



08/05/2008

The German Water Partnership is a joint initiative of the German private and public sectors, combining commercial enterprises, government and non-government organizations, scientific institutions and water-related associations. The network is supported by five federal ministries. Its head office in Berlin collects and coordinates information about innovations, activities and services of its members.

Germany has more than 150 years of experience in successful water management. Efficiency in plant engineering, consulting and operation is complemented by unparalleled expertise in scientific research, education and training, and by high levels of institutional and administrative knowledge.

Front-End Engineering for the construction of Water Treatment Facilities SWCC Desalination Plants as shown in the below map. The technical consultations enabled SWCC to reach The Gate3 Stage. This includes the identification and selection of appropriate water treatment systems options for each location by means of engineering design and the preparation of tender documents.



The Hazards and Operability (HAZOP) analysis is a Stage Gate deliverable was used to identify potential hazards in a system and operability problems that may lead to non-conforming products. This analysis followed by an updated analysis (HAZOP v2) during the Execute stage. A HAZOP review is also conducted in case the facility is subject to a process modification during the project lifecycle



The Saudi Vision 2030 specifically recognizes the critical importance of ensuring a future reliable provision of WW treatment services to improve the quality of life of residents and environment of KSA.







HAZOP Manager V7.0 - [Example1.hdf]

File Edit View GoTo Keywords Utilities Window Help



SECONDARY KEYWORDS | FREQUENCY/SEVERITY CODES | HAZARD CATEGORY CODES | RISK MATRIX | SEVERITY MATRI

- ☐ S - F
☐ F + S
☒ User defined

F = Frequency Code
S = Severity Code

Colour Code Factors



Start

Help

☒ Print Colour in Reports

F7								
F6								
F5								
F4	2R	3R	4R	1U	2U			
F3	1R	2R	3R	4R	1U			
F2	2C	1R	2R	3R	4R			
F1	1C	2C	1R	2R	3R			
F0	0	1C	2C	1R	2R			
	S0	S1	S2	S3	S4	S5	S6	S7

- ☒ S on X axis : F on Y axis
☐ F on X axis : S on Y axis



HAZOP STUDY WORKSHOP

Overall, the project scope was divided into nodes. Table below, shows the description of each node including the P&IDs on which the nodes appear, Design & Operating Conditions and their design intent.

The procedure follows these general steps:

- Introduction and training;
- System Description;
- Selecting Nodes;
- Description & Design Intent;
- Examining Deviations;
- Identifying Causes;
- Evaluating Consequences;
- Considering Safeguards;
- Generating Recommendations



HAZOP DEFINITIONS OF SEVERITY

Criteria	Metric	SEVERITY				
		1 Worst Case	2 Severe	3 Major	4 Moderate	5 Minor
Safety	Safety Incidents	OSHA Recordable Injury with Fatality	OSHA Recordable Injury with Lost Time	OSHA Recordable Injury (No Lost Time)	First-Aid	No Injury
Environment	Permit Violations	Effluent Discharge Permit Violation; Requirement for Extensive Clean-Up Likely; Off-Site Exposure	Effluent Discharge Permit Violation; Requirement for Significant Clean-Up Likely; No Off-Site Exposure	Significant Localized Release with Shelter-in-Place or Evacuation; Requirement for Clean-Up Likely; Potential Effluent Discharge Permit Violation	Larger Localized Release with Possible Shelter-in-Place	Localized Release (Odor) (No Shelter-in-Place); No Clean-Up Required
Operations	Operational Impact	Inability to Process Flow Leading to Permit Violation and Flooding/Spillage	Inability to Process Flow Leading to Permit Violation	Flow Re-Routing and Temporary Work Required; No Redundancy	Flow Re-Routing and Temporary Work Required	No Process Upset; Flow Re-Routing Required



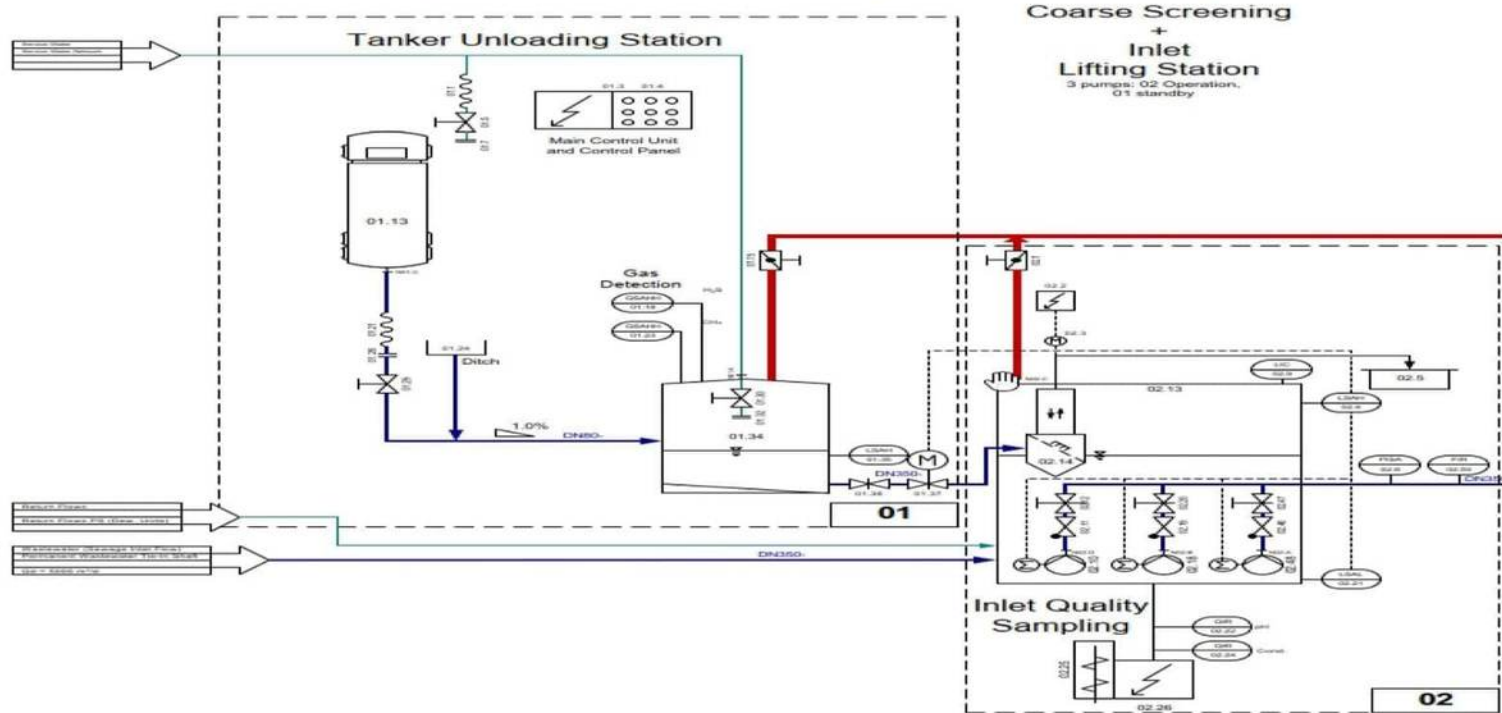
PHA STUDY WORKSHEETS

CASE STYDY - WWTP/LS - P&ID

1. Tanker Unloading & Inlet Lifting Station
2. Fine Screening & Sand & Grease Trap
3. Selector, Oxidation Ditch & Secondary Sedimentation
4. Odour Air Treatment
5. Tertiary Treatment Filters
6. Chlorination & TSE Pond & Tanker Filling Station
7. Sludge Dewatering & Disposal
8. Return Flows Pumping



Sections No. 1 & 2: Tanker Unloading & Inlet Lifting Station





Node	DEVIATION	CAUSES
1	High Flow	Peak Flow from Sanitary Sewer
2	High Level	More Tankers Discharge
3	High Flow	More Tankers Discharge
4	High Flow	Additional Flow @ Peak Hourly Flow
5	High Flow	All Pumps running
6	No Flow	All Pumps trip
7	High Pressure	Pump Operation
8	Leakage	Piping / Joints Rupture
9	Reverse Flow	Phase Sequence Reverse
10	No Flow	Both Pumps Failure
11	No Flow	D.S Valve is closed
12	No Air Change	Failure in Ventilation System

NWC - Technical Consultations (2020 -2021)

Riyadh – Saudi Arabia

- WaterGEMS V8.01 Hydraulic Modelling for Al Baha Water Supply Systems
- Bio Modelling for Ajial STP (1.2 MLD) “ATV-131” Treatment System, Al Khobar
- Assessment Study for “MEGAPOLIS” Wastewater Treatment System - Russia
- Decentralization Assessment for Wastewater Master Plan Jeddah – Jacobs Ch2m
- Bio-Win Simulation for ICEAS WWTP System - Riyadh
- TSE Disposal Methods & Reuse Management Plan
- Evaluate Technically and Commercially Variation & Change Orders (120 Project) for All Clusters Overall Kingdom of Saudi Arabia (CAPEX 30 Billion S.R).
- Hydrogen Sulphide Gas Release Odour Control Assessment Trunk Sewers - Riyadh
- CFD Model for Al Manh fouha TSE Pumping Station Intake – Riyadh
- Hydraulic Analysis for Airport-II Main Pumping Station (1000 ML) – Jeddah
- Hydraulic Analysis for Alraj Pumping Station Wet Well – Taif
- Hydraulic Analysis for Abha - Khamis STP TSE Pipeline – Abha
- Hydraulic Analysis for North Jeddah Operational Reservoirs – Jeddah
- Water Treatment RO Plants - Capex & Opex Study
- Surcharge Rates Assessment Study for Wastewater Discharge Users
- Geological Assessment for Land Collapse Bowaib Road – Riyadh

NWC - Technical Consultations (2020 -2021)

Riyadh – Saudi Arabia



NWC
المياه الوطنية

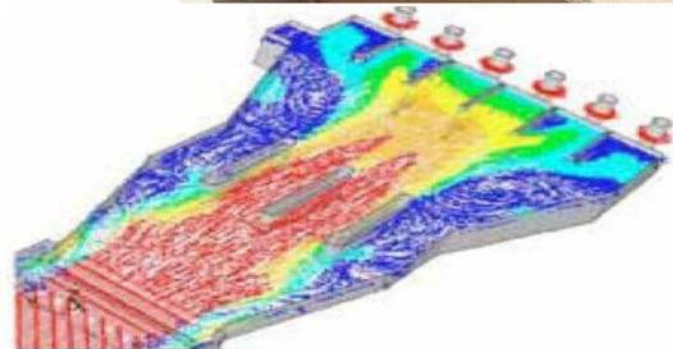
شركة المياه الوطنية
National Water Company



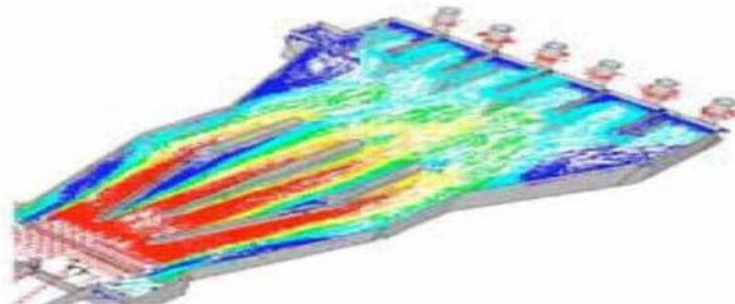
CFD Model for Main TSE Pumping Station Intake Saudi Arabia - Riyadh - 2022



6 No. Vertical Turbine – 8 Multistage Pump 6610 GPM@722 FT. Influence of Suction for Pumping in Parallel Operation with common Header



Rise to non-uniform flow distribution with a strong jet in the middle of the sump. This would in turn cause rough pump operation, vibrations and possibly cavitation



Capture the flow uniformly distributed among the pumps.

Value Engineering Proposal

إقتراح هندسة قيمية

Project/: المشروع تنفيذ شبكات الصرف الصحي بمحافظات منطقة المدينة المنورة (الخطوط الرئيسية)

Idea No. رقم الفكرة

Idea/: الفكرة **Pipe Trench Width Dimension Reduction as Cut Unsupported Slope**

T11

Original Design

التصميم

الأصلي

Trench Dimesion as per typical standards for pipe width with(O.D+0.70)

Proposed Design

التصميم المقترح

As per soil type & the angle of unsupported side (Slope < 60), the rench width fwill be reduced with (O.D+0.4) as per EN1610

Advantages and Disadvantages

مزايا وعيوب

الفكرة

Advantages/ : المزايا

Reduction of cut excavation volume

Disadvantages/ : العيوب

Unsupported Side Slope

Discussion & Justification

المناقشة والمبررات

Refer to attached skecth and standards diemensions

Life Cycle Cost Summary/

ملخص التكاليف الكلية

	Initial Cost/ التكاليف الأولية	LCC / التكاليف الكلية
Original Design/ التكلفة الأصلية	14,384,992	
Proposed Design/ تكلفة المقترح	11,507,994	
Potential Savings/ الوفورات الكامنة	2,876,998	

Value Engineering Proposal

إقتراح هندسة قيمة

رقم الفكرة Idea No.

T14

Project/: المشروع (الخطوط الرئيسية) تنفيذ شبكات الصرف الصحي بمحافظات منطقة المدينة المنورة

Idea/: الفكرة Using Min. Slope as per pipe diameter standrads

Original Design

التصميم

الأصلي

Pipe Slopes are as per Spec's

Proposed Design

التصميم المقترح

Minimizing Pipe Slopes as per pipe diamater standards

Advantages and Disadvantages

مزايا وعيوب

الفكرة

Advantages/ : المزايا

Reduction of cut excavation volume

Disadvantages/ : العيوب

Flushing Required @ Min. Flow

Discussion & Justification

المناقشة والمبررات

Refer to attached skecth and standards diemensions

Life Cycle Cost Summary/

ملخص التكاليف الكلية

	Initial Cost/ التكاليف الأولية
Original Design/ التكلفة الأصلية	14,384,992
Proposed Design/ تكلفة المقترح	12,386,925
Potential Savings/ الوفورات الكامنة	1,998,067

LCC / التكاليف الكلية

Cost Worksheet تحليل التكاليف

Project: تنفيذ شبكات الصرف الصحي بمحافظات منطقة المدينة المنورة (الخطوط الرئيسية)

Idea No.

Idea: Using Pipe Min. Slope for acheiving Self Clenasing Velocity 0.45 m/s

T14

Original Design

التصميم الحالي

	Quantity	Unit	Unit Cost	Total
Excavation for Pipes with standard slopes	52,700	m3	272.96	14,384,992
Subtotal				14,384,992
Markups		%		
			Total Cost (SR)	14,384,992

Proposed Design

التصميم المقترح

	Quantity	Unit	Unit Cost	Total
Excavation for Pipes with min. slopes	45,380	m3	272.96	12,386,925
Subtotal				12,386,925
Markups		%		
			Total Cost (SR)	12,386,925

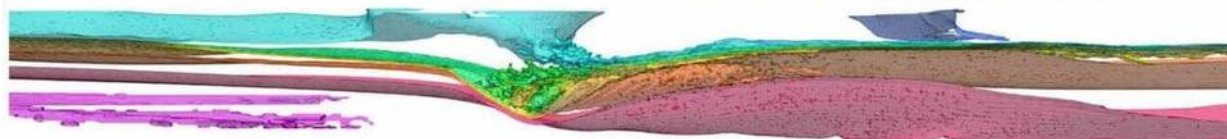
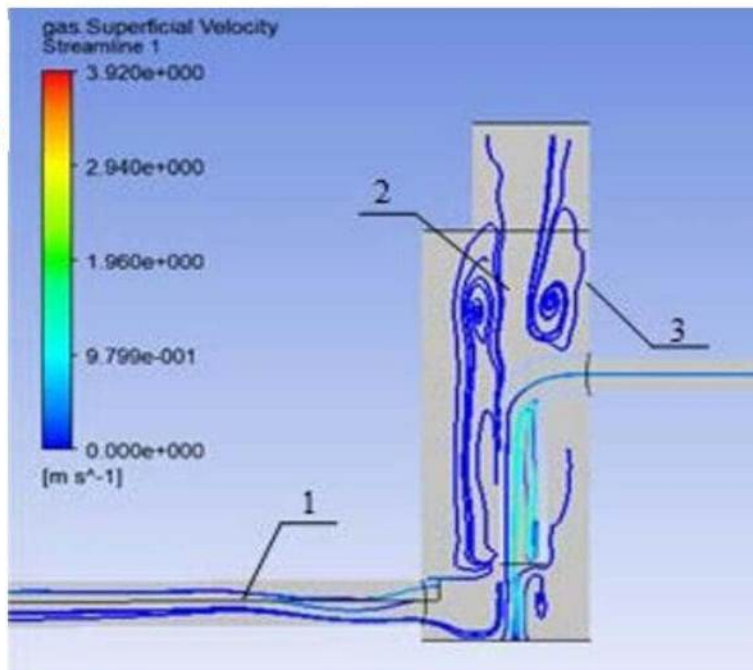
Potential Savings

الوفر المتوقع

Potential
Savings (SR)

1,998,067

H2S Modelling in Riyadh Main Trunk Sewer



Concentration C [mol/m³]



AJI'AL SEWAGE TREATMENT PLANT EXPANSION ASSESSMENT REPORT

Executive Summary

Reference to the workshop held on 15th June with NWC, ILF and Passavant for discussing the most applicable / feasible scenarios required for the duplication the existing capacity of Aj'al STP based on the instruction of H.E, The Minister of Water during the site visit to the plant and accordingly this report has been prepared.

The expansion required for the existing Aji'al WWTP from the current design capacity of average daily flow 70 MLD to 140 MLD. The additional flow will be provided from the existing WWTP Al Khobar located directly adjacent to the Aji'al WWTP.

The contractual documents allow an expansion in capacity (based on daily average flow only) from 70 MLD to 100 MLD while keeping the daily and hourly peak flow (121 MLD & 8,300 m³/h). Thus, most structures predominantly dimensioned according to their hydraulic capacity (e.g., screening, sand and grease trap, primary sedimentation, secondary sedimentation, filtration, chlorine contact tank and treated water tank, sea discharge) do not need any expansion to meet Stage II capacity requirements.

Expansion Aj'yal – Al Khobar WWTP 105 MLD System Capacity Assessment

WWTP South Dahrn _ Location Map



Figure [1] Aj'yal STP Location Map

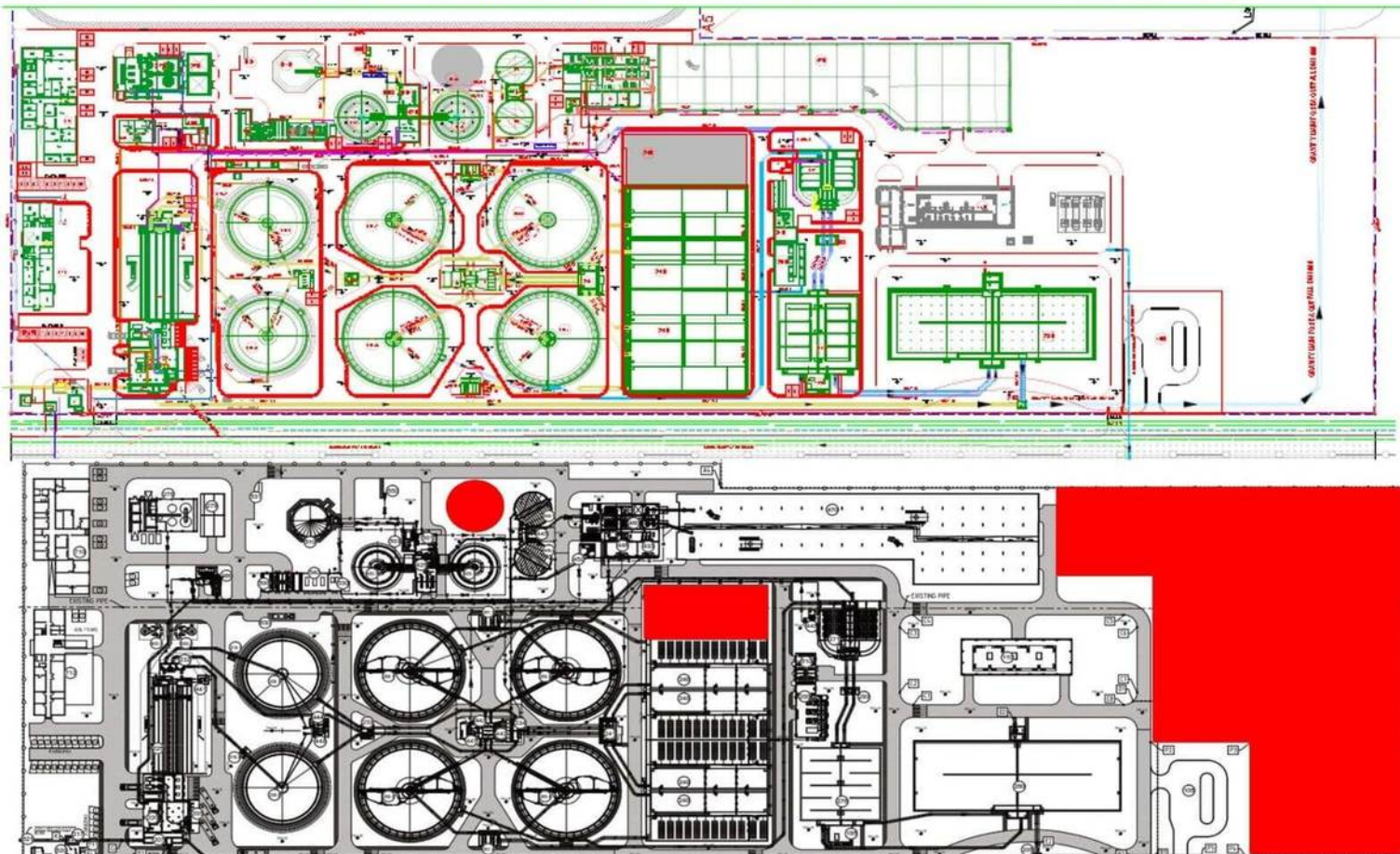
Expansion Aj'yal – Al Khobar WWTP 105 MLD System Capacity Assessment

Based on the process calculations prepared within this report according to the influent characterization, two scenarios have been done for checking the potential expansion of the existing plant to its ultimate capacity one for 70 MLD and the second for 105 MLD average daily flow, the first scenario shows the plant can accommodate an average design flow 70 MLD and 120 MLD peak daily flow and the second scenario shows that the plant can't accommodate the 181 MLD peak daily flow.

In order to satisfy the second stage expansion with 181 MLD peak daily flow, a retrofitting process via increasing the biomass and decreasing the detention time required for nitrification within the biological reactor, also increasing the surface area of both primary and secondary clarifiers. Special considerations will be required for sludge stream process line. Also, tertiary treatment units required to be expanded.

The capacity and efficiency of the existing attached growth with separate denitrification zone and phosphorus removal activated sludge system needs to be enhanced due to an expected future increase in wastewater flow and COD-load. Hybrid biomass technique shall be performed with the aim to increase the COD reduction capacity and increase the efficiency of the plant. In addition, improved sludge separation in the secondary clarifier shall be established. Integrating the treatment techniques in the existing activated sludge plant the future increases in wastewater flow and COD-load can be handled satisfactorily without increasing bioreactor volume.

Expansion Aj'yal – Al Khobar WWTP System Capacity Assessment 105 MLD



1ST SCENARIO - AVERAGE CAPACITY 70 MLD

1.1.1 Influent Sewage Characteristics & Average Waste Loads

Table (1) Influent Raw Sewage Characteristics & Average Waste Loads

Parameters	Unit Waste (mg/L)	Average Waste Loads, (kg/day)
BOD ₅	244	17,100
COD	488	34,200
Total Suspended Solids	285	19,950
TKN	46	3,221
Ammonia Inorganic Nitrogen	35	2,423
Total Phosphorus (P)	8	561
Alkalinity	200	

Expansion Aj'yal – Al Khobar WWTP 105 MLD System Capacity Assessment

Pollutants Relationship	
BOD ₅ / COD	0.50
TSS / BOD ₅	1.17
TKN / BOD ₅	0.19
BOD ₅ / TKN	5.31
BOD ₅ / TP	30.46

Comments:

- BOD₅/TP ratio of < 40 not sufficient for the biological phosphorus removal process.
- BOD₅/TKN > 5 is suitable for combined Nitrification/denitrification process.

1.1.2 Design Flows

Table (2) Design Loads @ Average Daily Flow 70 MLD

Population Equivalent (P.E)	285,000
Average Wastewater Flow (m ³ /day)	70,110
Average Wastewater Flow (m ³ /hr)	2,921
Peak Hourly Flow (m ³ /hr)	8,326
Peak Daily Flow (m ³ /day)	120,239
Min. Daily Flow (m ³ /day)	35,055

Expansion Aj'yal – Al Khobar WWTP

105 MLD System Capacity Assessment

Biological Reactor:

Sludge production from carbon removal, Hartwig coefficients (ATV A131)	13,171	kgMLSS /day
Bio-mass to be accumulated in the aeration reactor, $M_{MLSS, BB}$	99,229	kg
Total Biological Reactor Volume $V_{BB} = M_{MLSS, BB} / MLSS_{BB}$	27,949	m^3
	< 28,000	O.K
Volumetric Loading Rate	0.416	kg BOD ₅ / m^3 .day
	< 0.70	O.K
Sludge Loading Rate "F/M Ratio"	0.146	kg BOD ₅ / kg SS.day
	(0.12 ~ 0.25) 0.25	O.K
Combined Nitrification-Denitrification		
The alkalinity, through nitrification (with the inclusion of the recovery from denitrification) and through phosphate precipitation, decreases SALK,EAT	1.26	mmol/L
	< 1.50	O.K
Denitrification Volume	9,792	m^3
V_{DN}/V_{BB}	35%	
	< 40%	O.K

Expansion Aj'yal – Al Khobar WWTP 105 MLD System Capacity Assessment

2ND SCENARIO - AVERAGE CAPACITY @ 105 MLD

1.1.5 Influent Sewage Characteristics & Average Waste Loads

Table (3) Influent Raw Sewage Characteristics & Average Waste Loads Average Daily Flow 105 MLD

Parameters	Unit Waste (mg/L)	Average Waste Loads, (kg/day)
BOD ₅	244	25,800
COD	488	51,600
Total Suspended Solids	285	30,100
TKN	46	4,859
Ammonia Inorganic Nitrogen	35	3,655
Total Phosphorus (P)	8	847
Alkalinity	200	
Pollutants Relationship		
BOD ₅ / COD	0.50	
TSS / BOD ₅	1.17	
TKN / BOD ₅	0.19	
BOD ₅ / TKN	5.31	
BOD ₅ / TP	30.46	

Design Loads @ Average Daily Flow 105 MLD

Population Equivalent (P.E)	430,000
Average Wastewater Flow (m ³ /day)	105,780
Average Wastewater Flow (m ³ /hr)	4,408
Peak Hourly Flow (m ³ /hr)	12,561
Peak Daily Flow (m ³ /day)	181,413
Min. Daily Flow (m ³ /day)	52,890

Wastewater Fractions	Value
F _{bs} - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.47
F _{xsp} - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.19
F _{us} - Unbiodegradable soluble [gCOD/g of total COD]	0.04
F _{up} - Unbiodegradable particulate [gCOD/g of total COD]	0.28
F _{na} - Ammonia [gNH ₃ -N/gTKN]	0.65
F _{nox} - Particulate organic nitrogen [gN/g Organic N]	0.70
F _{nus} - Soluble unbiodegradable TKN [gN/gTKN]	0.00
F _{upN} - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.04

Primary Sedimentation Tanks:

Number of Tanks	2	No.
Water Depth	3.00	m
Tank Diameter	35.00	m
Overflow Rate / Surface Loading @ Peak Hourly Flow	7.10	m ³ /m ² /hr
	< 5	NO
Detention Time @ Peak Hourly Flow	0.54	hr
	> 0.70	NO
Primary Sludge	15,050	Kg/day
Primary Sludge	365	m ³ /day

Biological Reactor:

Sludge production from carbon removal, Hartwig coefficients (ATV A131)	19,873	kgMLSS/day
Bio-mass to be accumulated in the aeration reactor, $M_{MLSS, BB}$	149,714	kg
Total Biological Reactor Volume $V_{BB} = M_{MLSS, BB} / MLSS_{BB}$	42,00	m ³
	< 28,000	NO
Volumetric Loading Rate	0.627	kg BOD ₅ / m ³ .day
	< 0.70	O.K
Sludge Loading Rate "F/M Ratio"	0.221	kg BOD ₅ / kg SS.day
	(0.12 ~ 0.25) 0.25	O.K
Combined Nitrification-Denitrification		
The alkalinity, through nitrification (with the inclusion of the recovery from denitrification) and through phosphate precipitation, decreases SALK,EAT	1.26	mmol/L
	< 1.50	O.K
V_{DN}/V_{BB}	35%	
	< 40%	O.K

Secondary Clarifier:

No. of Clarifier	4	No.
Clarifier Diameter	40	m
Peak Sludge Volume (SV)	421	ml/l
	< 500	O.K
Specific Hydraulic Loading / Surface Overflow Rate @ Average	1.42	m/hr
	< 1.0	NO
Specific Hydraulic Loading / Surface Overflow Rate @ Peak	2.34	m/hr
	< 2	NO
Solids Loading @ Average	121	Kg SS/m ² .day
	< 100	NO
Solids Loading @ Peak	199	Kg SS/m ² .day
	< 192	NO
Retention Time @ Average (Without RAS)	2.20	hr
	> 3.0	NO
Retention Time @ Peak (Without RAS)	1.33	hr
	> 1.50	NO

Tertiary Treatment :

No. of Filters (1 Standby + 1 B/W)	8	No.
Filter Velocity @ Peak	25	m/hr
	< 15	NO

Disinfection by Chlorination :

No. Chlorine Tank	2	No.
Total Volume of Tanks	4,150	m ³
Detention Time @ Peak Hourly Flow	0.32	hr
	> = 0.50	NO



EBRD will provide a sovereign loan of up to EUR 186 million to the Arab Republic of Egypt. It is expected that the Project will be co-financed by a sovereign loan of up to EUR 172 million from the European Investment Bank ("EIB") and a EUR 30 million investment grant from the EU Neighborhood Investment Facility ("NIF"). The Project fully supports the Bank's Green Economy Transition ("GET") Approach which, among different goals, aims at scaling up the promotion of sustainability of natural resources use, to support pollution prevention and to avoid/reduce the degradation of ecosystems. The Scope of Work as follows

- Conduct ESIA Studies for 25 facilities studies in accordance with EEAA guidelines leading to obtaining the permits for construction and operation of the facilities.
- Conduct ESIA Studies for 25 facilities studies in accordance with EBRD guidelines leading for construction and operation of the facilities. This is a requisite for the finance process.
- Prepare Stakeholders Engagement Plans for the project.
- Hold public consultations/ hearings at sites location as part of the Stakeholders Engagement Plan

FAYOUM - EGYPT



EBRD - Water Pollution Control in Qanun Lake 2020

FAYOUM - EGYPT

The program will be implemented in two phases and under this contract only Phase 1 will be executed.

Phase 1 will include the following scope:

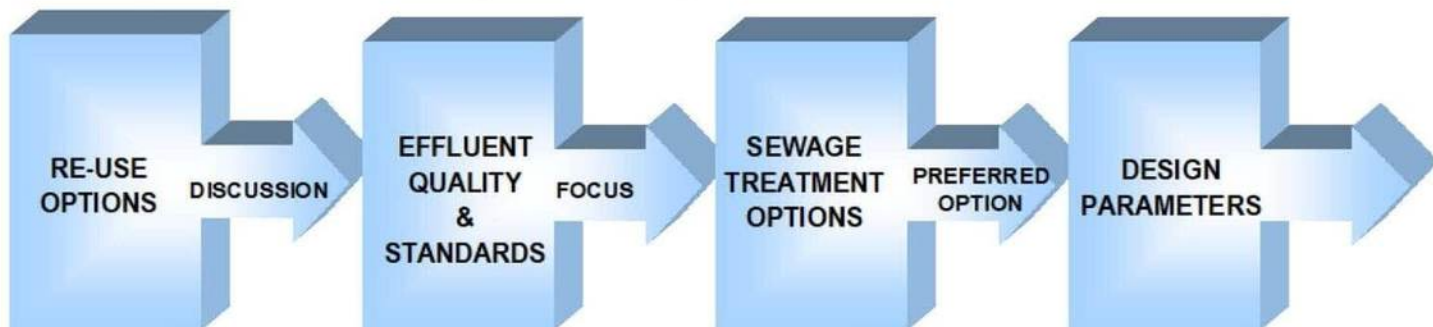
- ☐ Construction of 4 new WWTPs
- ☐ Expansion of 7 existing WWTPs
- ☐ Rehabilitation of 10 WWTPs
- ☐ Decommissioning of 6 WWTPs
- ☐ Expansion of existing sewer networks by approx. 2350 km
- ☐ Construction of approx. 260 km of pressurized rising mains
- ☐ Construction of approx. 100 new pumping stations
- ☐ Procurement of 150 evacuation trucks

EBRD - Water Pollution Control in Qanun Lake 2020 FAYOUM - EGYPT

Design of the New and Enhanced / Expanded WWTPs

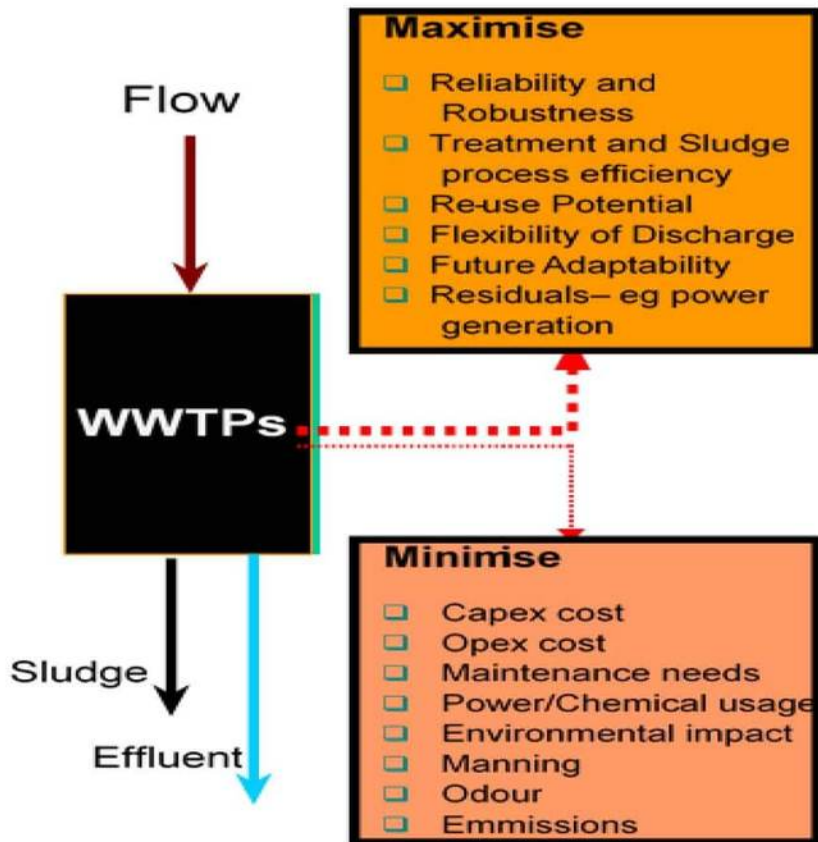
In responding to this RfP we recognize the need for a focused approach in line with the thinking and objectives of EBRD, HCWW and FWWC. It is vital in developing new and enhanced sewage treatment facilities in the Fayoum Governorate to bring to FWWC new technologies, new developments and to address the four most important drivers:

- Public Health
- Environmental Protection
- Water Conservation
- Whole Life Cycle Costs



EBRD - Water Pollution Control in Qanun Lake 2020

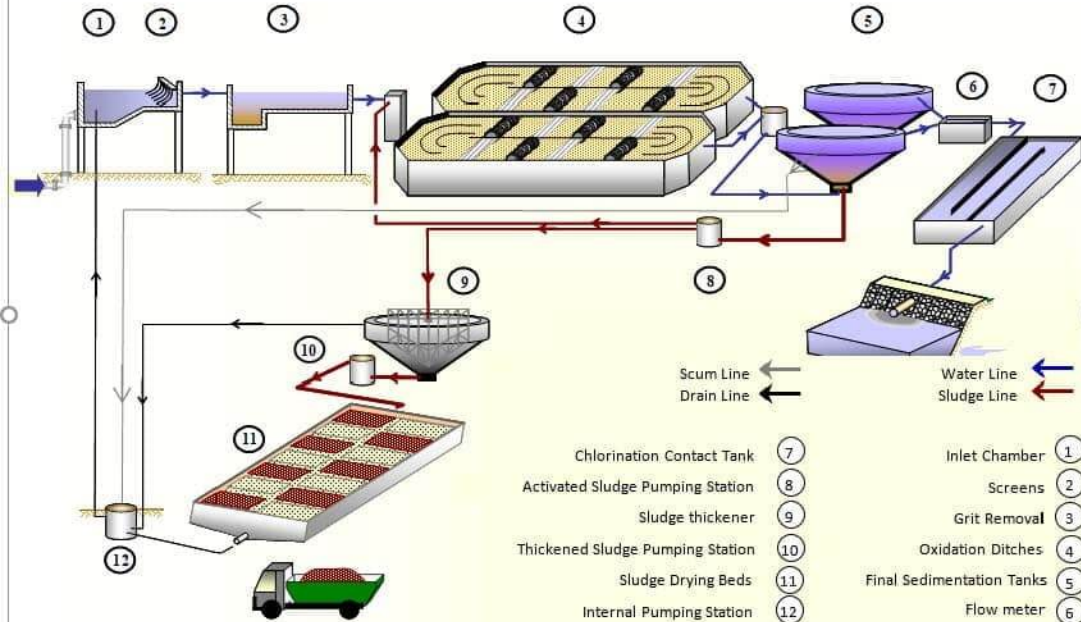
FAYOUM - EGYPT



Design Achievements of WWTP

EBRD - Water Pollution Control in Qanun Lake 2020

FAYOUM - EGYPT



EBRD - Water Pollution Control in Qanun Lake 2020

FAYOUM - EGYPT

PROCESS OUTPUTS / DELIVERABLES

PROCESS FLOW
DIAGRAM

OPERATING
PHILOSOPHY

PROCESS
CONTROL
PHILOSOPHY

PERFORMANCE
SCHEDULES

COMMISSIONING
PLAN

HYDRAULIC
PROFILE

INFLUENT/EFFLUENT
CRITERIA

PROCESS UNIT
SIZE

P&IDs

SITE LAYOUT &
PIPE ROUTES

GEOTECHNICAL
SURVEYS

ELECTRICAL
DRAWINGS

MEDIA
TECHNICAL
SCHEDULES

FDS

PRE TENDER
HEALTH&SAFETY
PLAN

DESIGN

TASKS REQUIRED

DEVELOP
PROCESS FLOW
DIAGRAM

DEVELOP
DETAILED SITE
LAYOUT

FINALISE
PROCESS UNIT
SIZES

DEVELOP
COMMISSIONING
STRATEGY

PROCESS
CONTROL
PHILOSOPHY

DEVELOP &
REVIEW P&IDs

OPERATING
PHILOSOPHY

TESTING
REQUIREMENT

LESSONS
LEARNT INPUT

HYDRAULIC
PROFILES

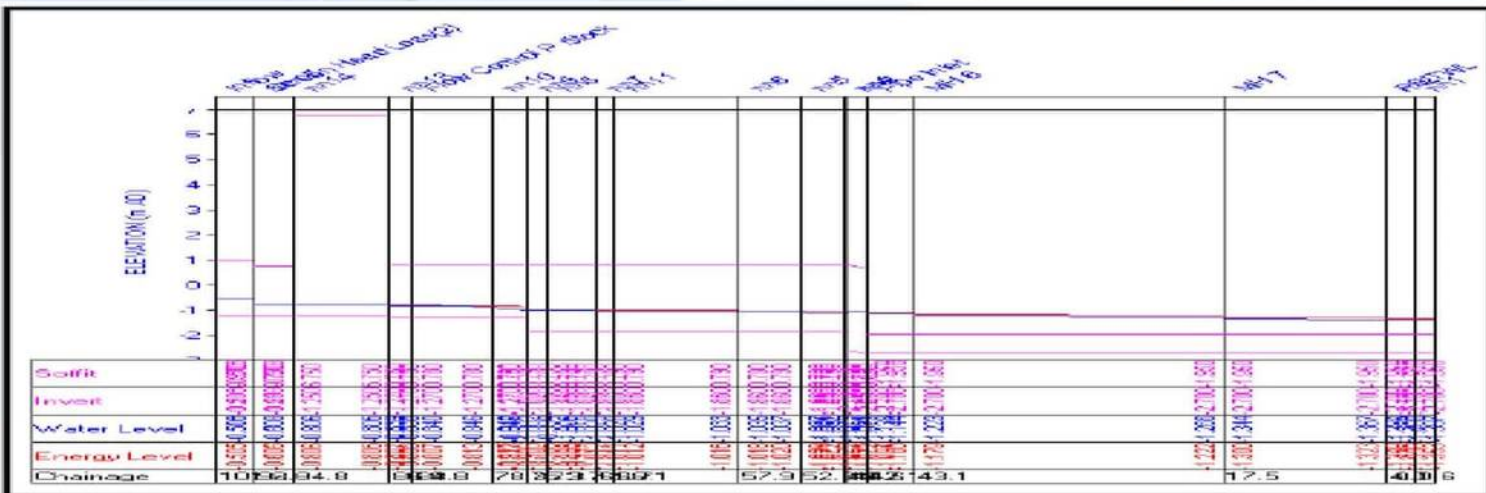
FDS
PRODUCTION

MECHANICAL
SCHEDULES

ELECTRICAL
SCHEDULES

HEALTH &
SAFETY PLAN

ATTEND HAZOP
& ADDRESS
ACTIONS





Egyptian Army National Services Projects (Arabian Industries Organization) - 2019



Plan, executes, and finalize awarded projects according to strict deadlines and within budget. This includes acquiring resources and coordinating the efforts of team members and third-party to deliver projects according to plan.

