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WATER REFORM
long term technical assistance

EU-AFD TECHNICAL ASSISTANCE PROGRAMME TO SUPPORT REFORMS IN THE WATER AND WASTEWATER SECTORS IN LEBANON

Contract CLB1105 – Funded by UE-AFD - Lot 2

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Diagnosis of BMLWE - Beirut Mount Lebanon Water Establishment – Organization and Human Resources

December 2022 modified February 2023

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CONTENT

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ABREVIATIONS

AFD	Agence Française de Développement
AWO	Autonomous Water Office
BOT	Build, Operate and Transfer
BMLWE	Beirut & Mount Lebanon Water Establishment
BWE	Bekaa Water Establishment
CAPEX	Capital Expenditures
CAS	Central Administration of Statistics
CDR	Council for Development and Reconstruction
DBOT	Design, Build, Operate and Transfer
EDL – EDK	Électricité du Liban – Electricité de la Kadicha
HR	Human Resources
IT	Information Technologies
LBP	Lebanese Pound
LC	Local Committee
LRA	Litani River Authority
LTTA	Long-Term Technical Assistance
LWP	Lebanon Water Project
MHER	Ministry of Hydraulic and Electrical Resources
MoEW	Ministry of Energy and Water
NLWE	North Lebanon Water Establishment
NRW	Non-Revenue Water
NSWS	National Strategy for the Wastewater Sector
NWSS	National Water Sector Strategy
O&M	Operation and Maintenance
OPEX	Operational Expenditures
PPP	Public-Private Partnership
RSR	Registered Syrian Refugees
WE	Regional Water Establishment
SCADA	Supervisory Control and Data Acquisition
SLWE	South Lebanon Water Establishment
UN	United Nations
WHO	World Health Organization
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1 EXECUTIVE SUMMARY

The "Technical assistance programme to support reforms in the water and wastewater" of Lebanon is funded by the European Union and implemented by the AFD (Agence Française de Développement). Within this overall context, ASPA/SCE was contracted by AFD to carry out an assessment, focusing on the identification of organizational and human resources (HR) issues which affect the four Regional Water Establishments (WEs) of the country, in order to elaborate operational action plans and road maps for each WE.

The present report aims at presenting a diagnosis of the current situation of the Beirut Mount Lebanon North Lebanon Water Establishment (BMLWE). It is based on a detailed review of existing documentation and data, consolidated by technical visits to the main actors of the Lebanese water sector (November 2022), including BMLWE.

It presents a general review of the national context and of the current performances of BMLWE, before identifying gaps and challenges of peculiar relevance for the further steps of the assessment, i.e., the establishment of recommendations related to the internal reorganization of the utility and its HR management.

Main findings

- The reform of the national water sector framework is incomplete. Decisions on the exact role expected from the WEs are required before addressing the organizational structure and the needs of personnel of each establishment.
  - Relationship with the tutela of the Ministry of Electricity and Water (MoEW).
  - Interfaces with other actors such as the CDR (Council for Development and Reconstruction) and the municipalities. What is the commitment of the WE about sewerage collection and treatment? Also, about irrigation?
  - Lack of objectives clearly set-up and monitored through performance indicators.

  In short, is it not possible to determine the detailed organizational framework and to address the RH issues of an WE before having a clearer "delegation contract" which defines the role of the entity.
- The status of the WEs is unclear. The original spirit of Law 221-2000 was giving a status of independent organization, self-sufficient in terms of finance and autonomous in terms of internal administration. This spirit has been jeopardized by subsequent legal decisions. The application of the rules defined by the Public Service Council for organizational chart, personnel recruitment, and HR management are incompatible with the activity of an operating company.

  It might be clearly decided which model to be followed by the WEs. Is BMLWE a "company" (although owned by the State) or a "public authority"?
- The available information is poor. This penalized the accuracy of a 360º diagnosis of the utility, before scrutinizing the HR issues.
- The present organization chart, established by law, is not complying with the requirements. Some activities are totally or partially missing such as wastewater, irrigation, communication, customer service, HR, water resource management, IT, health and safety, NRW control, etc.
- BMLWE is facing many difficulties related to human resources: retirement without replacement, resignations of skilled personnel due to better offers in the private sector, recruitment prohibited since 2017, and recruitment process submitted to the control of the Public Service Council.
- Obviously, financial issues are also at the root of many difficulties. The present national crisis emphasizes, up to a critical stage, problems which already existed before the crisis. Organizational charts and HR management in WEs must be thought on a long-term basis, as part of the revision of the overall national water sector framework.

2 INTRODUCTION

2.1 OBJECTIVE OF THE PRESENT REPORT

The "Technical assistance program to support reforms in the water and wastewater" of Lebanon is funded by the European Union and implemented by the AFD (Agence Française de Développement).

Within this overall context, ASPA/SCE was contracted by AFD to carry out an assessment, focusing on the identification of organizational and human resources issues which affect the four Regional Water Establishments (WEs) of the country, to elaborate operational action plans and road maps for each WE.

A diagnosis report of the current situation of Beirut Mount Lebanon Water Establishment (BMLWE) has already been prepared by the Long-term Technical Assistance (LTTA) contracted by AFD for the overall Technical Assistance Program to Support Reforms in the Water and Wastewater.[1]

The present document intends to consolidate the previous LTTA's diagnosis with additional information gathered through the meetings and technical visits carried out in November 2022. They focus on the specific topics which are at the heart of ASPA's assessment.

As such, Chapter 3 summarizes a general review of BMLWE's current situation. Chapter 4 addresses more specifically the challenges in terms of human resources management.

Chapter 5 intends to identify key issues that will have to be discussed with BMLWE in meetings focused on the review of the HR management of the utility. Annex 6.7 proposes a generic organizational chart to be used as a starting basis when investigating the more appropriate structure for BMLWE.

A workshop will be organized with the management of the WE to present and discuss the findings of the present report.

2.2 OVERVIEW OF THE NATIONAL CONTEXT

2.2.1 Overall framework of the water sector

Up to the year 2000, Lebanese drinking water services were managed by 22 Water Boards and 209 Local Committees.

The situation before 1999

Over time, Mesopotamian, Roman, Ottoman, and French water laws came to cohabitate with Muslim customs and practices and traditional Arab social water arrangements in Lebanon.

Customs and practices were constituted by various rules relating more to common sense than anything else and were recognized over time and given approval by legislators. It was not until the Ottoman reforms of 1839 and the publication of the Mejelleh Code, published by the Ottoman Empire in 1877, that a large part of the prevailing customs and habits was transformed into juridical texts.

The period of the French Mandate over Lebanon (1920– 1943) witnessed the adoption of two fundamental texts related to the protection and utilization of public water (Orders 144-S/1925 and 320/1926), which led to the involvement of French engineers via the inauguration of large-scale hydraulic projects and concession contracts that were put in place as part of their 'mission hydraulique'.

[1] AFD (2022). *Initial Diagnostic of the Water Establishments – Data collection and diagnosis report – BMLWE*, Consultants Hydroconseil-Hydrophil-VA, Revised Edition, July 2022.

After Lebanon gained independence in 1943, a General Directorate of Hydraulic and Electric Affairs was placed in the hands of the Ministry of Public Works. This situation remained unchanged until 1966, when the Ministry of Hydraulic and Electrical Resources (MHER) was established. Following the creation of the Beirut Water Office since 1951, 2 other Autonomous Water Offices (AWOs) were created to improve potable and irrigation water services to consumers. Decree 4517/1972 governed the organization of the AWOs and their relations with the MHER. This period also saw the creation of the Litani River Authority (LRA) in 1954. More than two hundred Local Committees (LCs) were created along the 1980s to cover the absence of government management of water resources. The LCs were nominally placed under the tutelage of the AWOs. The exploitation of potable water was regulated in 1983 (Decree 108/1983). In 1990, after fifteen years of civil war, the management of water resources was challenged with wrecked infrastructure and a completely disorganized administration.

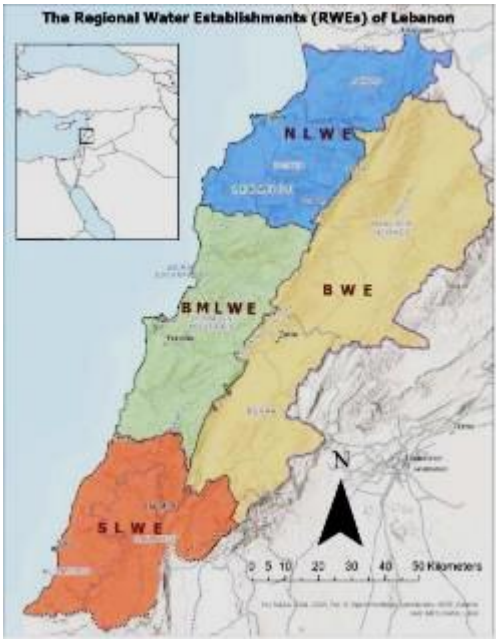
Lebanon embarked upon an ambitious program of social and economic reconstruction to rebuild much of its physical, social and economic infrastructure. The reconstruction program was financed mostly through borrowing from domestic banks, which resulted in a heavy government debt burden. By 1998, the growing debt, created by the postwar reconstruction program, became a major problem, which was exacerbated by the collapse of the country's real-estate sector. This brought the ambitious social and economic reconstruction program, initiated in the 1990s, to a halt.

(see Gharios et al., 2022)

a) Establishment of the WEs

Law nº 221 of 26/05/2000[2] opened a new era with an in-depth reorganization of the water sector. The Law provided the overarching legal framework for the development and operation of the water and wastewater sector in Lebanon. However, the law clearly envisioned and relied on the development of implementing regulations and decrees, which have not been fully developed since then.

- The Law defined the role of the Ministry of Energy and Water (MoEW) as the entity responsible for policy making, planning and implementation, regulation and monitoring of the water sector (water supply, wastewater and irrigation).
- It merged the former Water Boards and Local Committees into 4 Regional Water Establishments (WE), as the main water and wastewater service providers in charge of operating and maintaining the water supply and wastewater infrastructure and providing services to communities:
  - Beirut and Mount Lebanon Water Establishment (BMLWE), located in Beirut, covering the territory of the 2 Governorates of Beirut and Mount Lebanon;
  - North Lebanon Water Establishment (NLWE), located in Tripoli, covering the territory of the 2 Governorates of North Lebanon and Akkar;
  - Bekaa Water Establishment (BWE), located in Zahleh, covering the territory of the 2 Governorates of Bekaa and West Bekaa;
  - South Lebanon Water Establishment (SLWE), located in Saïda, covering the territory of the 2 Governorates of Nabatiyeh and the South.



The WEs enjoy legal personality and financial and administrative independence. According to the law, their mission is to ensure the following services:

[2] Completed by other legal documents:
Law 241/2000 of 07/08/2000, Law 377/2001 of 14/12/2001, Bylaw 8122 of 03/07/2002

- Studying, implementing, operating, maintaining, and renewing water systems to supply potable and irrigation water and collecting, treating, and discharging wastewater, according to the master plan, or upon previous approval by the Ministry.
- Proposing tariffs, taking into consideration the general socio-economic conditions.
- Monitoring the quality of drinking water and the quality of discharged wastewater.

Table 1
Main characteristics of the WEs - 2020

	NLWE	BWE	BMLWE	SLWE
Estimated population served	1 279 000	750.000	2.907.000	1.200.000
Number of villages	457	250	533	385
Number of water treatment plants	3	11	6	7
Produced volume of water (Mm^3/year)	94	68	171	113
Water network length (km)	6 000	4.384	9.000	5.000
Number of connections	67 500	86.761	592.835	176.000
Number of meters installed	60 979	38.400	185.960	NA
Number of employees	604	403	782	236
NRW rate (%)	48%	48%	30% - 40%	55%
Collection rate (%)	50%	32%	79%	51%

Source: data collected by LTTA

b) Litani River Authority

The Litani River Authority (LRA) had been created before the sector reorganization of 2000, aiming at managing water resources and hydropower capacities of the Litani River Basin (part of Bekaa Governorate and South Governorate). It remains as an autonomous entity (under the MoEW), with some attributions with regards to irrigation and water supply in rural areas of the basin.

c) Council for Development and Reconstruction

The Council for Development and Reconstruction (CDR) is another important body of the institutional structure of the sector. The CDR was created in 1977, with a corporate status, and directly attached to the Council of Ministers. The CDR competences focus on planning and implementing infrastructure projects. As such, the CDR is responsible for preparing feasibility studies, undertaking the execution of projects of any public institution, department, or municipality. The CDR, therefore, plays a major role in the investment programs to improve facilities operated by the WEs.

d) National Water Sector Strategy

A National Water Sector Strategy (NWSS) was proposed in 2010, followed by the National Strategy for the Wastewater Sector (NSWS). Both National Strategy Plans for water and wastewater were officially adopted by the Lebanese Government in 2012. The NWSS has been updated in the year 2021.

While the NWSS represented a necessary and important step in the development of the Lebanese water sector, it remained a non-binding executive order that did not impose any legal requirement on public or private entities to take action. The strategical framework constituted, however, an important starting base for the induction of the Canal 800 and Greater Beirut Water Supply Project (GBWSP) projects, as well as the rehabilitation of water distribution networks. The planned US$ 5 billion investment program for the period 2011-2015 was spread across the four WEs (Beirut Mount Lebanon 40%, North 23%, South 21%, and Bekaa 16%). Nevertheless, its implementation has been constrained by weak accountability and continuous delays

in the implementation of Law 221 that should guarantee the institutional and legal autonomy of the WEs. New tariff schemes should have been developed. Indicators related to service quality, collection rate or NRW remained poor. Despite ambitious aspirations, progress towards implementation of the strategy has been very slow up to this date.

A review process for the NWSS began in June 2019. The updated NWSS was issued in 2020, without any mention of the key issues and gaps that remained unchanged.

e) Water Code

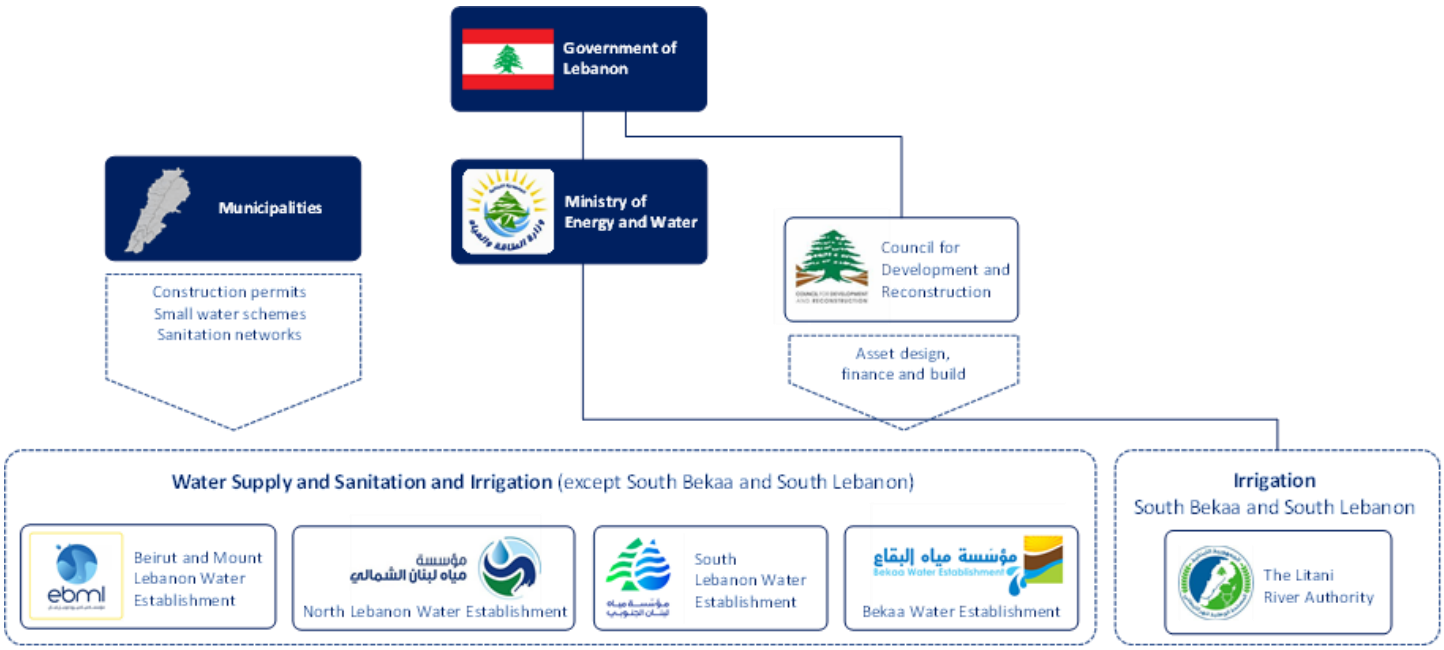
The Water Code was initially drafted in 2005. However, it was promulgated much later, by Law nº 77 dated 13/04/2018, amended by Law nº 192, dated 22/10/2020. It is not yet under application.

The Water Code represents a refinement of the institutional framework of the sector, reinforcing some major principles, such as sustainable management, responsibility of public authorities to ensure drinking water and water for irrigation, wastewater treatment, water resources protection and water quality control.

It completes the Law 221 with the creation of the National Water Council as main policy and planning body.

It also encourages private sector participation and promotes the principle of having polluters pay for the pollution they produce. Public establishments (including WEs) are allowed to delegate management and to promote PPP (Public-Private Partnership) projects[3]. Unfortunately, the text does not provide sufficient details on how the new policies might be implemented.

Figure 1
Water Sector Institutional Organization



Source: 2012 Water Strategy Document

In conclusion, the present institutional framework of the sector is clearly established in terms of general principles, but lacks complementary decrees to detail the reforms:

- Decree on vested rights over water.
- Composition and organization of the National Water Council.

[3] Legal forms of Built-Operate-Transfer – BOT, or Design-Build-Operate-Transfer – DBOT.

- Tariffs and fees regime.
- Public WSS services delegation types and arrangements for PPP.
- Rights and responsibilities of water users' associations.
- Etc.

2.2.2 Challenges related to the current national crisis

With the end of the hostilities in 1990, the challenges of post-war policy reforms in Lebanon's water sector became evident. The water and sanitation infrastructure, badly scarred by the civil war, had to be rebuilt.

Twenty years after launching its water sector reform, Lebanon has not been able to completely meet the needs of the water users or the priorities of the managing authorities. Significant delays and weaknesses have impeded the full implementation of the key reform launched in 2000. Poor coordination among government entities has led to the continuing fragmentation of responsibilities for investment planning and execution, and partial implementation of a delegated model of service provision has not been complemented by a parallel effort to strengthen central government management of the water sector.

The MoEW and the LTTA have already detailed the challenges in two documents:

- Updated National Water Sector Strategy 2020-2035;
- Road Map to the Recovery of the Water Sector in Lebanon.

Although the Water Code was amended in October 2020, it still carries on with the same old problem of adding another layer on top of older water texts without entirely replacing the old ones.

As a result, the development of WEs is still hampered by key drawbacks:

- The distribution of responsibilities and tasks are not sufficiently detailed, between the operational level of the WEs and the tutela / regulation at national level.
- The autonomy of the WEs is nominal at best. They are still linked to the central government in key areas:
  - Inability to hire staff independently of government's consent, and obligation to follow the Council for Civil Service rules and procedures.
  - Financial independence is non-existent.
  - Poor cost recovery (insufficient tariff, high NRW and poor collection efficiency).
  - Unclear ownership of the assets.
  - Insufficient cooperation with security and legal authorities to enforce laws.
- Relationship with consumers and coordination with municipalities are poor:
  - Wastewater fees conflict with fees levied by municipalities – there is double tapping where both entities levy the same tariff separately and independently;
  - Lack of trust.
  - Poor communication with beneficiaries.
  - Lack of transparency.

Table 2 summarizes some more relevant challenges. The last box (Organizational challenges for the WEs) is the mere subject of the present study. Nevertheless, these organizational challenges cannot be properly addressed as long as clear strategic decisions have not been taken with regards to the preceding boxes.

Table 2
Tentative summary of key challenges

Financial challenges
• Solve the issue of the pending invoices issued by private operators hired to manage wastewater treatment plants. The contracts were signed by the CDR, a settlement should be agreed. • Improve the investment capacities of the WEs to be able to face the future needs of the services. • Reduce deficit and balance income v/s expenses, which means rationalize O&M expenses as well as review the tariff settings in compliance with the real cost of the service
Commercial challenges
• Upscale metering and improve billing efficiency. • Increase the number of customers by the identification of illegal connections. • Improve the quality of services to reinforce the confidence of the customers in the WEs. • Increase the collection rate.
Technical challenges
• Implement meters to monitor the volumes on the water sources and the production. • Develop an action plan to control and reduce the NRW. • Rehabilitate old infrastructures. • Takeover the wastewater plants management under in-house or outsourced operation
Legal and institutional challenges

• Complete the application decrees of the Water Law.
• Clarify the relationships between the WEs and their tutela (MoEW), the municipalities, the CDR and all other entities related to the sector.
• Reinforce the WEs' autonomy, in particular for the recruitment process and HR management.
• Deeply review the framework for wastewater services. For the time being:
  • The WEs are officially responsible for the service provision, but this responsibility is not considered in their organization as stated by the law
  • Most existing WWTPs are handled by the CDR
  • Sewerage network operation is partially carried out by municipalities
  • Tariff levels for sewerage are unrealistically too low
• Also review the real level of responsibility of the WEs in terms of water resource management and irrigation.

Organizational challenges for the WEs
• Review the organization of each WE according to the services to be provided. • Reinforce the human resources capacities. • Review and simplify the procurement procedure. • Allow WE to determine salaries competitively outside the government salary scale. • Define a strategy about outsourcing, and develop contractual schemes based on performance.

3 GENERAL REVIEW OF BMLWE CURRENT SITUATION

EEBML (Établissement des Eaux de Beyrouth Mont Liban, hereafter BMLWE, Beirut Mount Lebanon Water Establishment) is a public institution in charge by law 221-2000 of the drinking water production and distribution as well as irrigation services and wastewater management. The services rendered by BMLWE cover the Lebanese Governorates of Beirut and Mount Lebanon, with a dimension of about 1 992 km^2.

BMLWE serves almost 76% of the 712 000 housing units of the area.

BMLWE management is considering that the present organization has no sufficient capacity to manage the wastewater systems (technical and financial capacities). For this reason, the collection network is still operated by municipalities and the WWTP are still operated under the management of the CDR.

The LTTA team has issued in 2022 a global assessment for the BMLWE. The situation can be summarized as follows:

Table 3
Main indicators of BMLWE's situation (about June 2022)

Population	
Estimated population served	2,900,000
Nbr of municipalities	533
Nbr of Housing Units	500,000
Nbr of connections	83,333
Housing units per connection	6
Subscribers	
Metered subscriber	
North Beirut (Smart meters)	20,000
Upper Matn (Smart meters)	26,000
Kesrouane	12,000
Total metered subscribers	58,000
Gauged subscribers	329,163
Total subscribers	387,163
Rate of metered subscribers	15%
Water production	
Volume produced (Million m³/Y)	221
Collection rate (%)	60%
Est. NRW rate (%)	8.7%
Water Resources & Infrastructures	
Nbr of WWTP under the WE's jurisdiction	20
Nbr of Water TP	12
Nbr of Wells	315
Nbr of Springs	29
Nbr of Dams	3
Est. length of the water networks (km)	10,000
Wastewater	
Nbr of WWTP under BMLWE jurisdiction (2022)	
Operated by BMLWE	15
Operated by CDR	1
	16
Length of existing sewer	Not
Staffing	
Nbr of actual employees (Permanent + On demar	1176

Source: AFD (2022). Initial Diagnostic of the Water Establishments – Data collection and diagnosis report – BMLWE, Consultants Hydroconseil-Hydrophil-VA, Revised Edition, July 2022

3.1 BEIRUT MOUNT LEBANON AREAS

According to the Central Administration of Statistics (CAS), total population of the area is estimated to 2,6 million inhabitants, including Lebanese, non-Lebanese nationalities and Registered Syrian Refugees (RSR). The population is slightly declining, due to the global crisis that is reinforcing emigration flows and to the progressive reduction of the number of Syrian Refugees.

Despite the population decline, Table 5 shows an increase of the number of households (+0,84% for Beirut and +1,46% for other areas). The population decline is compensated by a progressive reduction of the number of resident per household.

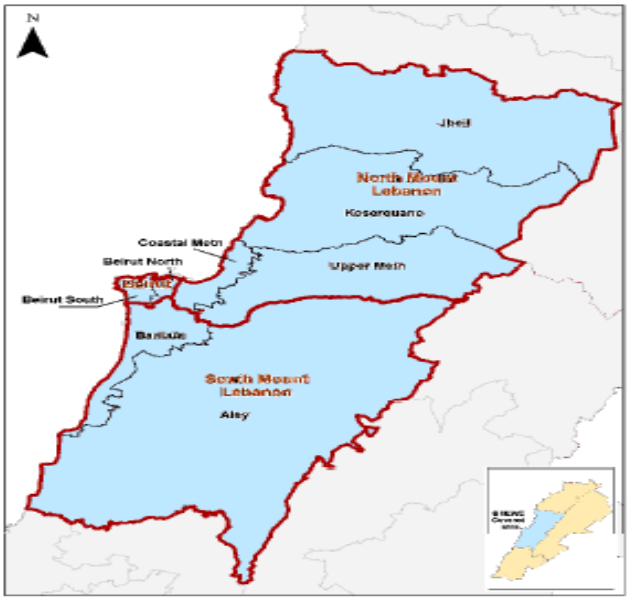


Table 4
Estimated population

	2018	2019	2020	2021
Beirut	342 110	341 939	340 434	337 643
Jbeil	130 000	129 935	129 363	128 303
Keserwan	261 000	260 870	259 722	257 592
Al Matn	511 000	510 745	508 497	504 328
Baabda	554 000	553 723	551 287	546 766
Aley	301 000	300 850	299 526	297 070
Chouf	276 000	275 862	274 648	272 396
RSR	215 569	207 799	196 640	191 051
Total Population	2 590 679	2 581 721	2 560 117	2 535 147

Source: CAS

Table 5
Estimated number of households

	2018	2019	2020	2021
Beirut	100 049	100 260	100 471	100 682
Baabda	151 630	152 185	152 743	153 302
Matn	147 677	148 218	148 761	149 305
Chouf	76 271	76 550	76 831	77 112
Aley	74 936	75 275	75 550	75 827
Keserwan	77 002	77 284	77 567	77 851
Jbeil	35 089	35 218	35 346	35 476
RSR	48 964	47 199	44 664	43 395
Total Households	711 682	712 188	711 933	712 950

Source: CAS – LFHLCS 2018-2019 Primary residences + RSR
CAS survey in 2004 shows that about 8% of Lebanese households have at least one secondary residence within the country

3.2 BMLWE EXPECTED ACTIVITIES

According to the Law 221-2000, the BMLWE must perform the main activities related to the water and wastewater at a competitive level and using modern tools and processes to achieve the goal of satisfying the customers and preparing for future improvements. The activities are confirmed by the Water Law nº 192-2020, which has recently been voted by the Parliament and is still waiting for application decrees. The activities may be summarized as follows:

- Resources management: protection of the water resources,
- Follow-up of the raw water quality,
- Forecast of the water demand,
- Supervision of the treated water quality,
- Management of the house connections,
- O&M of the drinking water distribution network, reservoirs, pumping stations, etc.,
- O&M of the wastewater collection network including pumping stations, as well as wastewater treatment plants,
- O&M of the irrigation systems,
- Proposals for the reinforcement of capacities and for new extensions (water, wastewater and irrigation),
- Implementation of the environment protection policy: treated effluent discharge, sludge management, noise and odors control,
- Customer service management: billing process, collection, metering strategy, quality of service (24/7), customer relation, updating and maintenance of customer database,
- Technical: design and supervision, laboratory, specific software (LIMS, GIS, CMMS, SCADA etc.), process expertise, meters calibration, master plans, power supply, and power optimization
- Tariffs proposals,
- Non-Revenue Water (NRW) policy: illegal connections, illegal wells, disconnections, leak detection,
- Communication: internal, external (universities, civil society, municipalities, etc.),
- Human resources management: wages policy, recruitment strategy, training, performance assessment, careers management, bonus and benefits rules, union relationships, etc.,
- Finance: expenses control, income, accounting, assets management, financial strategy, investment planning, profit & loss, annual balance,
- Legal: insurance, warranties, owner's rights, laws update and compliance, water law, labor law, contracts management, etc.,
- IT: software and hardware maintenance, update, licenses management, security, telecommunication,
- Procurement: cost optimization, products quality, new technologies
- Logistics: sites maintenance (cleaning, landscaping), vehicles, buildings maintenance, HVA,
- Administrative: board coordination, archives, relationships with public administration, chairman office,
- Health and safety: maintenance of the safety equipment, control safety on site works, training, follow-up of accidents
- Regional offices: as BMLWE covers a large area, it is important to maintain local contacts with the customers. Regional offices are implemented and should be maintained. They oversee local customer relations, O&M of local water production and local networks.

