, and surface conditions specified in the approved drawings, and that it is placed in the specified position.

(5) Quality of water distribution reservoirs

To check the water tightness of the steel tank, a water-tightness test is conducted to check for a drop-in water level after 24 hours of water tension.

2-2-4-6 Procurement Plan

Since this plan is a DBO scheme, the policy for the procurement of materials is left to the Japanese operator. However, the following assumptions are made for determining the estimated price in this preparatory study.

The main construction materials and equipment for the Project include ready-mixed concrete, aggregates, steel materials, piping materials (HDPE pipes, valves, etc.), onshore and submersible pumping equipment, pump control equipment, onshore steel tanks, and lightweight steel prefabricated construction buildings.

The basic plan involves the local procurement of these construction materials and equipment taking into consideration the procurement cost, time required for procurement, and future O&M. However, if there are quality and distribution problems, the materials will be procured from a third country or from Japan.

Almost all construction materials shall be locally procured materials since they can be procured domestically. It has been assumed that pump equipment and pump control devices will be procured in Japan because this is what is expected in actual procurement due to the ease of procurement and standard practices by Japanese suppliers. The table below lists the equipment procurement categories.

Table 2-36 Procurement Classification

Supplies	Sourcing			Remarks
	Local	Third country	Japan	
Concrete, coarse and fine aggregates, etc.	○			
Rebar materials, steel materials, etc.	○	○		Distribution of both local and imported products
Resin pipe (HDPE)	○	○		Only 350mm caliber to be procured from third countries
Electric cables	○			
Distribution boards	○			
Onshore pumps	○	○		Third-country products by local distributors
Water quality analysis equipment		○	○	By local agency
Construction machinery	○			
Plant equipment			○	Japanese procurement

*Third-country procurement assumed to be Libya, Italy, France, etc.

2-2-4-7 Initial Operational Guidance and Operational Guidance, etc. Plan

Since this is a Grant Aid Project with Exploitation Rights and will be operated by an SPC that will be established by the main construction entity, no consideration will be given to initial operation guidance or the operation guidance period.

2-2-4-8 Soft Component Plan

Since this Project will utilize the Grant Aid for Operation and Maintenance Rights, operation and Maintenance (hereinafter referred to as “O&M") of A-WWTP to be constructed will be undertaken by the Japanese firm who bid for the Project. In order for the Japanese firm to conduct efficient O&M, it is necessary for ONAS to properly perform its responsibilities stipulated in the contract and to ensure the realization of the business model to be developed under this Project. In addition, the Project will be implemented under the Three Party Contract (O&M Contract and Water Purchase Contract) that sets forth the respective tasks, responsibilities, and risks of ONAS, Japanese firm and the off-taker that will be directly engaged in the purchase and sale of advanced treated waste water with the A-WWTP's O&M services. Within this framework, ONAS's main tasks are to supervise the O&M services provided by Japanese firm and to ensure that the procedures for the sale of treated waste water to off-takers are carried out to ensure adequate quality and quantity at all times.

However, ONAS does not have the knowledge of O&M of membrane treatment facilities that are expected to be applied to advanced wastewater treatment facilities, nor does it have the experience in supervising waste water treatment facilities and operating businesses that sell treated waste water as reclaimed water, so its capacity to ensure sustainable effectiveness needs to be strengthened. Therefore, the capacity to sustainably implement the project will need to be strengthened.

In addition, the qualitative effect of this Project is to improve and disseminate the technology for reclamation of treated waste water, and it is expected to contribute to the promotion of reclamation of treated waste water and thus to solving the country's water resource problems by laying the foundation for ONAS to develop similar projects in other regions in the future. The Project is also expected to contribute to solving the country's water resource problems.

Under these circumstances, the requirements necessary for ONAS to operate the Three Party Contract (O&M Contract and Water Purchase Contract), compared the current capabilities, and identified areas that need to be strengthened, were sorted out.

Table 2-37 Requirements necessary for ONAS to operate water sales contracts and comparison against the current capabilities

Requirements to be fulfilled	Current Capabilities	Matters to be strengthened
The ability to perform the following various procedures for O&M services and sales of advanced treated waste water under the Three Party Contract (O&M Contract and Water Purchase Contract), appropriately and without delay. ・ Routine procedures and coordination with Japanese firm and off-takers (e.g. monthly and daily confirmation of basic water supply) ・ Review of annual/monthly operating plans prepared by O&M contractors ・ Review of income and expense reports prepared annually by O&M contractors	Although ONAS has extensive knowledge of the operation of the waste water business itself, it has no experience with the outsourcing of O&M services and water sales that will be performed under the Project.	・ Ability to implement routine procedures and coordination in accordance with the provisions of the tripartite contract ・ Ability to properly review and finalize the documents submitted by each party (operating plan and basic water supply statement) in accordance with the provisions of the tripartite contract.
The following duties shall be performed for the waste water treatment plant and A-WWTP ・ Supply of treated water of specified quality and quantity	Although ONAS has extensive experience in operating waste water systems, it has problems with reliable collection of waste	・ Ability to properly operate the technical aspects of pumping stations and waste water treatment plants ・ Basic knowledge of A-

Requirements to be fulfilled	Current Capabilities	Matters to be strengthened
from waste water treatment plant to A-WWTP ・ Supervision of O&M services performed by contractors for the A-WWTP and brief off-takers on the status of A-WWTP operations as needed.	water and proper waste water treatment due to malfunctions at waste water pumping stations and waste water treatment plants. In addition, they have little knowledge on O&M of advanced treatment facilities.	WWTP O&M and the ability to discuss and coordinate with vendors and off-takers, including technical content.
Understanding of the operational and financial management of reclaimed water projects necessary to develop similar reclaimed water projects nationally (e.g., to ensure profitability for ONAS itself and its operators).	ONAS has knowledge of the profitability of waste water projects, but no knowledge of the profitability of recycled water projects.	Ability to properly analyze and understand ONAS's own profitability and the profitability of operators in order to implement efficient reclaimed water projects

Based on the above assessment of the current situations, it is planned that the Consultant will support ONAS in the management of the O&M Services and Water Purchase Agreement for A-WWTP for the first year of the Operation and Maintenance Phase. Specifically, the soft component will support the following tasks to be carried out by ONAS within the framework of the Three Party Contract (O&M Contract and Water Purchase Contract).

a. To coordinate with the off-taker on the commencement of water sales operations and take the necessary steps and instruct the O&M contractor to commence O&M services in time for the commencement date
b. To supply treated water of a specified quality and quantity to the A-WWTP from the waste water treatment plant (However, the operation and maintenance of the waste water treatment plant itself will be carried out by the concessionaire who enters into a concession agreement with ONAS.)
c. To review the annual operating plan prepared by the O&M contractor each year and present the finalized version to the new off-taker one month prior to the start of the new annual
d. To review the monthly operating plan prepared by the O&M contractor each month and present the finalized version to the off-taker by the 12th day of each month
e. To review the following month's base water supply request provided by the off-taker by the 15th of each month and confirm with the O&M contractor that the supply is available
f. To review the next day's water supply request provided by the off-taker by 12pm daily and confirm with the O&M contractor that the supply is available
g. To report promptly to the off-taker any problems affecting the water supply and take prompt action to restore it in accordance with the contract

Moreover, the soft component will support the work below to help ONAS form appropriately profitable reclaimed water projects that will be required for similar projects to be developed in other regions.

h. To review the income and expenditure reports prepared annually by the O&M contractor and analyze the profitability and revenue structure of the reclaimed water project. In addition, issues that need to be taken into account for the formation of a profitable reclaimed water project, will be identified.
i. To calculate ONAS's own revenues from this Project and consider more efficient ways to operate the project.

For the membrane treatment technologies (MBR + RO) to be applied to the Project, the Japanese firm will provide technology transfer for design-build and operation and maintenance as part of the EPC and O&M contracts from the viewpoint of efficiency, and no soft components for the transfer of such technologies are planned. The technology transfer during the O&M period to be provided to ONAS by the Japanese firm are the following two programs:

- A three-day program, including two days of operational experience, to provide technical transfer of the fundamentals of operating and managing A-WWTP within three months of the start of O&M services
- Comprehensive on-the-job training on the operation and maintenance of A-WWTP on an ongoing basis during the last month of the O&M service period

Furthermore, regarding the stable supply of treated water to A-WWTP, ONAS plans to improve the sewage collection system and waste water treatment plant through support by other donors and PPP projects, and this will not be the subject of the soft component to be undertaken under the Project.

(1) Objective s of Soft Component

The soft component target is to "strengthen ONAS's capacity to form and implement a recycled water marketing project using advanced treated waste water."

(2) Outputs of Soft Component

The direct effects (outcomes) expected to be realized by the soft component are as follows:

Output 1: Under appropriate contract supervision by ONAS, the operation and maintenance of the advanced waste water treatment facilities to be constructed under the Project and the sale of treated advanced waste water to off-takers will be properly performed in accordance with the contract documents.

Output 2: Through analysis of ONAS revenues with the operator and, ONAS will understand the financial management and profitability of the recycled water sales business and recognize the considerations necessary to form a profitable business.

(3) Activities of Sof Component

The soft component activities are listed below:

Table 2-38 Soft Component Activities

Stage	Objective	Activity
1 Preparation for and start-up of O&M services and water sales operations	To support the work to be undertaken by ONAS prior to the commencement of O&M services and water sales operations. Also, to support the work to be carried out by ONAS once O&M services and water sales operations have commenced.	a. To brief ONAS stakeholders on O&M services and ONAS tasks required before and after the commencement of water sales operations b. To support ONAS review of annual operating plans submitted by operators c. To support ONAS in the process of initiating O&M services and water sales operations d. To support ONAS review of the initial monthly operating plan submitted by the operator e. To ensure that daily liaison and coordination activities related to determination of water supply in O&M services and water sales operations are properly carried out and provide support as necessary.
2 Performance of O&M services and water sales operations	To ensure that the work to be performed by ONAS continues to be performed properly and support corrective actions as needed. In addition, to assist ONAS in analyzing the revenues and expenditures associated with the Project.	a. To support ONAS review of monthly operating plans submitted by operator b. To Ensure that daily liaison and coordination activities related to determination of water supply in O&M services and water sales operations are properly carried out and provide support as necessary. c. To support ONAS calculate its own revenue
3 Summary of the first year and preparation for the next year	To ensure that the work to be performed by ONAS continues to be performed properly and support corrective actions as needed. In addition, to provide support to ensure that operations continue to be performed appropriately in the following year and beyond.	a. To perform 1.b, 2.a. and 2.b above. b. To conduct 2.c above to assist in the analysis of ONAS revenue for the year and consider considerations for improving profitability c. To assist in analyzing the financial reports of businesses, examining measures to improve profitability, and identifying issues to be considered in similar businesses in the future d. Through the year's activities, items to be considered in future work are organized as "Items to be considered in project supervision" and explained to ONAS to gain their understanding.

2-2-4-9 Implementation Schedule

This Project is a combination of equipment procurement and civil engineering work, and the critical parts of the overall construction schedule are the site survey and design by the contractor, the fabrication of machinery in Japanese factories, and the transportation and installation of machinery. The completion of civil works is planned to coincide with machinery fabrication and transportation after the site survey and design.

In civil engineering and construction work, the main types of work are steel tank installation, lightweight steel prefabrication, and buried piping installation. Among these, the construction of elevated steel tanks is the most affected by weather and has the greatest impact on the civil engineering construction period. In particular, the concrete work for the foundation is affected by the weather. However, even during the rainy season, it rarely rains all day and rainfall tends to be concentrated in short periods of time, so concrete placement can be carried out by avoiding rainfall periods and ensuring curing. To a large degree, rainfall does not affect the installation of buried piping because the construction cycle is easily adjustable.

The implementation process for this Project requires approximately 12 months from the signing of the G/A to the start of the detailed design study by the operator, approximately 4 months for the detailed design study period, and approximately 21.0 months for the actual construction of the main unit, making a total of approximately 37.0 months from the G/A. The implementation process chart formulated based on the Japanese Grant Aid program is shown in the figure below.

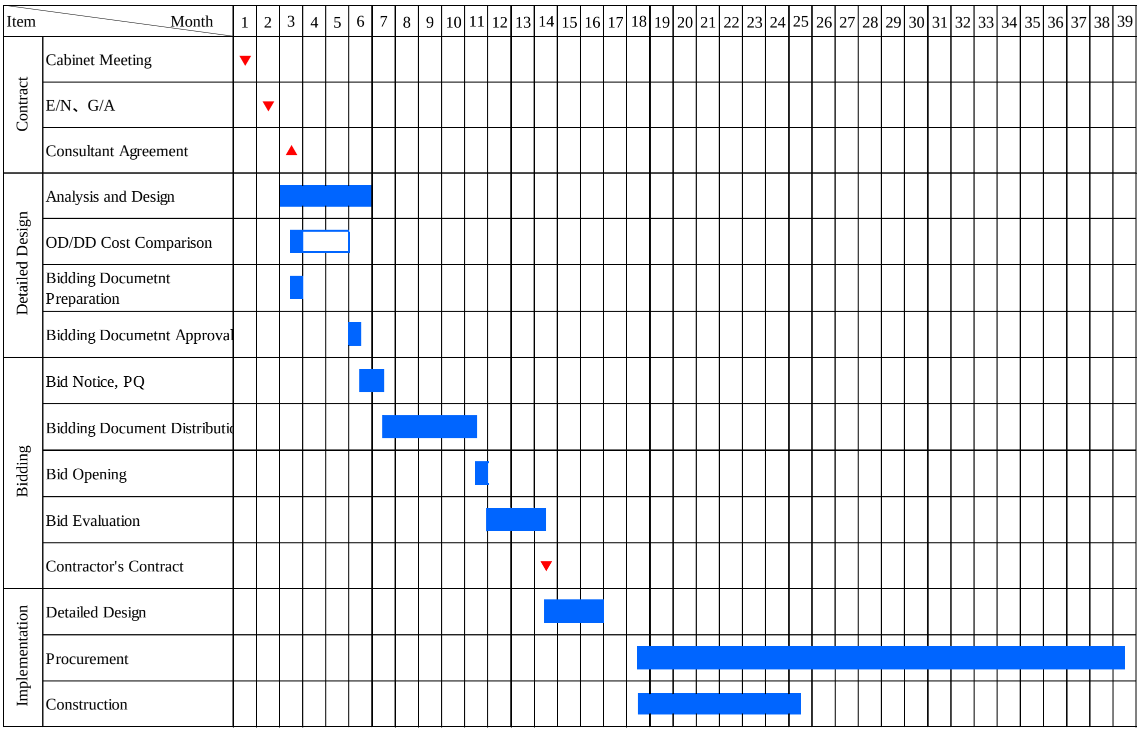


Figure 2-43 Implementation Schedule

2-3 Security Plan

The following safety measures should be considered.

- Although the project site, material storage area, and the operator and consultant office buildings are located inside the existing facility, in this Project, there will be three security guards on duty 24 hours a day because of the presence of a lot of expensive equipment, and because the existing facility's security guards are not available during nighttime or holidays.
- Since the security situation in Gabes is stable, no security guards will be assigned to the business dormitories or consultant's dormitories.

2-4 Contract Type/Bidding

2-4-1 Contract type

The contractual structure of this Project is shown below.

(1) Implementing agency
The implementing agency for this Project is ONAS, which is positioned as the ordering party in the contracts for the EPC and O&M work.

(2) Selection, contract, and delivery process
The tender to select the operator of the Project will be open to a single Japanese company or a joint venture composed of Japanese companies. The operator selected through the bidding process will enter into an EPC contract with ONAS, funded by a grant in accordance with Tunisia's Public Procurement Law. The operator will be responsible for the construction of the facility in accordance with the EPC contract, and will deliver the facility to ONAS once compliance with the required standards has been confirmed at the time of completion (with a one-year warranty period). ONAS will own the facility after receiving delivery from the operator.

(3) O&M operations
In order to ensure the O&M operations of the constructed facilities for a period of 10 years, the operator must, in accordance with the Tunisian law on concessions, create a company in Tunisia that will only perform O&M operations in Tunisia (hereinafter referred to as the "Project Company") which will enter into a contract with ONAS.

The Project Company will receive compensation from ONAS for O&M services, which will be funded by water sales fees from GCT.

(4) Water sales operations

ONAS is responsible for selling the advanced treated water produced in O&M operations to GCT based on the contract with GCT, and receives a portion of the water sales fee as compensation for its management services.

(5) Three Party Contract (O&M Contract and Water Purchase Contract)

In this Project, since O&M and water sales operations are closely related in terms of water sales and financing, the contracts for O&M and water sales operations were integrated into a single three-party contract signed by ONAS, the Project Company and GCT ("Three Party Contract (O&M Contract and Water Purchase Contract)") in order to ensure the smooth implementation of O&M and water sales operations.

(6) Comprehensive agreements

Furthermore, the project will enter into a comprehensive agreement between ONAS and the operator immediately after the selection of the operator. The comprehensive agreement will clarify the roles, tasks, and contract format of each stakeholder. In particular, it will clearly state that the operator will be responsible for the EPC and O&M services in an integrated manner, although separate contracts will be signed with ONAS for EPC and O&M services.

(7) Overall project implementation structure and contract type

The overall implementation structure and contractual arrangements for the Project are shown in the figure below.

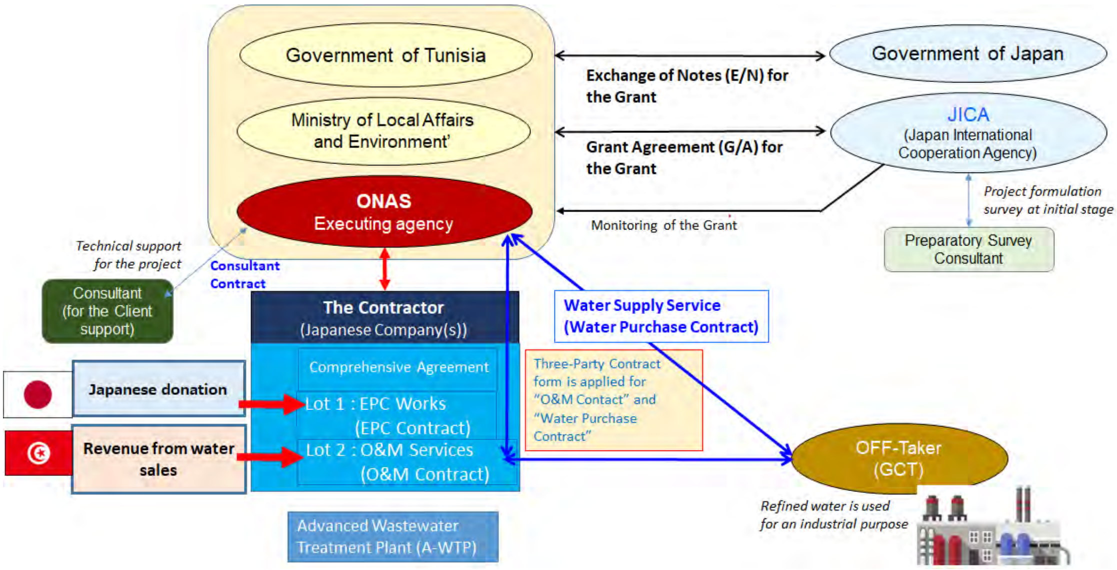


Figure 2-44 Overall Project Implementation Structure and Contract Type

The Project Company established by the operator for the purposes of this Project will also be referred to as the operator. When GCT is used as the Three Party Contract (O&M Contract and Water Purchase Contract), it means the GCT headquarters in Tunis, not the GCT Gabes plant.

2-4-2 Bid evaluation

(1) PQ

Bidding shall be conducted in two stages, with the first stage being Pre-qualification (hereafter referred to as "PQ") and the second stage being a technical evaluation and price evaluation for bidders who pass the PQ.

The PQ specifies the bidder's bidding qualifications and requires the successful bidder to present a bid qualification application. The PQ items are based on the items in Table 2-39. Bidding qualifications include disqualification conditions, such as "parties that have been disqualified from bidding by JICA" and "parties that are suspected of being antisocial forces or having involvement with antisocial forces."

Table 2-39 PQ Criteria

1	Bidding company nationality
2	Bidder type
3	Financial Status of bidding companies
4	Domestic and international construction and operation and maintenance experience

5	Track record of similar construction and operation and maintenance in Japan and overseas
6	Number of engineers for construction, operation and maintenance
7	Other (disqualification conditions)

(2) Member requirements

The requirements for the members of the Project at the time of bidding are based on (i) through (iii), below. Details will be provided in the bidding documents.

(i) Bidders for the bidding shall be a sole Japanese firm or joint venture (JV) or consortium consisting of Japanese firms.

(ii) The project proponent will establish a project company within one year of the award to enter into the Three Party Contract (O&M Contract and Water Purchase Contract) for the sole purpose of performing O&M services for the project in accordance with the Tunisian Concession Law.

(iii) in addition to the requirement of capital contribution to the Project Company and the requirement of minimum capital contribution, in the case that the bidder is a joint venture, the bidding documents must propose the division of roles of company members responsible for EPC work, and must stipulate the provision of equipment for the roles of company members responsible for O&M work and the Project Company's investment ratio requirements. Each bidder must make a proposal in its technical proposal.

(3) Performance order method

Since the bidding for this Project will be based on the performance order method, successful bidders who pass the PQ will be required to submit technical and price proposals that meet the specifications for EPC and O&M services (hereafter referred to as "Performance Requirements") to be presented in the bidding documents. The technical and price proposals will be evaluated based on the total evaluation bidding method.

(4) Technical evaluation and price evaluation

The technical evaluation and price evaluation after submission of bid documents shall be based on the flow of technical evaluation and price evaluation shown in Figure 2-45 (one-step, two envelopes method), and the detailed flow of the technical evaluation and price evaluation shall be shown in the bidding documents.

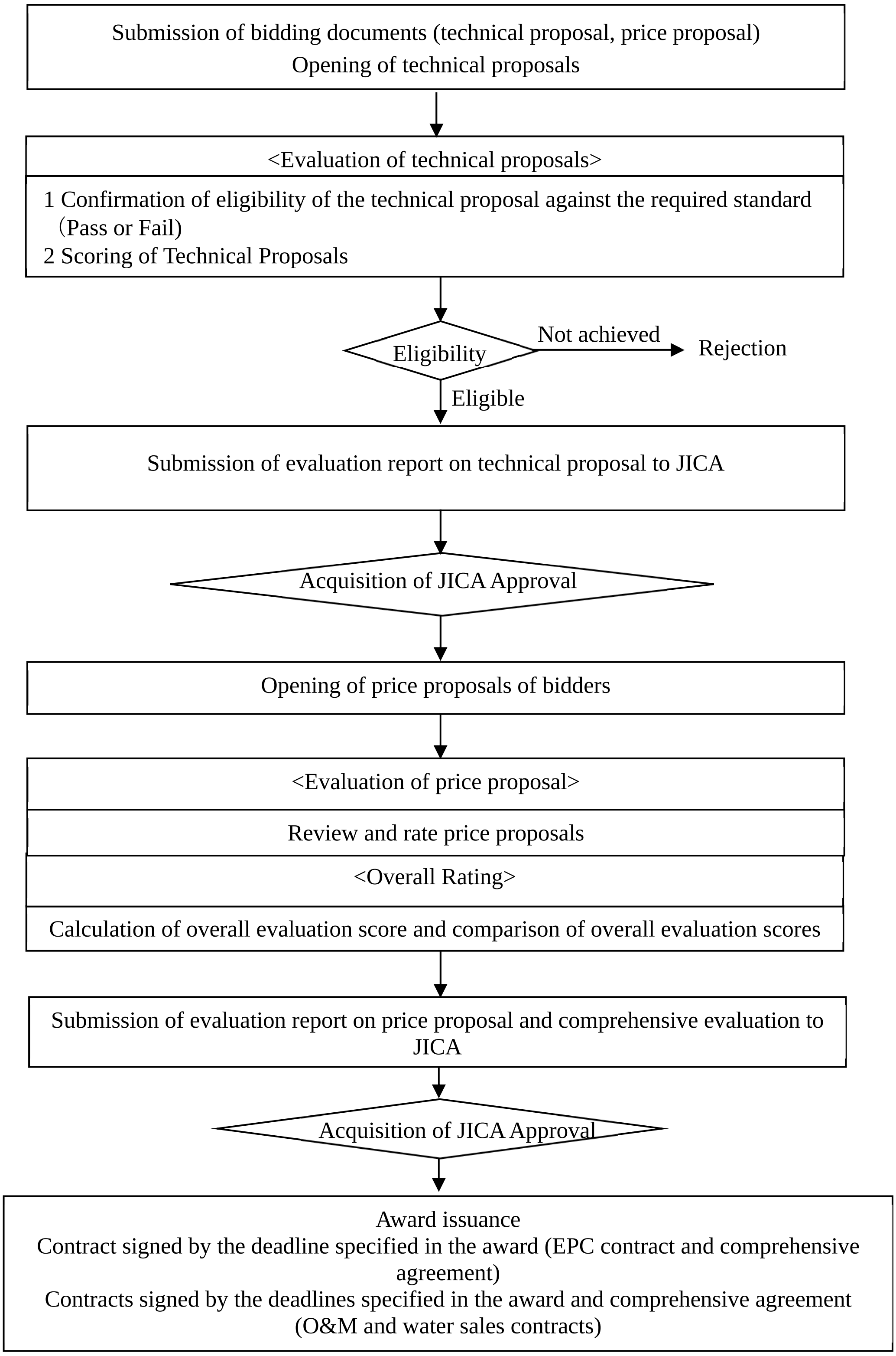


Figure 2-45 Flow of technical evaluation and price evaluation (1-step, 2-envelope method)

(5) Comprehensive evaluation bidding system

The evaluation of this Project by means of quality and cost-based selection shall be based on the following evaluation method on the basis of the method of evaluation and evaluation items for public works projects in Japan.

① Overall evaluation

The ratio of technical evaluation points and price evaluation points shall be 70:30 and shall be determined based on the following formula. The bidder with the highest overall evaluation score will be awarded the contract.

Overall evaluation score = Technical evaluation score (full 70 points) + Price evaluation score (full 30 points)

② Technical evaluation

The technical evaluation will be based on the proposals for the EPC and O&M services, with a total score of 70 points. The technical evaluation shall be based on the items listed in the table below.

Table 2-40 Technical evaluation items

	Item
1	Basic policy (implementation policy, project comprehension)
2	Proposals for EPC work (survey and design, construction planning, construction process and methods, construction management, disaster prevention and risk management, economic contribution to the region, environmental considerations, monitoring system, integration with O&M work, etc.)
3	Proposals for O&M operations (operation and maintenance plans, management plans, maintenance and inspections, water quality control, disaster prevention and risk management, handover upon completion, environmental considerations, monitoring systems, etc. (CSR (Corporate Social Responsibility) that contributes to the development of voluntary local communities (Gabes)) Activities (Draft))
4	Project structure and business plan (project implementation structure, track record of similar work by the company, track record of implementation structure and personnel, continuing education and safety management, risk management, business plan and financing plan)

③ Price evaluation

The price evaluation is based on the following formula, where 30 points are awarded for the total bid price for the EPC work and the O&M work.

$\boxed{\text{Price Evaluation Points = Lowest Bid/Bidder's Bid x 100 x 30/100}}$

It is assumed that the bid price will be calculated by adding up the EPC work cost (design and construction cost) and the O&M work cost (estimated income of the successful bidder for 10 years based on the specified formula), as shown in the following formula. The bid prices for both the EPC and O&M services must be within the limits of the estimated price. The final price evaluation method will be specified in the bidding documents.

$\boxed{\text{Bid price = EPC work cost (design and construction) + O\&M work cost (estimated income for 10 years)}}$

(Remarks) Calculation method for calculating O&M work cost

The price proposal for O&M service cost at the time of bidding shall be based on the following assumptions: O&M water production volume of 6,000 m^3 x 365 days x 10 years, exchange rate of 1 TND = "B" yen (exchange rate at the time of bidding), maximum unit price for water sales to GCT, and maximum unit price for water production by the successful bidder. The maximum price per unit of water sold to GCT and the maximum price per unit of water produced by the successful bidder will be presented as preconditions, and the successful bidder will be requested to submit the unit price per unit of water sold below the maximum price and the O&M service cost (estimated income for 10 years) calculated as "6,000 m^3 x 365 x 10 x A x B yen" at the unit price of "A" TND/m^3 . The maximum price for the unit price of water sales to GCT shall be determined by financial analysis using the latest data available at the time the bid documents are prepared, and using the financial internal rate of return (FIRR) as the evaluation index, the maximum price for the unit price of water sales that is financially feasible shall be set as the maximum price.

(6) Procurement method

This bid will be conducted in accordance with Tunisian Public Procurement Law (Decree No. 2014-1039 of March 13, 2014, on regulation of public contracts) (and the Concession Law (Law No. 2008-23 of April 1, 2008, relating to the regime of concessions and Decree No. 2020-316 of May 20, 2020, establishing the conditions and procedures for granting concessions and their monitoring)), but the conditions stated in the G/A and JICA's procurement guidelines (Procurement Guidelines for the Japanese Grants (Type I) (January, 2016)) will be given priority over the Law, which has been confirmed by the Government of Tunisia's Legal Counselor Services (hereafter referred to as the "LCS") and the General Body for Public-Private Partnerships (Instance Générale des Partenariats Public-Privé, hereafter referred to as "IGPPP"). Accordingly, bidding procedures will be conducted in accordance with the terms and conditions of the G/A and

JICA's procurement guidelines. Regarding the contract execution, the LCS expressed its opinion that it would be appropriate for the selected bidder to execute the contract with ONAS under the Tunisian Public Procurement Law for the EPC services and with ONAS under the Tunisian Concession Law for the O&M services. In order to ensure the legal consistency of the Concession Law, the Tunisian side has requested that an official written agreement be exchanged with the Japanese side, stating that it is necessary to make exceptions to certain provisions of the Concession Law.

2-4-3 Contract terms and conditions

(1) EPC Contract

For the EPC contract, the Yellow Book, which is the contract clauses of the International Federation of Consulting Engineers, is used as a model, which is a contract commonly used in Japan and abroad for design and construction work, and the contract incorporates the contents necessary for grant assistance, such as JICA's role in conventional grant assistance. The contract will be used. The country of governing law in the contract will be Tunisia.

(2) Main contract terms and conditions in the three-party contract (O&M and water sales contract)

The main terms and conditions of the three-party contract (O&M and water sales contract) will be based on the terms and conditions in the following table, based also on the results of the briefing sessions for Japanese companies and discussions between ONAS and the GCT.

Table 2-41 Three Party Contract (O&M Contract and Water Purchase Contract)

Item (O&M Operations)	Contract terms and conditions (O&M services)
Client for O&M services	ONAS
O&M work order recipient	Project company to be established in Tunisia by a Japanese company
O&M Operations	Operation and maintenance of facilities (including production of highly treated water) Detailed work is described in the requirement standard.
contract period	10 years (contract term can be extended in 3-year increments if agreed by the three parties)
Payment Currency	Tunisian Dinar (TDN)
Ownership of facilities	ONAS
Secondary treated water supply from existing facilities	Minimum water supply by ONAS is 10,000 m^3 /day, 365 days/year
Secondary treated water quality standards	Details are described in the requirement standard.
Production volume of highly treated water	In principle, the amount of water produced by a business is 6,000 m^3 /day, 365 days/year.

Item (O&M Operations)	Contract terms and conditions (O&M services)
	The operator shall send ONAS and GCT a business plan (annual and monthly) with the amount of water produced (supplied) for 6,000 m^3 /day or the amount of water produced (supplied) after the change from 6,000 m^3 /day if there is a change from the previous amount. · ONAS and the operator have the right to change the amount of water supplied to the GCT (even below 6,000m^3 no compensation is paid to the GCT) GCT has a take-or-pay obligation of 6,000 m^3 /day as the guaranteed purchase volume.
Standards for highly treated water	Colorless (turbidity less than 1 NTU) Odorless (less than 3TON) pasteurized Total dissolved solids (TDS) 300 mg/l or less pH 6.5 to 8.5
Receiving business expenses of the operator	Calculated by accumulating the daily water supply for each month. GCT's monthly water sales fee amount - ONAS's compensation amount - Operator's penalties (if applicable) See payment mechanism in 2-4-4 for details.
Amount of ONAS compensation	Calculated by accumulating the daily water supply for each month. GCT's monthly water sales charge x 5% (commission rate, varies depending on secondary treated water quality (SS concentration)) + operator penalties (if applicable) See 2-4-4 Payment Mechanisms for details.
bill payment	Monthly billing (monthly payment) Operator submits invoice to ONAS ONAS will make payment to the operator within 45 days from the date of receipt of payment of water sales charge revenue from GCT.
Measurement points for secondary treated water	The measurement point will be an intake pit connected to the drainage point from the existing sewage treatment facility. The detailed measurement points are described separately in the standard.
Water quality testing (secondary treated water and highly treated water)	The operator conducts daily or weekly water quality testing of secondary treated water and submits the test results to ONAS. The operator shall conduct daily or weekly water quality testing of the highly treated water and submit the test results to GCT and ONAS. Water quality testing of highly treated water by accredited laboratories is also conducted on a regular basis, and the test results are submitted to GCT and ONAS. Bacteriological testing of highly treated water is conducted once every two weeks at an accredited laboratory or at a sanitary laboratory in Gabes (Ministry of Health).
Maintenance of facilities	The operator shall perform appropriate maintenance (including repairs, etc.) of the facility at all times during the term of the contract. Details are described separately in the requirement standard.
Granting insurance to	The operator shall provide insurance equivalent to the value of the

Item (O&M Operations)	Contract terms and conditions (O&M services)
facilities and repairs	facility's assets in case of repairs to the facility due to a disaster, etc. In the event of damage to the facility due to negligence or carelessness on the part of the operator, the operator will utilize insurance to repair the facility.
O&M Monitoring Report	The operator submits periodic O&M monitoring reports to ONAS on the status of operations, maintenance, and finances.
Termination of Contract	(1) Each Contractor shall be responsible for contract work interruptions related to contract default by another Contractor or a force majeure event, specifically the following events. 1) Default of the operator: If the operator fails to perform its obligations and correct them within 90 days, or if the operator becomes bankrupt. 2) Default of ONAS: If ONAS fails to operate and maintain said sewage treatment plant and fails to make improvements within 90 days, or becomes bankrupt. 3) Failure to pay the Contractor the amount due under the Contract within 90 days of the date the payment obligation accrues. 3) GCT's default: GCT fails to pay ONAS the amount due under the contract within 90 days after submission of the invoice or fails to fulfill GCT's obligations 4) Force majeure: Force majeure event lasting more than 180 days (2) The operator may terminate the contract at the end of the seventh year after the start of the O&M period if the following events make it difficult to operate the business in a sound manner, despite the operator's efforts to ensure sustainable operations through additional investment from investors and negotiations to increase payment amounts, in order to make the business sustainable (1) Rapid fluctuations in exchange rates 2) Prolonged power shortages and blackouts 3) Changes in Tunisian laws and regulations 4) Late payment from ONAS and multiple occurrences of underpayment 5) Late payment from GCT and multiple occurrences of underpayment 6) Occurrence of a situation where the annual supply of highly treated water falls below 6,000 m3 x 365 days continuously for reasons beyond the control of the operator 7) In the event of a force majeure event lasting more than 180 days, or a failure to repair the facility to the required standard for more than 90 days due to a shortfall in the amount of insurance reimbursement.
Delivery of Claims for Payment	If no payment has been made by the off-taker to ONAS at the end of the contract, the right to claim payment for the GCT can be transferred from ONSA to the operator by mutual agreement between ONAS and the operator
Handover to ONAS at the	In the event of contract termination, ONAS and the operator will jointly

Item (O&M Operations)	Contract terms and conditions (O&M services)
end of the contract	form a delivery committee. ONAS may purchase equipment installed by the operator's investment at a price agreed between the parties The operator will train ONAS technicians in the transfer of technology under the terms and conditions set forth in the requirements document.
Capital investment by businesses	The operator may install additional equipment, software, and other devices, as well as renovate or modify the O&M facilities, provided that the price of water sold is not affected.
Applicable Laws and Regulations	Tunisian Law
communicative language	French (language)
force majeure clause	adoption
tax	Each contractor is responsible for paying corporate income tax, value-added tax (VAT), withholding tax, and other taxes in accordance with the relevant Tunisian laws.
Government Guarantee	There is no government guarantee for payments to businesses by ONAS.

Item (water sales operations)	Contract terms and conditions (water sales operations)
Seller of highly treated water	ONAS
Buyers of highly treated water	GCT
contract period	10 years (contract term can be extended in three-year increments if agreed by the three parties)
Payment Currency	Tunisian Dinar (TDN)
Amount of water sales fees paid by GCT	Monthly Calculation Guaranteed monthly purchased water volume (6,000m^3 /day x number of days/month) Water sold x unit price of water sold The unit price of water sold will be the unit price of water sold at the time of bidding. The water sales unit price is subject to the water sales unit price adjustment mechanism. See payment mechanism in 2-4-4 for details.
bill payment	Monthly billing (monthly payment) ONAS sends invoices to GCT within 7 days of the end of the month GCT pays ONAS within 45 days of receipt of invoice from ONAS each month
Measurement point of highly treated water (delivery point)	The boundary line with the site of the GCT and the GCT shall be the measurement and delivery point. The amount of water measured by the water meter installed in the water pipe at the measurement point will be used for payment. Water meters installed in front of water pipes are for reference only. Details of the measurement points are described in the requirement documents.
Advanced treated water	Same as contract terms and conditions for O&M services.

quality inspection	
Termination of Contract	Same as contract terms and conditions for O&M services.
Applicable Laws and Regulations	Tunisian Law
communicative language	French (language)
force majeure clause	adoption
tax	Each contractor is responsible for paying corporate income tax, value-added tax (VAT), withholding tax, and other taxes in accordance with the relevant Tunisian laws. The payment to ONAS for the sale of water by GCTs is not subject to VAT, in accordance with the VAT exemption approval letter for GCTs by the Tunisian Ministry of Finance.
Government Guarantee	No government guarantee for GCT payments.

2-4-4 Off-take pricing and payment mechanisms

GCT will pay the Performing Entity a water sales fee for the highly treated water received under the Three Party Contract (O&M Contract and Water Purchase Contract). The operator receives compensation for O&M services from ONAS, which is compensated for its management services under the Three Party Contract (O&M Contract and Water Purchase Contract); the amount of GCT's monthly water sales charge, ONAS's compensation, the method used to calculate the operator's cost of services received, and the price applied at the time of payment and receipt of the water. The adjustment mechanism is as follows.

(1) Methodology for calculating GCT's monthly water sales charge amount and price adjustment mechanism

GCT's monthly water sales charge amount = GCT's guaranteed monthly purchase of water (6,000m^3 /day x number of days/month) water sales x unit price of highly treated water sales

(Remarks)

① The unit price for the sale of highly treated water will be the unit price for the sale of water offered by the operator at the time of bidding (unit price for water production x 105.26%).

② For the sale of highly treated water by GCT, a contractual condition (take-or-pay contractual condition) of 6,000 m^3 /day of guaranteed purchased water volume is applied.

③ GCT is obligated to pay the cost equivalent to 6,000m^3 /day even if it does not receive 6,000m^3 /day for its own reasons in accordance with the terms of the take-or-pay contract.

④ The unit price for the sale of highly treated water is based on the producer price index at the time the contract is concluded and the unit price of electricity charged by the Tunisian

Electricity and Gas Authority, and is subject to the following unit price adjustment mechanism, which varies according to the producer price index and the unit price of electricity charged.

[Water sales unit price adjustment mechanism].

(i) The successful bidder shall submit at the time of bidding the following table of unit prices for water sales, unit prices for water production, and a breakdown of unit prices for water production. The breakdown table on the right will be included in the three-party contract (O&M and water sales contract).

Table 2-42 Breakdown table of unit price of water sold, unit price of water produced, and unit price of water produced at the time of bidding

Water production unit price breakdown items		Breakdown of unit cost of water production	distribution [注1]
1	Unit price not subject to price adjustment	Unit price of water production xa% (fill in)	a% (presentation)
2	Unit prices subject to price adjustment by the Electricity and Gas Authority of Tunisia	Unit price of water production xb% (fill in)	b% (fill in)
3	Unit prices subject to price adjustment by the annual Industry Retail Price Index (IPVI) of the Tunisian National Institute of Statistics (excluding price adjustments due to 2 above)	Unit price per unit of water production xc% (fill in)	c% (fill in)
I. Unit cost of water production (TND/m3) (1+2+3)		Unit cost of water production (fill in)	100% (presentation)
II. Price of water sold (TND/m3) (unit price of water produced x 105.26%)		Unit price of water sold (fill in)	

Note 1 : A specific value of a will be provided in the bidding documents. Bidders are required to calculate the values of b and c so that the total of a+b+c equals 100 based on the performance of the proposed facility, and bidders are required to enter a price that is a breakdown of the unit price of water production.

(ii) The water sales unit price applied at the time of monthly payment by GCT is subject to the water sales unit price adjustment mechanism and fluctuates. Specifically, it is calculated based on the indicators and formulas in the following table.

Table 2-43 Indicators and formulas used to calculate the unit price of water sold at the time of payment*

indicator		Source of Indicators	basic index[1]		distribution
			index value	Date	
1	No price adjustment	-	-	-	a%%
2	Electricity tariffs of Tunisian Electricity and Gas Company (E)	Electricity tariffs published on the official web of the Tunisian Electricity and Gas Authority	$(E)_0$ (latest value)	(Date of confirmation)	b%.
3	Annual Industry Retail Price Index (IPVI) of the Tunisian National Institute of Statistics (I)	Index published on the official web of the Tunisian National Bureau of Statistics	$(I)_0$ (latest value)	(Date of confirmation)	c%
				Total	100%.

Note (*) The latest basic index values (E_0 and I_0) and dates are set at pre-contract timing.
E_0 is the latest electricity tariff values published on the official web of the Tunisian Electricity and Gas Authority at the time of the contract
I0 is the latest annual Industry Retail Price Index (IPVI) published on the official Wen of the Tunisian National Institute of Statistics at the time of the contract (http://www.ins.tn/statistiques/89

Table 2-44 Indicators and formulas used to calculate the unit price of water sold at the time of payment*

(1)	Unit cost of water production at the time of payment (TND/m3) (Wn) = Unit cost of water production at the time of contract signing (TND/m3) (W_0) x (a + b x E /E_{n0} + c x I /I) $_{n0}$
(2)	Unit price of water sold at the time of payment (TND/m3) = Unit price of produced water (TND/m3) x 105.26

Note(*) E_0 and I_0 refer to the basic indexes described in the index and formula 1 used to calculate the unit price of water sold at the time of payment, and n in Wn, En and In refer to the latest basic index value when making price adjustments.

(2) Method of calculating the amount of ONAS compensation

ONAS monthly fee = GCT monthly water sales fee x 5% (commission rate, varies depending on secondary treated water quality (SS concentration)) + operator penalties (if applicable)

(Remarks)

The commission rate, which is used to calculate ONAS compensation, will be adjusted according to the improvement or deterioration of secondary treated water quality from the existing sewage treatment plant. The commission rate will be indexed to the turbidity (SS) of the secondary treated water as shown in the following table.

Table 2-45 Variation of commission rates based on secondary treated water quality

(data) item	Changes in commission rates					
Turbidity of secondary treated water (SS mg/L)	0 to 30	31～60	61～90	91～120	121～150	150 ... and upwards
Base commission rate (%)	5% (of the total)					
Percentage change in unit cost of water production	0.96	0.97	0.98	0.99	1.00	1.01
Commission rate increase/decrease (%)	+4%.	+3%.	+2%.	+1%.	0	-1%.
	increase				-	decrease

(Note) Turbidity (SS) of secondary treated water for facility design is 150 mg/L.

(3) Method of calculating the cost of services received by the operator

Cost of services received by the operator = GCT's monthly water sales charge - Amount of compensation received by ONAS + Penalties to the operator (if applicable)

(Remarks)

As per the formula, the amount received by the operator will vary according to the changes in the amount of compensation received by ONAS as indicated in the previous section.

① The penalties imposed on operators are applicable when the amount of water sold is less than 6,000 m^3 /day due to the operator's responsibility. The monthly penalty amounts are as follows

Monthly Penalty Amount = Total Water Sales Charges Equivalent to Total Monthly Quantity of Water Sales Shortage/day x 5 % (Base Commission Rate)

② At the time of payment from ONAS to the operator, taxes such as the application of VAT and withholding tax ("WHT") on the amount paid in accordance with Tunisian law will be applied. The payment is subject to taxes such as the application of VAT and the collection of Withholding Tax ("WHT") on the payment amount.

③ The amount of water sold on days when the water supply does not meet the water quality standards (water quality standards for highly treated water supplied by the operator: see "2-2-2-4-2 Overall Flow" and "2-2-2-5 Design Specifications") will not be accounted for as water sales. If water quality standards are not met, the amount of water sold will be reduced, but the operator and ONAS will not be obligated to compensate the GCT.