- Marsa Mattrouh STP (60,000 m³/day) / EA Process System
- Busilia El Sebia STP (27,000 m³/day) / MBBR Process System
- Al Kalah Sharq STP (6,000 m³/day) / MBBR Process System
- Itssa Water Supply Pipe Line 800mm
- Al Balmoon STP (10,000 m³/day) / MBBR Process System
- Al Monfia – Ashmoon Sanitary Drainage Project
- Al Gharabia - Al Salween Sanitary Drainage Project
- Al Behira – Kafer Al Dafwary Sanitary Drainage Project
- Aswan - Edfu Sanitary Drainage Project
- Al Mahala Sanitary Drainage Project
- Siwa STP (10,000 m³/day) / OP Process System



Egyptian Army National Services Projects (Arabian Industries Organization) - 2019



Ain Shams University – Faculty of Engineering – Architectural Department Infrastructure Planning – Semesters 2018 / 2019



DELTA University – Faculty of Engineering - Civil Department

4TH YEAR Civil - Sanitary Engineering & Graduation Project

Semesters 2017 / 2018



DELTA University – Faculty of Engineering - Civil Department

4TH YEAR Civil - Sanitary Engineering & Graduation Project

Semesters 2017 / 2018



Planning of Water Resources and supply safe potable water under controlled pressure from water treatment facilities to homes and businesses. Design of water distribution networks, or ensure the ongoing operation water infrastructure and hydraulic modelling using WaterGems. Building Geo-Database using Arc-GIS.

Tasks :

- ❑ Water Treatment Plants Performance Evaluation and Upgrading / Retrofitting. Interventions in the operation of drinking water treatment plants, such as the adjustment of valve positions or pump speeds, will lead to a change in the division of flows through the plant and, thus, in the flow through the individual treatment units.
- ❑ The work focuses on the effects of operational interventions on a complete drinking water treatment plant. Dynamic Modelling (Extended Period Simulations & modeling for future improvements.

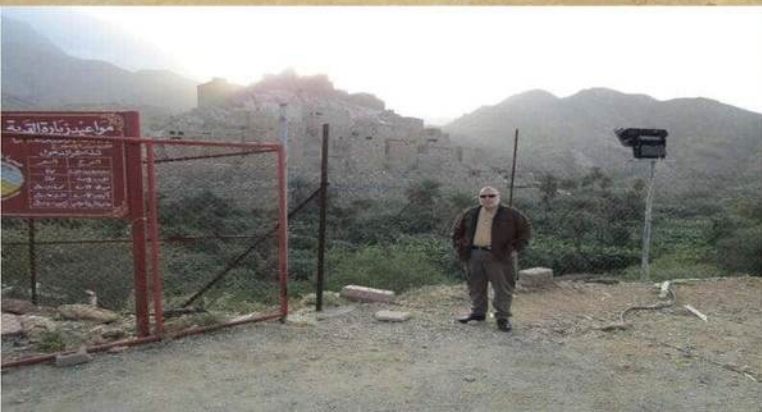


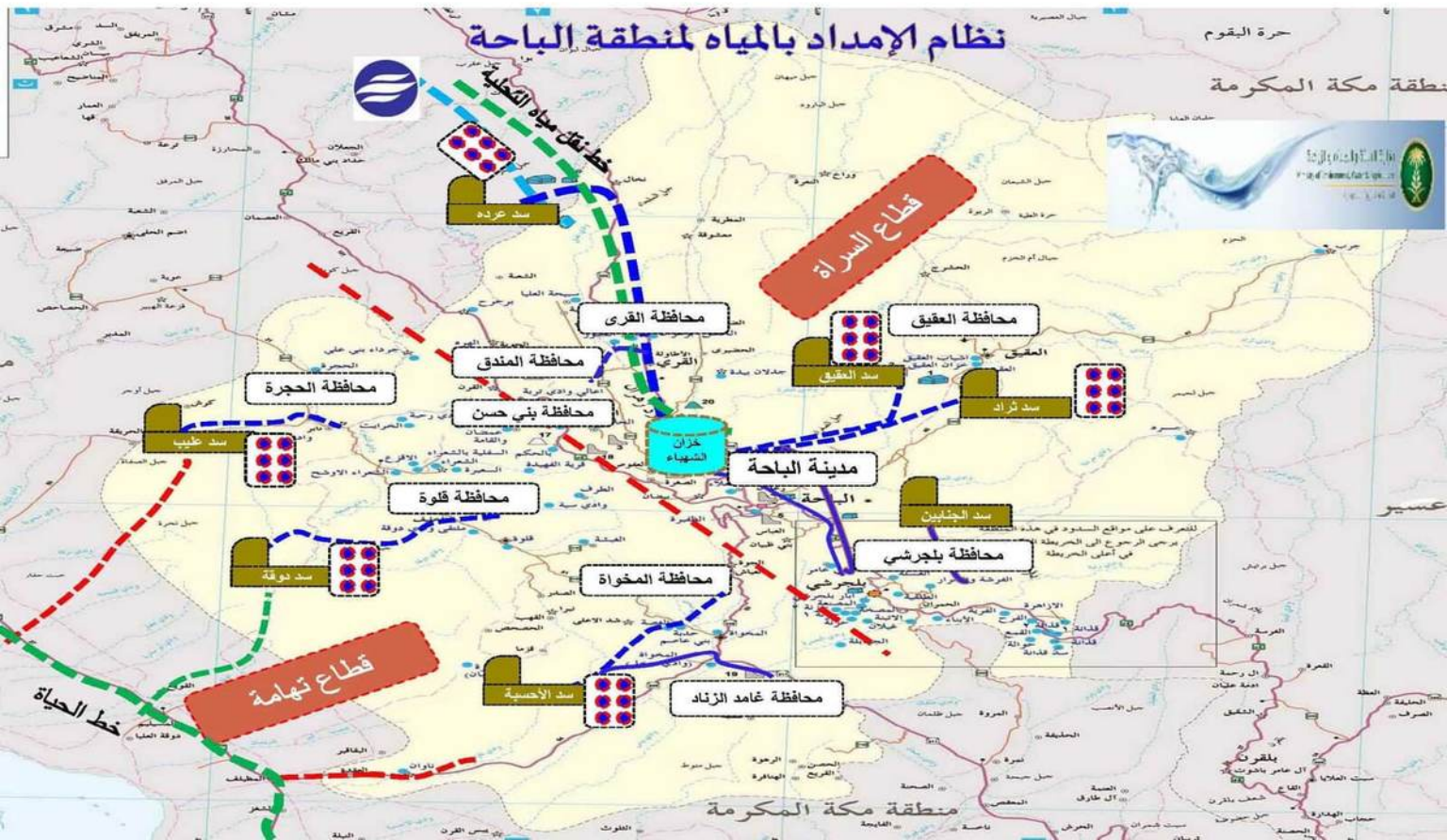
Ministry of Water & Environment, Saudi Arabia

Al Baha Region Water Supply Master Plan - 2016

- ☐ Water Treatment Plants Upgrading & Rehabilitation (Surface Water Dam Intake)
- ☐ Water Distribution System Evaluation
- ☐ Elevated Storage Evaluation
- ☐ Wellhead Protection Plan Evaluation
- ☐ Public Meetings/Citizens Group
- ☐ Water Rate Analysis and Cost of Service Study
- ☐ Hydrologic and hydraulic analysis.
- ☐ Develop and maintain systematic documentation files of facility experiences
- ☐ Design of water supply system using GIS and positioning of the storage water tank, assessment of the water quality and selection of the source of water for the water supply system, with consideration of ground surface properties,
- ☐ Using ArcGis 10.40 for network planning to supply drinking water to consumers.
- ☐ Using Digital Elevation Model (DEM) with 5-meter grid size and Satellite Image (ETM+) to prepare the geo spatial design of water supply system.
- ☐ Hydraulic Modelling and Simulation of Water Distribution Systems, WaterGems .

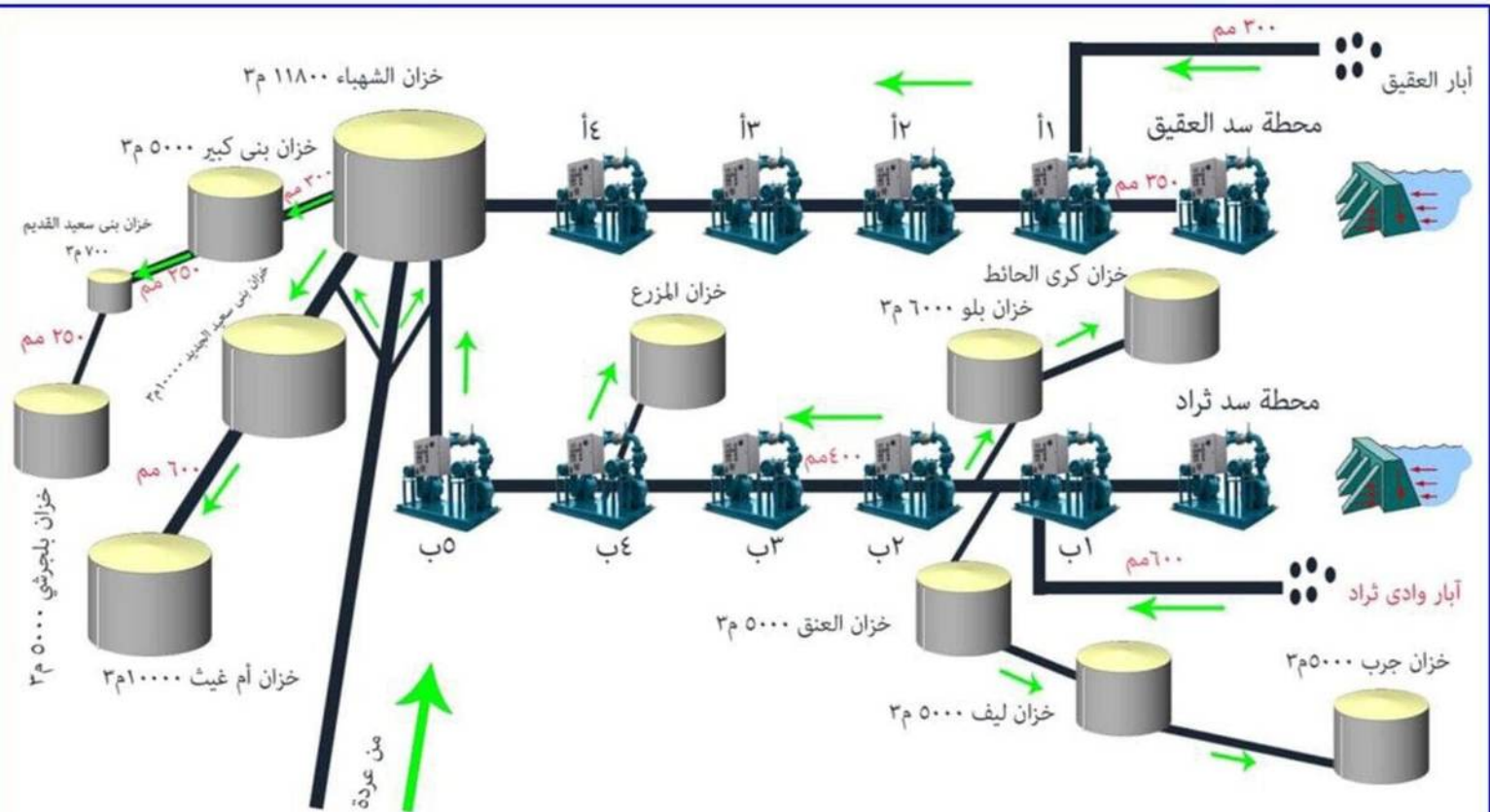






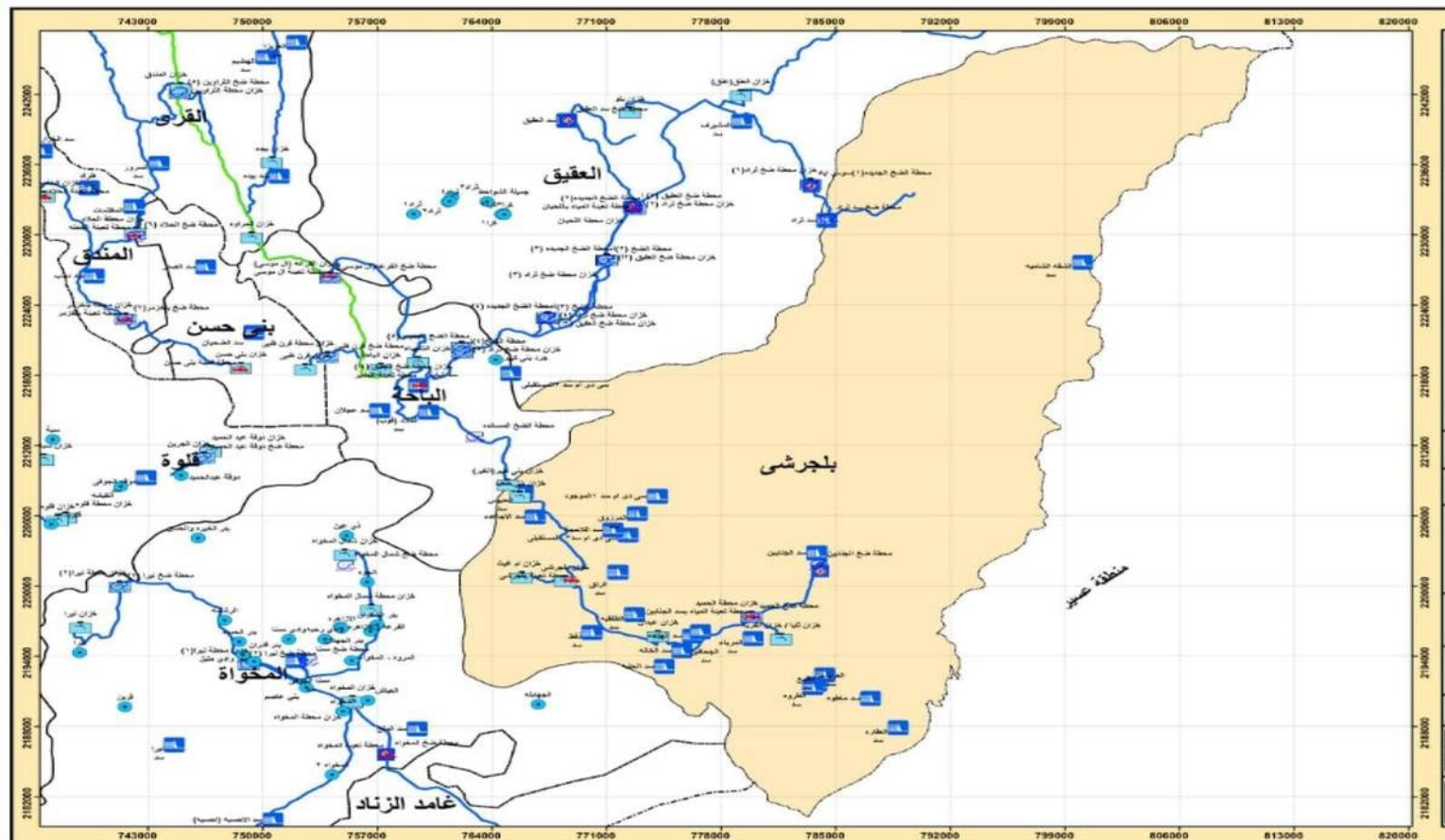
Ministry of Water & Environment, Saudi Arabia

Al Baha Region Water Supply Master Plan - 2016



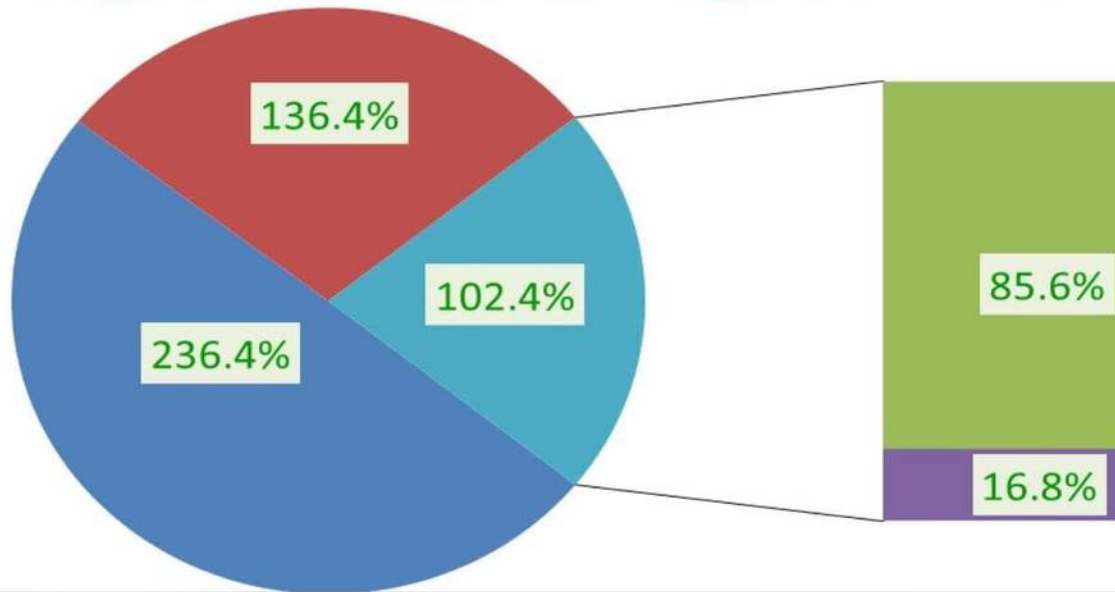
Ministry of Water & Environment, Saudi Arabia

Al Baha Region Water Supply Master Plan - 2016



الموازنة المائية المستقبلية عند سنة الهدف 1481 هـ

■ العجز / الطاقة ■ الطاقة / الإحتياج ■ الزيادة / الإستهلاك ■ الإحتياج / الإستهلاك



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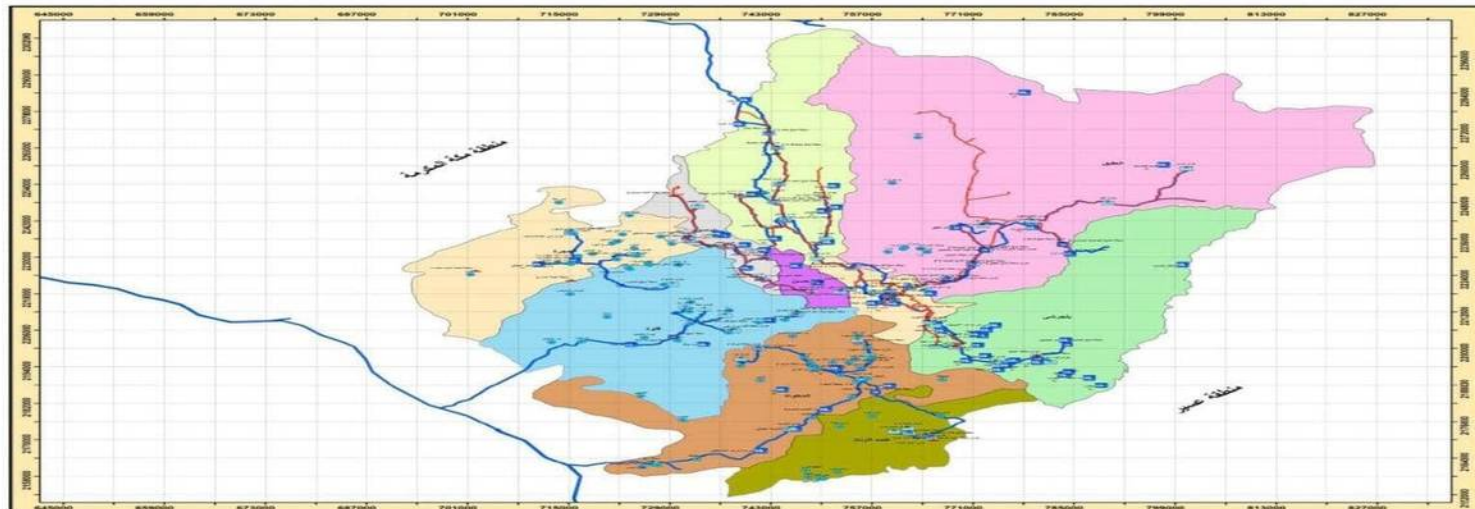
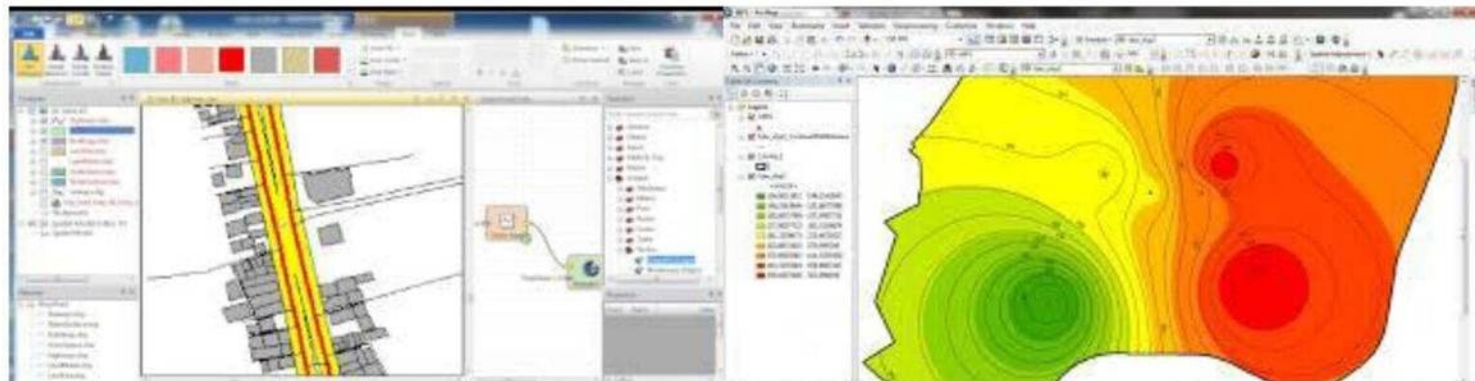
Al Baha Region Water Supply Master Plan - 2016



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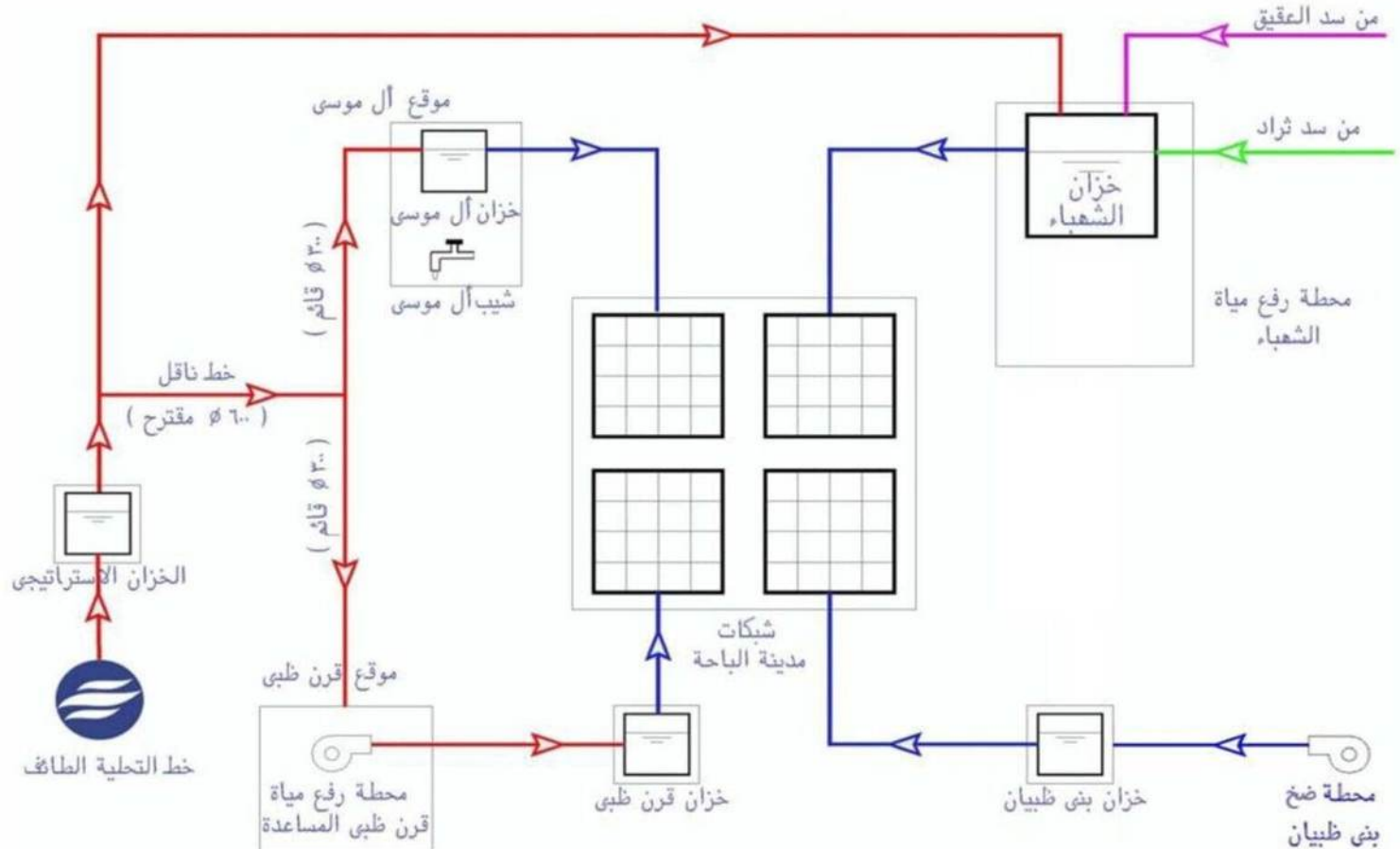
Al Baha Region Water Supply Master Plan – 2016

GIS OUTPUT



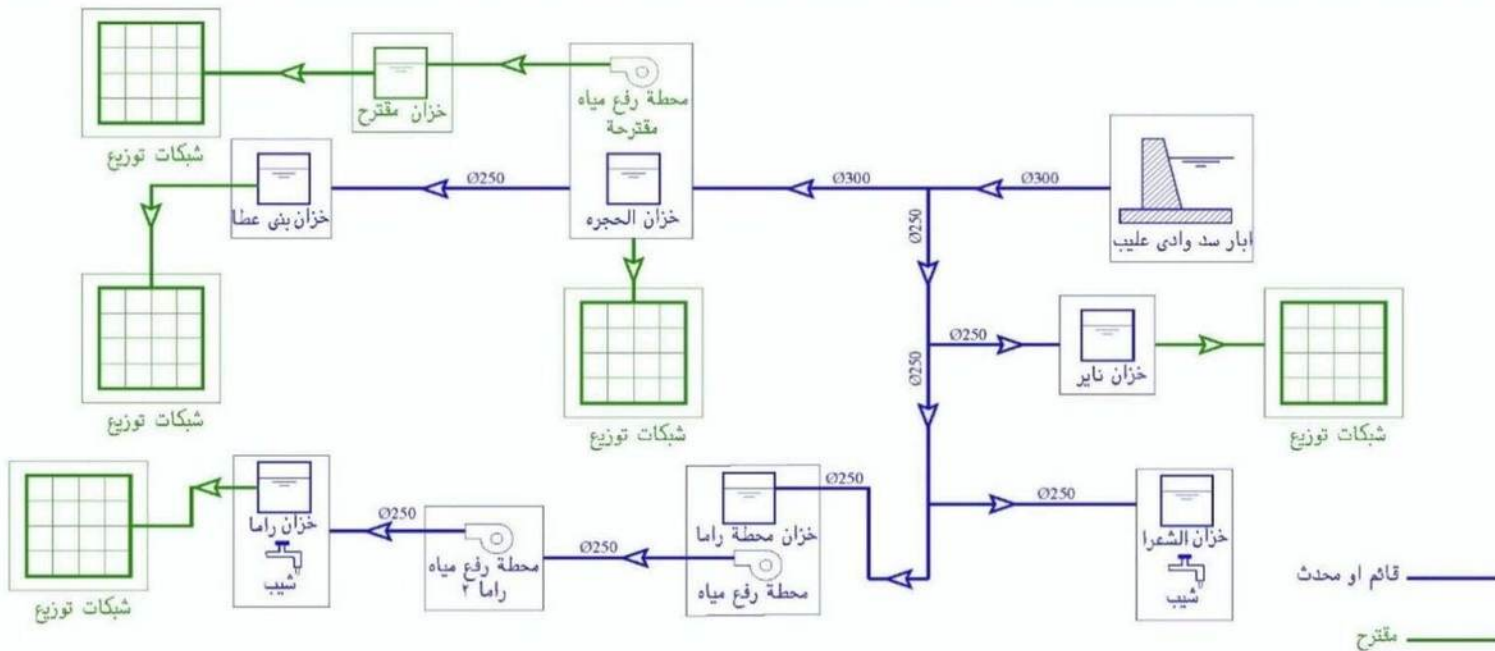
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Al Baha Region Water Supply Master Plan - 2016