3.3 ORGANIZATION CHART OF BMLWE

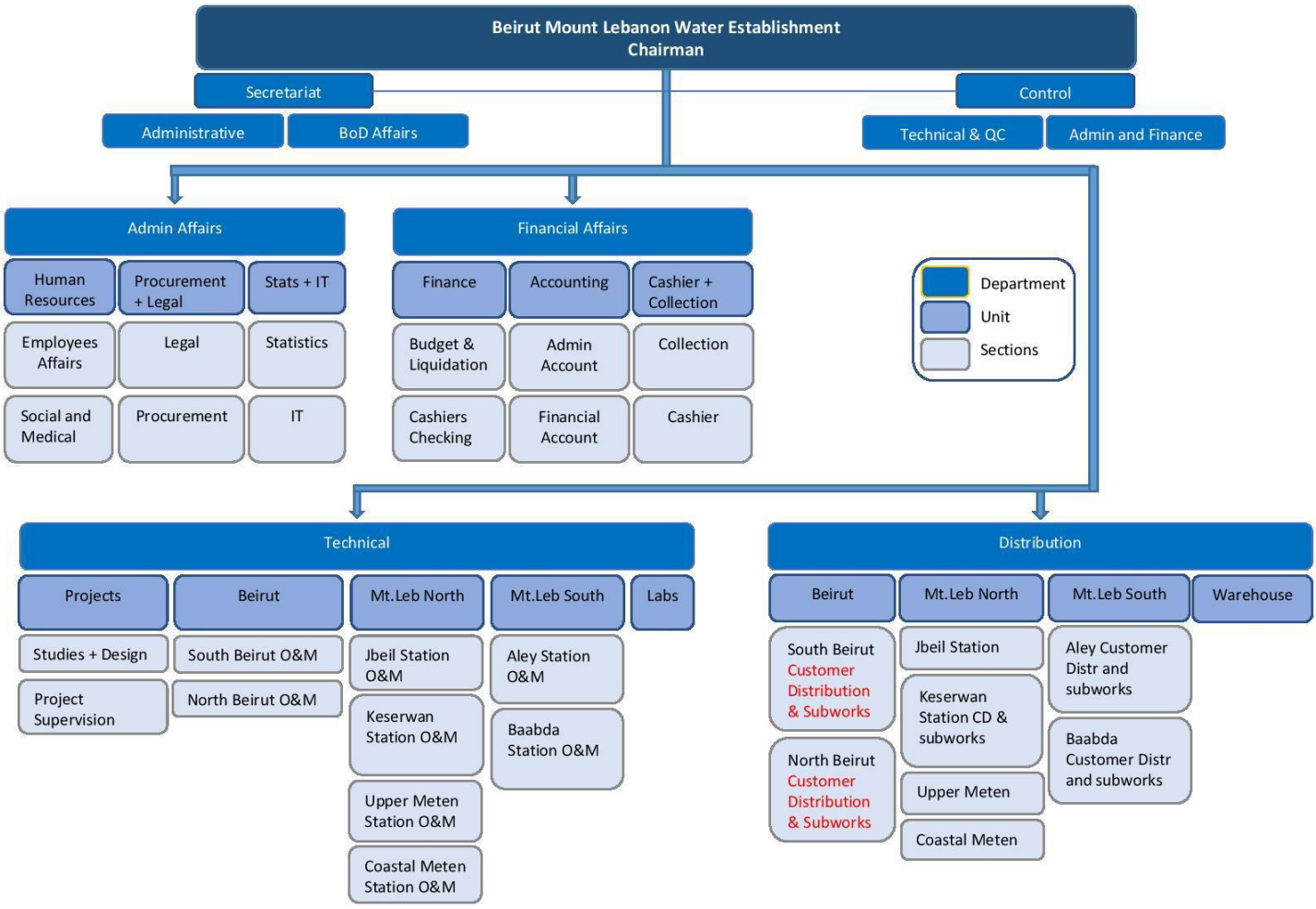
BMLWE – Beirut Mount Lebanon Establishment, based in Beirut is a public institution under the supervision of the MoEW. The services under the management of the BMLWE covers the capital Beirut, Jbeil, Kesrwan, Al Matn, Baabda, Aley, and Chouf with about 533 villages and a dimension of 1992 km^2.

Created by law 221-2000, BMLWE is the result of the merging of six former water authorities: Beirut, Jbeil, Barouk, Matn, Ain el Delbeh, and Keserwan.

The Establishment is driven under decrees promulgated in 2005, which are:

- Decree 14596 of 14/6/2005 – Rules of procedure
- Decree 14597 of 14/6/2005 – Operating rules amended by Decree 1759 of 16/4/2009
- Decree 14637 of 16/6/2005 – Financial regulations
- Decree 14877 of 1/7/2005 – Staff rules and regulations
- Decree 14915 of 5/7/2005 – Administrative organization

Figure 2
BMLWE Organization Chart



Source: Organization chart as per decree ref 14915 (2005)

BMLWE is organized around 4 main departments:

- Administrative Affairs, with 3 units:
  - Human Resources Management and Legal services
  - Procurement process
  - IT and statistics
- Financial Department, with 3 units:
  - Finance : budget and liquidation, cashiers checking;,
  - Accounting administrative and financial account
  - Collection and cashier Checking.
- Technical Department with 5 units:
  - Regional unit O&M for Beirut
  - Regional unit O&M for Mount Lebanon North
  - Regional unit O&M for Mount Lebanon South
  - Projects
  - Laboratories
- Distribution covering 3 regional units and the warehouse.

As a matter of fact, the present BMLWE organization does not match with the requirement of all the activities listed in 3.2. Many gaps are observed, with key required activities which are not highlighted in the organization chart established by law since 2005:

- Wastewater
- Irrigation
- Customer relations (except a subscriber's unit as part of the Operation Department limited to Beirut and surroundings)
- Communication
- Health, safety, and security
- Resources management
- Human resources
- IT and automation
- Non-Revenue Water

3.4 COMMERCIAL PERFORMANCE

3.4.1 Tariff settings

Accounts are billed either though gauges or through meters. In both cases, tariffs are set as a lumpsum. The price of the m3 is then derived from this lumpsum. The correct procedure should be to go from the pricing of one m^3 then determine what the client should pay for a continuous 1 m^3/day.

Gauge

- Gauges are technically supposed to allow a maximum flow equivalent to 1m^3/day when permanently open.[4] The device incentives the use of individual roof tanks, which can be poured by the limited but constant flow passing through the gauge, during the night.
- Meter reading is not effective at current time, due to insufficient staffing and insufficient funding to pay transportation costs.

The actual tariff under application is summarized in the following table:

- Metered accounts must pay a little more, due to higher maintenance costs.
- Sewerage charges are rather symbolic, unable to cover the cost of the service[5]
- The database does not differentiate the customers and the flat fee is the same for domestic and non-domestic accounts.

Table 6
Current tariff grid (as of 2022)

BMLWE	Annual Tariff (LBP)			
Tariff Items	Gauge (1m^3/Day)		Meter (1m^3/Day)	
	Not Connected to WWTP	Connected to WWTP	Not Connected to WWTP	Connected to WWTP
Annual Water Fees	778 500	778 500	824 500	824 500
Maintenance (Gauge/Meter)	2 000	20 000	100 000	100 000
Wastewater Fees	40 000	80 000	40 000	80 000
Automation Fees	Not Available	Not Available	Not Available	Not Available
VAT (11%)	90 255	96 635	106 095	110 495
Rounding	745	365	905	505
Stamp	1 000	1 000	1 000	1 000
Total	912 500	976 500	1 072 500	1 116 500

4 The gauge is calibrated for 1 m^3/day for every household with 200 m^2 area or less. It can be regulated for higher flows (up to 3 m^3/day) for larger customers.

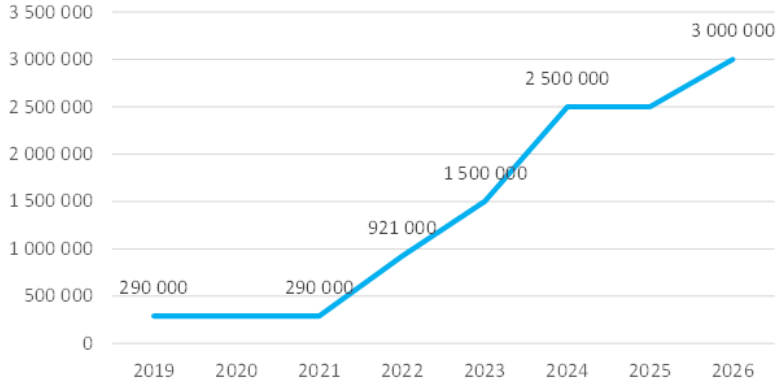
5 Generally speaking, the O&M cost of the sewerage service (collection + treatment) is similar to the cost of the water supply service. In many countries (for example Brazil), sewerage tariff is calculated by applying 100% or 80% over the water supply fee when the account is linked to a sewer.

In theory, tariffs should be set up for each WE, based on the demonstration provided by each establishment to cover their own costs. The Board of the WE proposes the tariff for the coming year, but the proposition must be validated by the MoEW and the Ministry of Finance before becoming effective.

In 2019, the OPEX cost recovery rate was estimated to 112%. Tariffs did not move in 2021, despite the high inflation rate since the beginning of the national crisis. Despite the tariff readjustment in 2022, the OPEX cost recovery is estimated to be limited to 10%.

Faced with the political difficulty to decide drastic increases of the water tariff, the plan is to approve gradual adjustments in order to reach sustainability within 4 years. In the "Roadmap to recovery of the water sector in Lebanon" (May 2022), the MoEW plans to progressively increase tariffs up to LBP/year 3 million by 2026; according to the latest information the target of 3 000 000 LBP/1m3/year has been fixed for 2023.

Figure 3
Real and planned tariffs 2019-2026 (LBP/year)



Source: MoEW (2022). Roadmap to recovery of the water sector in Lebanon

3.4.2 Customer database

The number of registered customers has reached 387 163 accounts at the end of 2021, and steadily increases about 1,9% per year.

Considering the 712 950 households existing in 2021 (see 3.1), the subscription coverage rate is estimated to 54,30%[6].

Subscribers have either gauge (329 163) or water meters (58 000). In the last few years 46 000 smart meters have been installed. Faulty water meters are not being regularly replaced. Until 2019 the meters in Keserwan areas were read and the customers invoiced according to the metered volume, due to the financial crisis the process was interrupted. In 2022 BMLWE has contracted with a private company for the reading of the meters in Keserwan area.

Significant number of illegal connections is suspected; however no data is collected to recognize and register illegal connections. Regularization of these connections is currently not performed.

3.4.3 Billing and collecting

BMLWE does not issue bills. The concept of "billing" refers to the following procedure:

- The MoEW establishes the tariffs to be charged annually

[6] Probably less, as approximately 10% of the customers are non-domestic (estimated through international benchmarking, as Lebanese customer database do not make difference between domestic and non-domestic connections).

- Radio, TV and other medias announcements inform the population about the tariffs and deadlines to pay the "bills."
- Payment can be done:
  - Paying BMLWE employees ("bill collectors") who go house-to-house collecting the charges
  - Going to the Water Establishment Agency and paying to the cashier
  - Paying by transfer through OMT
- Payment is usually done once a year, but installments (up to 6 per year) are also possible
- Subscribers receive an invoice/receipt once payment is done.

Collection rate was 56,6%% in 2020. The decrease observed since 2018 is related to a declining capacity and willingness to pay from the customers, associated with the crisis and the deterioration of the operational capacity of the WE.

Table 7
Information about revenues (LBP)

	2018	2019	2020
Revenues (billing)	131 763 615 219	156 275 505 870	165 712 650 318
Revenues (collection)	100 272 111 182	107 830 099 050	93 793 360 080
Collection rate	76,1%	69%	56,6%

Source: "Needs and Forecast 2021-2024", BMLWE, June 2021

3.4.4 Customer care

BMLWE has implemented a call center. A total number of 13 961 complaints was reported in 2020, almost 62 complaints received per working day.

3.5 TECHNICAL PERFORMANCE

3.5.1 Water production and demand

According to ATLT´s diagnosis (2022), the water production scheme consists of a combination of 315 wells, 29 springs, 3 dams , and 12 water treatment plants.

Water production significantly decreased since the beginning of the crisis, mainly due to energy availability and financial restrictions. In 2020, water production was 221 Mm^3/year, with about 24% of the resource coming from wells and 76% from springs.

Table 8
Water Production – 2017 – 2020

		2017	2018	2019	2020
Springs and dams	m^3/day	386 213	390 828	461 847	460 741
Wells	m^3/day	175 063	162 485	151 679	146 983
Total	m^3/day	561 272	553 313	613 527	607 724
Total	Mm^3/year	204.9	202.0	223.9	221.8

Source: "Needs and Forecast 2021-2024", BMLWE, June 2021

As the installed treatment capacity is estimated to 1,376,036 m^3/d, AFD (2022) estimates that the water production capacity utilization is around 44%.

However, water consumption has no reliable records, as bulk meters do not cover the entire service area (and some are not operational). Customers' water meters are not universally installed, and commercial and technical water losses are not accounted for.

From a conceptual point of view, it is possible to reach a "contractual water demand", by multiplying the number of subscribers by the subscribed consumption of 1 m^3/day. In 2020 the "contractual water demand" is around 141 Mm^3/year. Compared to the annual water production, the NRW is estimated at the level of 36,29%

Table 9
Contractual Water Demand, 2020

	Nº of subscribers	Annual contractual per subscriber (m^3)	Total contractual water demand (m^3 /year)
Water consumption	387 163	365	141 314 495

Source: "Needs and Forecast 2021-2024", BMLWE, June 2021

3.5.2 Water distribution

The network length is estimated at 10 000 km (including bulk transport pipes). Treated water storage capacity is estimated to 513 850 m^3, which corresponds to 20,3 hours of distribution (2020).

Regarding the level of service, daily service is intermittent almost everywhere:

- Water production is limited to 10 hours/day, because of fuel shortages and unreliable energy supply from the national grid.
- Water is thus rationed by service areas and pumped sequentially in order to provide "slots" for each service area.
- In Beirut and in its surroundings, water is distributed for 8 hours every two days.
- In other sub-systems, water is supplied 6 hours/day.
- Few areas are supplied by gravity with longer periods of service.

People, in general, do not drink tap water (bottled water is the main source for drinking water consumption, although tap water is used for cooking), as they consider its quality to be suspicious despite the regular information delivered by BMLWE through the media on the water quality.

According with WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene[7], only 47,7% of water is considered "safely managed" (statistics given at national level).

If limited water production capacity may have some responsibility over the lack of continuous service, it is far from being the sole responsible. Daily energy interruptions, network leakages, illicit connections, lack of spare parts for repairs (such as pump components, pipe accessories, and electrical materials), and private roof-top water tanks[8] contribute significantly to the poor service provided.

BMLWE was the first water authority to implement a SCADA system for Beirut in the nineties, it has been renovated and extended few years later. As of today, the SCADA allow the automation of 59% of the facilities and remote controlled 7% of the facilities, the total number of facilities to be controlled by the SCADA system is 1 842.

The distribution network is equipped with a limited number of district meters.

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7 https://washdata.org/, 2021

8 As water rationing is frequent and water supply is intermittent, there is a generalized practice of installation of individual roof-top water tanks to store water. This fact has a major importance in commercial and operational management as well as in water quality issues.

Bulk meters are to be calibrated and maintained. Service meters are not universally installed. Commercial and technical water losses are not accounted. In short, there is no reliable water balance and no precise estimate of the NRW rate.

3.5.3 Sewerage services

Sewerage has been "forgotten" by the water sector framework reorganization since 2000. Water supply was a priority. For the time being, there is no clear strategy about sewerage. According to the WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene, only 16.3% of the Lebanese population has safely managed wastewater by 2021.

For the time being:

- BMLWE has no capacities (financial and human skills) to assume its formal responsibility related to sanitation services in its territory.
- Some WWTP have been built by the CDR. CDR has no status and no capacity or willingness to operate the plants once commissioned. As they cannot transfer the O&M to somebody else, they keep the responsibility of managing the plants through the arrangement of outsourcing contracts with private operators. However, they don´t have mandate and funding for paying such contracts except in the short-term transitory phase.
- Similarly, some municipalities decided to invest by themselves in local sewage networks. They must now operate wastewater collection in areas where these networks have been implemented.
- Any institutional solution for transferring the asset ownership to a designated operator, must be accompanied with a financial capacity to operate the service. Present sewerage tariffs are symbolic and do not come close to the financing package needed.
- The political fear of having to impose to the population a large increase of the tariff is at the root of the problem. International experience shows that managing sewerage services has approximately the same cost as managing water supply services. In other words, correctly embracing sewerage together with water supply implies doubling the water tariff. This means a big political move, preceded by a strong communication effort. Obviously, the present financial crisis does not provide the appropriate political environment for such a national debate.

As for other WE, BMLWE is reluctant to take over the sewerage services, as long as financial and technical conditions are not reviewed:

- Tariffs (or public subsidies) are set up to cover the O&M costs
- Asset ownership is clearly established, with implications on transfer of commissioned facilities, responsibilities for heavy maintenance and replacement, technical and financial mechanisms for planning and financing new extensions, etc.
- The WE is allowed to adapt its in-house organization and its HR management to embed the sewerage service within its core business. As seen above, there is currently no sanitation department or unit dedicated to sanitation in the organization chart decided by law.

Table 10
Wastewater treatment facilities in BMLWE area

WWTP' Name	Operated by	Design Capacity (m3/d)	Remarks
El Ghadir	BMLWE	138,000	Preliminary treatment only
Ras Nabi Younes	CDR	11,900	
Jbeil	CDR	-	Not operating yet, waiting for network's completion
Gharifeh	BMLWE	1,125	
Safa	BMLWE	3,000	
Barouk	BMLWE	1,200	
El Khraibe	BMLWE	450	
Jbaa	BMLWE	225	
El Moukhtara-Boutme	BMLWE	450	
Aammatour	BMLWE	900	
Niha-Bater	BMLWE	900	
Maaser El Chouf	BMLWE	450	
Mrousti	BMLWE	250	
Jdaideh	BMLWE	1,600	
Baadarane	BMLWE	450	
Ainbal	BMLWE	2,200	
Kfarqatra	BMLWE	250	
Hemlaya	MoEW	-	Under construction
Khenchara	CDR	8,432	Waiting for commissioning
Remhala/Aley	Municipality	-	Not operating

Source: AFD (2022). Initial Diagnostic of the Water Establishments – Data collection and diagnosis report – BMLWE, Revised Edition, July 2022.

3.6 FINANCIAL PERFORMANCE

3.6.1 Accountancy

Article 4.2 of Law 221 states that WEs shall request an auditing of its financial statements, and of the internal control system implemented within the establishment.

According to the National Water Sector Strategy Update – 2020, Volume II, it seems that this practice is not in force. BMLWE prepares annual reports, which are submitted to the MoEW, alongside with annual budgets. Such reports are not publicly disclosed.

The Consultant could not have access to any annual report or official financial statements.

From what we gathered, the annual report presents general findings on operational and commercial aspects, considerations about investment, and simplified financial statements. The annual budget describes the costs by item of expenditure and the revenue forecast. Accounts are not audited.

An inventory of fixed assets has been promoted by the MoEW with support from donors and the CDR. However, it seems that there is no transfer accompanied by an accounting document that allows reliable entries in the accounts.

An ERP system was implemented since 2010-2012 (USAid support) with all modules except the billing and collection module, for which NLWE opted in favor of an in-house developed system.

The Lebanon Water Project (LWP) funded by USAid updated financial and performance audit manuals (by 2016 for SLWE and NLWE, by 2020 for BMLWE and BWE).

Asset management has also been assisted by the LWP, who developed a standardized asset management manual for all WEs.

3.6.2 Financial information

The Consultant did not have access to audited financial statements. The following table is based on information provided by BMLWE in a presentation done on June 2nd, 2021 (Workshop "Water Sector 2021… Sustain and grow! Ensure water services sustainability & continuity", Beirut).

According to Table 11, and as in most water utilities in the world, energy is the heaviest category of operational costs, after the costs of personnel.

Lebanon has been suffering from shortage of power supply for the past 30 years. The situation has worsened at present time, due to the conjunction of the national financial crisis and the increasing price of fuel at international level. This has a strong impact on the public utility, Electricité du Liban (EDL), which provides electricity only a few hours per day, as they are unable to supply fuel to power central generators.

Electricity is supplied by EDL at around 0.08 US$/kWh, while energy produced by generators costs about $0.30 US$/kWh. As a result, BMLWE is experiencing operating difficulties. since 2018, BMLWE pays partially the electricity provided by EDL.

In 2020:

- Total energy costs (EDL + generators) 81,378 MLBP
- Total paid 24,885 MLBP
- Toyal unpaid 56,493 MLBP

Table 11
Financial information (based on available data)

	in LBP			in €		
	2018	2019	2020	2018	2019	2020
Exchange rate (€ 1 = LBP)				1 724	1 688	1 852
Revenues (Collection)	100 272 111 182	107 830 099 050	93 793 360 080	58 162 477	63 880 390	50 644 363
Salaries	26 216 048 000	26 212 549 000	26 017 217 000	15 206 524	15 528 761	14 048 173
EDL/EDZ/EDQ	15 664 990 000	18 193 248 000	17 315 168 000	9 086 421	10 777 991	9 349 443
Diesel	4 995 743 000	7 466 988 000	6 195 801 000	2 897 763	4 423 571	3 345 465
Other O&M	8 679 494 403	9 932 988 000	12 428 886 000	5 034 510	5 884 472	6 711 062
Total OPEX	55 556 275 403	61 805 773 000	61 957 072 000	32 225 218	36 614 794	33 454 143
Wells and Pumping Stations	1 049 155 000	570 914 000	175 541 000	608 559	338 219	94 785
Water Reservoirs	1 624 589 000	1 787 120 000	797 144 000	942 337	1 058 720	430 423
New Secondary Water Network	6 404 399 000	8 045 005 000	3 599 911 000	3 714 849	4 765 998	1 943 796
Rehab-Replac. of old W. Netw.	1 069 899 000	1 418 245 000	129 974 000	620 591	840 193	70 180
Installation of Water meters	17 305 000	97 369 000	68 412 000	10 038	57 683	36 940
Other equipment	2 056 085 000	4 096 636 000	2 476 825 000	1 192 625	2 426 917	1 337 379
Total CAPEX	12 221 432 000	16 015 289 000	7 247 807 000	7 088 998	9 487 730	3 913 503
Other data given by the same document						
Total OPEX	81 625 306 921	85 114 355 363	78 182 304 571	47 346 466	50 423 196	42 215 067
Total CAPEX	98 006 849 000	93 798 380 000	32 022 612 000	56 848 520	55 567 761	17 290 827

Source: "BMLWE Achievements and Future Plans", Jean Gebran, May 2021

3.7 IT MANAGEMENT

As observed in 2022 by the ADPi experts required by USAid to scrutinize the IT state of art of the Lebanese WEs:

- BMLWE IT unit comprises 4 specialists to cover all IT areas.
- Data center room is located in the headquarter, and local servers are located in each of the 23 branches.

- Due to energy shortages the data center works with local generator and is turned off at night and during weekends.

Table 12
BMLWE Application Software

Device	Product	State	Comments
Virtualization	Hyperview	Operational	
Load Balance		N/A	
ERP	Nav (Microsoft)	Operational	Financial ERP module is working properly. Next steps should be engineering for GIS integration and O&M modules
Payroll	Nav (Microsoft)	Operational	
CAD	Autocad	Operational	
Hydraulic modelling	Water Cad	Operational	
Billing System	in-house software	Operational	BMLWE developed in-house software and maintains 1 technician dedicated
CRM	Nav (Microsoft)	Operational	BMLWE developed in-house software but database consolidation and integration with ERP are still required.
Email	Exchange	Operational	
Supervisory control and data acquisition - SCADA		N/A	
Operational Management		N/A	
Maintenance Management		N/A	
Business Intelligence		N/A	
GPS Tracking		N/A	
Water Leakage		N/A	
Backup Software		N/A	
Server Antivirus		Operational	Urgent antivirus new software.
WorkStations Antivirus		Operational	Urgent antivirus new software.
Office 365	E3	Operational	Licenses current updated.
Laboratory - LIMS		E/NW	
Quality Management System		N/A	
Document Management Software		N/A	
Access Control and Time Attendance System		No	
GIS - Geographic Information System		Operational	
Windows Server		Operational	Licenses current updated.
Windows Client		Operational	Licenses current updated.
Domain eeln.gov.lb		E/NW	
Dns		E/NW	
DHCP		E/NW	

Legend: E/NW: Exist or not working; N/A: not exist
Source: DAI / Águas de Portugal (2022)

The software managing all the administrative needs of the WE under the name “ERP” is in fact an off the shelf Microsoft product “Dynamics Navision” that has been heavily tailored for the needs of the WE.

This type of software is generally very rich in options to cater for the needs of the largest possible client base and allows for management of a particular solution by the creation of various templates adapted to the client’s needs. The creation of those templates requires a mix of computer proficiency and deep knowledge of the management needs in terms of data deliverables.

To this day, we are not aware of any in-depth training of IT personnel to enable the creation of internal templates fitting the needs of management.