2-4-5 Risk sharing

Risk sharing for the main risk factors in the three-party contract (O&M and water sales contract) is based on Table 2-45, which is also based on the results of the briefing sessions for Japanese companies and discussions between ONAS and the GCT.

Table 2-46 Risk Sharing in Three Party Contract (O&M Contract and Water Purchase Contract)

No.	risk factor	risk attribute (Remarks*)	Implementing Agency (ONAS)	Entrepreneur	off-taker (GCT)	remarks
1	Insufficient supply of secondary treated water	①	(◎)	-	-	・In the event of a shortage of secondary treated water supply, the operator may use raw secondary treated water to produce highly treated water. ・When raw water is used, the ONAS fee is reduced in accordance with the "Variation in commission rates based on secondary treated water quality" that is applied to the calculation of ONAS fees (ONAS bears the increased treatment costs for the operator).
2	Fluctuations in secondary treated water quality	①	(◎)	-	-	・The ONAS fee amount fluctuates according to the "Variation in commission rates based on secondary treated water quality," which is applied to the calculation of the ONAS fee amount, because the operator's treatment costs fluctuate when secondary treated water quality changes. When water quality deteriorates, the ONAS fee amount decreases as the operator bears the increased treatment costs.)
3	Insufficient supply of highly treated water	②	-	◎	-	・Decrease in monthly water sales due to decrease in water sales to GCT ・ONAS and the operator have the authority to change the amount of water sold to GCT, and there is no compensation payment to GCT in the event of a shortfall in the amount of water sold to supply

No.	risk factor	risk attribute (Remarks*)	Implementing Agency (ONAS)	Entrepreneur	off-taker (GCT)	remarks
						・ In the event of a supply shortage caused by the operator, the operator will pay a penalty to ONAS. Penalties will not be assessed for supply shortages caused by force majeure events or factors for which the operator is not responsible.
4	Failure to meet water quality standards for highly treated water	②	-	◎	-	Water sales are not subject to water quality standards for highly treated water that does not meet those standards. No compensation will be paid to GCT by the operator or ONAS due to non-achievement of water quality standards for highly treated water.
5	Insufficient water sales due to GCT	④	-	-	◎	GCT will be responsible for payment of any shortfall in water sales under the terms of the take-or-pay agreement.
6	Discrepancies in measurements and water quality test results of secondary and advanced treated water among contractors	⑦ ⑦	- -	- -	- -	The water volume of secondary treated water and highly treated water is measured by a single water volume meter as specified in the contract to prevent discrepancies. Water quality is measured periodically by accredited laboratories, and the results are used as official measurements to prevent deviations.
7	Inflation/Deflation	③	-	-	◎	The GCT burden will be borne by the GCTs, as the price adjustment mechanism for the unit price of water sold will be applied to reflect changes in inflation and deflation.
8	exchange fluctuations	③	-	◎	-	The risk of exchange rate fluctuations is borne by the operator because exchange rate fluctuations are not an indicator for adjusting the price of water sold.
9	Electricity rate fluctuation	③	-	-	◎	The GCT burden will be borne by the Company as a result of the application of a price adjustment

No.	risk factor	risk attribute (Remarks*)	Implementing Agency (ONAS)	Entrepreneur	off-taker (GCT)	remarks
						mechanism for the unit price of water sold that reflects changes in electricity prices.
10	Electricity supply interruption (power outage)	③	-	◎	-	The impact of the decrease in the amount of highly treated water produced due to the interruption of electricity supply (power outage) is borne by the operator, as it is not an index for adjusting the price of water sold.
11	Increase in manufacturing costs due to revision of Tunisian domestic laws and regulations	③	-	◎	-	The risk is borne by the operator, as fluctuations in production costs due to revisions to Tunisian laws and regulations are not directly reflected in the price of water sold.
12	Difficulties in sustainable management due to cost increases caused by external and social factors	③	-	-	-	In the event of cost increases by the operator due to external or social factors such as those listed in (6-10) above, the contract can be terminated at the end of the seventh year if the operator is unable to sustainably manage the business despite efforts to revise the payment formula and additional capital from investors, etc.
13	Damage to facilities	③	-	◎	-	The operator is responsible for insuring the subject facility and repairing any damage caused by disasters to the extent of the insurance cost. The operator is responsible for repairing any damage caused by himself/herself.
14	Increased costs and maintenance responsibilities due to leaking water pipes	②③④⑦	-	◎	○	The operator is responsible for the maintenance and management of water pipes and water meters up to the point of demarcation of responsibility (delivery point), and the operator bears the increased costs due to water leakage.

No.	risk factor	risk attribute (Remarks*)	Implementing Agency (ONAS)	Entrepreneur	off-taker (GCT)	remarks
						GCT bears the burden after the point of demarcation of responsibility (delivery point).
15	Decrease in water sales due to GCT's responsibility	④	-	-	◎	GCT will bear the cost based on the terms and conditions of the take-or-pay contract. The reduction in the amount of water sold in cases not due to GCT's responsibility is not covered by take-or-pay.
16	GCT Payments to ONAS	④	-	-	◎	GCT will make payment to ONAS within 45 days of the invoice date from ONAS Non-payment for 90 days or more falls under the contract termination requirement.
17	Payments to ONAS operators	②④	○	-	◎	ONAS pays the invoice from the business within 45 days of receipt of the monthly payment from GCT. Non-payment for more than 90 days is a requirement for contract termination.
18	Sludge Disposal	⑤	-	◎	-	Business burden
19	Taxation and Tax Payment	⑥	○	○	○	The Subscriber is liable for tax under Tunisian law.
20	conclusion of a contract	⑦	○	◎	○	The project sponsor will establish a project company and sign a contract within one year of receiving the award. Operator and ONAS apply for and obtain permission to enter into a contract GCT will maintain water pipes and, if necessary, water storage tanks on site.
21	Repair facilities that are in normal operation at the time of O&M completion	⑦	◎	-	-	Upon completion of the O&M, the operator shall deliver the equipment in a condition that meets the required standards. The following facility operation and maintenance managers are

No.	risk factor	risk attribute (Remarks*)	Implementing Agency (ONAS)	Entrepreneur	off-taker (GCT)	remarks
						responsible for the maintenance of the facility, including repairs to the facility

(Note) ◎: major risk underwriters, ○: few risk underwriters, -: those not expected to underwrite risk
(Remark*) Risk Attributes

The attributes of risk factors for this project are categorized as ① contract default by ONAS in terms of secondary treated water quantity and quality, ② contract default by the operator in terms of advanced treated water supply quantity and quality, ③ cost increase due to external and social factors, ④ contract default by GCT in terms of water sales default, ⑤ occurrence of negative environmental impacts, ⑥ default in company registration and tax payment obligations, and ⑦ others.

2-4-6 Company registration, taxes and tax exemptions

(1) Company registration and tax registration

In order to register a company in Tunisia, an application to establish a branch office or a local company will be filed with the Industry Promotion Agency under the Ministry of Industry and Small and Medium Enterprises of Tunisia. If the Project Operator establishes a local office in Tunisia to carry out EPC operations over the medium to long term, the local office is considered a Permanent Establishment ("PE") under the Tunisian tax system, regardless of whether the company is registered or not.

In accordance with the Concession Law for the execution of O&M operations by the operator, it is not necessary to obtain an investment permit from a government agency when establishing a project company for the sole purpose of performing O&M operations for the Project. In this regard, "Unless otherwise provided for in the contract, the concessionaire shall obtain all administrative authorizations necessary for the performance of the concession granted to him." Stipulated in Article 24-2 of the Concession Law, can be referred. And all tax matters related to the execution of the concession will be handled by the Ministry of Finance within the framework of Tunisian law.

Companies that have carried out business registration must also register separately with the tax authorities to obtain a taxpayer identification number.

(2) Taxes and tax exemptions for EPC work

For EPC work aimed at infrastructure development, in principle, tax exemptions apply under the E/N and A/D of the Japanese grant assistance scheme. For VAT, ONAS submits to the Ministry of Finance the E/N and A/D for grant assistance as well as the necessary documents such as the contract with the operator and requests the Ministry of Finance to issue a Tax Suspension Certificate. ONAS will submit a request to the Ministry of Finance for the issuance of a Tax Suspension Certificate, and will receive a Tax Suspension Certificate with the name of the Operator from the Ministry of Finance. By showing the Tax Suspension Certificate (copy) when placing an order with a local subcontractor in Tunisia, the contract and invoice will be exempted from VAT taxation.

Regarding corporate tax on PE as stipulated by the country's law, and personal income tax on Japanese nationals staying in the country for 183 days or more, the Tunisian government will provide corporate tax on PE through a tax-free written exchange for this project between the two countries. It is possible to introduce exemptions for tax and personal income tax, and discussions and adjustments will be made before the project implementation stage.

It should be noted that in the case of EPC work, if the Operator collects WHT in accordance with Tunisian law at the time of payment to the local subcontractor, the Operator is liable to pay WHT to the Tunisian tax authorities.

(3) Tax and tax incentives for O&M operations

The Operator will not be granted tax exemption under Grant Aid for the implementation of O&M services under the O&M and Water Sales Contract. The main taxes applicable to O&M operations are listed in the table below.

Table 2-47 Major Taxes Applicable to O&M Operations

Tax	Tax rate	Remarks
VAT (local procurement)	19% of the project's services	Varies depending on the item
Corporation tax Withholding Tax (WHT)	Corporation tax rate for ordinary companies is 15% (Withholding tax (WHT) is applied in the context of advance payment of corporate income tax in intercompany transactions.)	Tax rates vary depending on various conditions
Taxes on imports (customs duties, VAT, consumption tax)	Customs: 0-200%, VAT: 7%, 13%, 19%, Sales Tax: 10%-150%, etc.	Tax rates vary depending on the goods (e.g., partial duty exemption for goods imported from the EU).

Note: Tax rates are as of the time of the survey.

In addition to the above, there are other tax items such as stamp duty, *Caisse nationale de sécurité* *sociale* (tax rate: 1%) ("CNSS"), and other tax items. Individuals staying in Tunisia for more than 183 days per year are subject to personal income tax (0-35%) and CNSS (1%).

The Project site does not fall within any of the local development incentive zones (No. 1, No. 2, or No. 3) established by the Government of Tunisia, and therefore tax incentives under Tunisia's Investment Promotion Law are not applicable. However, the Tunisian Investment Promotion Law provides tax incentives for newly established companies, including a tax deduction for a portion of taxable profits/revenues until the fourth year.

2-5 Obligations of Recipient Country

In the case of the implementation this Project through grant assistance from Japan, the Tunisian side shall take necessary measures relating to the following items for smooth implementation of the Project.

2-5-1 Administrative Procedures

- Implementation of Banking Arrangement (B/A) and Authorization to Pay (A/P) procedures and cost sharing
- Procedures for customs clearance and duty exemption for imported materials and equipment required for the Project
- Inspection, witnessing, approval, etc., and related procedures for construction in the Project

2-5-2 Obligations of Recipient Country

The table below shows the items for which the Tunisian side shall be responsible.

Table 2-48 Obligation of the Tunisian Side

[Before bidding]

No.	Items	Deadline	In charge
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant)	Within 1 month after the signing of the G/A	Government of Tunisia
2	To issue Authorization to Pay (A/P) to the Agent Bank for the payment to the consultant	Within 1 month after the signing of the contract(s)	Government of Tunisia
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		Government of Tunisia

	1) Advising commission of A/P	Within 1 month after the signing of the contract(s)	
	2) Payment commission for A/P	Every payment	
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any)	Before notice of the bidding document	ONAS
5	To secure land necessary for the construction of advanced waste water treetment plant	Before notice of the bidding document	ONAS
	To secure stock yards for construction materials	Before notice of the bidding document	ONAS
6	To obtain the necessary permit for the implementation of the Project from the concerned organization (road crossing of pipeline, and others)	Before notice of the bidding document	ONAS
7	To clear, level and reclaim the following sites 1) Site for Gabes advanced waste water treatment Plant	Before notice of the bidding document	ONAS
8	To submit the Project Monitoring Report (with the result of the Detail Design)	Before preparation of bidding documents	ONAS
9	To assign counterparts for the EPC Contractor during the Detail Design Survey	Soon after starting detail design survey	ONAS

[During the Project Implementation]

No.	Items	Deadline	In charge
1	To issue A/P to the Agent Bank for the payment to the supplier the contractor	Within 1 month after the signing of the contract(s)	Government of Tunisia
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A		Government of Tunisia
	1) Advising commission of A/P	Within 1 month after the singing of the contract(s)	
	2) Payment commission for A/P	Every payment	
3	To ensure prompt customs unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	During the project	ONAS
4	To accord Japanese nationals and/or physical persons of the third countries whose services may be required in connection with the supply of the products and services under the verified contract such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.	During the project	ONAS
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	During the project	ONAS
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	During the project	ONAS

No.	Items	Deadline	In charge
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	During the construction	ONAS
8	1) To submit the Project Monitoring Report 2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	1) Every month 2) Within one month after signing of Certificate of Completion for the works under the contract(s)	ONAS
9	To submit a report concerning completion of the Project	Within six months after completion of the Project	ONAS
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		ONAS
	1) Electricity - The distributing line to the existing WWTP	before start of the constoruction	ONAS
	2) Water Supply - The city water distribution main to the site	before start of the constoruction	ONAS
	3) Drainage - The city drainage main (for storm, sewer and others) to the site	before start of the constoruction	ONAS
11	To ensure the safety of persons engaged in the implementation of the Project	during the project	ONAS
12	To take necessary measures for security and safety of the Project site	during the construction	ONAS
13	To implement EMP and EMoP	during the construction	ONAS
14	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	ONAS
15	To assign counterparts for the soft-component activities	During the project	ONAS
16	Public relations activities in Tunisia at an opportunities such as completion ceremony	During the project	ONAS

[After Completion of the Project]

No.	Items	Deadline	In charge
1	To implement EMP and EMoP	for a period based on EMP and EMoP	ONAS
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement	for 3 years after the Project	ONAS

	between ONAS and JICA.		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid	After completion of the construction	ONAS

2-6 Project Operation Plan

2-6-1 Operation and Maintenance Management System

(1) Operation and maintenance management system

Operation and maintenance of the facility after its construction will be carried out by a project company established locally by the Japanese company responsible for construction. In order to efficiently operate the constructed facility, the project company shall become familiar with the facility from the construction phase, and will take the lead in operation and maintenance, which is expected to ensure stable performance and technology transfer to the Tunisian partner during the O&M period.

The project company will be a Tunisian corporation established by the operator under the Concession Law, and a project manager will be dispatched from the Japanese operator to manage the project company. In order to ensure smooth operation of the project company in Tunisia, Tunisian companies are allowed to invest in the project company under the conditions permitted by the Concession Law, but the Japanese operator shall secure a majority stake in the project company.

Under this system, the project company can receive support from Japanese operators, and Japanese operators can provide guidance to the project company on the optimal operation of the facilities they have constructed.

(2) Project company

It is assumed that a project company with the following organizational structure shall be established in order to operate the facility to be constructed by the Japanese operator. The composition of the project company is shown in Figure 4-1.

① The company president and CEO will be a Japanese national dispatched by the EPC manufacturer that built the facility. From the perspective of business costs, the CEO is expected to manage the company on a part-time basis, traveling from Japan approximately three times a year.

② The vice president and factory manager are expected to be a Tunisian engineer. Prior to the start of the Project, technical training and business operation policies, etc., will be discussed by the Japanese company. This will create a system in which the project company can be managed centering around the vice president at all times. The Project aims to enable low-cost operation by confirming policies with the president in (1) above, who will travel to Japan on a regular basis, and by holding policy meetings remotely.

③ Inside the project company, there will be a processing department (equivalent to a manufacturing department), a technical department, and an administrative department.

④ The processing manager and technical manager shall be personnel capable of managing the entire group.

⑤ The processing department has four sets of three shift teams and day shift workers to operate 24 hours a day. The day shift workers and each shift leader shall be personnel capable of performing their duties in a self-contained manner.

⑥ The engineering department shall be staffed with engineers who can propose and study water quality analysis and facility improvement, etc. together with the engineering manager.

⑦ In addition, the technical staff and shift personnel shall be multi-skilled so as to be able to perform simple equipment repairs.

⑧ Similarly, the office staff in charge of clerical work shall include personnel who can handle general affairs, accounting, purchasing, and other clerical work under the supervision of the plant manager.

⑨ Since the project company has a specific customer for the treated water, no particular sales representative will be assigned to the Project.

⑩ Legal and formal accounting documents will be prepared by subcontractors. Therefore, no such personnel will be assigned within the project company.

⑪ It is assumed that contractual and other issues will not arise. If they do occur, the parent company will be allowed to use its functions.

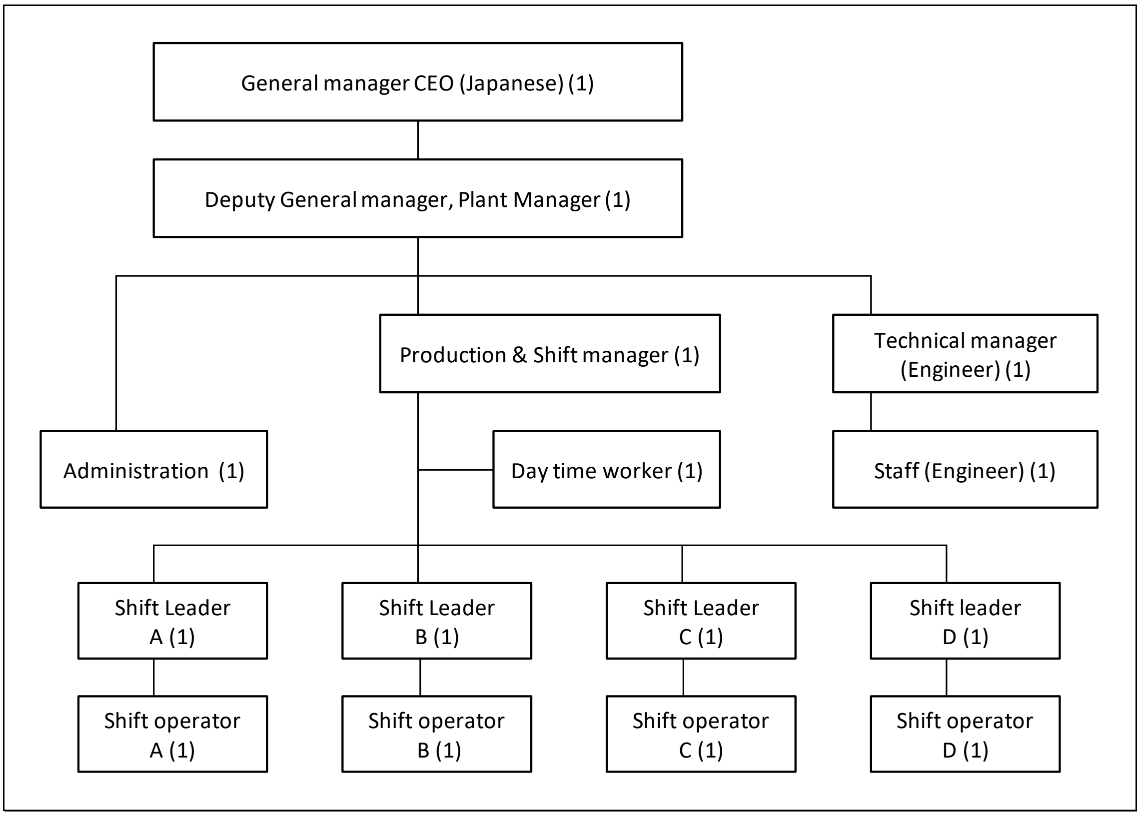


Figure 2-46 Project Company Organization

2-6-2 Facility Maintenance and Management Items

As described in the previous section, operation and maintenance of the facility after its construction will be carried out by the project company, mainly managed by the construction company of the facility. In order to properly operate and maintain the facility, the following points need to be considered, which will be proposed by the SPC established through the bidding process. The following are just a few examples of the maintenance plans that need to be developed with these considerations in mind.

2-6-2-1 Planning for repair and maintenance

① Short-term and long-term repair plans should be developed, as well as a budget plan for such repairs.

② Employees of the project company should be ready to perform simple maintenance, as described in section 4-1.

③ A certain number of parts for use in maintenance will be prepared at the start of the Project. A certain number of spare membranes will also be prepared at the start of the Project.

④ Except for the RO high-pressure pumps, there are basically two water pumps in operation with one in reserve. We plan to maintain this one pump on a regular basis.

⑤ RO high-pressure pumps should be kept in a warehouse with spare units so that they can be replaced immediately in case of failure.

2-6-2-2 Daily control items

Various data should be collected for proper operation of the A-WWTP facility and as a basis for materials to be provided to ONAS and GCT, which conduct water sales operations. Consideration should also be given to remotely transmitting some of the data from the project company to the Japanese operators so that they can discuss modifications to operating procedures, etc., if necessary.

Table 2-48 below is an example. Specifically, these items are finalized when the details of the facilities are identified during the bidding phase.

Table 2-49 Daily measurement items

Measurement location		MBR		RO		
		Influx	Processing	Influx	Advanced processing	Concentrated effluent
Consecutive	Electrical conductivity (EC)	●	−	●	●	●
	Flow rate	●	●	●	●	●
	Water temperature	−	−	●	−	−
	Turbidity (SDI)	−	−	●	−	−
	Residual chlorine	−	−	●	−	−
	Filtered water suction pressure	−	●	−	−	−
	Concentrated hydraulic power	−	−	−	−	●
1 time/day	Chemical Oxygen Demand (COD)	●	●	−	−	−
	Water temperature	−	●	−	−	−
	pH (measure of acidity)	●	●	−	−	−
1 time/week	Biochemical Oxygen Demand (BOD)	●	●	−	−	●
	Chemical Oxygen Demand (COD)	−	−	−	−	−
	Suspended solids	●	●	−	−	●

	Total Kjeldahl nitrogen (TkN)	●	●	−	−	−
	Total nitrogen (TN)	●	●	−	−	−
	Total phosphorus (TP)	●	●	−	−	−
one inning /3 months	TkN, nitrate nitrogen ($N\text{-}NO_3$) nitrite nitrogen ($N\text{-}NO_2$)	−	−	−	●	●
	TP	−	−	−	−	−
	Dissolved salts (Na, Ca, Mg, Cl, SO_4 , HCO_3)	−	−	−	●	●
	Metals (Al, Fe, Pb, Co, Hg, Cu, Ni, Zn, Crtot, Mn, Cyanide, Cr_6^+ , Cd)	−	−	−	−	−

Specific points to be considered for each item are listed below.

① Control of water quantity and quality of water supply (ONAS to A-WWTP)

It is necessary to monitor whether the water quality, quantity, and temperature are consistent with the facility design. Periodic analysis of water quality and calibration of conductivity and flow meter values, etc., which are continuously monitored at the facility, should be conducted on a regular basis.

② Water quantity and quality control of highly treated water

Confirmations will be made from time to time as to whether the quality of the treated water at the facility meets the water quality requirements of the customer, GCT. If the required water quality is not met, contact GCT, stop water delivery, investigate the cause, and take immediate action.

③ Daily Inspection Items

Collect and organize various data items related to daily operation and build an information sharing system with related parties including EPC manufacturers. Utilize a monitoring system that transmits data over the Internet or remotely.

④ Check for membrane contamination

The contamination of MBRs and RO membranes is expressed as the differential pressure between the membranes, so it is necessary to collect data on this area at all times. This data should be analyzed so that appropriate measures can be taken such as responding to changes in the inflow water and early cleaning.

⑤ Check for wear, etc. on rotating machine parts

Rotating mechanical parts such as water pumps may be subject to wear during sludge treatment, so maintenance and facility observation should be conducted with this in mind.

⑥ Routine cleaning plan

Water tanks can become dirty after years of operation. A regular cleaning plan should be established.

2-6-2-3 Electric power and equipment required for operation

The electric power, materials and equipment required for operation are shown below, which must be managed at all times to avoid shortages.

(1) Electricity

The study results assume that the facility will use 11,860 kWh (1.98 kWh/m^3) of electricity to produce 6,000 m^3 of treated water per day, which SPC will need to procure.

(2) Water treatment chemicals

To produce treated water, chemicals such as sodium hypochlorite (NaClO), SBS, citric acid and scale inhibitors will need to be utilized. The procurement and management of these chemicals should be handled by the project company. The main water treatment chemicals can be procured in Tunisia.

(3) Cartridge filter

Procurement, inventory control, and replacement of cartridge filters used in RO facilities must also be handled by the project company.

(4) MBR membrane, RO membrane

Procurement, inventory control, and replacement of MBR and RO membranes used at the facility must also be handled by the project company.

(5) Sludge treatment

The process of producing treated water produces sludge, and the project company will be responsible for sludge treatment, including procurement of chemicals to deal with this sludge.

The cost of these maintenance items will be covered by the monthly water sales fees paid by the off-taker. See Section 2-7-2-3 for the project company's feasibility study based on these assumptions.

2-7 Project Cost Estimation

2-7-1 Initial Cost Estimation

2-7-1-1 Costs borne by the Tunisian side

According to the estimation conditions shown in 2-7-1-2, the estimate costs to be borne by the Tunisian side for implementing this Project are as shown in the table below.

Table 2-50 Expenses borne by Tunisia

Item	Local currency (TND)	Japanese Yen (¥)	Remarks
(i) Fees related to A/P and B/A	37,847	1,632,182	B/A: 0.05% of E/N amount
(ii) Tax exemption	947,100	40,840,000	
Total	984,947	42,472,182	

2-7-1-2 Conditions of Cost Estimation

(1) Base Month of Estimation
April 2023

(2) Exchange Rate
EUR1.00= ¥143.66
TND1.00= ¥43.1210

(3) Period of Construction and Procurement
The implementation process for this Project will take approximately 37.2 months from the signing of G/A (assumed to be December 2023) to the procurement and construction of equipment for the A-WWTP, which will fall into the category of Type B government bond projects for which the period between the signing of the Grant Agreement and the start of operation (project completion) (including the period of detailed design) exceeds 24 months. The duration of implementation design and construction/procurement is as indicated in the construction/procurement process.

(4) Others

This Project shall be implemented in accordance with the grant aid program of the Government of Japan. It should be noted that the Project was designed as a project requiring reserve funds.

2-7-2 Operation and Maintenance Cost

2-7-2-1 Facility maintenance costs

2-7-2-1-1 Major expenses comprising maintenance and management costs

The major maintenance and management items for this facility are as follows. This section describes the costs directly relating to treatment (hereafter referred to as "production costs"). For other cost-related items, see "2-7-2-3-3-2 Input items" (2) to (5) below.

Table 2-51 Major Expenses Comprising Maintenance and Management Costs

Recorded items	
(1) Proportional cost components	Electricity expenses
	MBR membrane replacement cost
	RO membrane replacement cost
	Cartridge filter replacement cost
	Cost of water treatment chemicals, including cleaning chemicals
	Sludge disposal costs
(2) Fixed cost components	Personnel expenses
(3) Maintenance expenses	Although the cost of routine equipment repair can be considered part of the manufacturing cost, they are recorded separately from the general costs in paragraph (1) above, taking into account the possibility that relatively large repairs will be made over the 10-year project cycle.
Non-accounted-for items	
(4) On-site management costs	Since ONAS is entrusted with the operation and management of the facility, the management of guards, street lights, fire hydrants, etc., which are on-site management items, are not included in the cost component.
(5) Others	It is assumed that domestic wastewater and individual waste (household waste) generated from the facility will also be treated at ONAS.

2-7-2-1-2 Specific costs

The figures and amounts listed in this section are for reference purposes only and are based on a comprehensive review of industry information obtained by the survey team through on-site and in-country surveys and other information at hand. The prices are not guaranteed and are subject to change.

(1) Electricity cost

Since the A-WWTP uses MBR and RO membrane processes, it can be said that the only major utility that is required is electricity.

i) Unit price of electricity

The Tunisian Electricity Authority STEG 2019 electricity tariff stipulates that medium voltage power is the sum of fixed and metered rates, as shown in Table 2-52.

Table 2-52 STEG Medium Voltage Electricity Tariffs

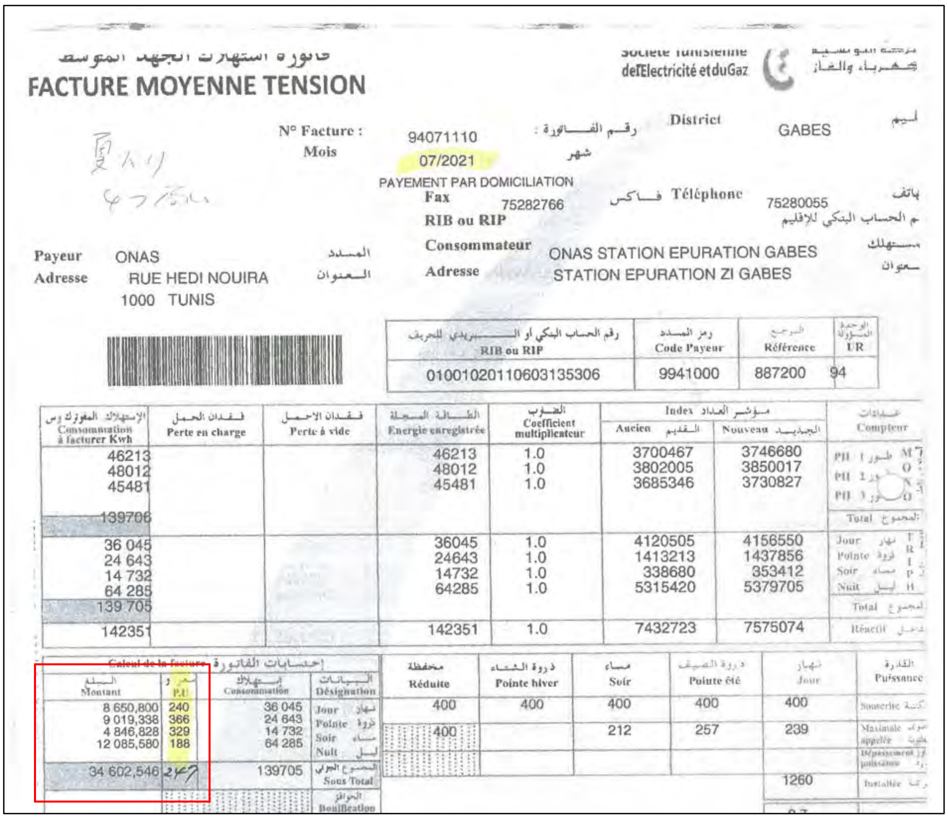
Medium voltage electricity tariffs depend on the hourly electricity consumption and are also subject to municipal duties and VAT

Tariff category	Power charge (mill/KW/Month)	Energy price for each monthly consumption range (mill/KWh) excluding taxes and surtaxes			
		Day	Summer morning peak hour	Night peak hour	Night
Uniform	5 000	251			
Hourly positions	11 000	240	366	329	188
Pumping for irrigation	-	279	NA	Deletion	225
Agriculture irrigation	-	189	Deletion	195	138
Rescue	6 000	264	407	365	200

Source : Medium Voltage Electricity Tariffs, STEG, June 1st 2019

Source: STEG (June 1, 2019)

The above price list is based on time of day, so the rates will vary depending on how operations are conducted. Therefore, reference was made to the actual electricity consumption data from ONAS for the actual case of 24-hour operation. According to this data, the electricity consumption in July 2021 was 247milTND/kWh (Figure 2-47), and in September 2021 it was 225milTND/kWh (Figure 2-48). With reference to these figures, 250milTND/kWh has been adopted as the electricity cost here.



FACTURE MOYENNE TENSION

Société Tunisienne de l'Electricité et du Gaz

N° Facture :	94071110
Mois	07/2021
District	GABES
PAYEMENT PAR DOMICILIATION	
Fax	75282766
Téléphone	75280055
RIB ou RIP	
Payeur	ONAS
Adresse	RUE HEDI NOUIRA 1000 TUNIS
Consommateur	ONAS STATION EPURATION GABES
Adresse	STATION EPURATION ZI GABES

RIB ou RIP	Code Payeur	Référence	UR
01001020110603135306	9941000	887200	94

Consommation à facturer Kwh	Perte en charge	Perte à vide	Energie enregistrée	Coefficient multiplicateur	Index Ancien	Index Nouveau	Compteur
46213			46213	1.0	3700467	3746680	PH 1
48012			48012	1.0	3802005	3850017	PH 2
45481			45481	1.0	3685346	3730827	PH 3
139706							Total
36 045			36045	1.0	4120505	4156550	Jour
24 643			24643	1.0	1413213	1437856	Pointe
14 732			14732	1.0	338680	353412	Soir
64 285			64285	1.0	5315420	5379705	Nuit
139 705							Total
142351			142351	1.0	7432723	7575074	Réactif

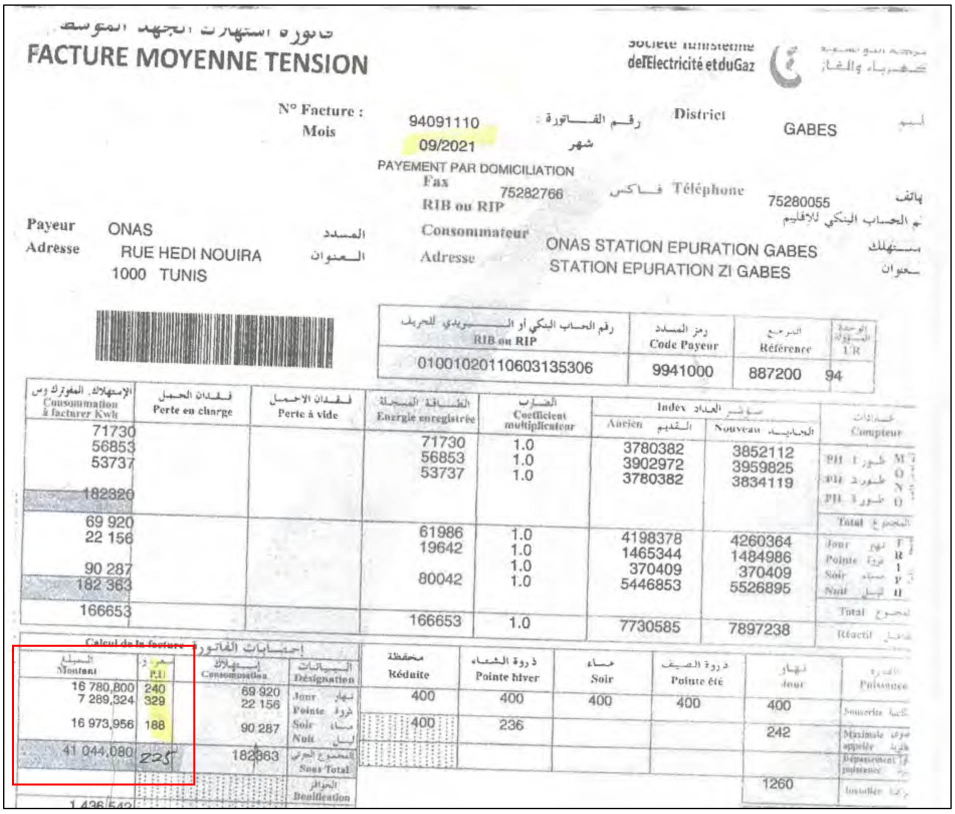
Calcul de la facture

Montant	P.U	Consommation	Désignation
8 650,800	240	36 045	Jour
9 019,338	366	24 643	Pointe
4 846,828	329	14 732	Soir
12 085,580	188	64 285	Nuit
34 602,546	247	139705	Sous Total

Réduite	Pointe hiver	Soir	Pointe été	Jour	Puissance
400	400	400	400	400	Souscrite
400		212	257	239	Maximale appelée
					Dépassement puissance
				1260	Installée

Source: ONAS

Figure 2-47 Example of ONAS Power Usage (July 2021)



FACTURE MOYENNE TENSION

Société Tunisienne de l'Electricité et du Gaz

N° Facture :	94091110
Mois	09/2021
District	GABES

PAYEMENT PAR DOMICILIATION

Fax 75282766 — Téléphone 75280055

Payeur	ONAS
Adresse	RUE HEDI NOUIRA 1000 TUNIS
Consommateur	ONAS STATION EPURATION GABES
Adresse	STATION EPURATION ZI GABES

RIB ou RIP	Code Payeur	Référence	TR
01001020110603135306	9941000	887200	94

Consommation à facturer Kwh	Perte en charge	Perte à vide	Energie enregistrée	Coefficient multiplicateur	Index Ancien	Index Nouveau
71730			71730	1.0	3780382	3852112
56853			56853	1.0	3902972	3959825
53737			53737	1.0	3780382	3834119
182320						
69 920			61986	1.0	4198378	4260364
22 156			19642	1.0	1465344	1484986
				1.0	370409	370409
90 287			80042	1.0	5446853	5526895
182 363						
166653			166653	1.0	7730585	7897238

Calcul de la facture

Montant	P.U	Consommation	Désignation
16 780,800	240	69 920	Jour
7 289,324	329	22 156	Pointe
16 973,956	188	90 287	Soir / Nuit
41 044,080	225	182363	Sous Total

Réduite	Pointe hiver	Soir	Pointe été	Jour
400	400	400	400	400
400	236			242
				1260

Source: ONAS

Figure 2-48 Example of ONAS Power Usage (September 2021)

ii) Electricity consumption

Table 2-53 shows the specific power consumption of an A-WWTP based on various industry information and the results accumulated by the survey team.

For MBRs, reference was made to industry information as well as guidelines from the Japan Sewage Works Agency, etc. For ROs, an investigation was conducted primarily into the power requirements for high-pressure pumps. The power requirements for various other water pumps, lighting, and air conditioning, etc. were estimated based on the distance, water level, building size, and other factors. As a result, the power requirement for this facility is 1.98 kWh/m^3.

Table 2-53 A-WWTP Power Requirements

No	Process	Water Flowrate	Equipment	1-2 yrs					3-10yrs				
1	MBR		Blower	0.30	kWh/m3				0.30	kWh/m3			
			MBR filtrated water suction pump	0.02	kWh/m3				0.02	kWh/m3			
			Other circulation pump	0.10	kWh/m3				0.10	kWh/m3			
			Others (Auto balve, flow meter etc)	0.10	kWh/m3				0.10	kWh/m3			
		10,000 m3/d	sub total	0.52	kWh/m3	5,200	kWh/day		0.52	kWh/m3	5,200	kWh/day	
2	RO		High pressure pump	0.53	kWh/m3				0.53	kWh/m3			
			Others (Auto balve, flow meter etc)	0.10	kWh/m3				0.10	kWh/m3			
		6,000 m3/d	sub total	0.63	kWh/m3	3,780	kWh/day	kWh/(m3/d)(*)	0.63	kWh/m3	3,780	kWh/day	kWh/(m3/d)(*)
			MBR+RO total			8,980	kWh	1.50			8,980	kWh	1.50
3	Others	6,000 m3/d	Transfwer pump, etc Office			2,880	kWh	0.48			2,880	kWh	0.48
			Total			11,860	kWh	1.98			11,860	kWh	1.98

(*)m3/d: Total production capacity(6,000m3/day)

Source: Survey Team

(2) MBR and RO membranes

It is thought that the MBR membrane used for pretreatment will be a flat-sheet type, which is relatively resistant to clogging. The membrane filtration area has been appropriately designed to extend the membrane life. Membrane replacement was recorded as a cassette unit, full replacement in 10 years, i.e., at a rate of 10%/year.

Since the RO membrane consists of an MBR equivalent to an MF membrane in the front stage, fouling from SS is not expected to occur. However, biofouling due to dissolved BOD is a concern, so it is expected that there will be a higher cleaning frequency than with other applications. Based on the above, it is estimated that all the membranes would be replaced in 7 years (about 15%/year).

Prices were estimated based on international market prices. The results are shown in Table 2-54. Note that these amounts are pooled annually on a budgetary basis for both MBRs and ROs, regardless of whether they are exchanged or not.

Table 2-54 MBR and RO Membrane Replacement Costs

1. MBR

MBR Membrane data

		Membrane Element	Casset	Module
Casset	pcs			12
Element	pcs		50	600
Membrane area	m2	0.7	35	420
			9,000	yen/m2
	Market price		315,000	yen/casset

Actual plant

MBR Filtrated water capacity	2,000 (m3/d)	10,000 (m3/d)	
Train numbers	1	5	
Module	10	50	pcs
Casset	120	600	pcs
Element	6,000	30,000	pcs
Membrane area	4,200	21,000	m2
Water flux	0.48	0.48	m3/d/m2

RO production: **6,000** m3/d x 365

40	yen/TND

Replacement

Casset Replacement cost					
1-2 years			3-10 yeas		
10%/year	60	casset/year	10%/year	60	casset/year
(10 yrs replace base)			(10 yrs replace base)		
unit price	315,000	yen/caset	unit price	315,000	yen/caset
Total	18,900,000	yen/year	Total	18,900,000	yen/year
=	2,190,000	m3/year	RO prod:	2,190,000	m3/year
	8.63	yen/RO production(m3/d)		8.63	yen/RO production(m3/d)
	0.22	TND/RO production(m3/d)		0.22	TND/RO production(m3/d)

2. RO

RO Element	115 pcs	14PV + 9 PV= 23PV, x5 element/PV = 115pcs/Train
	575 pcs	= 115pcs/Train x 5Train
Market price	70,000	yen/RO element

RO production: **6,000** m3/d x 365

40	yen/TND

1-2 years			3-10 yeas		
15%/year	86	RO element/year	15%/year	86	RO element/year
Only budget view point.			Only budget view point.		
unit price	70,000	yen/RO element	unit price	70,000	yen/RO element
Total	6,020,000	yen/year	Total	6,020,000	yen/year
=	2,190,000	m3/year	RO prod:	2,190,000	m3/year
	2.75	yen/RO production(m3/d)		2.75	yen/RO production(m3/d)
	0.07	TND/RO production(m3/d)		0.07	TND/RO production(m3/d)

Source: Survey Team

(3) Cartridge filters

Based on various industry information and the results estimated by the survey team, a price of 0.01 TND/m^3 is listed.

(4) Water treatment chemicals

The required chemical type and consumption were estimated using the current system, and 0.20 TND/m^3 is given based on separately surveyed market prices.

(5) Sludge treatment

The amount of sludge generated will increase in the first two years due to the high BOD and SS of the water from the A-WWTP. In 2-7-2-3-1 (2) Project Schedule Figure 2-59 (same as the figure below), it shows that the amount of sludge generated will decrease from the third year as the quality of the water improves. Table 2-55 shows specific estimates of the costs associated with sludge treatment.

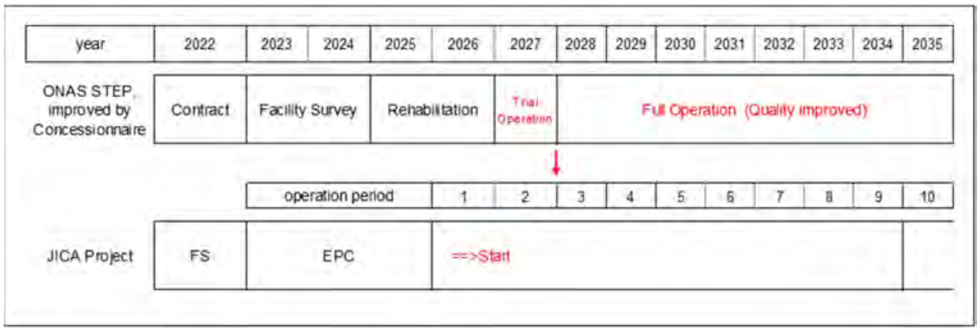


Figure 2-49 Project Schedule

Table 2-55 Sludge Disposal Costs

Expected Cost for Sludge treatment

40 yen/TND

1. Sludge cost estimation

		Now	After rennovation
Treatment process		MBR	Sub-merged MF
years after A-WWTP starts		1-2 yrs	3-10 yrs
SS, in raw water	mg/l	150	30
Sludge volume generated	DS-ton/day	1.05	0.21
Estimated competitive cost based on WWTP in Japan			
Chemical cost	*J.Yen/year*	*5,487,443*	*1,097,489*
Cost of Sludge treatment	*J.Yen/year*	*728,175*	*145,635*
Electric cost	*J.Yen/year*	*119,233*	*23,847*
Maintenance cost	*J.Yen/year*	*5,000,000*	*1,000,000*
Total Sludge treatment	J.Yen/year	11,334,852	2,266,970
Annuall treatment volume(m3/year)	6,000m3/dx365	2,190,000	2,190,000
Sludge treatment cost per production volume	J.Yen/m3	5.2	1.0
	TND/m3	0.13	0.03

2, for FIRR

Other cost, such as landfill disposal cost		*plus alpha*	*plus alpha*
Total (rounded)	TND/m3	0.20	0.05

Source: Survey team

On this bases, 0.20 TND/m^3 shall be recorded for the first two years and 0.05 TND/m^3 for years 3-10.