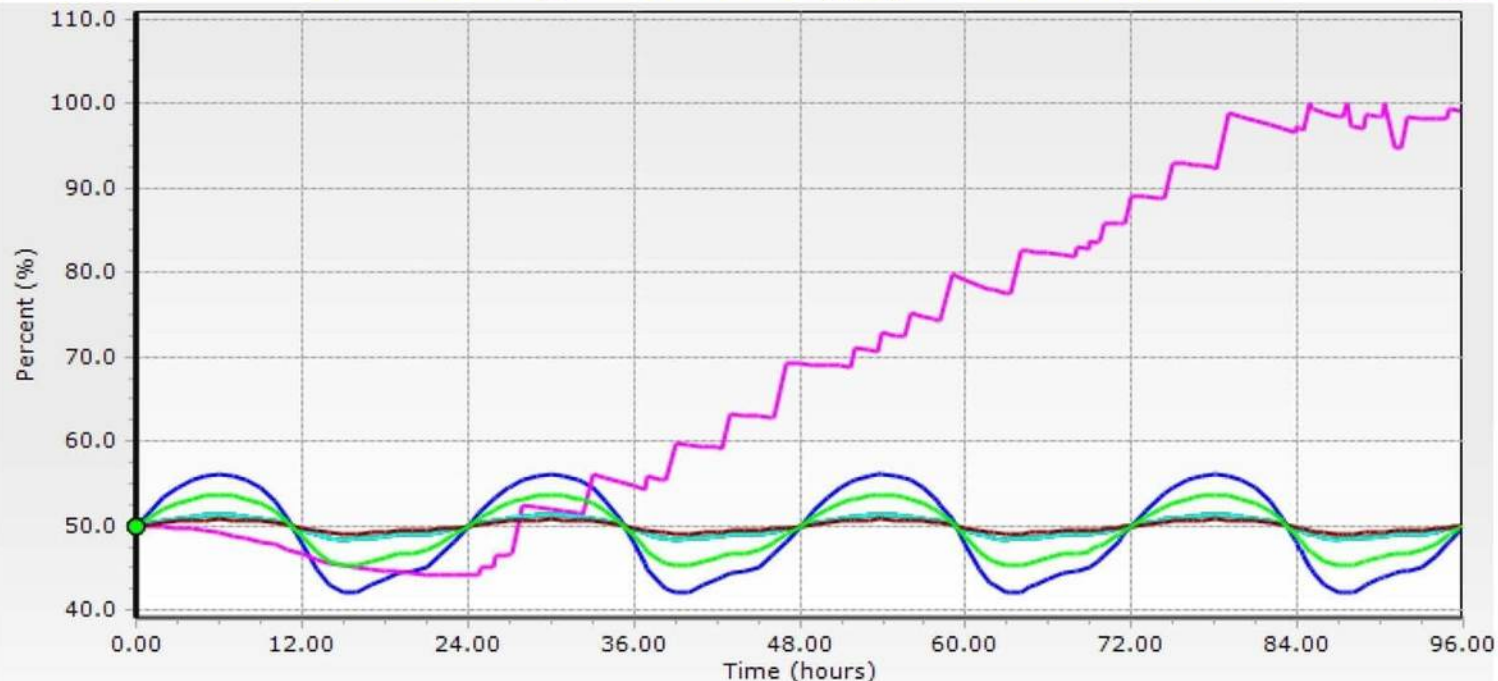
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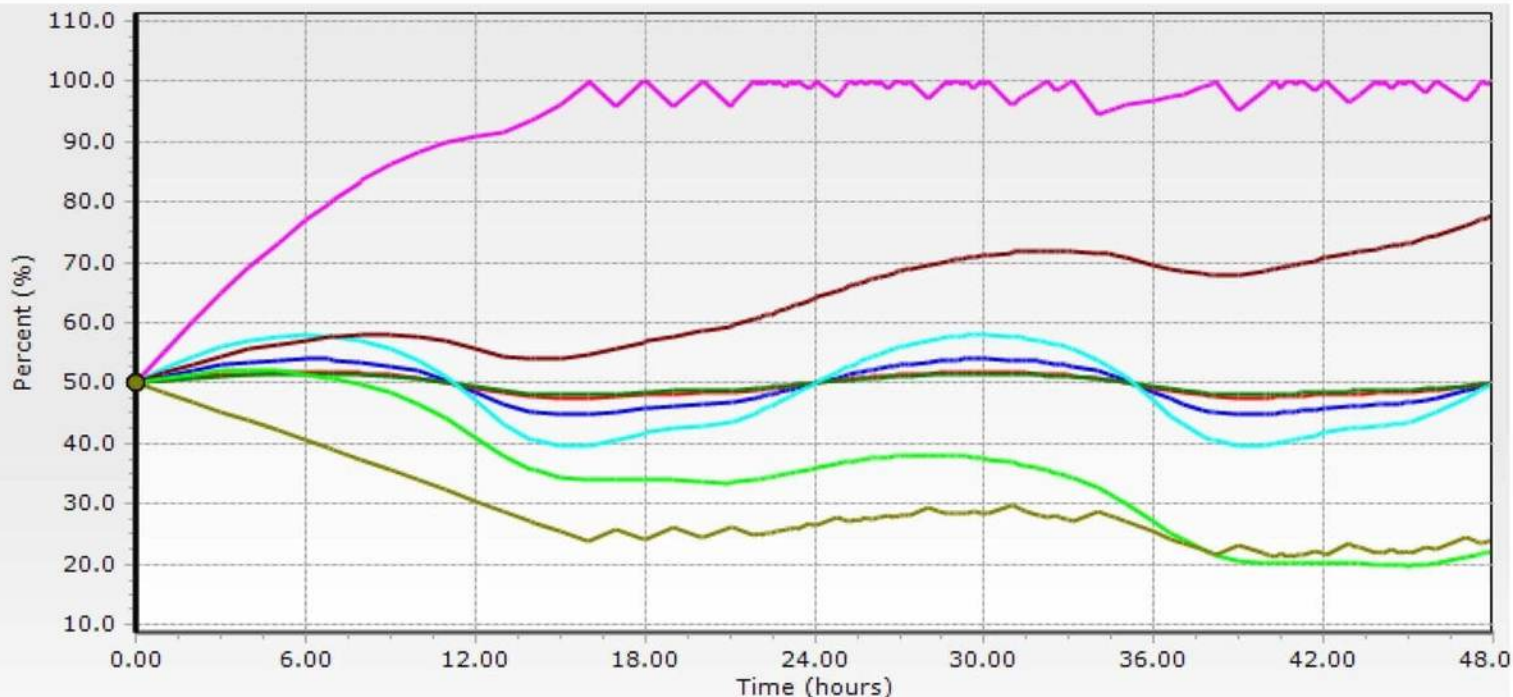
Al Baha Region Water Supply Master Plan - 2016



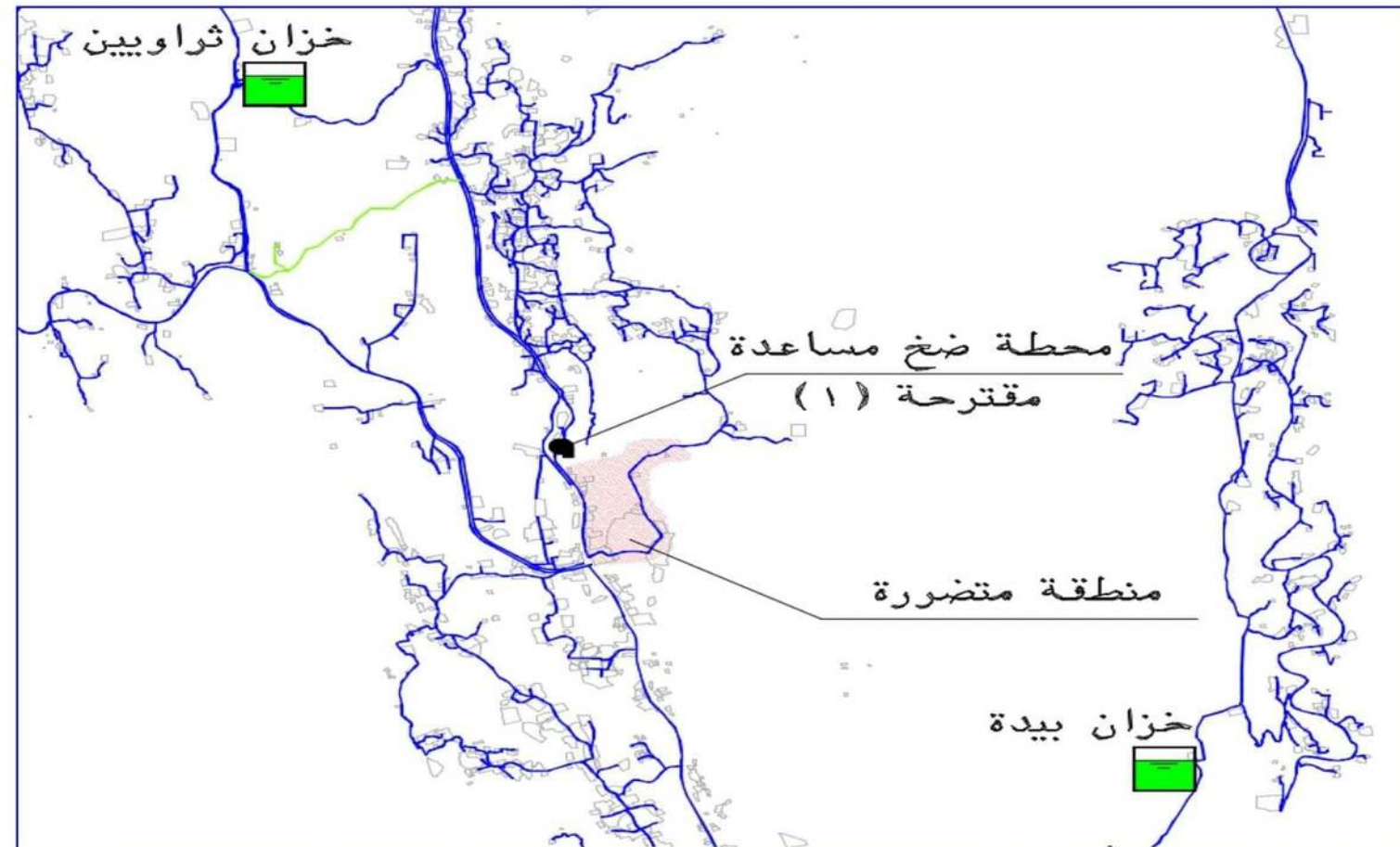
- | | |
|---|-----------------------------------|
| Blu - Base - Percent Full | Warakh - Base - Percent Full |
| Nehaya Kra-Industrial - Base - Percent Full | Tharad-2 - Base - Percent Full |
| Aala Kra-Industrial - Base - Percent Full | Aala Kra-UC - Base - Percent Full |
| AlOnq - Base - Percent Full | |

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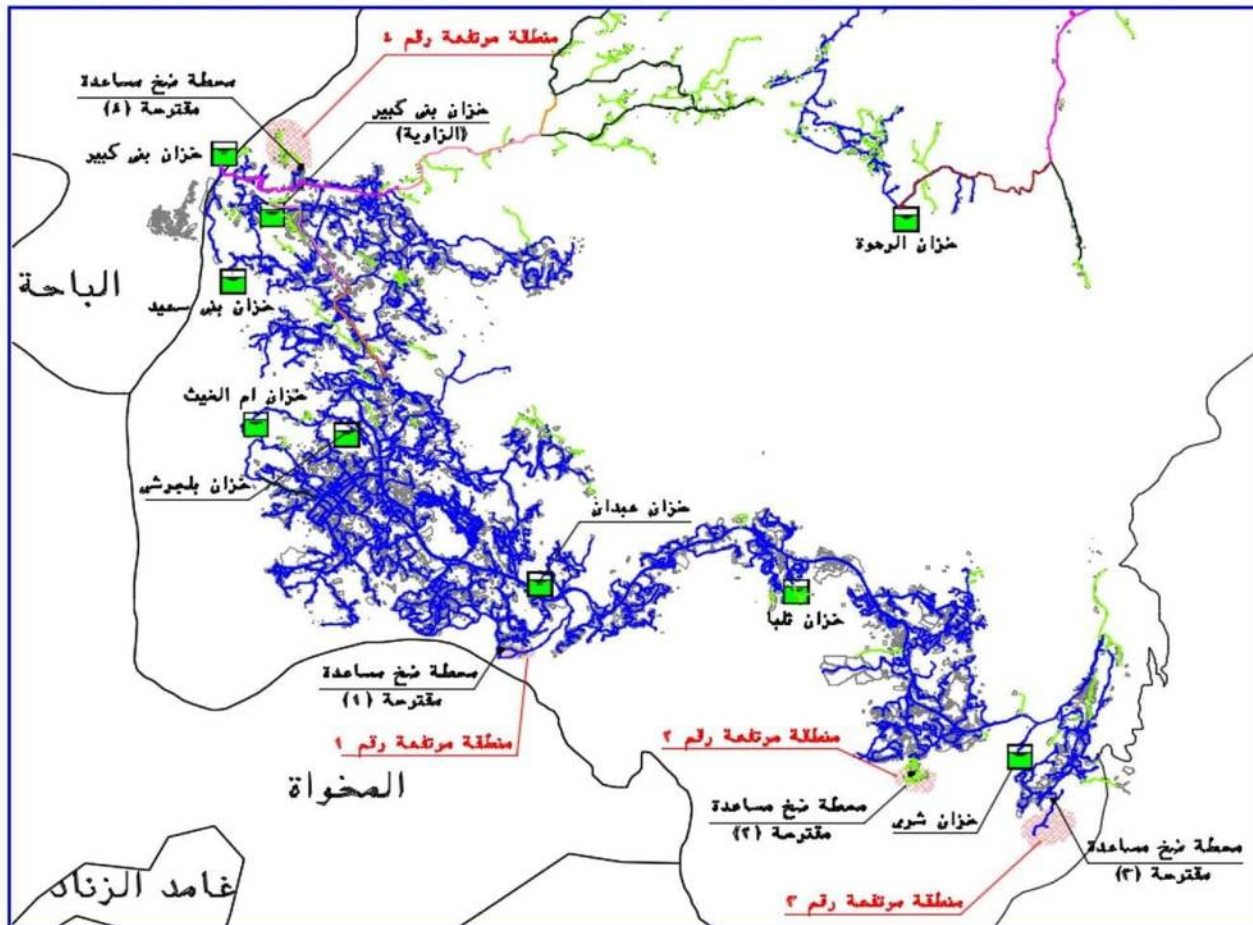


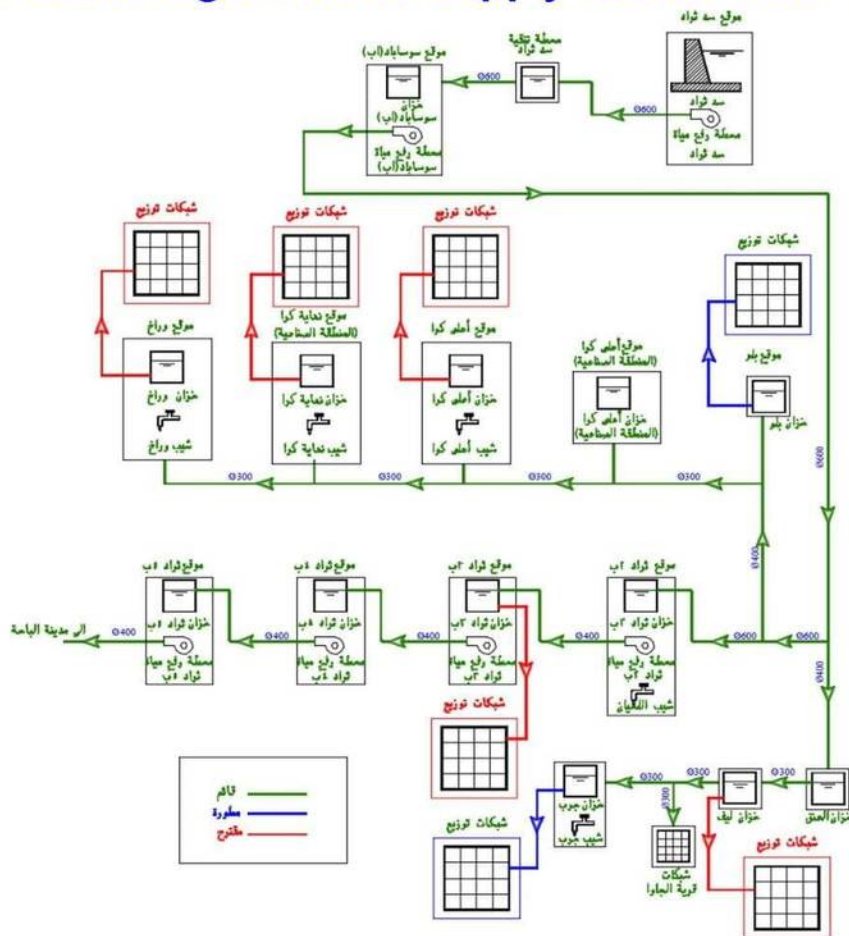
Adwan - Base - Percent Full	Sadhan - Base - Percent Full
Al Kohla - Base - Percent Full	Dos - Base - Percent Full
Al Khalb - Base - Percent Full	Bani Hassan - Base - Percent Full
Belkhazmer - Base - Percent Full	Al Halah - Base - Percent Full



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Al Baha Region Water Supply Master Plan - 2016





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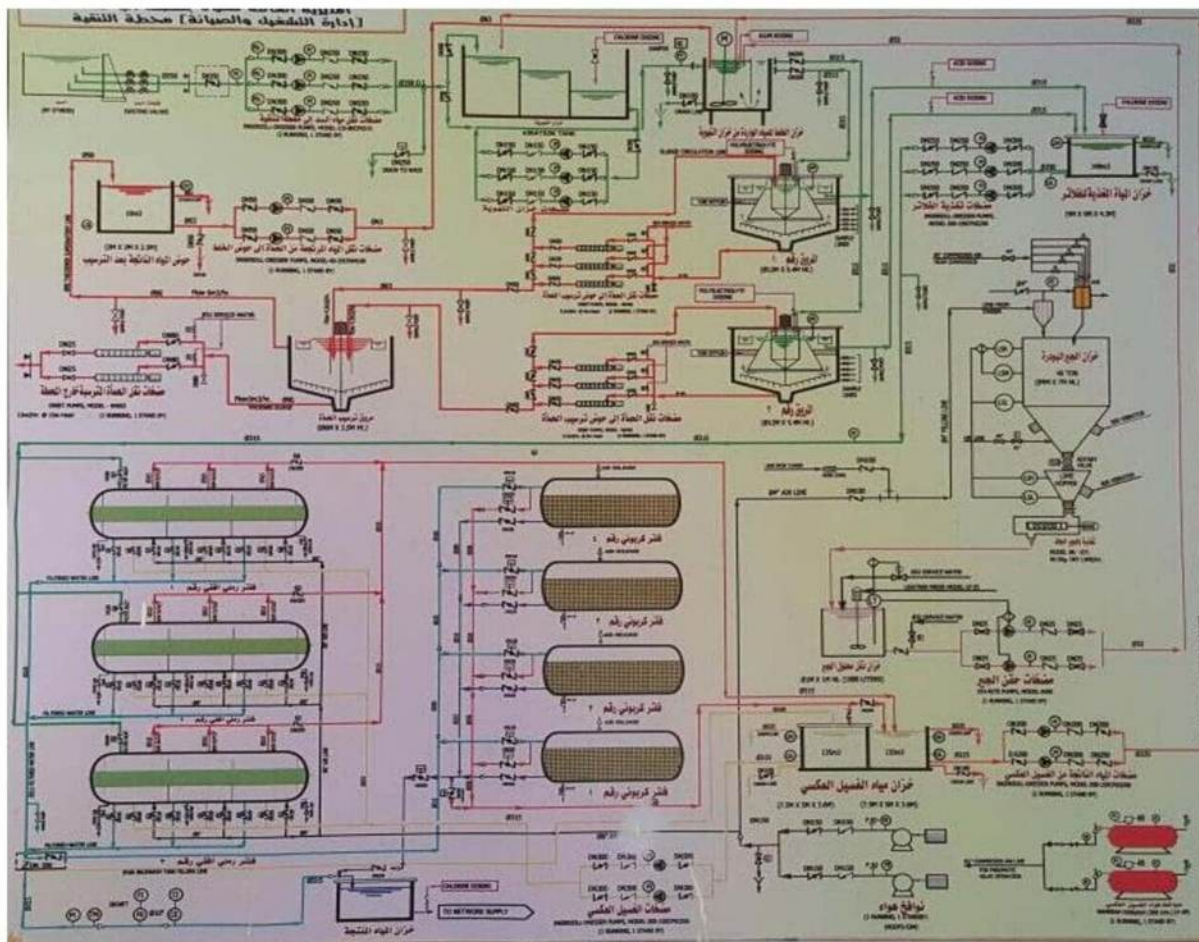
Al Baha Region Water Supply Master Plan – 2016

GPR & GPS



Ministry of Water & Environment, Saudi Arabia

Al Baha Region Water Supply Master Plan - 2016



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Al Baha Region Water Supply Master Plan - 2016

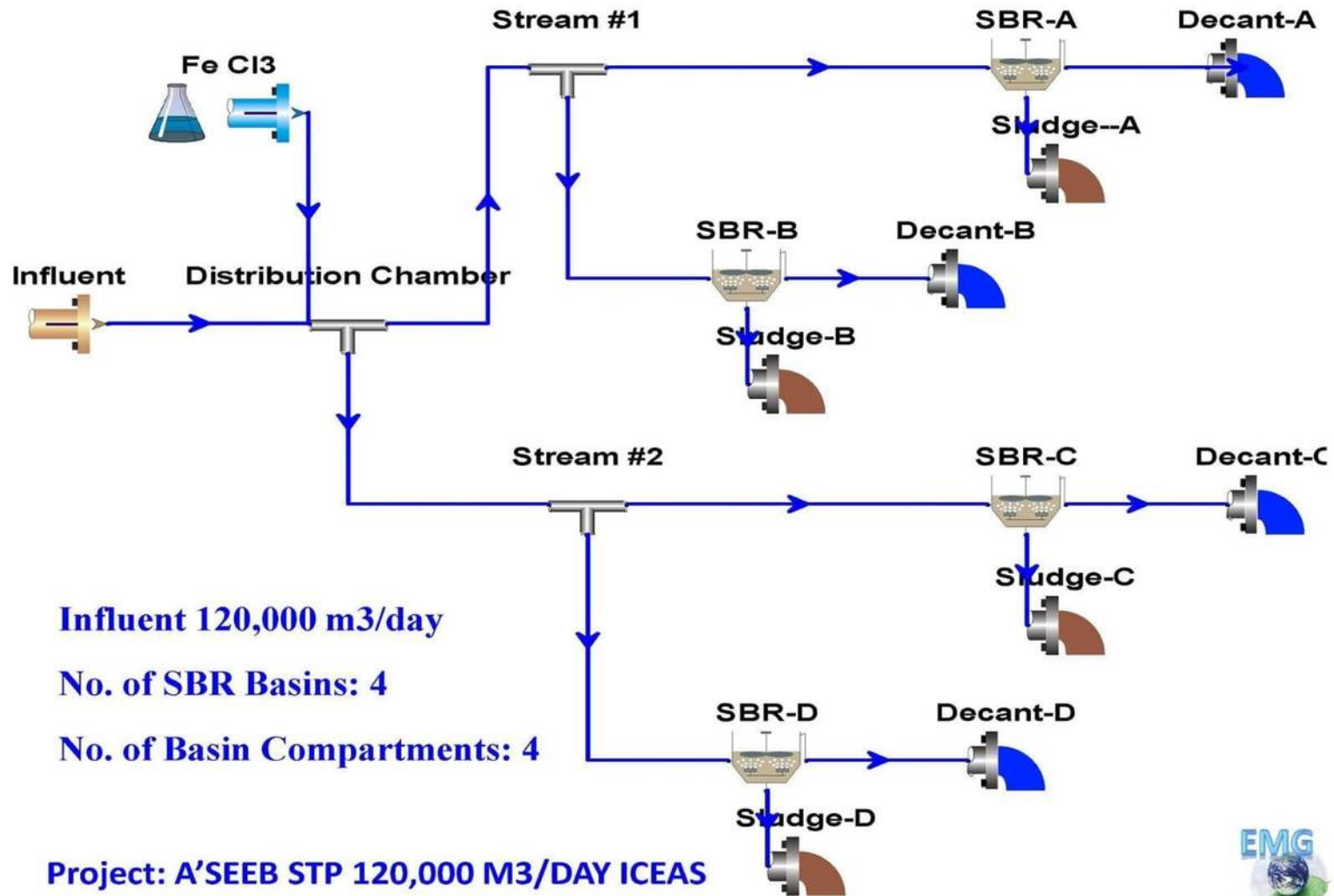


A'Seeb STP Phase-II shall include Design, Procurement, Installation, Testing and Commissioning of Electro-mechanical, ICA works and all other associated works that required to expand the STP capacity to 120,000 m³/day. The water treated using the SBR technology is further processed by an ultra-filtration membrane system.

BioWin Dynamic Simulation & Process Modelling for Analyze the behavior of treatment plant with multiple wastewater inputs. The Consultant shall conduct a design process from a conceptual design study through to preliminary design or a level suitable for EPC implementation, to determine the optimum design for A'Seeb Phase II extension.

The consultant conducted, Value Management / Engineering workshop for A'Seeb STP Phase II, and associated facilities.

The Conceptual design had been peer reviewed and approved by a DR. Knollman consultant German Consultant.





HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

Configuration information - BOD Influent units

Element name	Influent
Flow	120000
Total Carbonaceous BOD mgBOD/L	420.00
Volatile suspended solids mgVSS/L	325.00
Total suspended solids mgTSS/L	435.00
Total Kjeldahl Nitrogen mgN/L	58.00
Total P mgP/L	12.00
Nitrate N mgN/L	0
pH	7.30
Alkalinity mmol/L	6.00
Calcium mg/L	80.00
Magnesium mg/L	15.00
Dissolved oxygen mg/L	0

Configuration information for all Single-tank SBR units



Physical data

Element name	Volume [m3]	Area [m2]	Depth [m]	# of diffusers
SBR-A	2.175E+4	3955	5.50	14470
SBR-B	2.175E+4	3955	5.50	14470
SBR-C	2.175E+4	3955	5.50	14470
SBR-D	2.175E+4	3955	5.50	14470

Operating data Average

Element name	Average DO Setpoint [mg/L]
SBR-A	2.0
SBR-B	2.0
SBR-C	2.0
SBR-D	2.0

Element name	Average Temperature [deg. C]
SBR-A	20.0
SBR-B	20.0
SBR-C	20.0
SBR-D	20.0

Element name	$k1 \text{ in C} = k1(PC)^{0.25} + k2$	$k2 \text{ in C} = k1(PC)^{0.25} + k2$	$Y \text{ in } KLa = C \text{ Usg}^Y - \text{Usg in [m}^3/(\text{m}^2 \text{ d})]$	Area of diffuser	% covered by diffusers [%]
SBR-A	2.5656	0.0432	0.8200	0.0410	15.0000
SBR-B	2.5656	0.0432	0.8200	0.0410	15.0000
SBR-C	2.5656	0.0432	0.8200	0.0410	15.0000
SBR-D	2.5656	0.0432	0.8200	0.0410	15.0000

Element name	$\text{Alpha (surf) / Alpha F (diff) [-]}$	Beta [-]	Surface pressure [kPa]	Fractional effective saturation depth
SBR-A	0.50	0.95	101.325	0.325
SBR-B	0.50	0.95	101.325	0.325
SBR-C	0.50	0.95	101.325	0.325
SBR-D	0.50	0.95	101.325	0.325

Element name	Supply gas CO2 %	Supply gas O2 %	Off-gas CO2 %	Off-gas O2 %	Off-gas H2 %	Off-gas NH3 %	Off-gas CH4 %	Surface turbulence factor
SBR-A	0.035	20.95	2.0	18.8	0	0	0	2.0
SBR-B	0.035	20.95	2.0	18.8	0	0	0	2.0
SBR-C	0.035	20.95	2.0	18.8	0	0	0	2.0
SBR-D	0.035	20.95	2.0	18.8	0	0	0	2.0

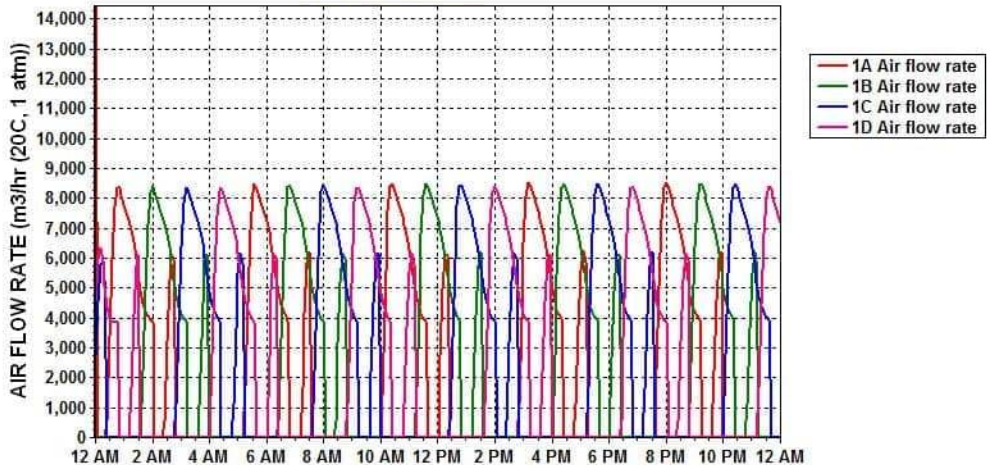


Influent Parameters	Value	Units	Notes
Parameters	Conc. (mg/L)	Mass rate (kg/d)	
Volatile suspended solids	325.00	39000.00	
Total suspended solids	436.11	52332.78	
Particulate COD	517.76	62131.61	
Filtered COD	330.50	39660.35	
Total COD	848.27	101791.96	
Soluble PO4-P	6.00	720.00	
Total P	12.00	1440.00	
Filtered TKN	46.17	5540.72	
Particulate TKN	11.83	1419.28	
Total Kjeldahl Nitrogen	58.00	6960.00	
Filtered Carbonaceous BOD	204.08	24489.24	
Total Carbonaceous BOD	420.00	50400.00	
Nitrite + Nitrate	0	0	
Total N	58.00	6960.00	
Total inorganic N	38.28	4593.60	
Alkalinity	6.00	720.00	mmol/L and kmol/d
pH	7.30		
Volatile fatty acids	20.36	2443.01	
ISS precipitate	0	0	
ISS cellular	1.11	132.78	
ISS Total	111.11	13332.78	
Ammonia N	38.28	4593.60	
Nitrate N	0	0	

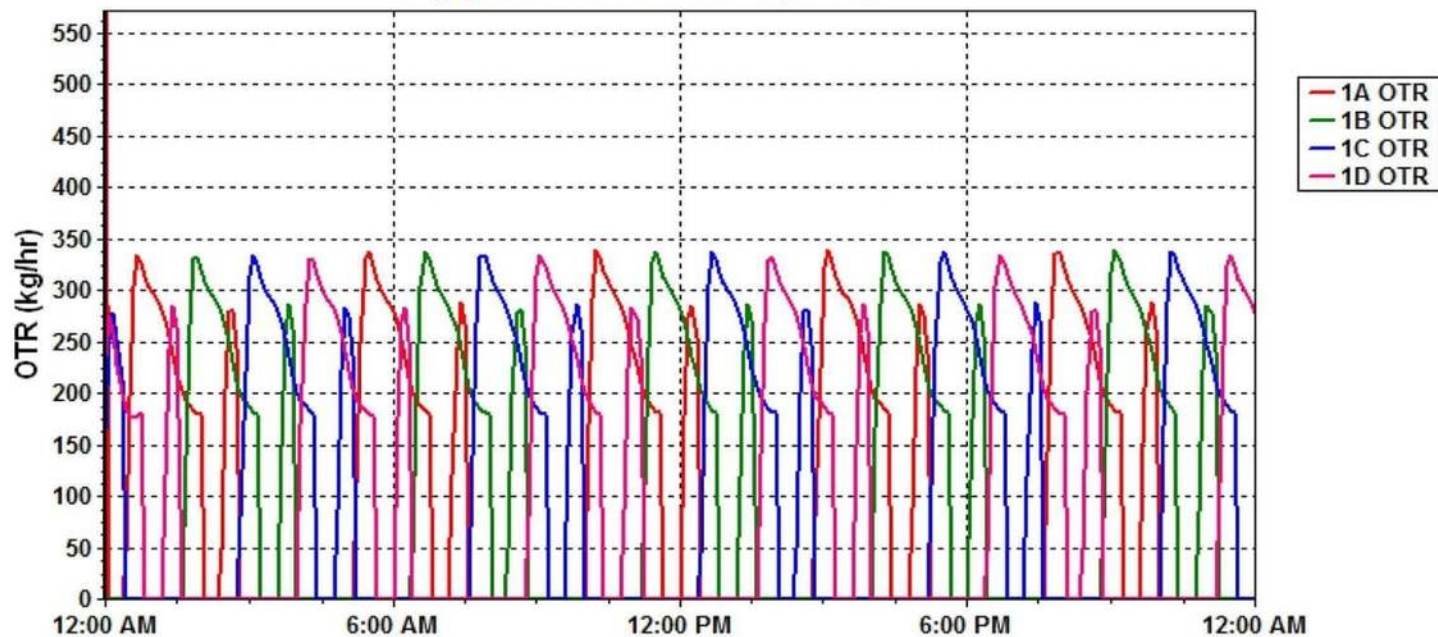
BiOWin ALBUM
INFLUENT



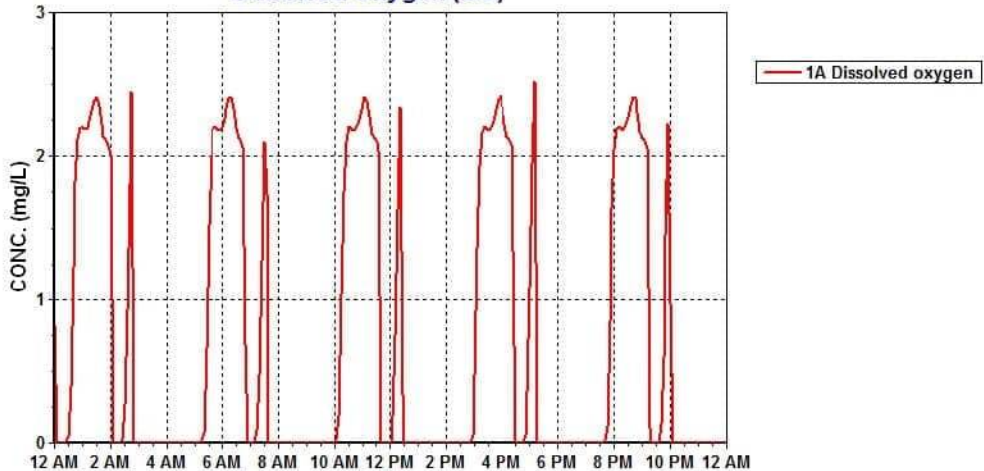
Air Flow Rate



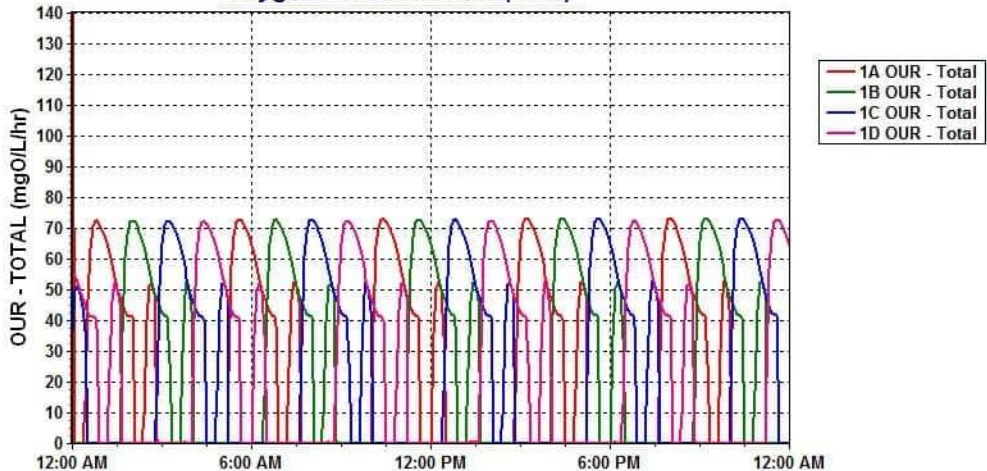
Oxygen Transfer Rate (OTR)



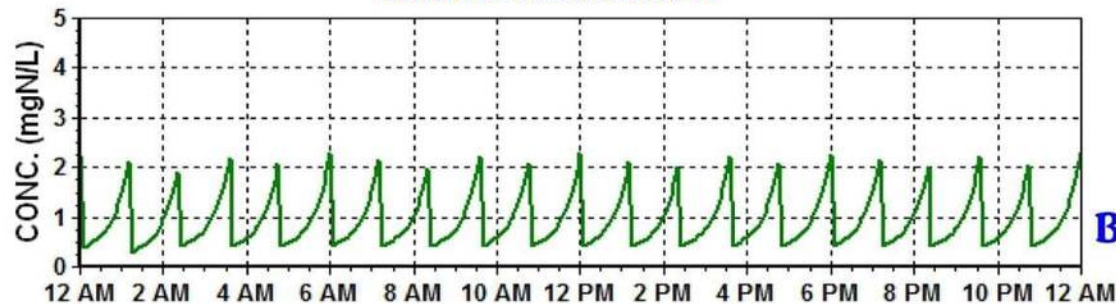
Dissolved Oxygen (DO)



Oxygen Utilization Rate (OUR)