The implementation process that was handled by the organization that first sold the products to the WE, have later been contracted with a single independent person, putting all the WE at the mercy of this person’s availability. No proper documentation was provided for the enacted modification and newly created functions.

The database performance management has to this date been done by the independent service provider, and no training has been provided to the personnel of the WE (when they are present) for this essential function.

Reports needed from any ERP management software can either be regular or circumstantial for specific action that must be conducted by the WE. Therefore, we see it as essential to have internal knowledge that can provide ad-hoc reports to fit management needs when they arise.

4 HUMAN RESOURCES ISSUES

4.1 CURRENT SITUATION

The theoretical total number of employees is defined by the decree nº 14915 as 1 121 employees. In 2022 only 386 positions are active, almost 20% of the theoretical number.

In 2017, the law nº 46-2017 (article 21) has prohibited any recruitment for all public institutions, including WEs, even for the replacement of retirees. The application of the law is still valid in 2022. BMLWE and all other WEs have contracted with service providers for "on demand" personnel.

The "on demand" personnel are made available by a private contractor to the public organization to achieve when needed temporary and limited field work as a support to the employees. Officially, the "on demand" personnel cannot be in a position of responsibility and cannot be working on a long-term basis, although this became a common practice today.

As a result, the total number of working staff at BMLWE was 1 176 in 2022:

- 386 public employees (therefore 735 vacant positions)
- 790 "on demand"

Although the Law 221-2000 has recognized that the WEs are independent for financial, administrative, and HR recruitment processes, a limitation was decided by the government through the finance frame law nº 583-2004, article 54, specifying that the recruitment process is submitted to the rules defined by the Public Service Council (Conseil de la Fonction Publique) including the categories and the salaries scale. The law is still under application. Any recruitment should follow a complicated process. The last cycle of recruitment happened in 2013!

The actual number of public employees is therefore decreasing as existing employees reach the retirement age and cannot be replaced. BMLWE expects that several people will retire in the coming 5 years, with no opportunity to prepare for a smooth replacement.

BMLWE like other WEs faces many experienced staff resignations. Since the financial crisis started in 2019, skilled people are looking for better job conditions, and they are moving toward the private sector or abroad, as the public salaries are not updated due to cope with inflation. [9]

It has to be noted that some specific positions (for instance cashiers) have to be filled by public employees. When the employee in charge of the position reaches retirement age, another employee is requested to fill the position as an interim. As the retirees are not replaced, it shall be impossible to fill some of the key positions in the coming years, leading the BMLWE to a critical situation.

Table 13
BMLWE staff, as in 2021

	Statutory positions	Existing permanent staff	Existing temporary staff	Existing total staff
Engineers	100	15	21	36
Administrative	253	98	709	1 057
Technical & others	768	250		
Total	1 121	363	730	1093

Source: "BMLWE Achievements and Future Plans", May 2021

9 Recently in May 2022, the Government has issued a decree nº 9129 (12 May 2022), approving an additional financial monthly support of 1 325 000 LBP for the employees that wages do not exceed 4,000,000 LBP.

Table 14
BMLWE staffing - 2020

Variable	Unit	Type	BMLWE
University degree personnel	No.	Employee	61
Basic education personnel	No.		38
Other qualification personnel	No.		287
Unknown	No.		-
University degree personnel	No.	Contracted	48
Basic education personnel	No.		103
Other qualification personnel	No.		639
Unknown	No.		-
University degree personnel	No.	Total	109
Basic education personnel	No.		141
Other qualification personnel	No.		926
Unknown	No.		-

Source: Initial Diagnosis of the water establishments- Data collection and diagnosis report BMLWE- July 2022

From the collected data some ratios can be calculated:

Table 15
Ratios

Customer per employee:	329,22
Employees per 1,000 customers	3,037
Customer per km of distribution network	48,39
Length of network (km) per employee	8,50
Treated water per employee	187 925 m^3/employee/year
Income per employee	21 258 503 LBP/year/employee
Expenses per employee	50 170 068 LBP/year/employee
Number of computers per employee:	NA

4.2 CURRENT ORGANISATION

The following tables (based on the information delivered by BMLWE) show the current positions filled in the organization either by their official holders or by proxy as well as the unfilled positions.

We have quantified the missing positions that are summarized in the top left corner of each table.

Table 15 shows the need for a yearly amount of 700 Thousand USD to cover all missing positions for department and unit and section heads.