(6) Personnel expenses

The organizational chart required for facility operation is described in Section 2-6-1 (2). The average personnel cost per grade in Tunisia in 2020 is shown in Table 2-56.

Table 2-56 Average Labor Costs by Grade in Tunisia

	Number	Study degrees	Years of experience	Recommended salary rationale	Benchmark recommended salary (TND)	Gross / Net	Yearly Cost (TND)
Plant Director	1	Master / Engineering	+15 years of experience	Based on similar positions in comparable industries. Remunerations for this position should also include special benefits specially to overcome low attractiveness of the location (car, houses)	4 861	Net	58 332
					6 751	Gross	81 012
Japanese president(***)	1	Master / Engineering	+15 years	Based on similar positions in comparable industries	TBD	TBD	TBD
					TBD	TBD	TBD
Technical Manager	1	Engineering	+10 years of experience	Based on similar positions in comparable industries	2 453	Net	29 436
					3 408	Gross	40 896
Shift Manager	2	Engineering	+10 years of experience	Based on similar positions in comparable industries	2 453	Net	58 872
					3 408	Gross	81 792
Water Analyst	1	Technician	No specifications	Based on similar positions in comparable industries	905	Net	10 860
					1 250	Gross	15 000
Data Operator day time worker	1	Technician	No specifications	Based on similar positions in comparable industries	905	Net	10 860
					1 250	Gross	15 000
Administration Operator	1	Technician	No specifications	Based on similar positions in comparable industries	905	Net	10 860
					1 250	Gross	15 000
Shift operator	8	No specifications	No specifications	Based on similar positions in comparable industries	448	Net	43 008
					619	Gross	59 424
Total yearly Cost (TND)						Net	222 228
						Gross	308 124

Source: Survey Team

As described in Section 2-6-1 (2), the CEO will be based in Japan and will operate on a business trip basis, and the Tunisian factory manager will be delegated to manage the business. As shown in Table 2-62 below, this SPC has sales of 130 million yen and gross profit of 8 million yen, so it was determined that the business would not be viable on an expatriate basis. Based on the above, Table 2-57 shows the calculation of the total labor cost required to operate the facility, and, for cost estimation purposes, the labor cost is listed as 426,000 TND/year (6,000 m of water produced^3 /d conversion 0.20 TND/m^3).

Table 2-57 Labor Cost

based by EY (2022-1-30)

Position	job	Nationality	person	Class	TND/year /person	Total/year	
Deputy General Manager	Plant director	Tunisia	1	1	81,000	81,000	
Operation Manager	Shift manager, Tech manager,	Tunisia	2	2	41,000	82,000	
Skilled operator	Under Plant director, admi	Tunisia	1	3	15,000	15,000	
Skilled operator	Under Tech, tech manager	Tunisia	1	3	15,000	15,000	
Skilled operator	Under shift, day time	Tunisia	1	3	15,000	15,000	
Skilled operator	Under shift, group leader	Tunisia	4	3	15,000	60,000	
Operator	Under shift, shift operator	Tunisia	4	4	7,500	30,000	
	Tnisian Staff					298,000	
General Manager(*)	Project manager	Japanese	1	S	128,000	128,000	
Total (TND/year)						426,000	TND
			x	40	yen/TND=	17,040,000 yen	

(*)General Manager (Japanese, Business trip base)

Air ticket : @650,000yen/time	650,000	yen/time
Absence fee : @55,000x15days=825,000yen/time	825,000	yen/time
Hotel : @15,000x15days=225,000yen/time	225,000	yen/time
Total :	1,700,000	yen/time
x	3	times/year
=	5,100,000	yen/year
÷40yen/TND=	128,000	TND/year

Source: Survey Team

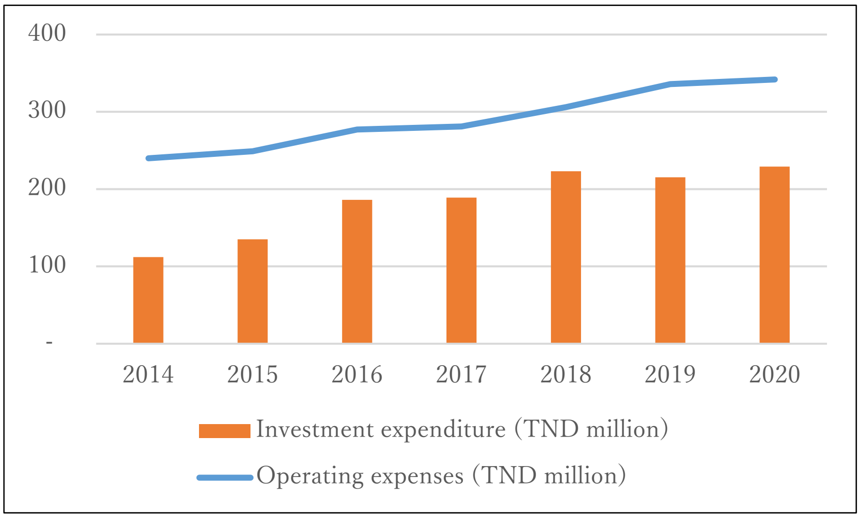
2-7-2-2 Financial analysis of ONAS and GCT

2-7-2-2-1 Financial analysis of ONAS

In this Project, the O&M provider will provide O&M services to ONAS. On the other hand, ONAS will be responsible for selling the highly-treated water produced through O&M operations to GCT based on the contract with GCT, and will receive a portion of the water sales fee as compensation for its management services. In light of this, the financial situation of ONAS is as follows.

ONAS's operating expenses have been increasing with the expansion of its service supply area, totaling TND 342 million in 2020. According to ONAS, 62.0% of these operating expenses will be covered by sewerage user fees, 25.2% by other revenues, and 4.8% by state funds.

Investment spending has also increased during this period, reaching 229 million dinars in 2020, of which 72% is financed by external loans and grants and 28% by expenditures from the national budget, according to ONAS.



Source: ONAS Website page

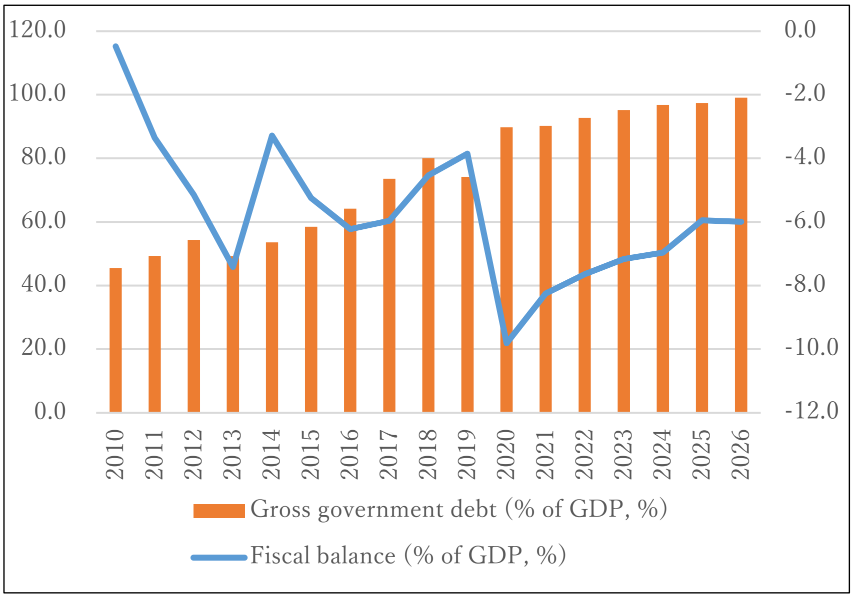
Figure 2-50 ONAS Operating and Investment Expenditures

Thus, the operations of ONAS are supported by grants and other funds, which are backed by the following provisions of Article 3 of the ONAS Act.

In order to carry out its operations, ONAS may obtain grants or state contributions from the general account budget for the purpose of covering deficits arising from its operations to the extent that the costs cannot be met by its assets.[1]

Given the existence of this provision, it is expected that the Government will basically supplement the funds necessary for the implementation of the Project in the future. However, it should be noted that the Tunisian economy is currently in a difficult situation. The International Monetary Fund expects that there will continue to be a large deficit, and it is expected that ONAS will be required to improve the efficiency of its operations.

During the current survey, a senior official from MoE, the ONAS competent authority, expressed the hope that ONAS would be involved in this Project to earn income form fees, and that similar projects would be implemented at other wastewater treatment plants. This may be due in part to the difficult financial situation in Tunisia. In light of this, ONAS is expected to actively participate as a partner in this project in order to secure its own revenue.



(Note: Data for 2020 and thereafter are projections of the International Monetary Fund)
Source: International Monetary Fund, World Economic Outlook (October 2021).

Figure 2-51 Tunisia's Fiscal Balance and Total Debt

[1] "L'Office National de l'Assainissement bénéficiera des subventions ou de dotations de l'Etat inscrites à cet effet au budget général et destinées, dans la mesure où ses ressources ne peuvent y faire face, à combler le déficit éventuel provenant de l'exploitation."

2-7-2-2-2 Financial Analysis of GCT

In this Project, the O&M operating company will receive compensation from ONAS for O&M services, but the source of funds will be water sales fees from GCT. In this regard, the financial situation of GCT is as follows.

GCT has recently been in a challenging financial situation, mainly due to the decline in domestic phosphate production. According to information that has been obtained, after a decline in sales in 2017 and 2018, sales in 2019 increased by 7.3% year-on-year to TND 1,294 million, but net income was a loss of TND 171 million due to increased expenses for machinery, equipment, etc. The company continues to make a loss. Although it posted a significant loss in 2019, it is in the process of generating cash through asset sales to maintain cash on its balance sheet.

Against this backdrop, the Government of Tunisia is emphasizing exports from its main export industry, the phosphorus industry. According to what was heard during a field study, the Tunisian MoIEM states that, first of all, it is necessary to put an end to the social movements and strikes since the Jasmine Revolution that started in 2011 and that continued until 2019, which are the cause of the decline in the production of phosphate ore, the raw material, and to restore the production volume as soon as possible. Also, in order to recover production, the company is focusing on securing the water necessary for production, and, according to MoIEM, although GCT itself is in the red, it has not experienced any delays or non-payment of water charges to SONEDE.

Table 2-58 GCT Financial Statements

	2016	**2017**	**2018**	**2019**
Balance sheet				
Total Assets	1853	2116	2317	2242
(Cash and Equivalents)	*17*	*109*	*107*	*125*
Total Equity	616	542	388	218
Total Liabilities	1237	1574	1929	2024
Profit & Loss				
Total Turnover	1371	1309	1206	1294
Total Operating Costs	1383	1272	1196	1353
Operating result	-12	37	9	-59
Net earnings	-72	-74	-109	-171
Cash Flow				
Operating Cash Flow		82	73	-103
Investing Cash Flow		-14	-64	140
Financing Cash Flow		4	-63	-47

Source: Tunisian Ministry of Economy, Finance and Investment, "Report on Public Companies GCT Financial Statements.”

2-7-2-3 Economic evaluation of SPC

The economic evaluation of SPC is described in 2-7-2-3-1 Assumptions, 2-7-2-3-2 Processing and Sales Plan, and 2-7-2-3-3 Financial Analysis.

2-7-2-3-1 Assumptions

(1) Operational entities to be considered

This section examines the economics of SPC's contracted operation of the A-WWTP (owned by ONAS) to be constructed in the current Project.

(2) Project schedule

The assumed project schedule is shown in Figure 5-6.

year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ONAS STEP, improved by Concessionaire	Contract	Facility Survey		Rehabilitation		Trial Operation	Full Operation (Quality improved)							
		operation period			1	2	3	4	5	6	7	8	9	10
JICA Project	FS	EPC			==>Start									

Source: Survey team

Figure 2-52 Project Schedule

It has now been decided that the existing Gabes wastewater treatment plant will be upgraded and operated and maintained under a concession system. According to the contract, the contract will be completed in 2022, followed by a two-year study of facility improvement specifications, and then rehabilitation will take place in 2025-2026. Therefore, treated wastewater from the current ONAS operation is expected to be improved after the concessionaires begin operation in 2027.

On the other hand, construction of the new facilities in this Project is expected to be completed by the end of 2025, and operation is generally expected to start in early 2026. Therefore, the water quality in the first year after the start of the Project (2026) will be the same as prior to the modification, and high-quality water will be supplied from 2027. The second year, 2027, may be delayed due to construction schedule delays and the possibility that the water quality may not reach a stable level.

(3) Project life

The project life is considered to be 10 years.

(4) Price increases

Costs and other information used in this study are based on August 2021 survey results. The study does not take into account inflation and wage increases by 2026, when the A-WWTP to be built in the Project is scheduled to start, and thereafter until the end of the project life. For reference, SONEDE prices, which are related to SPC sales prices, are expected to increase in the future, and sales prices (prices for GCT) may increase in line with these increases. The price list as of 2021 was used in this study.

(5) Currency

Since there is little difficulty in locally procuring the materials and equipment required for operation, costs have been estimated in the local currency, the Tunisian dinar (TND). In order to get a rough idea of the amount in Japanese yen, the following exchange rate was used in the calculations.

1TND = 40 yen

(6) Capital construction costs and interest rates on loans

Since this is a grant aid project funded by the Government of Japan, the SPC is not responsible for the construction costs of the A-WWTP and will not incur the depreciation costs that constitute project costs. For the purposes of this study, the CAPEX cost for the construction of the facility is assumed to be zero.

The necessary funds for the current Project are to be invested in the form of capital equivalent to three months of sales as a working capital reserve for the time being.

It is assumed that the working capital preparation is entirely self-financed and is not financed by loans. Also, it was assumed that the collection of debts and payments for operations are to be settled in cash on a monthly basis rather than by bills. For this reason, the interest burden of loans, interest during construction (IDC) and working capital (WC) were not taken into consideration in the FIRR calculations.

(7) Equipment-related import taxes, etc.

Import taxes, etc. are not taken into consideration in the costs relating to equipment since the subject equipment does not exist as an SPC in this case.

(8) Action to be taken at the end of the Project

Under the terms of the contract, the Project will come to an end after 10 years, at which point it will be decided whether to terminate or continue operations thereafter. Therefore, in this estimation, at the end of the 10-year period (the 11th year in the estimation), the capital invested at the beginning of the period will be recovered in the form of a sale of shares. For the purposes of our calculations, we have assumed that there will be no gain or loss on the sale of the shares, and therefore no income tax will be incurred by the sale of shares.

2-7-2-3-2 Processing and sales plan

(1) Advanced treated water sales plan

In consultation with ONAS and GCT, the study assumed that "10,000m^3/day of water derived from the existing ONAS wastewater treatment plant will be treated at the A-WWTP and 6,000m^3 will be sold to the off-taker GCT." Cases where off-taker take-back volumes decreased for reasons attributable to the off-taker were ignored, as were penalties for insufficient supply due to SPC's operational errors, etc. Estimates are based on the assumption that 6,000m^3/day, which is the specified volume, will be delivered.

(2) Selling price

Given that GCT will purchase the water at a price that does not exceed the current price of purchasing from SONEDE, 1.62 TND/m^3 was used as the SONEDE sales price (6th block) for FY2021 as shown in the estimates in Table 2-59.

Table 2-59 SONEDE Prices (2021)

Water	Consumption m^3	2016年			2020年			May-21		0.36443004
	per Quarterly	Tariff		Tariff	Tariff		Tariff (USD per m^3)	Tariff		Tariff (USD per m^3)
		TND per m^3	per 1st Block	(USD per m^3)	(TND per m^3)	per 1st Block		(TND per m^3)	per 1st Block	
				2016 (TND=0. 50USD)			2020 (TND=0. 37USD)			2021 (TND=0.37USD)
1st Block	0 to 20	0.16	1.000	0.08	0.2	1.000	0.07	0.200	1.000	0.07
2nd Block	20.01 to 40	0.27	1.688	0.14	0.495	2.475	0.18	0.665	3.325	0.24
3rd Block	40.01 to 70	0.37	2.313	0.19	0.62	3.100	0.23	0.810	4.050	0.30
4th Block	70.01 to 100	0.67	4.188	0.34	0.94	4.700	0.35	1.120	5.600	0.41
5tf Block	100.01 to 150	0.82	5.125	0.42	1.11	5.550	0.41	1.290	6.450	0.47
6th Block	150.01 to 500	1.14	7.125	0.58	1.43	7.150	0.53	1.620	8.100	0.59
7th Block	500.01 and more	1.19	7.438	0.61	1.49	7.450	0.55			
Fixed Charge		8.16		4.16						

Source: Survey Team

2-7-2-3-3 Financial analysis

2-7-2-3-3-1 Method

Under the aforementioned assumptions, the financial internal rate of return (FIRR) was estimated using the discounted cash flow (DCF) method.

2-7-2-3-3-2 Input items

(1) Direct manufacturing cost

Based on the various data in Section 2-7-2-1-2 above, we estimated the direct manufacturing cost (processing cost) at the A-WWTP to be 1.39 TND/m^3 for the first two years after start-up and 1.24 TND/m^3 thereafter, as shown in Table 2-60.

Table 2-60 Summary of Direct Processing Costs

item	refernce	1-2 years	3-10 years
1 Electric Power	1.98kWh/m3、0.25TND/kWh	0.50	0.50
2 Labor cost	426,000TND/year	0.19	0.19
3 Chemical	NaClO、SBS、Citric acid …	0.20	0.20
4 Cartridge Filter	5 μ	0.01	0.01
5 Membrane			
MBR	600casets/5trains x 10%/yr	0.22	0.22
RO	575pcs/5trains x 15%/yr	0.07	0.07
6 Sludge treatment		0.20	0.05
	Total (TND/production capacity (m3/d))	***1.39***	***1.24***

Source: Survey Team

(2) Maintenance expenses

As noted in section 2-7-2-1-1 above, in order to account for the possibility that relatively extensive repairs will be made over the 10-year project life, the estimated amount is separate from the general cost of "(1) Direct manufacturing cost," above.

Specifically, it is anticipated that sludge-related equipment repairs will be necessary until the completion of the initial renovation of the existing ONAS wastewater treatment plant since a large influx of SS, BOD, and other constituents is expected to occur during this period. On the other hand, since the facilities are still new at this time, repairs to other equipment are not expected to occur to a significant extent. Therefore, for the purpose of estimation, we have assumed an average annual cost equivalent to 5 million yen, which is separate from the direct manufacturing cost, and is mainly for repairs involving subcontracting, or 50 million yen over the 10-year life of the Project. This corresponds to approximately 4% of total sales of 1,350 million yen during this period (approximately 27% of cumulative gross profit of approximately 180 million yen). Personnel costs related to maintenance have already been included in the personnel expenses in section (1).

(3) Operating and SG&A expenses

Since the water produced by this Project will basically be returned to GCT, few operating expenses will be incurred for selling the product, as is the case with general companies. However, since payment collection operations and general administrative expenses are expected to be incurred, an amount of 6 million yen (i.e., approximately 5% of annual sales) was recorded based on the actual results of similar facilities.

(4) Taxes and dues, etc.

As taxes and dues, the following amounts were deducted according to the Tunisian system:

- Registration tax: 0.5% of sales (including 19% VAT) for the first three years
- Corporate tax: 15% of each year's profit
- Social insurance premium: 1% of each year's profit
- Local tax: 0.2% of sales (including 19% VAT) for each year
- Tax exemption for newly established companies: 100%, 75%, 50%, and 25% reduction of corporate income tax for 4 years from the first year of establishment.

(5) Amortization expense

Since the project is free of charge, there is no CAPEX for the equipment. Therefore, depreciation costs can be ignored.

2-7-2-3-3-3 Results of the study

(1) FIRR for the reference case

The FIRR for the reference case is shown in Table 2-62.

(2) Cash Flow Analysis

Since this is a grant aid project, SPC does not need to raise funds for the construction of the facilities. Therefore, there will be no construction-related debt, associated borrowing interest, or amortization costs. Given this unique financial situation, SPC will be judged to be soundly managed in terms of cash flow if it has a positive after-tax profit as shown in Table 5-14.

The consideration of the investment in the aforementioned FIRR estimation was based on the assumption that the company would use its own funds, not loans.

Incidentally, the cash flow chart shows a deficit in the first year due to the lump-sum payment of registration tax in the first year (the financial plan is to pay with cash injected as capital so borrowing is not required), but the tax will be recovered in the following year. From the third year onward, there will be an influx of treated water with stable quality, which will greatly improve the profitability of the Project. The profit margins have also improved significantly. It is estimated that TND 2,939,000 (approximately 120 million yen) in cash will remain in the final year of the Project. The collection periods for accounts receivable and accounts payable are assumed to be one month for sales and one month for operating expenses, respectively, and the difference between the two affects cash flow through changes in working capital.

For reference, the lower part of the same table also shows the estimated results of the projected balance sheet.

Table 2-61 FIRR

Expected Profit and Loss (PL)

Note: Facility is constructed with Grant. Deprciation is not considered.

MBR	2,000	m3/d/train
RO	1,500	m3/d/train
Operation	365	day/year

	New price				
Treated fee (price) : ONAS to GCT	1.62	TND/m3	, incl ONAS	5	% Commission
SPC to ONAS	1.54	TND/m3		177,390	TND/year income
			=	7,095,600	Yen/year income

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Concessionnaire	Contract	Facility Survey (2yrs)		Rennovation (2yrs)		Trial operation	Full operation								
						trial period	==>Quality improved								
JICA Project	FS	EPC (～Nov 2025)			==>Start										

MBR==>Partially modified to submerged membrane from MBR, which reduces sludge treatment cost.

Operation after start up			-1	1	2	3	4	5	6	7	8	9	10	11	
			2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	
No of MBR train	train			5	5	5	5	5	5	5	5	5	5		
No of RO train	train			4	4	4	4	4	4	4	4	4	4		
Treated water	m3/d			6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000		
(Producion capacity)	=m3/year			2,190,000	2,190,000	2,190,000	2,190,000	2,190,000	2,190,000	2,190,000	2,190,000	2,190,000	2,190,000		
Sales price	TND/m3			1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54		
Sales cost	TND/m3			1.39	1.39	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24		
Revenue (S)	TND/year			3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	3,370,410	33,704,100	
Sales cost (direct cost)	TND/year			3,044,100	3,044,100	2,715,600	2,715,600	2,715,600	2,715,600	2,715,600	2,715,600	2,715,600	2,715,600		
Sales cost (maintenace)	TND/year		(1-3yrs :5 mio yen) (4-10yrs: 5 mio yen)	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000		
Depreciattion	TND/year			0	0	0	0	0	0	0	0	0	0		
Gross Profit	TND/year			201,310	201,310	529,810	529,810	529,810	529,810	529,810	529,810	529,810	529,810	4,641,100	
Selling, general and administrative expenses	TND/year	=Sales Revenue x 5%		168,521	168,521	168,521	168,521	168,521	168,521	168,521	168,521	168,521	168,521		IRR before Tax
Profit before tax (P)	TND/year		▲ 887,000	32,790	32,790	361,290	361,290	361,290	361,290	361,290	361,290	361,290	361,290	887,000	25%
			investment yearly revenue (S) x 3/12 (=36million J.Yen)											withdrawal of investment	
Tax	Corporate tax	Px15%		4,918	4,918	54,193	54,193	54,193	54,193	54,193	54,193	54,193	54,193		
	Social insurance	Px 1%		328	328	3,613	3,613	3,613	3,613	3,613	3,613	3,613	3,613		
	Loacal tax	Sx(1+Value-added tax19%)x0.2%		8,022	8,022	8,022	8,022	8,022	8,022	8,022	8,022	8,022	8,022		
	Registration tax	Sx(1+Value-added tax19%)x3x0.5%		60,162											
	Tax exemption	1st year▲100%, 2nd year▲75%, 3rd year▲50%, 4th year▲25%		▲ 4,918	▲ 3,689	▲ 27,097	▲ 13,548								
Profit after tax	TND/year		▲ 887,000	▲ 35,722	23,210	322,558	309,010	295,462	295,462	295,462	295,462	295,462	295,462	887,000	21%

Table 2-62 Cash Flow

Operating Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
(Unit TND)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ONAS to GCT				1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
ONAS Commission Rate				0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Inflation Rate(%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Processing cost(TND/m3)				1.39	1.39	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
1. Cashflow													
Cashflow from Opeating Activity													
Net profit after tax	0	0	0	▲ 35,722	23,210	322,558	309,010	295,462	295,462	295,462	295,462	295,462	295,462
Depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in working capital	0	0	0	▲ 16,776	0	▲ 27,375	0	0	0	0	0	0	44,151
Cashflow from Investing Activity													
Capital Incestment	0	0	0	0	0	0	0	0	0	0	0	0	0
Cashflow from Financial Activity													
Equity Injection	0	0	886,950	0	0	0	0	0	0	0	0	0	▲ 886,950
Dividend	0	0	0	0	0	0	0	0	0	0	0	0	▲ 2,391,827
Net Cashflow	0	0	886,950	▲ 52,498	23,210	295,183	309,010	295,462	295,462	295,462	295,462	295,462	▲ 2,939,164
Opening Cash	0	0	0	886,950	834,452	857,663	1,152,846	1,461,856	1,757,318	2,052,779	2,348,241	2,643,702	2,939,164
Closing Cash	0	0	886,950	834,452	857,663	1,152,846	1,461,856	1,757,318	2,052,779	2,348,241	2,643,702	2,939,164	0
2 Balance Sheet													
Assets													
Cash	0	0	886,950	834,452	857,663	1,152,846	1,461,856	1,757,318	2,052,779	2,348,241	2,643,702	2,939,164	0
Account receivable	0	0	0	280,868	280,868	280,868	280,868	280,868	280,868	280,868	280,868	280,868	0
Property, Plants and Equipments	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Assets	0	0	886,950	1,115,320	1,138,530	1,433,714	1,742,724	2,038,185	2,333,647	2,629,108	2,924,570	3,220,032	0
Liabilities													
Account Payable	0	0	0	264,092	264,092	236,717	236,717	236,717	236,717	236,717	236,717	236,717	0
Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0	0
Total liabilities	0	0	0	264,092	264,092	236,717	236,717	236,717	236,717	236,717	236,717	236,717	0
Equity													
Share Capital	0	0	886,950	886,950	886,950	886,950	886,950	886,950	886,950	886,950	886,950	886,950	0
Retained Earnings	0	0	0	▲ 35,722	▲ 12,511	310,047	619,057	914,519	1,209,980	1,505,442	1,800,903	2,096,365	0
Total Equity	0	0	886,950	851,228	874,439	1,196,997	1,506,007	1,801,469	2,096,930	2,392,392	2,687,853	2,983,315	0

(3) Sensitivity analysis

(i) Impact of ONAS commission ratio

The above estimates are based on the assumption that ONAS pays 5% of the sales price to GCT as commission. The sensitivity of the pre-tax FIRR to the percentage of ONAS commission when this percentage is varied is shown in Figures 2-53.

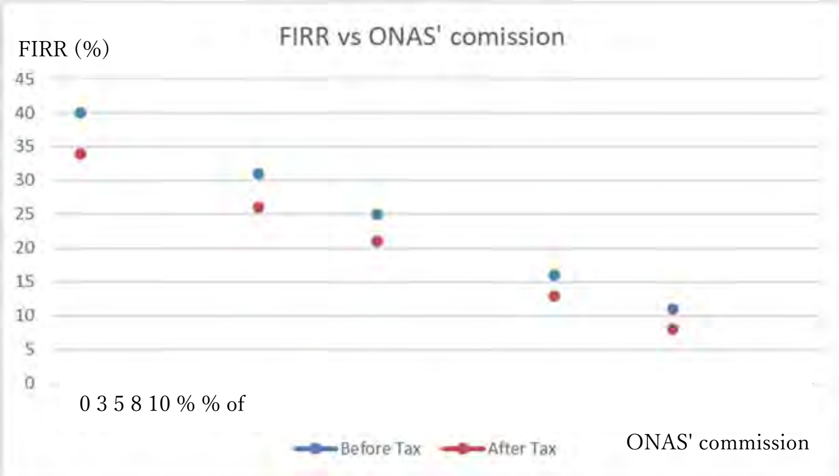


Figure 2-53 ONAS Commission and Pre-Tax FIRR

The impact of the ratio of ONAS commission on the FIRR of the SPC is 2.6% in after-tax FIRR. For companies considering investing in a new business, an FIRR in the low-10% range would be unattractive, so a 5% ONAS fee is appropriate to ensure an FIRR of around 20%. In this case, ONAS would be able to secure an annual commission of approximately TND 180,000 (7,200,000 yen), which would be a compromise for ONAS.

(ii) Impact of ONAS facility improvements

As described in Section 2-7-2-3-1, ONAS has decided to upgrade and operate and maintain the existing Gabes wastewater treatment plant under a concession system. Table 2-63, below, shows the impact on the FIRR with and without these improvements. Case 1 shows the case in which those improvements are made.

If they are not made, the after-tax FIRR would be less than 3% because the cost of sludge disposal would continue to be incurred after the third year, making the Project less attractive to the SPC (Case 3). If the Project were delayed for five years, the same 12% would be achieved, but the attractiveness of the Project would still be small (Case 2).

The concession contract for the existing Gabes sewage treatment plant was signed in June 2023. The concession agreement requires the facility to be rehabilitated and meet effluent standards.

In fact, regarding the setting of the water sales price, it was agreed that at the stage of preparing the bidding documents, the Japanese consultant consults with the off-taker and ONAS, taking into consideration the economic situation from the time of the preparatory survey, and set a price that will make the project feasible.

(iii) Impact of capital recovery

The capital invested prior to the start of the Project will be recovered at the time of its closure. Cases 1 through 3 examine the impact of the timing of concession operation based on this assumption.

For reference, an estimation was also made of the FIRR in the case that the A-WWTP incurs more expenses than expected for repairs due to SPC-induced problems at the time of return, etc., and that these expenses are made up with this investment, i.e., the investment is not recovered. In this case, the FIRR would still be 18%. (Case 4)

Thus, since the difference in FIRR with and without recovery is 2-3%, the presence or absence of recovery is not a significant obstacle.

Table 2-63 Return on Investment and Impact of Timing of Renovation of Existing Sewage Treatment Plant (STEP)

	Case 1	Case 2	Case 3	Case 4
STEP Renovation	On time	3yrs Delayed	10yrs Delayed	On time
Withdrawal of investment	Yes	Yes	Yes	No
ONAS comission (%)	5	5	5	5
Sludge treatment				
1-2 yrs(TND/m3)	0.2	0.2	0.2	0.2
3-5 yrs(TND/m3)	0.05	0.2	0.2	0.05
6-10 yrs(TND/m3)	0.05	0.05	0.2	0.05
Cost				
1-2 yrs(TND/m3)	1.39	1.39	1.39	1.39
3-5 yrs(TND/m3)	1.24	1.39	1.39	1.24
6-10 yrs(TND/m3)	1.24	1.24	1.39	1.24
Maintenace				
1-2 yrs(mio yen/year)	5	5	5	5
3-10 yrs(mio yen/year)	5	5	5	5
FIRR before Tax (%)	25	15	3	23
FIRR after Tax (%)	21	12	3	18

With the signing of the concession agreement, the feasibility of the Project has been studied based on the assumption that there will be an improvement to the discharge water quality of the existing Gabes sewage treatment plant (i.e. the inflow water quality of the advanced wastewater treatment facility), as presented by ONAS. At this time, there is no commitment to renovate the existing Gabes sewage treatment plant. Therefore, we are changing our consideration of the Project to the assumption that the effluent water quality will not be improved.

Accordingly, discussions are underway with Tunisia on the assumption that this grant assistance project, which is subject to bidding by Japanese firms, will secure an FIRR (24%) at the same level as the previous financial review results.

If it is difficult for Japanese firms to ensure business profitability, there is a risk that they will not be able to bid for the Project, and that the Project will be delayed.

Chapter 3　Poject Evaluation

Chapter 3　Project Evaluation

3-1 Preconditions

The prerequisites for Project implementation are listed below.

(1) Project implementation structure

Prior to the start of the Project, there will be no change to the implementation structure of this Project, shown in the figure below.

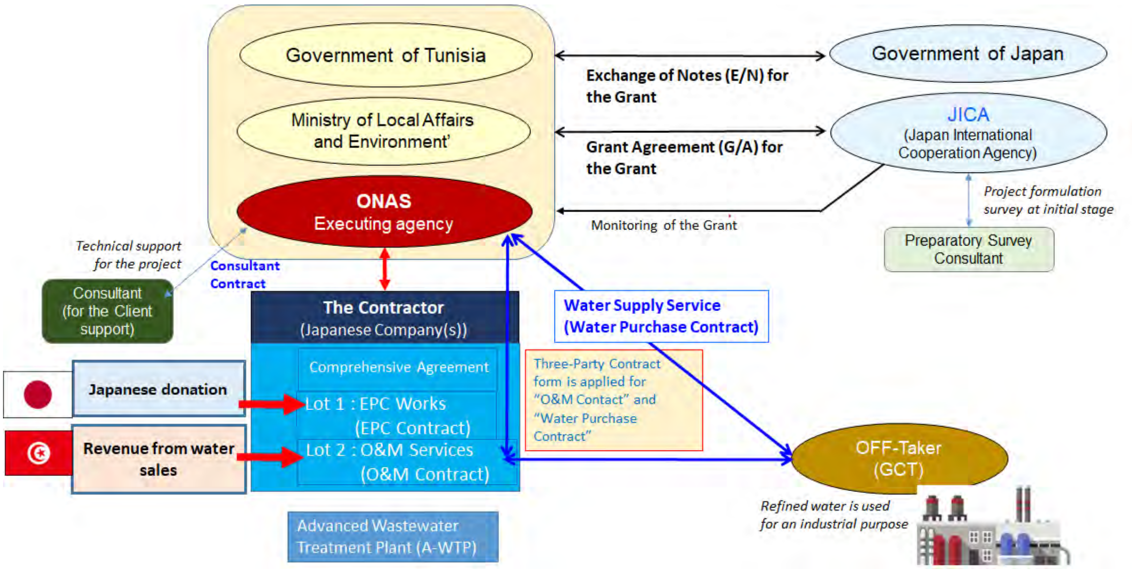


Figure 3-1 Overall Implementation Structure and Contract Type for the Project

(2) Payment authorization letter notification fee and payment fee

The payment authorization letter notification fee and the payment fees stipulated in the grant assistance program must be paid by the Government of Tunisian to the banks with which it has entered into banking arrangements.

(3) Prompt customs clearance

There is a limited construction period for grant assistance, and the materials for some of the major construction projects will be imported from overseas. Since these major construction projects will affect the overall construction period, prompt customs clearance is required for the imported construction materials and equipment.

(4) Tax exemption

A smooth tax exemption process will be essential to the completion of construction within the limited construction period.

(5) Customs procedures

Appropriate support from the Tunisian side will be essential to ensuring smooth customs procedures by the operators.

(6) Land acquisition

A site must be available for the construction of an advanced sewage treatment facility adjacent to the existing sewage treatment facility planned for the Project.

(7) Construction permits

In order to implement this Project, the necessary permits (e.g. pipeline road crossings) for project implementation must be obtained from the relevant agencies.

(8) Acquisition of EIA

The EIA implementation report must be submitted to and approved by ANPE.

3-2 Necessary Input by Recipient Country

The list of counterpart inputs (burdens) that are required in order to achieve the overall project is shown below.

① Assign a counterpart from the executing agency for the smooth implementation of the Project and bear the cost of the counterpart.
② Assign ONAS staff to participate in the soft component activities throughout the project period and pay their daily allowances and other expenses without delay.
③ Secure the necessary land for the construction of an advanced sewage treatment facility.
④ Provide a site as a base camp and stockade for construction.
⑤ Perform the various procedures (permits and approvals) necessary for construction implementation without delay.
⑥ Ensure that the advanced sewage treatment facilities to be constructed under the Project will be properly and effectively maintained, managed, and used, and that the necessary costs, personnel, and systems will be secured for this purpose.

3-3 Important Assumptions

The following external factors affecting the success of this Project are the assumed prerequisites for success.

① Social and security conditions in the target area will not deteriorate rapidly.
② The necessary expenses for this Project will be secured on the Tunisian side.
③ The inflow of secondary treated water to the advanced sewage treatment facility does not decrease.
④ The quality of secondary treated water at the advanced sewage treatment facility does not deteriorate unexpectedly.
⑤ No electricity supply shortage will occur in the target area.
⑥ Adequate staffing will be ensured at ONAS, which will be the main party responsible for the management and operation of the Project.

3-4 Project Evaluation

3-4-1 Relevance

The implementation of this Project through grant assistance from Japan is judged to be highly appropriate from the following points of view.

(i) Beneficiaries and needs
The Gabes Governorate relies on groundwater for about 93% of its water resources (Ministry of Agriculture, Water Resources and Fisheries, 2010), but 90% of groundwater in Tunisia has a high salinity of more than 1.5 g/L (AFD, 2016), forcing the use of expensive drinking water for industrial use, which is a challenge for industrial development. In addition, since the policy of the Government of Tunisia is to prioritize the use of tap water for drinking water and other purposes, companies face the challenge of securing alternative water sources for industrial use. In particular, Gabes is home to the chemical industry that produces, among other things, phosphoric acid products, one of the country's major exports, including the plant of the Tunisian National Chemical Company (GCT). Therefore, there is a high demand for low-salinity, high-quality water resources for industrial use. In view of the above, there is a strong demand for advanced wastewater treatment facilities in Gabes that can treat wastewater to a level that can allows its use as industrial water.

(ii) Contribution to the Tunisian Development Plan
With a semi-arid southern region, Tunisia receives only a small amount of average annual precipitation and uses almost all of its water resources, both surface water and groundwater, which are suitable for use. Therefore, promoting the use of treated wastewater is an urgent issue in Tunisia from the perspective of strengthening water resource management. Under these circumstances, the Tunisian government has set a target of using more than 50% of treated sewage water in its Five-Year National Development Plan (2016-2020), and has identified the promotion of treated sewage water usage as a priority issue in Water Reuse 2050, its sewage sector

development plan, which is currently being formulated.

Therefore, in Tunisia, where securing water resources has become a serious issue, especially in the Gabes region located in the south, this Project will contribute to the conservation of water resources in Tunisia by utilizing treated sewage water as industrial water.

(iii) Contribution to SDGs

The maintenance of sewerage facilities and improvement of wastewater discharge will improve and preserve the quality of public waters, which is the basic role of sewerage systems. The implementation of this Project will also contribute to the improvement of access to drinking water, as drinking water will no longer be used for industrial purposes. This, in turn, will contribute to SDG 6, “Clean water and sanitation for all," as well as the targets listed in the table below.

Table 3-1 SDGs to which this project will contribute

SDGs	Target
6. Clean water and sanitation for all – Ensure availability and sustainable management of water and sanitation for all.	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

(4) Consistency with Japanese assistance policy

Japan's "Country Assistance Policy for Tunisia (September 2019)" lists "improvement of the living environment and promotion of local industries to correct regional disparity" as a priority area (medium-term goal). Specifically, it mentions the "improving the living environment in rural areas by developing social infrastructure such as water supply and sewage systems in inland areas and other rural areas that lack sufficient social infrastructure compared to urban areas.” This is highly consistent with this Project.

3-4-2 Effectiveness

The following section summarizes the quantitative and qualitative effects expected from the implementation of this Project. The indicators and associated SDG monitoring indicator numbers currently anticipated are listed below.

(1) Quantitative effects

Table 3-2 Quantitative Effects Expected from the Project

Indicator	Standard value (Actual results for 2022)	Target value (2028) (3 years after project completion)	SDGs
Treated water discharge (m^3 /day)	20,000	10,000	Compatible with 6.3
Amount of treated waste water used as industrial water (m^3 / day)	0	6,000	Compatible with 6.3

(2) Qualitative effects

Table 3-3 Expected Qualitative Effects of the Project

Qualitative effects	Summary	SDGs
Development of alternative water resources	Urban water supply in Gabes Province is dependent on groundwater (fresh and brine), and withdrawals of groundwater are increasing due to the increase in the population served and per capita water use. The treated water supplied to GCT by the A-WWTP will replace the tap water supplied by SONEDE, thereby saving tap water and providing an alternative water source. Industrial water (TDS 300mg/L or less, 6,000m^3/day) with lower salinity than tap water and groundwater (TDS 2,000-3,000mg/L) will be supplied.	Compatible with 6.4
Use of new recycled water technologies by ONAS	MBR, RO other advanced wastewater treatment facilities such as the A-WWTP is a new recycled water technology for the Gabes region and, by extension, for Tunisia, and will contribute to the future development of recycled water use.	Compatible with 6.a
Groundwater conservation	Reducing water withdrawals with an alternative source to groundwater is expected to prevent the lowering of the groundwater table and the intrusion of seawater.	-

As mentioned above, the needs of the Gabes Governorate are high and the Project contributes to the Tunisian development plan. The quantitative (reduction of untreated water discharge, etc.) and qualitative (use of new recycled water technology, etc.) effects of the Project indicate that the implementation of grant assistance is highly appropriate and highly effective. The Project is expected to be highly effective.

Appendices

Appendix 1　Member List of the Survey Team

Appendix 1　Member List of the Survey Team

(1) First Field Survey

1	Yakuro Inoue	Chief Consultant / Advanced Waste Water Treatment Plant Planning	Japan Techno Co., Ltd.
2	Satoshi Yamada	Business Model for Grant Aid with Operation and Maintenance / Financial Planning	Japan Techno Co., Ltd.
3	Junichi Kamimura	Advanced Waste Water Treatment Plant (Machinery) Design	Japan Techno Co., Ltd.
4	Takafumi Ohashi	Environmental and Social Consideration / Grant Aid Scheme	Japan Techno Co., Ltd.

(2) Second Field Survey

1	Yakuro Inoue	Chief Consultant / Advanced Waste Water Treatment Plant Planning	Japan Techno Co., Ltd.
2	Satoshi Yamada	Business Model for Grant Aid with Operation and Maintenance / Financial Planning	Japan Techno Co., Ltd.
3	Shigeo Hayakawa	Advanced Waste Water Treatment Plant (Civil Engineering) Process Design / Facility Design 2	Japan Techno Co., Ltd.
4	Yoshihiro Takamura	Advanced Waste Water Treatment Plant (Civil Engineering) Design / Facility Design 1 / Natural Conditions Survey	Nippon Koei Co., Ltd.
5	Junichi Kamimura	Advanced Waste Water Treatment Plant (Machinery) Design	Japan Techno Co., Ltd.
6	Iwao Yoshioka	Advanced Waste Water Treatment Plant (Electric) Design	
7	Shuntaro Kinno	Procurement Planning 1 / Cost Estimation	Japan Techno Co., Ltd.
8	Takayuki Hagiwara	Operation and Maintenance	Nippon Koei Co., Ltd.
9	Takafumi Ohashi	Environmental and Social Consideration / Grant Aid Scheme	Japan Techno Co., Ltd.
10	Shinji Hosoya	Legal Affairs / Procurement Planning 2	Japan International Cooperation System

(3) Third Field Survey

1	Chie Shimodaira	Team Leader	Environment Management and Climate Change Team 2, Environment Management and Climate Change Group Global Environment Department, JICA
2	Yukiya Hosaka	Planning Management Officer	Environment Management and Climate Change Team 2, Environment Management and Climate Change Group Global Environment Department, JICA
3	Yakuro Inoue	Chief Consultant / Advanced Waste Water Treatment Plant Planning	Japan Techno Co., Ltd.
4	Shigeo Hayakawa	Advanced Waste Water Treatment Plant (Civil Engineering) Process Design / Facility Design 2	Japan Techno Co., Ltd.
5	Junichi Kamimura	Advanced Waste Water Treatment Plant (Machinery) Design	Japan Techno Co., Ltd.
6	Takayuki Hagiwara	Operation and Maintenance	Nippon Koei Co., Ltd.
7	Takafumi Ohashi	Environmental and Social Consideration / Grant Aid Scheme	Japan Techno Co., Ltd.