Effluent Ammonia-N

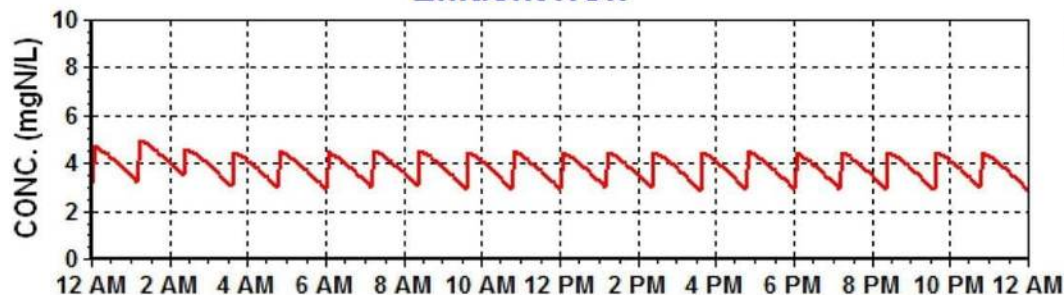


— Sec Effl Ammonia N



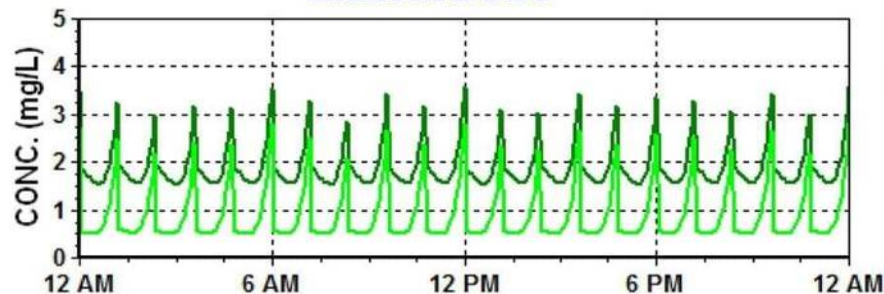
**BIO-WIN PROCESS
MODELLING**

Effluent NOx



— Sec Effl Nitrite + Nitrate

Effluent BOD5

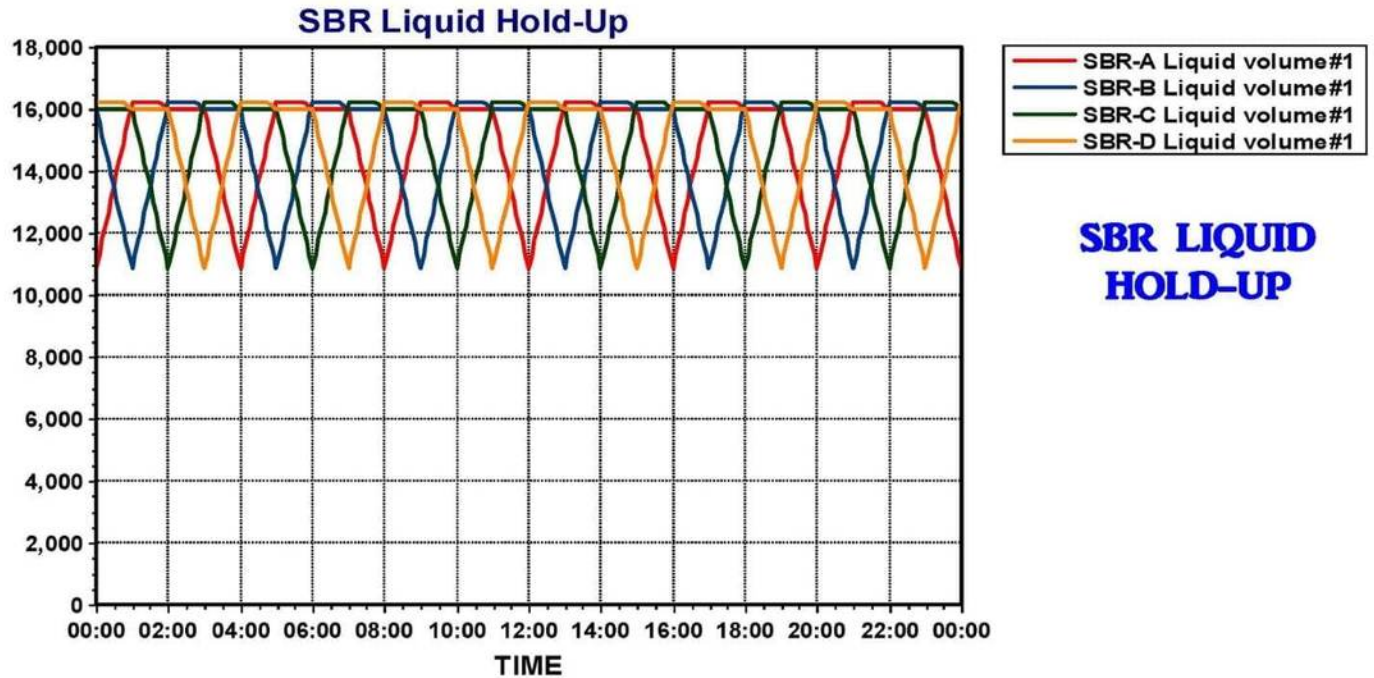


— Sec Effl Total Carbonaceous BOD
— Sec Effl Filtered Carbonaceous BOD



HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

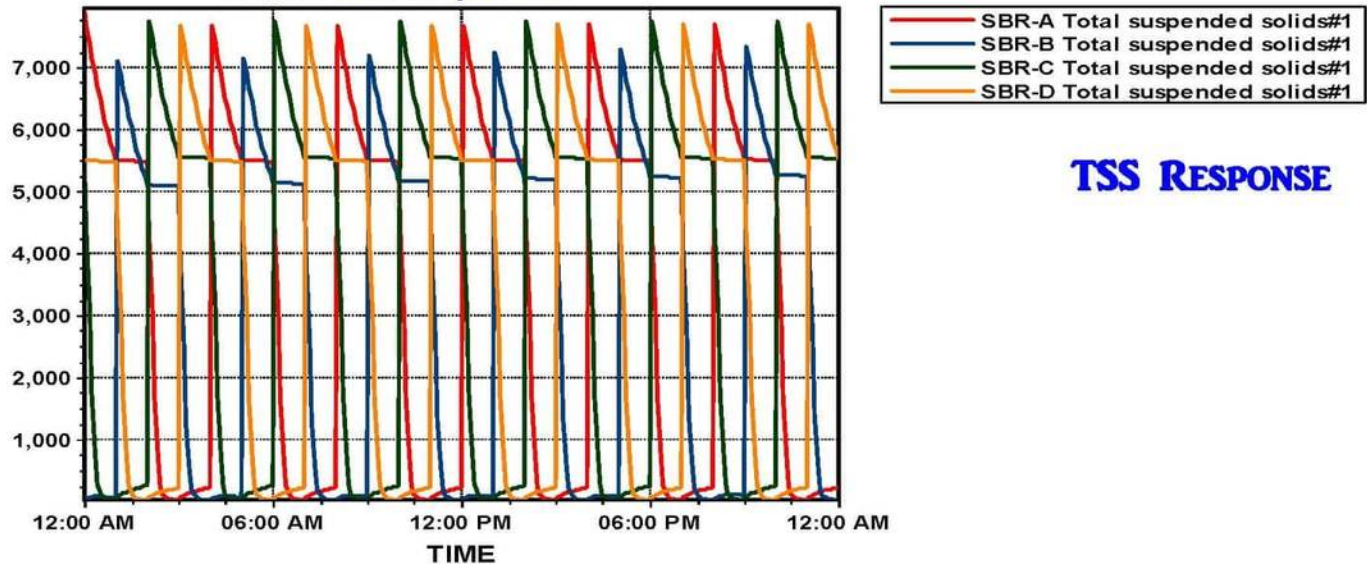




HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

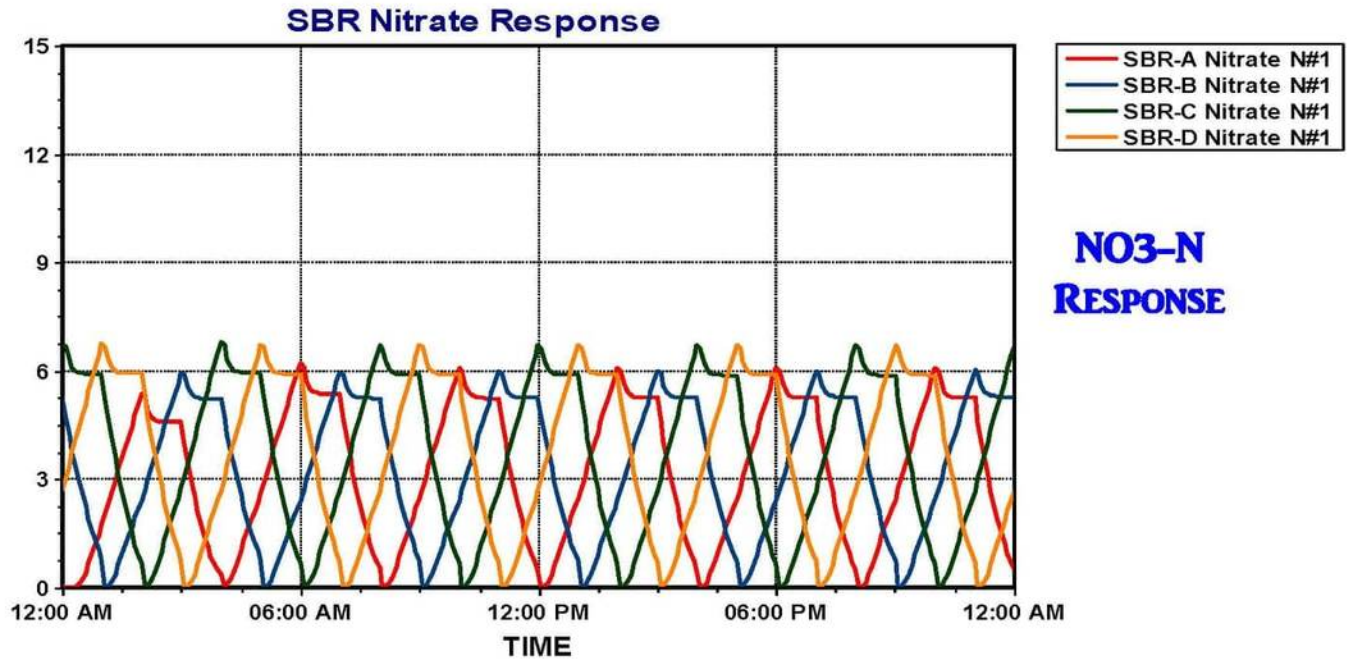
SBR TSS Response





HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

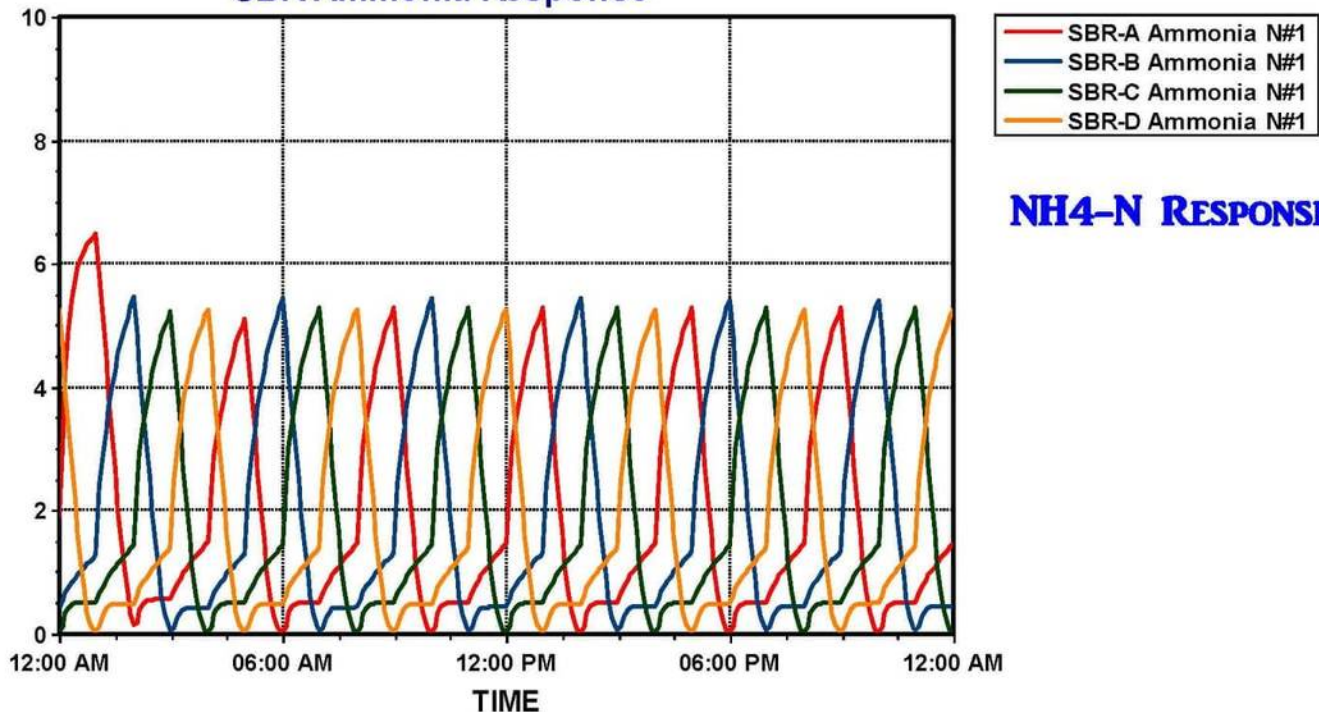




HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

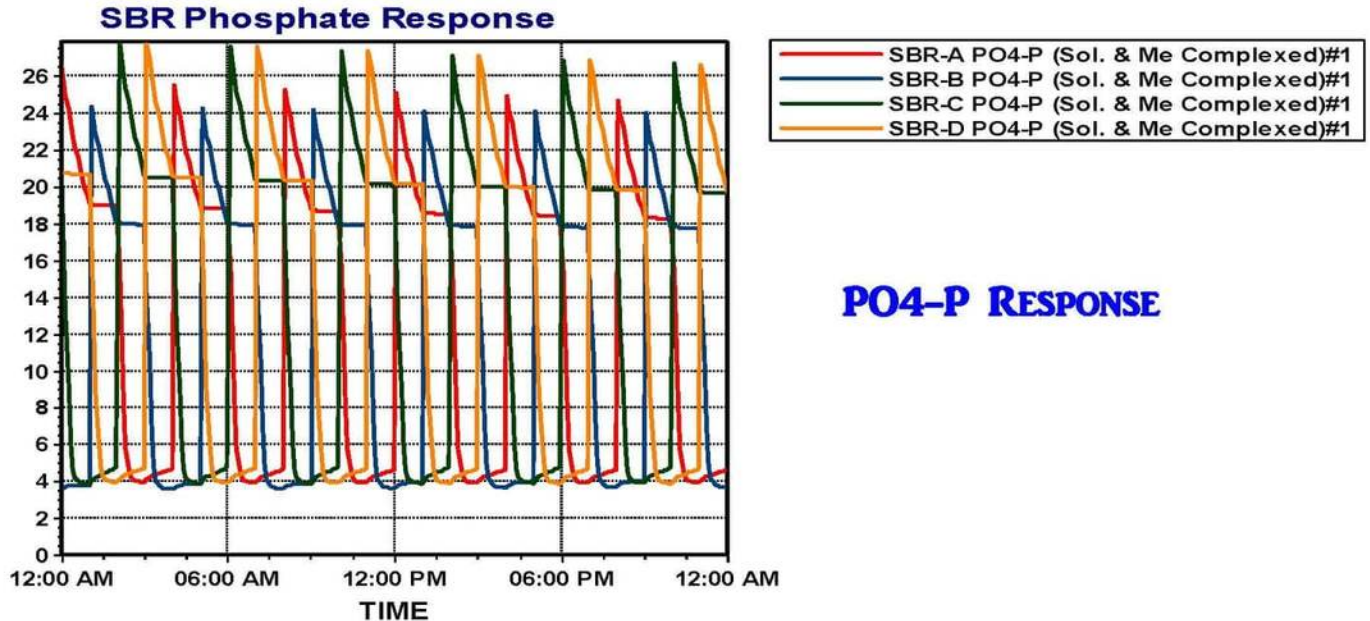
SBR Ammonia Response





HAYA WATER – Muscat - Oman (2014-2015)

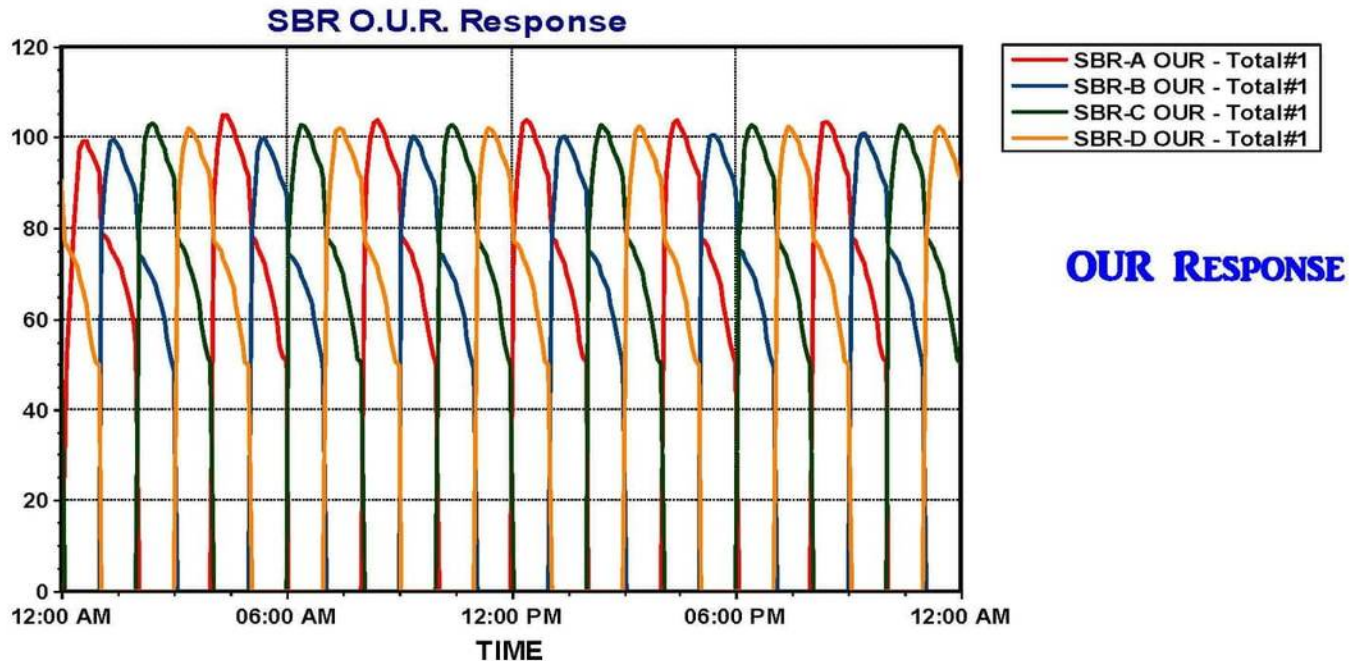
Project: A'SEEB STP 120,000 M3/DAY ICEAS





HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

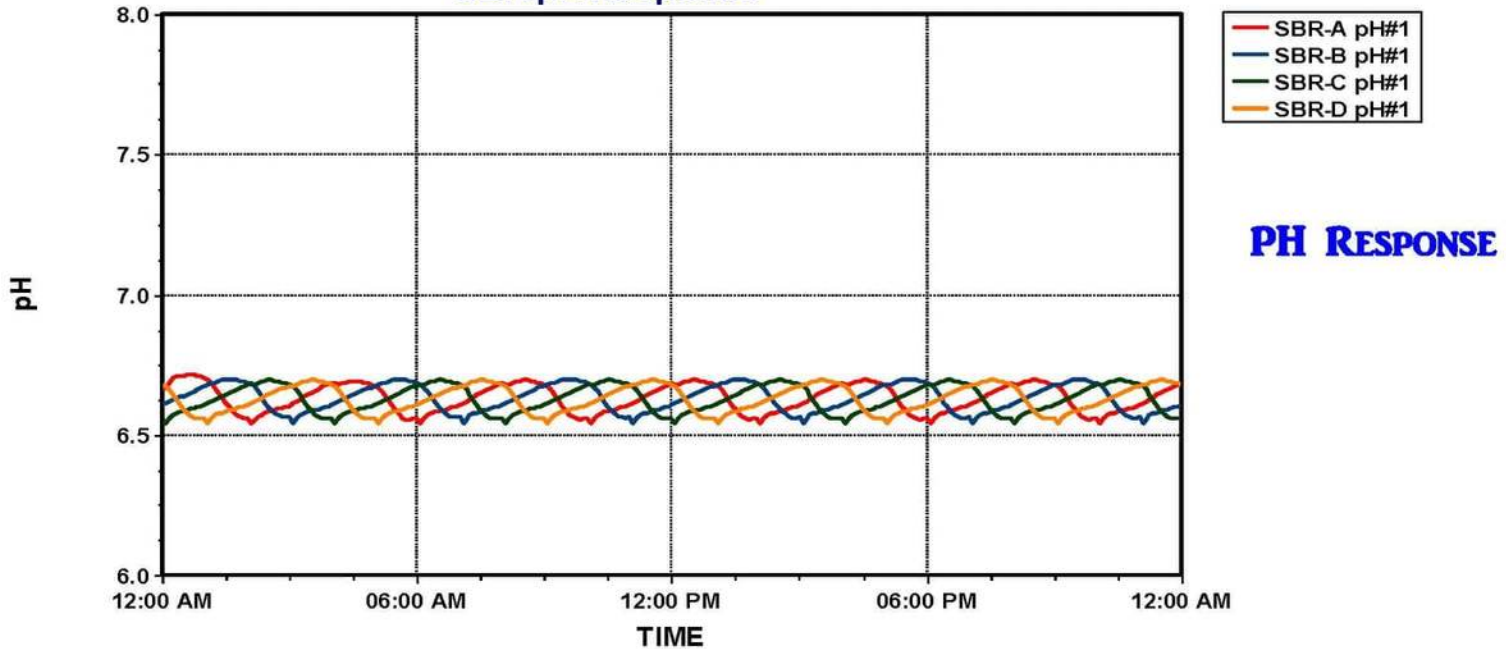




HAYA WATER – Muscat - Oman (2014-2015)

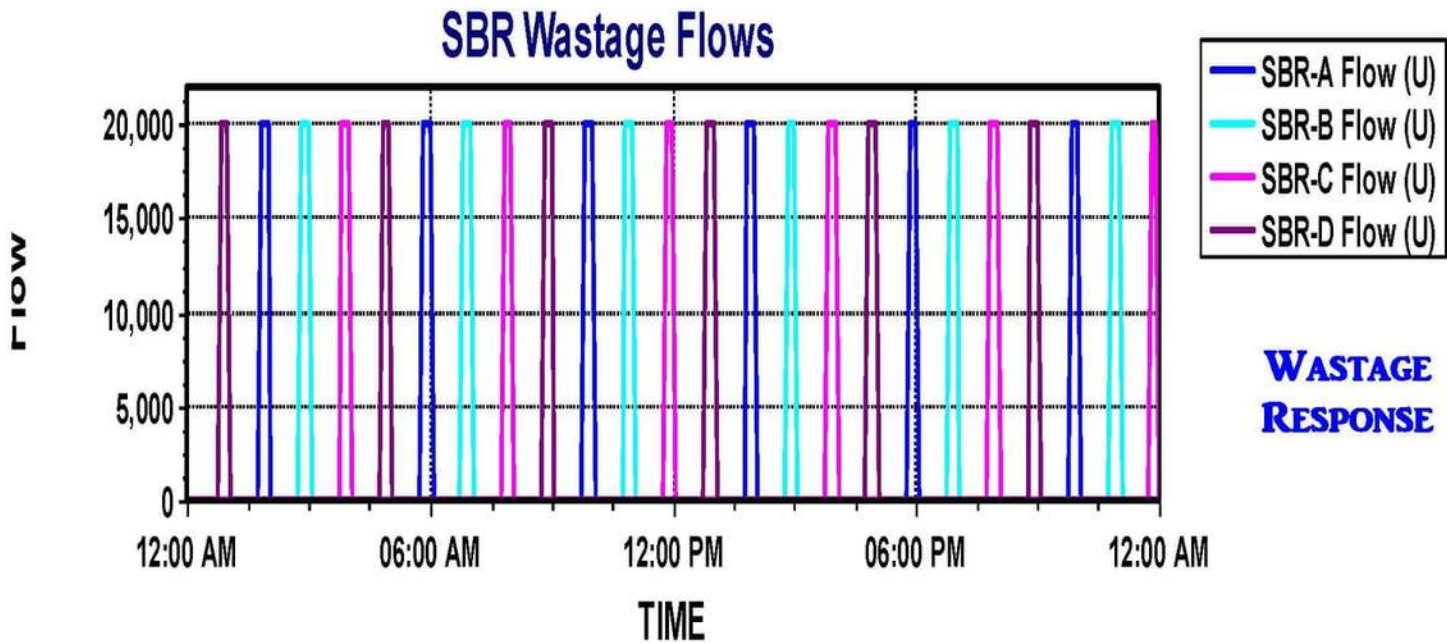
Project: A'SEEB STP 120,000 M3/DAY ICEAS

SBR pH Response





HAYA WATER – Muscat - Oman (2014-2015)
Project: A'SEEB STP 120,000 M3/DAY ICEAS

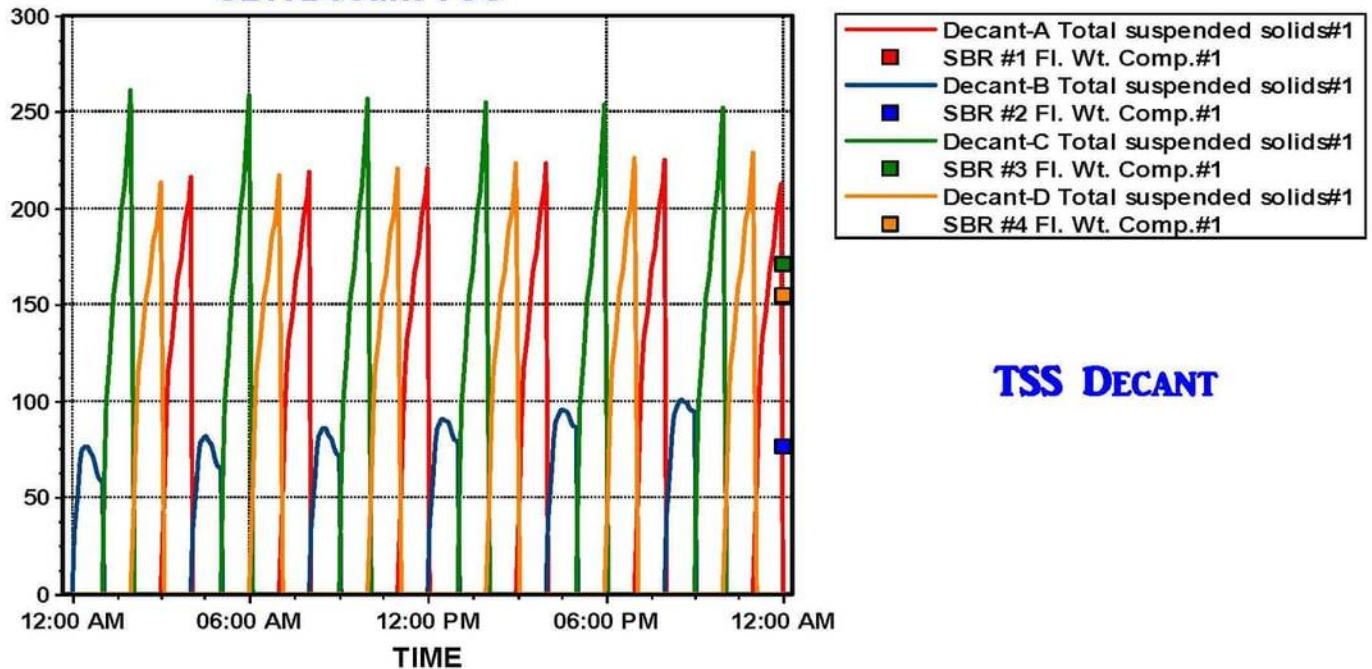




HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

SBR Decant TSS

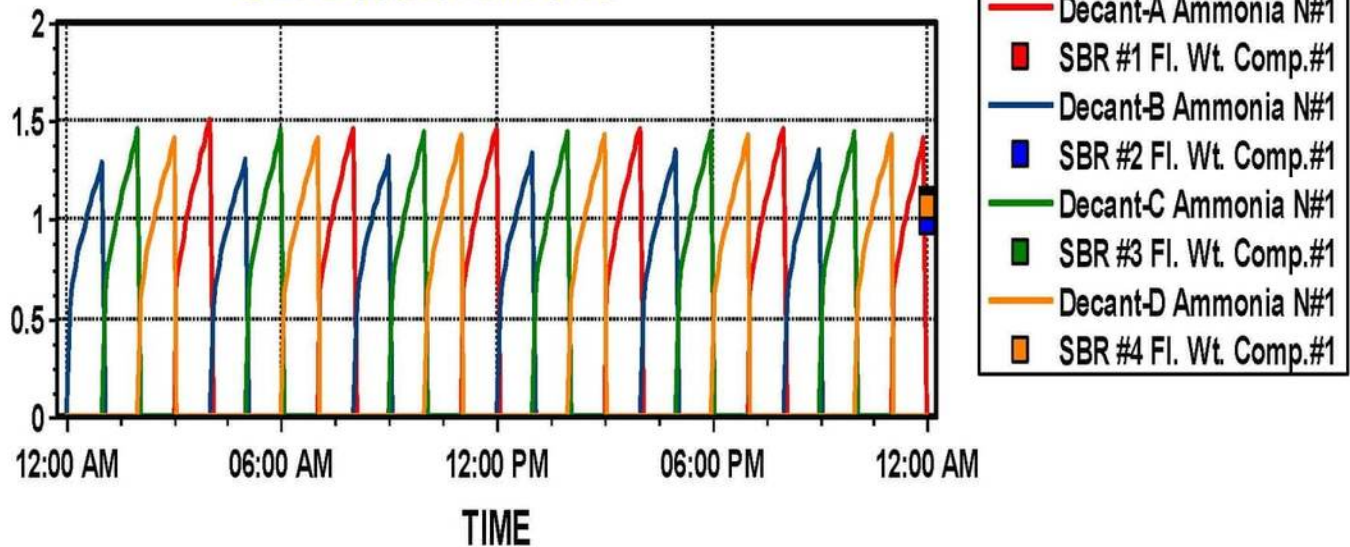




HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

SBR Decant Ammonia



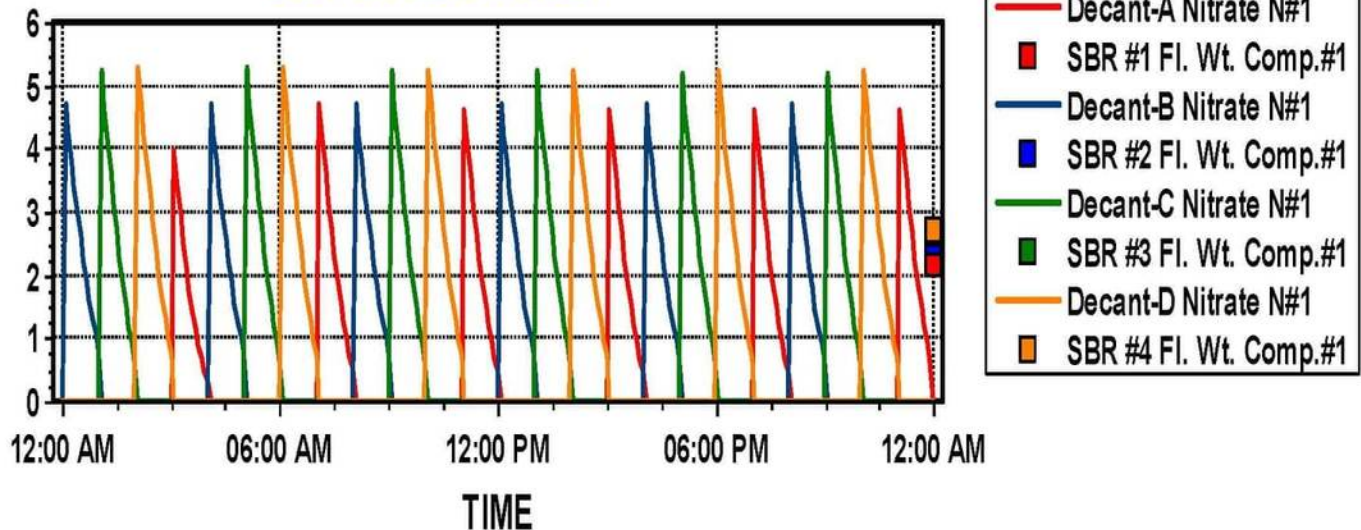
NH₄-N DECANT



HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

SBR Decant Nitrate

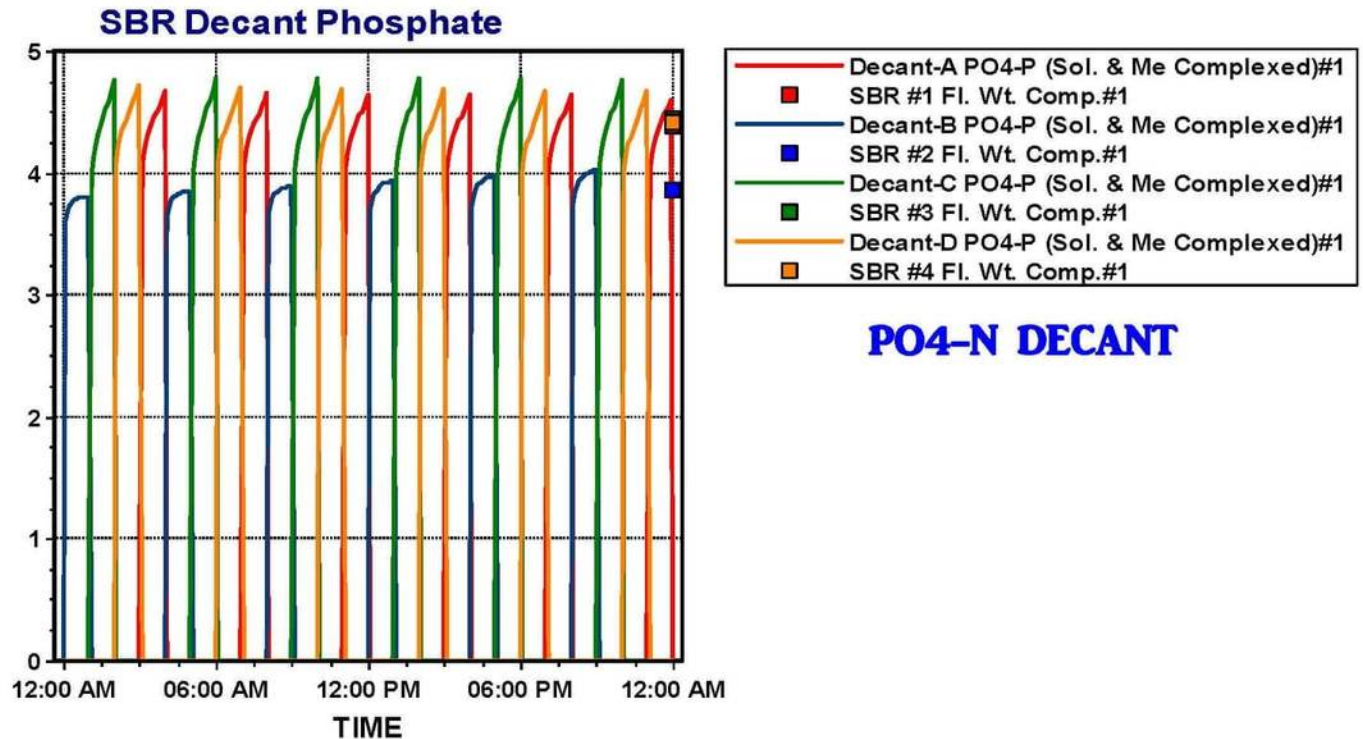


NO3-N DECANT



HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

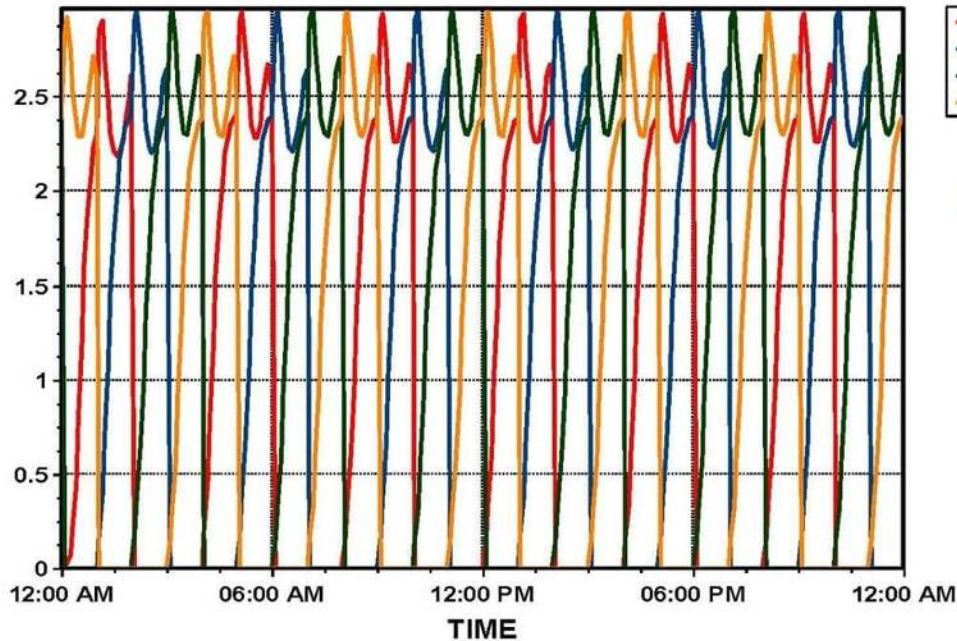




HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS

SBR D.O. Concentrations

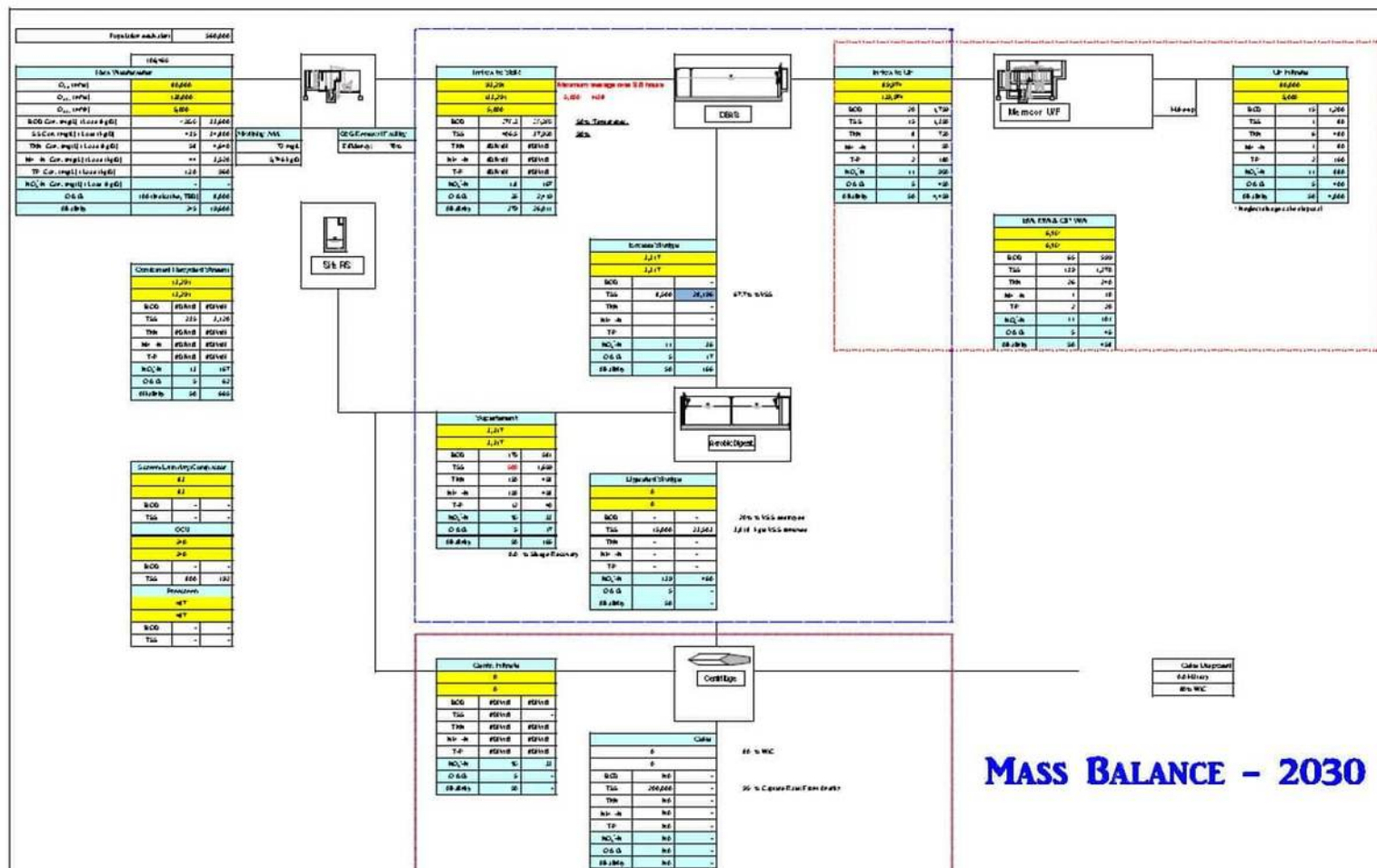


**DO
CONCENTRATION**



HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS



HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS



HAYA WATER – Muscat - Oman (2014-2015)

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HAYA WATER – Muscat - Oman (2014-2015)

Project: A'SEEB STP 120,000 M3/DAY ICEAS



HAYA WATER – Muscat - Oman (2014-2015)
Project: A'SEEB STP 120,000 M3/DAY ICEAS

OMAN – SALALAH WASTEWATER TREATMENT PLANT (2013)

The Salalah Wastewater Treatment and Reclamation Plant was designed and commissioned for an average flow (30,000 m³/day) operating with a single stage activated sludge suspended growth combined with nitrification / denitrification process posted by advanced tertiary treatment process stage in order to produce a high quality final treated effluent with an overall removal efficiency (98%) for BOD₅, TSS, and TN.