Figure 4
BMLWE General Directorate

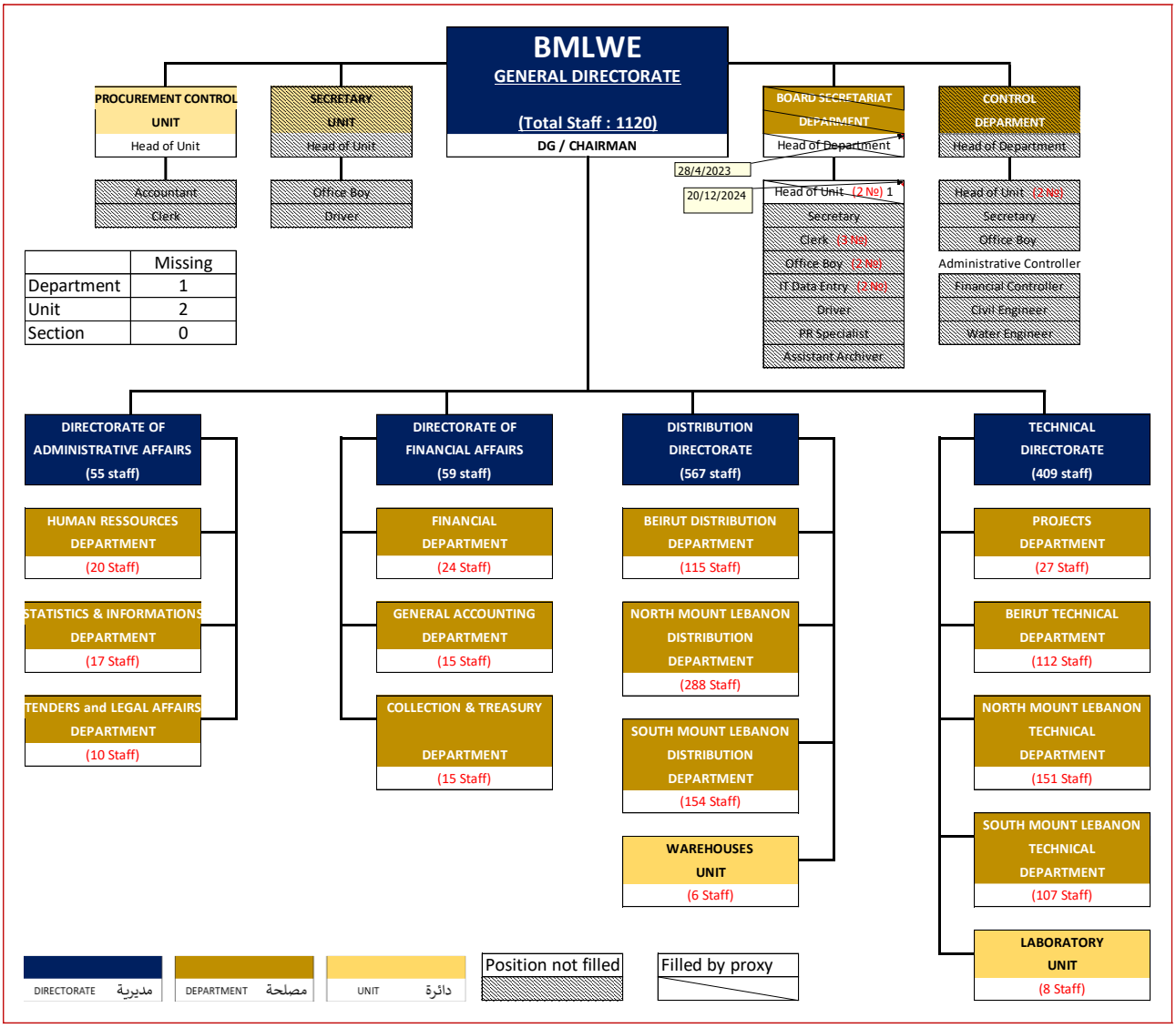


Figure 5
BMLWE Administrative Directorate

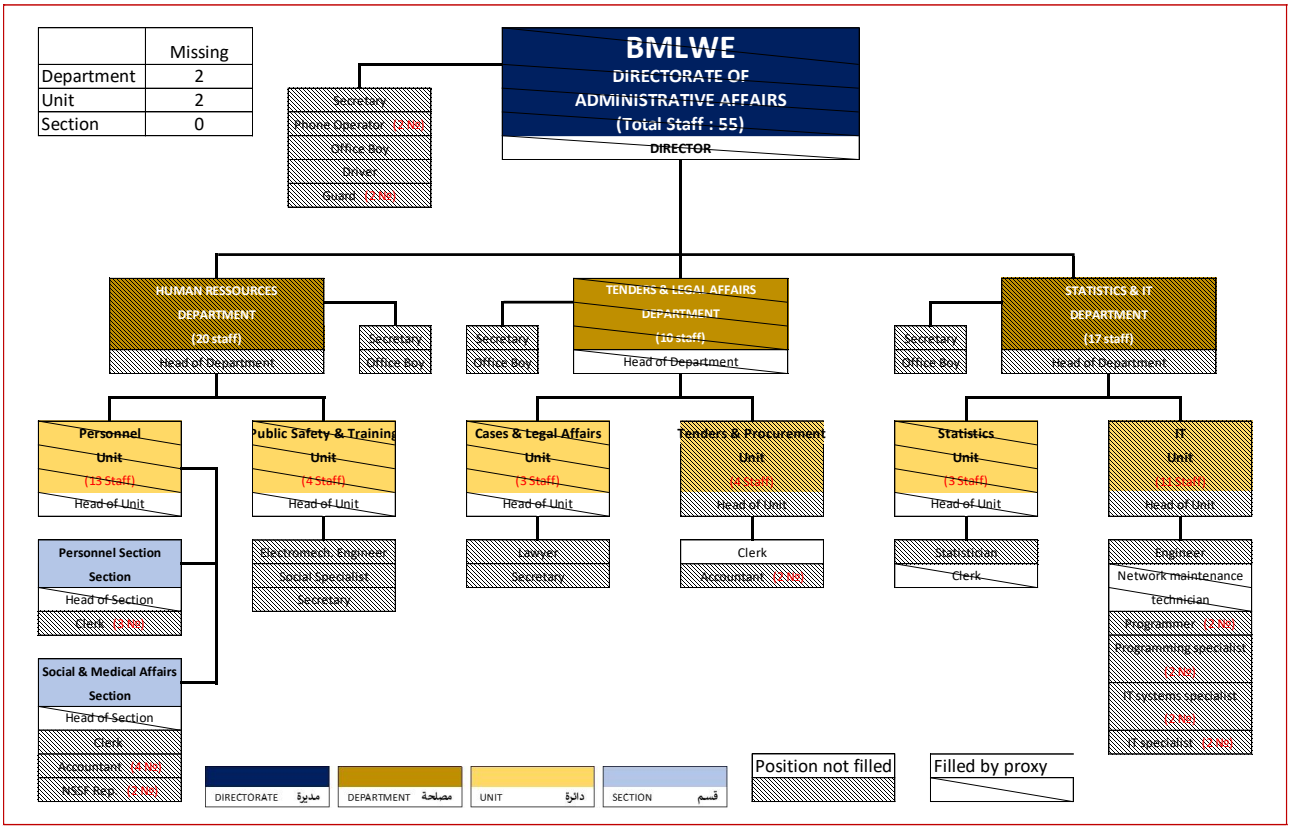


Figure 6
BMLWE Financial Directorate

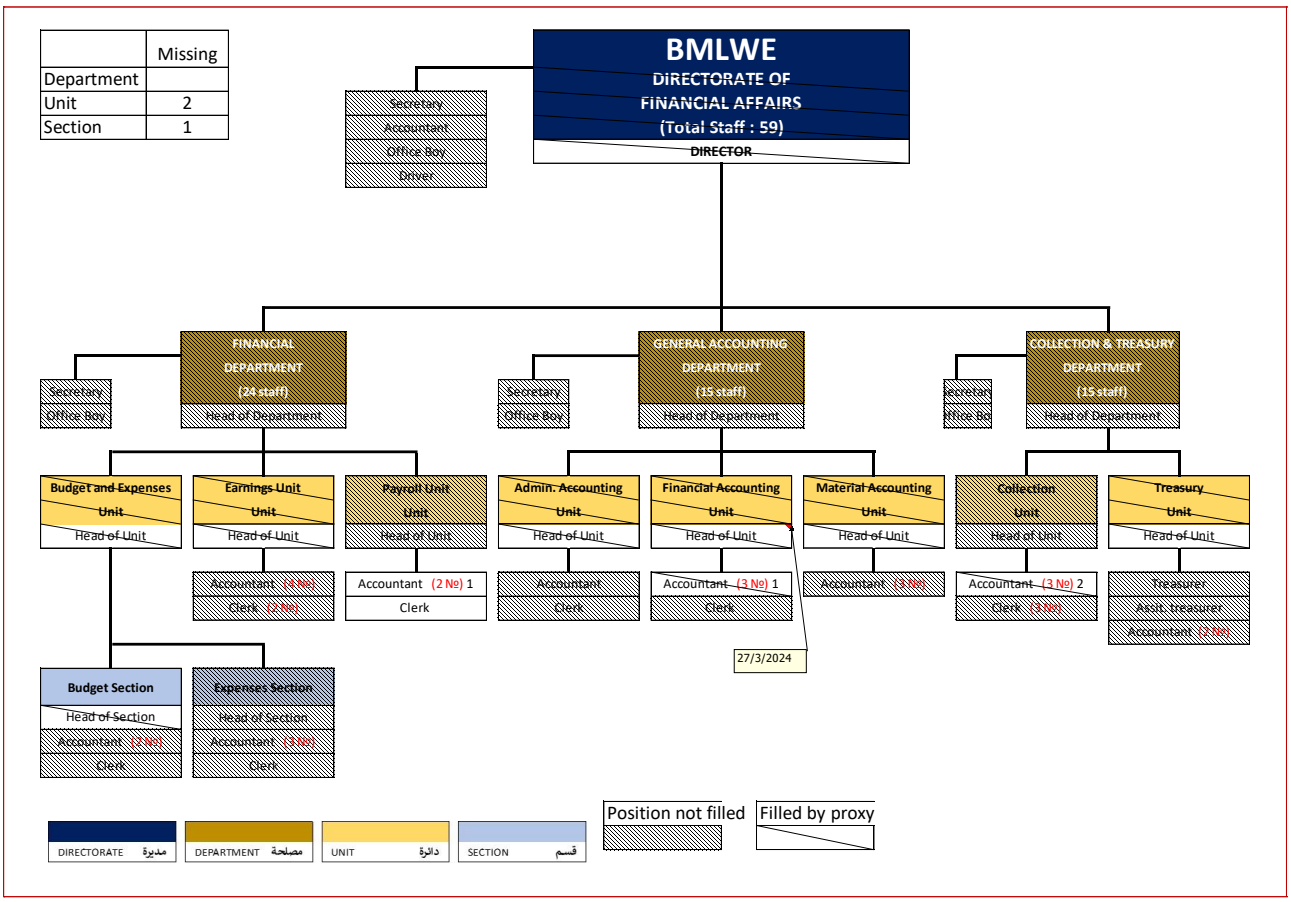


Figure 7
BMLWE Distribution Directorate

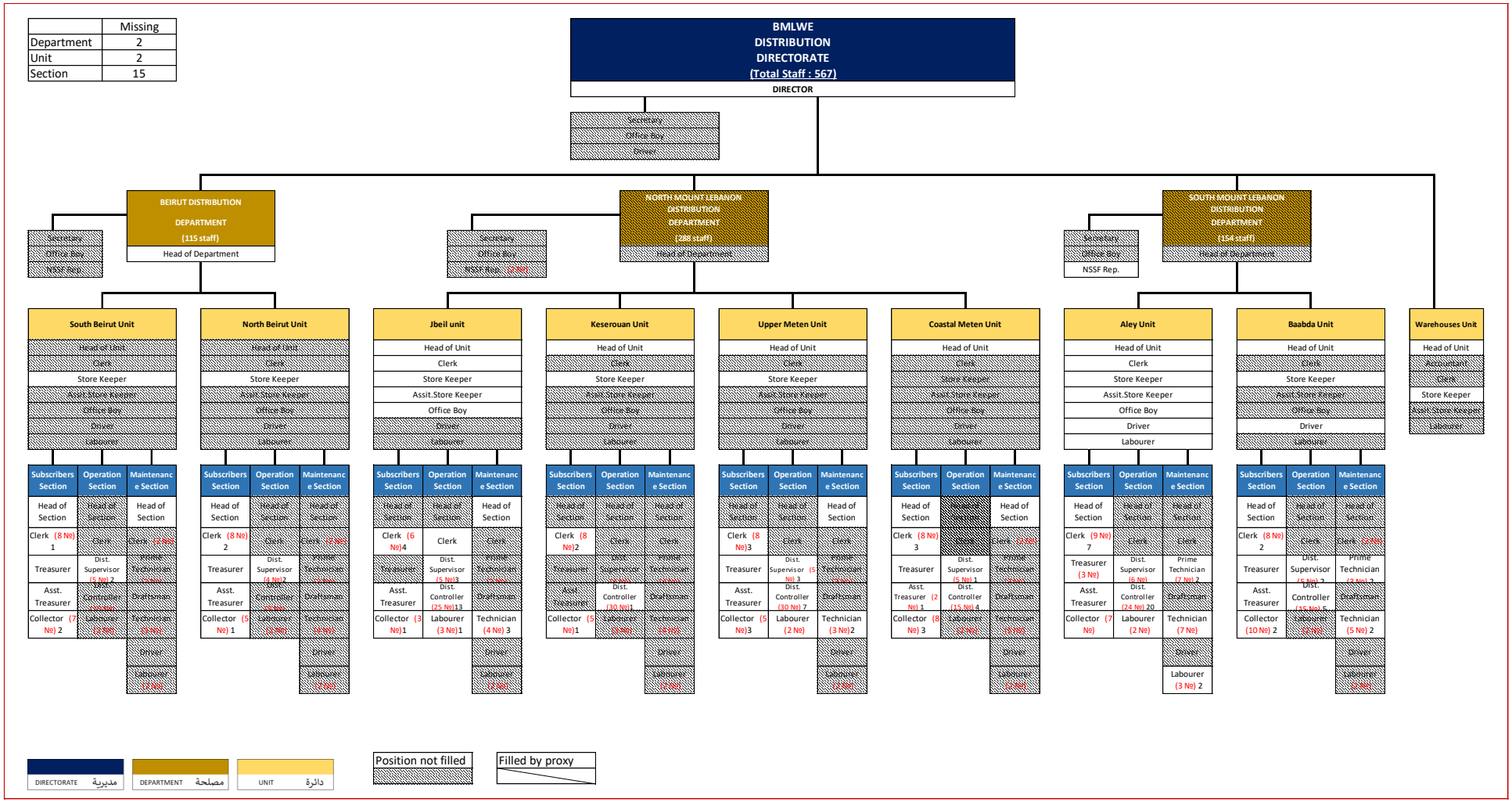


Figure 8
BMLWE Beirut Distribution Deparrtment

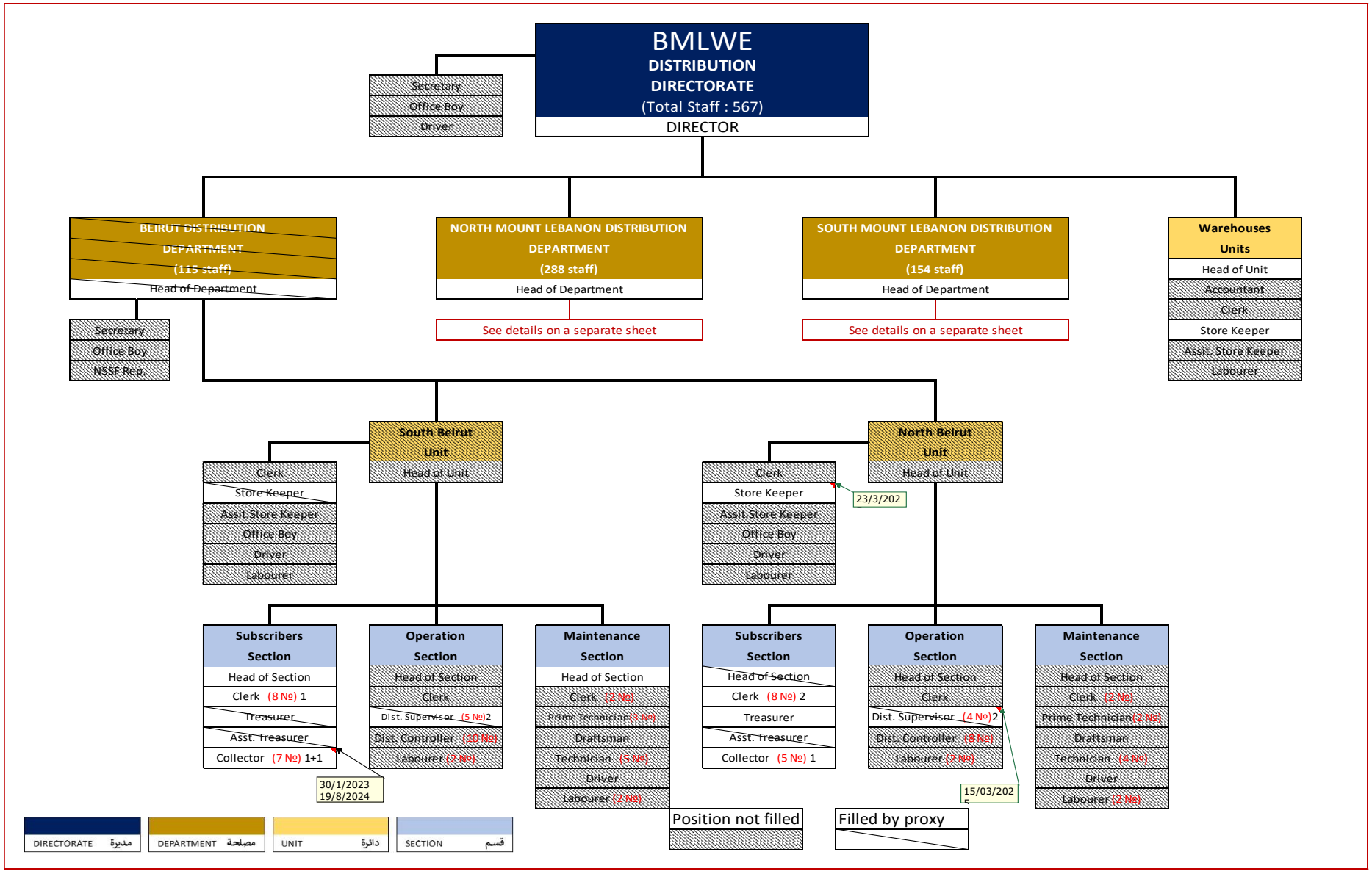


Figure 9
BMLWE North Mount Lebanon Distribution Department

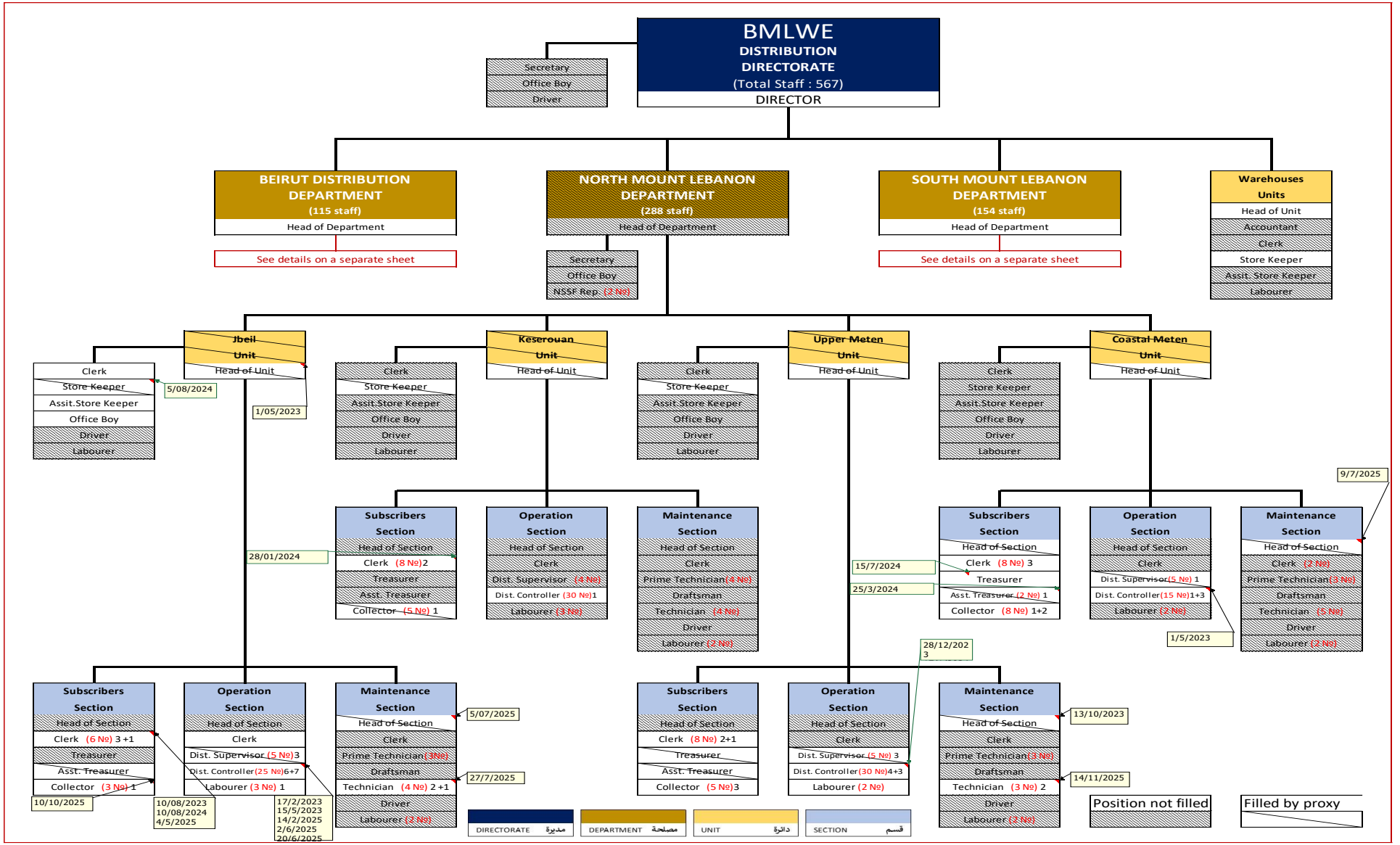


Figure 10
BMLWE South Mount Lebanon Distribution Department

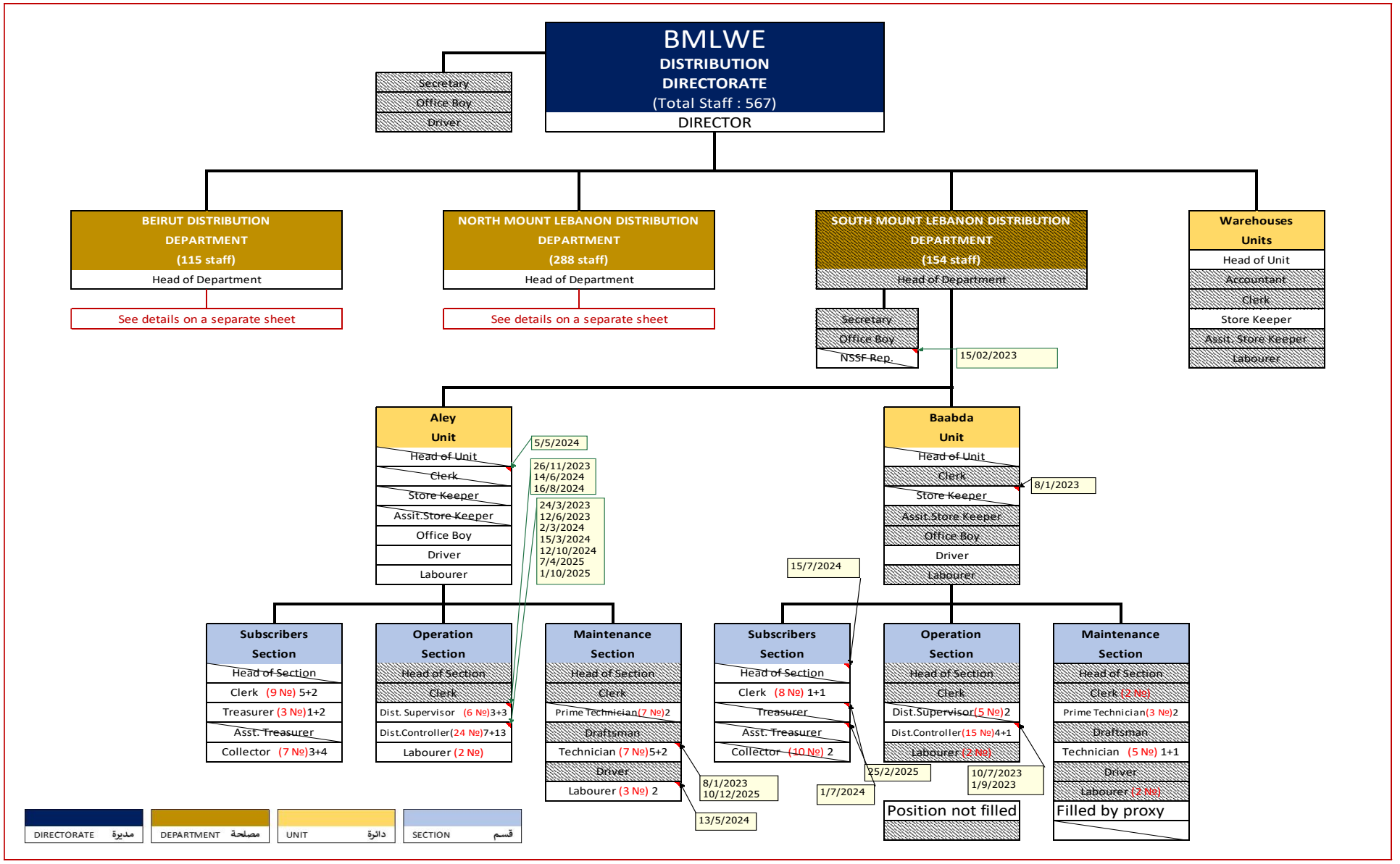


Figure 11
BMLWE Technical Directorate

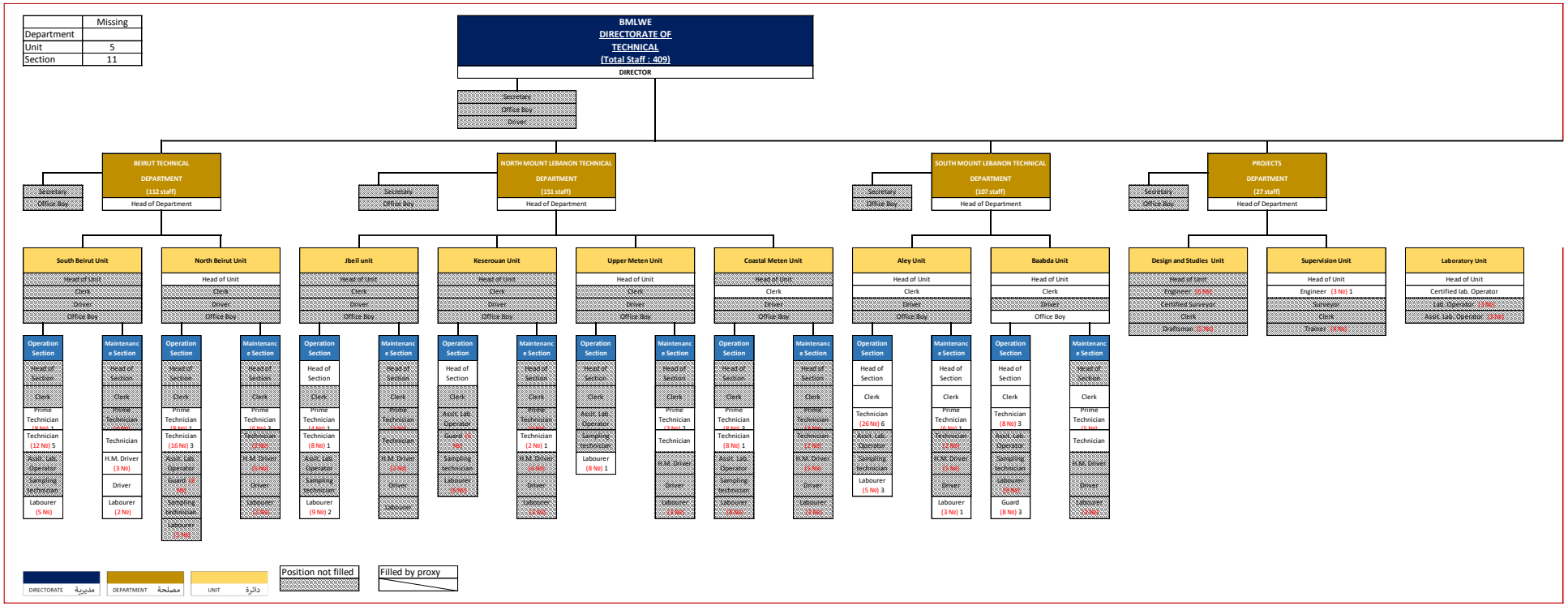


Figure 12
BMLWE Beirut Technical Department

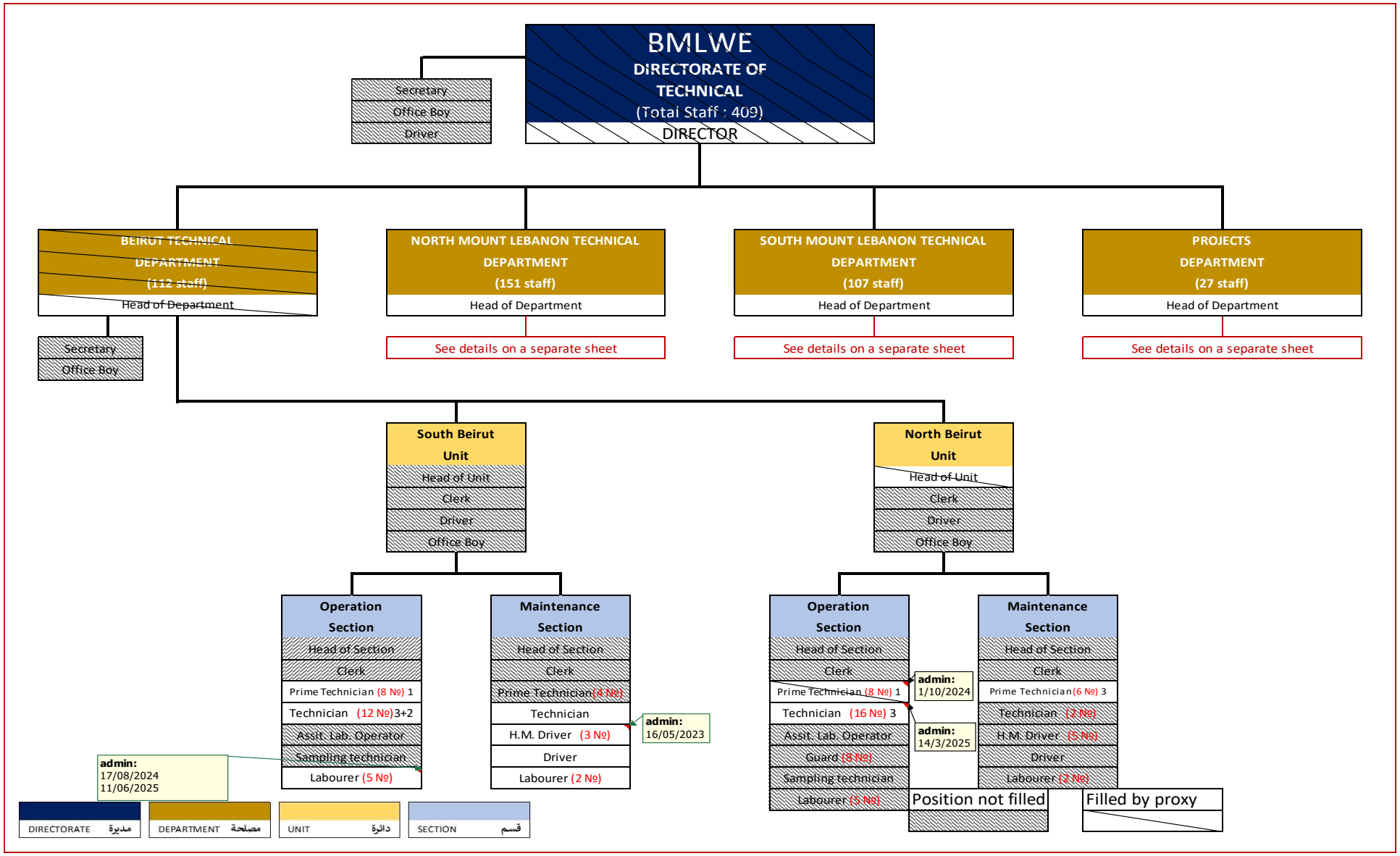


Figure 13
BMLWE North Mount Lebanon Technical Department

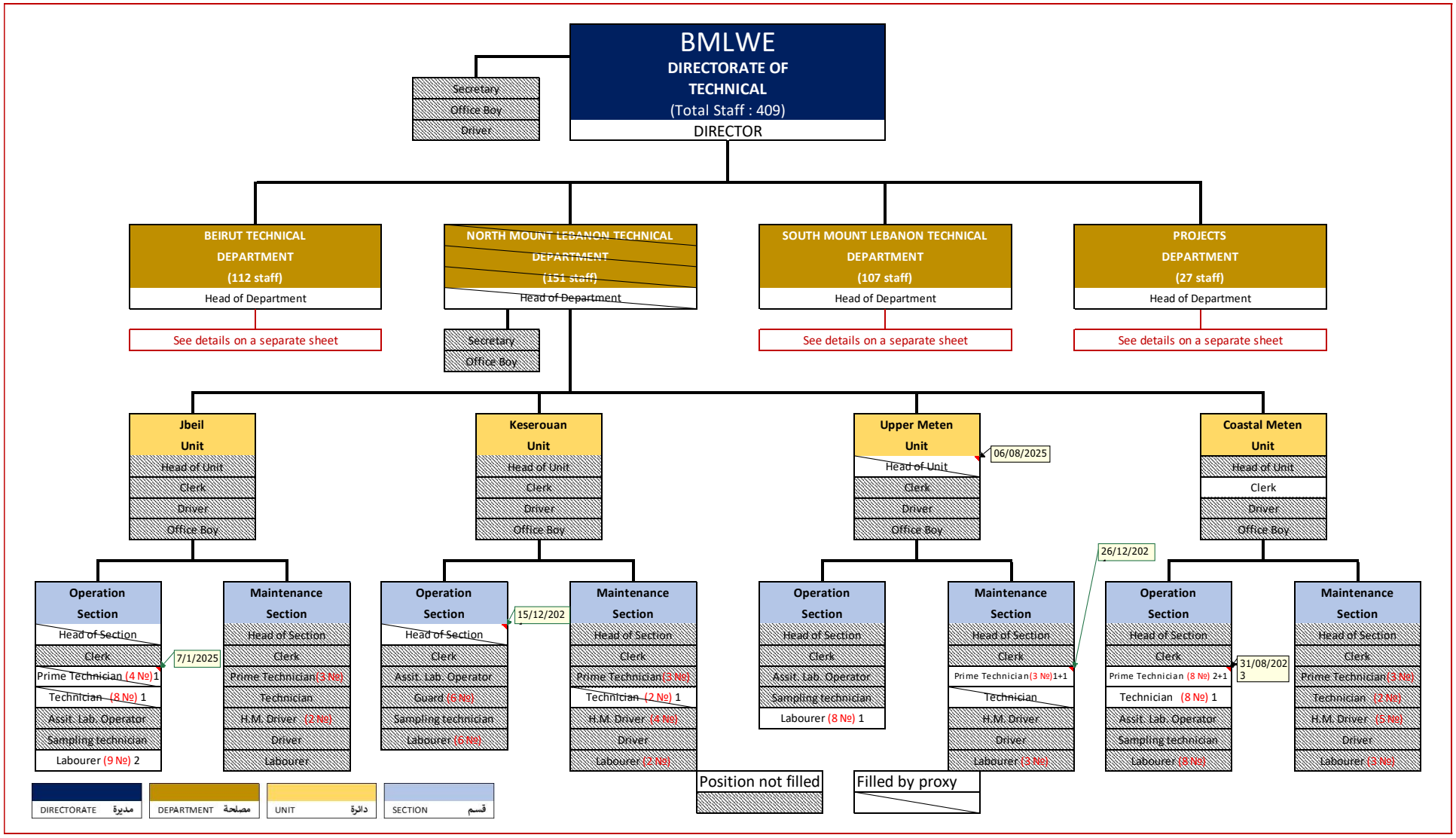


Figure 14
BMLWE South Mount Lebanon Technical Department

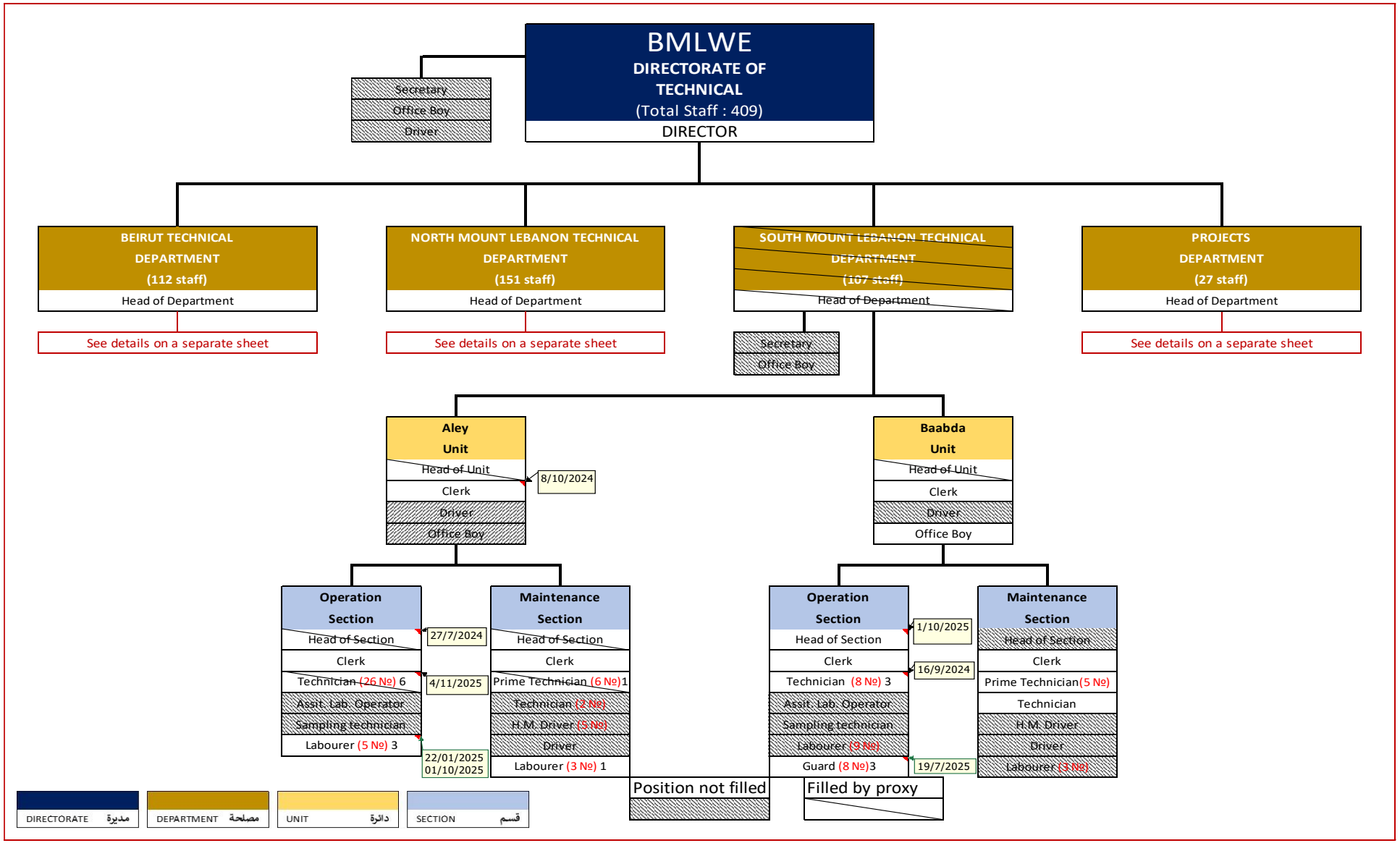


Figure 15
BMLWE Projects technical Department

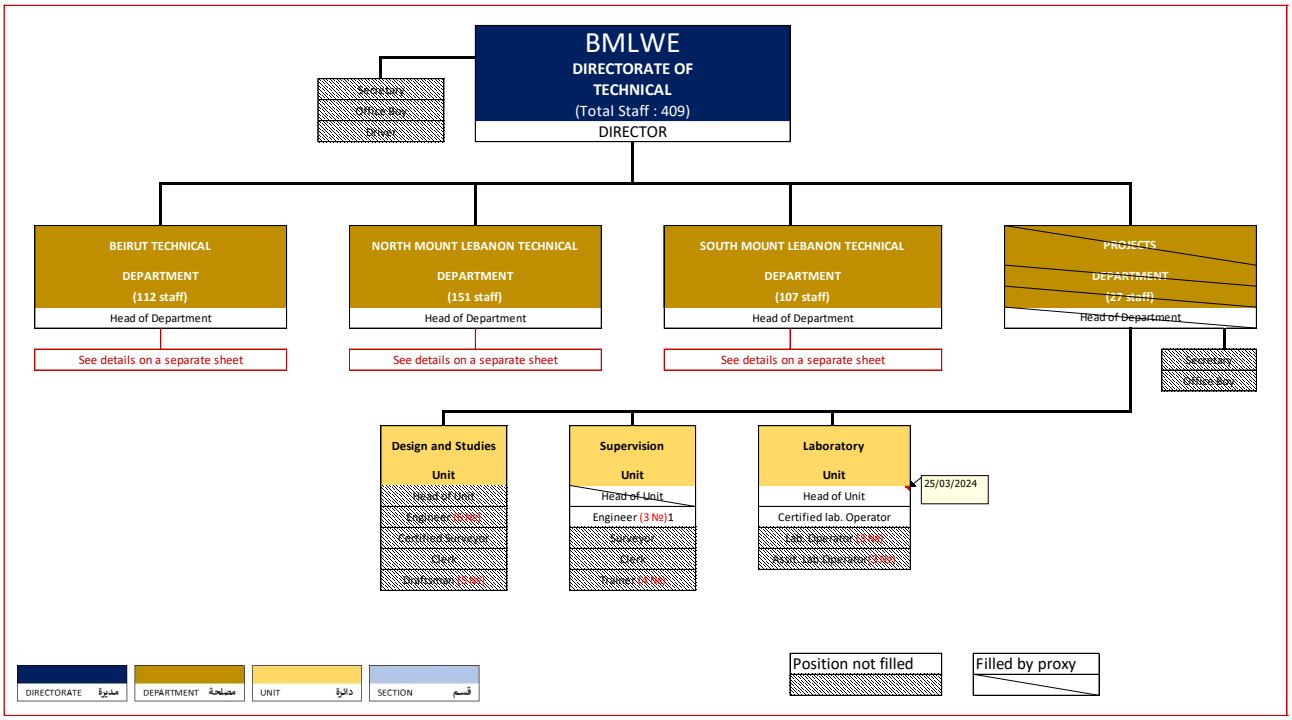


Table 16
BMLWE costing of unfilled positions

Missing personnel BMLWE

Department	Scale	Sub-scale	number	Monthly Unit salary	Yearly total salary
General Directorate	2		1	$ 2 900	$ 34 800
	3	1	1	$ 2 033	$ 24 396
Administrative Dir.	3	1	2	$ 2 033	$ 48 792
	3	2	2	$ 1 973	$ 47 352
Finance Dir	3	1	2	$ 2 033	$ 48 792
	3	2	1	$ 1 973	$ 23 676
Distribution Dir	2		2	$ 3 220	$ 77 280
	3	1	2	$ 2 247	$ 53 928
	3	2	15	$ 2 187	$ 393 660
Technical Dir	3	1	5	$ 2 247	$ 134 820
	3	2	11	$ 2 187	$ 288 684
					$ 1 116 984

4.3 SALARY SCALE

During our WE manager interviews, we noticed a common complaint about their personnel efficiency and proficiency. They have blamed various factors:

-Employees have come from the old “offices” structures with a lack of independence and initiative spirit.

-Limited hiring possibilities with no choice thru interviews when the hiring comes from the civil service board process where winners of exam sessions must be taken in the order of exam results without any consideration for previous experience and motivation that can be sensed thru direct interviews.

-Imposed salary scale, lower than what the private sector can offer for similar jobs.

For this last issue, we have tried to establish a comparison between the prevailing salary scale in 2019 and a benchmark for the private sector. We have obtained a private study done by Infopro SAL, a leading business, and economic research organization, for the Leaders Club, a business owner networking initiative. The part of the study that we used can be found in Annex 6.4

The study provides indicative salary brackets for various job positions according to their industry. Utilities are not one of the included categories, so we had to pick and choose from the various offered categories with our default choice going to the manufacturing sector.

We chose to use 2019 figures with a dollar exchange rate of 1,500.00LBP for one dollar as the last stable basis for comparison. Today the devaluation of the Lebanese currency has disrupted the market and it is not possible even for private companies to rely on any comparative study as various actors have chosen to respond in very different ways mixing payments in cash with payments on different conversion rates

Table 17
Salary scale comparison

WE				Private sector					
Category	**sub-category**	**Position**	**Salary @ grade 11**	**Position**	**industry**	**Salary min**	**Salary Max**	**Difference with Midpoint**	**Difference %**
Category 1		Chairman	$ 4 267,00	General manger	Manufacturing	$9 000,00	$10 500,00	$ -5 483,00	128%
Category 2	Management	Direct. Administration	$ 2 900,00	Human resource manager	Manufacturing	$3 600,00	$ 4 200,00	$ -1 000,00	34%
		Direct. Finance	$ 2 900,00	Finance Manager	General position	$6 000,00	$ 7 800,00	$ -4 000,00	138%
Category 2	Technical	Direct. Technical	$ 3 220,00	Production manager	Manufacturing	$5 000,00	$ 6 000,00	$ -2 280,00	71%
		Direct. Operation	$ 3 220,00	Production manager	Manufacturing	$5 000,00	$ 6 000,00	$ -2 280,00	71%
Category 3-1	Management	Chief accountant	$ 2 033,00	Chief accountant	General position	$3 500,00	$ 4 500,00	$ -1 967,00	97%
		Admin & HR	$ 2 033,00	Human resource manager 10y exp.	Manufacturing	$2 500,00	$ 3 100,00	$ -767,00	38%
Category 3-1	Technical	Head of Treatment plants, Laboratory	$ 2 247,00	Quality Assurance	Manufacturing	$2 600,00	$ 3 500,00	$ -803,00	36%
		Exploitation regional manager	$ 2 247,00	Warehouse manager	Manufacturing	$2 500,00	$ 3 200,00	$ -603,00	27%
Category 3-2	Management	Budgeting/expenses cl	$ 1 973,00	Senior Accountant	General position	$2 500,00	$ 3 000,00	$ -777,00	39%
Category 3-2	Technical	Head of section	$ 2 187,00	Surveyor	Construction	$2 300,00	$ 2 800,00	$ -363,00	17%
								Average	**63%**

The only purpose of such a comparative study is to show a general overview of the situation and must not be taken as a hiring rule for any particular position. Private sector salaries in Lebanon are always implied as being in the Beirut greater area. Salaries offered in the regions are usually lower but we have no data on the % differential.

We can see from table 17 that the differences in salaries can vary from 17% to 138% with an average of 63%. This must only be considered as one of the problems facing the recruitment of adequate personnel by the WE.

4.4 NORMATIVE FRAMEWORK

4.4.1 Labour law

The Ministry of Labour governs the labor market, regulates labor relations and enforces labor laws. Understaffed, with a limited budget and low technical capacity, its activities are confined mainly to administrative work and limited labor inspections.

The Lebanese Labour Law was passed in 1946 (Code du Travail – 23/09/1946). Some amendments have been implemented since then, in particular in 1962, 1993, and 1996. Recent amendments were promulgated in 2000 (law n°207 26/05/2000. Avoiding discrimination between men and women).

The Lebanese Labour Law applies to all employees and employers except for domestic and agricultural workers, enterprises limited to family members, and public servants.

According to Article 7: "*Sont exceptés de la présente loi […] les services gouvernementaux et municipaux pour ce qui concerne les employés et les salariés provisoires ou journaliers auxquels ne s'appliquent pas les règlements des fonctionnaires. Ces agents feront l'objet d'une loi spéciale*".

General features of the Labour Law

- Probationary periods, during which the employer or employee may terminate the employment contract without notice. The duration is for three months non-renewable.
- All employees must have a standard-format written employment contract, containing specified information.
- The maximum duration of a fixed-term contract is one year automatically renewed.
- Working hours must not exceed 48 hours per week.
- Employees are generally entitled to a one-hour break after five hours' work and to a weekly rest day, usually on Sundays.
- Employees are entitled to paid annual leave after they have completed one year's service. Paid annual leave varies depending upon the total number of years completed in service.
- Employees are entitled to a Schooling Allowance as per the National Social Security Fund (NSSF) for children aged between 3–21 years of age.
- Pregnant employees are entitled to 70 days of maternity leave on full pay. An employer must not dismiss a pregnant employee nor send any notice during the pregnancy or maternity leave
- Employees are entitled to sick leave after the successful completion of their probation period.
- The employer may not discriminate between working men and women in regard to type of work, amount of wage or salary, employment, promotion, professional qualifications, and apparel.
- There is a general, non-specific ban on any discrimination that prejudices equal opportunity employment, equal access to jobs, equal continuity of employment or equal enjoyment of rights, and on discrimination between employees with the same work duties. Disability is the only ground on which discrimination is specifically prohibited.
- Employers must provide employees with adequate means of protection against hazards of occupational injury and disease that may occur during work. They also have a range of specific obligations in this area.