(4) Forth Field Survey

1	Yumi Kimura	Team Leader	Environment Management and Climate Change Team 2, Environment Management and Climate Change Group Global Environment Department, JICA
2	Shinichi Wada	Planning Management Officer	Environment Management and Climate Change Team 2, Environment Management and Climate Change Group Global Environment Department, JICA
3	Yakuro Inoue	Chief Consultant / Advanced Waste Water Treatment Plant Planning	Japan Techno Co., Ltd.
4	Junichi Kamimura	Advanced Waste Water Treatment Plant (Machinery) Design	Japan Techno Co., Ltd.
5	Shinji Hosoya	Legal Affairs / Procurement Planning 2	Japan International Cooperation System

Appendix 2　Survey Schedule

Appendix 2　Survey Schedule

(1) First field survey (May to June 2021)

			Chief Consultant / Advanced Waste Water Treatment Plant Planning	Business Model for Grant Aid with Operation and Maintenance / Financial Planning	Advanced Waste Water Treatment Plant (Machinery) Design	Environmental and Social Consideration / Grant Aid Scheme
			Yakuro Inoue	Satoshi Yamada	Junichi Kamimura	Takafumi Ohashi
1	27-May	Thur	Tokyo→			
2	28-May	Fri	→Doha→Tunis (Isolation Day 1)			
3	29-May	Sat	(Isolation Day 2)			
4	30-May	Sun	(Isolation Day 3)			
5	31-May	Mon	(Isolation Day 4)			
6	1-Jun	Tue	(Isolation Day5) Meeting (JICA HQ / Tunisia Office)			
7	2-Jun	Wed	(Isolation Day 6)			
8	3-Jun	Thur	(Isolation Day 7)			
9	4-Jun	Fri	Meeting (ONAS), Courtesy CallCourtecy (JICA Tunisia Office)			
10	5-Jun	Sat	Documentation			
11	6-Jun	Sun	Documentation			
12	7-Jun	Mon	Meeting (Ministry of Industry, Energy and Mines), Meeting (GCT), Move (Tunis→Gabes)			
13	8-Jun	Tue	Meeting (JICA HQ / Tunisia Office), Meeting (GCT Gabes), Site Survey (arround GCT Gabes), Site Survey (ONAS WWTP), Meeting (ONAS Gabes)			
13	9-Jun	Wed	Meeting (JICA HQ / Tunisia Office), Move (Gabes→Tunis), Cost Estimation Survey			
14	10-Jun	Thur	Cost Estimation Survey, Meeting (Ministry of Environment)			
15	11-Jun	Fri	Meeting (JICA HQ / Tunisia Office), Meeting (Ministry of Industry, Energy and Mines), Meeting (Ministry of Forein Affairs and related organizations), Subcontract negotiation			
16	12-Jun	Sat	Documentation			
17	13-Jun	Sun	Documentation			
18	14-Jun	Mon	Documentation, Subcontract negotiation			
19	15-Jun	Tue	Documentation, Subcontract negotiation			
20	16-Jun	Wed	Meeting (Ministry of Environment)			
21	17-Jun	Thur	Meeting (Ministry of Environment), Subcontract negotiation			
22	18-Jun	Fri	Meeting (ONAS)			
23	19-Jun	Sat	Documentation			
24	20-Jun	Sun	Documentation			
25	21-Jun	Mon	Move (Tunis→Gabes)			
26	22-Jun	Tue	Site Survey (Gabes PPP site (North / South), Move (Gabes→Tunis)			
27	23-Jun	Wed	Meeting (SONEDE), Meeting (ONAS), Subcontractor negotiation			
28	24-Jun	Thur	Meeting (JICA HQ), Meeting (Ministry of Agriculture, Water Resources and Fisheries), Meeting (JICA Tunisia Office)			
29	25-Jun	Fri	Meeting (Embassy of Japan)			
30	26-Jun	Sat	Documentation			
31	27-Jun	Sun	Tunis→			
32	28-Jun	Mon	Doha→Tokyo			

(2) Second field survey (September to November 2021)

<table>
<tr><th colspan="3" rowspan="2"></th><th>Chief Consultant / Advanced Waste Water Treatment Plant Planning</th><th>Business Model for Grant Aid with Operation and Maintenance / Financial Planning</th><th>Advanced Waste Water Treatment Plant (Machinery) Design</th><th>Advanced Waste Water Treatment Plant (Civil Engineering) Process Design / Facility Design 2</th></tr>
<tr><th>Yakuro Inoue</th><th>Satoshi Yamada</th><th>Junichi Kamimura</th><th>Shigeo Hayakawa</th></tr>
<tr><td>1</td><td>10-Sep</td><td>Fri</td><td colspan="4">Tokyo→</td></tr>
<tr><td>2</td><td>11-Sep</td><td>Sat</td><td colspan="4">→Doha→Tunis</td></tr>
<tr><td>3</td><td>12-Sep</td><td>Sun</td><td colspan="4">Documentation</td></tr>
<tr><td>4</td><td>13-Sep</td><td>Mon</td><td colspan="4">Internal Meeting</td></tr>
<tr><td>5</td><td>14-Sep</td><td>Tue</td><td colspan="4">Meeting (JICA Tunisia Office), Meeting (Subcontractor)</td></tr>
<tr><td>6</td><td>15-Sep</td><td>Wed</td><td colspan="4">Meeting (ONAS), Meeting (JICA Tunisia Office), Meeting (Subcontractor)</td></tr>
<tr><td>7</td><td>16-Sep</td><td>Thur</td><td colspan="4">Meeting (GCT), Move (Tunis→Gabes)</td></tr>
<tr><td>8</td><td>17-Sep</td><td>Fri</td><td colspan="4">Meeting (ONAS Gabes), Site Survey (ONAS Gabes WWTP), Meeting (GCT Gabes), Site Survey (GCT Gabes Factory)</td></tr>
<tr><td>9</td><td>18-Sep</td><td>Sat</td><td colspan="4">Site Survey (Gabes PPP Site (North / South), Move (Gabes→Tunis)</td></tr>
<tr><td>10</td><td>19-Sep</td><td>Sun</td><td colspan="4">Documentation</td></tr>
<tr><td>11</td><td>20-Sep</td><td>Mon</td><td colspan="4">Meeting (SONEDE)</td></tr>
<tr><td>12</td><td>21-Sep</td><td>Tue</td><td colspan="4">Internal Meeting</td></tr>
<tr><td>13</td><td>22-Sep</td><td>Wed</td><td colspan="4">Meeting (Ministry of Environment), Steering Committee, Meeting (ONAS)</td></tr>
<tr><td>14</td><td>23-Sep</td><td>Thur</td><td colspan="4">Meeting (GCT)</td></tr>
<tr><td>15</td><td>24-Sep</td><td>Fri</td><td colspan="4">Internal Meeting</td></tr>
<tr><td>16</td><td>25-Sep</td><td>Sat</td><td colspan="4">Documentation</td></tr>
<tr><td>17</td><td>26-Sep</td><td>Sun</td><td colspan="4">Move (Tunis→Gabes→Tozeur)</td></tr>
<tr><td>18</td><td>27-Sep</td><td>Mon</td><td colspan="4">Meeting (ONAS Gafsa), Site Survey (ONAS Gafsa WWTP / candidate site for transmission pipe between ONAS and GCT in Gafsa)</td></tr>
<tr><td>19</td><td>28-Sep</td><td>Tue</td><td colspan="4">Move (Tozeur→Tunis)</td></tr>
<tr><td>20</td><td>29-Sep</td><td>Wed</td><td colspan="4">Courtesy Call / Meeting (Minister of Environement)</td></tr>
<tr><td>21</td><td>30-Sep</td><td>Thur</td><td colspan="4">Meeting (ONAS)</td></tr>
<tr><td>22</td><td>1-Oct</td><td>Fri</td><td>Steering Committee</td><td></td><td>Steering Committee</td><td>Steering Committee</td></tr>
<tr><td>23</td><td>2-Oct</td><td>Sat</td><td>Documentation</td><td></td><td>Tunis→Doha→</td><td>Documentation</td></tr>
<tr><td>24</td><td>3-Oct</td><td>Sun</td><td>Documentation</td><td></td><td>→Tokyo</td><td>Documentation</td></tr>
<tr><td>25</td><td>4-Oct</td><td>Mon</td><td>Preparation for Survey</td><td></td><td></td><td>Preparation for Survey</td></tr>
<tr><td>26</td><td>5-Oct</td><td>Tue</td><td>Subcontract Negotiation</td><td></td><td></td><td>Subcontract Negotiation</td></tr>
<tr><td>27</td><td>6-Oct</td><td>Wed</td><td>Move (Tunis→Gaves)</td><td></td><td></td><td>Move (Tunis→Gaves)</td></tr>
<tr><td>28</td><td>7-Oct</td><td>Thur</td><td>Site Survey (Gabes ONAS / GCT)</td><td></td><td></td><td>Site Survey (Gabes ONAS / GCT)</td></tr>
<tr><td>29</td><td>8-Oct</td><td>Fri</td><td>Site Survey (Gabes ONAS / GCT)</td><td></td><td></td><td>Site Survey (Gabes ONAS / GCT)</td></tr>
<tr><td>30</td><td>9-Oct</td><td>Sat</td><td>Site Survey (Desert Joy), Move (Gabes→Tunis)</td><td></td><td></td><td>Site Survey (Desert Joy), Move (Gabes→Tunis)</td></tr>
<tr><td>31</td><td>10-Oct</td><td>Sun</td><td>Documentation</td><td></td><td></td><td>Documentation</td></tr>
<tr><td>32</td><td>11-Oct</td><td>Mon</td><td>Internal Meeting</td><td></td><td></td><td>Internal Meeting</td></tr>
<tr><td>33</td><td>12-Oct</td><td>Tue</td><td>Subcontract Negotiation</td><td></td><td></td><td>Subcontract Negotiation</td></tr>
<tr><td>34</td><td>13-Oct</td><td>Wed</td><td>Internal Meeting</td><td></td><td></td><td>Internal Meeting</td></tr>
<tr><td>35</td><td>14-Oct</td><td>Thur</td><td>Site Survey (Tunis Irrigation Facility)</td><td></td><td></td><td>Site Survey (Tunis Irrigation Facility)</td></tr>
</table>

			Chief Consultant / Advanced Waste Water Treatment Plant Planning	Advanced Waste Water Treatment Plant (Civil Engineering) Process Design / Facility Design 2	Advanced Waste Water Treatment Plant (Civil Engineering) Design / Facility Design 1 / Natural Conditions Survey	Environmental and Social Consideration / Grant Aid Scheme	Procurement Planning 1 / Cost Estimation	Legal Affairs / Procurement Planning 2	Operation and Maintenance	Advanced Waste Water Treatment Plant (Electric) Design
			Yakuro Inoue	Shigeo Hayakawa	Toshihiro Takamura	Takafumi Ohashi	Shuntaro Kinno	Shinji Hosoya	Takayuki Hagiwara	Iwao Yoshioka
36	15-Oct	Fri	Documentation	Documentation	Tokyo→					Tokyo→
37	16-Oct	Sat	Documentation	Documentation	→Doha→Tunis				Tokyo→	→Doha→Tunis
38	17-Oct	Sun	Documentation	Documentation	Survey Prepration				→Doha→Tunis	Survey Preparation
39	18-Oct	Mon	Internal Meeting	Internal Meeting						
40	19-Oct	Tue	Meeting (ONAS)	Meeting (ONAS)						
41	20-Oct	Wed	Meeting (GCT), Move (Tunis→Gabes)	Meeting (GCT), Move (Tunis→Gabes)						Meeting (STEG)
42	21-Oct	Thur	Site Survey (Gabes ONAS / GCT)	Site Survey (Gabes ONAS / GCT)						Meeting (ONAS)
43	22-Oct	Fri	Site Survey (Gabes ONAS / GCT), Survey (Topography/Cadastral Office)	Site Survey (Gabes ONAS / GCT), Survey (Topography/Cadastral Office)		Site Survey (Gabes ONAS / GCT), Survey (Topography/Cadastral Office), Cost Estimation Survey		Site Survey (Gabes ONAS / GCT), Survey (Topography/Cadastral Office)		Site Survey
44	23-Oct	Sat	Site Survey (Gabes ONAS Relay pumping station), Move (Gabes→	Site Survey (Gabes ONAS Relay pumping station), Move (Gabes→Tunis)						Documentation
45	24-Oct	Sun	Documentation	Documentation						Documentation
46	25-Oct	Mon	Documentation	Documentation	Documentation	Subcontract Prepration	Cost Estimation Survey	Meeting (Subcontractor)		Survey Preparation
47	26-Oct	Tue	Meeting (Ministry of Environment), Subcontract Negotiation / Meeting, Tunis→Doha→	Meeting (Ministry of Environment), Subcontract Negotiation / Meeting			Cost Estimation Survey	Meeting (JICA Tunisia Office), Meeting (ONAS)		Move (Tunis→Gabes)
48	27-Oct	Wed	→Tokyo	Move (Tunis→Gabes)		Meeting (ONAS), Meeting (ANPE)	Cost Estimation Survey	Survey		Site Survey (Gabes ONAS / GCT / STEG)
49	28-Oct	Thur		Site Survey (Gabes ONAS / GCT)		Subcontract Prepration	Cost Estimation Survey	Survey		Site Survey (Gabes ONAS / GCT / STEG)
50	29-Oct	Fri		Site Survey (Gabes ONAS / GCT)		Subcontract Prepration	Cost Estimation Survey	Meeting (IGPPP)		Site Survey (Gabes ONAS / GCT / STEG)
51	30-Oct	Sat		Move (Gabes→Tunis)	Documentation		Move (Gabes→Tunis)	Documentation		Move (Gabes→Tunis)
52	31-Oct	Sun		Documentation						
53	1-Nov	Mon		Documentation	Survey Preparation with Subcontrac	Environmental and Social Considera	Cost Estimation Survey	Meeting (Subcontractor)		Documentation
54	2-Nov	Tue		Meeting (ONAS), Tunis→Doha→	Survey Preparation with Subcontrac	Environmental and Social Considera	Cost Estimation Survey	Meeting (JICAHQ)		Documentation
55	3-Nov	Wed		→Tokyo	Move (Gabes→Tunis)	Meeting (Subcontractor), Meeting (SONEDE)	Cost Estimation Survey	Meeting (Ministry of Finance), Meeting (JICA Tunisia Office), Meeting (SONEDE)		Documentation
56	4-Nov	Thur			Meeting (ONAS)		Cost Estimation Survey	Meeting (ONAS)	Meeting (ONAS), Tunis→Doha→	Documentation
57	5-Nov	Fri			Subcontract Negotiation, Meeting (Ministry of Public Works, Housing and Territorial Planning)		Cost Estimation Survey	Survey	→Tokyo	Documentation
58	6-Nov	Sat			Documentation			Tunis→Doha→		Documentation
59	7-Nov	Sun			Documentation			→Tokyo		Documentation
60	8-Nov	Mon			Survey Preparation with Subcontractor		Cost Estimation Survey			Documentation
61	9-Nov	Tue			Survey		Cost Estimation Survey			Documentation
62	10-Nov	Wed			Meeting (ONAS)		Cost Estimation Survey			Tunis→Dubai→
63	11-Nov	Thur			Survey		Cost Estimation Survey			→Kansai
64	12-Nov	Fri			Tunis→Doha→					
65	13-Nov	Sat			→Tokyo					

(3) Third field survey (February 2022)

<table>
<tr><th colspan="3" rowspan="2"></th><th rowspan="2">JICA Official</th><th>Chief Consultant / Advanced Waste Water Treatment Plant Planning</th><th>Advanced Waste Water Treatment Plant (Machinery) Design</th><th>Advanced Waste Water Treatment Plant (Civil Engineering) Process Design / Facility Design 2</th><th>Environmental and Social Consideration / Grant Aid Scheme</th><th>Operation and Maintenance</th></tr>
<tr><th>Yakuro Inoue</th><th>Junichi Kamimura</th><th>Shigeo Hayakawa</th><th>Takafumi Ohashi</th><th>Takayuki Hagiwara</th></tr>
<tr><td>1</td><td>5-Feb</td><td>Sat</td><td rowspan="6"></td><td colspan="4">Tokyo→</td><td></td></tr>
<tr><td>2</td><td>6-Feb</td><td>Sun</td><td colspan="4">→Doha→Tunis, Internal Meeting</td><td>Internal Meeting</td></tr>
<tr><td>3</td><td>7-Feb</td><td>Mon</td><td colspan="3">Internal Meeting</td><td>Internal Meeting, Meeting (Subcontractor)</td><td>Internal Meeting</td></tr>
<tr><td>4</td><td>8-Feb</td><td>Tue</td><td colspan="5">Meeting (JICA Tunisia Office), Meeting (Ministry of Foreign Affairs), Meeting (ONAS), Meeting (GCT)</td></tr>
<tr><td>5</td><td>9-Feb</td><td>Wed</td><td colspan="5">Steering Committee, Meeting (Ministry of Environment)</td></tr>
<tr><td>6</td><td>10-Feb</td><td>Thur</td><td colspan="3">Meeting (ONAS), Move (Tunis→Gabes)</td><td colspan="2">Meeting (ONAS)</td></tr>
<tr><td>7</td><td>11-Feb</td><td>Fri</td><td>Tokyo→</td><td colspan="3">Meeting (ONAS Gabes), Site Survey (ONAS Gabes WWTP), Meeting (GCT Gabes)）Site Survey (GCT Gabes Factory)</td><td>Subcontractor Supervision</td><td>Meeting (ONAS)</td></tr>
<tr><td>8</td><td>12-Feb</td><td>Sat</td><td>→Istanbul→Tunis、Move (Tunis→ Gabes), Internal Meeting</td><td colspan="3">Internal Meeting</td><td>Move (Tunis→Gabes), Internal Meeting</td><td>Documentation</td></tr>
<tr><td>9</td><td>13-Feb</td><td>Sun</td><td colspan="5">Site Survey (Gabes ONAS Relay pumping station / ONAS WWTP / GCT Factory / Transmission pipe route), Move (Gabes→Tunis)</td><td>Documentation</td></tr>
<tr><td>10</td><td>14-Feb</td><td>Mon</td><td colspan="2">Minutes Preparation, Meeting (JICA Tunisia Office), Meeting (Presidency of the Government)</td><td colspan="3">Minutes Preparation, Meeting (JICA Tunisia Office)</td><td>Minutes Preparation, Meeting (JICA Tunisia Office), Meeting (Presidency of the Government)</td></tr>
<tr><td>11</td><td>15-Feb</td><td>Tue</td><td colspan="2">Minutes Discussion (Ministry of Environment, GCT)</td><td>Minutes Discussion (Ministry of Environment, GCT), Meeting (STEG)</td><td>Meeting (STEG)</td><td colspan="2">Minutes Discussion (Ministry of Environment, GCT)</td></tr>
<tr><td>12</td><td>16-Feb</td><td>Wed</td><td>Meeting (Minister of Environment etc.)</td><td>Meeting (Minister of Environment etc.), Meeting (Ministry of Environment), Minutes Prepration</td><td>Meeting (Minister of Environment etc.), Meeting (Ministry of Environment)</td><td colspan="3">Meeting (Minister of Environment etc.), Meeting (Ministry of Environment), Minutes Prepration</td></tr>
<tr><td>13</td><td>17-Feb</td><td>Thur</td><td>Meeting (ONAS), Minutes Prepration</td><td>Meeting (GCT), Minutes Prepration</td><td>Documentation</td><td colspan="2">Meeting (GCT), Minutes Prepration</td><td>Meeting (ONAS), Minutes Prepration</td></tr>
<tr><td>14</td><td>18-Feb</td><td>Fri</td><td colspan="2">Minutes Prepration, Signing Minutes, Meeting (Embassy of Japan)</td><td>Signing Minutes, Meeting (Embassy of Japan)</td><td colspan="3">Minutes Prepration, Signing Minutes</td></tr>
<tr><td>15</td><td>19-Feb</td><td>Sat</td><td>Tunis→Istanbul→</td><td colspan="5">Tunis→Doha→</td></tr>
<tr><td>16</td><td>20-Feb</td><td>Sun</td><td>→Tokyo</td><td colspan="5">→Tokyo</td></tr>
</table>

(4) Fourth field survey (August to September 2023)

<table>
<tr><th colspan="3" rowspan="2"></th><th rowspan="2">JICA Official</th><th>Chief Consultant / Advanced Waste Water Treatment Plant Planning</th><th>Advanced Waste Water Treatment Plant (Machinery) Design</th><th>Legal Affairs / Procurement Planning 2</th></tr>
<tr><th>Yakuro Inoue</th><th>Junichi Kamimura</th><th>Shinji Hosoya</th></tr>
<tr><td>1</td><td>29-Aug</td><td>Tue</td><td>Tokyo→</td><td colspan="3">Tokyo→</td></tr>
<tr><td>2</td><td>30-Aug</td><td>Wed</td><td>→Dubai→Tunis, Internal Meeting</td><td colspan="3">→Doha→Tunis, Internal Meeting</td></tr>
<tr><td>3</td><td>31-Aug</td><td>Thur</td><td colspan="4">Steering Committee, Minutes Meeting</td></tr>
<tr><td>4</td><td>1-Sep</td><td>Fri</td><td colspan="4">Minutes Meeting</td></tr>
<tr><td>5</td><td>2-Sep</td><td>Sat</td><td colspan="4">Documentation</td></tr>
<tr><td>6</td><td>3-Sep</td><td>Sun</td><td colspan="3">Move (Tunis→Gabes)</td><td>Documentation</td></tr>
<tr><td>7</td><td>4-Sep</td><td>Mon</td><td colspan="3">Site Survey (ONAS Gabes WWTP / GCT Gabes Factory), Move (Gabes→Tunis)</td><td>EIA Report Submission</td></tr>
<tr><td>8</td><td>5-Sep</td><td>Tue</td><td colspan="4">Minutes Meeting / Signing Ceremony</td></tr>
<tr><td>9</td><td>6-Sep</td><td>Wed</td><td>Meeting (Embassy of Japan), Tunis→ Dubai</td><td colspan="3">Tunis→Doha→</td></tr>
<tr><td>10</td><td>7-Sep</td><td>Thur</td><td>Dubai→Tokyo</td><td colspan="3">Doha→Tokyo</td></tr>
</table>

Appendix 3　List of Parties Concerned in the Recipient Country

Appendix 3　List of Parties Concerned in the Recipient Country

Embassy of Japan in Tunisia

Takeshi Osuga	Ambassador Extraordinary and Plenipotentiary
Shinsuke Shimizu	Fomer Ambassador Extraordinary and Plenipotentiary
Kenji Kawaguchi	Secretary
Daisuke Kawahara	Second Secretary

JICA Tunisia Office

Shunei Shinohara	Former Chief Representative
Shuhei Ueno	Former Senior / Chief Representative
Rinko Jogo	Senior Representative
Ryo Tsujii	Former Representative
Kei Owada	Representative
Youssef Mejai	Senior Program Officer

Presidency of the Government

Dahech Zouhour	Sub Director

Ministry of Forein Affairs

Riadh Essid	Director General, General Direction of America-Asia
Jamel Boujdaria	Main Mission, Deputy Direcor
Mohamed Chiheb Zayani	Department Head

Ministry of Finance

Kalthoum Bouhlel	Director General, General Directorate of the Monitoring of the Foreign Offers Expenditures Performance
Amir Znaigui	Director
Maamar Oumaima	Department Head
Lotfi Zguir Boujdaria	Director, International Cooperation
Hamida Aloui	Unit Director, International Cooperation
Oumaima Maamar	Unit Director, General Directorate of Public-Private Partnership

Ministry of Environment

Kamal El Doukh	Acting Minister
Hedi Chebili	Director General, General Directorate of Environment and Life Quality

Awaref Larbi Messai	Director, General Directorate of Environment and Life Quality
Karim Sahnoun	Director, General Directorate of Environment and Life Quality
Souhir Ladhari	Deputy Director, General Directorate of Environment and Life Quality
Atef Kheder	Mechanical Engineer, General Directorate of Public Relationship and Environment Production
Jmour Nahed	Sub Director

Office National de l'Assainissement (ONAS), Headquarters

Abdelmajid Bettaieb	President Director General
Moncef Smaoui	Head, Central Deparment of Concession/PPP Projects
Marrakech Mohamed	Head of Central Department
Chaabouni Tarek	Head of Departement
Mehrez Khaled	Director
Sakli Naoufel	Director, Administration and Finance Affairs
Kerouat Lynda	Head, International Cooperation Department
Chatti Hassène	Deparment Head
Abid Mohamed	Head, Central Tehnical Directorate
Bouaoun Hedi	Head, Treatment Department
Kamel El Fadhel	Head of Central Department

Office National de l'Assainissement, Gabes

Sabri Slimi	Regional Director
Hoichtia Turki	Regional Director
Anis Jabri	Head of Department
Mohsen Chtioui	Head of STEP
Lilia Malouche	Head of Exploitation Department、ONAS Process Depratment

Office National de l'Assainissement, Gafsa

Salah Gley	Regional Director
Khadra Mkadem	Head of Treatment Department

Ministry of Industry, Energy and Mines

Miloudi Bouzidi	Director General, Mines Directorate
Fatma Mefteh	Deputy Director, Mines Directorate
Lamia Ghazouani	Director, International Cooperation Department
Faten Ayari	Director, General Directorate of Industry and Innovation

Salwa Abouda	Senior Engineer, General Directorate of Mines
Salma Abouda	Head of Department

Tunisian Chemical Group (GCT), Headquarter

Ridha Chalghoum	Director General
Abdelhafidh Ben Othman	Director, GCT Partnership Directorate
Mohamed Ali Khmiri	Deputy Director, GCT Partnership Directorate / Director
Ben othman Abdelhafidh	Central Director
Moez Haddad	Genera Secretary
Sadok Souai	Director General, Technical Affairs
Abdelwaheb Ajroud	Chief Executive Officer
Lotfi Mallek	Chief Financial Officer

GCT, Gabes

Anonar Derbel	Regional Director
Aymen Aloui	Director, Phosphorous Acid Factory
Adel Bouricha	Regional Legal Director
Farouk Chabchoub	Director, Studies and Implementation Department
Hedi Ben Abdallah	Engineer Manager, Scientific Research Department

GCT, Gafsa

Abdallah Fajraoui	Regional Director
Bilel Bessaker	Director, Environmental Upgrade Project
Ismail Soualhia	Director, Studies and Implementation

Ministry of Agriculture, Water Resources and Fisheries

Souad Sassi Dkhil	Deputy Director, DGGREE
Sabri Regaieg	Senior Engineer, DGGREE

Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE), Headquarter

Samy Sellami	Central Director, Planning and General Studies
Emma Channoufi	Senior Engineer, Desalination and Environment Department

Instance Générale de Partenariat Public Privé (IGPPP)

Majdoub Atef	President
Amine Helaoui	Administration of Advisor
Khaled ben Mouelli	Director

Agence Fonciere Industrielle (AFI)

Menchaoui Hichem	Director
Abdelwadoud Ghribi	Unit Director, Technical Direction

Agence Nationale de Protection de l'Environnement (ANPE)

Othman Harbaoui	Monitoring Expert

Regional Commissioner for Agricultural Development (CDRA), Gabes

Tahar Smei	Director HER
Zayed Jallali	District Director PTS

Appendix 4　Minutes of Discussions

Appendix 4-1 Minutes of Discussions (signed on 18 February, 2022)

Minutes of Discussions on the Preparatory Survey for
The Project for Construction of Advanced Waste Water Treatment Plant in Gabes

In response to the request from the Government of Tunisia (hereinafter referred to as "Tunisia"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Construction of Advanced Waste Water Treatment Plant (A-WWTP) in Gabes (hereinafter referred to as "the Project") to Tunisia. The Team held a series of discussions with the officials of the Government of Tunisia and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Tunis, 18th February, 2022

Chie SHIMODAIRA Leader Preparatory Survey Team Japan International Cooperation Agency Japan	Hedi CHEBILI Director General of Environment and Quality of Life Ministry of Environment The Republic of Tunisia

Witness by

Abdelmajid BETTAIEB President Director General Office National de l'Assainissement (ONAS) The Republic of Tunisia	Sadok SOUAI Deligated Director General Groupe Chimique Tunisien (GCT) The Republic of Tunisia

ATTACHMENT

1) Objective of the Project

The objective of the Project is to utilize the treated waste water as industrial water by/through construction of A-WWTP alongside existing waste water treatment plant (WWTP) in Gabes to support efficient operation and maintenance (O&M), thereby contributing to conservation of water resource in the Republic of Tunisia.

2) Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Construction of Advanced Waste Water Treatment Plant in Gabes".

3) Project site

Both sides confirmed that the site of the Project is in Gabes WWTP, which is shown in Annex 1.

4) Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Office National de l'Assainissement (ONAS) will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The Line Ministry of the Executing Agency is the Ministry of Environment (MoE). The MoE shall be responsible for supervising the Executing Agency on behalf of the Government of Tunisia.

5) Items requested by the Government of Tunisia

5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Tunisia are as follows:

(i) Construction of A-WWTP with membrane treatment (assuming water production capacity of 6,000 m^3/day)

(ii) Support in the Proccurment of the Contractor

(iii) Technology transfer on O&M of A-WWTP

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

6) Procedures and Basic Principles of Japanese Grant

6-1. Tunisian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Tunisian side to submit the Project Monitoring Report, the form of which is attached as Annex 4.

6-2. Tunisian side requested legal requirements described in Annex 5. And Tunisian side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Project. The contents of Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 5 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7) Schedule of the Survey

7-1. The Team will proceed with further survey in Tunisia until the end of September 2022.

7-2. JICA will prepare a draft Preparatory Survey Report in French and dispatch a mission to Tunisia in order to explain its contents around June 2022.

7-3. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by Tunisian side, JICA will finalize the Preparatory Survey Report and send it to Tunisia around September 2022.

7-4. The above schedule is tentative and subject to change.

8) Environmental and Social Considerations

8-1. Tunisian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as "B" from the following considerations:

The project is not considered to be a large-scale Sewerage project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA guidelines for environmental and social considerations (April, 2010), it is not likely to have a significant adverse impact on the environment.

Tunisian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by November 2022.

9) Other Relevant Issues

Both sides confirmed that the outline of the Grant projects with O&M with consideration of following issues in Annex 6 which should be further elaborated with consideration of following issues.

9-1. Project Scheme

(a) Project Scheme is collectively defined as procurement method and structure of the contract(s).

(b) Both sides agreed that the Project shall be implemented in a framework of the Grant projects with O&M by Japanese Contractor, where

(i) Under a comprehensive framework of design-build-operation (DBO), a contractor of Japanese nationality, selected through a competitive bidding, shall undertake design and build (EPC) works for A-WWTP and shall provide its O&M services for ten (10) years or more integrally,

(ii) The Grant shall cover only the costs for EPC works and the consulting services until completion of commissioning and defect liability period,

(iii) Contractor for EPC works shall be a Japanese company or a joint venture (JV) of Japanese companies who is/are registered in Japan. Any Tunisian company including local subsidiary companies or special purpose company (SPC) established by Japanese company(ies) is not regarded as eligible to EPC works, and

(iv) Contractor for O&M services, which is not financed by the Grant, shall be a subsidy company in Tunisia of Japanese company(ies) or a SPC that will be established by Japanese company(ies) potentially jointly with Tunisian private or public entity(ies).

(c) Both sides agreed that the project scheme must harmonize the conditions described in (b) with Tunisian relevant laws, which governs the O&M services. The Team has studied Pros/Cons between applications of the Public Procurement Law and the Concession Law. The conclusion of the Team is to apply the Public Procurement Law for the following reasons.

(i) The Concession Law presumes to engage a Tunisian company, specifically an SPC for the Project, by a single contract for all phases including design, construction and operation.

(ii) The Public Procurement Law indicates in his Article 1 that an international convention shall prevail himself, while the Concession Law does not have such an article for exceptional case.

(iii) For the two points above, the Concession Law has critical gap with the framework of the Grant.

(iv) In light of his Article 1, the Project can be duly implemented under the Public Procurement Law upon written agreement between the competent Tunisian and Japanese authorities to confirm application of special measures to ensure following issues under the project scheme.

- EPC Contract shall be awarded to Japanese company(ies) through a competitive bidding based on JICA's procurement guidelines to be applied to the Grant projects.
- O&M Contract shall also be awarded to the Japanese company(ies), who will execute EPC works, without additional competitive bidding.
- O&M contract period shall be 10 years or more regardless of the maximum contract period indicated in the Public Procurement Law of 5 years.

(d) Both sides confirmed that they will jointly solve legal argument on the project scheme as early as possible. For that purpose both sides will take all the measures which are, but not limited to:

(i) Continuous communication with the Legal Counselor Services (Head of Government), Haute Instance de la Commande Publique (HAICOP) and Instance Générale de Partenariats Public- Privé (IGPPP), who are in coordination to formulate a legal solution to overcome difficulties, to receive their instructions/advices and

(ii) Drafting MOU or any other format of official document, if needed, to authorize the conclusion among the parties according to the instructions/advices.

9-2. Business Model

(a) Business Model means the overall roles and responsibilities of all stakeholders of the Project, including purchaser of refined water (Off-taker), and the contractual interactions among them.

(b) Both sides confirmed that the Off-taker will be Groupe Chimique Tunisien (GCT) according to the request by ONAS dated 5th September, 2019. Final agreement on the Off-taker is subject to approval by Board of Directors and Supervising Bodies of GCT, the line ministries of GCT and Executing Agency.

(c) Based on the comprehensive analysis, the Team expressed that the Executing Agency shall conclude the Water Purchase Contract with the Off-taker (Business Model Option A) to realize the objective of the Project in conformity with the national policy of Republic of Tunisia to mitigate water shortage by reuse of waste water. At the same time the Executing Agency expressed their opinion that contractor shall conclude the water purchase contract with the Off-taker (Business Model Option B)

(d) The Team explains the reasons for their conclusion as follows;
- It will promote close collaboration between ONAS, the Contractor and the Off-taker assuring shared the responsibility in both operational and financial aspects.
- Through close collaboration with the Contractor and through the direct intervention in the refined water supply under Option A, the Executing Agency will effectively and efficiently acquire know-how on all aspects of operating water reuse projects which can be replicated in other areas of Tunisia.
- In option B where the Contractor must act as an independent water vendor, absence of the Executing Agency in the Water Purchase Contract may cause difficulties to ensure the Executing Agency to fulfill the responsibility to provide the treated waste water of sufficient volume and quality. It may consequently invite various risks which are not acceptable to potential Japanese bidders:
- The Executing Agency explained the reason for opinion that current financial situation of the Executing agency does not allow them to be exposed to any financial and commercial risks such as delayed or non-payment of the Off-taker in option A.
- The Executing Agency proposed that the three parties, the Executing Agency, the Off-taker and the Contractor, will conclude a trilateral contract for O&M service and water purchase, in order to precise obligations of each party and potential sanctions in case of non-fulfilment of the obligations.

(e) To bridge the different positions, the both sides agreed that the Team will clarify the responsibilities and risk allocations as well as penalties in case of non-fulfillment in both Options. Possibility of introduction of trilateral contract will be considered in the study.

(f) Both sides agreed that they will jointly establish a Draft Term Sheet, which defines the important terms and conditions of the contracts relevant to the Project.

(g) Both sides agreed to continue discussion to prepare the Draft Term Sheet by the middle of March, 2022 to be used for the market sounding for the Japanese companies, currently scheduled in the late March, 2022.

(h) The ongoing discussions on the project scheme and business model including the Executing Agency's investment will affect the Term Sheet but both sides agreed that the discussions on the Term Sheet should not be blocked by these ongoing discussions.

9-3. Outline of A-WWTP, and Responsibility among ONAS, GCT and SPC

(a) Outline of A-WWTP
  (i) Treatment facility which produces refined water of 6,000m^3/day.
  (ii) RO process with pretreatment process of MBR
  (iii) Transmission facilities of refined water to Off-taker

(b) Responsibility of ONAS
  (i) Supplying the treated waste water of Gabes WWTP of at least 10,000 m^3/day to A-WWTP.

(ii) Providing utilities for operating A-WWTP such as electricity (support to SPC in subscription approval by STEG) and drainage (acceptance of stormwater from A-WWTP site by the existing drainage system in Gabes WWTP).

(iii) Acceptance of the brine water from A-WWTP, by the existing discharge facility from Gabes WWTP.

(iv) Bearing O&M cost of sludge treatment facility for MBR to be constructed by the Grant (On this point, ONAS expressed that the cost shall be borne by the Contractor). The Team will prepare detailed analysis based on the current water quality of the treated waste water as well as possibility of improved water quality after commencement of the concessional contract of WWTP. Based on the analysis both sides will compare financial viability of the Project comparing the cases whether the cost is borne by the Contractor or the Executing Agency, then decide responsibility of the cost for the sludge treatment by the middle of March.

(v) Permission to Contractor on installation of emergency intake of wastewater at inlet diversion chamber or pump pit in case suspension of provision of treated waste water.

(c) Responsibility of GCT

(i) Purchase Contract of the refined water produced by A-WWTP of 6,000m^3/day or more which complies with the contracted quality.

(ii) Preparation of the transmission facilities including storage tank of refined water in GCT Factory. GCT, however, is concerned that the construction of the facilities, if needed, including budget allocation, tendering and contracting, will not be completed by the completion of the A-WWTP and that it will be difficult to secure a budget for the construction of the facilities in GCT.

(iii) O&M of the transmission facilities including storage tank of refined water in GCT Factory

(d) Responsibility of SPC

(i) Suppling the refined water with required quality of 6,000 m^3/day or more to Off-taker

(ii) O&M of A-WWTP

(iii) O&M of transmission facilities of refined water to Off-taker

(iv) Control of the quality of the brine water to comply with discharge effluent standard (2018).

9-4. Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey.

(a) Collection of information and gender disaggregated data for assessment of gender needs.

(b) Examination of gender-responsive measures based on the assessment, such as:

(i) Facility design that reflects gender-specific needs.

(ii) Selection of equipment that reflects gender-specific needs and ensure usability by women.

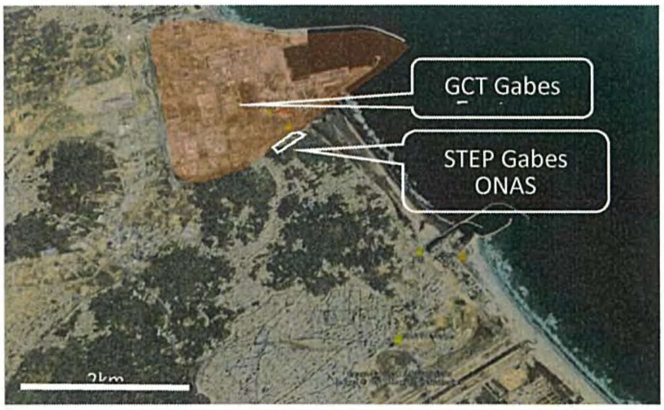
(iii) Implementation of soft-component activities that promote women's empowerment.

Annex:

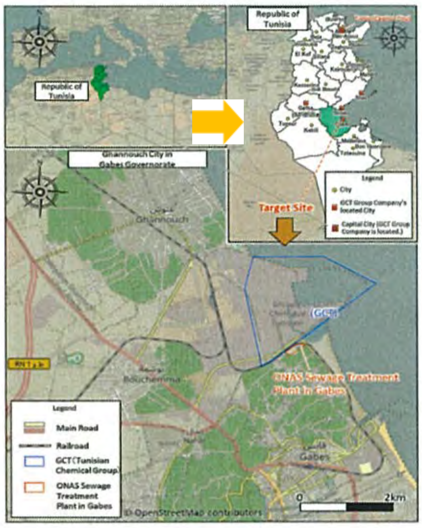
Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4 Project Monitoring Report (template)
Annex 5 Major Undertakings to be taken by the Government of Tunisia
Annex 6 Japanese Grant with O&M

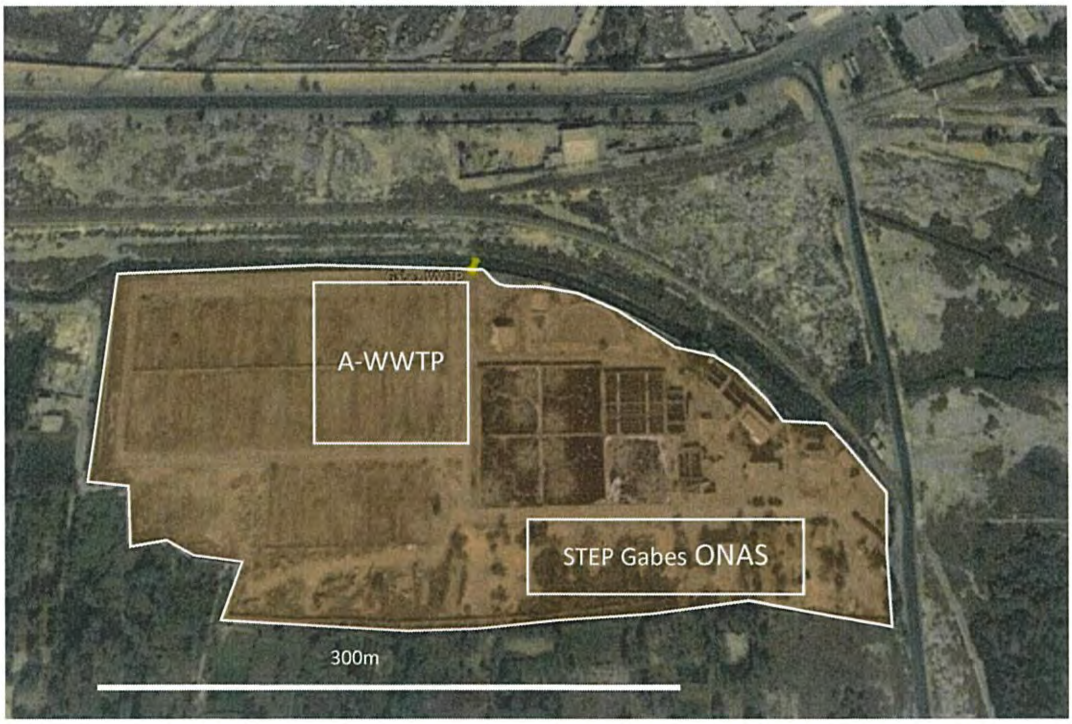
Project Site

Gabes WWTP, A-WWTP, and GCT Gabes Factory



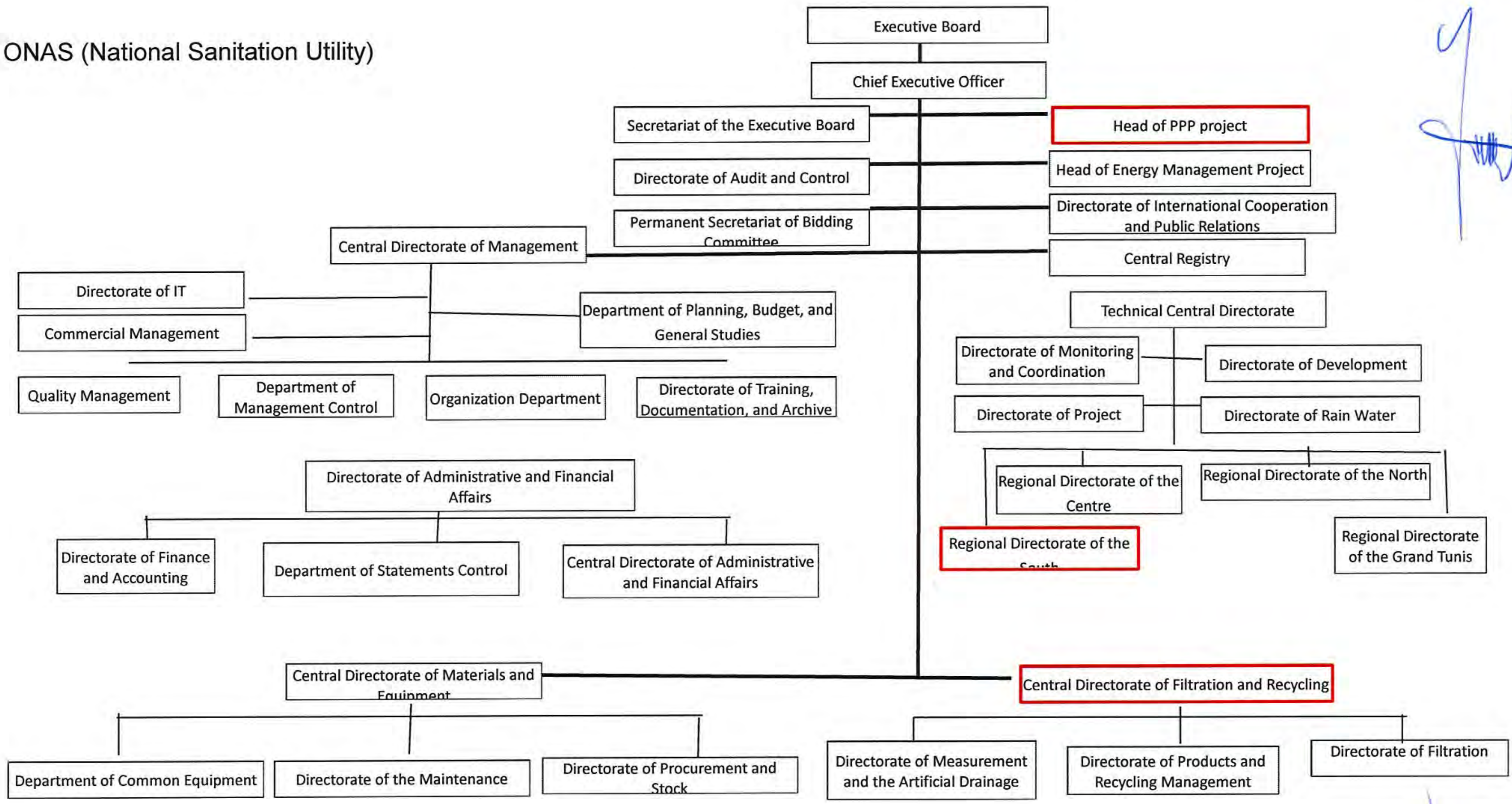
Gabes A-WWTP Site



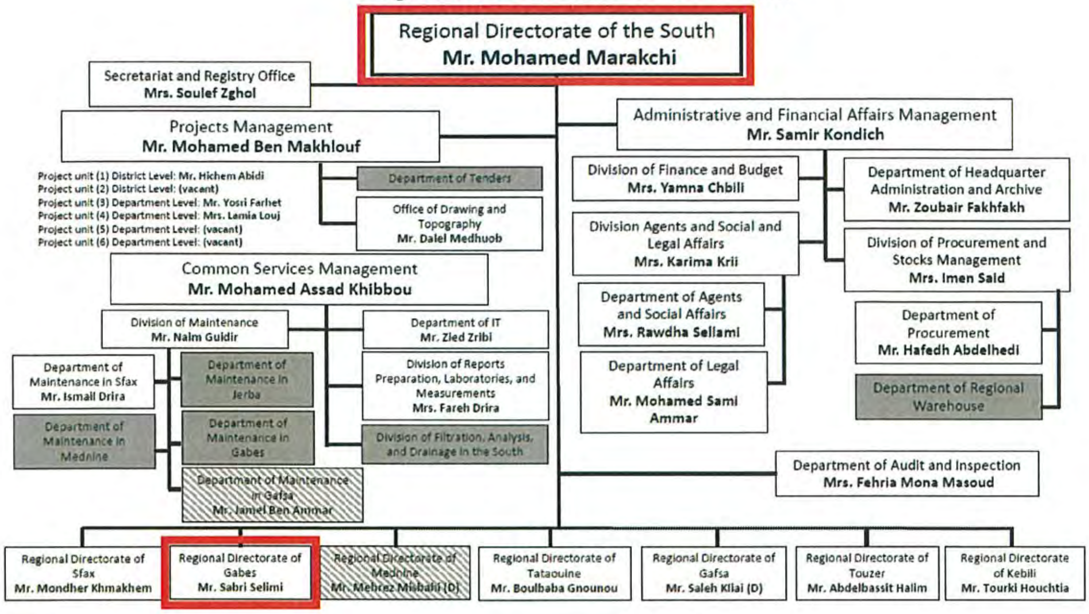


Annex 2

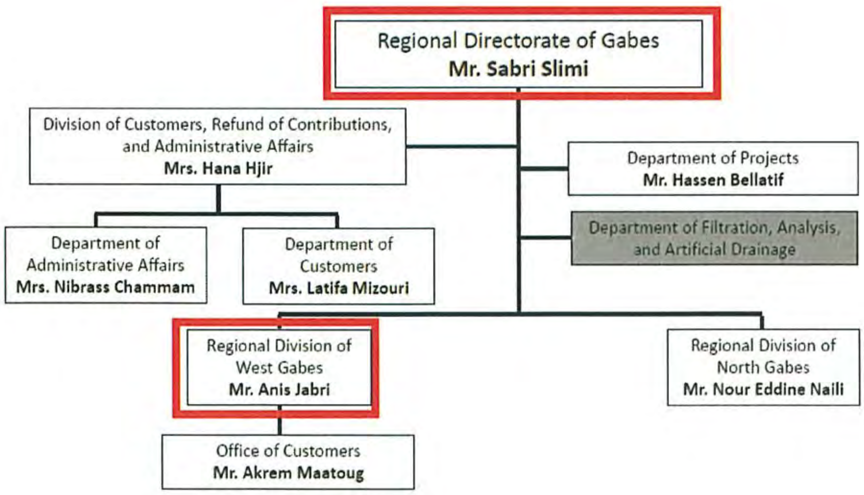
Organization Chart



Regional Directorate of the South



Regional Directorate of Gabes



Annex 3

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.

- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with

a

JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that

the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

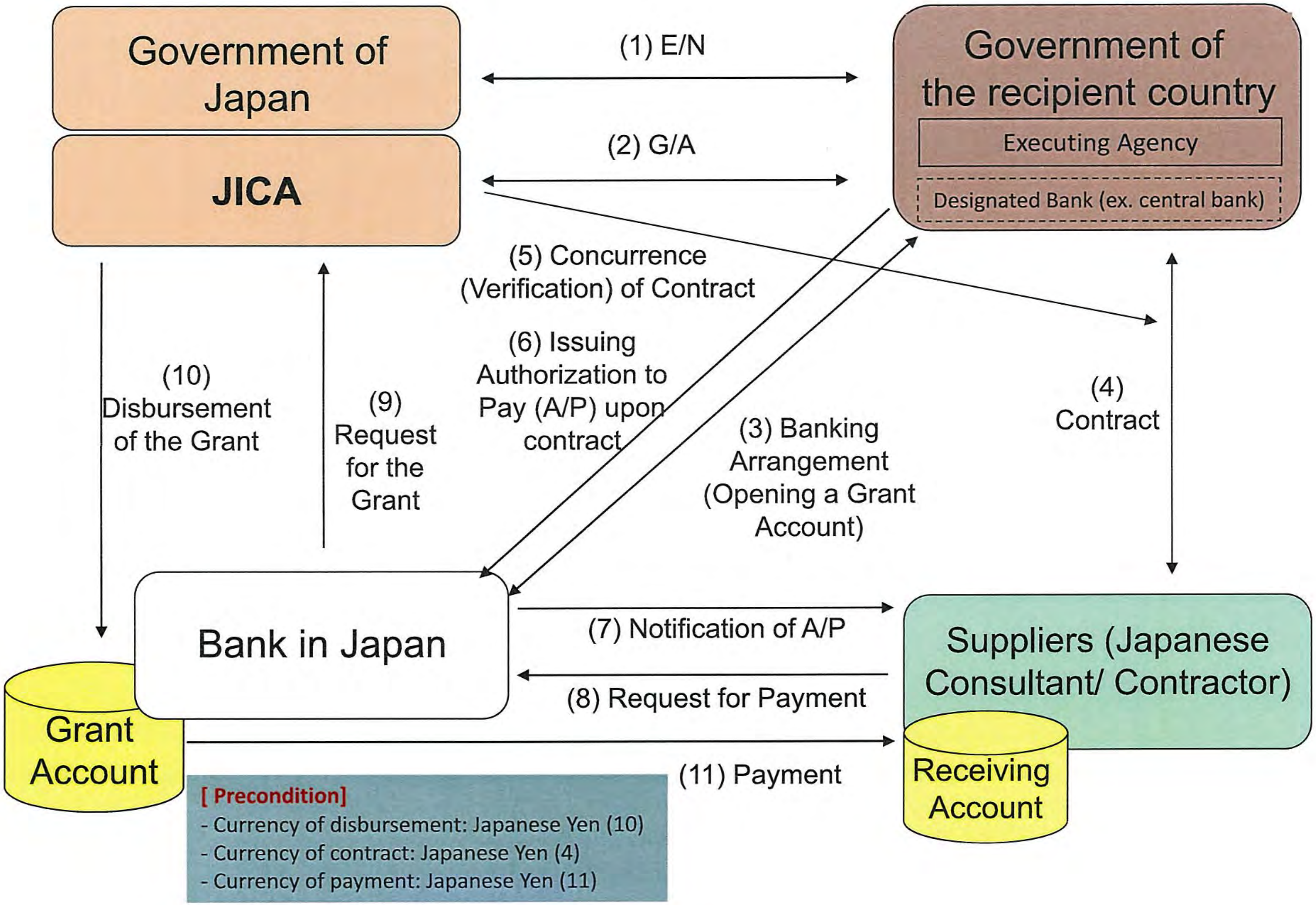
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)



Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:
Executing Agency	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:
Line Ministry	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY ______ mil. Government of (________): ____________

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original *(proposed in the outline design)*	Original *(at the time of signing the Grant Agreement)*	Actual

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(<u>Confidential until the Bidding</u>)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original1),2) *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original1),2) *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Major Undertakings to be taken by the Government of Tunisia

1. Specific obligations of the Government of Tunisia which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant)	Within 1 month after the signing of the G/A	ONAS		
2	To issue Authorization to Pay (A/P) to the Agent Bank for the payment to the consultant	Within 1 month after the signing of the contract(s)	ONAS		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		ONAS		
	1) Advising commission of A/P	Within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	Every payment			
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any)	Before notice of the bidding document	ONAS		
5	To secure land necessary for the construction of advanced waste water treetment plant	Before notice of the bidding document	ONAS		
	To secure stock yards for construction materials	Before notice of the bidding document	ONAS		
6	To obtain the necessary permit for the implementation of the Project from the concerned organization (road crossing of pipeline, and others)	Before notice of the bidding document	ONAS		
7	To clear, level and reclaim the following sites 1) Site for Gabes advanced waste water treatment Plant	Before notice of the bidding document	ONAS		
8	To submit the Project Monitoring Report (with the result of the Detail Design)	Before preparation of bidding documents	ONAS		
9	To assign counterparts for the EPC Contractor during the Detail Design Survey	Soon after starting detail design survey	ONAS		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier the contractor	Within 1 month after the signing of the contract(s)	ONAS		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A		ONAS		
	1) Advising commission of A/P	Within 1 month after the singing of the contract(s)			
	2) Payment commission for A/P	Every payment			

NO	Items	Deadline	In charge	Estimated Cost	Ref.
3	To ensure prompt customs unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	During the project	ONAS		
4	To accord Japanese nationals and/or physical persons of the third countries whose services may be required in connection with the supply of the products and services under the verified contract such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.	During the project	ONAS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be borne by its designated authority without using the Grant.	During the project	ONAS		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	During the project	ONAS		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	During the construction	ONAS		
8	1) To submit the Project Monitoring Report 2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	1) Every month 2) Within one month after signing of Certificate of Completion for the works under the contract(s)	ONAS		
9	To submit a report concerning completion of the Project	Within six months after completion of the Project	ONAS		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		ONAS		
	1) Electricity - The distributing line to the site	before start of the constoruction	ONAS		
	2) Water Supply - The city water distribution main to the site	before start of the constoruction	ONAS		
	3) Drainage - The city drainage main (for storm, sewer and others) to the site	before start of the constoruction	ONAS		
11	To ensure the safety of persons engaged in the implementation of the Project	during the project	ONAS		
12	To take necessary measures for security and safety of the Project site	during the construction	ONAS		
13	To implement EMP and EMoP	during the construction	ONAS		
14	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	ONAS		

NO	Items	Deadline	In charge	Estimated Cost	Ref.
15	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between ONAS and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) *- for 2 years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)*	ONAS		
16	To assign counterparts for the soft-component activities	During the project	ONAS		
17	Public relations activities in Tunisia at an opportunities such as completion ceremony	During the project	ONAS		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	ONAS		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between ONAS and JICA.	for 3 years after the Project	ONAS		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid	After completion of the construction	ONAS		

2. Other obligations of the Government of Tunisia funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	1) To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities a) Electricity - The drop wiring and internal wiring within the site - The main circuit breaker and transformer b) Water Supply - The supply system within the site (receiving and/or elevated tanks) c) Drainage - The drainage system (for toilet sewer, ordinary waster, storm drainage and others) within the site d) Furniture and Equipment - Project equipment		
	Total		

* The Amount is provisional. This is subject to the approval of the Government of Japan.

Japanese Grant with O&M

1. Basic Concept of Japanese Grant with O&M for the Project

(a) Exchange of Notes (E/N) and Grant Agreement (G/A) shall be concluded as the official bilateral agreement between two countries.

(b) A contractor of Japanese nationality, selected through a competitive bidding, shall undertake design and build (EPC) works for Advance Waste Water Treatment Plant (A-WWTP) and shall provide its operation & maintenance (O&M) services for ten (10) years or more integrally.

(c) An EPC contract and an O&M contract shall be separately prepared and concluded. (This modality is applied to any DBO type projects under Japanese Grants to meet the accountability required by the accounting law in Japan.)

(d) Upon necessity, MOU on relevant issues shall be concluded for common understandings between/among parties in accordance with JICA's procurement guidelines and Tunisian law(s).

(e) The Japanese Grant shall cover only the costs for EPC works and the consultancy services until completion of commissioning and defect liability period.

Main Budget	Japanese Grant Aid (Japanese Yen)		Water Sales revenue (Tunisian Denair)
Main Component	Design and Build (EPC) Works		O&M Services
Employer	ONAS	ONAS	ONAS
Contract	Consultant Contract	EPC Contract (Design and Build)	O&M Contract
Contractor	Company B	Company A (Japanese Nationals)	Company A (Tunisian Nationals)

Fig.1 Basic Framework of Japanese Grant with O&M

2. Outlines of the Project Scheme and Contractual Relationship

(a) ONAS shall conclude an O&M contract with Contractor based on the applicable law(s) in addition to an EPC contract for the Project.

(b) O&M services shall be conducted for ten (10) years or more integrally with the EPC contract. As there is no restriction on the nationality of the Contractor, the Contractor may establish a special project company (SPC) in Tunisia in accordance with relevant law(s).

(c) Refined water produced during O&M period is going to be sold to an Off-taker, namely the Groupe Chimique Tunisien (GCT) in Gabes.

(d) ONAS shall continuously utilize the A-WWTP after O&M period and beyond by itself or by outsourcing to a third party.

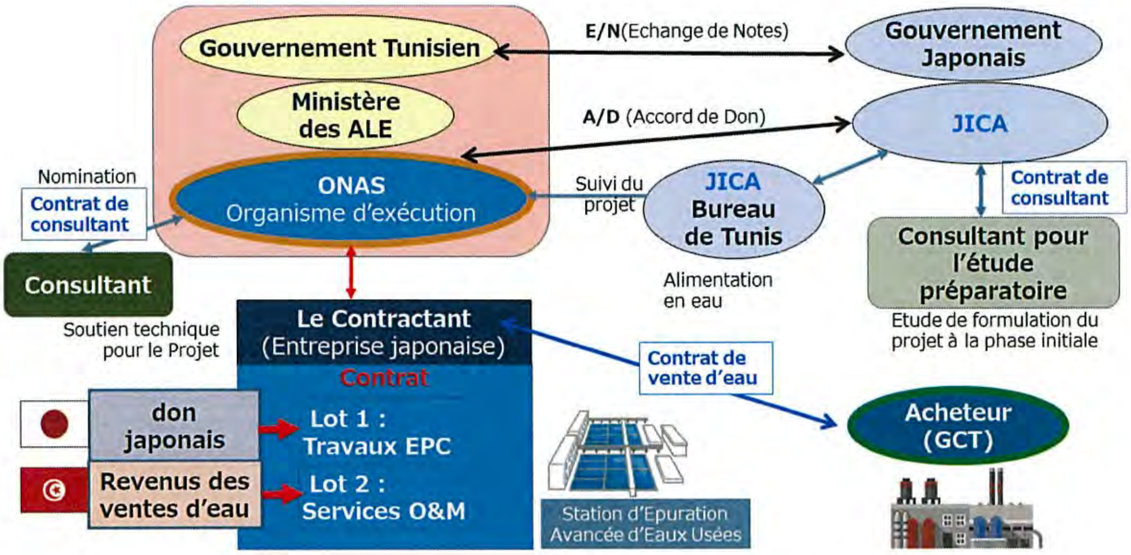

Fig.2 Project Scheme and Contractual Relationship

3. Outline of the Contracts to be concluded under the Project

1) DBO Contract

(a) DBO Contract shall be concluded between ONAS and the Contractor.

(b) Contractor with Japanese nationality shall undertake EPC Works and O&M Services integrally.

(c) DBO Contract also consolidates the EPC Contract and O&M Contract.

2) EPC Contract

(a) EPC Contract shall be concluded between ONAS and the Contractor.

(b) EPC Works shall be funded by the Japanese Grant.

(c) Design-build type of JICA's standard bidding documents shall be applied.

(d) Payment currency to the Contractor shall be Japanese Yen.

(e) All constructed facilities under EPC Contract shall be transferred to ONAS after completion of construction et une période d'essai industriel.

3) O&M Contract

(a) O&M Contract shall be concluded between ONAS and Contractor. The initial contract period is ten (10) years.

(b) Contractor uses the facilities constructed.

(c) Contractor will receive the treated waste water from existing Waste Water Treatment Plant (WWTP), and a provisional sewage water intake is installed at the inlet diversion chamber of WWTP.

(d) Contractor operates A-WWTP to produce refined water from the treated waste water.

The design specifications of A-WWTP are assumed as follows;

- Quality : BOD≦90mg/L, SS≦150mg/L, TkN≦39mg/L, TP≦3mg/L,
  Salinity Av. 4,000-5,000μS/cm= 3,000mg/L in TDS,
  pH≒7.5, Temp. 17-30degC
- Flow rate : $200m^3$ /hr or more

(e) ONAS shall supply $10,000m^3$/day of the treated waste water to A-WWTP.

(f) Payment currency to the Contractor shall be Tunisian Dinar.

(g) Contractor shall receive the remuneration of O&M Service from ONAS or the Off-taker.

4) Water Purchase Contract

(a) Water Purchase Contract shall be concluded with Off-taker in initial period ten (10) years.

(b) Contractor delivers refined water to the boundary of the site of Off-taker.

(c) Price of the refined water shall be competitive with water price of SONEDE, the national water utility of Tunisia.

(d) Contract condition of refined water;

- Quality : No color, no odor, no bacteria and TDS at 300mg/l or less
- Amount : 6,000 m^3/day or more

Conditions of EPC Contract, O&M Contract and Water Purchase Contract will be mentioned in Term Sheets

4. Bidding Documents and Evaluation Procedures for EPC and O&M

(a) Bidding documents for selecting the Contractor for EPC works, O&M services shall be prepared based on JICA's standard bidding documents.

(b) QCBS (Quality- and Cost- Based Selection) method shall be applied to evaluation and qualification.

(c) Evaluation Total score for EPC and O&M is 100 points out of which technical score is 70 points and the price score is 30 points.

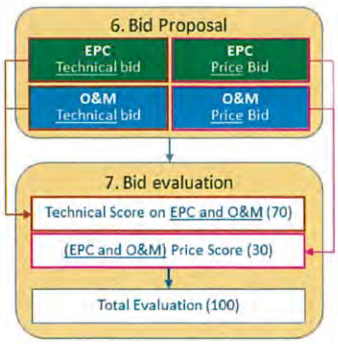

Figure-3 Procedure of bit Evaluation

Appendix 4-2 Minutes of Discussions (signed on 5 September, 2023) (in English)

Minutes of Discussions
on the Preparatory Survey for the Project for
Construction of Advanced Waste Water Treatment Plant in Gabes
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between the Ministry of Environment (hereinafter referred to as "MoE") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 18th February, 2022 and in response to the request from the Government of Tunisia (hereinafter referred to as "Tunisia") dated 5th September, 2019, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Construction of Advanced Waste Water Treatment Plant in Gabes (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets. This document has been executed in English and French. In the event that there arise any doubts or controversies between English and French expression, the English text shall prevail.

Tunis, September 5th, 2023

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Yumi KIMURA	Hedi CHEBILI
Leader	Director General of Environment and
Preparatory Survey Team	Quality of Life
Japan International Cooperation Agency	Ministry of Environment
Japan	The Republic of Tunisia

Witness by

Abdelmajid BETTAIEB	Ridha CHALGHOUM
President Director General	Director General
Office National de l'Assainissement	Groupe Chimique Tunisien
(ONAS)	(GCT)
The Republic of Tunisia	The Republic of Tunisia

ATTACHEMENT

1. Objective of the Project

   The objective of the Project is to utilize the treated waste water as industrial water by/through construction of A-WWTP inside the existing waste water treatment plant (WWTP) in Gabes to support efficient operation and maintenance (O&M), thereby contributing to conservation of water resource in the Republic of Tunisia.

2. Title of the Preparatory Survey

   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Construction of Advanced Waste Water Treatment Plant in Gabes".

3. Project site

   Both sides confirmed that the site of the Project is in Gabes WWTP, which is shown in Annex 1.

4. Responsible authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:

   4-1. The Office National de l'Assainissement (ONAS) will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization charts are shown in Annex 2.

   4-2. The line ministry of the Executing Agency is the MoE.

5. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Tunisian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Tunisian side after E/N.

6. Cost estimate

   The team explained that the cost estimate including the contingency is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc. The Tunisian side understood this explanation.

7. Confidentiality of the cost estimate and technical specifications
   Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant
   The Tunisian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Tunisian side agreed to take necessary measures according to the procedures. The Tunisian side understood that the Grant shall cover only for design and build (D&B) Works and consulting services, and shall not cover O&M Services provided by a special purpose company which is established by the contractor of the project. Details of the structure and business model of the Project are described in Annex 10.

9. Timeline for the project implementation
   The Team explained to the Tunisian side that the expected timeline for the project implementation is as attached in Annex 4.

10. Expected outcomes and indicators
    Both sides agreed that key indicators for expected outcomes are as follows. The Tunisian side will be responsible for the achievement of agreed key indicators targeted in year 2030 and shall monitor the progress for Ex-Post Evaluation (refer to 11.) based on those indicators.

[Quantitative indicators]

Indicator	Standard value (Actual results for 2022)	Target value (2030) (3 years after project completion)	SDGs
Treated water discharge (m3 /day)	20,000	10,000	Compatible with 6.3
Amount of treated waste water used as industrial water (m3 / day)	0	6,000	Compatible with 6.3

[Qualitative indicators]

Qualitative effects	Summary	SDGs
Development of alternative water resources	Urban water supply in Gabes Province is dependent on groundwater (fresh and brine), and withdrawals of groundwater are increasing due to the increase in the population served and per capita water use. The treated water supplied to GCT by the A-WWTP will reduce the amount of the tap water supplied by SONEDE, thereby saving tap water and providing an alternative water source. Industrial water (TDS 300mg/L or less, 6,000m^3/day) with lower salinity than tap water and groundwater (TDS 2,000-3,000mg/L) will be supplied.	Compatible with 6.4
Use of new recycled water technologies by the Executing Agency	MBR, RO and other advanced wastewater treatment facilities such as the A-WWTP is a new recycled water technology for the Gabes region and, by extension, for Tunisia, and will contribute to the future development of recycled water use.	Compatible with 6.a
Groundwater conservation	Reducing water withdrawals with an alternative source to groundwater is expected to prevent the lowering of the groundwater table and the intrusion of seawater.	-

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Tunisian side is required to provide necessary support for the data collection.

12. Technical assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project. The Tunisian side will assign the necessary number of counterparts who are appropriate and competent in terms of its purpose of the technical assistance as described in the Draft Report.

i. To support the work to be undertaken by the Executing Agency prior to the commencement of O&M services and water sales operations. Also, to support the work to be carried out by the Executing Agency once O&M services and water sales operations have commenced.

ii. To ensure that the work to be performed by the Executing Agency continues to be performed properly and support corrective actions as needed. In addition, to assist the Executing Agency in analyzing the revenues and expenditures associated with the Project.

iii. In addition, to provide support to ensure that operations continue to be performed appropriately in the following year and beyond.

13. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in No. 5 of "(2) During the Project Implementation" of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by the Executing Agency during the implementation stage of the Project.

The Tunisian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of G/A.

14. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) in English attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

15. Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency by using a standard form for ODA Grants, but in any event not later than six months after completion of the Project.

16. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as follows:

i. Regular sharing of an information sheet on the progress of the concession project for the existing WWTP in Gabes to JICA from its effective start.

17. Environmental and Social Considerations

17-1 General Issues

17-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

17-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 7. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Tunisian side shall submit the modified version to JICA in a timely manner.

17-2 Environmental Issues

17-2-1 Environmental Impact Assessment (EIA)

The team explained that the EIA report has been developed during the Preparatory Survey and ready to submit to ANPE. Both sides confirmed the EIA report need to be approved by Agence Nationale de Protection de l'Environnement (ANPE) in January, 2024 in order to proceed with the bidding process. The Tunisian side will report to JICA after approval by ANPE.

17-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 8, respectively. Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

17-3 Environmental and Social Monitoring

17-3-1 Environmental Monitoring

Both sides agreed that the Tunisian side will submit results of environmental monitoring to JICA with PMR by using the monitoring form attached as Annex 9. The timing of submission of the monitoring form is described in Annex 5.

17-3-2 Information Disclosure of Monitoring Results

Both sides confirmed that the Tunisian side will disclose results of environmental and social monitoring to local stakeholders through ONAS' website or in their regional office in Gabes.

The Tunisian side agreed JICA will disclose results of environmental and social monitoring submitted by the Tunisian side as the monitoring forms attached as Annex 9 on its website.

18. Other Relevant Issues

18-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

18-2. Both sides re-confirmed the following items to be conducted as responsibility of GCT.

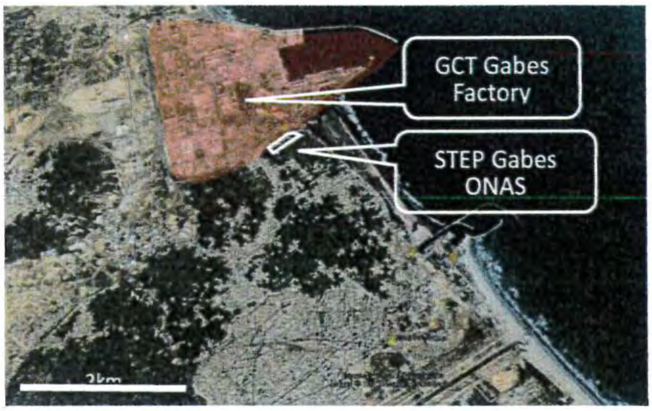
i. Preparation of the transmission and storage facilities of refined water in GCT Factory in a timely manner to avoid unnecessary delay in the Project implementation schedule.

18-3. Both sides confirmed the contents of the Term Sheet attached as Annex 10. Both sides agreed that the relevant contracts would be developed based upon this Term Sheet. Both sides understood that in accordance with advice from the legal consultant(s), the relevant contracts may be modified from this Term Sheet.

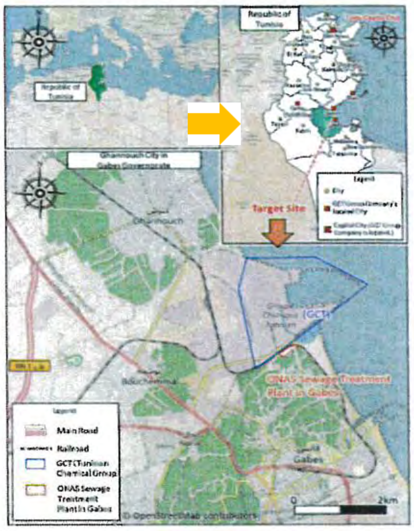
Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 3-1 Attachment (1) Procedures
Annex 3-2 Attachment (2) Financial Flow of Grant
Annex 4 Project Implementation Schedule
Annex 5 Major Undertakings to be taken by the Government of Tunisia
Annex 6 Project Monitoring Report (template)
Annex 7 Environmental Check List
Annex 8 Environmental Management Plan/Environmental Monitoring Plan
Annex 9 Environmental and Social Monitoring Form
Annex 10 Term Sheet
Annex 11 Japanese Grant with O&M

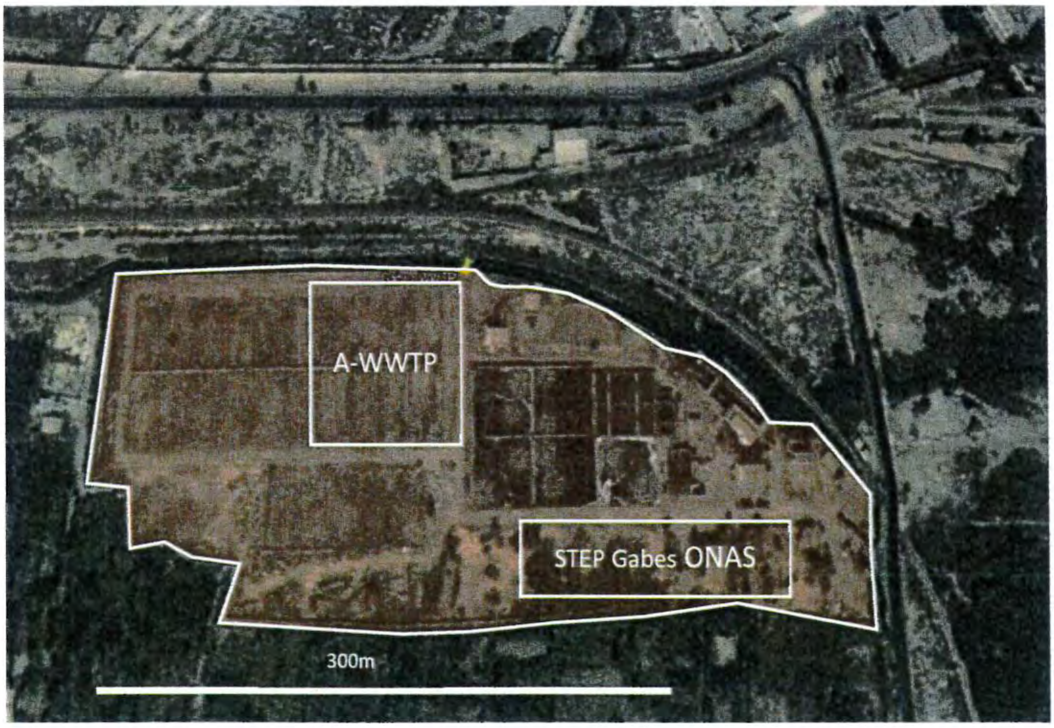
Project Site

Gabes WWTP, A-WWTP, and GCT Gabes Factory



Gabes A-WWTP Site





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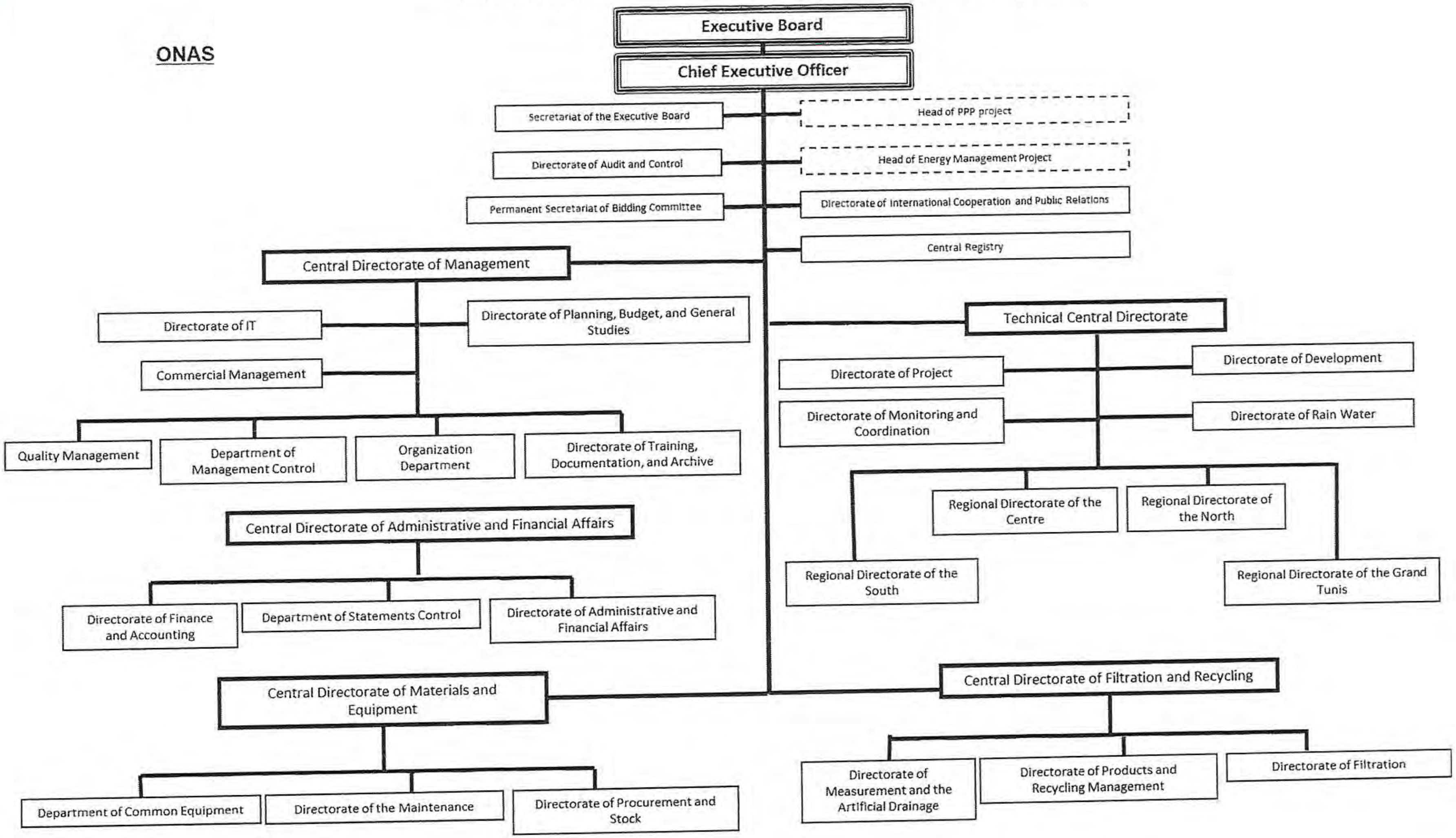
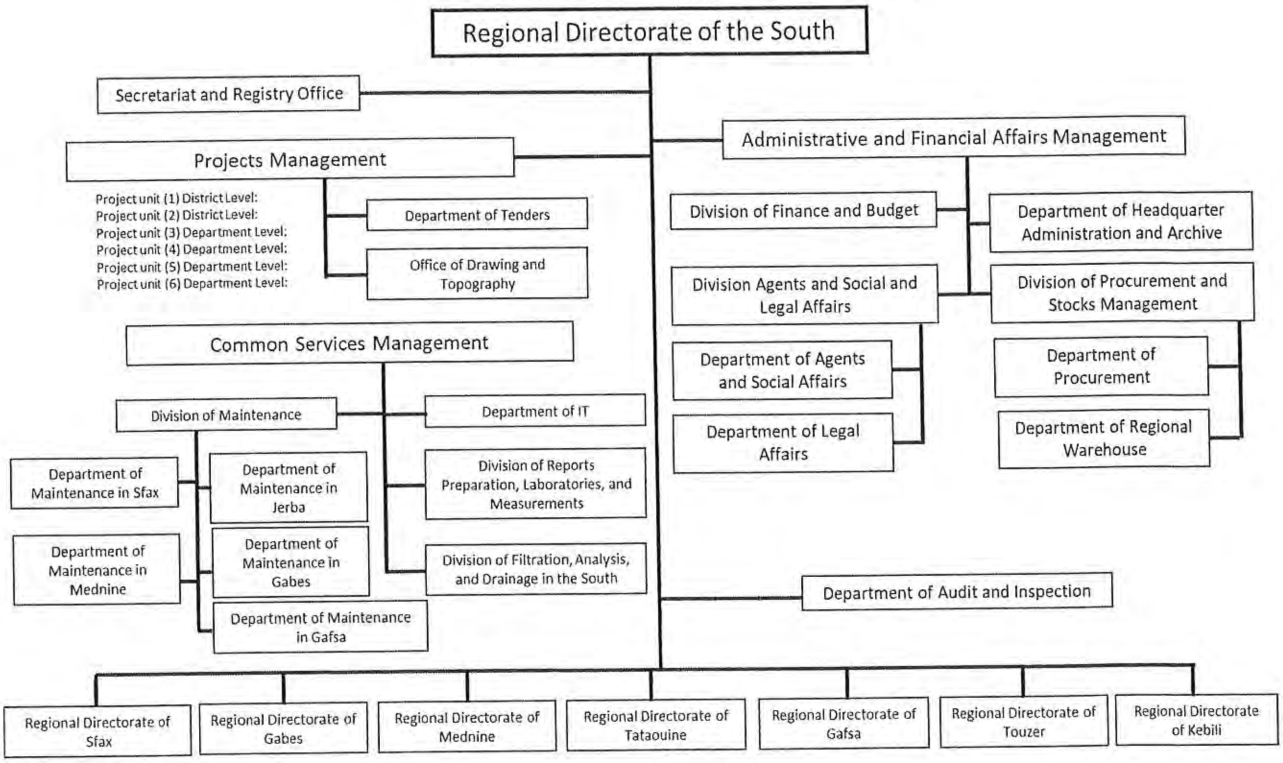
Organization Chart

General Organizational Structure of the National Sanitation Utility

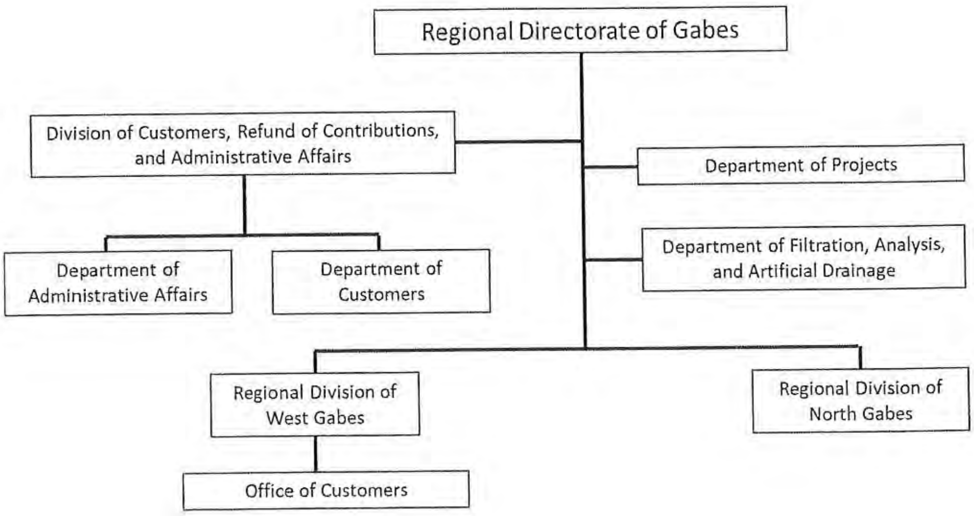
ONAS



Regional Directorate of the South



Regional Directorate of Gabes



Annex 3

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Operation and Maintenance (without using the Japanese Grant)

-Operation and maintenance of the facilities and equipment

(5) Ex-post Monitoring and Evaluation (without using the Japanese Grant)

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the Project Grants made by the

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GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement

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conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account in the Bank. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractor(s), namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

a) Contracts consist of (i) a comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (ii) contract(s) for the purchase of products and/or services and (iii) contract(s) for the operation and maintenance.

b) The Recipient will conclude (ii) contract(s) for the purchase of products and/or services denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by

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using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Operation and Maintenance Stage

The Contractor operates and manages the facilities and equipment based on the contract(s) for operation and maintenance with the Recipient.

(3) Ex-post Monitoring and Evaluation Stage

1) After the project completion of all construction and procurement works by using the Japanese Grant, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion of all construction and procurement works by using the Japanese Grant. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(4)Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the

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environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

a) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

b) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

c) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

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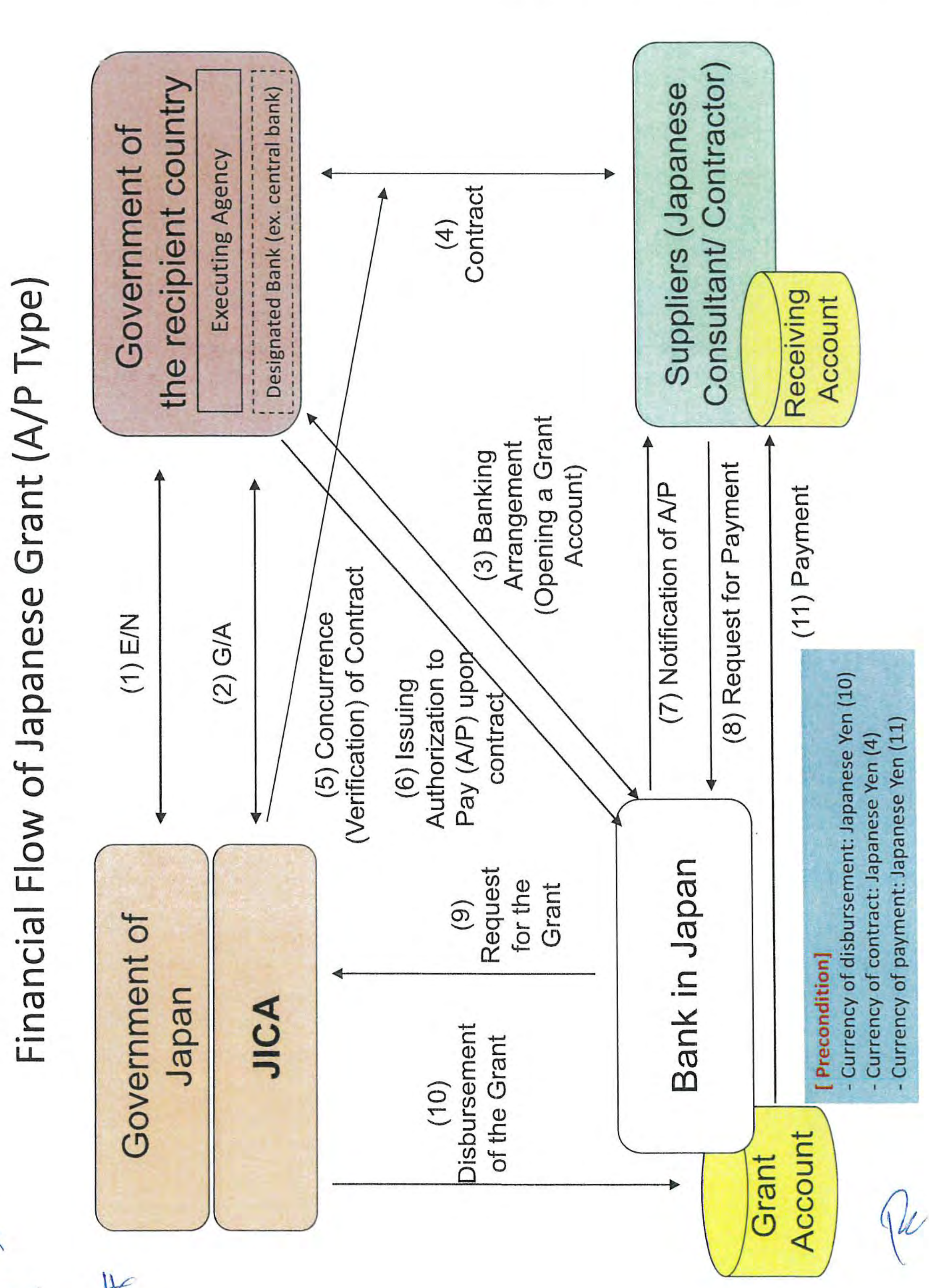
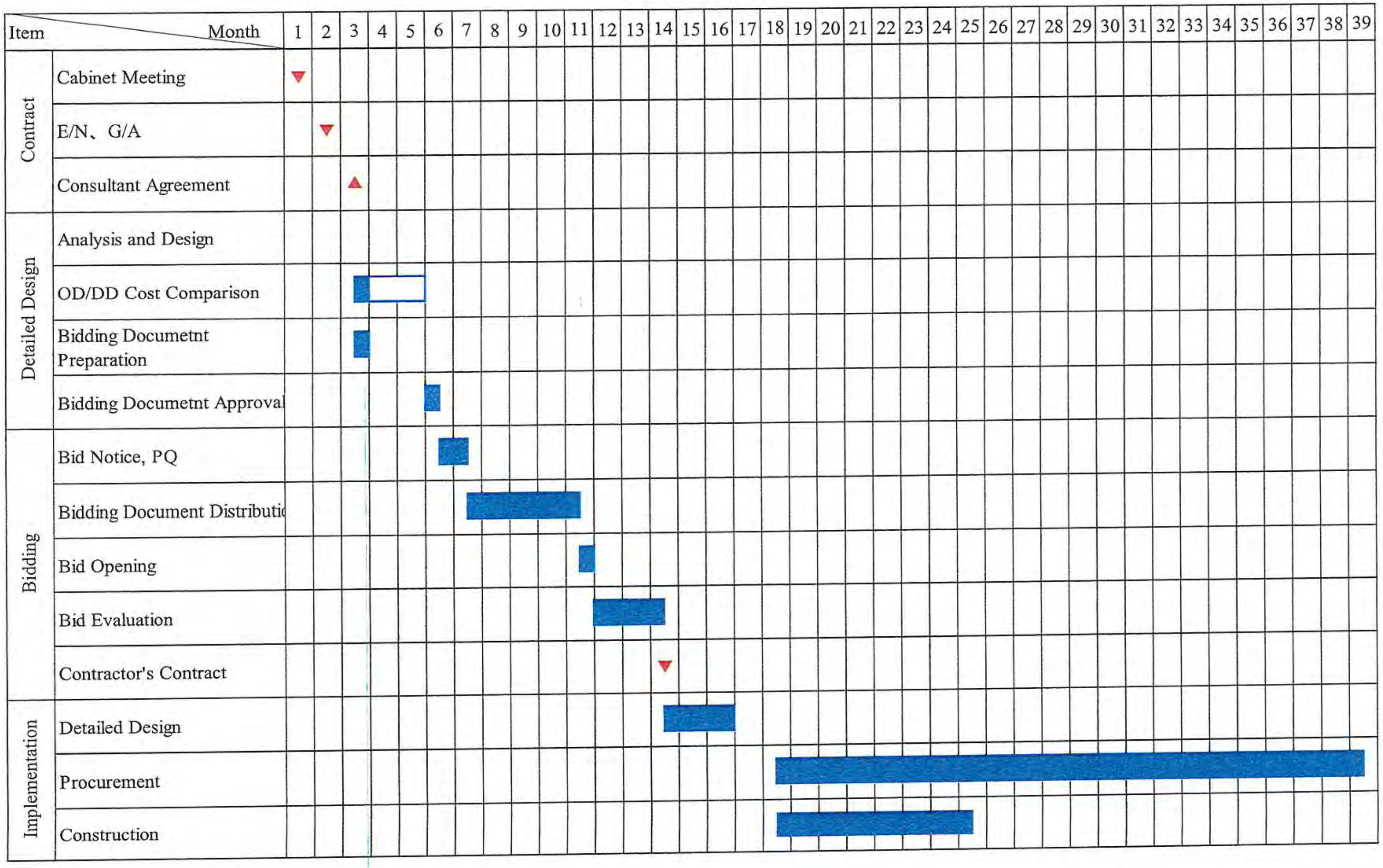

Financial Flow of Japanese Grant (A/P Type)
Government of the recipient country
Executing Agency
Designated Bank (ex. central bank)
Government of Japan
JICA
(1) E/N
(2) G/A
(3) Banking Arrangement (Opening a Grant Account)
(4) Contract
(5) Concurrence (Verification) of Contract
(6) Issuing Authorization to Pay (A/P) upon contract
(7) Notification of A/P
(8) Request for Payment
(9) Request for the Grant
(10) Disbursement of the Grant
(11) Payment
Suppliers (Japanese Consultant/ Contractor)
Receiving Account
Bank in Japan
Grant Account
[Precondition]
- Currency of disbursement: Japanese Yen (10)
- Currency of contract: Japanese Yen (4)
- Currency of payment: Japanese Yen (11)

Annex 4

Project Implementation Schedule



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Annex 5

Major Undertakings to be taken by the Government of Tunisia

1. Specific obligations of the Government of Tunisia which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost (TND)	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant)	Within 1 month after the signing of the G/A	Government of Tunisia	35,873	
2	To issue Authorization to Pay (A/P) to the Agent Bank for the payment to the consultant	Within 1 month after the signing of the contract(s)	Government of Tunisia		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		Government of Tunisia	323	
	1) Advising commission of A/P	Within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	Every payment			
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any)	Before notice of the bidding document	ONAS		
5	To secure land necessary for the construction of advanced waste water treetment plant	Before notice of the bidding document	ONAS		
	To secure stock yards for construction materials	Before notice of the bidding document	ONAS		
6	To obtain the necessary permit for the implementation of the Project from the concerned organization (road crossing of pipeline, and others)	Before notice of the bidding document	ONAS		
7	To clear, level and reclaim the following sites 1) Site for Gabes advanced waste water treatment Plant	Before notice of the bidding document	ONAS		
8	To submit the Project Monitoring Report (with the result of the Detail Design)	Before preparation of bidding documents	ONAS		
9	To assign counterparts for the EPC Contractor during the Detail Design Survey	Soon after starting detail design survey	ONAS		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (TND)	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier the contractor	Within 1 month after the signing of the contract(s)	Government of Tunisia		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A		Government of Tunisia	323	
	1) Advising commission of A/P	Within 1 month after the singing of the contract(s)			
	2) Payment commission for A/P	Every payment			

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NO	Items	Deadline	In charge	Estimated Cost (TND)	Ref.
3	To ensure prompt customs unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	During the project	ONAS		
4	To accord Japanese nationals and/or physical persons of the third countries whose services may be required in connection with the supply of the products and services under the verified contract such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.	During the project	ONAS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	During the project	ONAS		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	During the project	ONAS		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	During the construction	ONAS		
8	1) To submit the Project Monitoring Report 2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	1) Every month 2) Within one month after signing of Certificate of Completion for the works under the contract(s)	ONAS		
9	To submit a report concerning completion of the Project	Within six months after completion of the Project	ONAS		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		ONAS		
	1) Electricity - The distributing line to the existing WWTP	before start of the constoruction	ONAS		
	2) Water Supply - The city water distribution main to the site	before start of the constoruction	ONAS		
	3) Drainage - The city drainage main (for storm, sewer and others) to the site	before start of the constoruction	ONAS		
11	To ensure the safety of persons engaged in the implementation of the Project	during the project	ONAS		
12	To take necessary measures for security and safety of the Project site	during the construction	ONAS		
13	To implement EMP and EMoP	during the construction	ONAS		
14	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	ONAS		
15	To assign counterparts for the soft-component activities	During the project	ONAS		
16	Public relations activities in Tunisia at an opportunities such as completion ceremony	During the project	ONAS		

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(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (TND)	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	ONAS		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between ONAS and JICA.	for 3 years after the Project	ONAS		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid	After completion of the construction	ONAS		

2. Other obligations of the Government of Tunisia funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	1) To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities a) Electricity - The drop wiring and internal wiring within the site - The main circuit breaker and transformer b) Water Supply - The supply system within the site (receiving and/or elevated tanks) c) Drainage - The drainage system (for toilet sewer, ordinary waster, storm drainage and others) within the site d) Furniture and Equipment - Project equipment		
	Total		

* The Amount is provisional. This is subject to the approval of the Government of Japan.