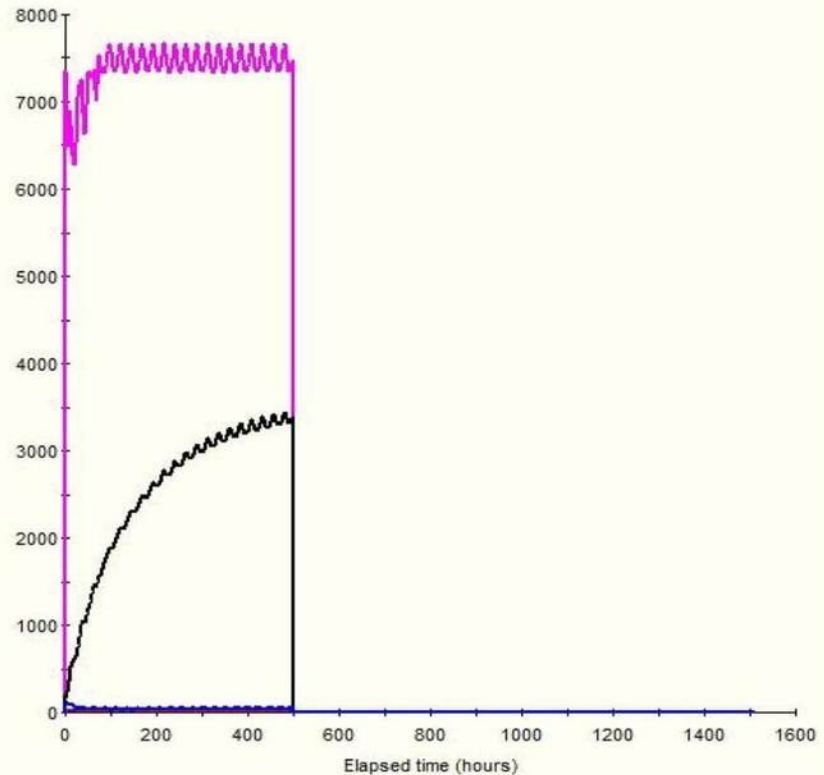
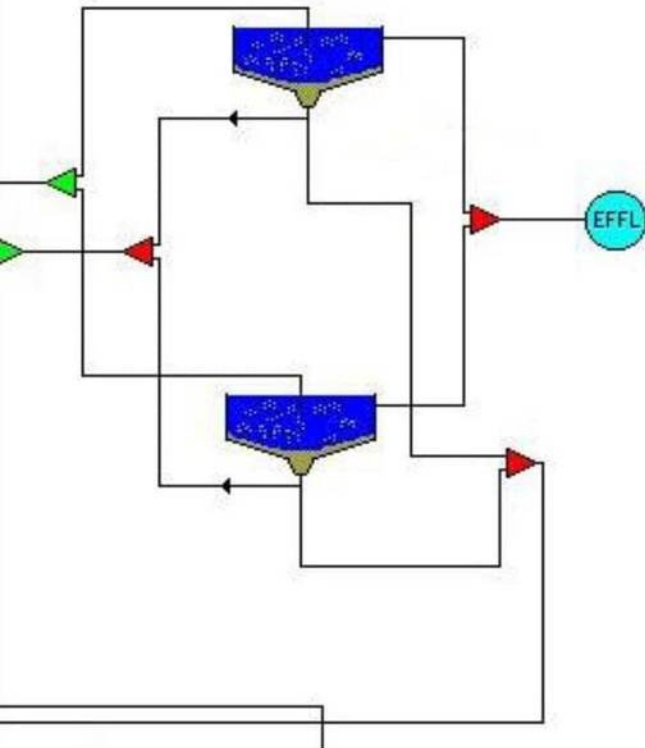
The Final Treated Effluent is supplied to several customers to be reused for Irrigation, landscaping, ground water aquifer recharging, cooling, and industrial usages. The Final Treated Effluent Quality must be produced in compliance with WHO treated wastewater reuse guidelines and Oman Regulations for wastewater re-use and discharge as per Royal Decree 115/2004

Population Equivalent (P.E)	150,000
Average Daily Design Flow (m ³ /day)	30,000
Average Hourly Design Flow (m ³ /hr)	1,250
Peak Daily Factor (1.25 ~ 1.85)	1.83
Peak Daily Flow (m ³ /day)	55,000

OMAN – SALALAH WASTEWATER TREATMENT PLANT (2013)

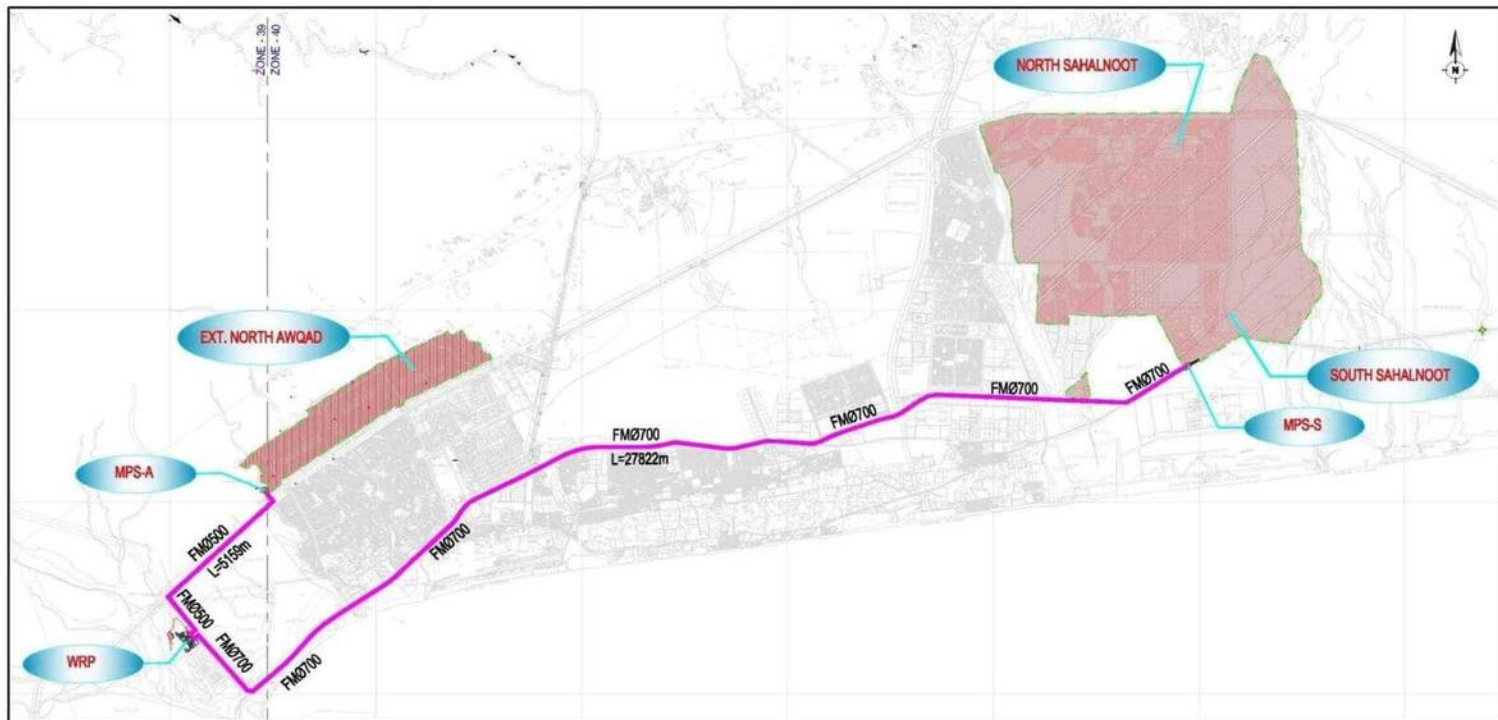


OMAN – SALALAH WASTEWATER TREATMENT PLANT (2013)



SLUDGE AGE & SLUDGE STABILIZATION SIMULATION MODELLING

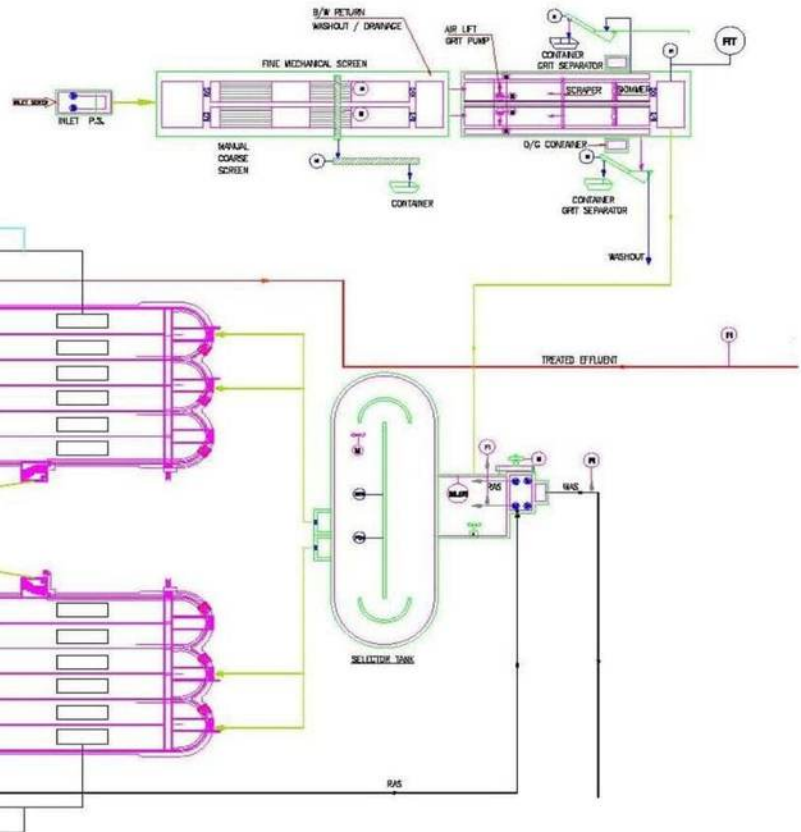
OMAN – SALALAH WASTEWATER TREATMENT PLANT (2013)



FLOW SERVED AREA

OMAN – SALALAH WASTEWATER TREATMENT PLANT (2013)

WWTP GENERAL LAYOUT



Salalah City Overall Sanitary Drainage Project Scheme

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Aden City is the second largest city of Yemen, but since it is the main seaport of the country, it is also Yemen's economic capital. The city is located at the southern tip of the Arabian Peninsula some 170 km east of the straight of Bab El Mandab. The Ministry of Planning and International Cooperation on behalf of the Government of the Republic of Yemen has signed an agreement with the Arab Fund for Economic and Social Development (AFESD) to contribute to the financing of the Aden Water and Sanitation Utilities Development Project (the Project). This project is a part of the large-scale development investment program for the water and wastewater services in Aden Governorate. Greater Aden total average daily water demand 3,500 l/s and a total population served 1.5 Million.

Tasks:

Water Distribution EPS Hydraulic Modelling using an advanced computer software (WaterCAD Bentley), which allows both instantaneous (steady-state) and dynamic (extended period) network simulation for 24-hour period in order to analyze the piping system's response to varying supply and demand schedules. Design process from a conceptual design study to detailed design.

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

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Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

- EIA Environmental Impact Assessment study had prepared for the construction works of the water and wastewater components of Aden Water and Sanitation Utilities Development Project. The aim of Environmental Impact Assessment is to enable the approving authority, the public, local and central government and the developer to properly consider the potential environmental consequences of a proposal, and to make recommendations to reduce the environmental consequences if necessary. It is important to provide sufficient information for the approving authority to make a decision on -whether to approve a proposal and if so, under what conditions. The EIA provides the basis for sound ongoing environmental management. In addition, Institutional and Social Study had prepared to assess the institutional capacity of the Local Water and Sanitation Authority in Aden City, and social analysis and come-up with conclusions and recommendation in this regard.

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Aden Water and Sanitation Utilities Development Project

Table (1.7): Water Demand for Year 2025

District	Population				% Population Served	** Per Capita Consumption l/c/d (Served)	Total Domestic m ³ /d	% for Non Domestic	Total Water Consumption m ³ /d	Production Based on 20 %
	Current Built Areas	New Development	New Expansion	Total						
Khormaksar	72,304			72,304	100	107	7,707.4	100.8	15,474.7	19,343.4
Khormaksar		157,000		157,000	100	100	15,700.0	30.0	20,410.0	25,512.5
Crater	99,127			99,127	100	89	8,855.8	26.2	11,179.6	13,974.4
Ma'alla	61,594			61,594	100	81	5,002.5	36.8	6,843.0	8,553.7
Tawahi	85,091			85,091	100	81	6,910.8	36.8	9,451.9	11,814.8
Sheikh Othman	150,946			150,946	100	89	13,485.2	27.4	17,184.0	21,480.0
		97,500		97,500	100	100	9,750.0	30.4	12,712.2	15,890.3
Dar Sa'ad	119,728			119,728	100	76	9,116.1	30.4	11,885.7	14,857.1
		174,250		174,250	100	100	17,425.0	27.8	22,270.7	27,838.4
			61,187	61,187	100	100	6,118.7	102.6	12,397.6	15,497.0
Mansoura	170,083			170,083	100	96	16,276.8	27.8	20,803.2	26,004.0
			65,963	65,963	100	110	7,255.9	102.6	14,701.8	18,377.3
Buraiqah	96,291			96,291	100	102	9,775.5	102.6	19,806.9	24,758.6
Buraiqah			88,937	88,937	100	100	8,893.7	30.0	11,561.8	14,452.2
Green City*	N/A	N/A	N/A						9,263.0	11,578.8
Total	855,166	428,750	216,087	1,500,003			142,273		215,946	269,933

* Green City is an integrated compound outside Aden residential boundary to be served by the project

** Per Capita Average Daily Water Consumption have been revised for current built areas based on actual district pattern consumption. For new development and expansion areas (100 l/c/d).

Total Water Production / Year = 98.525 MCM/yr

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Aden Water and Sanitation Utilities Development Project

Table (1.12): Wastewater Production for Year 2015

District	Population (Capita) / Area (ha)								% Water Served	Wastewater Served Existing	Wastewater Served Future	Per Capita Water Consumption l/c/d	
	Current Built		New Development		New Expansion		Total						
	Population	Area	Population	Area	Population	Area	Population	Area					
Khormaksar	62,302	948	45,458	1,718			62,302	948	90	75		105	
Khormaksar Crater	89,739	283					45,458	1,718	90		75	90	
Ma'alla	55,761	230					89,739	283	90	95		88	
Tawahi	77,032	306					55,761	230	90	90		80	
Sheikh Othman	133,313	568	26,956	377			77,032	306	90	90		80	
Sheikh Othman							133,313	568	90	80		88	
Dar Sa'ad	105,742	852					26,956	377	90		80	90	
Dar Sa'ad							70,785	990	90	70		75	
Dar Sa'ad			70,785	990			70,785	990	90		70	90	
Mansoura	150,214	892					2,400	24	2,400	24	90	70	90
Mansoura									150,214	892	90	80	94
Buraiqah							22,400	224	22,400	224	90	80	90
Buraiqah	82,971	978					82,971	978	90	70		100	
Green City*							29,200	292	29,200	292	90		70
Total	757,074	5,057	143,199	3,085	54,000	540	954,273	8,682					

*outside Aden residential boundary to be served by the project

Yemen - Ministry of Water & Environment Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



Yemen - Ministry of Water & Environment Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



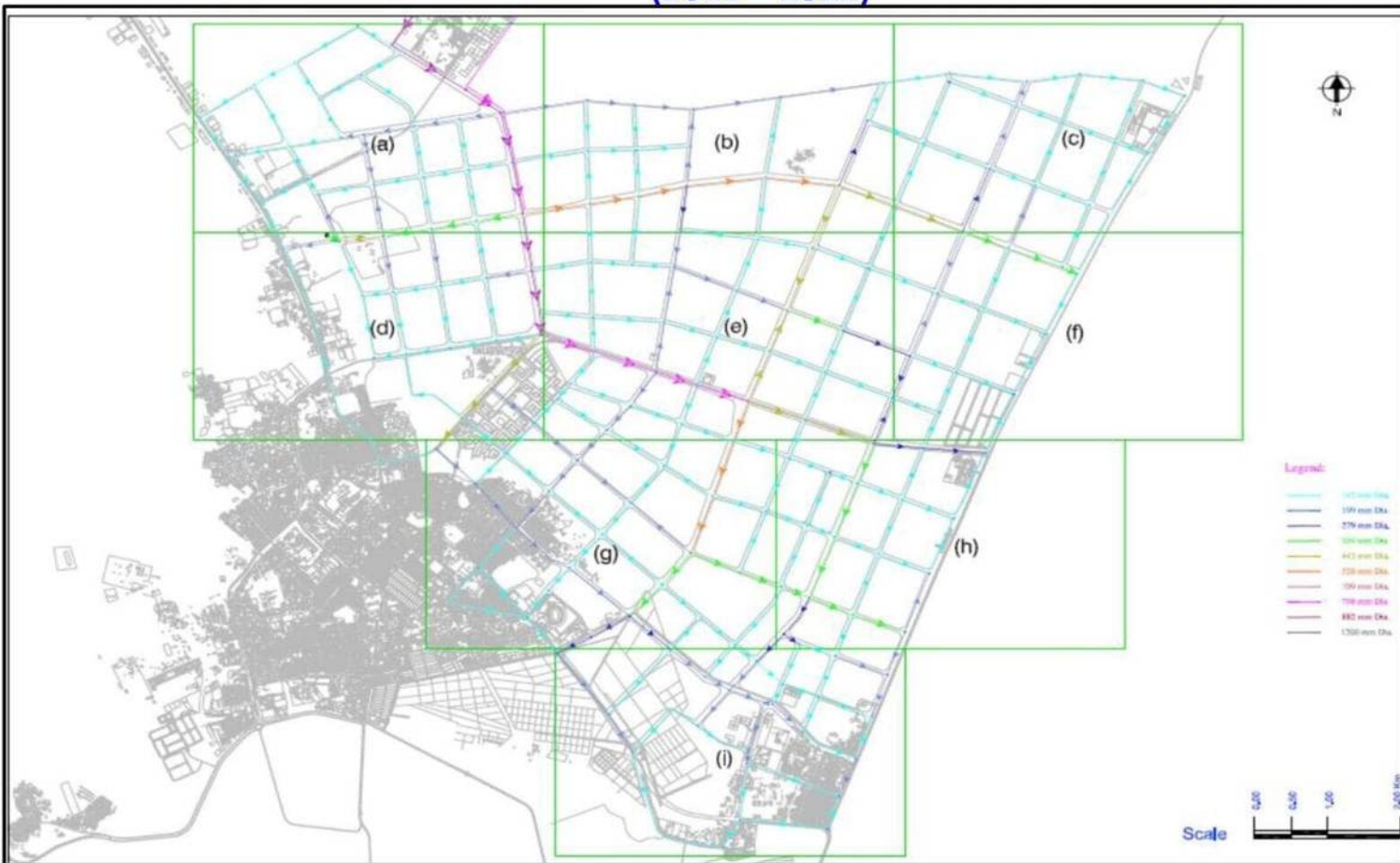
Yemen - Ministry of Water & Environment Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)





Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



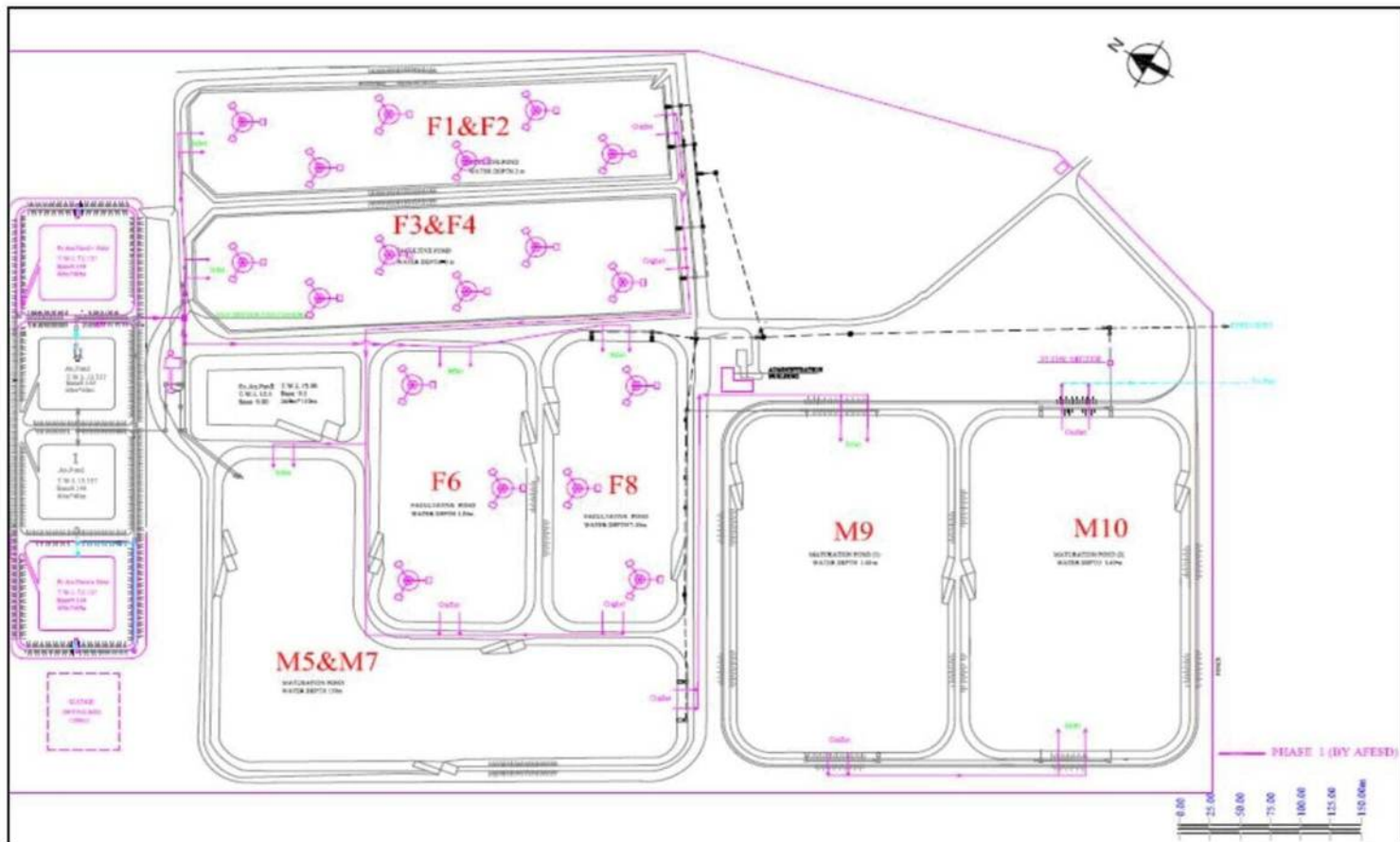
Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



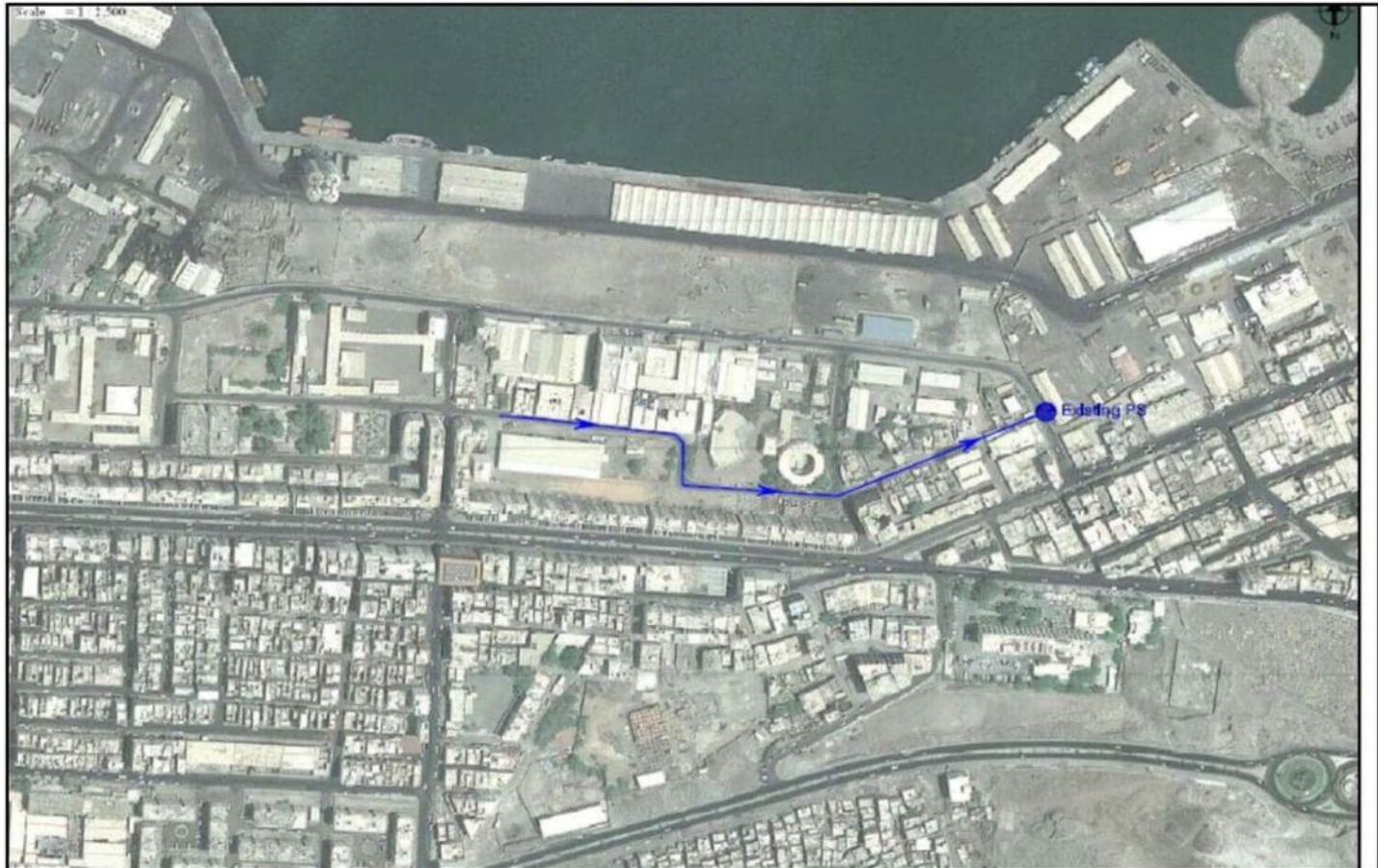
Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



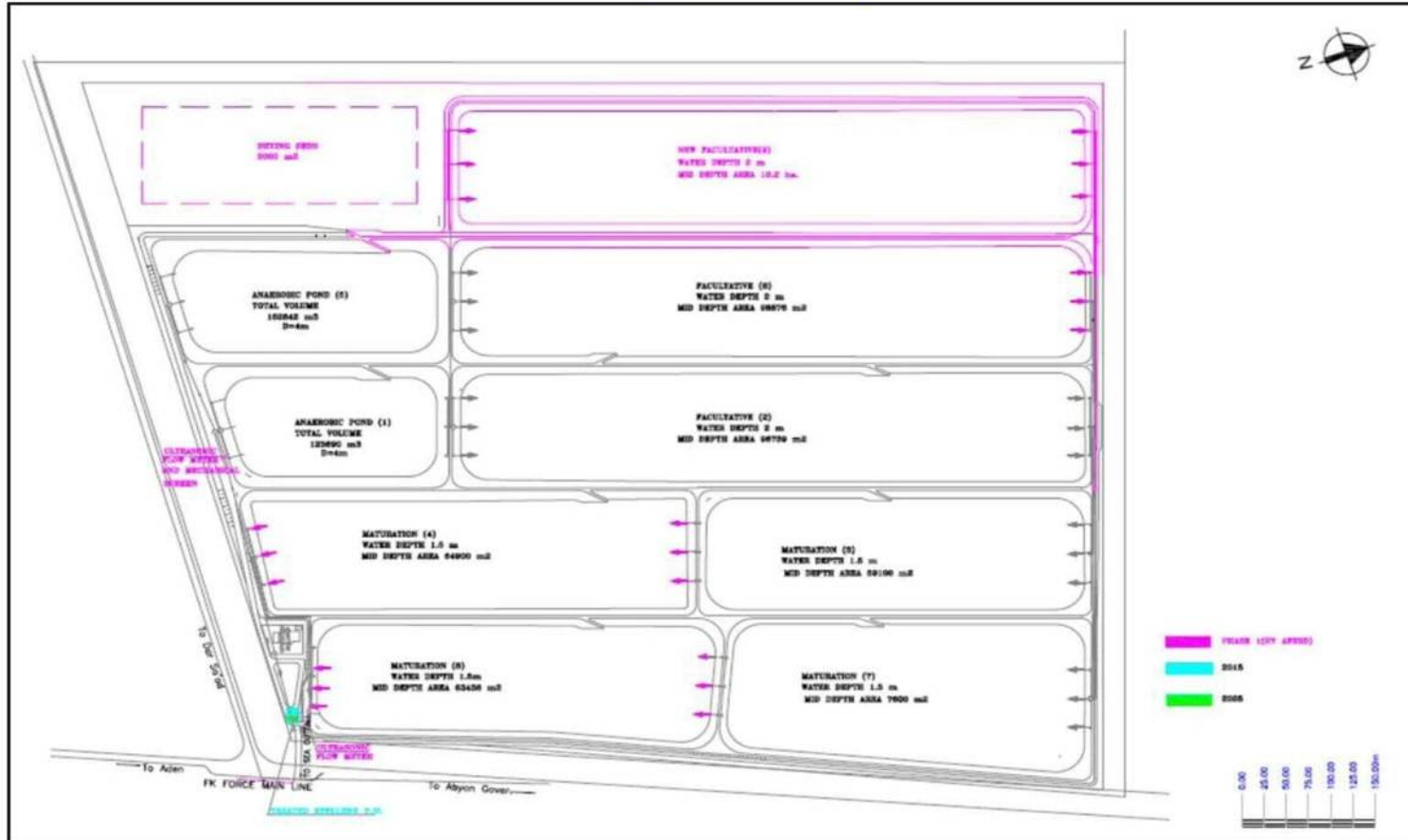
Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



Yemen - Ministry of Water & Environment

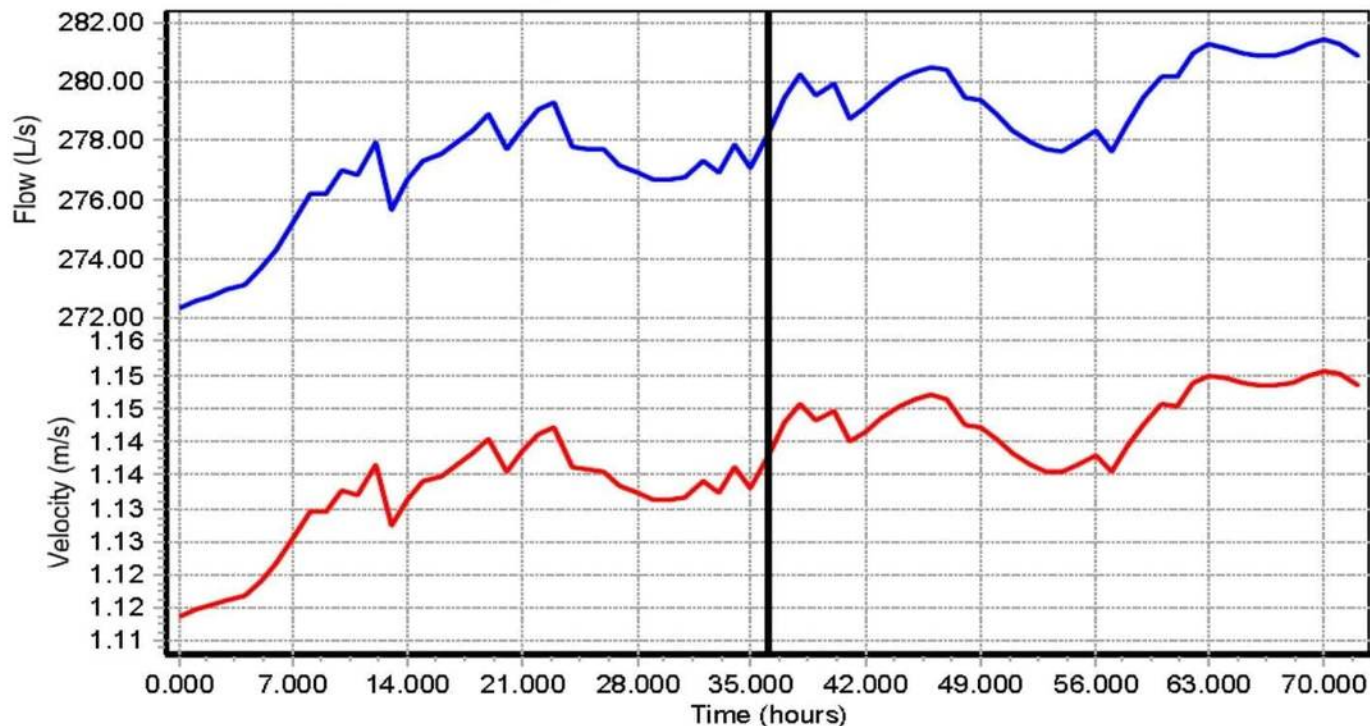
Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)



Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Pipe line from Slaughter House station to Cathedral Hill tank

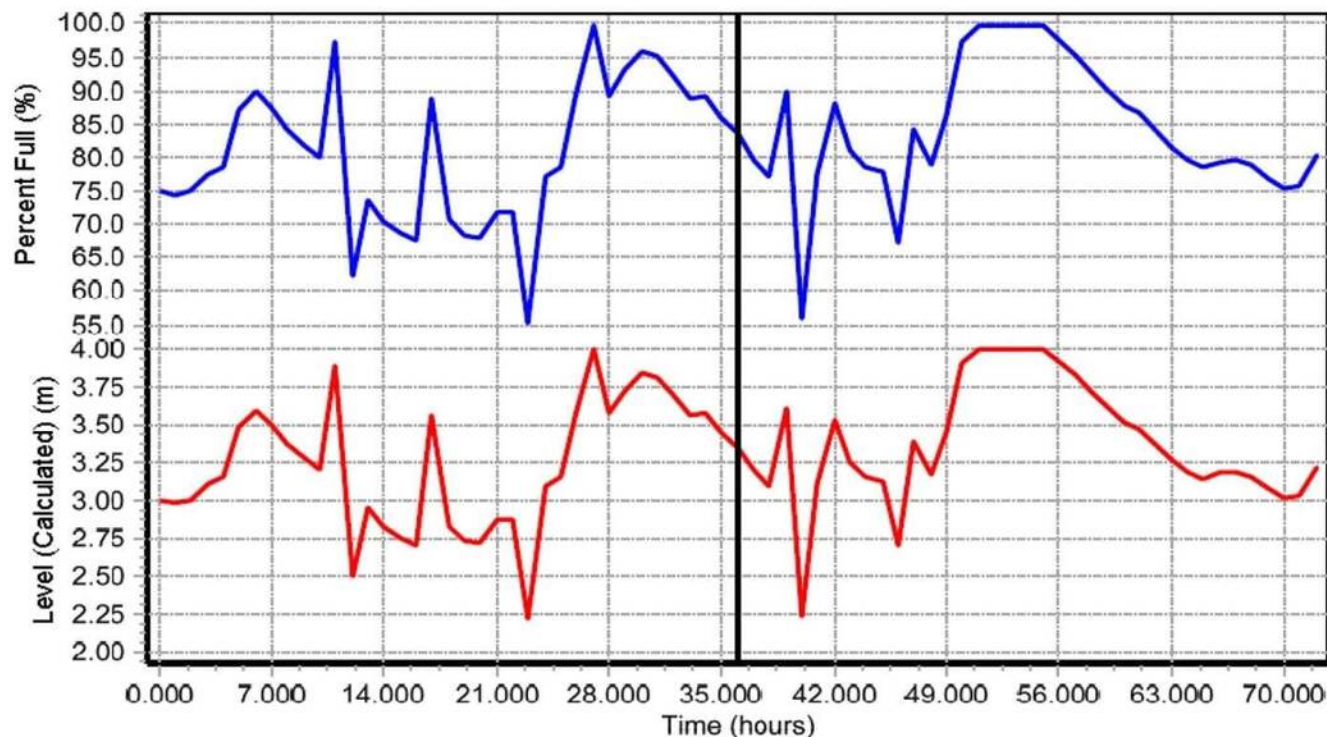


— P-196 - 2025 - Flow — P-196 - 2025 - Velocity

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Bir Ahmed reservoir



— Bir Ahmed (1) - 2025 - Percent Full

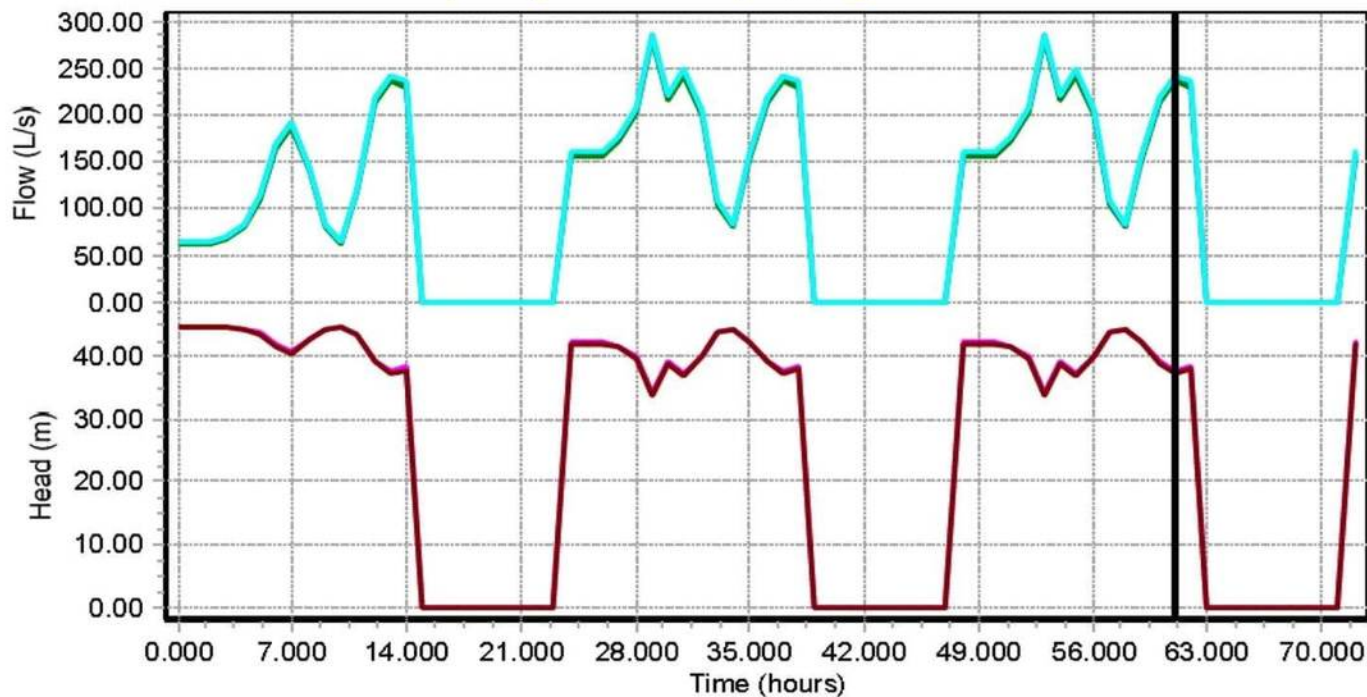
— Bir Ahmed (1) - 2025 - Level (Calculated)

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program

(2011 – 2012)

Operating Curves of Pumps 1,2,3 @2025

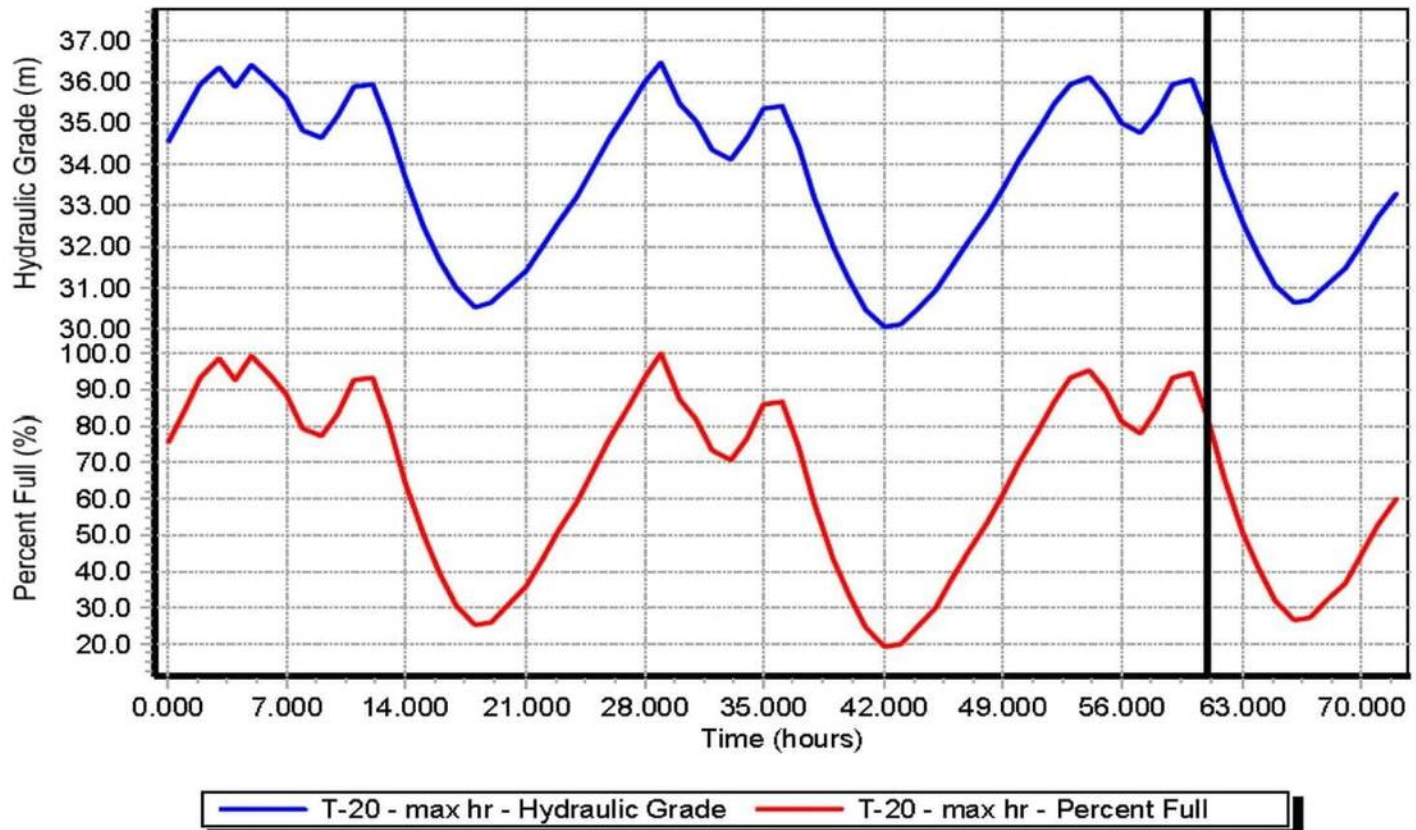


— PMP-2 - max hr - Flow (Total)	— PMP-2 - max hr - Pump Head
— PMP-3 - max hr - Flow (Total)	— PMP-3 - max hr - Pump Head
— PMP-1 - max hr - Flow (Total)	— PMP-1 - max hr - Pump Head

Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

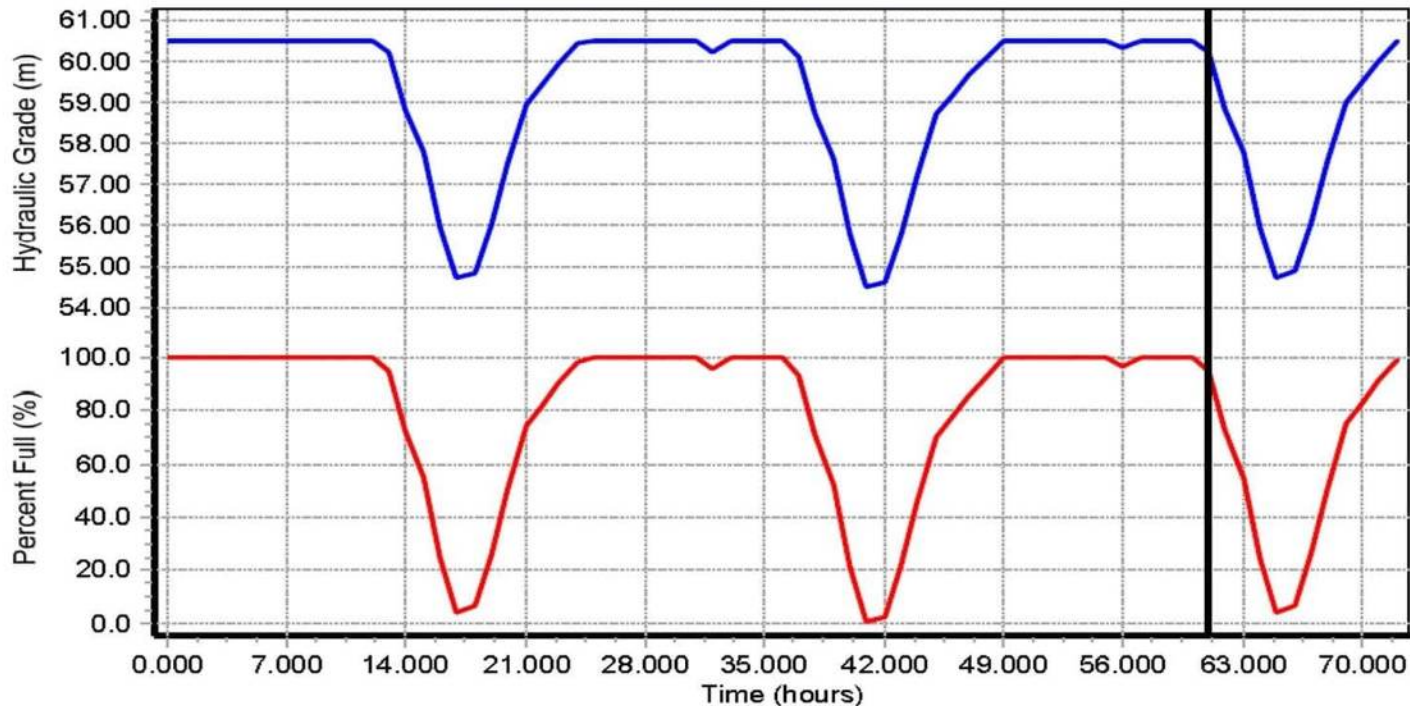
Reservoir Fluctuation @ 2025



Yemen - Ministry of Water & Environment

Greater Aden City Water & Sanitation Utilities Development Program (2011 – 2012)

Elevated Tank Fluctuation 2025



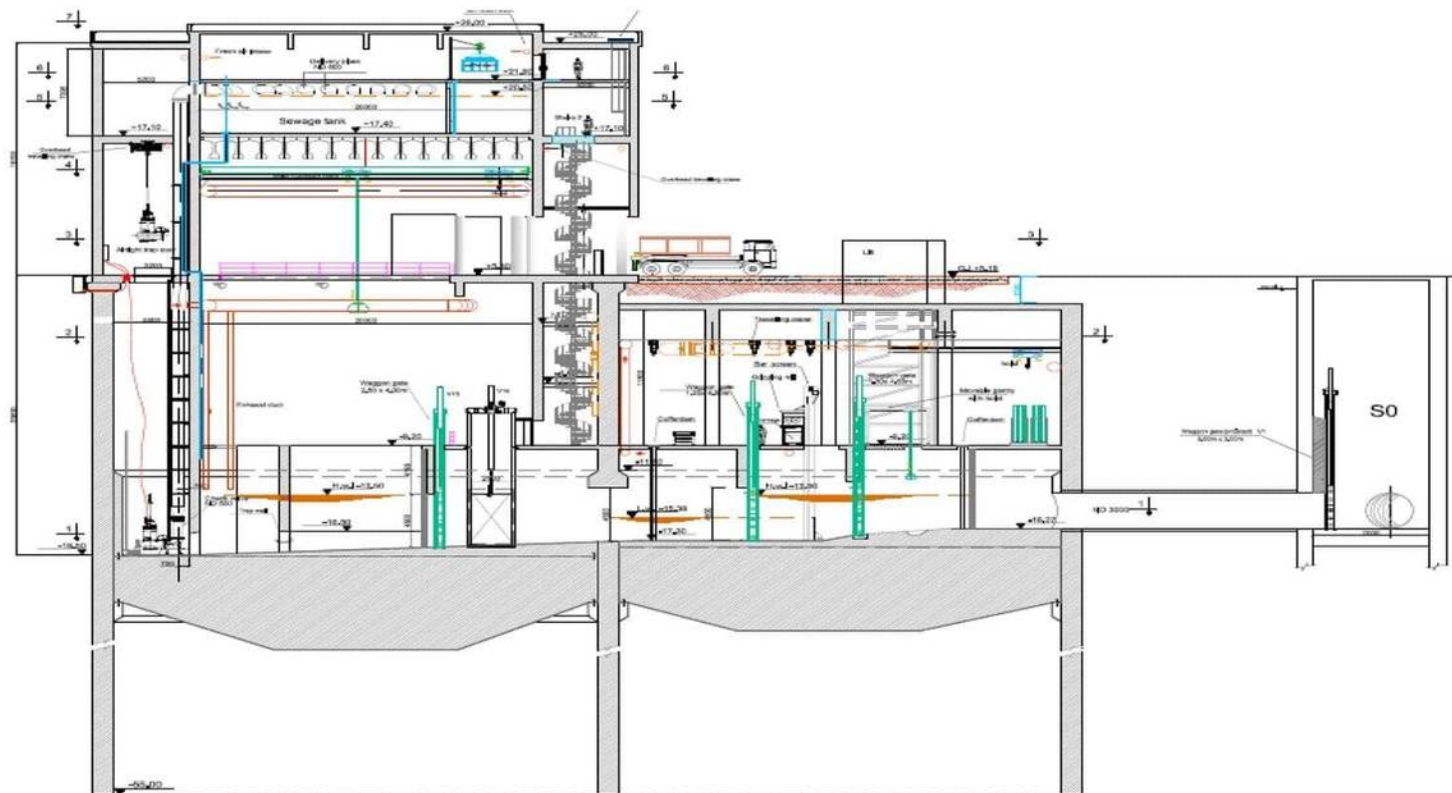
— T-18 - max hr - Hydraulic Grade — T-18 - max hr - Percent Full

In order to verify the well operation of the pumping station, the following testing scenarios had performed:

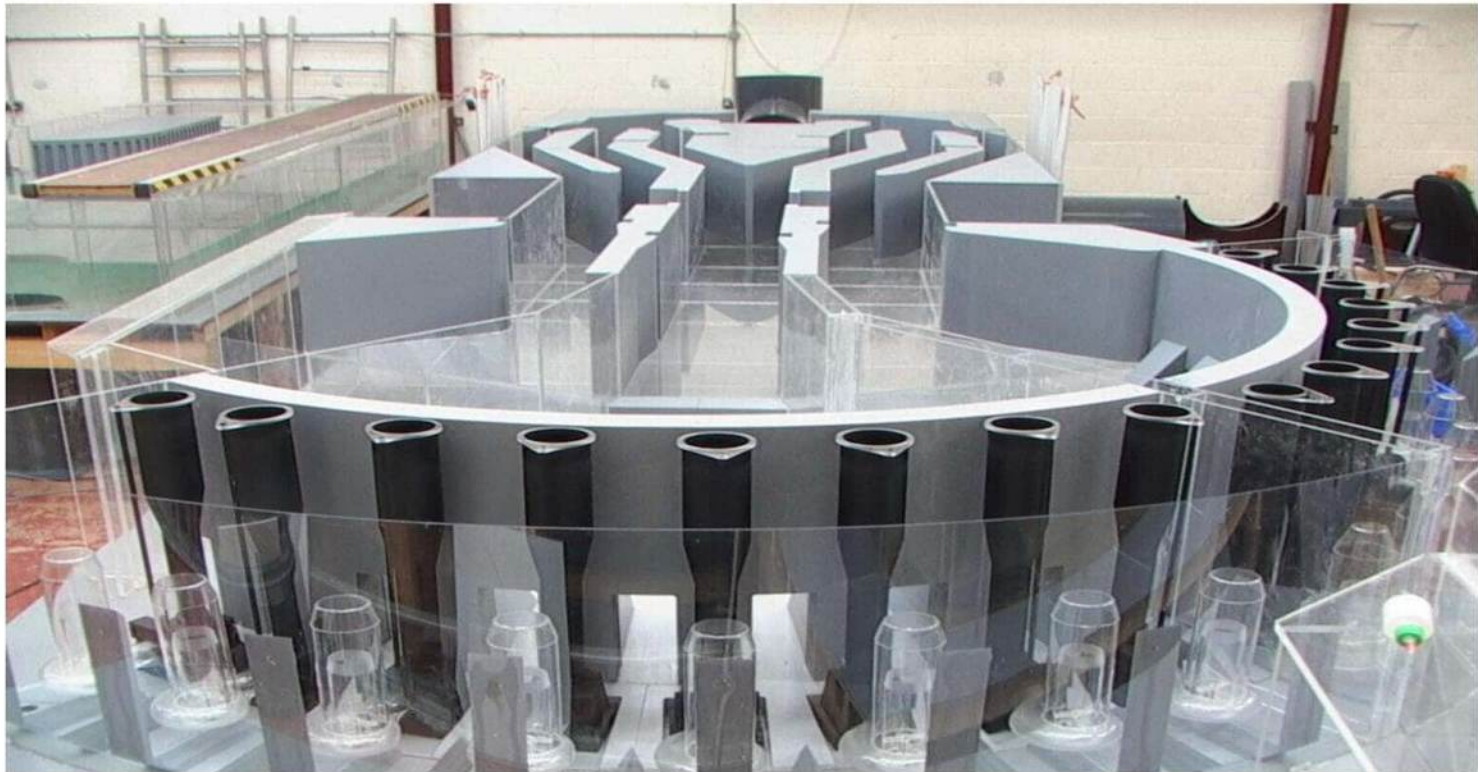
- Study of screens and wet well arrangement under all operating levels, inflow rates and operating combinations to identify all adverse operating conditions
- Determination of flow pattern in the sumps and determination of no-flow zones.
- Flow patterns in the screening sets.
- Air and submerged vortices at pump intake occurrence.
- Flow profile at pumps intake (velocities and pre-swirl).
- Determine the minimum acceptable pump operating levels.

In order to validate a hydraulic structure design, you have to build a physical model by using similitude laws.

These laws allow the model simulation and the extrapolation of results to the prototype design.



Prototype Scale = 1/1



Physical Model Scale = 1/8

Saudi Arabia – General Water Directorate & NWC JCBU Al Khumrah Main Lifting Station 12 m³/s Physical Modelling (2010)



Saudi Arabia – General Water Directorate & NWC JCBU Al Khumrah Main Lifting Station 12 m³/s Physical Modelling (2010)

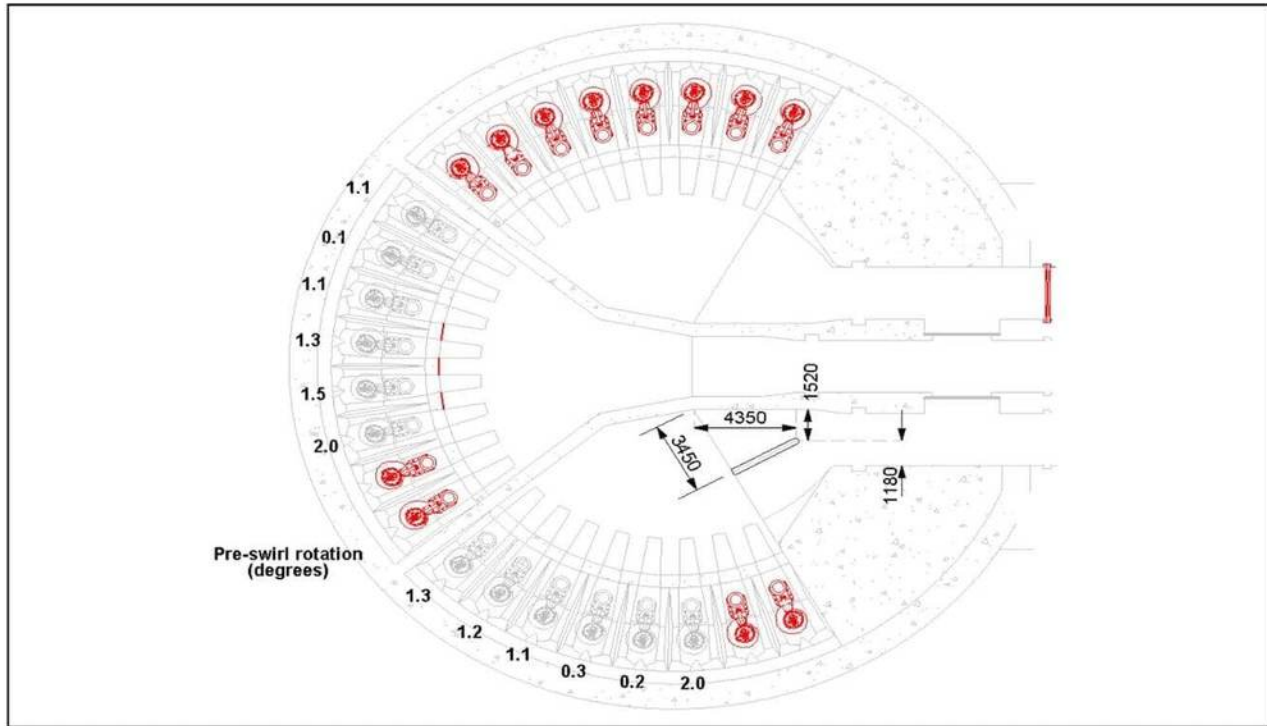




- ❑ Three different flow scenarios had been observed (min. 2 m³/s), (average 6 m³/s) and (max. 12 m³/s) which cover the design flow conditions.
- ❑ Final testing showed some pump combinations of lower water levels to result in higher levels of pre-swirl rotation.
- ❑ All pre-swirl are within acceptable limits, we selected the pump type which results up to pre-swirl value (5 degrees).
- ❑ The testing and demonstration of the model proved the suitability of the pumping station configuration as per the applied developed model arrangements and plan setting geometry.
- ❑ The model testing has confirmed the general arrangement of the pumping station and identified various minor improvements.



**Fore bay (12 m³/s)
Ultimate Flow Conditions**



Pre-swirl Rotation

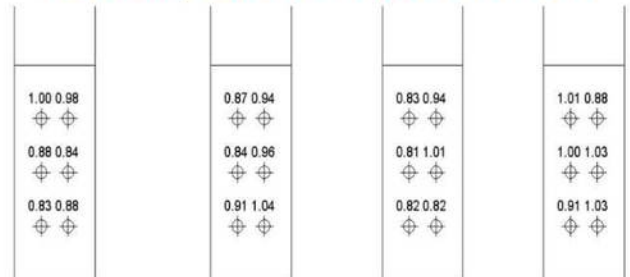
Pump Coherent Submerged Vortices



Approach Channel Flow



Velocity Distribution Pattern



Screen channel 6
(-1.9 % of average flow)

Screen channel 5
(+0.7 % of average flow)

Screen channel 4
(-4.9 % of average flow)

Screen channel 3
(+6.1 % of average flow)

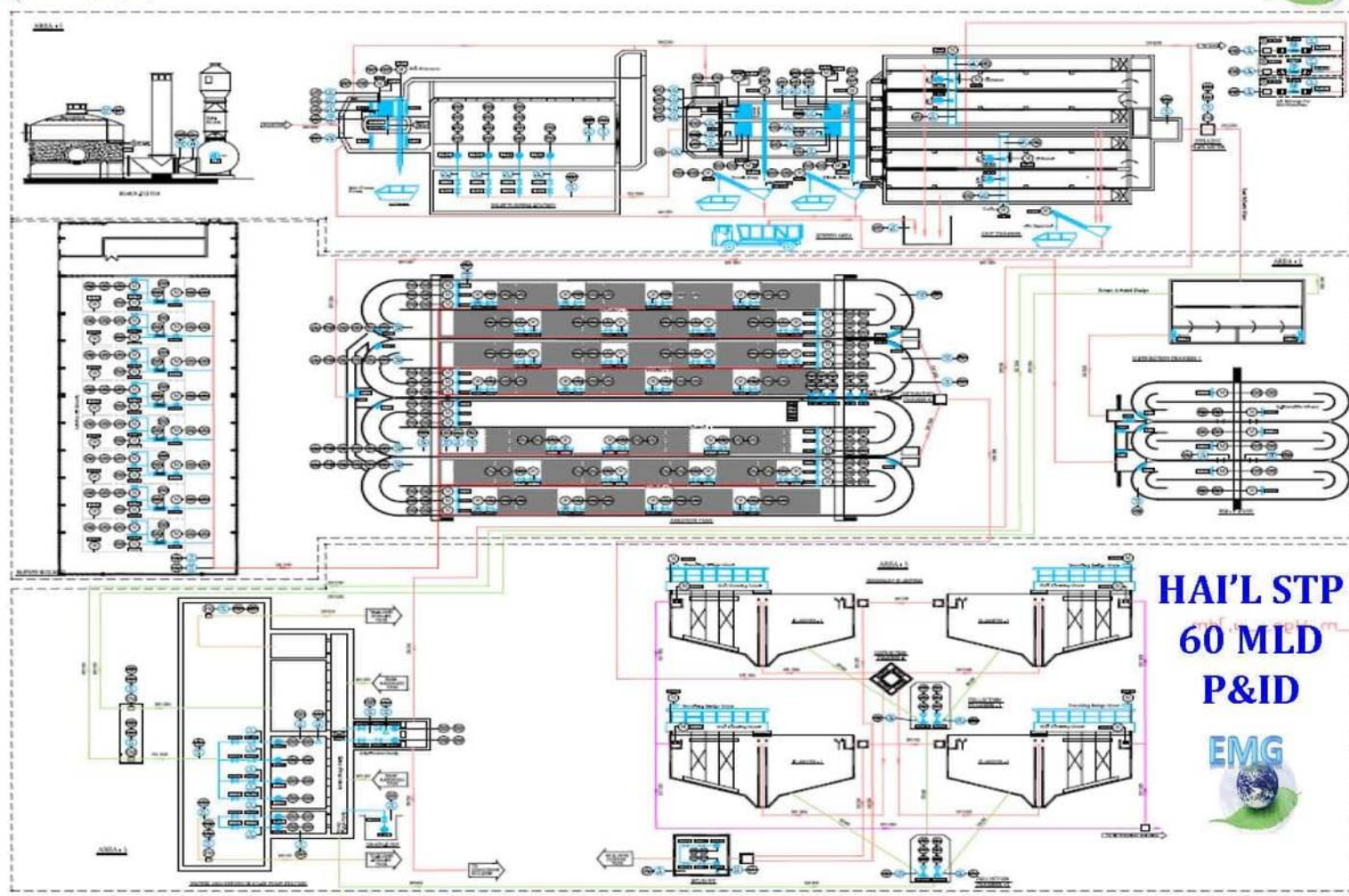


مع التمام لمطبعة مطالبة الكتب التي جازت بعد التعديل
على طلب استشاري المترجم والمطبعة.