- In principle, an employer may dismiss an employee at any time providing the required official written warnings registered at the Ministry of Labour. Other reasons for termination will lead to unlawful termination and full end-of-service gratuity.

The minimum wage in the public and private sectors is set by the government following consultation with employers and workers. Lebanon's monthly minimum wage was established at 675 000 LBP, which amounted to US$ 450 prior to the currency's collapse. With the crisis, it went down to US$ 30. Recently, Decree 9129 of 13/05/2022 increases the minimum wage for workers in the private sector, bringing it to a total of 2 million LBP/month. This translated to around 74 US$/month at the exchange rate of that time. The decree also approved an additional financial support to civil servants of 1 325 000 LBP/month for wages that do not exceed 4 000 000 LBP/month.

In addition to the minimum wage, a salary scale also applies in the public sector. This is based on the position and rank of the respective employee.

Staff members are recruited through the Public Service Council. They are classified under categories:

- Category 1 is the highest level with high qualifications (engineers or advanced university graduates). Individuals in this group perform management functions.
- They are directly supported by people under Category 2, also of high qualification level.
- Category 3 is for individuals of intermediate level that assist the higher category people in team management. They are in charge of managing projects, missions, reports' production… etc. The qualification level of people under this category is high. They also include engineers for example.
- Finally, categories 4 and 5 are made up of task execution teams with lower qualifications (technical BT, high school, or even no degree whatsoever).

The National Social Security Fund (NSSF) manages key elements of the social insurance system. It provides health insurance, an end-of-service indemnity, and family allowances to formal workers in the private sector. Private sector workers not covered by the NSSF or the civil service (around 50% of the labor force, including informal wage earners and self-employed people) can, in principle, obtain health coverage from the Ministry of Public Health. However, the coverage offered by the ministry is insufficient for the Lebanese population's needs. Furthermore, no unemployment fund exists to support those who lose their job or do not find one in the first place.

According to the site salaryexplorer.com (2022):

- 2 280 000 LBP/month is the average monthly salary including housing, transport, and other benefits.
- The median salary is 2 140 000 LBP/month.
- Reading from the salary distribution diagram, 25% of the population earns less than 1 220 000 LBP while 75% earns less than 5 790 000 LBP.

4.4.2 Staff productivity

Staff productivity is a usual element of comparison when benchmarking WSS utilities. The number of employees per 1,000 active connections is the most usual KPI employed by the bench markers. Table 21 shows KPIs obtained for different utilities worldwide.

2-3 employees/1000 connections is generally considered as good performance ratio for utilities in developed countries. A ratio up to 4-5 is still accepted as a rather efficient result in less developed countries.

Table 18
WASREB (Kenya) – Evaluation of staff productivity (employees / 1,000 active connections)

WASREB, the national water regulator publishes every year a Performance Report of Kenya's water Services Sector, reviewing performance of 90 water utilities across the country.

As a rule, WASREB considers the following values for scoring national utilities in terms of staff productivity:

Size of utilities	Good	Acceptable	Not acceptable
Large companies	< 5	5 – 8	> 8
Medium companies	< 7	7 – 11	> 11
Small companies	< 9	9 – 14	> 14

Source: WASREB Impact Report n°14

According to WASREB last IMPACT n°14 report (data of fiscal year 2020/21), the average staff productivity at national level is stable at 7.4 employees per 1,000 active connections. The KPI is smaller for the very large utilities (2.9 in Nakuru, 3.9 in Eldoret, but 8.1 in Nairobi and 9.0 in Mombasa), and higher for the smallest (up to 70).

With about 387 163 registered connections and 1 176 effective employees, the number of staff per 1,000 connections of BMLWE is close to 3,037 which may be considered as a good performance ratio, when compared with international benchmarking.

However, it may be observed that this indicator has limitations as a tool to compare staff productivity:

- All Utilities do not have the same perimeter of activities. Some utilities jointly manage electricity and water distribution. Other include solid waste removal in their scope of work, etc.

  For example, it would be difficult to compare the staff efficiency of LYDEC with other W&S utilities, as the Moroccan company is in charge of both water and electricity services for Casablanca. The staff dedicated to water and wastewater departments is relatively limited, but a larger contingent of employees works for common services (including commercial services)

Table 19
LYDEC (Casablanca - Morocco) – Nº of employees per activity – 2021

Activity	N° of employees	%

Water	273	9
Wastewater	362	12
Electricity	411	13
Public Lighting	105	3
Customer services	1 140	36
Common services	837	27
Total	3 128	100

Source: LYDEC Annual Report 2021

BMLWE's perimeter includes irrigation services, which are usually not on the behalf of W&S utilities.

- Moreover, the relative weight of sewerage may differ a lot. In general terms, water utilities are also in charge of sanitation operations in the same area. But this is not the case everywhere. In Tunisia, for example, SONEDE is the public company responsible for the water supply services of the whole country, while a distinct national public company, ONAS, is in charge of sanitation. In international comparisons, SONEDE often appears as one of the most efficient companies in terms of staff per 1,000 water connections. This is in part due to the effective high staff productivity of the Tunisian company, as more in-depth analysis can demonstrate, but there is a bias when SONEDE's low number of employees per 1,000 water connections is compared with the same KPI of other utilities, which must also deal with sewerage O&M.

Table 20
Tunisia – Staff productivity – Water and Sewerage

Company (2020)	N° of customers	N° of employees	Staff / 1,000 connections (W+S)
SONEDE (Water)	3 038 656	6 239	2.05
ONAS (Sewerage)	2 125 000	3 241	1.53
Total	5 163 656	9 480	1.84

Source: SONEDE and ONAS – end of 2020

- The concept of "active" connections is not well defined everywhere. In Jos (Plateau state, Nigeria), the customer database of JOWASCO, the state-owned water utility, gathers a total of about 28,000 registered customers. The database is outdated, and it is estimated that the real number of existing connections is higher, possibly around 35,000. However, the billing process of the utility is not efficient. Less than 7,000 customers are regularly billed and may be considered as active. Of course, dividing the 278 employees (as of May 2022) by 28,000, 35,000 or 7,000 will provide very different values for the staff productivity KPI.
- The number of employees underestimates the manpower needs when activities are outsourced. In Brazil, most utilities are presently used to outsource core tasks such as meter reading and bill distributing to specialized private entities, through different types of contracts. As a result, the number of direct employees is rather low, but does not fully translate the staff productivity. The Brazilian national benchmarking system, SNIS, tries to observe a second indicator, adding to the number of employees the number full time equivalent workers mobilized through outsourcing, but this last information is not easy to estimate, and the result is not very reliable.

  In 2020, the total number of direct or indirect (outsourced) staff working for the Brazilian W&S utilities was estimated to 229,100 people, out of which 150,200 (66%) are direct employees and 78,900 (34%)

are outsourced workers.[10] This estimate leads to an average of 2.7 employees per 1,000 connections at the national level, meanwhile, the national average hides relevant regional variations:

- 2.0 for the State of Parana and 2.1 for the State of São Paulo, in the more developed South-East of the country,
- Respectively 4.8 and 2.9 in the less developed macro-regions of the North and the Northeast.

Despite the conceptual limitations listed above, the number of employees per 1,000 active connections remains the stronger and most commonly used KPI to compare staff productivity among water utilities.

[10] SNIS (2022). *Diagnóstico temático – Serviços de Água e Esgoto – Gestão administrativa e financeira (ano de referência 2020*.

Table 21
Benchmarking staff productivity

Region	Country	City	Utility	Year	Source	N° wat. conn.	N° sew. conn.	N° staff	Staff W/000 W Conn.	Staff / 000 W+WS conn.
Asia C	Armenia	Yerevan		2016	IBNet	461 133	941	297 505	2,0	1,2
Asia C	Kazakhstan	Almaty		2016	IBNet				3,3	
Asia C	Uzbekistan	Tashkent	Suvsoz	2018	OpT	602 218	558 018	3 622	6,0	3,1
Asia S	Bengladesh	Dhaka	DWASA	2017	IBNet				7,6	7,2
Asia S	Bengladesh	Chittagong	CWASA	2017	IBNet				10,6	
Asia S	Myanmar	Mandalay	MCDC	2018	OpT	91 627		444	4,8	
Asia S	Pakistan	Lahore	Lahor WASA	2019	OpT	452 266	707 390	9 657		8,3
Asia S	Pakistan	Faisalabad	WASA	2019	OpT	118 422	262 339	2 688		7,1
Asia S	Sri Lanka	Colombo City	NWSDB	2018	OpT	146 881		500	3,4	3,4
Asia SE	Cambodia	Phnom Penh	PPWSA	2020	Aspa	407 779		1 114	2,7	
Asia SE	Cambodia	Siem Reap	SRWSA	2018	OpT	8 797		112	12,7	
Asia SE	Indonesia	East Java	SWU	2018	OpT	564 104	3 131	1 185	2,1	2,1
Asia SE	Indonesia	West Java	UPTD PAL	2017	OpT	154 132	2 606	451	2,9	2,9
Asia SE	Malasia	Penang	PWSC	2021	IBNet				7,5	9,9
Asia SE	Vietnam	Hue Province	HueWACO	2018	OpT	255 695		528	2,1	2,1
Europe	Bulgaria	Sofia	Sofiyska Voda	2016	IBNet				6,2	
Europe	Finland	Helsinki	HSY	2020	IBNet				2,6	2,6
Europe	France	Paris	EAU de PARIS	2021	ASPA	95 000		900	9,5	9,5
Europe	France	Strasbourg	Régie	2021	ASPA	73 586	69002	304	4,1	2,1
Europe	Portugal	Lisbon	EPAL	2020	ASPA	103 536		383,6	3,7	3,7
Europe	Portugal	Porto	Aguas do Porto	2020	ASPA	71 225	60070	436,9	6,1	3,3
Europe	Serbia	Belgrad	BVK	2020	IBNet				9,7	9,0
Europe	United Kingdom	Wales	Welsh Water	2016	IBNet				2,9	1,8
Europe	United Kingdom	Bristol	Bristol Water	2016	IBNet				0,9	
Latin America	Brazil	São Paulo State	SABESP	2020	SNIS	8 961 967	7 680 388	21 920	2,4	1,3
Latin America	Brazil	Rio de Janeiro S	CEDAE	2020	SNIS	2 729 547	885 702	7 983	2,9	2,2
Latin America	Brazil	Minas Gerais	COPASA	2020	SNIS	4 438 378	2 960 307	14 234	3,2	1,9
Latin America	Brazil	Parana	SANEPAR	2020	SNIS	3 273 807	2 308 135	10 236	3,1	1,8
Latin America	Brazil	Bahia	EMBASA	2020	SNIS	3 197 449	1 312 545	9 592	3,0	2,1
Latin America	Brazil	RS	CORSAN	2020	SNIS	2 002 046	235 621	6 560	3,3	2,9
Latin America	Brazil	GO	SANEAGO	2020	SNIS	2 270 106	1 261 012	7 599	3,3	2,2
Latin America	Brazil	DF	CAESB	2020	SNIS	699 779	608 398	2 985	4,3	2,3
Latin America	Brazil	PE	COMPESA	2020	SNIS	2 026 205	411 155	7 812	3,9	3,2
Latin America	Brazil	CE	CAGECE	2020	SNIS	1 696 655	650 037	2 584	1,5	1,1
Latin America	Brazil	SC	CASAN	2020	SNIS	798 713	109 985	3 358	4,2	3,7
Latin America	Brazil	PB	CAGEPA	2020	SNIS	828 651	275 209	3 623	4,4	3,3
Latin America	Brazil	ES	CESAN	2020	SNIS	590 335	278 764	2 381	4,0	2,7
Latin America	Brazil	RN	CAERN	2020	SNIS	741 847	200 281	2 766	3,7	2,9
Latin America	Brazil	MS	SANESUL	2020	SNIS	510 166	229 498	2 815	5,5	3,8
Latin America	Brazil	SE	DESO	2020	SNIS	587 496	144 177	2 246	3,8	3,1
Latin America	Brazil	MA	CAEMA	2020	SNIS	571 844	116 788	2 801	4,9	4,1
Latin America	Brazil	AL	CASAL	2020	SNIS	427 151	75 914	1 640	3,8	3,3
Latin America	Brazil	PA	COSANPA	2020	SNIS	444 793	52 293	2 561	5,8	5,2
Latin America	Brazil	PI	AGESPISA	2020	SNIS	424 367	45 570	1 688	4,0	3,6
Latin America	Brazil	RO	CAERD	2020	SNIS	140 750	9 280	679	4,8	4,5
Latin America	Brazil	RR	CAER	2020	SNIS	118 779	89 696	870	7,3	4,2
MENA	Egypt	Sharquia		2015	IBNet				2,6	3,2
MENA	Egypt	Dakahlia		2015	IBNet	1 122 668			4,3	3,8
MENA	Egypt	Beheira		2015	IBNet				9,0	13,2
MENA	Jordan	Amman	MIYAHUNA	2020	ASPA	730 740		1 774	2,4	
MENA	Mauritania	Nouakchott	SNDE	2018	OpT	110 000	9 950	817	7,4	6,8
MENA	Oman	Oman	PAEW	2015	IBNet				5,1	
MENA	Tunisia	National	SONEDE	2020	ASPA	3 038 656		6 239	2,1	
MENA	Tunisia	National	ONAS	2020	ASPA		2 125 000	3 241		1,5
SSA	Centrafrique	Bangui	SODECA	2017	OpT	16 877		228	13,5	
SSA	Djibuti	National	ONEAD	2018	OpT	42 132		316	7,5	
SSA	Kenya	Nairobi	NCWSC	2021	WASREB	400 693	244 095	3 239	8,1	5,0
SSA	Kenya	Mombasa	MOWASSCO	2021	WASREB	41 648		374	9,0	
SSA	Kenya	Eldoret	ELDOWAS	2021	WASREB	85 736		331	3,9	
SSA	Kenya	Nakuru	NAWASSCO	2021	WASREB	64 795		188	2,9	
SSA	Madagascar	National	JIRAMA	2020	IBNet				4,4	
SSA	Malawi	Lilongwe	LWB	2019	Esawas	90 658		581	6,4	
SSA	Mali	National	SOMAGEP-SA	2017	OpT	210 730		1 227	5,8	
SSA	Mozambique	Maputo	AdeM	2019	Esawas	256 839		832	3,2	
SSA	Nigeria	Lagos	LWC	2018	IBNet				7,5	
SSA	Nigeria	Kano	KNSWB	2020	IBNet				11,6	
SSA	Nigeria	Calabar	ORTECH	2015	OpT	40 000		232	5,8	
SSA	Rwanda	National	WASAC	2019	Esawas	213 706		1 376	6,4	6,4
SSA	Senegal	National	SONES	2017	OpT	683 421		1 311	1,9	
SSA	Senegal	National	ONAS	2018	OpT		129 967	585		4,5
SSA	Tanzania	Dar es Salaam	DAWASCO	2019	Esawas	261 294	19 806	1 113	4,3	4,0
SSA	Uganda	National	NWSC	2019	Esawas	659 157	22 606	3 778	5,7	5,5
SSA	Zambia	Lusaka	LWSC	2019	Esawas	109 454	36 117	888	8,1	6,1

Source: ASPA Benchmarking Database

5 GAP ANALYSIS AND IDENTIFICATION OF MAIN ISSUES

5.1 SUMMARY OF THE 360º DIAGNOSIS

Summarizing the overall review of BMLWE performances, the establishment appears in table 20 as a rather weak utility.

BMLWE shows deficiencies in many items, but the most negative points are a consequence of the inappropriate (or uncomplete) institutional framework, worsened by the impact of the national crisis on the sector. It would be very surprising for a water utility to obtain good performance and demonstrate efficiency in such a difficult environment.

Table 22
360º summary of the existing situation

Area	Topic	Score	Comments
Billing / collection / customer attention	Consistency and reliability of the customer database		No distinction between types of consumers
	Suitability of IT tools - customers information & billing		Inhouse developed software CIS functioning; not linked to ERP
	Management of new customers / new connections		Dedicated awareness campaigns stopped during the crisis
	Business relationship with customers		Lack of communication
	Existence and quality of contracts with customers		Existing according to the law; no customer-oriented culture
	Communication with customers (including internet)		Website partially functioning and App running
	Customer debt management and water cut-off policies		Inefficient warnings issued (after two years) and possibility of cut-offs after four years' debt
	Collection management		56,6% collection rate; more alternatives to pay should be available
Metering and Non Revenue Water	General measurement policy		48% of customer meters installed
	Meter management		Faulty meters not replaced
	Reading management		No reading routine in place
	Fraud control & illegal connections		Illicit users are not being checked
	Management of physical losses		No routine repairs
	Intervention procedures on leaks		No routine procedures in place
	Existence of DMA-type approach		Existent in some service areas
Ability in engineering and investment planning	Internal engineering capability. Tools and models		Some skills are missing or requiring capacity
	Existence and quality of updated master plans		Master Plan dated from 2012, needs to be updated
	Knowledge and mapping of networks		Poor asset inventory; ongoing update
	Maintenance, renewal, and extension of networks		Lack of spare parts and equipment
	Competence in project management (PMU)		Investment mainly done by CDR
	Water treatment plants O&M		Performing with context difficulties

Capacity in current operation and maintenance	Wastewater treatment plants O&M		Lack of spare parts and equipment; Absence of proper ownership of O&M role by WEs
	Electromechanical pumping units O&M		Lack of spare parts and equipment
	Water network operation		Intermittent service
	Operation and cleaning of sewage networks		Performed by municipalities
	SCADA and other technological means		Existent but not operating
	Pressure management and energy efficiency		Few procedures in force
	Preventive and corrective maintenance		Few procedures in force
Water quality and environmental control	Water resources management		Low control
	Distributed water quality monitoring		Some disinfection systems out of service; lack of water quality monitoring
	Effluent quality monitoring		Lab chemicals often not available
Administration, finance and accountancy	Consistency of financial reports		Delays on annual financial statements; Lack of information and accountability
	ERP-type tools		Existing
	Analytical accounting		Non-existent
	Purchasing/Procurement management		Public service procedures in force
	Experience with national and international financial institutions		Good involvement
Human resources	General HR policy and organization charts		No internal HR policy; Non-existent Commercial and Wastewater Departments
	Salary policy		Civil servants' rules in force; Huge depletion impact on employee's income
	Capacity building and career management		Non-existent
	Outsourcing capability		Experienced in managing supplies and services
Management, Information, and reporting	Existence and quality of annual reports		Existent with inconsistencies
	Information flows within the company		Not effective and dispersed
	External communication policy		Call Center existing and active
	Asset management and GIS		Existing GIS unit
	Crisis management		Good relationship with IFIs and donors
	Demand projections and tariff policy		No forecasts; No water balance; No volumetric charge
	Relations with the supervisory authority		Good
Governance	Legal framework and regulation scheme		Inadapted the key issue
	Clarity of the utility's mission and objectives		Lack of clear objectives
	External auditing and tutela		

5.2 REVIEW OF KEY ISSUES

5.2.1 Defining better the role and status of a WE

First, it is necessary to better define what is the exact status and role of an WE.

- Is an WE a "company" (although owned by the State) or an "authority"?
  - The original spirit of Law 221/2000 gave a status of independent organization, self-sufficient in terms of finance and autonomous in terms of internal administration. This spirit has been jeopardized by subsequent legal decisions. It needs to clearly decide which is the model to be followed by the WEs.
  - In our opinion, the application of the rules defined by the Public Service Council is incompatible with the activity of an operating company. The day-to-day operation of a public service means flexibility and capacity to adapt the organization according to the needs. Neither the organizational chart nor the number of employees can be rigidified by law. In an operating company, the manner to organize the entity and the way to allocate employees are typically the job, the skill, and the merit of the general management. The management is controlled by the tutelar authority or the shareholders based on results he can achieve, financially as well as technically.
- Who owns and takes care of the facilities? Using the French nomenclature, is the WE a "fermier" or a full "concessionaire"?
  - What is the relationship between the CDR and an WE? The CDR manages the financing and the construction of new installations. Is he supposed to transfer the facility as soon as it is commissioned?
  - Who pays for the heavy maintenance and the replacement of obsolete equipment?
  - What is supposed to be covered by the tariff: only the O&M costs or also the amortization of the assets?
- How the relationship between the WEs and the tutela (the MoEW) is organized and how are the tasks shared between them?
  - The WEs are under the supervision of the MEW through the General Directorate of Operation. But such a relation is not clarified by any procedure specifying the rights and obligations of each party.
  - Who has the overall responsibility for master planning, investment, and long-term strategy? Is the WE supposed to have a strong planning unit or just the mini unit to manage the current O&M?
  - Which documents (standardized annual reports, audited financial statements, etc.) are required by the Ministry to perform its own tasks as a tutela?
  - Which KPIs (Key Performance Indicators) must be followed? What are the quantitative objectives to be reached by the WE? How to revise periodically these objectives?
- What is the exact role of an WE regarding water resource management? Control of underground water tables? Existence of undeclared wells or boreholes?
- What is the commitment of the WE about sewerage collection, sewage treatment and irrigation?
- How is an WE allowed to outsource or sub-delegate certain activities?

In short, is it possible to properly determine the organizational framework and the RH issues of a WE before having a clearer "delegation contract" which defines the role of the entity?

5.2.2 Improving the quality of available information

For the time being, information does not appropriately flow within the establishment as well as outwards. Lack of reliable data significantly affects the capacity to address the big issues as listed above.

During the site visits, BMLWE was requested to supply data regarding HR issues. The collected data is summarized in the Annex 6.1.

Table 23
Comments on the collected data (Nov. 2022)

Strength ▪ the number of personnel is balanced according to international indicators. ▪ the number of customers is increasing, bringing larger income to the BMLWE ▪ the implementation of the global management ERP software ▪ tariff increase plan is defined for the coming years ▪ capacity of engineering ▪ Large number of customers	***Opportunities*** ▪ the new water law decrees under preparation ▪ the LTTA support ▪ large number of potential future customers ▪ the new public procurement law giving more flexibility for the procurement ▪ the water metering for large customers ▪ billing consumed volumes ▪ five years strategy ▪ outsourcing
Weaknesses ▪ no action plan has been developed for the NRW ▪ power supply defect is a major issue for the production ▪ the number of skilled employees is limited ▪ public sector salary scale is a real limitation for the recruitment of experts ▪ the strategy for the takeover of the wastewater system is not defined yet ▪ the amount of the debt is not specified ▪ the board is not active ▪ the rate of the water bills recovery is decreasing ▪ many activities are still ignored: communication, NRW, HR management process, water resources management, ▪ there is no initiative for decentralizing the activities ▪ complexity of administrative procedures ▪ the undefined rights and obligations of the supervisory authority namely MEW ▪ the global management software ERP requires for specific actions the support of an external expertise. This is not sustainable in the long run ▪ need to sort the customers by categories ▪ SCADA to be reinforced	***Threats*** ▪ the new public procurement law, the complexity of the application process ▪ the limited availability of the number of employees ▪ the confidence of the population in the public sector ▪ the finance capacity ▪ centralization ▪ water resources quality and availability

5.2.3 Addressing legal and Institutional issues at national level

As reported earlier, the BMLWE was created by law 221 – 2000 and the decrees were issued to specify the organization, the rules, and the procedures to be used.

The law 221-2000 has stated that the WEs are public and independent organizations. It was clearly mentioned that the WEs should be self-sufficient in terms of finance and that they are able to recruit their employees according to their needs. The law has specified the activities under the responsibility of the WEs. Few months later, the decrees have defined the organization chart for each WEs, as well as positions and number of employees.

At this level, the WEs have faced the first issues. The new organization chart did not include any position related to wastewater, irrigation, IT, and customer services, although these activities were declared under the responsibility of the WEs.

In 2004 the law ref 583-2004 article 54 made mandatory for the WEs to abide by the Public Service Council rules and procedures.

It is surprising to fix by decree the number of employees at each position, making any modification very complex as any modification shall require a new decree. The issue faced today is that the BMLWE does not have the number of employees required to achieve the tasks defined by the law.

In 2017 the law ref 46 - 2017 article 21 has prohibited any recruitment for all public organizations. Since this time the WEs are using private contracts with service providers to have “on demand” staff.

The WEs have lost their independence for recruitment, and for any amendment of the existing organization chart to add the missing activities such as water resources management, wastewater O&M, communication, NRW, etc.)

The new public procurement law ref 244-2021, that went into application in August 2022, imposes many restrictions on the terms of reference for any tendering process, it should impact from 2023 the “on demand” contracts as the law shall not allow to recruit permanent “on demand” position, and it should limit the “on demand” to the categories 5 and 4 (site workers and low-level technician). If this is confirmed, it shall have a large impact on the organization of the WEs.

5.2.4 Addressing financial issues

As reported earlier, the WEs are supposed to be independent. They have their own board in charge of preparing the annual budget. However, two ministries are also involved in the process: the MoEW and the Ministry of Finance for the approval of the budget and the tariffs. Once again, it is important to define the rights and obligations of each party, knowing that the role of the MEW and the Ministry of Finance should be limited to check the compliance with the procedures and not interfering on the decisions of the board.

The income of the WEs is the water bills, the tariff is proposed by the board, and must be approved by the MWE. This is a normal procedure because the tariff has a social impact, so the government must be involved in the final decision in compliance with the official global strategy.

It has been noted during the sites visit that BMLWE is not paying part of the power bills. It confirms the information shown in Paragraph 3.6.2. This situation has generated a debt that will have to be settled in the coming years.

For the time being there is no global strategy for outsourcing. Some of the managers are hesitating as they have the feeling that by outsourcing some activities, they shall lose some of their power, on the other side some managers are considering that outsourcing shall limit their responsibility. The strategy for outsourcing should be clarified and implemented as much as possible for any activity that is not the core business of the WE.

5.2.5 Addressing technical issues

All the assessment reports prepared on the WEs show that there is a large potential for improvement on the technical side. As an illustration, it can be reminded that the WEs are not equipped with a strong centralized SCADA, that the CMMS is not available, that the GIS tools are to be reinforced, that the CIS is not as performant as expected, that the ERP is running in parallel with old handwritten books, that water metering is not covering all customers, there is no district metering or even production bulk metering, that the WEs do not have adequate expertise for the wastewater O&M, that archiving process is still based on old paper support, that communication strategy is not clearly defined, etc.

There is a lot to do for reaching the standard level of service expected from the WEs. But despite all the points reported, it is also obvious that the existing capacities are not used at the optimum. For instance, some examples can be mentioned: there is no CMMS, but the preventive maintenance can be done based on excel sheets; one other example: all customers are not equipped with water meters but the few ones that have meters (and there are thousands) can be used as pilot sample to know the profile of the customers' water consumption, as well as the customers' data base can be reviewed and updated according to the present situation with no need to wait for an external assistance, etc. It is the responsibility of the chairman to initiate such actions and improve the quality of service, even with limited human and financial capacities.