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Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge Contacts	(Designation) Address: Phone/FAX: Email:
Executing Agency	Person in Charge Contacts	(Designation) Address: Phone/FAX: Email:
Line Ministry	Person in Charge Contacts	(Designation) Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY ______ mil. Government of (________): ____________

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1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

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2-3 Implementation Schedule

Items	Original *(proposed in the outline design)*	Original *(at the time of signing the Grant Agreement)*	Actual

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(<u>Confidential until the Bidding</u>)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original1),2) *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original1),2) *(proposed in the outline design)*	Actual
	1.			

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Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

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Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

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	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)
12. Report on the Management of Safety for Construction Works

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Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment: Price (Decreased) E=C−D	Condition of payment: Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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Report on the Management of Safety for Construction Works

Month/Year 2022 年×月	Cumulative number of labor 労働延人数	Cumulative number of public accident 公衆災害件数	Cumulative hours worked 延べ実労働時間数	Number of deaths and injuries due to industrial accidents 労働災害による死傷者	Death and injuries 死傷者数	Aggregated number of calendar days absent 延べ休業日数	Aggregated number of work-days lost 延べ労働損失日数	Frequency rate 度数率	Severity rate 強度率
This Month 当月				Death 死者					
				More than 4 calendar days absent 休業 4 日以上					
				1 to 3 calendar days absent 休業 1～3 日					
				Total 計					
Total including this month 当月迄累計				Death 死者					
				More than 4 calendar days absent 休業 4 日以上					
				1 to 3 calendar days absent 休業 1～3 日					
				Total 計					

Note 注)

1. Frequency rate is the frequency of occurrence of industrial accidents.
   Frequency rate = (Number of deaths and injuries due to industrial accidents ÷ Cumulative hours worked) × 1,000,000
   度数率＝（労働災害による死傷者数÷延べ実労働時間数）×100 万時間
2. Severity rate is degree of seriousness of the industrial accident.
   Severity rate = (Aggregated number of work-days lost ÷ Cumulative hours worked) × 1,000
   強度率＝（延べ労働損失日数÷延べ実労働時間数）1000 時間
3. Aggregated number of work-days lost = Aggregated number of calendar days absent ×(300÷365)
   Death（7,500 days）：death as a result of an industrial accident includes not only instantaneous death but also death as a result of occupational injury or disease.
   延べ労働損失日数＝延べ休業日数×（300÷365）・・・死亡 7500 日（即死のほか負傷が原因で死亡したものを含む）
4. Frequency rate and severity rate are rounding off the third decimal place.
   度数率・強度率は小数点第 3 位以下四捨五入

Environmental Check List

Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
(1) Licensing and consultation	(1) Environmental assessment and environmental permit	(a) Has an environmental assessment report (EIA report) or similar been prepared?	(a) Y	The EIA report was officially sent to Ministry of Environment (MoE) in 4th September, 2023. The EIA report shall be submitted to ANPE from MoE in September 2023.
		(b) Have the EIA reports, etc. been approved by the government of the country concerned?	(b) N	After explaining the DFR, it will be applied, and approval will follow.
		(c) Does the approval of the EIA report, etc. involve ancillary conditions? If there are ancillary conditions, are they satisfied?	(c) N/A	It will be known at the time of approval.
		(d) In addition to the above, have environmental permits and approvals been obtained from the local competent authorities, if necessary?	(d) N/A	None in particular.
	(2) Explanation to local stakeholders	(a) Have local stakeholders been adequately briefed on the Project and its impacts, including information disclosure, to ensure their understanding?	(a) Y	The main local stakeholders (implementing agency (ONAS) and off-takers (GCT)) have been briefed. Additionally, a stakeholder consultation was held on July 22, 2022 to obtain their understanding of the Project.
		(b) Have comments from residents and others been incorporated into the Project details?	(a) Y	Comments are reflected.
	(3) Consideration of alternatives	(a) Have multiple alternatives to the project plan been considered (including environmental and social items during the review)?	(a) Y	A comprehensive review of alternatives, including environmental and social impacts, was conducted and presented in the "Comparative Study of Alternatives" section of the report.
2) Pollution control measures	(1) Water quality	(a) Are items such as SS, BOD, COD, pH, etc. in the effluent after sewage treatment consistent with the discharge standards of the country concerned?	(a) Y	The design meets the effluent quality standards set by INNORPI in Tunisia.
		(b) Does the untreated water contain heavy metals?	(b) N	No heavy metals are present; Fe is present but in amounts below effluent quality standards.
	(2) Waste	(a) Are sludge and other waste generated as a result of the operation of the facility properly treated and disposed of in accordance with the regulations of the country concerned?	(a) Y	Waste management and disposal are defined in Law No. 96-41, which specifies the classification of waste, which is then treated and disposed of

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Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
				accordingly.
	(3) Soil contamination	(a) If sludge, etc. is suspected to contain heavy metals, will measures be taken to prevent soil and groundwater contamination by leachate leakage from the waste?	(a) N/A	No heavy metals are present; Fe is present but in amounts below effluent quality standards.
	(4) Noise and vibrations	(a) Do noise and vibrations from sludge treatment facilities, pumping facilities, etc. meet the relevant national standards, etc.?	(a) Y	In Tunisia, there are no national standards for noise and vibrations, and environmental management standards are based on WHO guidelines or EU standards. The Project was designed with reference to EU standards, with underground pumping facilities and a sludge dewatering machine (the dewatering machine rotates slowly, so there is little vibration) installed inside the building to minimize noise.
	(5) Bad odors	(a) Will measures be taken to prevent odors from sludge treatment facilities, etc.?	(a) Y	A multiple plate screw press dehydrator that facilitates odor control and has high durability will be used. No odor is expected to be generated.
Natural environment	(1) Protected areas	(a) Is the site and treated water discharge destination located within a protected area as defined by the laws of the country concerned and international treaties? (b) Will the Project affect a protected area?	(a) N	(a) There are no protected areas in or around the Project site.
	(2) Ecosystem	(a) Does the site and treated water discharge include primary forests, natural tropical forests, and ecologically important habitats (e.g., coral reefs, mangrove swamps, tidal flats)?	(a) Y	Not included in Project site. The treated water is discharged to Gabes Bay, and there are protected areas 25 km and 50 km away from the discharge site. However, the Project is designed to meet effluent quality standards through its implementation.
		(b) Does the site contain habitats of valuable species that require protection under the laws of the country concerned, international treaties, etc.?	(b) N	The Project does not include habitats for valuable species.
		(c) If significant ecological impacts are a concern, will measures be taken to reduce ecological impacts?	(c) N	No impact on the ecosystem by the project is expected.
		(d) Will the Project affect the aquatic environment, such as rivers? Will	(d) N	The wastewater (concentrated water) from the A-WWTP to be

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Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
		measures be taken to reduce impacts on aquatic organisms?		constructed under the Project will be discharged via a discharge pit at the existing wastewater treatment facility into a channel at the site boundary via a concrete drainage pipe and discharged into Gabes Bay, thus having no impact on the aquatic environment.
Social environment	(1) Resettlement	(a) Will involuntary resettlement occur as a result of Project implementation? If so, will efforts be made to minimize the impact of resettlement?	(a) N/A	The Project will utilize the implementing agency site and public land (roads). No land acquisition or resettlement is expected to occur.
		(b) Will the residents to be relocated be adequately briefed on compensation and livelihood restoration measures prior to relocation?	(b) N/A	Not applicable.
		(c) Will a resettlement study be conducted and a resettlement plan developed that includes compensation at reacquisition price and restoration of livelihoods after resettlement?	(c) N/A	Not applicable.
		(d) Will compensation payments be made prior to relocation?	(d) N/A	Not applicable.
		(e) Has a written indemnification policy been developed?	(e) N/A	Not applicable.
		(f) Does the plan give appropriate consideration to socially vulnerable groups among the relocated residents, especially women, children, the elderly, the poor, and ethnic and indigenous minorities?	(f) N/A	Not applicable.
		(g) Will there be a pre-relocation agreement on the relocated residents?	(g) N/A	Not applicable.
		(h) Will a system be in place to properly implement the resettlement? Will adequate implementation capacity and budgetary measures be put in place?	(h) N/A	Not applicable.
		(i) Is monitoring of the impact of the relocation planned?	(i) N/A	Not applicable.
		(j) Has a grievance mechanism been established?	(k) N/A	Not applicable.
	(2) Livelihood and living	(a) Will the implementation of the Project adversely affect the livelihoods of residents by changing the surrounding land use and water use?	(a) N	The plan is for the Project to be a facility within an existing wastewater treatment plant, and its implementation will not change the surrounding land use

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Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
				or water use. In addition, the project site is in an industrial area and there are no residents nearby, so the Project will not adversely affect the lives of residents.
		(b) Will there be adverse impacts from the Project on the livelihoods of residents? If necessary, will consideration be given to mitigate those impacts?	(b) N/A	Not applicable.
	(3) Cultural heritage	(a) Is there a risk that the Project may damage archaeological, historical, cultural or religious heritage, historical sites, etc.? (b) Is the Project likely to damage archaeological, historical, cultural, or religious heritage or historic sites, and will measures prescribed by the national law of the country be taken into account?	(a) N	There are no archaeological, historical, cultural, or religious sites of archaeological, historical, or religious value in or near the Project site.
	(4) Landscape	(a) Will there be an adverse impact on the landscape, if any, that should be given special consideration? If so, will necessary measures be taken?	(a) N/A	There are no landscapes in or around the Project site that require special consideration.
	(5) Minorities, indigenous peoples	(a) Has consideration been given to reducing the impact of the Project on the culture and lifestyle of minorities and indigenous peoples in the country?	(a) N/A	There are no ethnic minority or indigenous cultures or lifestyles on or near the Project site.
		(b) Are the land and resource rights of minorities and indigenous peoples respected?	(b) N/A	Not applicable.
	(6) Working conditions	(a) Are the country's applicable labor and environmental laws being observed in the Project?	(a) Y	Tunisia has a labor law and a social security system. The survey team will request the Project sponsors to comply with the right laws and systems at the time of distribution of bidding documents.
		(b) Are measures taken to provide hard safety considerations for Project-related personnel, such as the installation of safety equipment and control of hazardous substances related to the prevention of occupational accidents?	(b) Y	During construction, appropriate safety protections, such as stairs and handrails, will be installed to reduce the risk of accidents during construction. At the time of provision, the Project facilities will be equipped with appropriate safety protection such as stairs and handrails to reduce the risk of accidents during service.

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Classification	Item	Main items to check	Yes: Y No: N	Specific Environmental and Social Considerations (Reason for "Yes/No," rationale, mitigation measures, etc.)
		(c) Will soft measures be planned and implemented for Project-related personnel, such as the development of a health and safety plan and safety training for workers and others (including traffic safety and public health)?	(c) Y	The influx of workers from the outside may pose a risk of spreading infectious diseases. This risk can be reduced by providing appropriate health guidance to workers.
		(d) Will appropriate measures be taken to ensure that security personnel associated with the Project do not infringe on the safety of Project personnel and local residents?	(d) Y	Relevant personnel will be educated on the subject matter during safety instruction.

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Annex 8

Environmental Management Plan/Environmental Monitoring Plan

(1) Environmental Management Plan

No.	Environmental Items	Mitigation measure	Responsibility	Supervisory agency	Cost
During construction					
1	Air quality	· Use of properly maintained vehicles and machinery that can control emissions · Watering for dust suppression on site and surrounding roads	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
2	Water quality	· Preventive maintenance of construction equipment and vehicles · Drainage management of construction accommodation	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
4	Soil contamination	· Ensure safety of fuel and oil storage and disposal · Prevent oil leaks and other problems through proper inspection and maintenance of construction equipment	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
19	Existing social infrastructure and social services	· Secure access routes for detours around the construction site · Notification by posting construction signs	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
27	HIV/AIDS and other infectious diseases	· Education and instruction of workers on infection prevention	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
28	Working conditions (including occupational safety)	· Provide occupational health and safety guidance · Conduct periodic safety meetings for workers · Installation of safety signage	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
29	Accidents	· Set speed limit (25 mph or less) · Restrict machine movement on designated haul routes · Appropriate safety signage to control on-site traffic	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.

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No.	Environmental Items	Mitigation measure	Responsibility	Supervisory agency	Cost
At time of provision					
2	Water quality	· MBR membrane treatment and RO membrane treatment processes are incorporated into the Project plan.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
3	Waste	· Project plan includes multiple plate screw press dehydrator that facilitates odor control and has high durability.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
4	Soil contamination	· It is planned that the treated water from the existing sewage treatment facility and the treated water/condensed water from this project facility will be combined, discharged from the existing outlet, and discharged to the sea area through the waterway.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
5	Noise and vibrations	· The pumping facility planned in this Project will be an underground type, and the sludge dewatering machine will be installed inside the building to reduce noise.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
7	Bad odors	· Project plan includes multiple plate screw press dehydrator that facilitates odor control and has high durability.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.
29	Accidents	· In this Project, it is planned to install a fence around the power receiving equipment to prevent intrusion. · In this project, it is planned to install handrails to prevent worker to fall down from the ladder when going up and down to the receiving tank.	Contractor	ONAS	Contractor: Included in construction cost ONAS: Not separately generated for on-site supervision.

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(2) Environmental Monitoring Plan

No.	Environmental Items	Item	Location	Frequency	Responsibility	Supervisory agency	Cost
During construction							
1	Air quality	Existence of exhaust gas and dust from construction	Around the construction site	1 time/month	Contractor	ONAS	Included in construction costs
2	Water quality	pH, SS, BOD, COD	River adjacent to construction site	1 time/month	Contractor	ONAS	Included in construction costs
4	Soil contamination	Leakage of fuel, oil, etc. into the soil	Around the construction site	1 time/week	Contractor	ONAS	Included in construction costs
19	Existing social infrastructure and social services	· Visual inspection of construction site detour access routes and construction signage markings · Listen to complaints from local residents	Construction site neighborhood	1 time/month	Contractor	ONAS	Included in construction costs
27	HIV/AIDS and other infectious diseases	· Records of diseases and infections · Interviews regarding the health status of workers	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
28	Working conditions (including occupational safety)	Status of implementation of occupational health and safety guidance and periodic safety meetings	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
29	Accidents	· Whether or not an accident occurred · Installation status of safety facilities such as protective fences, warning signs, etc.	Construction site	1 time/week	Contractor	ONAS	Included in construction costs
At time of provision							
2	Water quality	pH, SS, COD, BOD	A-WWTP Drainage Facility	1 time/month	Contractor	ONAS	Included in operating expenses
3	Waste	Dredging	Sludge drying	1 time/month	Contractor	ONAS	Included in

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No.	Environmental Items	Item	Location	Frequency	Responsibility	Supervisory agency	Cost
		conditions of waste	bed				operating expenses
4	Soil contamination	Drainage conditions of treated water	Outlet of treated water	1 time/week	Contractor	ONAS	Included in construction costs
5	Noise and vibrations	Operation of pumping facilities and sludge dehydrator	Pump facility and sludge dehydrator room	1 time/month	Contractor	ONAS	Included in operating expenses
7	Bad odors	Sludge dehydrator in operation	Sludge dehydrator room	1 time/month	Contractor	ONAS	Included in operating expenses
29	Accidents	Installation conditions of safety equipment such as fences and handrails	Power receiving equipment and receiving tank.	1 time/month	Contractor	ONAS	Included in construction costs

Annex 9

Environmental and Social Monitoring Form

(1) During construction

1) Pollution control measures

1.1) Air pollution

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Vehicle exhaust gas, dust	Around construction site, once/month, check vehicle operation and maintenance records, visual inspection (check for smoke and dust)

1.2) Water quality

Item (units)	Measured value (average value)	Measured value (maximum value)	Local standard (INNORPI)	Remarks (measurement location, frequency, method, etc.)
pH			$6.5<pH<8.5$	River adjacent to construction site, 1 time/month
SS			30mg/l	River adjacent to construction site, 1 time/month
BOD			30mg/l	River adjacent to construction site, 1 time/month
COD			90mg/l	River adjacent to construction site, 1 time/month

1.3) Soil contamination

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Whether fuel, oil, etc. has leaked into the soil	Visual inspection (check for leaks of fuel, oil, etc.) once a week around the construction site

3) Social environment

3.1) Existing social infrastructure and social services

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Secure access routes for construction site detours and complaints from local residents	Around construction site, 1 time/month, site perimeter survey

3.2) HIV/AIDS and other infectious diseases

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Health status of workers	Construction sites, 1 time/week, health records and interviews with workers

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3.3) Working conditions

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Working conditions	Construction site, 1 time/week, interviews with workers, visual check of working conditions

3.4) Accidents

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Accidents during construction	Around construction site, 1 time/week, record of accidents, survey around site

(2) At the time of provision

1) Pollution control measures

1.1) Water quality

Item (units)	Measured value (average value)	Measured value (maximum value)	Local standard (INNORPI)	Remarks (measurement location, frequency, method, etc.)
pH			$6.5<pH<8.5$	A-WWTP waste water facility, 1 time/month
SS			30mg/l	A-WWTP waste water facility, 1 time/month
BOD			30mg/l	A-WWTP waste water facility, 1 time/month
COD			90mg/l	A-WWTP waste water facility, 1 time/month

1.2) Waste

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Dredging status of waste	Sludge drying bed, 1 time/month, visual inspection

1.3) Soil contamination

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Drainage conditions of treated water	Outlet of treated water, 1 time/week, visual inspection

1.4) Noise and vibrations

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Operation of pumping facilities and sludge dehydrator	Pump facility, sludge dewatering machine, 1 time/month, noise meter

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1.5) Bad odors

Monitoring Item	Remarks (measurement location, frequency, method, etc.)
Sludge dehydrator during operation	Sludge dehydrator, 1 time/month

(3) Social environment

3.4) Accidents

Monitoring Items	Remarks (measurement location, frequency, method, etc.)
Installation conditions of safety equipment such as fences and handrails	Power receiving equipment and receiving tank, 1 time/month, confirmation of present conditions

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(As of September 4, 2023)

(12th Draft)

Term Sheets

(Summary of the Contract Conditions)

for
the Project for Construction of Advanced Waste Water Treatment Plant in Gabes under JICA's Grants

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List of abbreviation

A-WWTP	Advanced Waste-Water Treatment Plant
D&B	Design and Build
EPC	Engineering, Procurement and Construction
E/N	Exchange of Note
G/A	Grant Agreement
JV	Joint Venture
MBR	Membrane Bioreactor
ONAS	Office National de l'Assainissement
O&M	Operation and Maintenance
PQ	pre-qualification
RO	Reverse Osmosis
SPC	Special Purpose Company (a project company)
GCT	Groupe Chimique Tunisien
DBO	Design-Build-Operate

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1. Project Structure and Business Model

In interpreting the term sheet, the following words and expressions shall have the meanings stated below.

No.	Item	Contents
1	Project	The Project for the Construction of the Advanced Waste-Water Treatment Plant in Gabes
2	Project Objective	Gabes Governorate is located in the southern part of Tunisia, where securing water resources is a serious issue. The Project aims to utilize treated wastewater for industrial use by developing an A-WWTP next to the existing wastewater treatment plant and by conducting efficient operation and maintenance of the A-WWTP. This Project will contribute to the conservation of water resources in Tunisia.
3	Executing Agency for the Project / Employer	ONAS
4	Contractor	A Japanese company or JV/Consortium of Japanese companies which shall undertake the EPC Works and also the O&M Services integrally for the Project.
5	EPC Contractor	A Japanese company or JV/Consortium of Japanese companies which shall undertake the EPC Works for the Project.
6	O&M Contractor	SPC to be established under Tunisian Law in Tunisia by the Contractor, which shall undertake the O&M Services integrally for the Project.
7	EPC Works	Design and construction of the A-WWTP and relevant facilities (hereinafter referred to as "Facilities") including purchase of goods and services for the Project by utilizing Japanese Grant Aid.
8	O&M Services	Operation and maintenance services of the Facilities (hereinafter referred to as "the O&M Facilities") including producing refined water conducted by the O&M Contractor.
9	EPC Contract	Contract to be concluded between ONAS and the Contractor to describe mutual rights and obligations when currying out the EPC Works.
10	Comprehensive Contract	Contract to be concluded between ONAS and the Contractor to confirm that the Contractor shall curry out the EPC Works and the O&M Services by contracting integrally. The Contract also describes the deadline of establishment of O&M Contractor and schedule for conclusion of Three Party Contract.
11	Off-taker	Purchaser of the refined water used for industrial purposes produced by the O&M Contractor from ONAS, namely, Groupe Chimique Tunisien (GCT)
12	Water Supply Service	Water supply service of the refined water produced by the O&M facilities to the Off-taker from ONAS.
13	Three Party Contract	In the form of a contract signed by three parties of ONAS, O&M Contractor, GCT. The Contract shall set forth the respective obligations, rights and payment

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		mechanisms and so on among three parties for O&M Services and Water Sales Services.
14	Consultant Contract	Contract for technical consultancy service for ONAS, especially bid assistance for election of the Contractor for EPC Works and O&M Services, and supervision of EPC Works for the Project covered by Japanese Grant Aid.

The image of the project structure and business model are shown in Figure-1 and Figure-2 below.

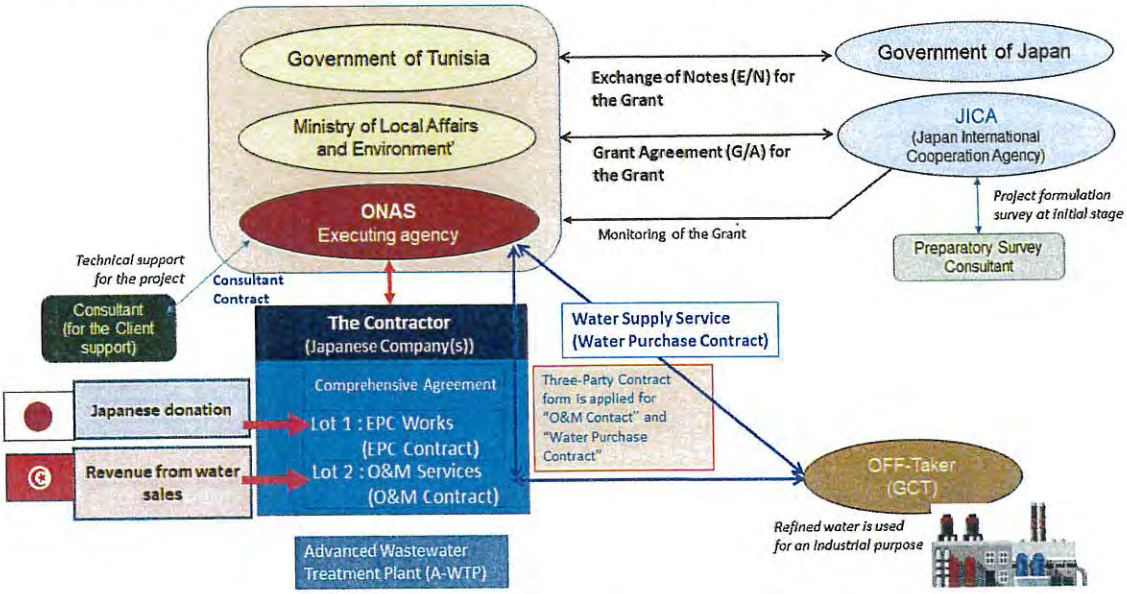

Figure-1: Image of Project Structure and Business Model (1)

Budget	Japanese Grant Aid (Japanese Yen)		Water Sales revenue (Tunisian Dinar)	
Main Component	Design and Build (EPC) Works		O&M Services	Water Sales
ONAS	ONAS	ONAS	ONAS	
Contract	Consultant Contract	EPC Contract (Design and Build)	Three-Party Contract	
Contractor	Company B	Company A (Japanese National)	Company A (SPC of Tunisian National)	Off-taker (GCT)

A Japanese company or a joint venture / consortium of Japanese companies to be selected by a single bid.

Figure-2: Image of Project Structure and Business Model (2)

(Note) ONAS shall conclude the EPC Contract with the EPC Contractor based on the Public Procurement Law in Tunisia and also shall conclude Three Party Contract with the O&M Contractor to be established in accordance with the Concession Law in Tunisia. ONAS shall hold a single bidding to select the Contractor who shall provide EPC Works and O&M Services.

2. Term Sheets of the Contracts

(1) The Term Sheets describe key terms and conditions of the following contracts to be incorporated in the bidding documents. The contracts shall be prepared as a part of bidding documents.

(2) Term sheets of the following contracts for the Project are attached:

1) Term Sheet No.1 for Comprehensive Contract (between ONAS and the Contractor)

2) Term Sheet No.2 for EPC Contract with major undertakings and risk allocation (between ONAS and the Contractor (so called as the EPC Contractor))

3) Term Sheet No.3 for Three Party Contract for O&M Services and Water Supply Service with major undertakings and risk allocation (among ONAS, the O&M Contractor and Off-taker)

(3) Term Sheets of the contracts were disclosed in the market sounding to Japanese companies to be held in Japan to explain the outlines of the Project and the contracts.

Term Sheet No.1 for Comprehensive Contract (among ONAS, the Contractor and GCT)

(1) Purpose of the Contract

The awarded contractor shall enter into separate contracts for EPC works and O&M services to implement the project. However, separate contracts would make it unclear that the awarded contractor is responsible for both EPC works and O&M services as a single entity. Therefore, a comprehensive contract shall be concluded between ONAS and the awarded contractor to confirm that the contractor shall undertake the EPC works and O&M services, and that the contractor will establish an SPC (a project company) established under Tunisian law in Tunisia for this purpose immediately after awarded.

(2) The Key terms and conditions are presented below.

No.	Item	Contents (Key Terms and Conditions)	Confirmation between ONAS/JST
1	Signers	ONAS, the Contractor and GCT.	Confirmed
2	Contents of Description		
(1)	Project Components	The Contractor shall undertake the EPC Works and O&M Services.	Confirmed
(2)	Contractor	A Japanese company or Joint Venture (JV) / consortium of Japanese companies who provides EPC Works and O&M Services.	Confirmed
(3)	Explanation on Project Scheme (Japan' Grant and O&M)	In the Grant Agreement (G/A) for the Project it is agreed that the nationality of the Contactor for the EPC Works to be financed by the Grant shall be Japanese. O&M Services shall be financed by the revenue from refined water.	Confirmed
(4)	Contracts which constitute the Project	(a) The Contactor with Japanese nationality shall conclude EPC Contract and Comprehensive Contract in a form of a Japanese company or a joint venture / consortium of	Confirmed

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		Japanese companies immediately after awarded with ONAS. The form of the Contractor shall be offered in the bidding. (b) Then, the Contractor with Japanese nationality shall establish SPC (a project company) under Tunisian Law in Tunisia to conclude the O&M Contract (three party contract) in line with investment law and other laws applied in Tunisian. The Contractor is permitted to offer the minor invest of the Tunisian firm for the SPC (a project company) established under Tunisian Law in Tunisia in the bidding as far as Tunisian law applied allows. (c) Comprehensive Contract is used to secure that the Contractor will undertake both EPC Works and O&M Services integrally through contracting. (d) O&M Services and Water Supply Service shall be concluded in a form of the Three Party Contract after relevant authorities of Tunisian Government approve the conclusion.	
(5)	Deadline of establishment of SPC (a project company) and conclusion for O&M Services	The Three Party Contract shall be concluded within one year after concluding EPC Contract. Thus, the Contractor is requested to establish SPC (a project company) to proceed the approval process smoothly immediately after awarded. The application of establishment of SPC for Tunisian authorities must be conducted at the latest within three months of receipt of the award by the Contractor.	

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Term Sheet No.2 for EPC Works (between ONAS and the Contractor)

(1) JICA's Standard Form for EPC Works shall be used. The conditions in the Form are not modified.

(2) The Key terms and conditions are as mentioned below.

No.	Item	Contents (Key Terms and Conditions)	Confirmation between ONAS/JST
1	Bidding Documents Type	Design Build Type, JICA's basic form is Yellow Book (FIDIC)	Confirmed
2	Employer	ONAS	Confirmed
3	Consultant	A Japanese consultant shall be assigned to provide overall technical consultancy services for ONAS	Confirmed
4	EPC Contractor (the Contractor)	A Japanese company or JV / Consortium of Japanese companies selected through the bidding	Confirmed
5	Country of Origin of Products	Basically, Japan and/or the Recipient country. Third countries could be added based on the survey result.	Confirmed
6	Performance Security	Required	Confirmed
7	Governing Law	Tunisian Law (note) E/N, G/A and JICA's Procurement Guidelines for the Japanese Grants are also applied for the procurement of the EPC Works finance by the Grant.	Confirmed
8	Language	French (to correspond to Item No.1 Contract Type)	Confirmed
9	Design Obligation	The Contractor carries out and is responsible for the design.	Confirmed
10	Contract Type	Lump sum contract type	Confirmed
11	Payment Schedule	Milestone type or Progress type will be applied.	Confirmed
12	Advance Payment	Available (upon submission of advance payment security)	Confirmed
13	Currency of Payment	Japanese yen	Confirmed
14	Adjustment for Change in Cost	Not applied	Confirmed
15	Subcontractors	Allowed, but not for the whole of the works	Confirmed
16	Insurance	Contractor's All Risks (CAR) and third party liability insurance	Confirmed
17	Test on Completion	Applied	Confirmed
18	Termination	Termination by ONAS and the Contractor is allowed.	Confirmed
19	Force Majeure	Applied (War, riot, natural catastrophes, evacuation decision by the Ministry of Foreign Affairs of Japan, JICA and so on are defined as Force Majeure.). Detailed terms and conditions shall be described in the Contract.	Confirmed

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20	Delay Damages	Not applied	Confirmed
21	Defects Liability Period	One (1) year from the date of hand-over	Confirmed
22	Ownership of Facilities	To be transferred to ONAS on the day the completion of Test on Completion conducted and confirmed the satisfaction of the requirements.	Confirmed
23	Time for Completion	To be determined in the survey	Confirmed
24	Main Scope of Works	Site survey, basic design, detailed design, construction works, procurement of equipment and test on completion of the Facilities	Confirmed
25	Outline of Facilities	(to be mentioned in the bidding documents based on the survey)	Confirmed
26	Requirement for Facilities	(to be mentioned in the bidding documents based on the survey)	Confirmed

Major undertakings to be taken by the Government of the Republic of Tunisia and ONAS for EPC Works

Major undertakings to be taken by the Government of the Republic of Tunisia and ONAS for the Project in relation to EPC Works are mentioned in Annex 5: Major Undertakings to be taken by the Government of Tunisia, Minutes of Discussion between MoE and JICA.

Risk Allocation of EPC Works

No.	Item of Risk	ONAS/ Grant	Contract or	Remarks	Confirmation between ONAS/JST
1	Cost inflation related to Contractor's works during the EPC Contract period	-	Yes	The Contractor takes the inflation risk and also currency exchange rate fluctuation risk.	Confirmed
2	Design Deficiency	-	Yes	The Contractor takes the risk. (It shall be mentioned in the Contract.)	Confirmed
3	10-year guarantee Law	-	Yes	Tunisian 10-year guarantee Law (Structural defects compensation insurance and employment with bureau de controle as needed) is applied for the Civil engineering component of the Facilities	Confirmed
4	Force Majeure Events in EPC	Please	-	In the event that a force	Confirmed

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	Contract during Contract Period	refer to remarks		majeure event happens, both parties shall consult with the Consultant and discuss measures to be taken based on the terms and conditions of the Contract. Change of the design etc. should be conducted in line with the procurement guideline to be applied for the Project.	

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Term Sheet No.3 for Three Party Contract for O&M Services and Water Supply Service

(1) The Key terms and conditions are as mentioned below.

No.	Item	Contents (Key Terms and Conditions)
1	Contract Type	Three Party Contract Type
2	ONAS	(1) ONAS is a receiver of the O&M Services from the O&M Contractor under O&M Service Part (2) ONAS is a seller of refined water used for industrial purposes to the Off-taker under Water Supply Service Part
3	O&M Contractor	(1) The contractor, in form of SPC (a project company) incorporated under Tunisian Law in Tunisia, means a provider of the O&M Services including producing refined water from treated wastewater by ONAS. (2) The O&M Contractor is allowed to hire Tunisian sub-contractor for conducting the O&M Services.
4	Off-taker	Off-taker means a purchaser of the refined water used for industrial purposes, namely the Groupe Chimique Tunisien (GCT).
5	Contract Effectiveness	This contract shall become effective on the date of signature by all three parties.
6-1	O&M Services	Operation and maintenance services of the Facilities (hereinafter referred to as "the O&M Facilities") including producing refined water used for industrial purposes conducted by the O&M Contractor.
6-2	Commencement Date of O&M Service and Supply of Refined Water	(1) The commencement date of O&M Services shall be the same date of handing-over of the Facilities to ONAS constructed under the EPC Contract. The O&M Contractor is allowed to use the O&M Facilities for providing O&M Services from the commencement date. (2)The commencement date of supply of refined water to the Off-taker shall be from the following day of the commencement date of O&M Services above. The date should be within 14 days from the Commencement Date of O&M Service. (3) In case that the any parties find that the situation does not confirm satisfaction of the conditions and requirements to produce, supply, and/or receive the refined water produced by the O&M Facilities, the party should notify the other parties the delay of commencement and new commencement date of supply in writing. Unless otherwise agreed among parties, the take-or-pay mechanism shall commence automatically after one (1) month from the commencement date of O&M Services above.
7	Contract Period	10 years from the operation commencement date. The contract period of ten years could be expired or extended in accordance with Item 8.

8	Extension of Contract Period	(1) Extendable with agreement by all three parties. In this case, a party shall give a notice of intention of extension at least 12 months prior to the expiration date of the Contract in writing and the other parties do not show objection within 3 months. If this condition is satisfied, the contract period shall be extended automatically for successive 3 years on the same terms and conditions unless otherwise agreed among the parties. (2) When a party gives the intention of extension, ONAS shall host a joint meeting attended by the O&M Contractor and the Off-taker to exchange views on the extension. (3) In case that a party have no-intention of extension, the party should notify the intention in writing at least 12 months prior to the expiration date of the contract.	
9	Payment Currency	Tunisian dinar	
10	Governing Law	Tunisian Law	
11	Tax Payment	All parties shall make payments of taxes such as Corporation Tax, VAT and WHT incurred under the project in accordance with Tunisian Law respectively. Please refer to Article 11. Invoice Settlement in the Contents (Key Terms and Conditions).	
12	Communication	French	
13	Force Majeure	Applied (Any party shall be liable to the other parties for any delay or failure in the performance of its obligations under this Contract in the event that such delay or failure arises from any cause beyond the reasonable control of the party affected (hereinafter called the "Force Majeure").)	
14	Major Undertakings and Risk Allocation	Please refer to attached Table on Major Undertakings and Risk Allocation.	
15	Amicable Settlement	In case of dispute between or among the parties, the parties shall attempt to settle the dispute amicably by negotiation.	
16	Dispute Resolution mechanism	In case of failure to reach an amicable settlement, the dispute resolution shall be conducted by the Tunisian court in accordance with Tunisian common law.	
No.	Item	Contents (Key Terms and Conditions)	
	Contract Part	O&M Services Part	Water Supply Service Part

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1	Outline of the Contract	The O&M Contractor shall provide O&M Services utilizing the O&M Facilities including producing of refined water from swage water to ONAS. The detailed requirements for O&M Services shall be described in the bidding documents.	The Off-taker shall purchase the refined water processed through the O&M Facilities from ONAS.
2	O&M Facilities	A-WWTP and incidental facilities to be constructed under the EPC Contract and to be operated and maintained by the O&M Contractor. The detailed O&M Facilities shall be specified in the bidding documents.	-
3	Right to use O&M Facilities	Property of the O&M Facilities belongs to ONAS. The O&M Contractor for the O&M Services is entitled to use the O&M Facilities during the contract period.	-
4	Land Access and Utilization	The O&M Contractor is entitled to access the land inside the Project site for conducting O&M Services and allowed to use the area of operation within the Project site agreed upon with ONAS in order to provide the O&M Services during the contract period.	-
5	Volume and Quality of Treated Wastewater Supplied from ONAS	(1) Volume: ONAS shall provide treated wastewater of 10,000m3 or more on a daily basis (10,000m3 or more per day). (2) Quality: Treated wastewater shall be supplied in accordance with the designed parameters for the construction of O&M Facilities, which ONAS confirmed, and are mentioned in the bidding documents.	