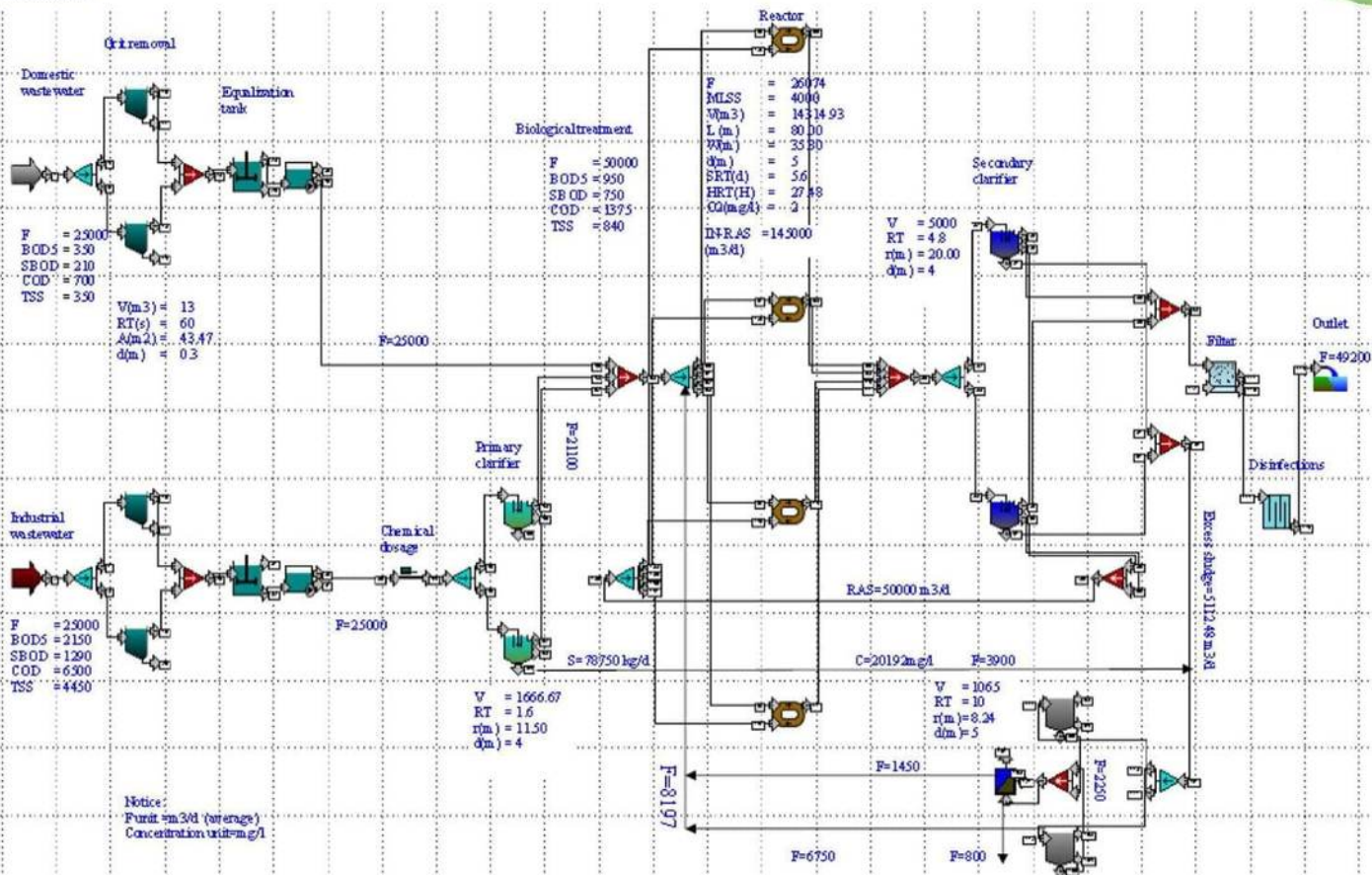
م/و ص الش
٥٨/٩/١٤

HAI'L STP – 60 MLD – GENERAL SITE LAYOUT

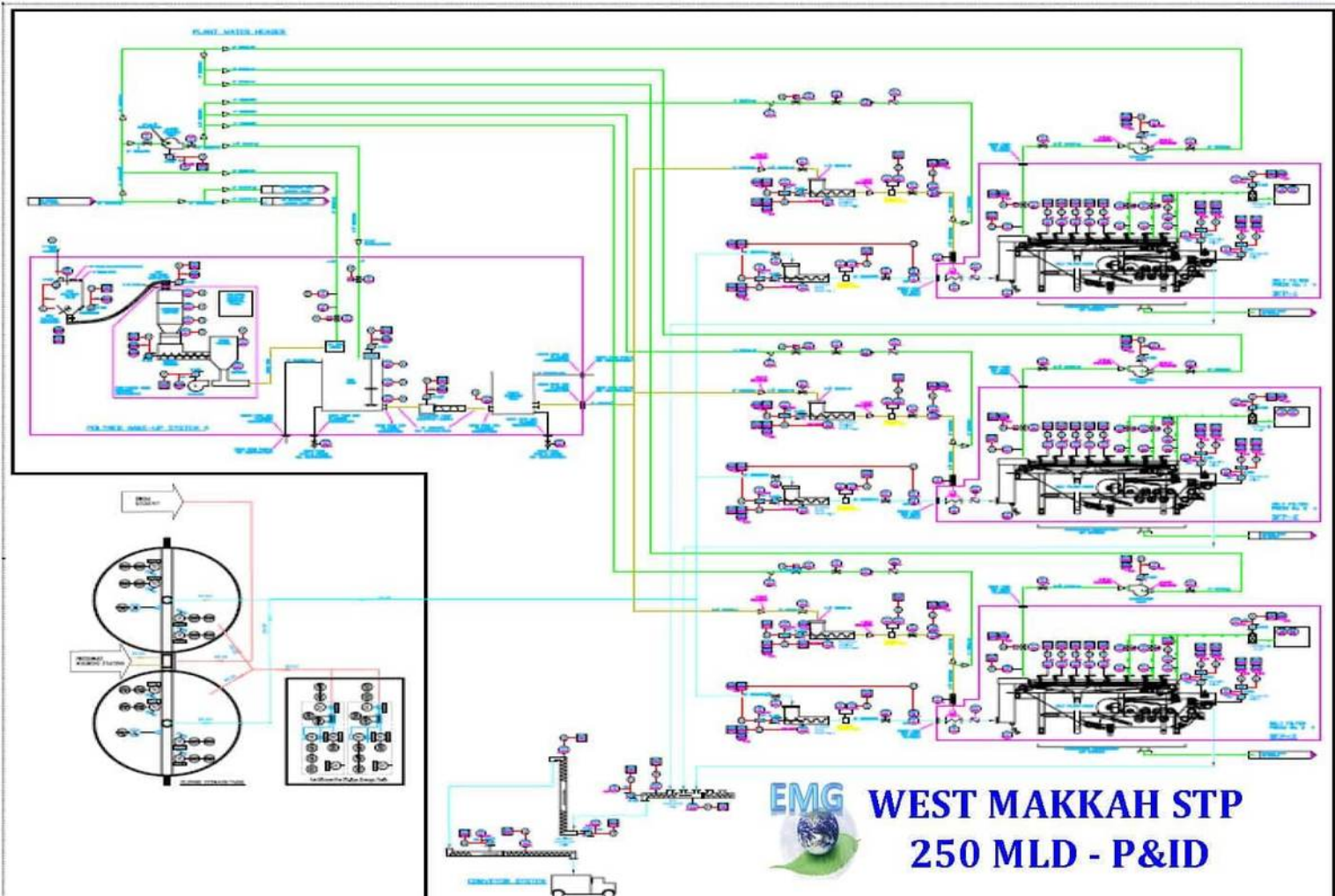


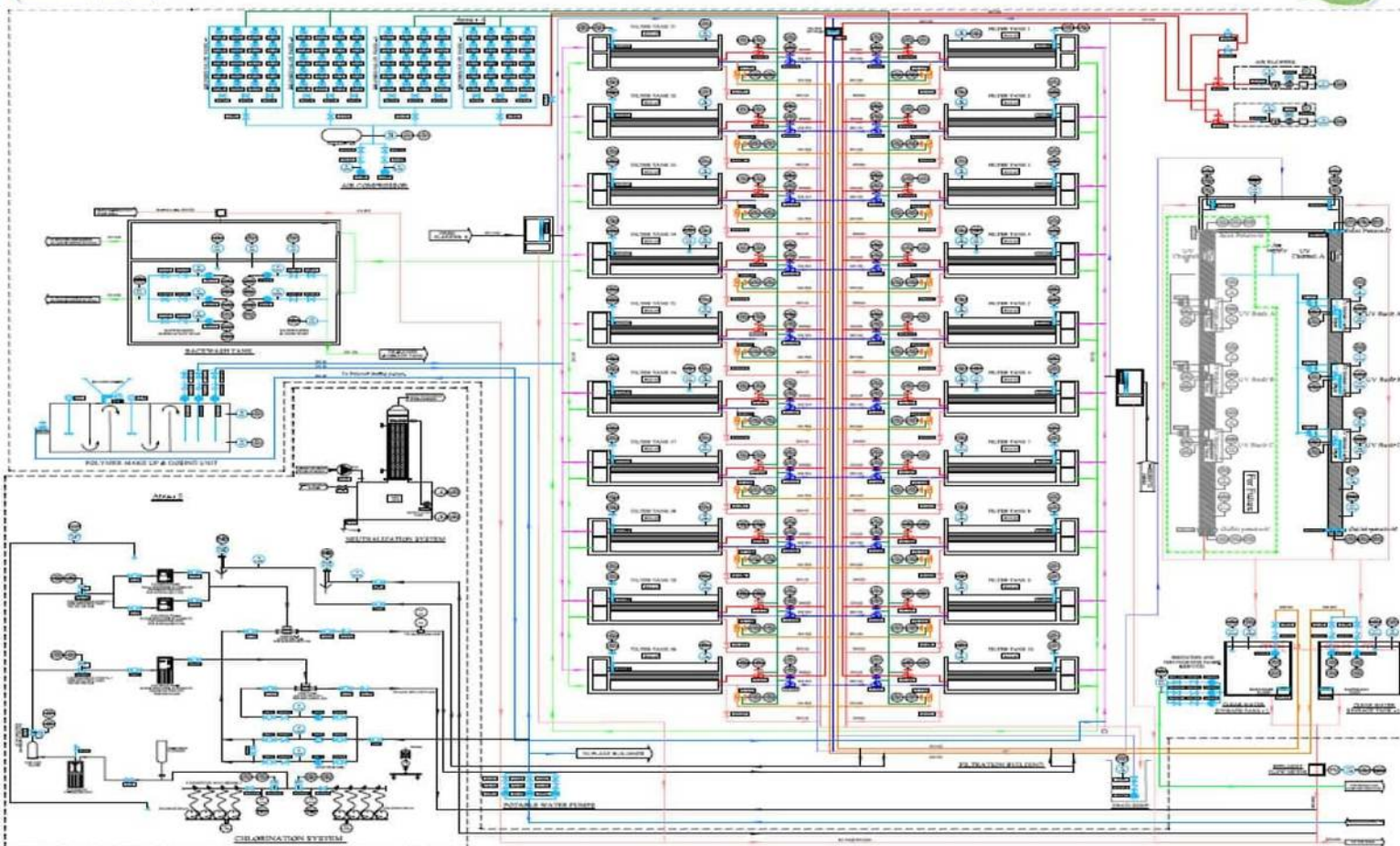


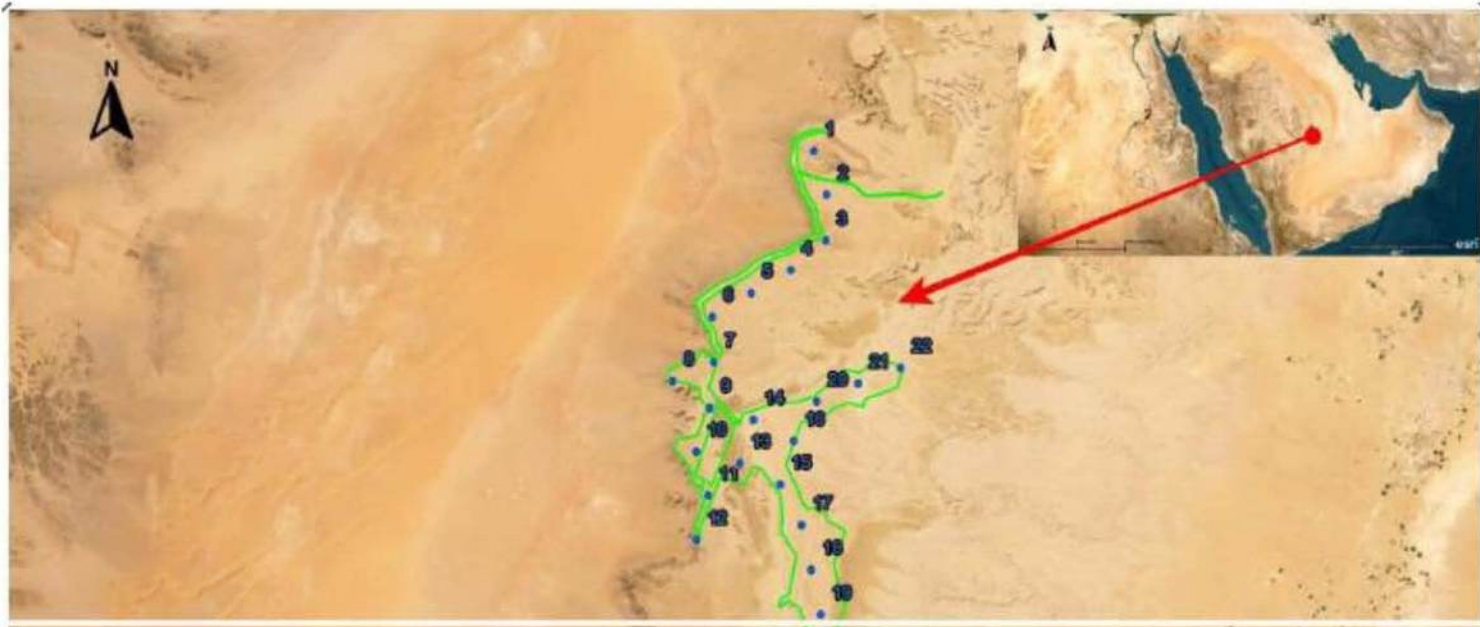




JEDDAH ALKHUMRAH STP – EXPANSION 250 MLD – MASS BALANCE







A Preliminary Avifaunal Survey of Starah Wind Power Project, Saudi Arabia



نيوم NEOM

Bird Baseline

from February 2022 till Now.



نيوم NEOM

Projects





SUMMARY OF SURVEY DATA

Vantage Point Surveys

- 35 surveyors deployed
- More than 5,500 surveys uploaded
- More than 12,000 survey hours

Flight Activity

- More than 120 target species
- More than 40,000 flights
- More than 80,000 individual birds

Green Plus - EnviGlobe Green Plus Accomplished Projects



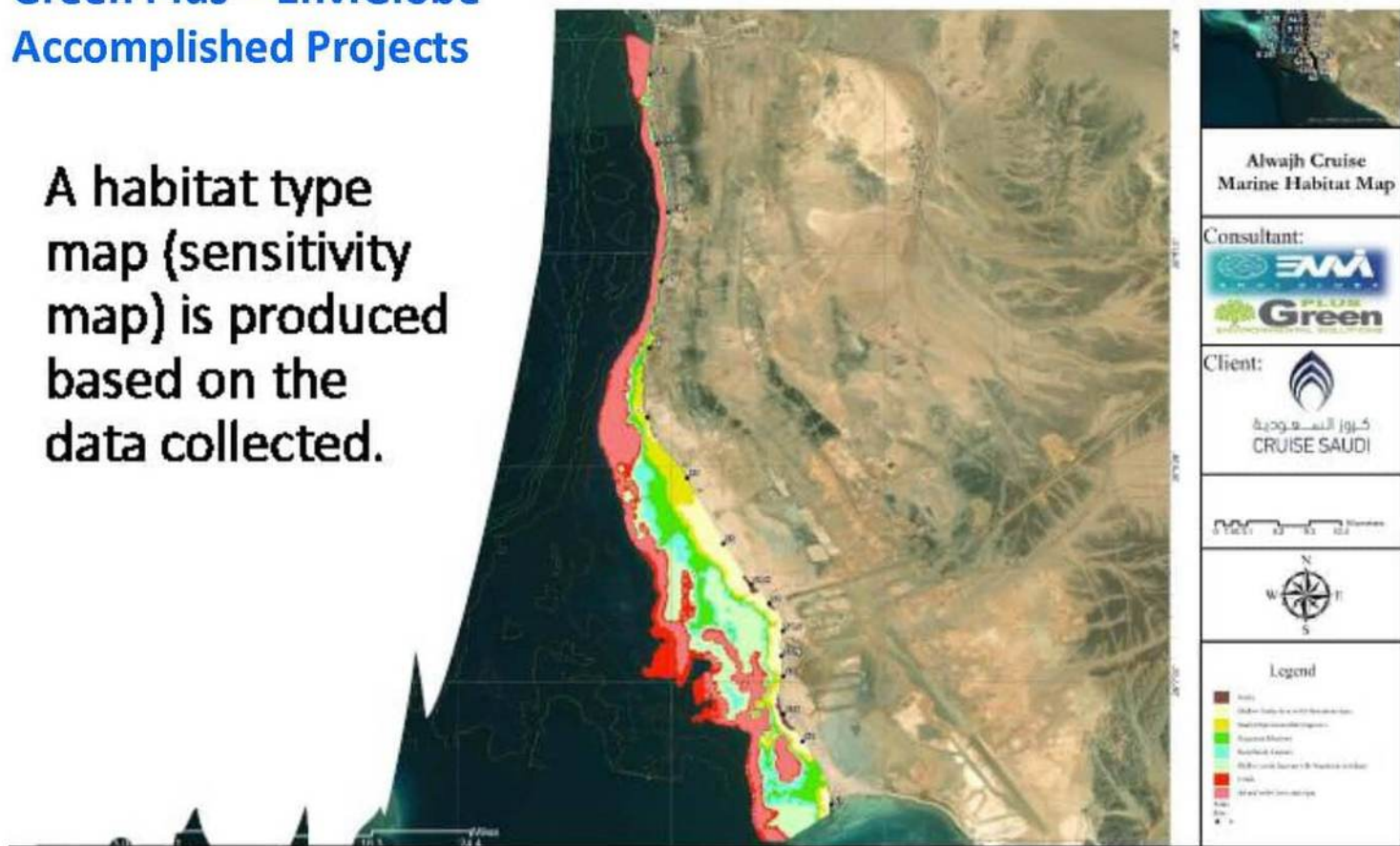
Alwajh Marine Environment and Body of water
Characteristics Survey January 2023.



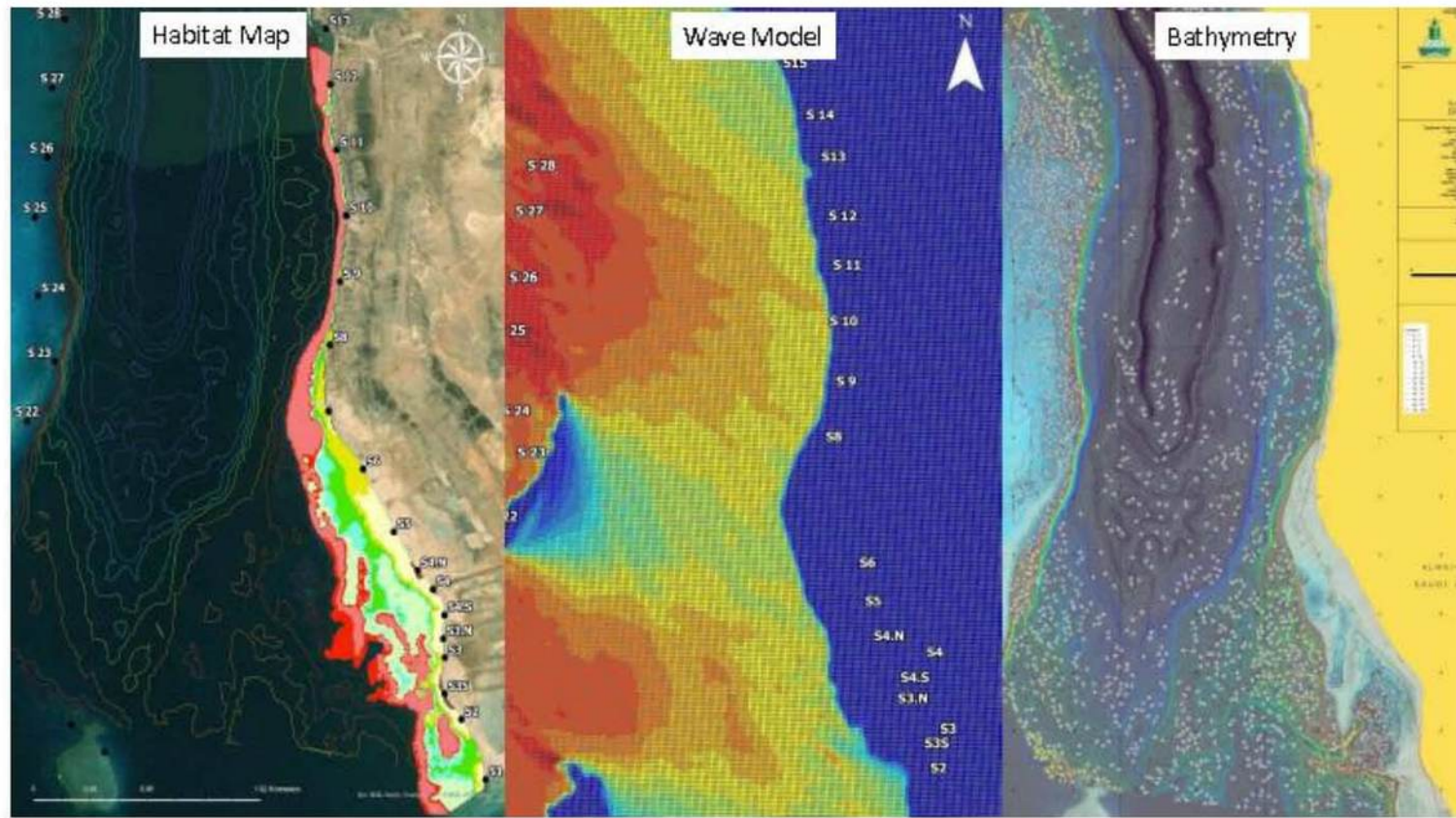
- The overall objective of the present work is to provide the Cruise Saudi with the information and consultation services needed to support an informed decision-making process of selecting the best location to accommodate for a Tender Pier capable of berthing tender boats with an LOA of 35 meters and a draught of 3 meters, and an Anchorage Area for large vessels with an LOA of 365 meters and a draught of 12 meters. The said project is located near Al Wajh city on the Red Sea coast of KSA.
- Therefore, a bathymetric, marine environment & body of water characteristics and topographic surveys were conducted to deliver the results that were thoroughly specified in the Scope of Work document provided by the Employer.
- The results of the Marine Ecological Survey which will be used to decide on the best location for the tender pier only will constitute its scope. As for the selection of the most suitable anchorage spot for large cruise vessels.

Green Plus - EnviGlobe Accomplished Projects

A habitat type map (sensitivity map) is produced based on the data collected.



Green Plus Accomplished Projects



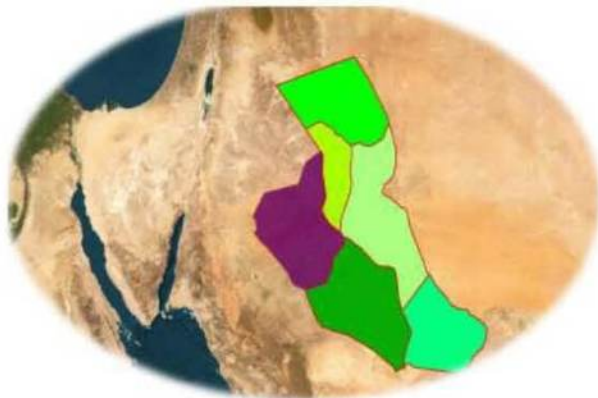
Bird Baseline Survey at KSRNR (King Salman Ibn Abdulaziz Royal Reserve)

- The scope of works for the Spring Breeding Bird 2023 Survey has been designed to identify the distribution and abundance of bird species within King Salman Ibn Abdulaziz Royal Nature Reserve (KSRNR) during Spring in order to inform environmental and conservation priorities for the conservation management of the reserve.



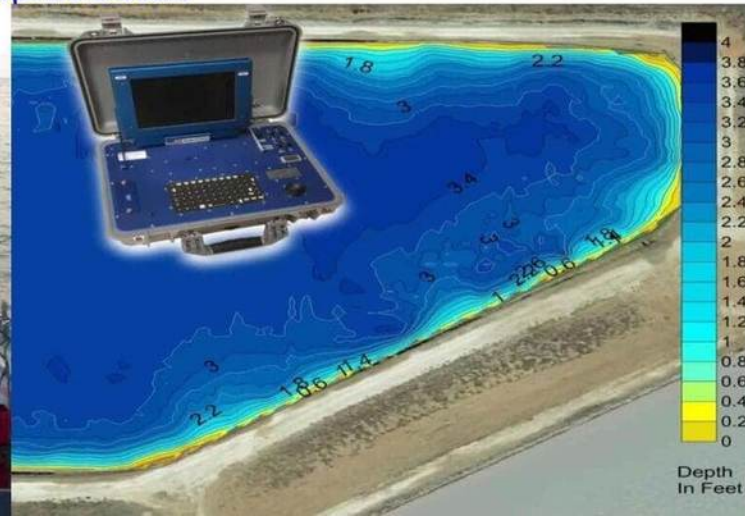


- King Salman bin Abdulaziz Royal Reserve Development Authority has launched the first phase of preliminary bird surveys, which to assess the number, species, distribution and abundance of resident, migratory and visiting birds and to identify them. Also, to identify their migration pathways and work to protect them through ongoing monitoring and follow-up programs, updating the database and developing the reserve's bird surveillance tourism programs.



BATHYMETRIC SURVEY

The BathyCase includes features that make this system ideal for jet ski operation. Bluetooth keyboard/mouse interface work with SDI's proprietary "Shallow Depth" mode for bottom tracking in very shallow water applications. full survey-grade 200 kHz depth sounder, it digitizes sonic echo's to 16-bit resolution. Store the full digital record and provide playback with high resolution detail. The Bathycase digitizes 65,536 shades of gray and the depth resolution is consistent through the depth range. Positions, events, and operator annotations can exchange between HYPACK and SDIDEPTH programs. DEPTHPIC and SDIDEPTH software provides convenient full echo replay and post-processing of hydrographic data..





**Dr. Knollmann - Dr. Berrou
Engineering**

Company Profile:

Dr. Knollmann - Dr. Berrou Engineering



For over 30 years, Dr. Knollmann - Dr. Berrou Engineering, with its interdisciplinary independent team of engineers, offers overall services in design, optimization and modernization of water and wastewater processing-systems and distribution networks for public and private clients.

We design and engineer:

- Wastewater-treatment-plants - waterworks
- water-reclamation-units - water-reservoirs
- water-supply and sewer networks - pumping-plants
- pipelines - irrigation-systems/
re-use of pre-cleaned wastewater
- sewer-databases - water/wastewater management -

We work:

efficiently and economically,
from feasibility-study to comparative cost
evaluation, choice of treatment processes,
design, tender and construction supervision,
commissioning of optimized plants.

We offer:

turn-key projects,
project handling as a joint-venture
in cooperation with our clients,
project partners and local experts.

www.kb-eng.de



**Aerial view
Wastewater treatment
plant "Obere Lutter"**

Please hand over to Dr. Yusef Berrou

with regards *VB*

Dr. Knollmann - Dr. Berrou Engineering

Knollmann Engineering Group

Fax: 00971 42 95 9006

Dr. Knollmann - Dr. Berrou Engineering - Postfach 510 534 - D-30935 Hannover



**Dr. Knollmann - Dr. Berrou
Engineering**

Dr. Knollmann - Dr. Berrou Engineering

Office: Hannover
Großbuchholzer Kirchweg 30
D-30855 Hannover
Germany
info@kb-eng.de
Tel. +49 (0) 511 54750-0
Fax: +49 (0) 511 54750-32

Office: Bad Oeynhausen
Ravensberger Str. 8
D-32547 Bad Oeynhausen
Germany
info@kb-eng.de
Tel. +49 (0) 5731 21053
Fax: +49 (0) 5731 26570

15.03.2006

Agency Agreement

Absichtserklärung

Absichtserklärung zwischen:

Dr. Knollmann - Dr. Berrou Engineering,
Ravensberger Straße 8, 32547 Bad Oeynhausen, Germany

und

Eng. Faisal Al Mahdi Engg. Consulting Office
P.O. Box 7167 Riyadh 11462, K.S.A.

im weiteren Unternehmen genannt,

1. Veranlassung

Die Unternehmen betreiben in Deutschland, K.S.A und Egypt Ingenieurbüros.

Die Unternehmer beabsichtigen eine Zusammenarbeit in den GCC Staaten an.





Dr. Knollmann - Dr. Berrou
Engineering

pecific Values

Project costs: 7.500.000 \$

Size: 47,000 inhabitants

Dry weather day inlet: 4,750 m³/d

Raw sludge amount: c. 400 m³/d

Digester gas production: c. 850 m³/d:

Influent pump station with 3 centrifugal pumps (c. 500 m³/h)
Filter level calculation, 1-line, with need circulation of screenings wash press

Aerated Grit chamber and grease trap, 1-line

Grease pump work with eccentric spiral pump (12 m³/h)

2 Settlement tank with each 210 m³ volume, linkage rooms, bypass lines

Primary sludge pump station with 2 rotary piston pumps (each 25-50 m³/h)

2 aeration tanks with 4,400 m³ volume each

Intermittent fine bubbly area ventilating, per tanks 2 propeller stirring works

6 trick piston blasts with c. 1,500 Nm³/h each, ventilating performance.

2 secondary settlement tanks with 2,200 m³ volume each

Return sludge pump station with 2 spiral conveyer (max. 313 m³/h each)

Simultaneously and secondary precipitation plant

Maturation pond with 3.550 m³ volume

Primary thickener with 268 m³ volume

Digester with 2,500 m³ volume

Temperature of digested sludge 39°C

Digested sludge mixer with 1,500 m³/h circulating capacity

Sludge heat exchanger with 250 kW heat power

Excess sludge loading with rotary reciprocating pump (25-50 m³/h)

Primary sludge loading with 2 rotary reciprocating pumps (each 15 m³/h)

Heating sludge circulating with 2 Centrifugal pumps (each 85 m³/h)

Final thickener with 519 m³ Volume

Sludge storage tanks with 622 m³ Volume

Sludge dewatering with centrifuge, Throughput 1.2 till 1.4 t DS/h

Sludge water storage tank with 146 m³ volume

Non-Pressurized dry gas tank with 800 m³ contents

gas pressure rise plant with 3 blowers.

Block thermal power station with 2 modules and 85 kW each

of electrical and 150 kW thermal power

Heating system with 350 kW of heat power



Aeration Tanks, Final Thickener



Heating Sludge Circulation Pump



Secondary Clarifier



Heating Distribution



Operational Building – Mechanical Part



Head of the Digester

Design and Realization:

Dr.-Knollmann – Dr. Berrou Engineering mbH
Großbuchholzer Kirchweg 30
D-30655 Hannover
Germany

Tel: +49 511 54750-0

Fax: +49 511 54750-32

E-Mail: info@knollmann.de

Internet: www.kb-eng.de

Knollmann Engineering Group

GEMEINDE VERL ABWASSERBETRIEB DER GEMEINDE VERL



Wastewater Treatment Plant Expansion - Verl-West



1999 – 2003

Mechanical Part

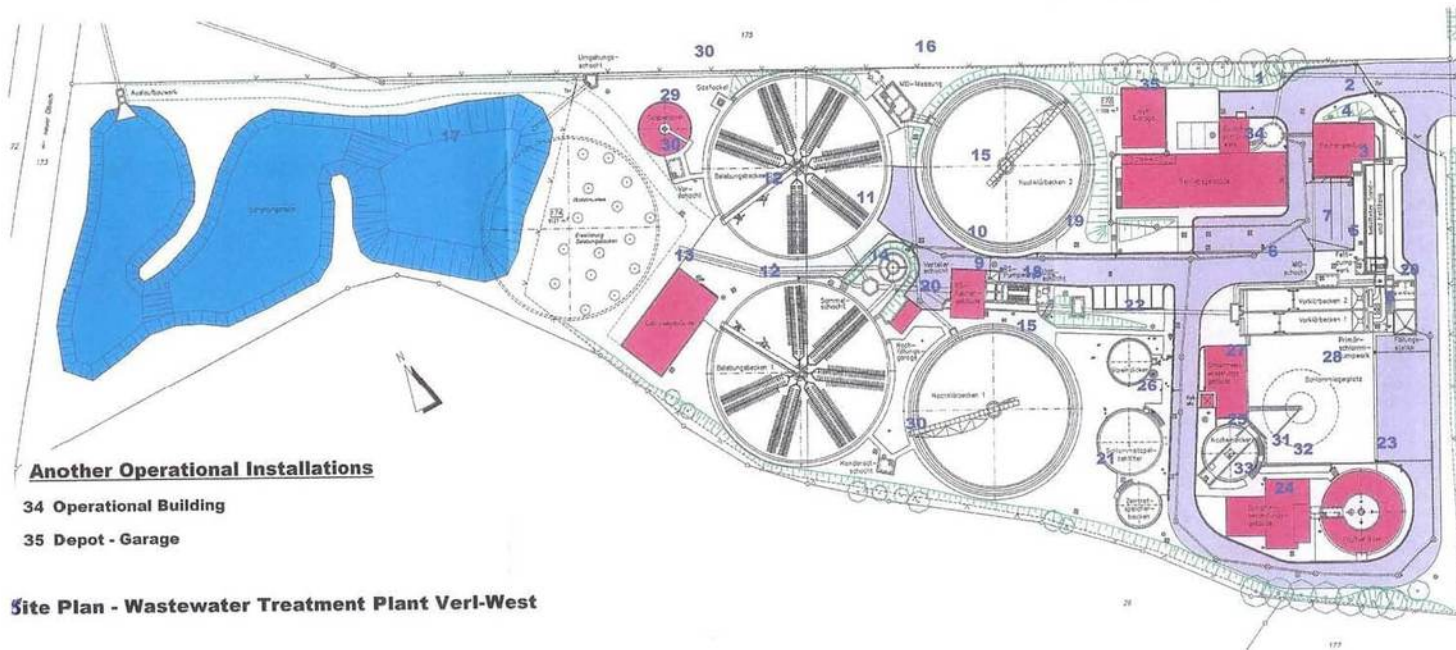
- 1 Influent Pump Station
- 2 Influent Screen
- 3 Aerated Grit Chamber -Grease Trap
- 4 Grit Washer
- 5 Grease Pump Station
- 6 Primary Settlement Tank
- 7 PST-Bypass
- 8 Primary Sludge Pump Station
- 9 Return Sludge Screen
- 10 Faecal Sludge Acceptance und -Screen

Biological Part

- 11 Distribution Shaft
- 12 Aeration Tank
- 13 Blower Building
- 14 Collector Shaft
- 15 Secondary Settlement Tank
- 16 MID-Effluent-Measurement
- 17 Maturation Pond
- 18 Return Sludge Pump Station
- 19 Surplus Sludge Shaft
- 20 Precipitation Station
- 21 Sludge Water Storage Tank

Sludge Treatment

- 22 Primary Thickener
- 23 Digester
- 24 Digester - Pump Cellar
- 25 Final Thickener
- 26 Sludge Storage Tank
- 27 Sludge dewatering
- 28 Sludge Storage area
- 29 Gas Tank
- 30 Gas Shaft and Gas Flare
- 31 Gas pressure elevation
- 32 Heating Plant
- 33 Block Heating Works



Another Operational Installations

- 34 Operational Building
- 35 Depot - Garage

Site Plan - Wastewater Treatment Plant Verl-West

EMG Environmental Engineering Group
Attn.: Mr. Ahmed El-Zayat
P.O. Box 2341
Riyadh 11451
Saudi-Arabia

Telefon (+49) 07954/9804-0
Telefax (+49) 07954/9804-20

Tel: 00666 53 286 757
Fax: 00966 1 465 4291
info@environmental-engineering-group.com

your sign	our sign	date
	RP/cp	01/04/04

TO WHOM IT MAY CONCERN / INTRODUCTION LETTER

We hereby certify that EMG group represents **SYSTEM S&P®** in the project
WWTP 50 m³/d "Jeddah K.S.A Dream"

Kirchberg/Jagst, 1st April 2004

System S&P Vertriebs GmbH
Ulmenstraße 2
74592 Kirchberg/Jagst
Telefon ++49 (0) 7954-9804-11
Telefax (0) 7954-9804-20

Introduction letter

Bankverbindung:
Deutsche Bank AG, Calle Rio: 0106282 (BLZ 257 700 59)
SWIFT: DEUTDE2257 (BAN: DE80 257 0069 0010 8282 00)

Geschäftsführer:
Florian Georg Pfaffner

HRA Crailsheim 464 L
Ust.-id.Nr. DE200357517
St.-Nr. 57073/12017





Environmental Engineering Group
Ahmed El Zayat

Riyadh
The Kingdom of Saudi Arabia

Herent, 26 April 2004

Dear Mr. El Zayat,

We herewith confirm – as a consequence of our negotiations – that we, WATERLEAU GLOBAL WATER TECHNOLOGY, will be bidding mutually exclusive via EMG only to the Anasser Group for the electro-mechanical part of the project Al Dawasser.

The Anasser Group has signed a subcontract agreement with Jazal Contractor for this Al Dawasser project.

Hoping to have informed you accordingly, we herewith remain,

Sincerely,



WATERLEAU.
GLOBAL WATER TECHNOLOGY NV
RADIOWEG 18
B-3020 HERENT (LEUVEN)
BELGIUM
Commercial director



Tom Hanson
Sales director

WATERLEAU.
GLOBAL WATER TECHNOLOGY NV
RADIOWEG 18
B-3020 HERENT (LEUVEN)
BELGIUM

WATERLEAU, Global Water Technology nv – Radioweg 18 – 3020 Herent - Belgium
Tel.: +32(0)16 650 657 - Fax: +32(0)16 650 663 - Email: info@water-leau.com
www.water-leau.com - BTW BE 438 047 842 - H.R.L. 108.766
KBC 432-0026651-22 - FORIS 230-0049600-53 - BBL 335-0530911-76

AGENCY AGREEMENT

BETWEEN:

WATERLEAU, Global Water Technology NV,
with its principal place of business Radioweg 18, B-3020 Herent, Belgium,
duly represented by Mr. Luc Vriens, Managing Director & Mr. Willy Gils, Commercial
Director

called hereinafter WATERLEAU

and

Ahmed El-Zayat (or EMG Saudi Arabia??), with registration number
With its principal place of business
duly represented by,

called hereinafter the "AGENT",

WHEREAS

WATERLEAU is engaged in engineering, fabrication, procurement and operation of
water, wastewater, sludge, odor & off-gas treatment installations, worldwide and
possesses its own proprietary systems.

All off its staff have extended experience in the water, wastewater and air treatment
market, including management of large turn-key projects, and operation &
maintenance contracts;

WHEREAS

AGENT desires to act as WATERLEAU's sales AGENT for the Products and in the Territory
(as these terms are hereinafter defined), and WATERLEAU is willing to grant AGENT the
non-exclusive right to do so.

Letter of Appointment

We: LimnoTec Abwasseranlagen GmbH
Represented by the Managing Directors
Mr. Dr. Holm and Mr. Haake
Eickhorster Straße 3
32479 Hille / Germany
Tel: +49 / 5703 / 5103-0
Fax: +49 / 5703 / 5103-33
Email: holm@limnotec.de, haake@limnotec.de

experts in the field of:

SBR- and other technologies for municipal sewage & sludge treatment

hereby appoint: **ANASSER Water Treatment (AWT)**
Represented by Ahmed El-Zayat
P.O. Box 7167
Riyadh 11462
Kingdom of Saudi Arabia

as our sole agent in Saudi Arabia for marketing and sales of our services and products, namely:

- 1) *Process Engineering*
- 2) *Supply of Process Equipment (mechanical, electric-equipment and programic)*
- 3) *Start-Up, Commissioning, Dynamic Simulation and general optimisation*

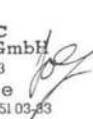
for SBR- and other technologie for Municipal Wastewater & Sludge Treatment

This appointment is for a period of three years as of date of signature and can be renewed by written mutual agreement.

LimnoTec
Abwasseranlagen GmbH

Hille, 04.07.2005

LimnoTec
Abwasseranlagen GmbH
Eickhorster Straße 3
32479 Hille
Tel.: 0 57 03 / 51 03-0 · Fax: 51 03-33







Deutsch-Saudi Arabisches Verbindungsbüro für
Wirtschaftsangelegenheiten (GESALO)
مكتب الاتصال الألماني السعودي
للشؤون الاقتصادية (جيسالو)

German-Saudi Arabian Liaison Office for Economic Affairs
P.O. Box 61695 | Riyadh 11575 | KSA

A. Nasser Group
Mr. Ahmed El Zayat
PO Box 7167
Riyadh
Saudi Arabia

Fax: 206 1932

Dear Mr. El Zayat,

We are happy to invite you to visit "ACHEMA 2006" which will be held in Frankfurt, Germany from 15th to 19th of May 2006. ACHEMA is the International Exhibition-Congress on Chemical Engineering, Environmental Protection and Biotechnology.

More than 4,000 exhibitors from 50 countries will exhibit their new products and technologies to an expected amount of 200,000 visitors from 100 countries. The interdisciplinary exchange of ideas and experience among scientists, developers, manufactures, and users has always been the main concern of ACHEMA.

Main products groups are: Analysis Technology, Biochemistry, Biotechnology, Compressors, Environment Protection, Environmental Engineering, Laboratory Technology, Material Testing, Materials Technology, Measuring Systems, Packaging Technology, Pharmaceutical Ingredients, Plants and Machinery for the Chemical Industry, Pumps, Regulating and Control Technology, Security Systems, Storage Technology, Valves and Fittings, etc.

Please order your admission ticket now online at www.chema.de. Do not hesitate to contact us for more information about the online registration.

As you are one of the leading companies in this field, we are sure that this event will be a very interesting opportunity to expand your business contacts.

For further information about the exhibition, please contact Mr. Abdulazeez Valappil, Mr. Asif Iqbal or Mr. Mushtaq Ahmed on Tel.: 01-4623800 or Fax: 01-4628730. Email: tradefairs@ahk-arabia.com

Yours sincerely

Mark Potstada
Deputy Delegate of German Industry & Commerce



E-Mail:
tradefairs@ahk-arabia.com

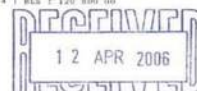
Tel:
00966-1-4623800 x 113

Fax:
00966-1-4628730

www.ahk-arabia.com

01-4623800

Bank Info: Account name : GESALO | Account No. 0101-141440-001 | The Saudi Investment Bank Head Office & Riyadh Branch |
Branch No. 0101 | P.O. Box 3533 | Riyadh 11481
bankverbindung | Deutschland | DIME / Email: Arabien | Dresdner Bank | Berlin | Kto-Nr : 40 576 000 24 | BLZ : 120 800 00





Deutsch-Saudi Arabisches Verbindungsbüro für
Wirtschaftsangelegenheiten (GESALO)
مكتب الاتصال الاقتصادي
للألمانية (جيسالو)

German Saudi Arabian Liaison Office for Economic Affairs
P.O. Box 61695 | Riyadh 11575 | KSA

A. Nasser Group
Mr. Ahmed El Zayat
Executive Manager
PO Box 7167
Riyadh
Saudi Arabia

Tel: 206 0796, Mobil-050 3286757
Fax: 206 1932
Email: info@environmental-engineering-group.com

Visit of German Trade Delegation to the Kingdom of Saudi Arabia

Dear Mr. El Zayat

First of all we would like to thank you for your interest in meeting members of the German Trade Delegation from the German Federal State of Niedersachsen. We were delighted to receive your acknowledgement.