5.2.6 Addressing management issues

Each WE has its own specific management style, it is not the purpose of the present report to assess the personal management style. It was noted that all managers have in mind to get more "autonomy" but on the other hand, in terms of responsibility, they consider that it must be shared with the MWE.

The existing rules and laws under application, even if they need to be reviewed, are not used at the optimum. One example can clarify this statement: the existing rules allow the managers to develop an annual performance assessment of each employee, such assessment can be referred to for the promotion of the employees. BMLWE is not applying the procedure.

The managers of the WEs are used to working under "emergency procedure"; any document to be signed must be done immediately. The decision process is centralized, and no delegation is under application. Hierarchical relationships must be reviewed to allow a smooth, responsible, and motivating management.

5.2.7 Addressing HR issues

As mentioned in point "a", law 221-2000 has considered the WEs as independent for recruiting their employees. But this has been limited by law 583-2004, imposing to refer to the procedure of recruitment under the control of the Public Service Council. Since that time, the WEs are not able to recruit the profiles according to their needs and are not allowed to propose salaries that are out of the official scale of the public service. This situation has negatively impacted the efficiency of the WEs' actions.

The question is why the legislator has imposed such a constraint? It is assumed that the legislator had in mind the local pressure that can be applied on the management of the WEs by local leaders for the recruitment and even for the salaries; by imposing the rules defined by the Public Service Council, the management is protected from such pressure. But on the other hand, it becomes very hard to recruit as the process is a long process.

One important issue that has been noted, is related to the existing organization chart. As discussed earlier, the organization chart for each WE was defined by decree, stating the positions and the number of people. It is known worldwide that an organization chart is a "living organization", positions are moving according to the new development of technologies, as well as the number of people per position is defined by the degree of investment in new technologies. To clarify the concept, by using specific software, the number of employees in some activities can be reduced, but this necessitates to have an IT activity to handle the hardware and the software. Surprisingly the existing organization chart prepared in 2005 did not forecast for any IT position.

On top of the previous comment, the existing organization chart has not referred to any position for the following: wastewater and irrigation as recommended by law 221, but also the customer service and communication activities were ignored.

It is now urgent to revise the existing organization chart to have all the required activities included as it is now mandatory for any modern water organization.

The number of employees by position should be presented as indicative because the situation for each WE is moving from year to year and it is not very efficient to define a hard frame for the number of employees that may vary according to the specific needs and the use of new technologies. The same thinking should be applied to the salaries. For instance, and as we know, some positions are facing high demand on the market, it is the case for the IT expert, if the salaries proposed by the WE are not competitive with the industrial private sector, it will be almost impossible to recruit such a profile by the WEs. The board of each WE should be able to decide the most adequate salary scale to be used for each position. Such a flexibility must be compensated by the responsibility of the board and mainly the chairman, who must be sure that the WE has the capacity to pay the agreed salaries in the long term and that these salaries are fair and consistent with market conditions.

It has been noted that the WEs did not develop an annual training plan for the personnel, to be initiated to new technologies, new management styles, etc.

Due to the recruitment freeze and the increase of workload, particularly on wastewater, the hiring of private operators to carry out O&M tasks appears to be a relevant approach, as soon as the utility undertakes an appropriate reorganization and acquires the financial capacities to pay the service providers:

- Increasing the size of the Procurement Unit, to enable BMLWE to develop and monitor contracts with the private sector
- Developing performance-based contracts and providing specific training and support to the legal and procurement teams and to the technical staff in charge of overseeing and monitoring these contracts
- Progressively reorganizing the Technical and Distribution Departments by creating a unit in charge of supervising the private operators and, if necessary, reassigning O&M activities currently undertaken by WE staff to newly contracted private operators.

6 ANNEXES

6.1 METHODOLOGY APPLIED

The methodology developed for this phase of the project can be summarized as follow:

Based on the large volume of reliable data collected by the LTTA, the Consultant has updated the HR information during the sites visits, mainly focusing on:

- Number of employees
- Number of “on demand”
- Monthly wages and increase strategies
- Types and Profiles of the personnel (categories, status, etc.)
  - Managers
  - Supervisors
  - Workers
- Age repartition
- Mobility
- RH department organization and IT tools
- Working hours and management of overtime
- Trade-Union
- Annual training plans
- Incentives and benefits strategy
- Availability of job description
- Annual performance assessment
- Promotion strategy
- Health and safety rules
- Internal rules
- Sanctions strategy
- Gender strategy

As well, the Consultant has gathered some complementary data such as:

- Labor law (French version updated 1996)
- HR management rules for the public employees
- Most recent decrees regarding salaries and benefits in the public sector
- Internal rules of each WE when available.

The Consultant has identified the gaps between the objectives defined by the law for each WE and the existing situation as described by the managers which have been interviewed:

- institutional
  - Internal: the laws and national rules exist but are not under application in the WE
  - External: the laws and national rules are not available or are available but require some modifications to be adapted to the actual and future needs
  - Improvements required in the procedures of the WEs
- Operational
  - Review the needs for each of the main activities of the WEs (in terms of number of employees, skills, procedures, etc.) to be compared to the existing figures:
    - Water resources management
    - Water production
    - Water distribution
    - Wastewater collection
    - Wastewater treatment
    - Environment management at discharge points
    - Customer service
    - NRW
    - IT
    - Design and investment
    - Administrative
    - Finance and accounting
    - Communication
    - Procurement
    - Quality control
    - Health and safety
    - HR management
    - Internal audit and control

6.2 COLLECTED DATA RELATED TO RH ISSUES

Table 24
Questionnaire submitted to BMLWE on November 8th and rediscussed on December 1st

Name of the organization	Beirut Mount Lebanon Water Establishment
dates of visit	08/11;
Names and functions of the host	Jean Gebran (Directeur General) Ghada Rida (directeur technique) Antoine Zoghby (Technical Assistant Expert)
Board	no Board
Organization chart	Data collection and diagnosis report BMLWE revised, July 2022. As per law 221-2000 number of employees 1120 General Manager Directorate (30) Directorate of Administrative Affairs (55) Directorate of Finance Affairs (59) Directorate of Distribution (4) Warehouse Unit (6) Distribution Beirut Manager (4) Distribution South Beirut (59) Distribution North Beirut (52) Distribution North Mount Lebanon Manager (5) Distribution Jbeil (67) Distribution Keserouan (76) Distribution Upper Meten (74) Distribution Coastal Meten (66) Distribution South Mount Lebanon Manager (4) Distribution Aley (83) Distribution Baabda (67) Directorate of Technical (4) Projects Department (27) Laboratory Unit (8) Technical Beirut Manager (3) Technical South Beirut (46) Technical North Beirut (63) Technical North Mount Lebanon Manager (3) Technical Jbeil (39) Technical Keserouan (34) Technical Meten (27) Technical Coastal Meten (48) Technical South Mount Lebanon Manager (3) Technical Aley (58) Technical Baabda (46)
Local Branches	Jbail, Kesrouan, upper Metn, coastal Metn, Beyrouth North, Beirut south, Baabda, Aley,
Laboratories	Jbeil (Out of Service) Chabrouh – Keserouan (Out of Service) Wadi Hantouch – Keserouan (Out of Service) Daychounieh Upper Meten (Out of Service) Bqellaiaa Upper Meten (Out of Service) Hazmieh - Baabda (Out of Service) Batloun – El Chouf (Out of Service)

	Dbayeh Main Laboratory – Beirut (In Service) Baadarane El Chouf WW (in Service) El Ghadir (WW) (In Service)
Procurement	Tender and Procurement Unit (4) As per Law 221
HR	Human Ressources Department (20)
Comunication	No Communication unit As per Law 221
Stores	Branch Local Store in Jbeil (1) Branch Local Store in Keserouan (3) Branch Local Store in Upper Meten (4) Branch Local Store in Coastal Meten (2) Branch Local Store in Baabda (3) Branch Local Store in Aley (2) Branch Local Store in Beirut North (3) Branch Local Store in Beirut South (1) Central Store in Daoura Central Store in Dbayeh – Bahreh Central Store in Dbayeh – Usine Central Store in Zeghzghi Central Store in Rabieh Central Store in Hazmieh Central Store in Borj Abi Haidar Central Store in Achrafyeh
Surface area covered	Almost 2 000 km²
Number of Municipalities	533
Population	2 900 000
Water resources	Dams :3 ; springs : 29 ; wells in service: 315; surface water:31
Number water plants	12
Capacities WTP	364.680 m3/day
Number of réservoirs	754
Total volumes of the reservoirs	513.850 m3
Number of pumping stations	398
Capacities of pumping stations	74.211 kW
Number of generators	256
Annual volume produstion	221 Mm3/y
Number wastewater treatment plant	BMLWE (15) CDR (1) CDR not yet Operated (2) MoWE under construction (1) Municipality need rehabilitation (1)
Capacities in service	BMLWE : Design Flow 151 450m3/ day Actual Flow 93 770 m3/day CDR : Design Flow 38 000 m3/day Actual Flow : 5 880 m3/day
Distribution network length	8 000 Km
Transmission lines length	2 000 km
Material	DI, PEHD, FG, AC, GRP
Diameter range	50mm up to 1200 mm
Number breaks /year	NA
WW collection network length	NA

Operation	
Number of operators employees (2020)	Pumping Station (94) Treatment Plant & Wells (52) Distribution (217) Water Quality (4) Meter Management (2)
Academic profiles	University (61) Basic Education (38)
Number of On demand operators (2020)	Pumping Station (319) Treatment Plant & Wells (106) Distribution (340) Water Quality (11) Meter Management (6)
Academic profiles	University (48) Basic Education (103)
Reporting	Pumping Station & Treatment Plant to Technical Department & Technical Directorate. Water Quality to Technical Department. Distribution & Meter Management to Distribution department & Distribution Directorate Annual report to MoEW
Number of vehicles	86
Number of stores	27
Number of customer receptions	6
Number of customers	387 163 (2020)
Categories of customers	
Number of metered customers	58 000
Number of gauged customers	329 163
Amounts annual Invoicing (2021)	157 004 855 314 LBP
Annual amount recovery	88 773 487 876 LBP
Rate of recovery	56,54%
CIS	In operation
Number of calls received at the call center	13 961 (2020)
Total number of employees	386
Total number of « on demand"	790
Total personnel	1 176
Monthly wages	
Age répartition of the personnel	
HRIS	In operation
Working hours	8:00 am to 2:00pm 5d/w
Overtime	According to the labor law
Union	yes
Annual training plan	Not available
Incentives and benefits	According to te decree
Annual performance assessment	Not in practice
Health and safety rules	satndard
Gender policy	none
Recruitment process	Following the rules of the Public Service Council

Annnual income 2021	25 000 MLBP
Annual expenses	59 000 MLBP
Debt	
Management information system	In use
Future projects	
Water Production future projects	Reinforcement of Surface Water Finalyse the incomplete works in Dams
Distribution future projects	Extension 1 000 km
Power generation	Reinforcement of Solar Energie Backup Rehabilitation of existing and Supply of new Generators
Archives	
Master Plan /Strategy	Available for Jbeil , Keserouan , Meten , Baabda , Iklim El Kharroub Beirut under Study by Artelia Aley need to be study (TOR under process by TA)
Crisis management manual	NA
Health and safety manual	NA
Quality insurance manual	NA
KPIs	NA
Number of computers	
Number of servers	
Numer of telephones	
Security number of guards	
Fuel Power generators	256 (73 699 kVA)
Solar power generators	7 (300 kVA)

6.3 QUESTIONNAIRE AS RECEIVED FROM THE BMLWE

			data
Name of the organization			Beirut Mount Lebanon Water Establishment
dates of visit			08/11;
Names and functions of the host			Jean Gebran (Directeur General) Ghada Rida (directeur technique) Antoine Zoghby(Technical Assistant Expert)
Intitutional situation			
	Boards members		no Board
	CEO		
	COO		
	CFO		
Organization chart			Data collection and diagnosis report BMLWE revised, July 2022, by Hydroconseil, BTD, Hydrophil, VA
Admin organization			
	Local branches		Jbail, Kesrouan, upper Metn,coastal Metn, Beyrouth North, Beirut south, baabda, Aley,
		As per Law 221 Total number 1120	General Manager Directorate (30) Directorate of Administrative Affairs (55) Directorate of Finance Affairs (59) Directorate of Distribution (4) Warehouse Unit (6) Distribution Beirut Manager (4) Distribution South Beirut (59) Distribution North Beirut (52) Distribution North Mount Lebanon Manager (5) Distribution Jbeil (67) Distribution Keserouan (76) Distribution Upper Meten (74) Distribution Coastal Meten (66)

			Distribution South Mount Lebanon Manager (4) Dsitribution Aley (83) Distribution Baabda (67) Directorate of Technical (4) Projects Department (27) Laboratory Unit (8) Technical Beirut Manager (3) Technical South Beirut (46) Technical North Beirut (63) Technical North Mount Lebanon Manager (3) Technical Jbeil (39) Technical Keserouan (34) Technical Meten (27) Technical Coastal Meten (48) Technical South Mount Lebanon Manager (3) Technical Aley (58) Technical Baabda (46)
		activities	Production, distribution
	interbarnches coordination		
		regular meetings	
		field coordination	
	common services		
		lab	Jbeil (Out of Service) Chabrouh – Keserouan (Out of Service) Wadi Hantouch – Keserouan (Out of Service) Daychounieh Upper Meten (Out of Service) Bqellaiaa Upper Meten (Out of Service) Hazmieh - Baabda (Out of Service) Batloun – El Chouf (Out of Service) Dbayeh Main Laboratory – Beirut (In Service)

			Baadarane El Chouf WW (in Service) El Ghadir (WW) (In Service)
		procurement	Tender and Procurement Unit (4) As per Law 221
		HR	Human Ressources Department (20)
		communication	No Communication unit As per Law 221
		central store	Branch Local Store in Jbeil (1) Branch Local Store in Keserouan (3) Branch Local Store in Upper Meten (4) Branch Local Store in Coastal Meten (2) Branch Local Store in Baabda (3) Branch Local Store in Aley (2) Branch Local Store in Beirut North (3) Branch Local Store in Beirut South (1) Central Store in Daoura Central Store in Dbayeh – Bahreh Central Store in Dbayeh – Usine Central Store in Zeghzghi Central Store in Rabieh Central Store in Hazmieh Central Store in Borj Abi Haidar Central Store in Achrafyeh
		legal	
geographical description			
	area covered		2 000 km²
	number of municipalities		533
	population		2 900 000
		residents	
		refugees	
	number of ressources		

	capacities		
		dams	3
		springs	29
		Wells in service	315
		surface water	=29+3=31
	number water plants		12
	Capacities WTP		364.680 m3/day
	number of reservoirs		754
	volumes		513.850 m3
	number of pumping stations		398
	capacities		74.211 Kw
	generators		256
	annual volume production		221 Mm3/y
	number WW plants		BMLWE (15) CDR (1) CDR not yet Operated (2) MoWE under construction (1) Municipality need rehabilitation (1)
	Capacities in Service		BMLWE : Design Flow 151 450m3/ day Actual Flow 93 770 m3/day CDR : Design Flow 38 000 m3/day Actual Flow : 5 880 m3/day
	%nominal in use		
	distribution network	length	8 000 Km
	Distribution & Transmission Network	length	10 000 km
		type material	DI, PEHD, FG, AC, GRP
		range dia	50mm up to 120mm
		breaks/year	

	collection network		
		length	NA
		type of material	
		range of dia	
		breaks/year	
Operation			
	organization of O&M		
	Staff (2020)	number operators	Pumping Station (94) Treatment Plant & Wells (52) Distribution (217) Water Quality (4) Meter Management (2)
		profiles personnel	University (61) Basic Education (38)
	On Demand (2020)	number operators	Pumping Station (319) Treatment Plant & Wells (106) Distribution (340) Water Quality (11) Meter Management (6)
		profiles personnel	University (48) Basic Education (103)
	reporting		
		who	Pumping Station & Treatment Plant to Technical Department & Technical Directorate Water Quality to Technical Department Distribution & Meter Management to Distribution department & Distribution Directorate
		to	
	equipment		
		workshops	
		vehicles	86
		stores	27

customer service			6
	number customers		387 163 (2020)
	type of customers		
		domestic	
		commercial	
		industrial	
		institutional	
		metered	58 000
		gauge	329 163
	annual invoicing		Refer to Attached Excel Sheet
		number bills	
		amounts	
		volume	
	annual recovering		
		number bills	
		amounts	
		volumes	
	tariffs		
		water	
		WW	
	CIS		
		available	
		operatiional	
	pending amounts		
	number collectors		
	call center		
		number calls received	13.961 (2020)

HR			
	total		1 176
	total number employees		386
	total number on demand		790
	monthly wages		
	salaries increase strategy		
	profiles personnel		
		managers categories	
		supervisors categories	
		workers categories	
	age repartition	future retirees	
	mobility		
	RH department		
		activity	
	HRIS		
		available	
		operational	
	workig hours		8:00 am to 2:00pm 5d/w
	overtime number/year	monthly	
	union		
	annual training plans		
		number sessions	
		hours/employee/year	
		budget	
	incentives &Benefits		
		incentives	

		benefirts	
	available jobs description		
	annual performance assessment		
	promotion strategy		
	health and safety rules		
	sanctions and penalties		
	internal rules		
	gender policy		
	recruitment processes		
		employees	
		on demand	
Financial 2021			
	annual income		25 MLBP
	annual expenses		59 MLBP
	debt		
	investment		
	subsidies		
	Management information system		
		available	
		operational	
Future projects			
	water		
		production	Reinforcement of Surface Water Finalyse the incomplete works in Dams

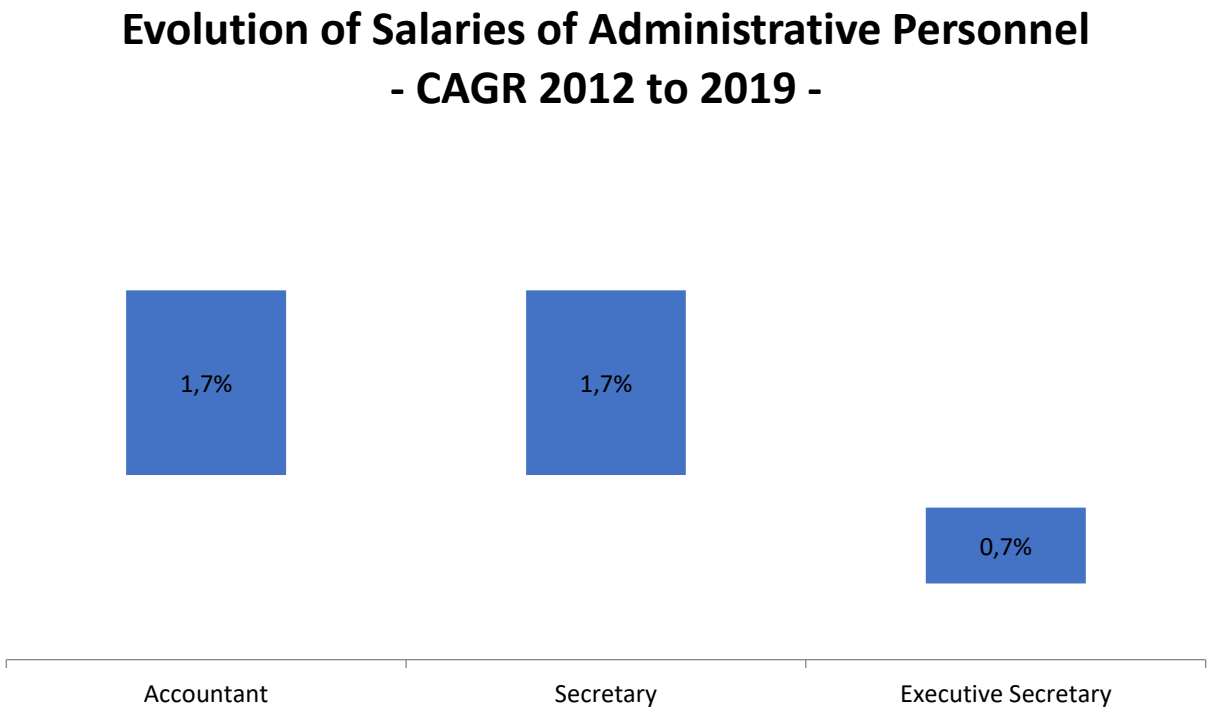
		distribution	1000 km extension
	WW		
		collection	
		treatment	
	customer service		
	IT		
	power generation		Reinforcement of Solar Energie Backup Rehabilitation of existing and Supply of new Generators
information available			
	archives		
		storage	
		electronic storage	
		technical documentation	
	master plan/strategy		Available for Jbeil , Keserouan , Meten , Baabda , Iklim El Kharroub Beirut under Study by Artelia Aley need to be study (TOR under process by TA)
	crisis management manual		
	health and safety manual		
	quality insurance manual		
	annual preventive maintenance plan		
	KPIs		
	reporting		
		weekly	
		monthly	
		yearly	
IT			

	number computers		
	number servers		
	softwares		
	CMMS		
	SCADA		
	communication		
		radios	
		telephone	
	security		
		inhouse	
		number of guards	
power generation			
	number generators		
	type		
		fuel	256 Generators / 73.699 KVA
		gas	
		solar	7 Solar Systems / 300 Kw
	total capacities		74.000 KVA

6.4 LEADERS CLUB: SALARY TRENDS & SALARY BRACKETS

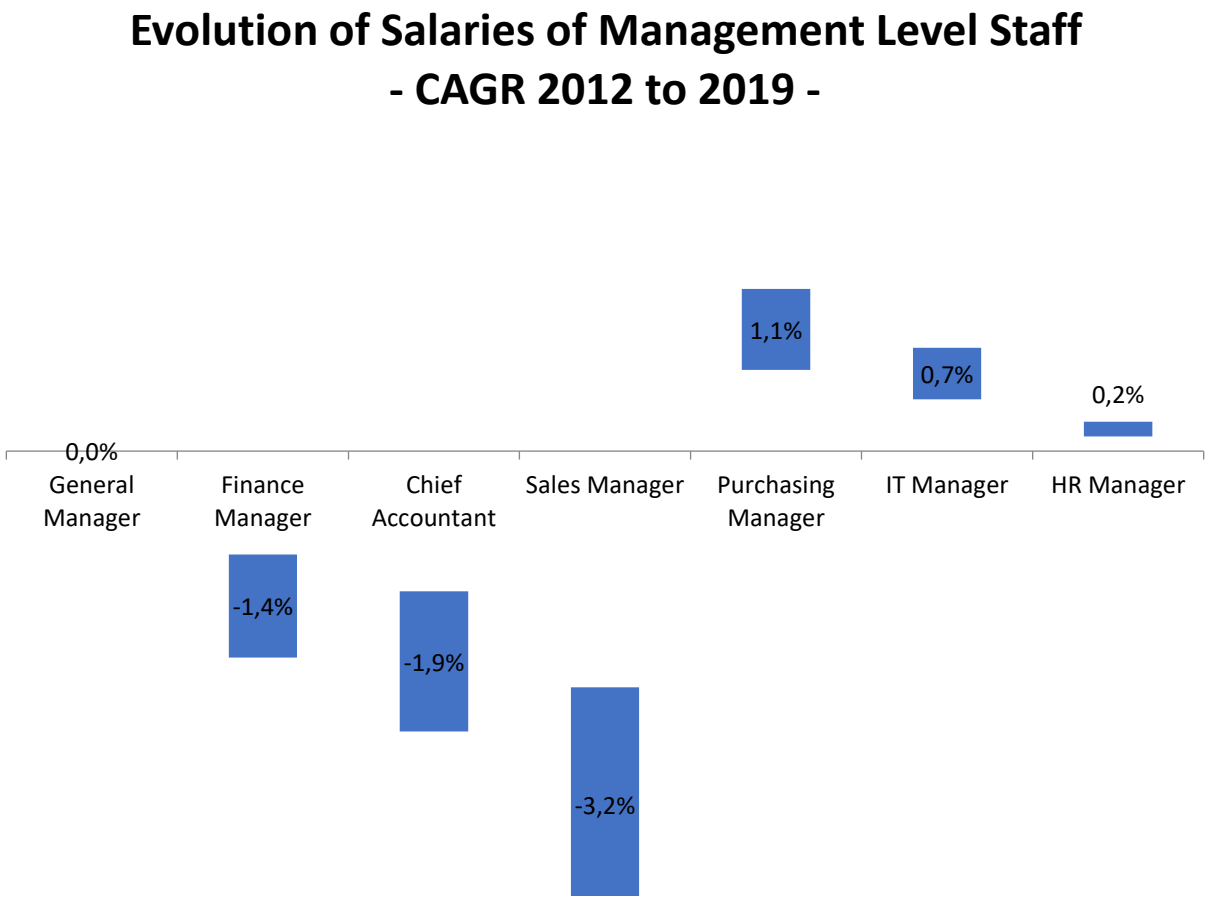
6.4.1 Salaries General positions

General positions which are common among all business sectors have witnessed different growth trends in salaries between 2012 and 2019. For instance, junior positions such as accountants and secretaries have seen an increase in salaries with a Compounded Annual Growth Rate (CAGR) of 1.7 percent between 2012 and 2019 which implies a yearly increase of 1.7 percent. However, for the last two years, the salaries of both positions have remained stable. While the salaries of executive secretaries did not experience any significant growth during the period between 2012 and 2019.



On the contrary, management level positions were split with some experiencing a decrease in salaries, others remaining stable, and others experiencing an increase in salaries between 2012 and 2019. Of those who witnessed a decrease in salaries, sales managers have seen the highest decrease reaching a CAGR of -3.2 percent during the period between 2012 and 2019. Similarly, chief accountants and finance managers experienced a decline in their salaries during the same period with a CAGR of -1.9 percent and -1.4 percent respectively. For chief accountants, salaries have remained fairly stable during the last two years. However, finance managers have had some fluctuations in their salaries starting with a decline during the period of 2012 and 2016 followed by an increase during the last two years. Among the managerial positions, purchasing managers were the only ones to witness an increase in their salaries with a CAGR of 1.1 percent between 2012 and 2019. Specifically, during the last two years, there has been a change in trend with salaries increasing to a CAGR of 1.8 percent for purchasing managers.

Salaries of general managers, HR managers and IT managers remained fairly stable during the period of 2012 and 2019 with a CAGR of not more than 0.7 percent. However, for the last two years, the salaries of IT managers and HR managers have witnessed a moderate increase with a CAGR ranging between 1.1 percent and 2.9 percent.



Both marketing managers and senior accountants were only covered in the salary scale surveys of 2016 and 2019. Salaries of marketing managers showed a small decrease between the two periods with a CAGR of -1.6 percent. On the other hand, senior accountants witnessed a moderate increase in their salaries with a CAGR of 2.5 percent between 2016 and 2019.