6	Processing Volume of Refined Water by the O&M Contractor	(1) The basic processing capacity of A-WWTP shall be 6,000m3 per day on a daily basis. The detailed requirements for processing capacity shall be mentioned in the bidding documents. (2) The processed volume is measured at Delivery Point of Refined Water (Hand-Over Point).
7	Supply Volume of Refined Water	(1) The basic water volume to be supplied to the Off-taker shall be 6,000m3 per day on a daily basis. (2) The O&M Contractor shall provide A-WWTP Operation Plan, which refers to basic supply water volume and also the water supply volume change due to maintenance of the facilities, increase production volume etc., if any, to ONAS and Off-taker yearly and monthly basis during the contract period. (3) The O&M Contractor shall process the water volume in accordance with A-WWTP Operation Plan. The Off-taker is allowed to request ONAS and the O&M Contractor to increase or decrease the basic supply volume by every 15th of the preceding month. (4) ONAS and the O&M Contractor reserve the right to change the supply volume according to the situation on the day. In that case, ONAS and/or the O&M Contractor shall immediately notify the Off-taker on the change in supply volume and relevant information. (5) The detailed requirements of A-WWTP Operation Plan and supply conditions of refined water shall be mentioned in the bidding documents.
8	Quality of Refined Water by the O&M Contractor	The O&M Contractor shall process the refined water that satisfied the following quality. a) no color, which is defined to be "Turbidity of 1NTU or less", b) no odor, which is difined to "Acceptable with 3 TON or less", c) no bacteria and viruses, d) TDS is not more than 300mg/l, and e) pH between 6.5 and 8.5 (note) The O&M Contractor shall submit the Water Quality Management Plan, which consists of monthly / quarterly monitoring plan tested by certified laboratory and daily continuous operational monitoring plan done by O&M Contractor. Objectives of operational monitoring plan is to ensure and control the performance of water treatment. Please refer to Article 14 Water Quality Test on the quality of refined water as well.
9	Remuneration Amount to the Contactor	(1) Remuneration amount to the O&M Contractor Remuneration amount to the O&M Contractor from ONAS

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		for O&M Services and remuneration of ONAS for each month is calculated in line with the following payment calculation formula. [Payment Calculation Formula to the O&M Contractor] Remuneration Amount to the Contactor: (a) Off-taker's Payment Amount to ONAS – (b) Payment Amount to ONAS (2) Remuneration amount to the O&M Contractor shall be changed in accordance with the penalty for the O&M Contractor and also the adjustment (reduction) of the annual payment amount based on the SS parameter figure.	
	Remuneration Amount to ONAS	(1) Payment Amount to ONAS Payment Calculation Formula of Remuneration Amount to ONAS (TND/month): [Remuneration Amount to ONAS (TND/month)] = Off-taker's Payment Amount (TND/moth) × Commission Fee Percentage (Basic Commission Fee is 5%) (note) The remuneration amount shall be adjusted in accordance with article 11. Invoice Settlement and Attachment-2. (2) Remuneration amount to the O&M Contractor shall be changed in accordance with the penalty for the O&M Contractor as mentioned in Risk Allocation below.	
10-	Payment Amount to	-	(1)Payment Amount

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1	ONAS from the Off-taker		Payment for refined water is made from Off-taker to ONAS for each month. Payment amount is calculated in line with the Payment Calculation Formula. [Payment Calculation Formula] Payment Amount = [Month's cumulative guaranteed purchase volume (6000m3 x days of the Month)] x Selling Unit Price (TND/m3) (Note 1) Daily Guaranteed Purchase Volume Committed by Off-taker shall be 6000 m3. Therefore, Month's cumulative guaranteed purchase volume above shall be basically calculated as "6000 m3 x days of the Month". Purchase obligation of Daily Guaranteed Purchase Volume Committed by Off-taker shall be not applied when Off-taker is not able to receive refined water due to events which is not attributable to Off-taker or the force majeure events or insufficient quality. (2) In case of a deviation from the O&M Contractor's financial business plan is found in the following cases, a party is allowed to request the other party to modify the Payment Calculation Formula, Price Adjustment Formula, and/or "unit price of water production (TND/m3); 1) in the case of termination by the O&M Contractor in Article 18 (2); and 2) in the case that the net asset in Balance Sheet of the O&M Contractor is positive (surplus) and the O&M Contractor's IRR (after tax) is also projected 25% or more, which shall be calculated in accordance with financial business plan submitted at the time of bidding for the Project, on or after the 7th year from the commence of the Project; 3) In the case that three parties do not reach an agreement, profit sharing

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			system between GCT and the Contactor could also be introduced instead of reduction of "unit price of water production (TND/m3). Profit sharing is applied when the amount of the O&M Contractor's profit (profit before tax) of the year (7th to 10th) exceeded by 25% against the planned profit amount of the year (profit before tax) mentioned in the business plan. GCT shall receive a certain percentage of profit amount, which is calculated by [Profit amount of the year – 125% of planned profit of the year (profit before tax)] x 30%.
10-2	Deposit of Fund for Equipment for Replacement	The O&M Contractor is required to reserve the funds for equipment for replacement which is listed to be mentioned in the Contract by allocation of a part of the income (profit) and to purchase and/or replace the equipment in line with the terms and conditions of the Contract. The O&M Contractor is required to show the amount reserved for equipment for replacement in the balance sheet (B/S).	
11	Invoice Settlement	(1) Payment to the O&M Contractor: Payment to the O&M Contractor shall be conducted monthly basis. 1) The O&M Contractor shall submit an invoice monthly basis. The invoice amount shall be calculated as follows: [Invoice Amount (TND/month)] = [Off-taker's Payment Amount (TND/month)] – [Remuneration Amount to ONAS (TND/month)] – [Penalty Amount to ONAS (TND/month) from the O&M Contractor, if any] (2) Remuneration Payment to ONAS: Remuneration Payment to ONAS could be conducted monthly basis according to the following calculation formula. 1) Calculation Formula of Remuneration Amount to ONAS (TND/month):	(1) Payment to the ONAS: Monthly settlement and monthly payment 1) ONAS shall submit an invoice monthly basis. The invoice amount shall be calculated as follows: [Invoice Amount (TND/month)] = [Off-taker's Payment Amount (TND/month)] 2) The O&M Contractor shall draft the payment amount based on supplied refined water volume in line with the Payment Calculation Formula and inform ONAS and Off-taker monthly basis. 3) ONAS shall prepare and submit an invoice to the Off-taker within 7 days after receiving the draft. Off-taker shall make payment to ONAS within 45 days after receiving of the invoice from ONAS. However, the Off-taker shall make its best efforts to make payments to the ONAS at the earliest possible time in order to avoid possible financial problems of the

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		[Remuneration Amount to ONAS (TND/month) = Off-taker's Payment Amount (TND/month) × Basic Commission Fee of 5% (TND/month)] ±[Monthly or Annual Adjusted Payment Amount to ONAS according to the figure of SS of treated waste water as per attachment-2] (3) ONAS shall make payment to the Contractor within 45 days after receiving of payment from the Off-taker in accordance with the Invoice from the O&M Contractor. However, ONAS shall make its best efforts to make payments to the O&M Contractor at the earliest possible time in order to prevent financial problems of the Project and for smooth implementation of the Project. (4) There will be no reduction of the payment for the reason of depreciation cost for the project facility.	Project and for smooth implementation of the Project. (note1) The VAT regulation which is in force shall be applied for the Invoice from ONAS to Off-taker. VAT is not charged for the Invoice from ONAS and payment to ONAS in accordance with the legislation applied for GCT in Tunisia. (note2) Price adjustment mechanism shall be applied for Selling Unit Rate (TND/m3) in accordance as per attachment-1 (Price Adjustment Formula and Bid Offer Mechanism). (note3) ONAS and the O&M Contractor are not obliged to compensate GCT in related to the water supply services under this Contract.
		(note) Optional Case for Introduction of Escrow Account for Settlement: In the survey stage, GCT did not accept to introduction of Escrow Account against the proposal from ONAS due to its regulations. If the O&M Contractor would like to utilize the Escrow Account for Settlement foe the Project, the O&M Contractor and ONAS are jointly required to submit an official request letter with required conditions to GCT after awarding for three Party Contract after contracting. In case that GCT accept the official request, the parties shall prepare the Escrow agreement consulting with the fiduciary agent and conclude the agreement.	
12	Measurement Point of Treated Wastewater (Feed Water)	Measurement point for treated wastewater shall be at the intake pit to be constructed followed by the existing treatment facility. The detailed measurement point shall be shown in the bidding documents.	-

13	Delivery Point of Refined Water (Hand-Over Point)	-	Measurement point shall be at the boundary point of the Off-taker's site. The Water Volume measured by the meter installed at the measurement point shall be used for payment. The detailed measurement point shall be shown in the bidding documents. Another meter shall be also installed before pipeline to the Off-taker for reference purpose.
14	Water Quality Test	(1) The O&M Contractor shall submit to ONAS the results of treated wastewater quality test conducted by the O&M Contractor on a daily and weekly basis to see the quality requirements are satisfied. (2) The O&M Contractor shall submit to the Off-taker and ONAS the results of refined water quality test conducted by the O&M Contractor on a daily and weekly basis and also the test result by a certified laboratory periodically. With regard to the bacteria test, it shall be conducted by a certified laboratory or at the laboratories of the Hygiene Directorate (Ministry of Health) in Gabes once each two weeks as a part of O&M Services. The frequency of its test frequency could be reduced in case that the Off-taker and Hygiene Directorate (Ministry of Health) accept the alternative offer from the O&M Contractor (The O&M Contractor may offer when satisfaction of the requirements refined water quality is confirmed). (3) The requirements for the water quality test to submit ONAS and the Off-taker is defined in the specification sheet separately prepared.	
15	Insurance for the O&M Facilities and rehabilitation	(1) The O&M Contractor is required to carry damage multi risk insurance (against disaster (flood, earthquake etc.), fire, Impact and so on) for O&M Facilities sold in Tunisia in order to cover the rehabilitation. The insurance amount shall be at least equal to the book value of the O&M Facilities. (2) As for the damage caused by the failures or misuse of the O&M Contractor, such rehabilitation shall be conducted by the O&M Contractor at his own responsibility utilizing the insurance.	-

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		(3) The O&M Contractor is required to rehabilitate the damage, which is not caused by the failures or misuse of the Contactor, within the amount of the insurance payment (It is required to cover the minimum self-payment amount of the insurance.).	
16	Monitoring Report	The O&M Contractor shall submit an O&M monitoring report on the operation, maintenance and financial status of the O&M Contractor to ONAS periodically and at the termination. Detailed requirements for the monitoring reports shall be mentioned in the bidding documents.	-
17	Termination	(1) Termination by ONAS, the O&M Contractor and the Off-taker is allowed in the following cases; 1) ONAS, the O&M Contractor and the Off-taker may terminate the contract in case of default of the other parties, or interruption of the contract related to the Force Majeure events. Such cases and events include: a. Default of the O&M Contractor: In case that the O&M Contractor fails to carry out their obligations and fails to remedy within 90 days and/or becomes bankrupt. The O&M Contractor shall hand over the O&M Facilities with relevant data and report to ONAS. The O&M Contractor is required to pay the reasonable costs to the damage incurred by ONAS, if any, in accordance with the hand-over conditions of the O&M facilities to be defined in the bidding documents. b. Default of ONAS: In case that ONAS fails to operate and maintain the existing wastewater treatment plant and fails to supply the treated wastewater of required volume per day defined in the Contract and recover supply of such required volume per day within 90 days and/or becomes bankrupt. In case that ONAS fails to pay the contracted payment amount to the O&M Contractor within 90 days after date of payment obligation, c. Default of Off-taker: In case that Off-taker fails to pay the contracted payment amount to ONAS within 90 days after submission of invoice, or it fails to meet Off-taker's obligations persistently etc. d. Force Majeure: In case that Force Majeure situation continues more than 180 days. (2) Termination by the O&M Contractor is also allowed in the following cases;	

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The O&M Contractor may terminate the contract from 7 years of O&M after commencement of the O&M period (min. 7 years engagement) in case it finds difficulty with continuous sound business due to the following cases which the O&M Contractor is not able to control despite their endeavor for the sustainable business. Such cases include: (note) Difficulty with continuous sound business means that the O&M Contractor's Net Income in the Profit and Loss (P/L) Statement is deficit for three consecutive years, and also the amount of Net Asset in the latest Balance Sheet (BS) is negative.

1) In case of significant fluctuation in exchange rate which causes difficulty in the O&M Contractor's sustainable business.
2) In case of long term electricity shortage and blackout which cause difficulty in the O&M Contractor's sustainable business.
3) In case of the changes in Tunisian law(s) and regulation(s) which cause difficulty in the O&M Contractor's sustainable business.
4) In case that plurality of times of payment delay and shortage of payment by ONAS for the reasons not attributable to the Contactor which cause difficulty in the O&M Contractor's sustainable business.
5) In case that plurality of times of payment delay and shortage of payment by the Off-taker for the reasons not attributable to the Contactor which cause difficulty in the O&M Contractor's sustainable business.
6) In case that water supply volume is much less than 6,000m3 x 365 days per year continuously for the period for the reasons not attributable to the Contactor which cause difficulty in the O&M Contractor's sustainable business.
7) In case that Force Majeure situation continues more than 180 days, and also the performance requirements of O&M facilities are unable to achieved for more than 90 days due to a lack of insurance payment for the damage rehabilitation.

Because these cases are not attributable to the Contactor, the O&M Contractor should propose to have negotiation among the O&M Contractor, ONAS and Off-taker on increase of the amount of "unit price of water production (TND/m3)", Payment Calculation Formula and/or Price Adjustment Formula etc. at least 1 year prior to issuance of termination in writing. The O&M Contractor is responsible for explanation on the difficulty of sound business comparing the change of factors or indicators mentioned in the business plan submitted at the bidding and also conduct reasonable explanation on the amount of "unit price of water production (TND/m3) to be revised". The explanation should be reasonable and acceptable for ONAS and Off-taker. The O&M Contractor's endeavor is also required for the sustainable business includes seeking available financial support such as additional investment from the Contractor with Japanese nationality which established the project company.

(3) Neither Party may terminate the Contract at his convenience by giving agreed indemnity to the other parties.

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18	Right to claim the Payment after the Termination	ONAS is allowed to transfer the right to claim the payment against the Off-taker to the O&M Contractor upon mutual agreement in case that the Contract is terminated and the payment from the Off-taker to ONAS is not made. In case that the O&M Contractor receive the right to claim, ONAS is released from the obligation of the payment against the O&M Contractor.	
19	Hand-Back to ONAS at Termination	(1) In case of termination, ONAS and the O&M Contractor shall jointly organize a committee and discuss so that the transfer of the O&M facilities can be done smoothly. (2) The O&M Contractor shall carry out a training program for the Employer's personnel on know-how of the operation and maintenance to the extent as specified in the Requirements for O&M Services. The overall program and scheduling of the training shall be decided in the survey and the O&M Contractor will prepare a detailed proposal in the technical bid. (3) In case ONAS dispatches staff for technical transfer training during the O&M period, ONAS bears the staff salary. (4) ONAS is entitled to purchase the O&M Contractor's equipment installed by the investment from the O&M Contractor at the price to be agreed between the parties. (5) Detailed conditions on Hand-Back to ONAS at Termination shall be mentioned in O&M Requirements in the bidding documents.	-
20	Investment in the O&M Facilities by the O&M Contractor	The O&M Contractor is allowed to invest in the O&M Facilities, such as additional installation of equipment & software, and renovation and variation of the O&M Facilities	-

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		during the contract period, aiming at conducting O&M Services effectively and maintaining the required performance of the O&M Facilities in case that the investment does not lead to the increase of Selling Unit Price (TND/m3). It is not allowed to offer to increase of Selling Unit Price (TND/m3) due to such investments.	

(Remarks) The contract shall be prepared based on the term sheet above in the implementation stage. The expected clauses of the Contact are as follows.

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Major undertakings to be taken by ONAS, the Contactor and Off-taker

No.	Item	In charge	Remarks	Item	In charge	Remarks
1	To supply required volume of treated wastewater to the O&M Contractor	ONAS	for the Contract Period	-	-	-
2	To supply treated wastewater shall be supplied in accordance with the designed parameters for the construction of O&M Facilities, which ONAS confirmed, mentioned in the bidding documents to the O&M Contractor	ONAS	for the Contract Period	-	-	-
3	To discharge the concentrated water satisfying EIA Standard.	the O&M Contractor	for the Contract Period	-	-	-
4	To process of required volume of refined water	the O&M Contractor	for the Contract Period	To purchase of 6,000m3 of refined water of required quality on daily basis	the Off-taker	for the Contract Period
5	To process of required quality of refined water	the O&M Contractor	for the Contract Period	-	-	-

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6	To conduct maintenance and rehabilitation of the O&M Facilities daily, weekly, monthly and yearly basis	the O&M Contactor	for the Contract Period (The O&M Contractor shall use the O&M Facilities with due care and shall maintain and rehabilitate them including replacement of parts on a daily, weekly, monthly and yearly basis in order to keep the processing capacity and quality. Detailed requirements for maintenance and rehabilitation shall be mentioned in the bidding documents.)			
7	To conduct repair the facilities, in case that ONAS use the facilities, which are working normally at the time of O&M completion, after completion of the O&M Services by the O&M Contractor	ONAS	Maintenance of the facilities, including repairs shall be conducted by the user of the facilities			
8	To conduct appropriate operation and maintenance of refined water transmission pipeline to the Hand-over	the O&M Contractor	for the Contract Period (Since the refined water transmission pipeline is included in the O&M	To conduct construction and appropriate maintenance of refined water transmission pipeline inside the Off-	the Off-taker	(1) The Off-taker shall construct refined water transmission pipeline inside the Off-taker's

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	Point		facilities, the Contractor is required to conduct an appropriate maintenance work of refined water transmission pipeline of Hand-over Point.)	taker's site		site (2) The Off-taker shall conduct appropriate maintenance work for the refined water transmission pipeline.
9	To dispose sludge to be discharged from the O&M Facilities	the O&M Contactor	for the Contract Period			
10	Commencement for the Contract	ONAS and the O&M Contractor	(1) ONAS shall obtain permission and authorization, for which ONAS is responsible, required to start the O&M Services and also to supply the refined water to the Off-taker. (2) The O&M Contractor shall obtain permission and authorization, for which the O&M Contractor is responsible, required to start the O&M Services and to continue the services.	Commencement of the Contract	The Off-taker	The Off-taker shall construct refined water transmission pipeline inside the Off-taker's site. A dedicated reserve tank for receiving the reined water shall be also constructed, if necessary.

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Risk Allocation

No.	Risk	ONAS	O&M Contractor	Off-taker	Remarks
1	Shortage of Treated Wastewater Volume	(Yes)	-	-	(1)Between ONAS and Off-taker: It is not applied. (2)Between ONAS and the O&M Contractor: 1) In case of shortage of treated wastewater volume, the raw wastewater could be available to cover the shortage volume of water through the connection pipeline constructed in the site. In this case, the quality of water shall be also measured at the same way for treated water. 2) When insufficient supply of volume happens, it is required take necessary measures for secure10,000 m3 of treated wastewater immediately after ONAS find the shortage of treated wastewater volume and also to notify in writing to the O&M Contractor. ONAS shall hold a joint meeting with the O&M Contractor in order to exchange views on how to secure the wastewater volume upon request from the O&M Contractor.
2	Quality Change of Treated Wastewater	(Yes)	-	-	(1) Between ONAS and Off-taker: It is not applied. (2) Between ONAS and the O&M Contractor: In case of the quality of the wastewater is improved, Adjustment of Annual Payment Amount shall be applied for ONAS's payment according to the figure of SS. In case that quality degradation of treated wastewater (SS: 150 mg/L is or more) is caused, ONAS is required to take necessary measures for recovery of the figures. Also, ONAS shall hold a joint meeting with the O&M Contractor upon request from the O&M Contractor.
3	Shortage of supply of refined water volume	-	Yes	-	(1) Between ONAS and Off-taker: Month's cumulative shortage volume shall be applied when it the supply shortage occurs for reasons not attributable to Off-taker. In this case, the Payment Amount to ONAS from the Off-taker shall be reduced by Month's cumulative shortage volume in line with the following calculation formula. [Month's cumulative water volume supplied to Off-taker - Month's cumulative shortage volume] x Selling Unit Price (TND/m3)

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					*[Month's cumulative shortage volume = Total of "6000m3 per day - volume of refined water supplied of the day" for the month] **Month's cumulative water volume supplied to Off-taker may increase more than Daily Guaranteed Purchase Volume Committed by Off-taker as the result of increases of daily supply volume from 6000m3 by mutual consensus. (2) Between ONAS and the O&M Contractor: In case that the supply shortage of refined water is caused for reasons attributable to the O&M Contractor, payment amount to the O&M Contractor shall be reduced as follows. 1) In case that supply shortage of refined water (less than 6,000m3 per day unless prior notice is given) is caused for reasons attributable to the O&M Contractor, the O&M Contractor is required to take necessary measures to secure the volume of refined water immediately after shortage of supply is recognized and to notify in writing to ONAS and the Off-taker. The O&M Contractor is also requested to have a joint meeting with ONAS and the Off-taker in order to exchange views on how to secure the volume when it is required from ONAS or the Off-taker. 2) In this case, the penalty shall be charged to the O&M Contractor in accordance with the calculation formula. 3) The penalty amount for supply shortage shall be calculated as follows. [Penalty amount per month by the O&M Contractor in case of supply shortage] = Insufficient Volume for the month x Commission Fee Percentage (5)% x Selling Unit Price (TND/m3) 4) In case that the supply shortage of refined water is caused for reasons not attributable to ONAS or by force majeure event, it shall result in the income decrease of both ONAS and the O&M Contractor in accordance with the Contact.
4	Insufficient Quality	-	Yes	-	(1) Between ONAS and Off-taker:

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	of supply of refined water volume				The calculation formula of the payment amount to ONAS from the Off-taker including conditions of payment amount change is described in Article10 Payment Amount to ONAS from the Off-taker. Thus, please refer to Article 10. (2) Between ONAS and the O&M Contractor: 1) In case that insufficient quality of refined water is caused for reasons attributable to the O&M Contractor, payment amount to the O&M Contractor shall be reduced in the same way of No.3 above in this Risk Allocation. Shortage of supply of refined water volume. In this case, the insufficient supply volume shall be 6000 m3 per insufficient quality day. 2) In case that the supply shortage of refined water is caused for reasons not attributable to ONAS or by force majeure event, it shall result in the income decrease of both ONAS and the O&M Contractor in accordance with the Contact.
5	Off-taker's Demand Change (Receiving shortage and rejection of refined water)	-	-	Yes	Take-or-Pay mechanism shall be applied in accordance with the Contract. (Take-or-Pay mechanism is one in which Off-taker agrees to buy a particular quantity of refined water at a defined price over the contract period, and the Off-taker should pay the amount for a particular quantity of refined water, even though the Off-taker does not buy a particular quantity of refined water for the convenience of the Off-taker.)
6	Deviation of treated wastewater volume	-	-	-	Deviation of treated wastewater volume between ONAS and the O&M Contractor is not expected because the water volume measured at the measuring point defined in the Contract shall be applied.
7	Deviation of refined water volume	-	-	-	Deviation of refined water volume between ONAS and the Off-taker is not expected because the water volume measured at the hand-over point defined in the Contract shall be applied.
8	Deviation of quality of refined water	-	-	-	(1) Deviation is not expected because the result of the water quality test conducted by the O&M Contractor and the certified laboratory shall be officially applied. (2) In case that the Off-taker claims the water quality does not satisfy the requirements with any evidence, all parties shall jointly re-conduct water quality test at the site laboratory and also certified laboratory test. If it is considered that quality occurred by the reasons attributable to the O&M

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					Contractor, the O&M Contractor is required to submit an improvement plan within 15 days after the submission of the test. (3) The cost for the certified laboratory test shall be covered by the O&M Contractor or Off-taker. If it is considered that quality occurred by the reasons attributable to the O&M Contractor, the Contactor shall cover the cost. Otherwise, the Off-taker shall cover the cost. (4) Between ONAS and Off-taker: The calculation formula of the payment amount to ONAS from the Off-taker including conditions for supply of refined water are described in Article10 Payment Amount to ONAS from Off-taker. In case of the shortage of supply of refined water volume, Article 3 of this Risk Allocation Shortage of Supply of Refined Water Volume is applied.
9	Inflation and Deflation in Tunisia	-	-	Yes	Payment amount by Off-taker shall be adjusted in accordance with inflation and deflation in Tunisia through Price Adjustment Formula.
10	Fluctuation of Exchange Rate	-	Yes	-	Fluctuation of exchange rate is not related to the payment amount from ONAS to the O&M Contractor. However, in case of fluctuation of exchange rate which cause difficulty in the O&M Contractor's sustainable business, the Contactor is allowed to request Off-taker and ONAS to modify "unit price of water production (TND/m3)" that contributes to sustainable business, or declare the termination if termination clause is applicable.
11	Electricity Rate Fluctuation	-	-	Yes	Payment amount by Off-taker shall be adjusted in accordance with Electricity Rate of STEG in Tunisia through Price Adjustment Formula.
12	Electricity Shortage and Blackout	-	Yes	-	In case of long term electricity shortage and blackout which cause difficulty in the O&M Contractor's sustainable business per yearly basis, the Contactor is allowed to request Off-taker and ONAS to change "unit price of water production (TND/m3)" that contributes to sustainable business, or to declare the termination if termination clause is applicable.
13	Increase in O&M Cost due to Tunisian Law and Regulation	-	Yes		In case of the change of Tunisian law(s) and regulation(s) which cause difficulty in the O&M Contractor's sustainable business, the Contactor is allowed to request Off-taker and ONAS to modify the "unit price of water production (TND/m3)" that contributes to sustainable business, or

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	Change (e.g. Tax, duties rate change in Tunisia)				to declare the termination if termination clause is applicable.

End

Attachment 1: Price Adjustment Formula and Bid Offer Mechanism

Attachment 2: Adjustment of Annual Payment Amount to ONAS according to the figure of SS

Attachment-1

Price Adjustment Formula and Bid Offer Mechanism
in the Preparatory Survey
for the Project for Construction of Advanced Waste Water Treatment Plant in Gabes

Selling Unit Rate (TND/m3), which is referred to as "Water Purchase Amount by GCT", shall be determined in accordance with the offer by the Bidder in the bidding. In the bidding documents, the upper limit of the "unit price of water production (TND/m3)" shall be set. The upper limit of the "unit price of water production (TND/m3)" shall be set as the price which is the Project could be feasible based on the calculation to be conducted in the preparation of bidding documents. The "unit price for water production (TND/m3)" awarded shall be the "unit price of water production (TND/m3)".

1. Water Purchase Amount by GCT

(1) "Water Purchase Amount (TND)" by GCT shall be described referring to O&M Contractor's "unit price of water production (TND/m3)" in the three party contract as follows.

1) Water Purchase Amount (TND) = Selling Unit Price (TND/m3) x water supply volume (m3)

(2) However, the payment amount to ONAS by GCT will be adjusted with the following price adjustment formula.

Price Adjustment Formula of unit price of water production

Adjusted unit price of water production (TND/m3) = Offered unit price of water production (TND/m3) = (W_0) x (a + b x E_n/E_0 + c x I_n/I_0)

Note: n of Wn, En and In means the period after the contract is signed.

Table 1-1. Table for Price Adjustment Data of offered unit price of water production (TND/m3)

(i)		(ii)	(iii)		(iv)
Index Description		Source of Index	Base Cost Index[1]		Weight
			Value	Date	
1	Non-adjustable	-	-	-	a%
2	STEG Electricity Rate (E)	Official Web on STEG Electricity Rate Table of STEG	(E_0)		b%
3	Indice d'annuels of IPVI (I)	Official Web on IPVI Tale of the Institut National de la Statistique	(I_0)		c%
				Total	100%

Note1: The Values (E_0 and I_0) and the Dates of the Base Cost Indices shall be provided by the Employer prior to contract signing.

*E_0 shall be the latest value of STEG Electricity Rate.

*I_0 shall be **Indice d'annuels of IPVI (**Indices annuels des prix à la vente industriel (IPVI) par

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branche (2010 = 100)) published by the Institut National de la Statistique (http://www.ins.tn/statistiques/89).

Note2: The Price Adjustment Formula shall begin to apply as of the date of the year in which the tripartite contract is signed. The latest index announced shall be applied for the calculation of the payment (Indice d'annuels of IPVI to be announced once a year. STEG Electricity Rate is expected to be announced once in a few years).

Note3: The adjustment Indice d'annuels of IPVI be applied immediately after official announcement which once a year with retroactive effect. The adjustment ETEG tariff change will be applied immediately after official announcement of the tariff change from the STEG.

2. Bid Offer Mechanism

(1) Bidders shall offer a "unit price of water production (TND/m3)" at the time of bidding.

Table 1-2. Table for Price Schedule for offered unit price of water production

(i)		(ii)	(iii)
Item of Water Production		Unit Price of Water Production with Breakdown	Weight[1]
1	Unit price not subject to price adjustment	To be offered (unit price of water production x a%)	a%
2	Unit price subject to price adjustment by STEG electricity rate	To be offered (unit price of water production x b%)	b%
3	Unit price subject to price adjustment by Indice d'annuels of IPVI of Tunisia (excluding cost of 2 above)	To be offered (unit price of water production x c%)	c%
Total		To be offered (offered unit price of water production)	100%
Selling Unit Price (TND/m3)		To be offered (offered unit price of water production (TND/m3) x 105.26%)	

Note1: The Employer shall also provide a fixed value in 'a' (ex.10%) and a range of values in 'b' and 'c' of column (iii) (ex. b=25% to 65%, c=25% to 65%). Bidders shall offer values within the ranges given by the Employer in 'b' and 'c' of column (iii), so that the total weighting equals to 100%.

(2) The "Expected Water Purchase Amount for Ten Years (TND)" could be calculated according to bidders' "unit price of water production (TND/m3)" with the following formulae.

Expected Water Purchase Amount for Ten Years (TND) = Selling Unit Price (TND/m3) x 6000 (m3) x 365 days x 10 years

(3) In the bidding documents, the upper limit of the "unit price of water production (TND/m3)" shall be set base on the financial analysis and the FIRR of the Special Purpose Company (SPC) should be in the higher 10% or higher range. The selling price might be 1.99ND of SONEDE or higher price. The upper limit of the "unit price of water production (TND/m3)" shall be set based on the calculation by the same methodology conducted in the preparatory survey so as to the Project shall be feasible when the bidding is held, and the

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figure shall be get confirmed and accepted by Off-taker (GCT). The "unit price for water production (TND/m3)" awarded shall be the "unit price for water production (TND/m3)" in the Contract.

End

Attachment-2

Adjustment of Annual Payment Amount to ONAS according to the figure of SS

Adjustment of Annual Payment Amount to ONAS according to the figure of SS of treated wastewater as mentioned in the table below.

Table1 :Treated WW Quality and Adjustment Factor

	Treated WW Quality and Adjustment Factor					
Treated WW Quality SS mg/L	0~30	31~ 60	61 ~90	91~ 120	121~ 150	More than 150
Basic % of Commission Fee of ONAS	5%					
Water production unit price adjustment factor	0.96	0.97	0.98	0.99	1.00	1.01
Bonus/ Reduction (%)	4%	3%	2%	1%	0%	-1%
	Bonus				-	Reduction

(note) The standard value of the facilities is designed as SS 150 mg/L

1) Adjustment of Annual Payment Amount to ONAS shall be determined according to the figure of SS of treated waste water SS of treated water on an annual average.

2) Calculation Formula of SS:

[Average SS = Σ (water volume x SS) / Σ (water volume)]

Measurement of SS of 24 hours and 365 days shall be conducted by the O&M Contactor, and then monthly and annual average of SS shall be calculated using the formula above. The adjusted percentage (%) shall be determined in accordance with the monthly average of SS and annual average of SS.

3) Formula for calculating the adjustment payment amount:

ONAS shall choose the monthly or annual adjustment payment when bidding is held. In case of annual adjustment payment, the adjustment payment shall be conducted in the last month of the year. The monthly and annual adjustment payment amount shall be calculated based on the following formula.

3-1) Calculation Formula of Monthly Adjustment Payment Amount:

Monthly Adjustment Payment Amount = ([Month's cumulative guaranteed purchase volume (6000m3 x days of the Month) x Selling Unit Price (TND/m3)] x adjusted percentage (%) (from -1% to 4%) of the monthly average SS

3-2) Calculation Formula of Annual Adjustment Payment Amount:

Annual Adjustment Payment Amount =Σ ([Month's cumulative guaranteed purchase volume (6000m3 x days of the Month) x Selling Unit Price (TND/m3)] x adjusted percentage (%) (from -1% to 4%) of the yearly average SS

4) Daily SS, Monthly average SS, Yearly average SS shall be reported in the Weekly Report and Monthly Report submitted by the O&M Contractor to ONAS. The O&M Contractor and ONAS shall mutually confirm the average SS and % of cost.

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5) Adjustment of Annual Payment shall be applied for ONAS. In case of 120mg/L or less, ONAS receive the amount of additional remuneration. In case of 150mg/L or more, the amount shall be subtracted from remuneration of ONAS.

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Japanese Grant with O&M

1. Basic Concept of Japanese Grant with O&M for the Project

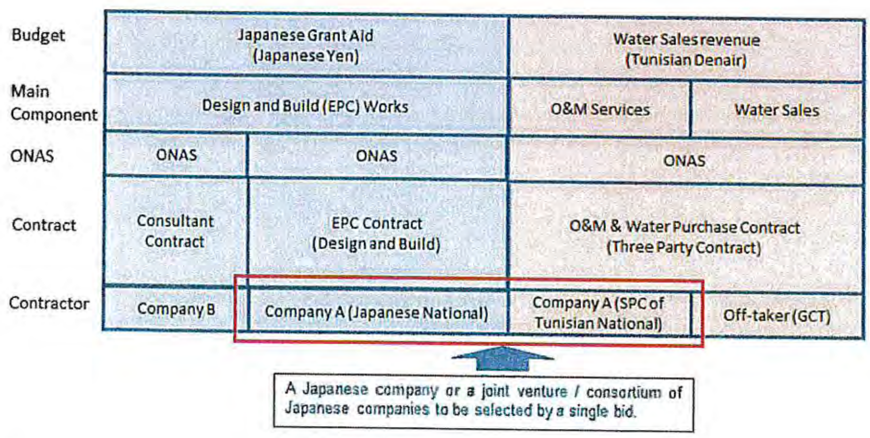
(a) Exchange of Notes (E/N) and Grant Agreement (G/A) shall be concluded as the official bilateral agreement between two countries.

(b) A contractor of Japanese nationality, selected through a competitive bidding, shall undertake design and build (EPC) works for Advance Waste Water Treatment Plant (A-WWTP) and shall provide its operation & maintenance (O&M) services for ten (10) years or more integrally.

(c) The EPC works and an O&M services to be provided by the contractor shall be separately concluded. (This modality is applied to any Design-Build-Operation (DBO) type projects under Japanese Grants to meet the accountability required by the accounting law in Japan.)

(d) Upon necessity, MOU on relevant issues shall be concluded for common understandings between/among parties in accordance with JICA's procurement guidelines and Tunisian law(s).

(e) The Japanese Grant shall cover only the costs for EPC works and the consultancy services until completion of commissioning and defect liability period.



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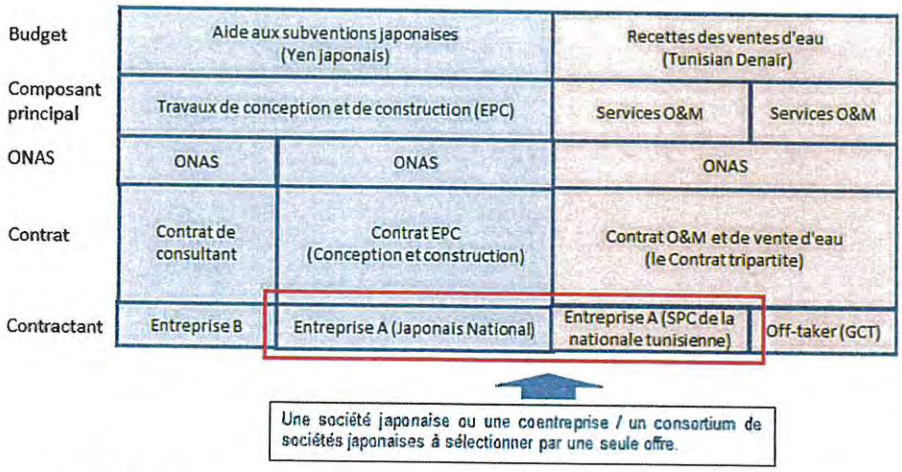


Fig.1 Basic Framework of Japanese Grant with O&M

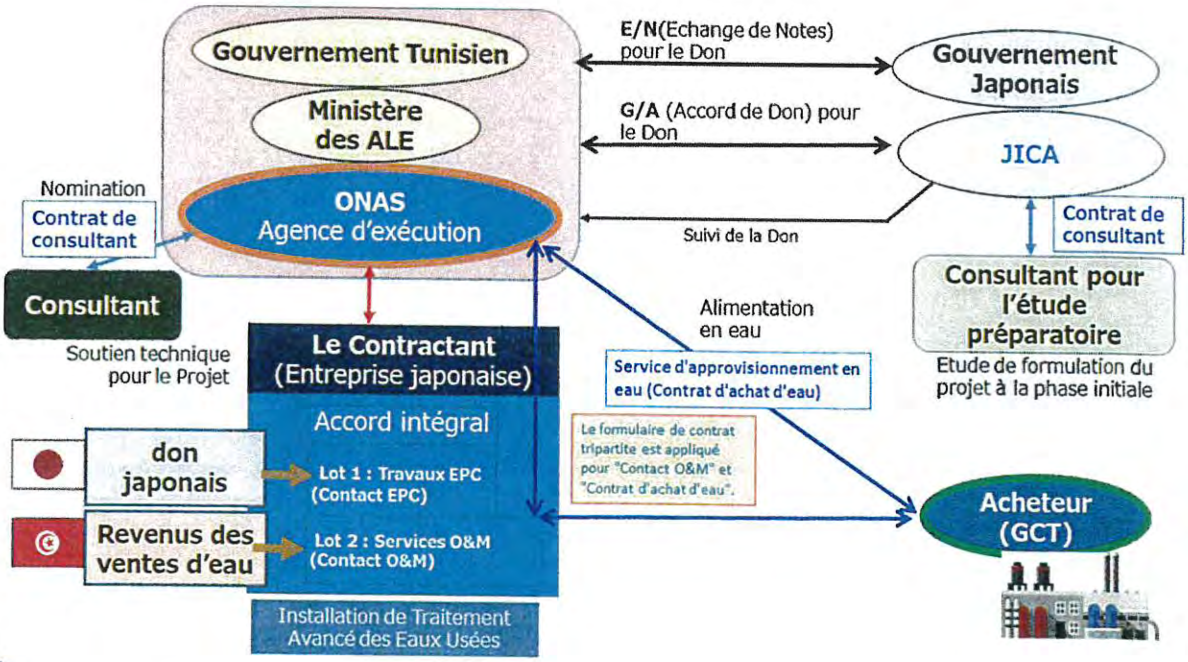
2. Outlines of the Project Scheme and Contractual Relationship

(a) ONAS shall conclude the three party contract with the Contractor for O&M services based on the applicable law(s) in addition to an EPC contract.

(b) O&M services shall be provided for ten (10) years or more integrally with the EPC works. The Contractor is required to establish a special project company (SPC) for providing O&M services in Tunisia in accordance with relevant law(s) after awarded.

(c) Refined water produced during O&M period is going to be sold to an Off-taker, namely the Groupe Chimique Tunisien (GCT) in Gabes.

(d) ONAS shall continuously utilize the A-WWTP after O&M period and beyond by itself or by outsourcing to a third party.



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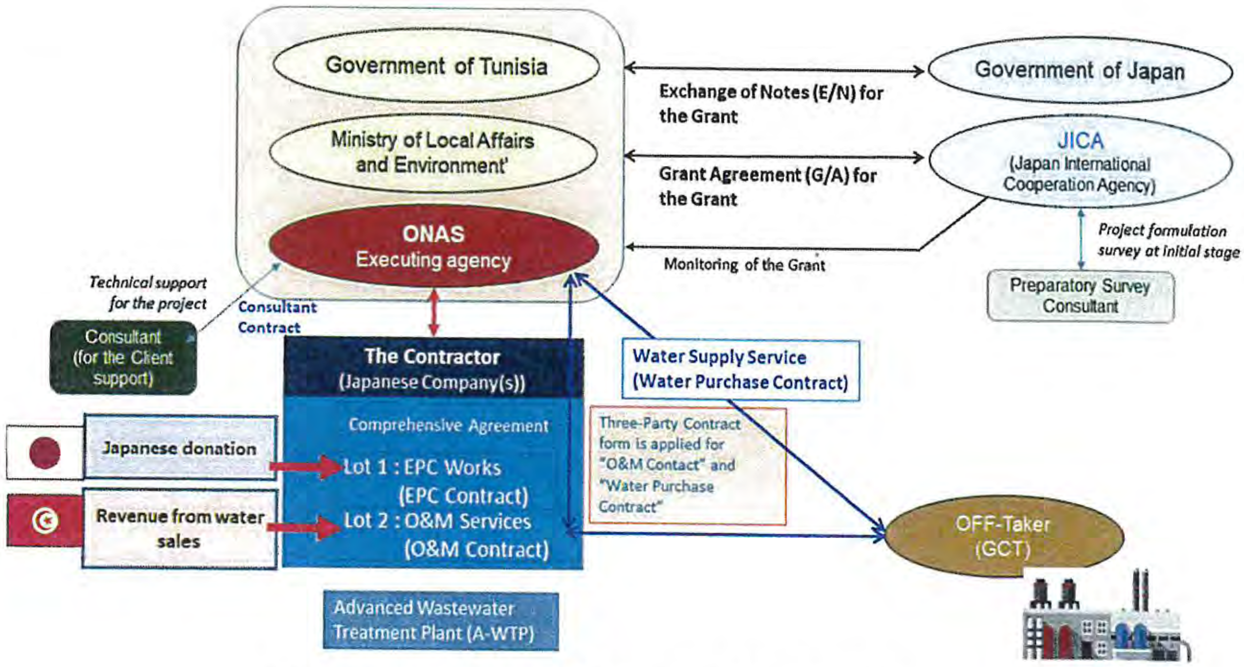

Fig.2 Project Scheme and Contractual Relationship

3. Outline of the Contracts to be concluded under the Project

1) Comprehensive Contract

(a) Comprehensive contract shall be concluded among ONAS, the Contractor and GCT when EPC contract is contracted.

(b) The Comprehensive contract shall describe the timeline and obligations for establishment of SPC by the Contractor and conclusion of the three party contract.

(c) The Comprehensive Contract also consolidates EPC works and O&M services.

2) EPC Contract

(a) EPC Contract shall be concluded between ONAS and the contractor.

(b) EPC Works shall be funded by the Japanese Grant.

(c) Design-build type of JICA's standard bidding documents shall be applied.

(d) Payment currency to the Contractor shall be Japanese Yen.

(e) All constructed facilities under EPC Contract shall be transferred to ONAS after completion of construction and satisfaction of the performance requirements.

3) Three Party Contract

(a) Three party contract shall be concluded among ONAS, the Contractor and GCT.

(b) The initial service period for O&M services provided by the Contractor shall be ten (10) years.

(c) Contractor shall use A-WWTP constructed by EPC contract in accordance with the terms of the contract.

(d) Contractor shall receive the treated waste water from existing Waste Water Treatment Plant (WWTP), and a provisional sewage water intake which is installed at the inlet diversion chamber of WWTP.

(e) Contractor shall operate A-WWTP to produce refined water from the treated waste water. The design specifications of A-WWTP are assumed as follows;

- Quality : BOD≦90mg/L, SS≦150mg/L, TkN≦39mg/L, TP≦3mg/L,
  Salinity Av. 4,000-5,000μS/cm= 3,000mg/L in TDS,
  pH≒7.5, Temp. 17-30degC
- Flow rate : 200m^3 /hr or more

(f) ONAS shall supply 10,000m^3/day of the treated waste water to A-WWTP.

(g) ONAS shall make payment the remuneration of O&M service to the contractor applying the sales amount of refined water to GCT.

(h) GCT shall purchase refined water produced by A-WWTP from ONAS.

(i) Payment currency under the three party contract shall be Tunisian Dinar.

(j) Refined water is delivered and hand overed to GCT at the boundary of the site of GCT.

(k) Refined water shall be delivered as follows.

- Quality : No color, no odor, no bacteria and TDS at 300mg/l or less, pH between 6.5 and 8.5
- Amount : 6,000 m^3/day or more

4. Bidding Documents and Evaluation Procedures for EPC and O&M

(a) Bidding documents for selecting the contractor for EPC works and O&M services shall be prepared based on JICA's standard bidding documents.

(b) QCBS (Quality- and Cost- Based Selection) method shall be applied to evaluation and qualification.

(c) Evaluation Total score for EPC works and O&M services is 100 points out of which technical score is 70 points and the price score is 30 points.

(d) As for the O&M services, the capped price for remuneration price for the contactor and also sales price to GCT shall be described in the bidding documents. The bidder shall offer the price less than the capped price.

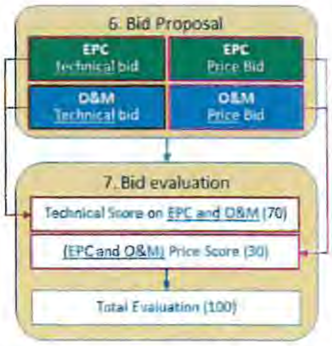

Figure-3 Procedure of bit Evaluation

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Procès-verbal des discussions
Relatives à l'Étude préparatoire pour le Projet de
Construction d'une Station Avancée de Traitement des Eaux Usées à Gabès
(Explication de l'avant-projet du rapport de l'Étude Préparatoire)

En référence au procès-verbal des discussions signé entre le Ministère de l'Environnement (ci-après dénommée « ME ») et l'Agence Japonaise de Coopération Internationale (ci-après dénommée « JICA ») le 18 février 2022 et en réponse à la requête du Gouvernement tunisien (ci-après dénommé « Tunisie ») datée du 5 septembre 2019, la JICA a envoyé l'Équipe d'Étude préparatoire (ci-après dénommée « Équipe ») pour l'explication de l'avant-projet de rapport d'Étude préparatoire (ci-après dénommé « avant-projet de rapport ») pour le Projet de construction d'une Station Avancée de Traitement des Eaux Usées à Gabès (ci-après dénommé « Projet »).

À la suite des discussions, les deux parties ont convenu des principaux points décrits dans les documents joints. Ce document est établi et dupliqué en anglais et français, et les deux documents font foi. En cas de divergence d'interprétation, le texte anglais prévaut.

Tunis, 5 septembre 2023

木村真美

Yumi KIMURA
Chef d'Équipe de l'Étude Préparatoire
Agence Japonaise de Coopération Internationale
Japon

Hedi CHEBILI
Directeur Général
Direction Générale de l'Environnement et de la Qualité de la vie
Ministère de l'Environnement
Tunisie

Sous le témoignage de :

Abdelmajid BETTAIEB
Président Directeur Général
Office National de l'Assainissement (ONAS)
Tunisie

Ridha CHALGHOUM
Directeur Général
Groupe Chimique Tunisien (GCT)
Tunisie

APPENDICE

1. Objectif du Projet

   Le Projet a pour but l'utilisation des eaux épurées pour l'usage industriel et ceci par la construction d'une A-WWTP (Station Avancée de Traitement des Eaux Usées) dans l'enceinte de la Station d'Épuration (STEP) actuelle de Gabès. L'A-WWTP fournira l'appui au bon fonctionnement et aux activités de maintenance (O&M), contribuant ainsi à la conservation des ressources en eau en Tunisie.