We are pleased to confirm your participation for the meetings with the German companies in Riyadh on the following date:

**27th May, 2006 in the Riyadh Chamber of Commerce between 9:30 a.m. – 2 p.m.
In the Business Club Hall**

**The meetings will take place on a first come first served basis.
Should you need any assistance, our colleagues look forward to the pleasure of welcoming you at the
Gesalo help desk in the Business Club Hall.**

The German companies will be available from 9:30 a.m. until 2 p.m. The event will be officially inaugurated.

Please do not hesitate to contact the undersigned, if you have any further queries.

Mr. Mohammed Faleel Tel: 00966-1-4623800 Ext.108, Mobile: 0506456331, faleel@ahk-arabia.com
Mr. Dennis Bornemann Tel: 00966-1-4623800 Ext.108, bornemann@ahk-arabia.com

We hope that the visit of the German Trade Delegation will lead to prosperous and long-lasting business relations between both our countries.

Yours sincerely,

Mohammed Faleel
- Head of Marketing & Business Dev. -

Dennis Bornemann
- Marketing Consultant -

Bank Info: Account name : GESALO / Account No. 9191-141440-001 / The Saudi Investment Bank Head office & Riyadh Branch /
Branch No. 9101 / P.O. Box 1533 / Riyadh 11481
Bankverbindung : Deutschland : BIRG / Saudi -Arabien / Dresdner Bank / Berlin / Bank für Sozialwirtschaft AG 040 00



E-Mail: faleel@ahk-arabia.com

Tel: 00966-1-4623800 x 105/100

Fax: 00966-1-4628730

www.ahk-arabia.com

Date: May 21, 2006

Kingdom of Saudi Arabia
King Abdulaziz City for
Science and Technology
General Directorate of Support Services



المملكة العربية السعودية
مدينة الملك عبد العزيز
للعلوم والتقنية
الإدارة العامة للخدمات المساندة

Anasser Water Treatment
RIYADH - FAX # 2061932

Attn: Mr. Ahmed El-Zayat

We have forwarded the STP proposal to one of our Institute for consultation and below are their comments.

1. Your design should consider that the domestic waste water contains many contaminants which have mainly organic nature and sometime are of inorganic type.
2. From almost all the households, considerable large quantities of oils and grease and surfactants (soap and detergent) disposed off and their treatment should also be considered in your design.
3. The wastewater also expected to have appreciable quantities of various forms of nitrogen (especially Ammonia) and phosphates and this has to be considered.
4. The concentration of dissolve solids is also needed to be checked in the untreated and treated wastewater because it should adhere to the standards for irrigation.

Since all the quotation have taken BOD & TSS in consideration in the untreated and treated wastewater and none of the other parameters, we request you to comment on this and confirm that the above comments has been considered in the design and the STP plant can handle the necessary requirements without any problem.

Furthermore, take note that your confirmation will be incorporated as part of your proposal.

Please contact Engr. Pepito on Tel. no. 488-3555 ext. 5691 for coordination.

Best regards,

ENGR. ABDULLAH AL BOIEZ
ASST. DIR. DGSS - TECHNICAL

FAX, # 481-3695

Encl.: NA : المرفقات Date : 26/07/05 التاريخ NO.: 09M-2329 الرقم

ص.ب. ٦٠٨٦ الرياض ١١٤٤٢ - هاتف: ٤٨١٦٣٨٦ - ٤٨٨٢٤٤٤ - فاكس: ٤٨١٦٣٩٥ - تليكس: ١٠١٧ - ١٠١٥٩٠ - كاكست إس جي بريفيا - موسوعة،
P. O. Box 6086 Riyadh 11442 - Tel. 4813686-4883444 - Fax. 4813695 - Telex 404017 - 401590 KACST S.J. - Cable MAWSOAH
TATTOE, R. P.

TOTAL P. 01

مجموعة بن لادن السعودية
SAUDI BINLADIN GROUP



PUBLIC BUILDINGS & AIRPORTS

البنات العامة والمطارات

January 06, 2005

M/s Anasser
P. O. Box: 7167
Riyadh 11462

Fax: 01 2061932

Attn: Mr. Ahmed El Zayat

Ref: Development of King Abdul Aziz Endowment Project-Makkah
Sub: Grey Water Treatment Plant

Further to our discussion today and your letter No. FMEC-R/AWT/217 dated December 30, 2004 please furnish 8 sets (1 original+7 copies) of technical submittals to obtain Consultant's approval/comments.

Please assure response latest by January 11, 2005.

Regards,

for SAUDI BINLADIN GROUP
Public Buildings and Airports Division

As
As'ad Jara'dat
Technical Manager
Electro-Mechanical Division



شركة بنات مسكونة مسكونة - م. بنات - ٦٤٠٤٣٦٨ / ٦٤٠٤٣٦٨ - رأس المال: ٢٢٠,٠٠٠,٠٠٠ ريال سعودي
م. بنات: ٩٨٨٧ - جدة: ٢١١١٣٣ - المملكة العربية السعودية - هاتف: ٦٤٠٠٠٠٤ - فاكس: ٦٤٠٤٣٦٨
Limited Liability Co. - C. R. NO. : 4030068284/001 - Capital : 220,000,000 Saudi Riyals
م. بنات: ٩٨٨٧ - جدة: ٢١١١٣٣ - المملكة العربية السعودية - هاتف: ٦٤٠٠٠٠٤ - فاكس: ٦٤٠٤٣٦٨

February 21, 2005

M/s Anasser
P. O. Box: 7167
Riyadh 11462

Fax: 01 2061932

Attn: Mr. Ahmed El Zayat

Ref: Development of King Abdul Aziz Endowment Project-Makkah
Sub: Gray Water Treatment Plant

Further to your submittal of gray water treatment plant please find enclosed the Consultant's comments for your immediate compliance and response.

Please assure response latest by February 28, 2005.

Regards,

for SAUDI BINLADIN GROUP
Public Buildings and Airports Division

AS
As'ad Jaradat
Technical Manager
Electro-Mechanical Division

Encl: As stated (2 pages)



شركة بنات مسئولية محدودة - س.ت: ٤٠٣٠٠٦٨٤٤ / ٠٠١ - رأس المال: ٢٢٠,٠٠٠,٠٠٠ ريال سعودي
٩٨٨٧ : ص.ب : ٢١٤٢٢ ، المملكة العربية السعودية - هاتف : ٦٤٠٠٠٠٤ - فاكس : ٦٤٠١٣٨٠
Limited Liability Co. - C.R. NO. : 4030068264/001 - Capital : 220 000 000 Saudi Rials

Consult de France à Djedda
France Visa Application Centre
Manazil Mutaqin street,
Al Rowais District,
Jeddah - Kingdom of Saudi Arabia

Paris, le 3 novembre 2010

Objet : Invitation à un congrès en Allemagne

Monsieur le Consul,

Nous, la Chambre franco-allemande de Commerce et d'Industrie, souhaitons inviter par la présente Monsieur Mohamed Ahmed Salah Eldin Ibrahim de la société Saudi Consolidated Engg. Co à se rendre au centre des congrès de Karlsruhe (Allemagne) les 24 et 25 novembre 2010 pour la conférence IWRM.
Son numéro de passeport est le suivant : 2268522.

Ses frais de déplacement et de séjour en Allemagne seront pris en charge par les organisateurs KMK de Karlsruhe.

Nous vous remercions vivement par avance de votre aide précieuse pour l'obtention de son visa dans les meilleurs délais et vous prions d'agréer, Monsieur le Consul, nos salutations distinguées.



Sophie Cabotte / CCI franco-allemande
Tél. : 01 40 58 35 80
Email : salondulijouet@francoallemand.com

A. Nasser Group
Mr. Ahmed El Zayat - Executive Manager

Fax: 206 1932

Dear Mr. El Zayat,

It gives us great pleasure to invite you to a reception on June 19, 2006 at the Ambassador's Residence in the German Embassy to celebrate the Soccer World Cup 2006 taking place in Germany.

The final preparations for the world cup are in full swing and will come to fruition on the 9th of June 2006, when millions of fans from all over the world are expected to join in the celebrations as 32 countries battle it out for the title of Soccer World Cup Champion.

The eyes of the world will be upon Germany and the tournament provides the ideal opportunity for Germany to shine both on and off the pitch.

The official motto of the tournament is "Time to make Friends" and Invest in Germany together with the Land of Ideas campaign would like to apply this motto to a series of events throughout the world aimed at celebrating the legendary German hospitality for football fans and investors alike.

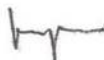
Together with the German-Saudi Arabian Liaison Office for Economic Affairs we would like to give you an insight into the land of ideas and warmly invite you to a celebration of the two factors most commonly associated with Germany: world class football and world class business. Please see the attached program for further details.

I hope you will take advantage of this opportunity to get to know *Germany - The Land of Ideas* a little better.

With best regards



Gerhart Maier
General Manager,
Invest in Germany



Gerd M. Doeppner
Delegate of German Industry & Commerce,
German Saudi Arabian Liaison Office for Economic Affairs

- School Hygiene @ WHO, Egypt (1995)
- On-Site Sanitation @ WHO, Egypt (1996)
- Wastewater Pumping Station Hydraulics, @ FEGAWS, Egypt, (1997)
- Anaerobic Digester Biogas Generation @ Salalah Wastewater Co., Oman (2014)
- Industrial Wastewater Reuse & Recycle @ IPQC Abu Dhabi, UAE (2015)
- Monitoring Performance of Industrial Wastewater Treatment Facilities MRMWR, Muscat, Oman (2015)
- Bio-Win Simulation for Wastewater Treatment Plant @ Haya Water, Muscat, Oman (2015)
- Industrial Wastewater Treatment, Challenges and Re-use", Sohar, Oman (2015)
- Use on Unconventional Water in Urban Water Management, Muscat, Oman (2004)
- Biological Wastewater Treatment Systems Applications, Metito, Cairo, Egypt (2019)

- Dynamic Simulation for ICEAS Process System, AquaEnergyExpo, Saudi Arabia, Riyadh (2020)
- Physical Losses for NRW, AquaEnergyExpo, Saudi Arabia, Riyadh (2021)
- Dynamic Simulation for ICEAS Process System, AquaEnergyExpo, Saudi Arabia, Riyadh (2020)
- Design of MBBR Wastewater Treatment System, Riyadh, Saudi Arabia (2021)
- Water Pollution Control, National Water Company, Riyadh, Saudi Arabia, (2022)
- Green, Blue, Water Infrastructures, Saudi Arabia, Riyadh, OIMTEC (2022)
- HAZOP for Process Treatment Systems, Saudi Arabia, Riyadh, SWCC (2022)
- Desalination Plants Water Pollution Control, Saudi Arabia, SWCC (2022)
- Physical Modelling for Complex Hydraulic Structures, AquaEnergyExpo, Saudi Arabia, Riyadh (2023)
- Pretreatment Stages for Surface & Ground Water, Saudi Arabia, Al Jubail, Saudi Water Academy (2024)
- RO Treatment Process for Brackish & Sea Water, Saudi Arabia, Al Jubail, Saudi Water Academy (2024)
- Post Treatment Process for Brackish & Sea Water, Saudi Arabia, Al Jubail, Saudi Water Academy (2024)

WEBINARS / SEMINARS / WORKSHOPS

(الدبلومة التطبيقية في أنظمة المياه والصرف الصحي (تخطيط - تصميم - تشغيل)

Applied Diploma In Water & Wastewater Systems (planning , Design & Operation



عناصر الدورة التدريبية

- 1- Planning & Study of Infrastructures for Urban cities.
- 2- Green , Blue , Gray & Infrastructure.
- 3- Water Resources and Water Use.
- 4- Population forecast and water demands.
- 5- Design of Water Supply System.



- 6- Types of Pipes and valves.
- 7- Design of Transmission Lines.
- 8- Design of Pumping Stations.
- 9- Design of Surface Water Purification Plants.
- 10- Water Quality Standards & Management

ورشة عمل أون لاين
مجانية

د/ أحمد صلاح الدين الزيات

التاريخ
(السبت 12 يونيو 2021)

مدة ورشة العمل
(ساعة)
(11:30 - 12:30)

**تصميم نظام المعالجة البيولوجية
للمتعلق المتكامل**
مع الحماية المنشطة IFAS

Zoom
FREE ONLINE WORK SHOP

مع مرعاة فروق التوقيت في بلدان العالم

SOUL water

ورشة عمل أون لاين
المحاكاة الديناميكية ونموذج المعالجة البيولوجية
باستخدام برنامج BioWin لحظته معالجة ICEAS
طاقة 120 ألف / م3 يوم

الدكتور
أحمد صلاح الدين الزيات

Zoom
FREE ONLINE WORK SHOP

Bio Win Process Modelling
ICEAS Case Study 120,000 CMD
حاله دراسه لمحطة قائمة تحت التشغيل

مجانية

(الجمعة 2 أبريل 2021)
مدة المحاضرة (ساعة)
(4:30 - 3:30) عصر (بتوقيت القاهرة)

مع مرعاة فروق التوقيت في بلدان العالم

SOUL water

4 **ورشة عمل أون لاين**
مجانية

MBBR Process Design System
تصميم أنظمة المعالجة البيولوجية للنوساط
الديناميكية ذات النمو المتعلق

Zoom
FREE ONLINE WORK SHOP

(السبت 5 يونيو 2021)

مدة ورشة العمل (ساعة) (1:30 - 12:30) ظهرا (بتوقيت القاهرة)

مع مرعاة فروق التوقيت في بلدان العالم

د/ أحمد صلاح الدين الزيات

SOUL water



FREE ONLINE WORK SHOP

الدكتور

أحمد صلاح الدين افرات

مجانيه

ورشة عمل

المحاكاة الديناميكية ونماذج حسابية
لعمليات معالجة الصرف الصحي

Dynamic Simualtion & Process Modelling For WWTPS

الساعة 12:30 - 1:30 ظهرا

يوم السبت 27 من شهر مارس 2021



ورشة عمل أون لاين

IFAS & MBBR Wastewater
Treatment Biological
System Design

عبر تطبيق زوم لايف

مجانيه

الدكتور

أحمد صلاح الدين افرات

أسس تصميم ونمذجة أنظمة
المعالجة البيولوجية

IFAS & MBBR

يوم السبت 17 ابريل
الساعة 12: بتوقيت القاهرة
الوقت : ساعه ونصف



Free Online Webinar
Physical Modelling for Complex Hydraulic Structures




Dr . Ahmed El-Zayat

- ✔ What is a Physical Modelling?
- ✔ Physical Model VS Computational Fluid Dynamic CFD?
- ✔ How to perform Physical Modelling?

Participants will get a certificate of attendance



Date: Saturday, January 20th
Time :from 8:15 to 10 PM
(Saudi Arabia Time)

Organized by  www.aquaenergyexpo.com



Free Online Webinar
"Hazards & Operability Study"

Webinar Topics:

- Introduction
- HAZOP Objective
- HAZOP Methodology
- HAZOP Ground Rules
- Risk Ranking
- Study Team
- Resources
- Recording Software
- Study Workshop
- Study HAZOP
- Recommendations
- Risk-Based Recommendations




Dr. Eng. Ahmed Salah Eldien El-Zayat

Date: Saturday, March 9th
Time: from 08:30 to 10:30 PM
(Saudi Arabia Time)
(On Google Meet)

Participants Will Get a Certificate of Attendance



Organized by  www.aquaenergyexpo.com

CONFERENCE
OMAINTEC
EXHIBITION

THE 20TH INTERNATIONAL OPERATIONS & MAINTENANCE CONFERENCE IN THE ARAB COUNTRIES

WORKSHOP 08

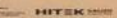
BGI as an Integrated Approach for Climate Change Adaptation in Saudi Arabia
البنية الخضراء والزراعة كاستراتيجية مناخية للتكيف مع تغير المناخ في المملكة العربية السعودية



Dr. Ahmed ElZayat
Water Engineering Manager
IIR Consulting Engineers
Egypt

Mon 08 Jan 2023
11:00 - 12:15

Organized by  

Organized by  



ورشة عمل

دراسة المخاطر وقابلية التشغيل

Hazards & Operability Study (HAZOP)

www.aquaenergyexpo.com



Dr. Eng. Ahmed Salah
Eldien El-Zayat

شركة المياه الوطنية
National Water Company



ساعة المعرفة
Knowledge hour

مفاهيم أساسية في معالجة تلوث المياه



تقديم

د. أحمد الزيات

• مستشار فني
• مستشار معتمد
• خبير استشاري في مجال المياه والصرف الصحي

الأهداف

- تعريف تلوث المياه.
- مصادر تلوث المياه.
- توصيف مياه الصرف الصحي.
- أنظمة معالجة مياه الصرف الصحي.

الثلاثاء
2021/12/07



من 12:30 مساءً
حتى 02:30 مساءً



المستهدفون لحضور الدورة
المدرسة ورؤساء الأقسام والمهندسين



الدارة العامة للتدريب والتطوير
Training and Developing General Department



OPEN ONLINE WEBINAR

"RO Water Desalination Plants Performance Assessment"

Webinar Topics:

- Basics of Reverse Osmosis
- Factors Affecting Reverse Osmosis and Nanofiltration Performance
- RO Plant Performance Calculations
- Membrane Fouling
- RO Plant System Performance Assessment
- RO Data Trending and Normalization



Dr.Eng. Ahmed El-Zayat

Date: Friday, July 26th
Time: from 09:30 PM to 11:30 PM
(Saudi Arabia Time)



SCAN HERE

Participants Will Get a Certificate of Attendance

Organized by  www.aquaenergyexpo.com



وبينار

المملكة العربية السعودية رائدة صناعة التحلية في العالم

Saudi Arabia is the World's Leader
in the Desalination Industry



www.iwrn-karlsruhe.com
Integrated Water
Resources
Management

Dr.Eng. Ahmed El-Zayat

 www.aquaenergyexpo.com



AquaEnergy Expo

Open Online Webinar

Desalination Process Innovations



Dr. Eng. Ahmed El-Zayat

Webinar Topics

1. Global Water Resources
2. Saltwater Composition
3. Major & Minor Desalination Systems
4. Green Desalination
5. Green / Renewable H2 & Desalination Ability
6. Desalination Process Innovations
7. R&D in Desalination by WTIIRA
8. Desalination Industries Vendors

 Date: Friday, September 13th
Time: from 09:15 to 11:15 PM


SCAN HERE!

Participants Will Get a Certificate Of Attendance

Organized by  [www.https://aquaenergyexpo.com](https://aquaenergyexpo.com)

ASCE *American Society of Civil Engineers*

By action of the Board of Direction

AHMED SALAH EL-DIN EL-ZAYAT

has been elected

MEMBER

who is entitled to all the privileges granted by the Constitution of the Society, an organization
for the advancement of professional knowledge and the improvement of civil engineering.



James E. Davis, Executive Director



H. Gerard Schwartz, Jr., President

June, 2002

MITGLIEDSAUSWEIS 2002

Mitgliedsnr: 5036

Herrn

Ahmed Salah El-Dien El-Zayat

Deutsche Vereinigung für Wasserwirtschaft,
Abwasser und Abfall e.V.

Tel.: 02242/ 872-0 • E-Mail: atvurg@atv.de



ASCE



Ahmed El-Zayat

Grade: Member
SAUDI ARABIA SECTION

Member #: 393064

A handwritten signature in black ink, appearing to read 'James E. Davis', is written over a horizontal line.

James E Davis, P.E., F.ASCE
CEO and Executive Director

The American Society of Civil Engineers certifies that this member
is in good standing through 2002



This is to certify that
Ahmed Salah El-Din El-Zayat
is a member in good standing of

The Environmental & Water Resources Institute
of the American Society of Civil Engineers
1801 Alexander Bell Drive, 1st Floor
Reston, VA 20191-4400

Phone: 703-295-6380

Fax: 703-295-6132

Website: www.EWRIInstitute.org

Identification No.

Grade

393064

Member



American Water Works Association

Dedicated to Safe Drinking Water

6666 W. Quincy Avenue | Denver, CO 80235

AHMED EL-ZAYAT

MEMBER # 00535688

MEMBERSHIP EXPIRES JULY 31, 2003

MEMBER TYPE 03, International Active

SECTION International Members

Jack W. Hoffbauer
Executive Director

Quick Reference Phone Numbers

Headquarters Switchboard 303-794-7711

AWWA Customer Service Line 800-826-7337

(includes Bookstore [publications ordering], member record changes, general membership questions, conference information [registration, exhibitor, hotel, technical content])

Fax # Membership Changes 303-347-0804

Section Services Information 303-347-6202

AWWA Official Travel Service 800-821-5154

AWWA Small Utility Network 800-396-0107

WaterWiser 800-556-8855

AWWA Homepage <http://www.awwa.org>



WATER MIDDLE EAST 2004
Bahrain International Exhibition Centre
13-15 September 2004 - Kingdom of Bahrain

AHMED EL-ZAYAT
CONFERENCE SPEAKER
ENVIRONMENTAL ENGINEERING GROUP

WME2004 CONFERENCE

9/15/2004

CERTIFICATION

This certificate is awarded to

Mr. Ahmed El-Zayat



REGIONAL CENTRE ON URBAN WATER MANAGEMENT — TEHRAN
UNDER THE AUSPICES OF UNESCO

Dr. R. Ardakanian
Director, RCUWM - Tehran



MINISTRY OF REGIONAL MUNICIPALITIES,
ENVIRONMENT & WATER RESOURCES

Mr. Abdullah al Bakri
Undersecretary for Water Resources Affairs



*In recognition of his participation in
the international seminar on*

***Experiences and Practices of
Water and Wastewater Technology***

MUSCAT, SULTANATE OF OMAN
OCTOBER 5-7, 2004

Sultanate of Oman
Ministry of Regional Municipalities,
Environment & Water Resources
Directorate General of Water
Resources Affairs



سلطنة عمان
وزارة البلديات الإقليمية والبيئة وموارد المياه
المديرية العامة لشؤون وموارد المياه

Rf. : MRMEWR/WR/11/05

Date : 16th August 2005

C7 :

الرقم :

التاريخ :

الموضوع :

Eng. Ahmed El-Zayat
Senior Environmental Specialist
SAUDCONSULT, K./S.A
Cairo EGYPT

Dear Eng. El Zayat,

This has a reference to the letter of acceptance which was sent to you by our joint partner in Iran Regional Center on Urban Water Management - Tehran, for attending International Workshop on "Public Participation, Awareness and Information Exchange for Water Resources Development and Management"

The Ministry of Regional Municipalities Environment and Water Resources have a pleasure to invite you to participate in this technical events that will be held on 26 28 September 2005 in the Sultanate of Oman.

We are looking forward to meeting you soon in Oman.

Sincerely Yours


Eng. Zahir Al Suleimani
Director General Water Resources Affairs



سلطنة عمان



Sultanate of Oman
*Ministry of Regional Municipalities,
Environment & Water Resources*
*Directorate General of Water
Resources Affairs*

سلطنة عمان
وزارة البلدية والبيئة والموارد المائية
المديرية العامة لشؤون وموارد المياه

Ref: MRMEWR/WR/11/05
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Cairo EGYPT

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We are looking forward to meeting you soon in Oman.

Sincerely Yours


Eng. Zahir Al Suleimani
Director General Water Resources Affairs



CERTIFICATION

This certificate is awarded to

Mr. Ahmed El-Zayat



REGIONAL CENTRE ON URBAN WATER MANAGEMENT - TEHRAN
UNDER THE AUSPICES OF UNESCO

Dr. Reza Ardakanian
Director, RCUWM - Tehran



MINISTRY OF REGIONAL MUNICIPALITIES,
ENVIRONMENT & WATER RESOURCES

Mr. Abdullah al Bakri
Undersecretary for Water Resources Affairs



*in recognition of the outstanding paper presented in the
International Workshop on*

***Public Participation, Awareness and
Information Exchange in Water Resources
Development and Management***

MUSCAT, SULTANATE OF OMAN
SEPTEMBER 26-28, 2005



**THE 7TH
SAUDI-JAPAN BUSINESS COUNCIL
JOINT MEETING**

Riyadh, March 22, 2006

AHMED EL ZAYAT

3rd International Conference
for Water Resources and Arid Environment 2008
and 1st Arab Forum

16 – 19 November 2008
King Fahd Cultural Center – Riyadh, Saudi Arabia

25 October 2008

Dear Dr Ahmed El-Zayat:

We are pleased to inform you that your paper entitled:

BIOLOGICAL PHOSPHORUS REMOVAL FEASIBILITY STUDY

has been accepted for the 3rd International Conference on Water Resources and Arid Environments (2008) and the 1st Arab Water Forum to be held in Riyadh, Saudi Arabia from 16-19 November 2008.

You will be provided with hotel accommodation, inclusive of breakfast, only from 15 to 20 November 2008. Lunch will be served at the Conference venue itself. Transportation between the hotel and conference venue will also be provided.

Airplane tickets will not be provided by the Conference. Attendees will have to arrange their own airfare.

For enquiries, please contact us at info@psipw.org.

For more information about the Prize, please visit our website at: www.psipw.org.

Best regards,



Dr. Abdulaziz Al Bassam
Chairperson of the Scientific Committee

ORGANIZERS



CERTIFICATE OF PARTICIPATION

*The Organizing Committee of the Conference would
like to thank*

Ahmed AlZayat

Environmental Engineering Group - Egypt

*for providing valuable scientific input and contributing to
the success of the Conference and Forum*

Dr. Abdulmalek A. Al Alshaikh
Chairperson of the Organizing Committee.

19 November 2008



CERTIFICATION

This certificate is awarded to

Dr. Ahmed S. El Zayat



United Nations
Educational, Scientific and
Cultural Organization



Regional Centre
on Urban Water Management
(under the auspices of UNESCO)



MINISTRY OF REGIONAL MUNICIPALITIES
AND WATER RESOURCES

REGIONAL CENTRE ON URBAN WATER MANAGEMENT — TEHRAN
UNDER THE AUSPICES OF UNESCO

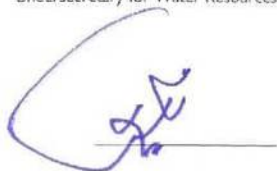
Dr. Homayoun Motiee
Director, RCUWM - Tehran

Eng. Ali bin Mohammed Al-Abri
Undersecretary for Water Resources Affairs

*in recognition of the outstanding paper presented in
the International Conference on*

Capacity Building in Urban Water Management Under Water Scarcity Conditions

MUSCAT, SULTANATE OF OMAN
DECEMBER 13-15, 2009





بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

شهادة حضور



تشهد الإدارة العامة للصرف الصحي والوكالة اليابانية للتعاون الدولي (jica)

بأن الدكتور / أحمد الزيادات

قد حضر ورشة عمل عن

" دورة مصممي محطات معالجة مياه الصرف الصحي " التي عُقدت في اليابان

والتي أقامتها الإدارة العامة للصرف الصحي لمدة يومين بتاريخ (١٣-١٤) / ١١ / ١٤٢٩ هـ

مدير عام إدارة الصرف الصحي

م/ يعرب أمين خياط



ممثل جايكا بالمملكة

Mr. Tomizawa

رئيس فريق الخبراء

Mr. Naoki Mori

KMK-EMGH | P.O. BOX 1209 | 76002 KARLSRUHE - GERMANY

By e-mail

Karlsruhe, 23/06/2010

IWRM Karlsruhe 2010 | Call for Papers

Dear Mr. ElZayat,

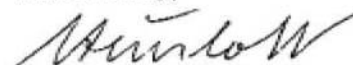
by submitting your paper to the IWRM Karlsruhe 2010, you have underscored the international importance of managing the vital resource water, which is attested to by the fact that we received a total of 150 papers on the topic. We would like to thank you for your contribution!

We are glad to inform you, that your submission has been chosen as a presentation by our advisory board.

Please confirm that you will speak at IWRM Karlsruhe 2010 with the attachment to this letter. We will send you further information to the Full-Paper and the organisational details after having received your confirmation.

We are looking forward to welcome you in Karlsruhe on the 24th and 25th November 2010 and ask you to send us the confirmation of your presentation via e-Mail or fax until the 7th July 2010.

Yours sincerely,



Prof. Hartwig Steusloff
Chairman of the Advisory Board,
Fraunhofer IOSB



Britta Wirtz
Managing Director,
Karlsruher Messe- und Kongress-
GmbH

KONGRESSZENTRUM KARLSRUHE

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E info@emkg.de

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F +49 721 3720-5494

GESCHÄFTSFÜHRER
MANAGING DIRECTOR
Britta Wirtz (Sprecherin/Speaker)
Klaus Helfmann

VERSTÄNDLICHE DES AUFSICHTSRATS
CHAIRMAN OF THE SUPERVISORY
BOARD
Erste Bürgermeisterin/
First Mayress
Margret Mergen

Reg.-Ger. Mannheim
HRB 108147

MITGLIED
MEMBER
AUMA | FKM | GSB | IDFA | EWG

www.messe-karlsruhe.de
www.iwr-karlsruhe.com

KMK-GMBH | P.O. BOX 1208 | 76002 KARLSRUHE - GERMANY

Certificate of Participation

Karlsruhe, November 2010

This is to certify that

Dr. Ahmed El-Zayat

has attended **IWRM – Integrated Water Resources Management -Karlsruhe 2010**, which was held from 24 – 25 November 2010 in the Convention Center Karlsruhe, Germany.
He has given a lecture with the following title: "Multi-criteria framework for performance benchmarking of the water sectors in the Nile Basin".



Prof. Dr. Hartwig Steusloff
Chairman of the IWRM Karlsruhe
Advisory Board
Fraunhofer IOSB



Britta Wirtz
Managing Director
Karlsruher Messe- und
Kongress-GmbH

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F +49 721 3720-5494

GESCHÄFTSFÜHRER
MANAGING DIRECTOR
Britta Wirtz (Sprecherin/Speaker)
Klaus Hoffmann

VORSITZENDE DES AUFSICHTSRATS
CHAIRWOMAN OF THE SUPERVISORY
BOARD
Erste Bürgermeisterin/
First Mayoress
Margret Mergen

Reg.-Ger. Mannheim
HRB 100147

MITGLIED
MEMBER
AUMA | FKM | GCB | IDFA | EVVC

www.messe-karlsruhe.de
www.iwrm-karlsruhe.com



IWRM

Integrated Water
Resources
Management

Karlsruhe 2010

Dr. Ing. Ahmed Salah ElDien ElZayat

Environmental Sanitation & Water Resources Expert
Environmental Engineering Group (EMG)
Egypt-Faiyoun



(20) 144644007 - (966) 503286757



(20) 846310412 - (966) 26525743



E-mail contact



Presentations:

Multi-criteria Framework for Performance Benchmarking of the Water Sectors in the Nile Basin

□ 11/25/2010 14:00-14:20

Specialization: Water & Wastewater Treatment Systems / Water Resources & Irrigation

Education:

- B. Sc. of Civil Engineering, Cairo University, Giza, 1987
- Environmental & Sanitary Engineering Diploma of Higher Studies, Cairo University, Giza
- Master of Science, (Cairo University, Giza)
- (Comparative Study On Activated Sludge Biological Treatment Systems in Some Arab Cities)
- Doctor of Philosophy Degree (Cairo University & Co-Referee Ruhr University, Bochum, Germany) (Development Dynamic Simulation & Modelling for Bio-P Removal)

ICWRAE
The International Conference on Water Resources and Arid Environments



المؤتمر الدولي
للموارد المائية والبيئة الجافة

The 4th International Conference on Water Resources and Arid Environments 2010

6 - 8 December 2010 (30 Dhu Al-Hijjah 1431 H - 2 Muharram 1432 H)

Certificate of Participation

The Organizing Committee would like to thank

Dr. Ahmed Mohamed

for providing valuable scientific input and contributing to
the success of the Conference

*Dr. Abdulmalek A. Al Alsheikh
Chairperson of the Organizing Committee
6th December 2010*

Organizers



Acknowledgement

Dr. Ahmed El-Zayat

*In recognition of your informative presentation in the
International Seminar on*

Use of Unconventional Water in Urban Water Management

Muscat – Sultanate of Oman
24-26 February 2014

Regional Centre on Urban Water Management-Tehran
under the auspices of UNESCO

Dr. Homayoun Motiee
Director, RCUWM - Tehran



Ministry of Regional Municipalities
and Water Resources, Sultanate of Oman
Eng. Ali bin Mohammed Al-Abri
Undersecretary for Water Resources Affairs

المنظمة الأورو عربية لأبحاث البيئة والمياه والصحراء
تشهد المنظمة الأورو عربية لأبحاث البيئة والمياه والصحراء أن :-

Dr Ahmed ElZayat

EMG Egypt

قد شارك باعمال المؤتمر الدولي السادس للموارد المائية والبيئة
"بيئتنا ومياهنا حاضرننا ومستقبل اجيالنا"،

المنعقد في اسطنبول - تركيا خلال الفترة من ٢٧-٣٠ اكتوبر ٢٠١٤
ببحثه الموسوم "

"Nile Basin Countries Water Strategy " concession

Dr. Lutfi Almomani
President of EWDR



OMAN WATER SOCIETY



الجمعية العمانية للمياه

شكر ونقاش

تتقدم الجمعية العمانية للمياه بالشكر والتقدير

إلى الفاضل / د. محمد الزيات الختم

للمشاركة بفعاليات ندوة مياه الصرف الصناعي

وتحديات المعالجة وإعادة الاستخدام

المنعقدة خلال الفترة من ١-٢ ديسمبر ٢٠١٤م بمدينة صحار



SOHAR
Post-Industrial

azd
المهندسة في الهندسة
AZD Engineering & Consulting

أوربك
Orpic

2014
Water & Energy
١١-١٢-٢٠١٤

مجلس البحث العلمي
The Research Council

الخدمات
INDUSTRIAL SERVICES S.A.O.C.

زاهر بن خالد السليماني
رئيس مجلس الإدارة

7th International Conference on Water Resources and Arid Environments 2016

4-6 December 2016, King Saud University, Riyadh, Saudi Arabia

Certificate of Participation ICWRAE would like to thank

Dr. Ahmed Salaheldin Ibrahim Mohamed

for making a valuable scientific contribution to the conference.

Dr. Abdulmalek A. Al Alsheikh, Chairperson of the Steering Committee

Organizers



وزارة البيئة والمياه والزراعة
Ministry of Environment, Water & Agriculture
Kingdom of Saudi Arabia - المملكة العربية السعودية



مؤسسة سلطان بن عبد العزيز آل سعود الخيرية
Sultan Bin Abdulaziz Al-Saud Foundation

Strategic Partner

samba سامبا



Wednesday 2nd of September 2020

TO WHOM IT MAY CONCERN

This is to certify that Dr. Ahmed Salah Eldien Ibrahim El Zayat, Consultant No. 0105594, has conducted a 30 hours training course for our Design and Proposals' Engineers in the field of Biological Wastewater Treatment Systems and Applications, held at our premises during the period from Sunday 9th of August 2020 to Wednesday 2nd of September 2020.

Training scope covers the following topics:

1. Biological Nutrients Removal Literature Review
2. Simultaneous Nitrification and Denitrification Models
3. Activated Sludge Process Model
4. Extended Aeration / Orbal System Application
5. Bio-Film Concept
6. Competition in Biofilms
7. Crucial Factors for the Dimensioning of MBBR/IFAS
 - Carrier Media Filling Rate vs. Pollutant Loads
 - Temperature at the design point
 - Removal Efficiency
8. Empirical Equations for Biofilm Carbonaceous Uptake and Nitrification
9. Design Optimization and Troubleshoot A MBBR Full-Scale Treatment Plant
10. Media Types and Applications
11. Obstacles and Mistakes Made Can Be Hard to Remedy
12. Problems can arise when Inexperienced Plant Construction Companies and Plastic Manufacturers
13. Complete Mix MBBR Design Model
14. Case Study
15. Reference List in Egypt
16. Trainees Evaluation

This certificate has been issued upon his request, with no obligation on the part of our company.

Yours Faithfully,
Marwa Abdelsalam



Human Capital Manager
Metito Water Treatment SAE

METITO WATER TREATMENT SAE

Regional Office for Africa, Pyramids Heights Office Park - Bldg 7 , Km 22 Cairo - Alex Desert Road Giza, Egypt.

Tel. : +202 35368100, Fax : +202 35362400 email: infoegypt@metito.com

www.metito.com

شهادة شكر وتقدير

تم منح هذه الشهادة الى

د. / أحمد الزيات

نظير جهوده المتميزة في نقل المعرفة لموظفي الشركة من خلال مبادرة ساعة المعرفة
بعنوان (مفاهيم أساسية في معالجة تلوث المياه) بتاريخ ٢٠٢١/١٢/٠٧
متمنين له دوام التوفيق والسداد

مدير عام التدريب والتطوير



سعود بن ناصر العمير