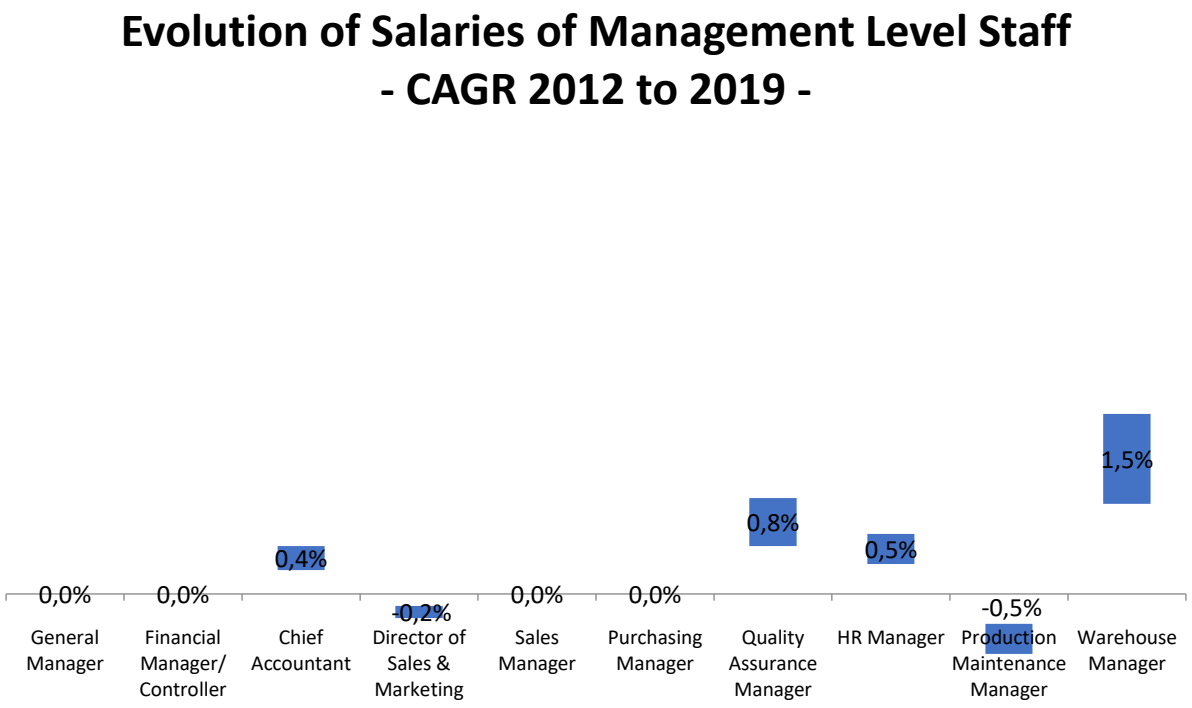
6.4.2 Salary Brackets

	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**
General Manager	Prior Managerial Experience Required						$6,700-$7,700	$7,700-$8,300	$8,300-$10,000
Finance Manager	Prior Financial Experience Required					$2,500-$3,500	$3,500-$5,200	$5,200-$6,000	$6,000-$7,800
IT Manager	Prior IT Experience Required				$2,200-$2,500	$2,500-$2,800	$2,800-$3,300	$3,300-$3,800	$3,800-$5,000
HR Manager	Prior HR Experience Required				$2,000-$2,500	$2,500-$3,000	$3,000-$3,500	$3,500-$4,200	$4,200-$5,000
Chief Accountant	Prior Accounting Experience Required					$2,000-$2,300	$2,300-$2,800	$2,800-$3,500	$3,500-$4,500
Sales Manager	Prior Sales Experience Required				$2,000-$2,300	$2,300-$2,500	$2,500-$2,800	$2,800-$3,300	$3,300-$4,200
	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**

Marketing Manager	Prior Marketing Experience Required				$1,700-$1,900	$1,900-$2,100	$2,100-$2,400	$2,400-$2,900	$2,900-$4,000
Purchasing Manager	Prior Experience Required				$1,200-$1,500	$1,500-$2,000	$2,000-$2,300	$2,300-$3,000	$3,000-$3,700
Senior Accountant	Prior Accounting Experience Required				$1,500-$1,700	$1,700-$1,900	$1,900-$2,200	$2,200-$2,500	$2,500-$3,000
Executive Secretary	Prior Secretarial Experience Required				$1,200-$1,300	$1,300-$1,500	$1,500-$1,800	$1,800-$2,100	$2,100-$2,600
Accountant	$700-$800	$800-$900	$900-$1,000	$1,000-$1,200	$1,200-$1,500	Promoted to Senior Accountant			
Secretary	$650-$750	$750-$800	$800-$900	$900-$1,000	$1,000-$1,200	Promoted to Executive Secretary			

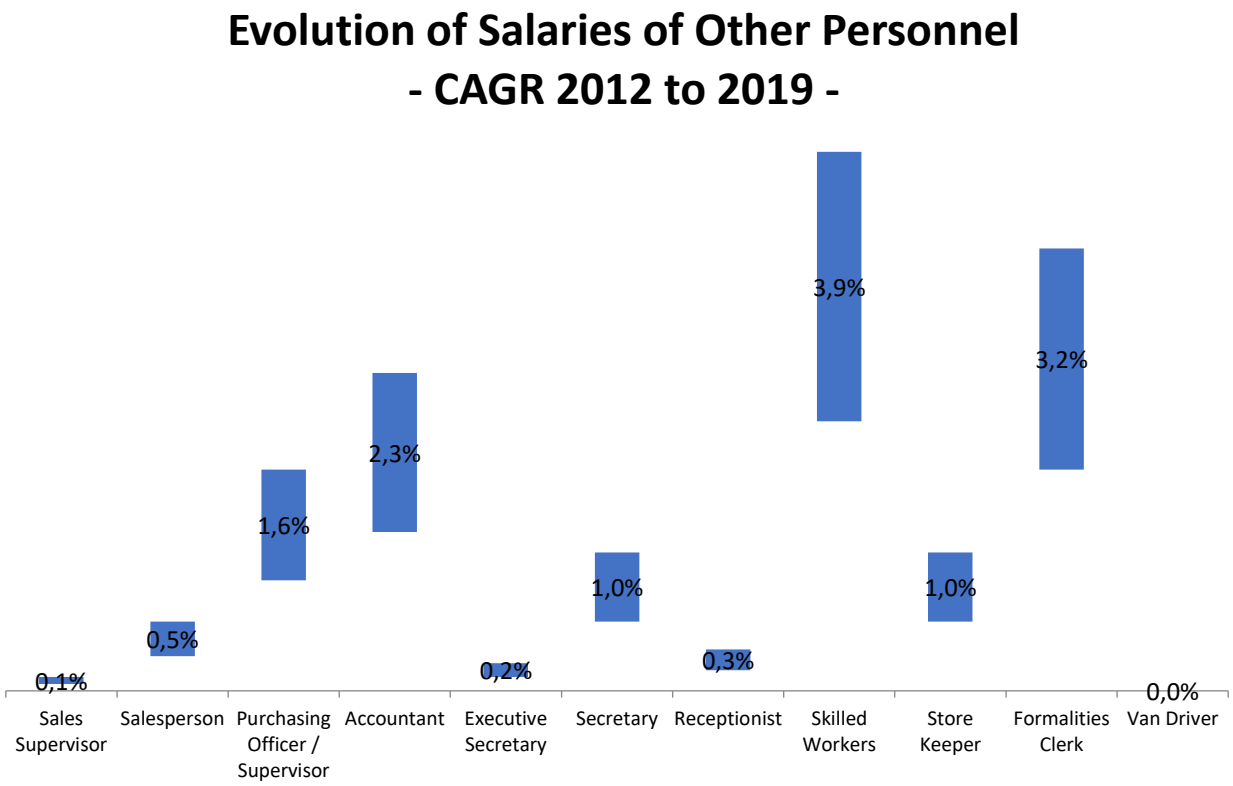
6.5 SALARIES MANUFACTURING

The manufacturing sector has remained fairly stable in its salaries between 2012 and 2019. Starting with managerial positions, warehouse managers were the only ones to witness a slight growth in their salaries with a Compounded Annual Growth Rate (CAGR) of 1.5 percent between 2012 and 2019 which implies a yearly increase of 1.5 percent. Specifically, during the last two years, there has been a change in trend with salaries increasing to a CAGR of 4.6 percent for warehouse managers. In contrast, the salaries of general managers, financial managers/controllers, sales managers and purchasing managers remained the same between 2012 and 2019. Similarly, the salaries of production maintenance managers, HR managers, quality assurance managers, chief accountants and directors of sales & marketing have not experienced any significant change during the same period. Assistant purchasing managers, whose salaries were only covered in the salary scale surveys of 2016 and 2019, also followed the same trend with no growth in salaries recorded between the two years.



A similar trend in salaries has been seen with several administrative and junior positions in the manufacturing sector. For instance, the salaries of sales supervisors and executive secretaries have remained fairly stable during the period between 2012 and 2019. Similarly, salespeople, receptionists, and van drivers did not experience any significant change in their salaries during the same period. However, a moderate increase in salaries has been seen between 2012 and 2019 with other administrative and junior positions in this sector. Skilled workers have seen the most increase in their salaries with a CAGR of 3.9 percent between 2012 and 2019. Similarly, formalities clerks and accountants have seen a moderate increase in their salaries during the same period with a CAGR of 3.2 percent and 2.3 percent respectively. Secretaries, whose salaries have remained stable for the last two years, have also experienced a slight growth in their

salaries between 2012 and 2019 with a CAGR of 1.0 percent. Other positions in the manufacturing sector that have followed a similar salary trend are purchasing officers/supervisors and store keepers.



6.5.1 Salary Brackets

	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**
General Manager	Prior Managerial Experience Required						$7,000-$7,500	$7,500-$9,000	$9,000-$10,500
Financial Manager / Controller	Prior Experience as Chief Accountant Required					$2,500-$3,500	$3,500-$5,500	Promoted to Chief Financial Officer (if position available)	
Chief Accountant	Prior Experience in Accounting Required				$1,650-$1,850	$1,850-$2,100	$2,100-$2,300	$2,300-$3,000	Promoted to Financial Manager or reaches a maximum of $3,500
Accountant	$700-$800	$800-$900	$900-$950	$950-$1,000	$1,000-$1,300	Promoted to Senior Accountant/ Chief Accountant			
Director of Sales & Marketing	Prior Experience as Commercial Sales Director Required						$4,200-$5,500	$5,500-$6,500	$6,500-$7,500

Sales Manager	Prior Sales Experience Required	$2,000-$2,300	$2,300-$2,800	$2,800-$2,900	Promoted to Director of Sales & Marketing

	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**
Sales Supervisor	Prior Sales Related Experience Required				$850-$1,300	$1,300-$1,600	$1,600-$1,700	Can Be Promoted to Sales Manager	
Salesperson	$700-$800	$800-$900	$900-$1,000	$1,000-$1,100	$1,100-$1,200	$1,200-$1,300		$1,300-$1,500	
Purchasing Manager	Prior Experience as Assistant Purchasing Manager/Purchasing Officer Required					$4,000-$4,500	$4,500-$5,000	$5,000-$6,000	$6,000-$7,000
Assistant Purchasing Manager	Prior Experience as Purchasing Officer Required					$1,700-$2,000	$2,000-$2,500	$2,500-$3,000	Promoted to Purchasing Manager (if position is available) or reaches a maximum of $3,500
Purchasing Officer / Supervisor	Prior Purchasing Experience Required		$800-$850	$850-$1,050	$1,050-$1,300	$1,300-$1,450	$1,450-$1,800	Promoted to Assistant Purchasing Manager	

Quality Assurance Manager	Prior Experience in Quality Control Required				$1,500-$1,600	$1,600-$1,800	$1,800-$2,100	$2,100-$2,600	$2,600-$3,500
Executive Secretary	Prior Secretarial Experience Required				$1,150-$1,250	$1,250-$1,400	$1,400-$1,600	$1,600-$1,800	$1,800-$2,500
	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**
Secretary	Prior Experience as Receptionist Required		$700-$800	$800-$1,000	Promoted to Executive Secretary				
Receptionist	$550-$600	$600-$700	$700-$800	Promoted to Secretary or reaches a maximum of $900					
Skilled Workers	$450-$500	$500-$550	$550-$600	$600-$650	$650-$750	$750-$850	$850-$1,000	$1,000-$1,200	
Human Resources Manager	Prior Experience as Assistant HR Manager Required					$2,200-$2,500	$2,500-$3,100	$3,100-$3,600	$3,600-$4,200
Production Maintenance Manager	Prior Experience in Mechanical and Electrical Engineering Required				$3,000-$3,400	$3,400-$3,750	$3,750-$4,200	$4,200-$5,000	$5,000-$6,000

Warehouse Manager	Prior Experience Required				$1,200-$1,400	$1,400-$1,600	$1,600-$2,100	$2,100-$2,500	$2,500-$3,200
Store Keeper	$550-$650	$650-$700	$700-$750	$750-$800	$800-$900	$900-$950	$950-$1,100	Promoted to Warehouse Manager or reaches a maximum of $1,300	

	Salaries vs. Years of Experience								
	Fresh Graduate	**1year**	**2 years**	**3 years**	**5 years**	**7 years**	**10 years**	**15 years**	**20 years**
Formalities Clerk	$550-$600	$600-$700	$700-$750	$700-$750	$750-$800	$800-$900	$900-$950	$950-$1,000	$950-$1,000
Van Driver	$550-$600		$600-$750		$750-$850	$850-$900	$900-$950	$950-$1,100	

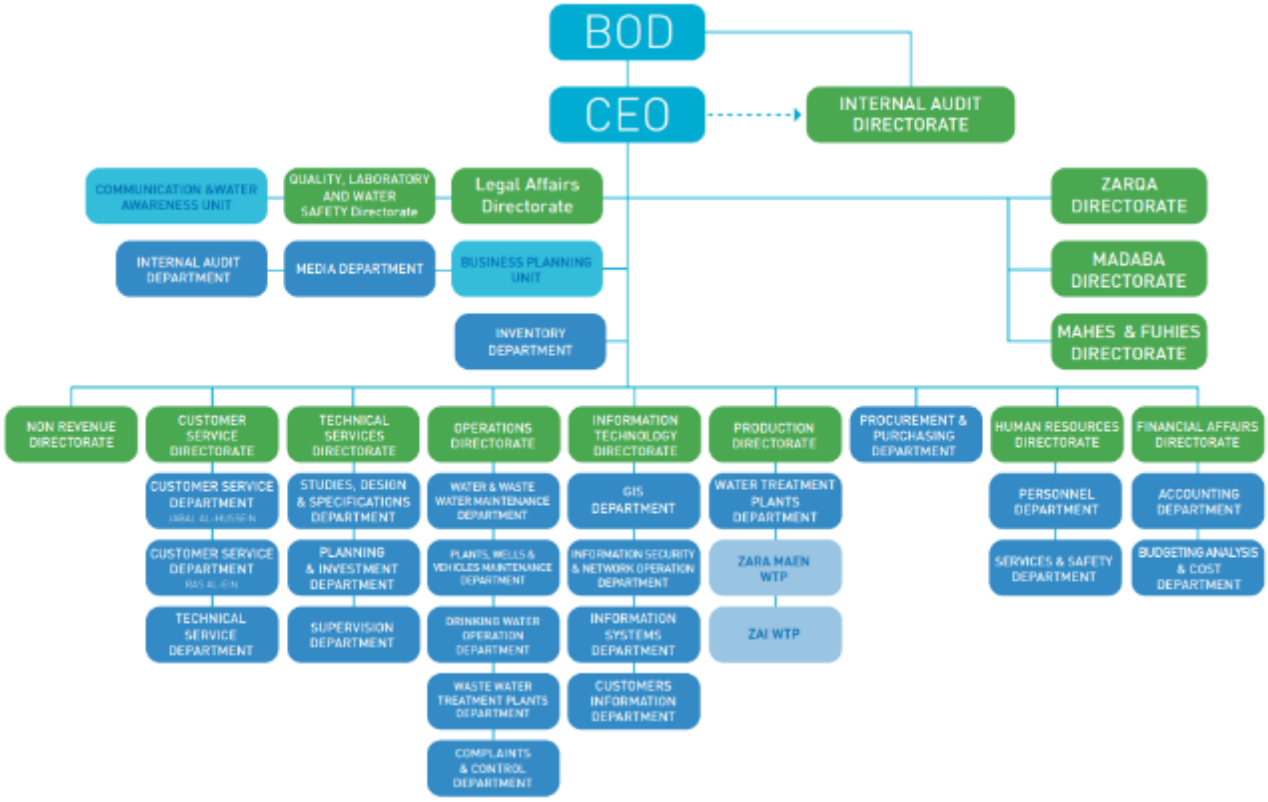
6.6 ELEMENTS OF BENCHMARKING

6.6.1 Miyahuna – Jordan

Jordan Water Company – Miyahuna was established as a limited liability company in 2006. The company is wholly owned by WAJ (Water Authority of Jordan).

Miyahuna is responsible for the water & sanitation services of the Capital Governorate of Jordan, according to a management contract signed with the national water authority. Miyahuna extended its area to Madaba Governorate, since 2019, Zarqa Governorate since 2020 and Mahes & Fuheis Directorate since 2020.

Figure 16
Miyahuna organizational Chart



Source: Miyahuna Annual Report 2020

Total number of employees was 1,774 at the end of 2020.

Table 25
Miyahuna – Current tariff in Amman

	JD/m3	up to 18 m3 Fixed fee	19-36 m3	37-54 m3	55-72 m3	73-90 m3	91-126 m3	> 127 m3
Residential	Water	6,50	0,45	0,55	1,00	1,20	1,62	1,92
	Water + Sewerage	7,22	0,51	0,84	1,57	2,00	2,55	3,02

	JD/m3	up to 6 m3 Fixed fee	> 7 m3
Non-residential	Water	13,80	1,43
	Water + Sewerage	18,63	2,38

Source: Miyahuna website

a) Water production and distribution

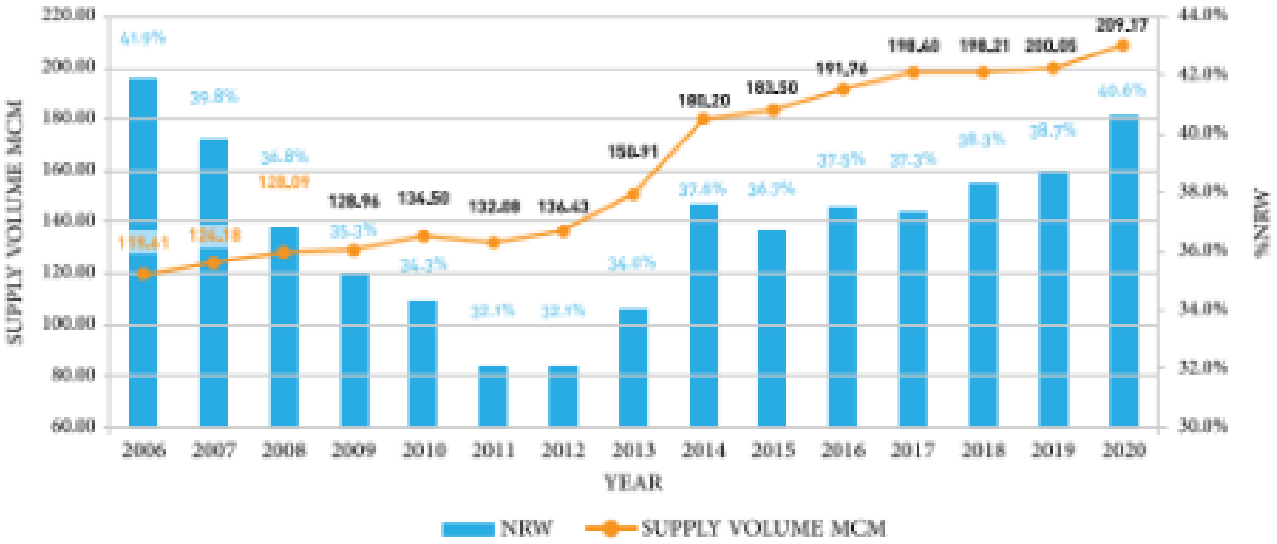
Amman governorate is fed mainly from:

- a number of local well fields and springs, which totaled 31.6 Mm^3/year in 2020
- the Zara Maeen WTP (34.1 Mm^3/year)
- the Zai WTP (85.6 Mm^3/year)
- the Disi system (100 Mm^3/year). In 2020, the Zara Maeen WTP fed Amman with 34.11 MCM, the Zai WTP fed Amman with 85.5 MCM, and the Disi system[11] fed Amman with 100 MCM.

In counterpart, about 43.7 Mm^3/year are exported to neighboring governorates.

In 2020, Miyahuna distributed 209.2 Mm^3 in Amman to 730,740 water subscribers along 851.85 km of water network. The NRW rate was 40.6%.

Figure 17
Miyahyuna – Supply volume and NRW – Capital Governorate



Source: Miyahuna Annual Report 2020

11 The Disi Water Conveyance Project transports water to Amman and other Jordanian cities in the north, including Zarqa, Ajloun, Irbid, Mafraq and Jerash, from Disi, a fossil aquifer located on the border with Saudi Arabia in the south-east. The project began in 2009 and became operational in 2013, at a cost of about $1.1 billion.

Table 26
Miyahuna – Occurrence of fractures and repairs in Amman water distribution

Year	Water network length (km)	N° of fractures on main lines	N° of fractures on connections	Total n° of repairs	% of fractures per km
2017	9 805	6 816	26 722	33 538	3.42
2018	9 950	5 690	25 427	31 117	3.12
2019	10 172	6 140	27 792	33 932	3.34
2020	10 180	6 118	25 093	31 211	3.06

Source: Miyahuna Annual Report 2020

In 2020, 3,574 invisible leaks have been identified through leakage detection campaigns. During the same year, the Illegal Uses Detection Division discovered and solved 2,418 illegal cases.

b) Water sales

Total water sales in 2020 amounted to JD 93.9 million (€ 81.8 million), out of it JD 73.5 million was achieved in Amman Directorate. The apparent unit price for water in Amman was 0.59 JD/m^3 (0.52 €/m^3).

The collection rate reached 90.3% at the end of 2020, despite a decrease in the % due to the Corona pandemic.

Electronic payments amounted to 32.7% of the total collections.

Table 27
Miyahuna – Financial statements

		JD 2020	JD 2019	€ 2020	€ 2019
Assets	Non-current assets	148 334 616	136 252 905	129 211 338	108 223 118
	Accounts receivable	43 499 514	30 966 311	37 891 563	24 595 958
	Cash & equivalents	41 624 999	9 471 729	36 258 710	7 523 216
	Other current assets	97 506 601	61 700 962	84 936 064	49 007 913
	Total	330 965 730	238 391 907	288 297 674	189 350 204
Equity & Liabilities	Net Equity	141 756 601	98 723 597	123 481 360	78 414 295
	Non-current loans	51 744 835	47 790 428	45 073 898	37 959 037
	Other non-current	56 852 584	40 654 015	49 523 157	32 290 719
	Current loans	622 125	61 972	541 921	49 223
	Other current	79 989 585	51 161 895	69 677 339	40 636 930
	Total	330 965 730	238 391 907	288 297 674	189 350 204
Revenues	Water sales	93 868 983	73 207 856	81 767 407	58 147 622
	Water connection fees	56 972 095	46 495 683	49 627 260	36 930 646
	Sewerage revenues	4 572 315	6 424 976	3 982 853	5 103 237
	Sew. Connection fees	5 397 046	7 698 917	4 701 260	6 115 105
	Other	6 538 441	29 945 737	5 695 506	23 785 335
	Total	167 348 880	163 773 169	145 774 286	130 081 945
Operating expenses	Water purchases	4 751 703		4 139 114	0
	Electricity	93 552 897	90 717 584	81 492 071	72 055 269
	Salaries	29 739 721	23 117 308	25 905 680	18 361 643
	Outsourced treatment	23 833 985	27 548 250	20 761 311	21 881 056
	O&M expenses	20 862 753	17 948 688	18 173 130	14 256 305
	Admin. Expesnes	7 459 261	32 352 117	6 497 614	25 696 678
	Total	180 200 320	191 683 947	156 968 920	152 250 951
Other expenses	Depreciations	8 031 336	8 197 830	6 995 937	6 511 382
	Loan service	3 706 950	1 838 609	3 229 051	1 460 373
	Other	5 224 647	-748 594	4 551 086	-594 594
	Total	16 962 933	9 287 845	14 776 074	7 377 160
Profit & Loss Result	Operation	-29 814 373	-37 198 623	-25 970 708	-29 546 166
	Water Authority Subsidy	170 461 675		148 485 780	0
	Total	140 647 302	-37 198 623	122 515 071	-29 546 166
Cahs Flow	Beginning of year	9 641 729	4 924 486	8 398 719	3 911 427
	Operating activities	40 971 710	23 788 065	35 689 643	18 894 412
	Investing activities	-8 768 102	-18 928 326	-7 637 720	-15 034 413
	Financing activities	-218 338	-142 496	-190 190	-113 182
	End of year	41 626 999	9 641 729	36 260 452	7 658 244

Exchange rates		
	31/12/2019	JD 1,00 = € 1,259
	31/12/2020	JD 1,00 = € 1,148

6.6.2 SONEDE – Tunisia

SONEDE is a national autonomous public utility, created in 1968, with the responsibility of the water supply services in all urban centers of the country (8.044 million inhabitants in 2020) as well as part of the rural areas (3.741 million inhabitants. SONEDE has financial autonomy and is placed under the tutela of the Ministry of Agriculture.

SONEDE's mission embraces the entire value chain of water supply (production, treatment, and transport, distribution, commercial management of subscribers, development of new infrastructure). However, SONEDE is not in charge of sewerage services, which are provided by another public company, ONAS.