2. Titre de l'Étude préparatoire

   Les deux parties ont confirmé le titre de l'Étude préparatoire comme étant « l'Étude préparatoire pour le Projet de Construction d'une Station Avancée de Traitement des Eaux Usées à Gabès».

3. Site du Projet

   Les deux parties ont convenu que le Projet soit mis en place à Gabès, comme c'est indiqué dans l'Annexe 1.

4. Autorité responsable du Projet

   Les deux parties ont confirmé que les autorités responsables du Projet sont les suivantes :

   4-1. L'Office National de l'Assainissement (ONAS) sera l'Agence d'exécution du Projet (ci-après dénommée « Agence d'exécution »). L'Agence d'exécution doit coordonner avec toutes les autorités compétentes pour assurer le bon déroulement du Projet et veiller à ce que les autorités compétentes s'acquittent des engagements du Projet de manière appropriée et à temps. Les organigrammes de l'ONAS sont détaillés dans l'Annexe 2.

   4-2. Le ministère de tutelle de l'Agence d'exécution est le ME.

5. Contenu de l'avant-projet du rapport

   Après l'explication du contenu de l'avant-projet du rapport par l'Équipe, la partie tunisienne a confirmé son contenu. La JICA va finaliser le Rapport de l'étude préparatoire sur la base des points confirmés. Le rapport sera transmis à la partie tunisienne après l'Echange de Notes.

6. Estimation des coûts

   L'Equipe a expliqué que l'estimation des coûts, incluant un fonds de réserve pour les imprévus, est provisoire et sera examinée davantage par le Gouvernement du Japon pour approbation. Ce fonds couvrirait les coûts supplémentaires liés aux catastrophes naturelles, aux conditions naturelles inattendues, etc. La partie tunisienne a compris cette explication.

7. Confidentialité de l'estimation des coûts et des spécifications techniques
Les deux parties ont confirmé que l'estimation des coûts et les spécifications techniques ne devraient jamais être communiquées à des tiers avant la conclusion de tous les contrats prévus dans le cadre du Projet.

8. Procédure et principes de base du Don du Japon
La partie tunisienne a convenu que les procédures et les principes de base d'accord de Don japonais (ci-après dénommé « le Don »), tels que décrits dans l'Annexe 3, seront appliqués au Projet. En outre, la partie tunisienne a accepté de prendre les mesures nécessaires conformément à ces procédures. La partie tunisienne a compris que le Don couvrira uniquement les travaux de Conception et de Construction (D&B) et les services de consultants, et ne couvrira pas les Services d'exploitation et de Maintenance (O&M) qui seront assurés par une Société à Finalité Spécifique qui sera créée par le Contractant du Projet. Les détails de la structure et du modèle commercial du projet sont décrits dans l'annexe 10.

9. Calendrier de la mise en œuvre du Projet
L'Équipe a expliqué à la partie tunisienne que le calendrier prévu pour la mise en œuvre du Projet est comme décrit dans l'Annexe 4.

10. Résultats attendus et indicateurs
Les deux parties ont convenu que les indicateurs clés pour les résultats attendus sont les suivants. La partie tunisienne sera responsable de l'atteinte des indicateurs clés convenus ciblés en 2030 et doit suivre les progrès réalisés, pour l'évaluation ex-post (voir paragraphe 11.) sur la base de ces indicateurs.

[Indicateurs quantitatifs]

Indicateur	Valeur de référence (chiffres réels pour 2022)	Valeur cible (2030) (3 ans après l'achèvement du projet)	ODD*
Débit d'eau usée épurée et évacuée par la STEP de Gabès (m^3 /jour)	20 000	10 000	6.3
Quantité d'eau épurée raffinée utilisée pour l'usage industriel (m^3 /jour)	0	6 000	6.3

* ODD : Objectifs de Développement Durable

[Indicateurs qualitatifs]

Effets qualitatifs	Aperçu	ODD
Promotion des ressources en eau alternatives	L'approvisionnement en eau potable à Gabès provient essentiellement de l'exploitation des eaux souterraines (douces et saumâtres). L'exploitation des eaux souterraines est en croissance avec la croissance de la population desservie et de la demande en eau par habitant. L'eau raffinée que sera fournie au GCT par la station avancée de traitement des eaux épurées, A-WWTP, va permettre de réduire la quantité d'eau potable fournie par la SONEDE et par la suite cette dernière sera économisée et l'eau raffinée est considérée comme une source en eau alternative. Une eau industrielle (Total des Solides Dissous (TDS) de 300 mg/L ou moins, et un débit journalier de 6000 m3/jour) ayant une salinité inférieure à celle de l'eau de la SONEDE et celle des eaux souterraines (TDS de 2000 à 3000 mg/L), sera fournie.	6.4
Adoption par l'Agence d'Execution de nouvelles technologies le recyclage des eaux usées.	Les stations avancées de traitement des eaux usées telles que l'A-WWTP enfermant des bioréacteurs à membrane (BRM) et utilisant l'Osmose Inverse, exploitent des nouvelles technologies pour le recyclage des eaux épurées non seulement dans la région de Gabès mais aussi sur toute la Tunisie, et il est prévu que l'A-WWTP contribue à la promotion de la réutilisation des eaux épurées recyclées dans le futur.	6.a.
Conservation des eaux souterraines	La réduction de l'exploitation des eaux souterraines par la mise en place d'une source en eau alternative va permettre de réduire le tarissement de la nappe phréatique et l'intrusion de l'eau de mer.	-

11. Évaluation ex post

La JICA procédera à une évaluation ex post, en principe après trois (3) ans à compter de l'achèvement du Projet, concernant cinq critères d'évaluation (Pertinence, Efficacité, Efficience, Impact, Durabilité). Le résultat de l'évaluation sera rendu public. La partie tunisienne est tenue de fournir l'appui nécessaire à la collecte des données.

12. Assistance technique (« composante immatérielle » du Projet)

Compte tenu de l'exploitation et de l'entretien durables des produits et services octroyés par le Projet, une assistance technique est prévue dans le cadre du Projet. La partie tunisienne désignera le nombre nécessaire d'homologues appropriés et compétents en termes d'objectif d'assistance technique comme décrit dans l'avant-projet de rapport.

i. Soutenir les travaux à réaliser par l'Agence d'exécution avant le début des services d'E&M et des opérations de vente d'eau. Soutenir également les travaux à réaliser par l'Agence d'exécution après le début des services d'E&M et des opérations de vente d'eau.

ii. S'assurer que les activités à réaliser par l'Agence d'exécution continuent à être exécutées correctement et soutenir les actions correctives si nécessaire. Également fournir un soutien à l'Agence d'Exécution pour l'analyse des revenues et des dépenses associées au Projet.

iii. . Également fournir un soutien pour garantir que les opérations continuent à être menées correctement l'année suivante et au-delà.

13. Engagements du Projet

Les deux parties ont confirmé les engagements du Projet tels que décrits dans l'Annexe 5. En ce qui concerne l'exonération des droits de douane, des taxes intérieures et d'autres prélèvements fiscaux prévus tels qu'indiqués dans le No. 5 de "(2) Durant la mise en œuvre du Projet" de l'Annexe 5, les deux parties ont confirmé que lesdits droits de douane, taxes intérieures et autres prélèvements fiscaux devront être explicités dans le dossier d'appel d'offres par l'Agence d'exécution au cours de la phase de mise en œuvre du Projet.

La partie tunisienne s'est engagée à prendre les mesures nécessaires et à coordonner avec les parties prenantes concernant ces actions, qui sont des conditions préalables à la mise en œuvre du Projet, dont notamment l'allocation du budget nécessaire. Il est en outre convenu que les coûts estimés sont à titre indicatifs, c'est-à-dire à l'étape de la conception générale. Des coûts plus précis seront calculés à l'étape du plan détaillé.

Les deux parties ont également confirmé que l'Annexe 5 sera jointe au document initial de l'A/D.

14. Suivi pendant la mise en œuvre

Le Projet sera suivi par l'Agence d'exécution qui remettra un rapport de suivi du Projet à la JICA en utilisant le formulaire de « Project Monitoring Report » (PMR) en anglais (Annexe 6). Le calendrier de soumission du PMR est décrit dans l'Annexe 5.

15. Achèvement du Projet

Les deux parties ont confirmé que le Projet se termine lorsque toutes les installations construites et les équipements acquis au moyen de la Don sont en exploitation. L'achèvement du Projet sera notifié rapidement à la JICA, en utilisant un formulaire standard de l'Aide Publique au Développement sous forme de dons, en tout état de cause au plus tard six mois après l'achèvement du Projet.

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16. Éléments et mesures à prendre en considération pour la mise en œuvre fluide du Projet

Les deux parties ont confirmé les éléments et les mesures à prendre en considération pour la mise en œuvre fluide du Projet comme suit :

iv. Partage régulier avec la JICA d'une fiche d'information sur l'avancement du projet de concession relatif à la STEP actuelle de Gabès dès son démarrage effectif.

17. Considérations environnementales et sociales

17-1 Questions générales

17-1-1 Lignes directrices environnementales et catégorie environnementale

L'Équipe a expliqué que les « Lignes directrices relatives aux considérations environnementales et sociales de la JICA (avril 2010) » (ci-après désignées « Lignes directrices ») sont applicables au Projet. Le Projet est classé dans la catégorie B de ces directives. En effet, le site du projet n'est pas situé dans une zone sensible et ne présente pas de caractéristiques sensibles, et il ne touche pas à un secteur sensible selon les directives de la JICA relatives aux considérations Environnementales et Sociales (Avril 2010). En plus, ses éventuels impacts négatifs sur l'environnement ne seront probablement pas significatifs.

17-1-2 Liste de contrôle environnemental

Les considérations environnementales et sociales, y compris les impacts majeurs et les mesures d'atténuation pour le Projet, sont résumées dans la liste de contrôle environnementale attachée (Annexe 7). Les deux parties ont confirmé qu'en cas de modification majeure du contenu de la liste de contrôle environnemental, la partie tunisienne doit soumettre la version modifiée à la JI CA en temps opportun.

17-2 Questions Environnementales

17-2-1 Étude d'Impact Environnemental (EIE)

L'Equipe a expliqué que le rapport de l'Etude d'Impact Environnemental (EIE) a été préparé durant l'Etude Préparatoire et prêt à être soumis à l'Agence Nationale de Protection de l'Environnement (ANPE). Les deux parties ont confirmé qu'il est nécessaire que l'EIE soit approuvée par l'ANPE en janvier 2024, afin de procéder à l'appel d'offres. La partie tunisienne informera la JICA après l'approbation de l'ANPE.

17-2-2 Plan de gestion environnementale et plan de suivi environnemental

Les deux parties ont confirmé que le Plan de gestion environnementale (PGE) et le Plan de suivi environnemental (PSE) du Projet se présentent comme indiqué dans l'Annexe 8, respectivement. Les deux parties ont convenu que les mesures d'atténuation et le suivi environnementaux seraient effectués sur la base du PGE et du PSE, qui peuvent être mis à jour au cours de l'étape du plan détaillé.

17-3 Suivi environnemental et social

17-3-1 Suivi environnemental

Les deux parties ont convenu que la partie tunisienne soumettra à la JICA les résultats du suivi environnemental dans le cadre du Project Monitoring Report en utilisant le formulaire de l'Annexe 9. Le calendrier de soumission du formulaire de suivi est explicité dans l'Annexe 5.

17-3-2 Publication d'informations sur les résultats du suivi

Les deux parties ont confirmé que la partie tunisienne divulguera les résultats du suivi environnemental et social aux parties prenantes locales à travers le site Web de l'ONAS ou à la Direction Régionale de l'ONAS à Gabès .

La partie tunisienne a donné son accord à la divulgation par la JICA sur son site Web des résultats du suivi environnemental et social transmis par la partie tunisienne conformément au formulaire de suivi de l'Annexe 9.

18. Autres questions pertinentes

18-1. Publication d'informations

Les deux parties ont confirmé que le rapport d'Étude préparatoire excluant le coût du Projet sera communiqué au public après l'achèvement de l'Étude préparatoire. Le rapport complet incluant le coût du Projet sera communiqué au public après la conclusion de tous les contrats prévus dans le cadre du Projet.

18-2. Les deux parties ont aussi reconfirmé les éléments suivants stipulant la responsabilité du GCT.

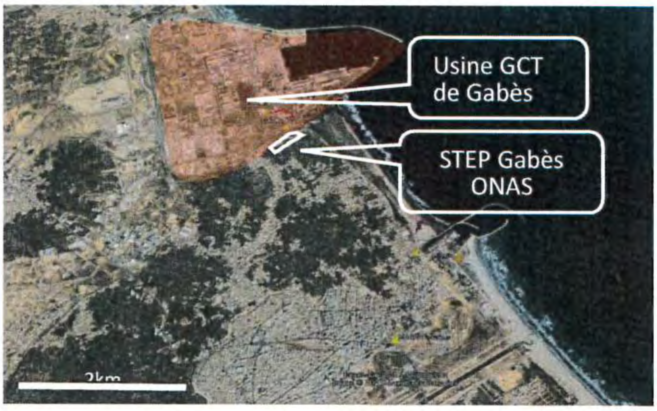
i. Préparation des installations de transmission et de stockage de l'eau raffinée en temps opportun, pour éviter tout retard non nécessaire dans le calendrier de mise en œuvre du projet.

18-3. Les deux parties ont confirmé le contenu des conditions des contrats (Term Sheet) de l'Annexe 10. Les deux parties ont convenu que les contrats pertinents seraient élaborés sur la base de cette feuille de conditions. Les deux parties ont compris que, conformément aux conseils du ou des consultants juridiques, les contrats concernés peuvent être modifiés à partir de cette feuille de conditions.

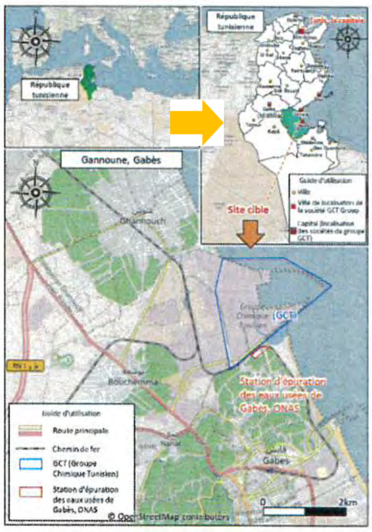
Annexe 1 Site du Projet
Annexe 2 Organigramme de l'ONAS
Annexe 3 Le Don japonais
Annexe 3-1 Pièce jointe (1) Procédures
Annexe 3-2 Pièce jointe (2) Schéma Financier du Don
Annexe 4 Calendrier de la mise en oeuvre du Projet
Annexe 5 Principaux engagements à prendre par le Gouvernement tunisien
Annexe 6 Rapport de suivi du Projet (modèle)
Annexe 7 Liste de contrôle environnemental
Annexe 8 Plan de gestion environnementale/ Plan de suivi environnemental
Annexe 9 Formulaire de suivi environnemental et social
Annexe 10 Term sheet
Annexe 11 Don japonais avec O&M

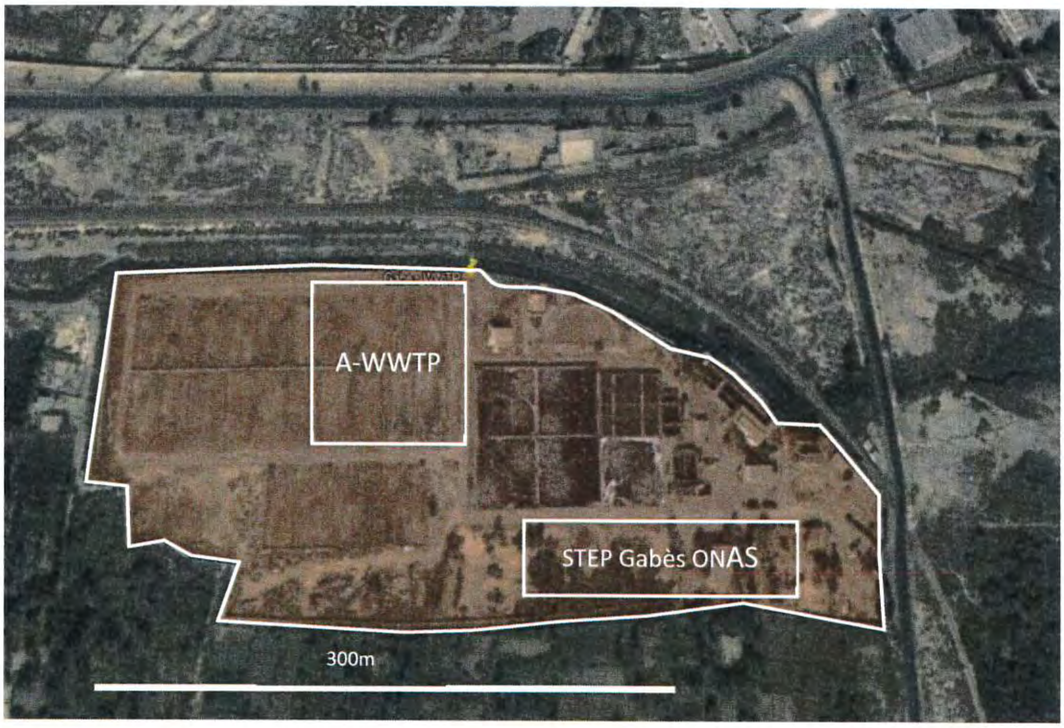
Site du Projet

STEP de Gabès, A-WWTP et Usine GCT de Gabès



Site A-WWTP de Gabès





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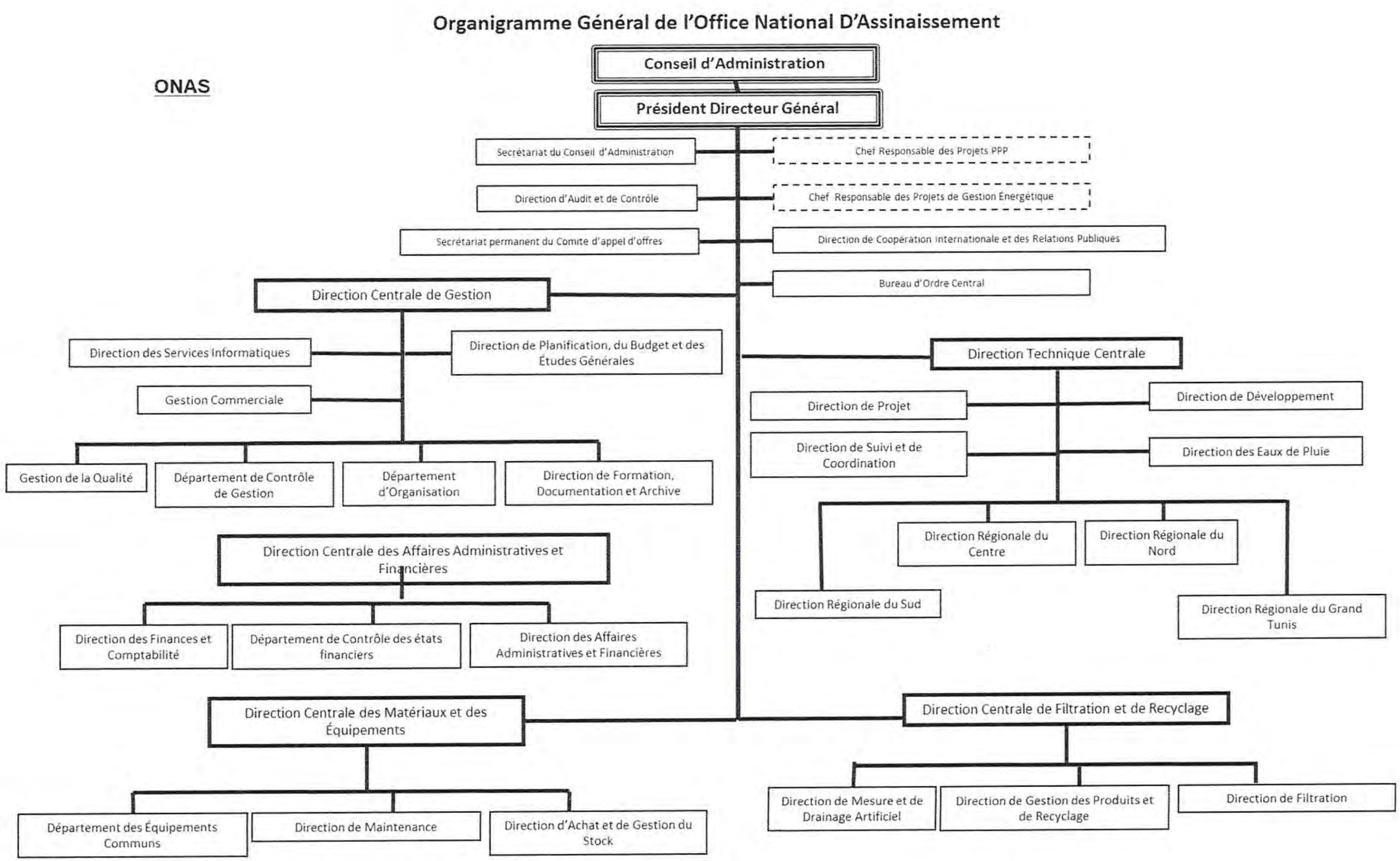
Annexe 2

Organigramme



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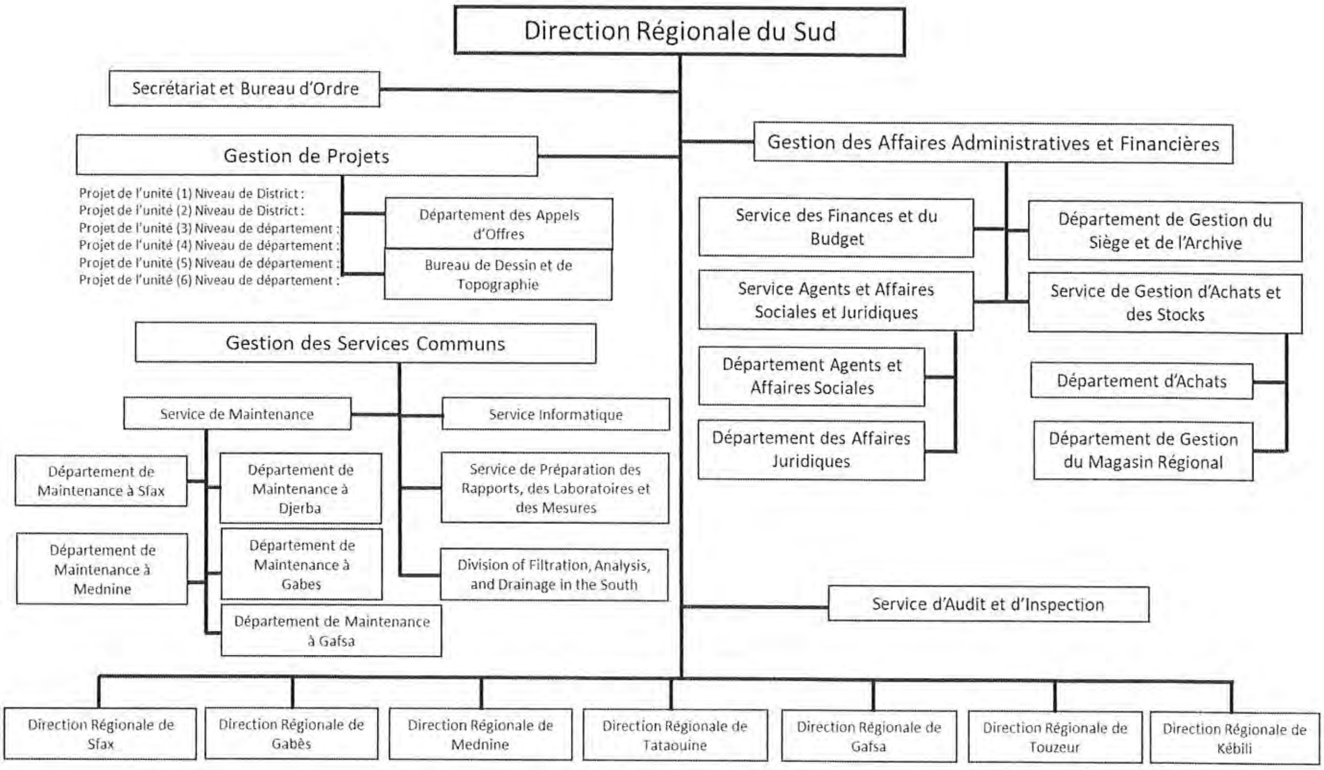
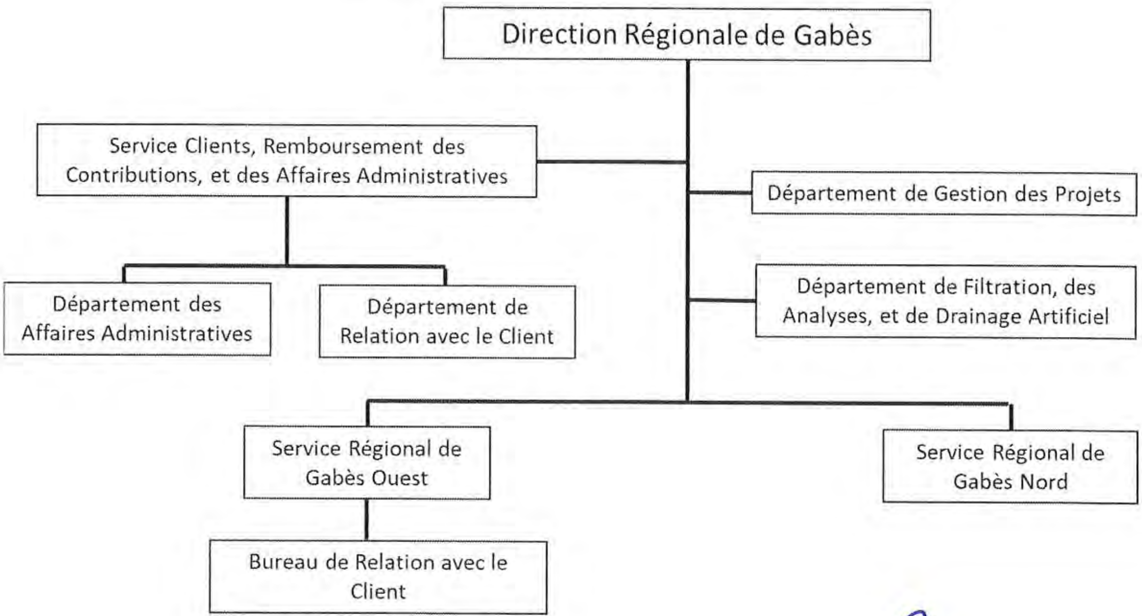
Direction Régionale du Sud



Direction Régionale de Gabès



Annexe 3

DON DU JAPON

Le Don du Japon est un fonds non remboursable fourni à un pays bénéficiaire (ci-après dénommé « le Bénéficiaire ») pour acheter les produits et/ou services (services d'ingénierie et transport des produits, etc.) en vue de son développement économique et social, conformément aux lois et règlements applicables au Japon. Ci-après, les caractéristiques de base des Dons pour les Projets administrés par la JICA (ci-après dénommés « Dons pour les Projets »).

1. Procédures des Dons pour les Projets

Les Dons pour les Projets sont effectués selon les procédures suivantes (voir « PROCEDURES DU DON DU JAPON » pour plus de détails) :

(1) Préparation

- L'Etude préparatoire (ci-après dénommée « l'Etude ») menée par la JICA

(2) Evaluation ex-ante

- Evaluation ex-ante par le Gouvernement du Japon (ci-après dénommé « GDJ ») et la JICA, et Approbation par le Cabinet japonais

(3) Mise en œuvre

Echange de Notes (ci-après dénommé « l'E/N »)

- Les Notes échangées entre le GDJ et le Gouvernement du Bénéficiaire

Accord de Don (ci-après dénommé « l'A/D »)

- Accord conclu entre la JICA et le Gouvernement du Bénéficiaire

Arrangement bancaire (ci-après dénommé « l'A/B »)

- Ouverture d'un compte bancaire par le Gouvernement du Bénéficiaire dans une banque au Japon (ci-après dénommée « la Banque ») pour recevoir le Don

Travaux de construction/approvisionnement

- La mise en œuvre du projet (ci-après dénommé « le Projet ») sur la base de l'A/D

(4) Fonctionnement et Maintenance (hors de l'étendue du Don japonais)

- Fonctionnement et Maintenance des installations et des équipements

(5) Suivi et Évaluation ex-post (hors de l'étendue du Don japonais)

- Suivi et Évaluation ex-post à la mise en place

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2. Étude préparatoire

(1) Contenu de l'Etude

Le but de l'Etude est de fournir les documents de base nécessaires à l'évaluation du Projet de Don faite par le GJ et la JICA. Le contenu de l'Etude est le suivant :

- Confirmation de l'arrière-plan, des objectifs et des effets du Projet ainsi que des capacités institutionnelles des organismes compétents du Gouvernement du Bénéficiaire nécessaires à la mise en œuvre du Projet.
- Evaluation de la faisabilité du Projet à mettre en œuvre dans le cadre du Don du Japon d'un point de vue technique, financier, social et économique.
- Confirmation des points convenus entre les deux parties concernant le concept de base du Projet.
- Préparation de la conception générale du Projet.
- Estimation des coûts du Projet.
- Confirmation des Considérations environnementales et sociales.

Le contenu de la demande originale du Gouvernement du Bénéficiaire n'est pas nécessairement approuvé dans sa forme initiale. La conception générale du Projet est confirmée sur la base des lignes directrices du Don du Japon.

La JICA demande au Gouvernement du Bénéficiaire de prendre les mesures nécessaires pour accomplir son autonomie dans la mise en œuvre du Projet. Ces mesures doivent être garanties même si elles ne relèvent pas de la compétence de l'Agence d'exécution du Projet. Par conséquent, le contenu du Projet est confirmé par tous les organismes compétents du Gouvernement du Bénéficiaire sur la base des procès-verbaux des discussions.

(2) Sélection des Consultants

Pour une mise en œuvre harmonieuse de l'Etude, la JICA conclut des contrats avec un/des cabinet(s) de consultants. La JICA sélectionne un/des cabinet(s) sur la base des propositions soumises par les cabinets intéressés.

(3) Résultat de l'Etude

La JICA passe en revue le rapport sur les résultats de l'Etude et recommande au GDJ d'approuver la mise en œuvre du Projet après avoir confirmé la faisabilité du Projet.

3. Principes de base des Dons pour les Projets

(1) Etape de mise en œuvre

1) L'E/N et l'A/D

Après que le Projet soit approuvé par le Cabinet du Japon, l'E/N sera signé entre le GDJ et le Gouvernement du Bénéficiaire pour établir un gage d'assistance, qui sera suivi de la conclusion de l'A/D entre la JICA et le Gouvernement du Bénéficiaire pour définir les articles nécessaires, conformément à l'E/N, pour mettre en œuvre le Projet, telles que les conditions de versement, les responsabilités du Gouvernement du Bénéficiaire et les conditions d'approvisionnement. Les termes et conditions généralement applicables au Don du Japon sont stipulés dans les « Conditions générales applicables au Don du Japon (janvier 2016) ».

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2) Arrangements bancaires (A/B) (Voir « Flux financiers du Don du Japon (type A/P) » pour plus de détails)

a) Le Gouvernement du Bénéficiaire devra ouvrir un compte ou faire en sorte que son autorité désignée ouvre un compte au nom du Bénéficiaire à la Banque, par principe. La JICA versera le Don du Japon en yen japonais afin que le Gouvernement du Bénéficiaire puisse couvrir les obligations contractées en vertu des contrats vérifiés.

b) Le Don du Japon sera versé lorsque les demandes de paiement seront soumises par la Banque à la JICA en vertu d'une autorisation de paiement (A/P) délivrée par le Gouvernement du Bénéficiaire.

3) Procédure d'approvisionnement

Les produits et/ou les services nécessaires à la mise en œuvre du Projet seront approvisionnés conformément aux Directives de l'approvisionnement de la JICA, comme stipulé dans l'A/D.

4) Sélection des Consultants

Afin de maintenir une cohérence technique, le(s) cabinet(s) de consultants qui aura(ont) mené l'Etude sera(ont) recommandé(s) par la JICA au Gouvernement du Bénéficiaire pour continuer à travailler à la mise en œuvre du Projet après l'E/N et l'A/D.

5) Pays d'origine éligibles

Dans le cadre de l'utilisation du Don du Japon versé par la JICA pour l'achat de produits et/ou de services, les pays d'origine éligibles desdits produits et/ou services seront le Japon et/ou le Bénéficiaire. Le Don du Japon peut être utilisé pour l'achat des produits et/ou services d'un pays tiers éligible, si nécessaire, compte tenu de la qualité, de la compétitivité et de la rationalité économique des produits et/ou services nécessaires pour atteindre l'objectif du Projet. Toutefois, les principaux entrepreneurs, à savoir les entreprises de construction et d'approvisionnement et le principal cabinet de consultants, qui concluent des contrats avec le Gouvernement du Bénéficiaire, sont limités en principe aux « ressortissants japonais ».

6) Contrats et non-objection de la JICA

a) Les Contrats sont : (i) une convention d'entente pour couvrir et renforcer les deux contrats de la vente des produits et/ou services, et de fonctionnement et maintenance; (ii) Le(s) contrat(s) d'achat des produits et/ou services, et de fonctionnement et maintenance

b) Le Receveur va conclure le(s) (ii) contrat(s) pour l'achat des produits et/ou services prescrits en Yen japonais pour les ressortissants japonais. Ces contrats doivent être validés par la JICA après la vérification de leur conformité avec les conditions d'octroi du Don japonais.

7) Suivi

Le Gouvernement du Bénéficiaire est tenu de prendre l'initiative de suivre attentivement l'avancement du Projet afin d'assurer sa mise en œuvre, initiative faisant partie intégrante de ses responsabilités dans l'A/D, et de présenter régulièrement à la JICA sa situation en utilisant le formulaire de « Project Monitoring Report » (PMR) en anglais.

8) Mesures de sécurité

Le Gouvernement du Bénéficiaire doit s'assurer que la sécurité est respectée avec la plus grande rigueur pendant la mise en œuvre du Projet.

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9) Réunion de contrôle de la qualité de la construction

Une réunion de contrôle de la qualité de la construction (ci-après dénommée la « Réunion ») sera organisée pour l'assurance de la qualité et la mise en œuvre harmonieuse des Travaux à chaque étape des Travaux. Les participants de la Réunion seront composés du Gouvernement du Bénéficiaire (ou l'Agence d'exécution), du Consultant, de l'Entrepreneur/du Fournisseur et de la JICA. Les fonctions de la Réunion sont les suivantes :

a) Partager des informations sur l'objectif, le concept et les conditions de conception de la part de l'Entrepreneur, avant le démarrage de la construction.

b) Discuter des questions touchant les Travaux, telles que la modification de la conception, essai, inspection, contrôle de sécurité et obligation du Client pendant la construction.

(2) Phase de Fonctionnement et de Maintenance

Le Contractant fait fonctionner et gère les installations et les équipements sur la base du (des) contrat(s) de fonctionnement et de maintenance conclu(s) avec le Receveur.

(3) Étape de suivi et d'évaluation ex-post

1) Après l'achèvement des travaux de construction et d'achat des équipements pour le Projet en utilisant le Don japonais, la JICA continuera de rester en contact étroit avec le Gouvernement du Bénéficiaire afin de s'assurer que les réalisations du Projet sont utilisées et maintenues correctement pour atteindre les résultats attendus.

2) En principe, la JICA procédera à une évaluation ex-post au Projet au bout de trois ans à compter de la date d'achèvement des travaux de construction et d'achat des équipements pour le Projet en utilisant le Don japonais. Le Gouvernement du Bénéficiaire doit fournir tous les renseignements nécessaires que la JICA peut raisonnablement demander.

(4) Autres

1) Considérations environnementales et sociales

Le Gouvernement du Bénéficiaire doit examiner attentivement les incidences environnementales et sociales du Projet et se conformer aux réglementations environnementales du Gouvernement du Bénéficiaire et aux Lignes directrices relatives aux considérations environnementales et sociales de la JICA (avril 2010).

2) Principaux engagements à prendre par le Gouvernement du Bénéficiaire

Pour assurer la mise en œuvre harmonieuse du Projet, le Gouvernement du Bénéficiaire est tenu d'entreprendre les mesures nécessaires, y compris l'acquisition des terrains, et de régler à la Banque la commission pour notification de l'A/P et la commission de paiement comme convenu avec le GDJ et/ou la JICA. Le Gouvernement du Bénéficiaire veillera à ce que les droits de douane, les taxes intérieures et les autres prélèvements fiscaux pouvant être appliqués au Gouvernement du Bénéficiaire concernant l'achat de produits et/ou services soient exemptés ou supportés par son autorité désignée sans utiliser le Don ni ses intérêts courus, puisque les fonds du Don proviennent des contribuables japonais.

3) Mesures pour assurer une mise en œuvre plus efficace du Don.

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a) Dans le cas où l'E/N et l'A/D concernant le Projet ne peuvent être signés avant la fin de l'année fiscale japonaise suivant la décision du Cabinet concernée par le GDJ, les autorités concernées des deux Gouvernements discuteront de l'annulation du Projet.

b) Dans le cas où la période, spécifiée dans l'A/D, au cours de laquelle le Don est disponible expire avant la fin du déboursement, les autorités concernées du GDJ étudieront en profondeur l'état, la situation et les perspectives pour la mise en œuvre du Projet avant l'extension de ladite période. Les autorités concernées des deux Gouvernements discuteront de la fin du Projet impliquant un remboursement, à moins qu'il y ait des perspectives concrètes pour son achèvement.

c) Indépendamment de la période mentionnée au point b) ci-dessus, les autorités concernées des deux Gouvernements discuteront, dans le cas où cinq ans se seraient écoulés depuis la décision concernée du Conseil des ministres du GDJ avant la fin du déboursement, de la fin du Projet impliquant un remboursement, à moins qu'il y ait des perspectives concrètes pour son achèvement.

4) Utilisation adéquat

Le Gouvernement du Bénéficiaire est tenu de conserver et d'utiliser correctement et efficacement les produits et/ou services entrant dans le cadre du Projet (y compris les installations construites et l'équipement acheté), d'affecter le personnel nécessaire pour son exploitation et sa maintenance et enfin de supporter toutes les dépenses autres que celles couvertes par le Don du Japon.

5) Exportation et réexportation

Les produits achetés dans le cadre du Don du Japon ne doivent ni être exportés ni réexportés du pays Bénéficiaire.

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PROCEDURES DU DON DU JAPON

Etapes	Procédures	Remarques	Gouvernement du Bénéficiaire	Gouvernement du Japon	JICA	Consultants	Entrepreneurs	Correspondant bancaire
Requête officielle	Demande de Don par voie diplomatique	La demande doit être soumise avant l'étape de l'évaluation ex-ante.	x	x				
1. Préparation	(1) Etude préparatoire Préparation de la conception générale et estimation des coûts		x		x	x		
2. Evaluation ex-ante	(2) Etude préparatoire Explication du projet de conception générale, y compris l'estimation des coûts, les engagements, etc.		x		x	x		
	(3) Accord sur les conditions de mise en œuvre	Les conditions seront expliquées avec les projets de Notes (E/N) et d'Accord de Don (A/D) qui seront signés avant l'approbation par le Gouvernement du Japon.	x	x (E/N)	x (A/D)			
	(4) Approbation par le Cabinet japonais			x				
3. Mise en œuvre	(5) Echange de Notes (E/N)		x	x				
	(6) Signature de l'Accord de Don (A/D)		x		x			
	(7) Arrangement Bancaire (A/B)	Nécessité d'informer la JICA	x					x
	(8) Passation du contrat avec un consultant et émission de l'Autorisation de Paiement (A/P)	La non-objection de la JICA est requise	x			x		x
	(9) Plan détaillé (P/D)		x			x		
	(10) Préparation des dossiers d'appel d'offres	La non-objection de la JICA est requise	x			x		
	(11) Appel d'offres	La non-objection de la JICA est requise	x			x	x	
	(12) Passation du contrats avec contractant/fournisseur et émission d'une A/P	La non-objection de la JICA est requise	x				x	x
	(13) Travaux de construction/approvisionnement	La non-objection de la JICA est requise pour une modification majeure de la conception et la modification des contrats.	x			x	x	
	(14) Certificat d'achèvement		x			x	x	
4. Suivi et évaluation ex-post	(15) Suivi ex-post	À mettre en œuvre généralement 1, 3, 10 ans après l'achèvement, sous réserve de modifications	x		x			
	(16) Evaluation ex-post	À mettre en œuvre essentiellement 3 ans après l'achèvement	x		x			

notes :

1. Le Rapport du Suivi du Projet et le Rapport d'achèvement du Projet doivent être soumis à la JICA comme convenu dans l'A/D.

2. La non-objection de la JICA est requise pour l'attribution du don pour le montant restant et/ou les imprévus comme convenu dans l'A/D.

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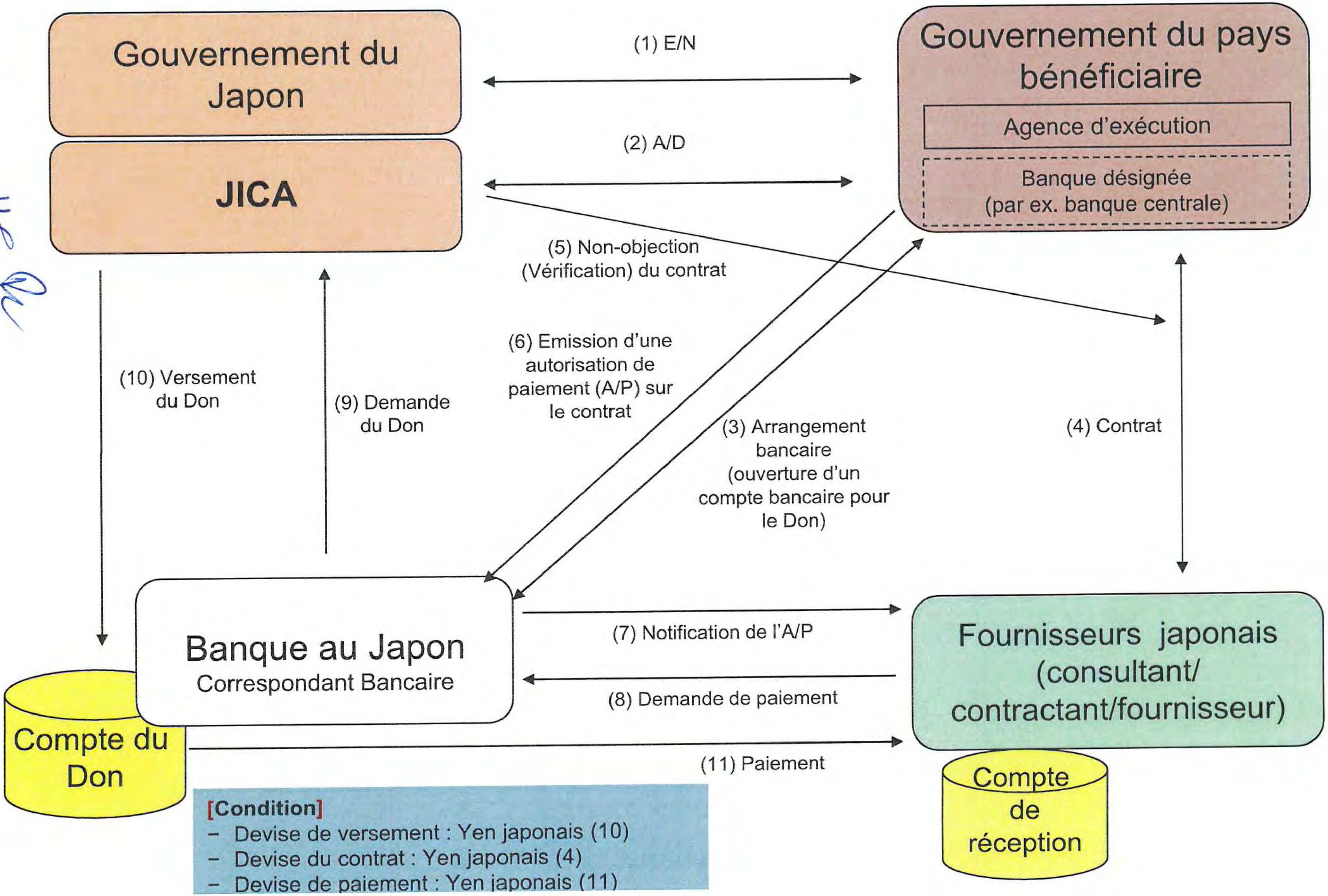
Flux financiers du Don du Japon (type A/P)



Calendrier de la mise en oeuvre du Projet