Table 28
SONEDE – Main indicators (2020)

Coverage rate	Total	%	98.3
	Urban	%	100.0
	Rural	%	94.7
Water production	Total	Mm^3/yr	759.1
	Surface water	Mm^3/yr	431.2
	Underground water	Mm^3/yr	285.2
	Desalination	Mm^3/yr	42.7
Water distribution	Distributed volume	Mm^3/yr	664.5
	Billed volume	Mm^3/yr	465.5
Network length	Total	km	56 651
	Transportation	Km	9 968
	Distribution	km	46 593
N° of customers	Total	N°	3 038 656
	Domestic customers	N°	2 900 738
	Non-domestic customers	N°	137 918
Average consumption	Per customer	m3/month	12.8
	Domestic customers		10.8
	Non-domestic customers		55.1
Efficiency	Overall	%	71.9%
	Transportation		88.5%
	Distribution		76.3%
Personnel	N° of employees	N°	6 239
	Employees / 1000 customers		2.05
Average price		DN/m^3	0.765
		$€/m^3$	0.23

Source: SONEDE -Rapport Statistique 2020

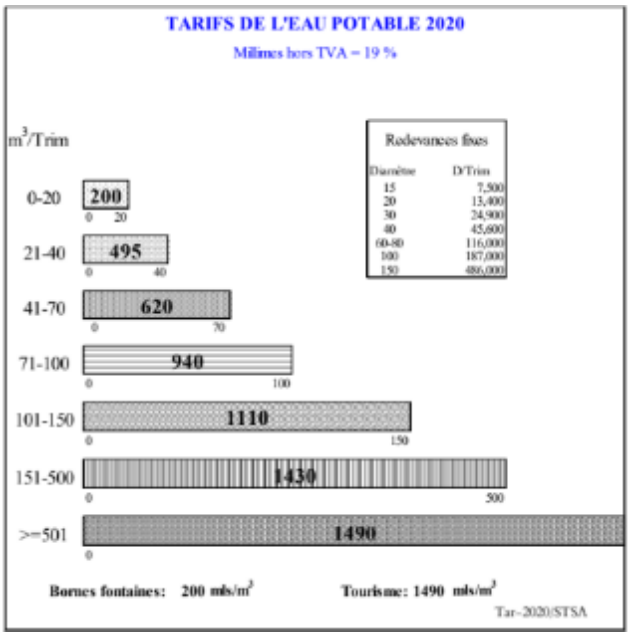
Table 29
SONEDE – Human resources

N° of employees	Technical		Administrative		Total	
High level	417		230		647	10.4%
Medium level	703		588		1 291	20.9%
Execution	3 112		1 189		4 301	68.9%
Total	4 232	67.8%	2 007	32.2%	6 239	100%

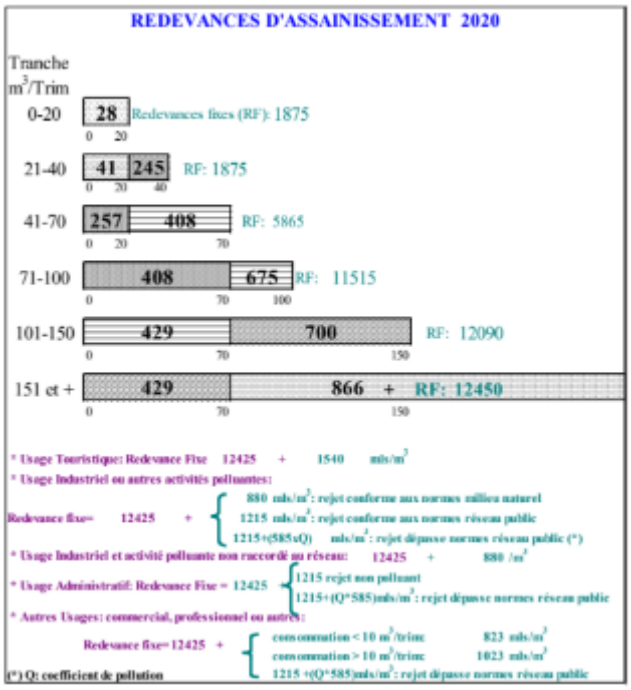
Source: SONEDE -Rapport Statistique 2020

Figure 18
Tunisia – Water and sewerage tariffs (2020)

Water (SONEDE)



SEWERAGE (ONAS)



6.6.3 NWSC - Uganda

The National Water and Sewerage Corporation (NWSC) was created as a government-owned organization in 1972, at that time serving only the capital Kampala as well as Entebbe and Jinja.

NWSC is fully owned by the government of Uganda. It operates as an autonomous water board with a separate legal status, under the jurisdiction of the MWE (Ministry of Water and Environment), which appoints its Board of Directors to formulate the policies by which the corporation is run.

Table 30
NWSC main indicators

		FY June 2014
Operating revenue	M USh	184 349
Operating costs	M USh	152 378
EBIT	M USh	31 971
Depreciation	M USh	21 852
EBITDA	M USh	10 119
N° of subscribers water		366 330
N° of subscribers sewerage		18 810
Water service coverage (%)		81,0%
Public standposts		9 638
N° of employees		2 263
/ 1000 connections		6,2
Water main total network	km	7 113
Sewer main total network	km	483
Water production	Mm^3/year	93,8
Water supplied	Mm^3/year	92,0
Water sold	Mm^3/year	61,1
Metered accounts		364 637
Non revenue water	%	33,7%
Collection efficiency	%	96,0%

During the 1970s and early 1980s, Uganda was subject to public turmoil, and the performance of NWSC, like many other institutions, declined considerably. Between 1986 and 1997, the NWSC embarked on major rehabilitation and expansion of its water supply and sewage systems with the help of international donor support.

In 1995 (NWSC Statute) and 2000 (NWSC Act), NWSC was reorganized, giving it more operational autonomy and the mandate to operate and provide water and sewerage in areas entrusted to it, on a sound, commercial, and viable basis.

Among other problems, NWSC had, in 1998:

- An astonishing volume of labor force (1,800 employees => 36 employees/1,000 connections). Staff costs accounted for 64% of the total operating costs
- High NRW: 50-60 % and low collection rate: 60 %
- Poor service, poor vision from the customers: delays, corruption, etc.
- Lack of performance incentives

- Recurrent deficit around US$ 300,000 per month, despite a rather high average tariff (close to 1.00 US$/m^3). At least 3 unviable towns among the 12 cities operated by NWSC

In late 1998, more emphasis was placed on commercial viability. At the same time, political interference within the utility was reduced. The reform strategy was then built on a number of short-term performance enhancement programs.

- A first step was a "100 days program" bound to a change of management, aiming at reversing operational & financial inefficiencies (Feb-May 1999).
- Then, a Service and Revenue Enhancement Programme (SEREP) was launched to restore customer confidence and thus service enhancement (August 1999 – August 2000).
- Area & Service Performance contracts were established aiming at financial break-even of each area (branch-town) by empowering managers and giving them autonomy of decisions. The performance contract with the government increased the NWSC's accountability for results and provided incentives for good performance. Area performance contracts in turn transferred more autonomy to the town level (Kampala) and the branch level, defined the targets more specifically, and introduced accountability for results (2000 – 2003).
- The Stretch Program focused on improving operating margins by reducing bureaucracy, simplifying processes, and instilling self-confidence. This program resulted in a higher level of commitment from the employees due to internal communication improvement and higher performance targets (with correspondingly better incentives for achievement) were set (2002 – 2003).
- The One-Minute management program determined individual performance accountability. Therefore, not just business units but also individuals can accurately be held accountable for their outputs (2003).
- Furthermore, the Internal Delegated Area Management Contracts (IDAMCs) consolidated the decentralization process through the establishment of a contractual (internal) framework summarizing the relationship between NWSC, Kampala Water, and the branches as business units, giving more autonomy and better incentive plans to operating teams (since 2003).
- Outsourcing of non-core activities (guard services, motor vehicle maintenance, etc.) was also an issue to reduce the costs.

To improve the situation, the Government of Uganda (GoU) embarked on a comprehensive program of investments in services in the urban sub-sector with the launch of the Reform of the Urban Water Sector program in 2002. The program was later extended to include sanitation and renamed Reform of the Urban Water & Sanitation Sector Programme (RUWASS) with the aim of supporting GoU initiatives to develop the sub-sector into an efficient, sustainable, and affordable service to the population, underscored by sound governance, efficient investment management, and a cost-efficient delivery system.

Since 2000, NWSC has worked under performance contracts with the national government, each covering three years. The contracts contain precise performance indicators, which the NWSC is expected to achieve. For example, the 2003-2006 contract required NWSC to reduce NRW from 39% in 2003 to 36% in 2006. Simultaneously, inactive connections should be reduced from 21% to 13%. To encourage management to achieve the targets, an incentive element of 25% of the annual basic salary depended on the fulfillment of the contract. Each year the NWSC board decides the appropriate bonus rate that the NWSC management receives.

Every employee has an individual "pseudo contract" outlining specific, key, verifiable tasks and deliverables. Achievement of performance targets is accompanied by incentive payments that can be as high as 50 percent of the basic salary. However, underachievement of the performance standards below a certain level may lead to members of the area management team forfeiting 25% of their basic pay.

The reform was also supported by two contracts of technical assistance with foreign companies, focusing on Kampala area:

- Kampala Revenue Improvement Project (KRIP) with Gauff (Germany) in 1998-2000:

- Kampala WSS Area Management Contract with Ondeo (Suez – France) in 2002-2004.

Since then, it has been decided to suspend international technical assistance.

Subsequently, NWSC service area gradually grew to incorporate large and mid-sized towns all over Uganda, reaching a total of 23 towns in 2008, and 74 in January 2021.

At the end of FY 2013-14, total company staff was 2,263, of which:

- 350 allocated at head office
- 816 allocated at Kampala Water
- 1,832 allocated in the other areas.

51 members have the statute of managers (31 at HQ and 20 on sites)

By the year end, staff productivity was 6 employees per 1,000 connections, against a target of 5. The performance during the year was below the target, partly due to the take-over of new towns where the productivity ratios were less effective.

Since 2000, all NWSC staff are employed on contract basis of 2 years. The contract period was increased to 3 years since July 2012.

The appraisal process is an essential tool for staff evaluation, motivation and retention. The 5% turnover rate at NWSC is quite reasonable and reflects the company attractive character.

The training expenses represented in 2015-16 a proportion of 1,17% of the USh 61.2 billion staff costs, which is close to European averages.

Table 31
Training programs Budget - FY2015-2016

DIRECTORATE	AMOUNT USh	% of Total	Nb of trainees*	Average training cost/trainee USh	Nb days of Trainings
ENGINEERING	191 878 600	18,6%	720	266 498	3 550
COMMERCIAL	64 836 000	6,3%	530	122 332	2 100
MANAGEMENT	54 612 000	5,3%	190	287 432	425
FIN & ACCOUNTS	67 154 000	6,5%	531	126 467	1 162
P&CD	75 240 000	7,3%	103	730 485	190
BSS	18 600 000	1,8%	90	206 667	234
AUDIT	23 315 000	2,3%	66	353 258	132
CROSS CUTTING	403 399 500	39,0%	1 080	373 518	10 185
REGIONAL	134 078 500	13,0%	650	206 275	4 200
TOTAL	1 033 113 600	100,00%	3 960	260 887	22 178

Source: ASPA (2016). Kampala Water Lake Victoria WATSAN Project. NWSC Capacity Assessment and Development of a Long-Term Assistance Programme. Final Report
Exchange rate: € 1.00 = Ush 3,448

6.6.4 Sofiyska Voda – Sofia - Bulgaria

Sofiyska Voda JSC is a joint stock company in charge of water supply and sewage services for the municipality of Sofia. Total population of the territory was estimated to 1,319,804 in 2015 and 1,366,936 in 2021.

The company provides 100% coverage of water services on the territory of the municipality (1,348.9 km²°. Furthermore, Sofiyska Voda JSC supplies raw water for VIK EOOD Sofia District, treated water for the needs of the neighbouring town of Bozhurishte and non-potable water for the needs of the industrial enterprises.

As of 2015, the customer data base of the company included 617,245 customer numbers using the water supply service, which covers the four water supply systems

Total number of water customers (2021): 655,970

Total number of sewerage customers (2015): 553,598

The company measures and bills consumption of about 105,000 water meters (2021).

a) Water production and distribution

Water for the Municipality of Sofia mainly comes from the Iskar Dam, a multiannual compensating reservoir with a total volume of 655 Mm^3, able to supply from 570 to 630 Mm^3/year. It ensures about 80% of Sofia's water supply, through the WTPs of Bistritsa, Pancharevo and Passarel. Beli Iskar dam (15.3 Mm^3 reservoir), Vitosha catchments and some other alternative sources complete the sources of raw water for Greater Sofia.

The WTP Bistritsa was constructed at the first stage with a capacity of 6.75 m^3/s. The final planned capacity is 13.5 m^3/s.

The WTP Pancharevo was commissioned in 1968, with a 4.5 m^3/s capacity.

Other WTPs with minor installed capacity were commissioned in 2011, in Dolni Passarel and Tala Tsarkva (2 m^3/s).

The territory of the Municipality of Sofia is water supplied by means of 4 water main rings.

The total length of the water main network is 3,814 km (2015). 15 strategic distribution reservoirs sum up a total volume of 336,560 m^3.

According to the Business Plan 2017-2020, the water main network is in unsatisfactory operational condition. In the oldest parts of the city, a large part of the network was commissioned at the start of the 20th century. Suburban zones are also problematic areas, with parts of the network, constructed at the expense of the customers and sometimes passing through private properties, do not meet technical requirements. Their replacement is impeded by regulation issues.

The general water scheme is designed as a gravity one. However, the company manages 13 pumping stations which are necessary for supplying some specific zones.

Billed consumption in 2015:

- Domestic customers 61.086 Mm3/year daily average consumption 127 lcd
- Budget customers 4.512 Mm3/year
- Commercial customers 13.836 Mm3/year
- Industrial customers 4.449 Mm3/year

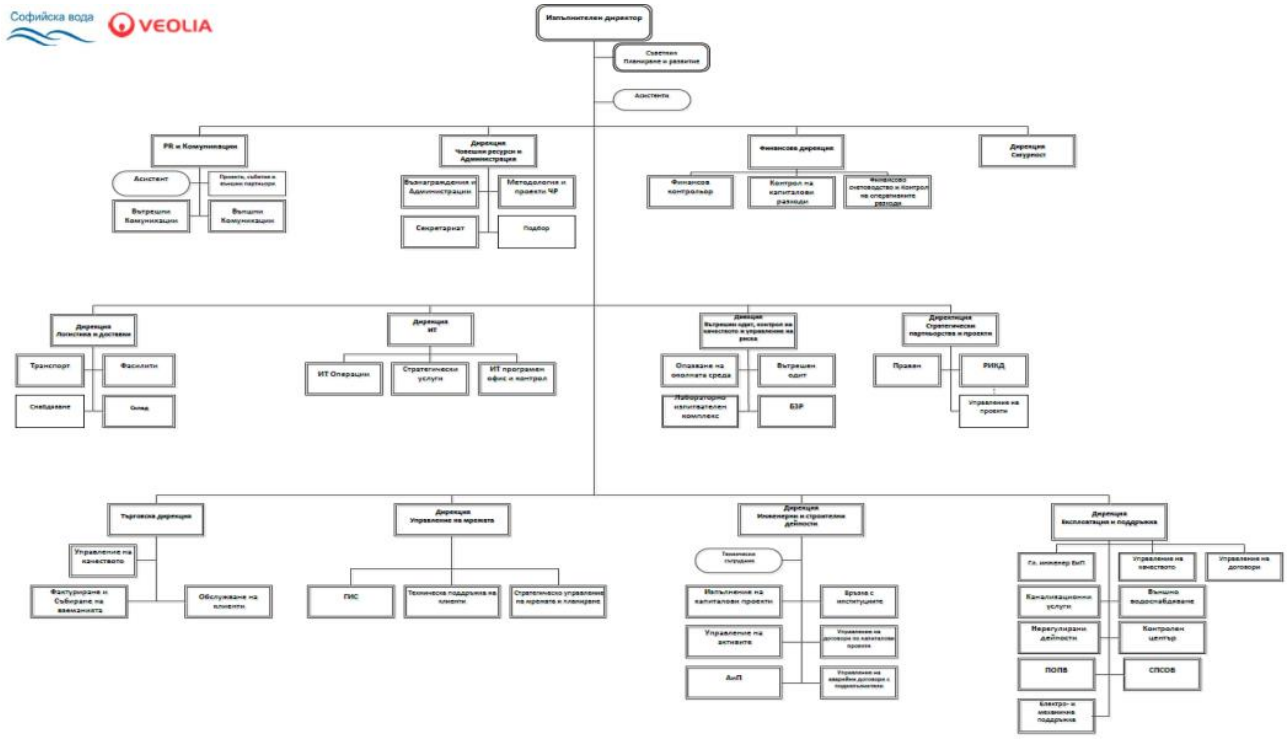
b) Sewerage

The sewer network was initiated by 1897. To date (2015), the length of the 11 main sewer collectors is more than 430 km. while the length of the serviced sewer network is 16,77 km.

Kubratovo WWTP only receives a part of the collected effluent.

c) Organization

Figure 19
Sofiyska Voda – Organization chart



The company is organized with 4 hierarchical levels:

- A Directorate is managed by a Director and consists of one or several interrelated Departments
- A Department is which is managed by a Senior Manager and consists of one or several interrelated Sectors
- A Sector is managed by a Manager and consists of one or several interrelated teams
- A Team is managed by a Supervisor or an equivalent position.

The main functional areas are divided into 11 Directorates and one Department that reports directly to the Executive Director. The "Operation and maintenance", "Engineering and construction activities" and "Network Management" Directorates cover the processes related to the management, operation and maintenance of water supply and sewerage network within the concession area as well as the realization of the investment program of the company.

Activities related to customer service are united within the Commercial Directorate.

Other directorates presented on the chart are administrative in nature and aim to ensure all processes in support of the core business of the company.

For operational purposes, the territory has been divided into 6 zones, each one with 4 separate regions and a total of 28 operational regions.

In 2015, a new ERP form SAP was implemented. It allowed a reduction of staffing due to the higher level of automation of different tasks.

d) Staffing

Table 32
Sofiyska Voda – Existing and planned staff (2015)

N° of employees	Water supply	Sewerage	Treatment	Unregulated	Total
Existing	690	99	187	88	1 064
Planned	725	111	211	97	1 144

Source: Sofiyska Voda Business Plan 2017-2022
Unregulated business includes raw water supply to other operators and non-potable water supply

At the end of 2014, the Billing and Corrections teams counted 59 employees, of which: 44 in Billing, 13 in Corrections and 2 in Payment Maintenance. At the end of July 2016, the department counted only 48 employees, (32 in billing, 13 in corrections, and 3 in payments maintenance). In total, 11 employees were not necessary anymore, due to the implementation of highly automatized billing processes. These employees were internally transferred to other departments, where additional workforce was needed.

e) NRW

Figure 20
Sofiyska Voda – Water balance (2015) (in m^3/year)

<table>
<tr><td rowspan="6">Total water volume at the system inlet
158 249 702</td><td rowspan="3">total authorized consumption
85 752 164</td><td rowspan="2">Sold billed water
79 434 122</td><td>Billed metered
78 624 151</td><td rowspan="2">Total billed water
79 434 122</td></tr>
<tr><td>Billed unmetered
809 971</td></tr>
<tr><td rowspan="2">Supplied unbilled water
6 318 042</td><td>Unbilled metered
2 848 348</td><td rowspan="5">Non-revenue water
78 815 580</td></tr>
<tr><td>Unbilled unmetered
3 469 694</td></tr>
<tr><td rowspan="3">Total water losses
72 497 538</td><td>Commercial water losses
21 749 261</td><td>Unauthorized cons.
17 696 558</td></tr>
<tr><td rowspan="2">Actual water losses
50 748 277</td><td>Metering inaccuracy
4 052 703</td></tr>
<tr><td>Raw water & treatment
761 224</td></tr>
<tr><td></td><td></td><td></td><td>Distribution system
32 161 720</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Reservoirs
507 483</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Service connections
17 317 849</td><td></td></tr>
</table>

6.7 GENERIC ORGANIZATIONAL CHARTS FOR A W&S UTILITY

Water & Sewerage utilities are usually organized according to an overarching structure rather similar everywhere.

The following figures synthesize a generic organizational chart proposed as a starting point for further participative interaction with the respective WEs, to fine-tune the most appropriate chart for each specific case.

Figure 21
Starting figure for the review of the organizational chart

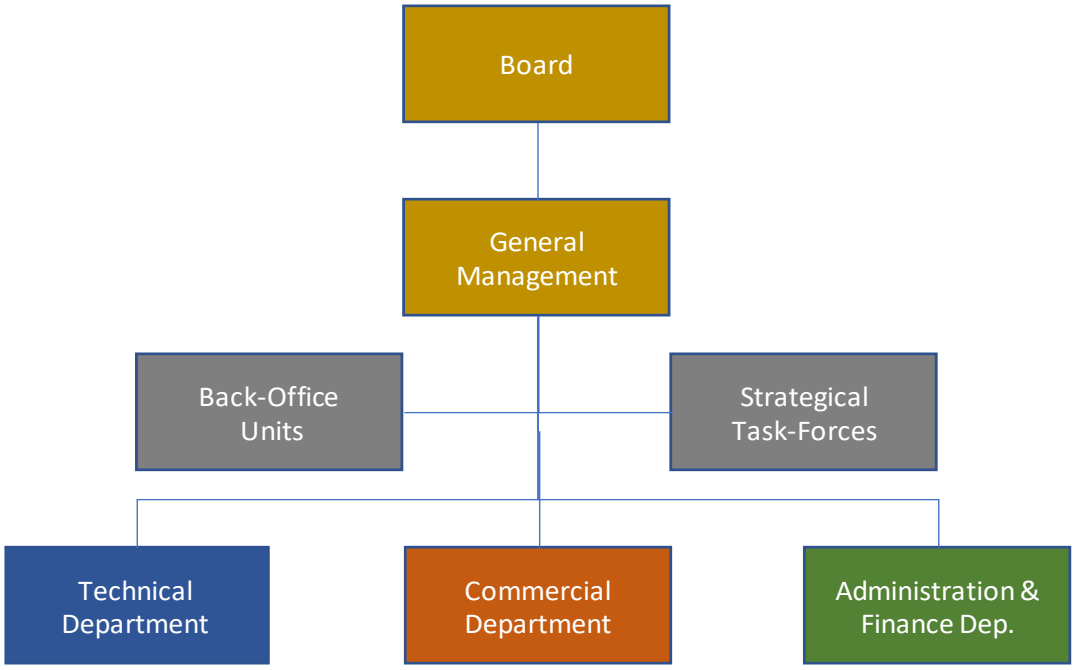


Figure 22
Starting figure for the review of the organizational chart – Technical Department

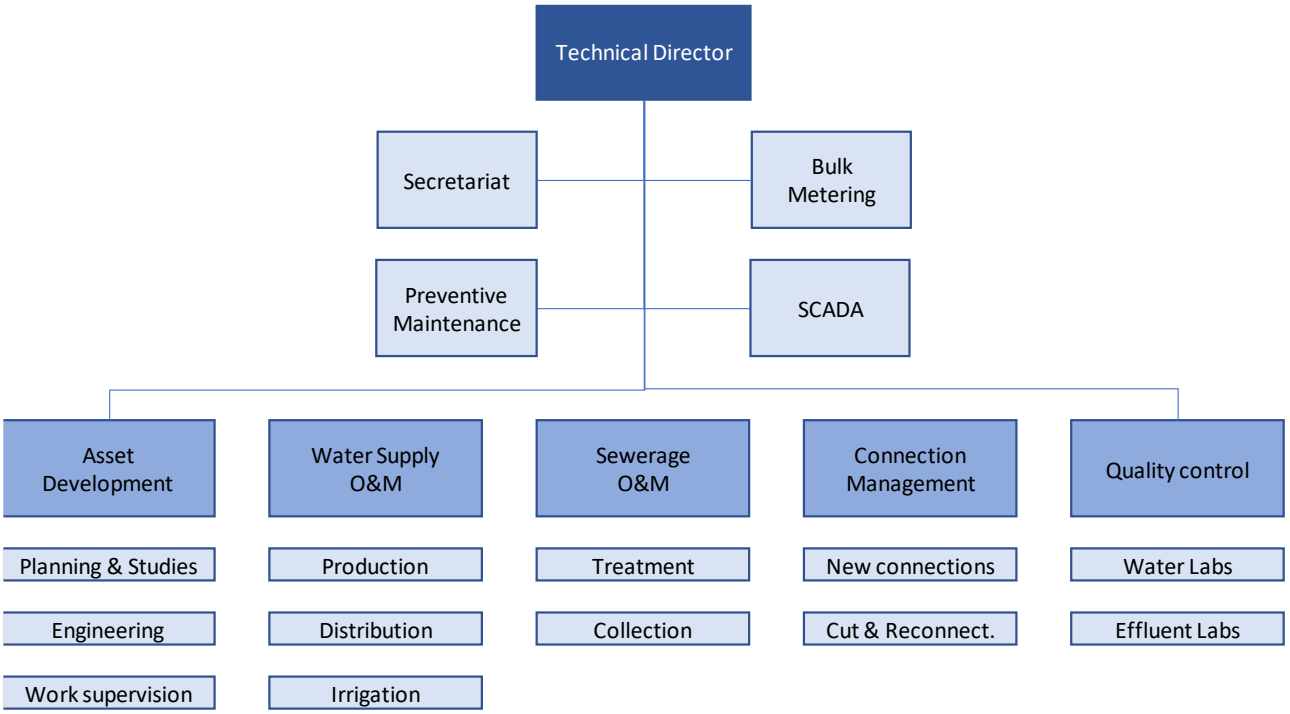


Figure 23
Starting figure for the review of the organizational chart – Commercial Department

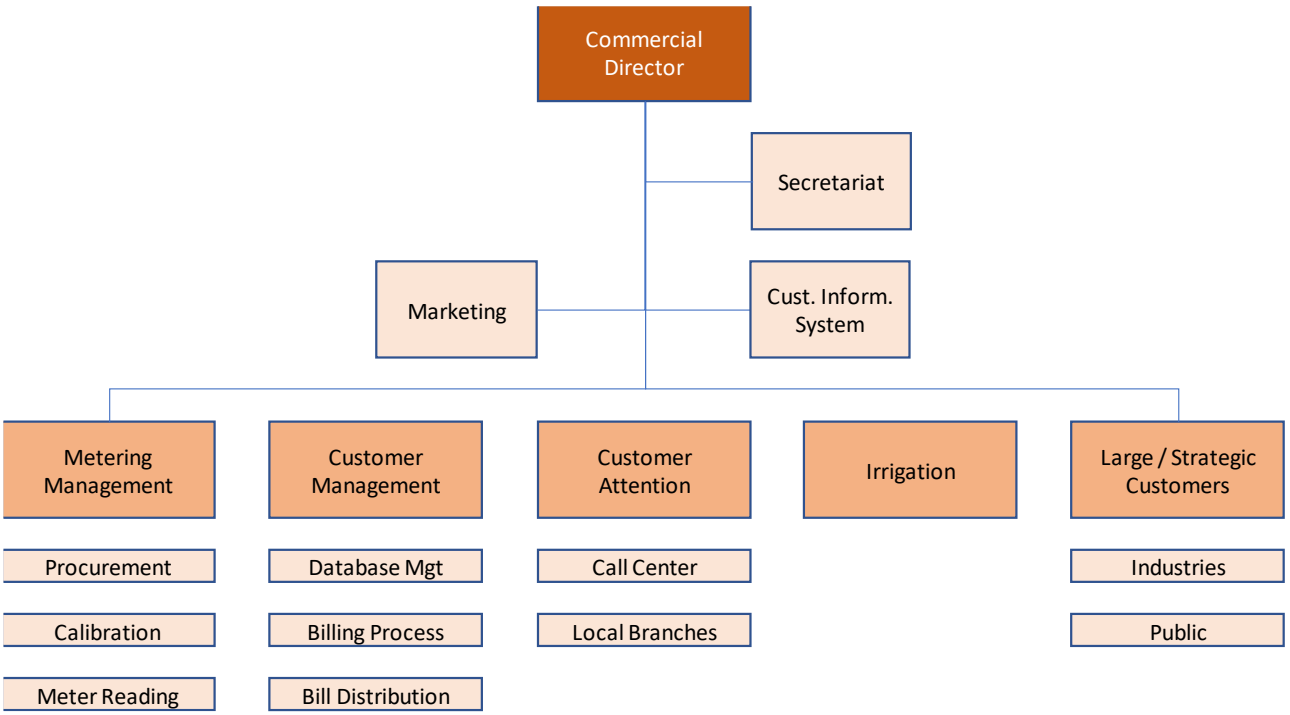


Figure 24
Starting figure for the review of the organizational chart – Adm & Fin Department

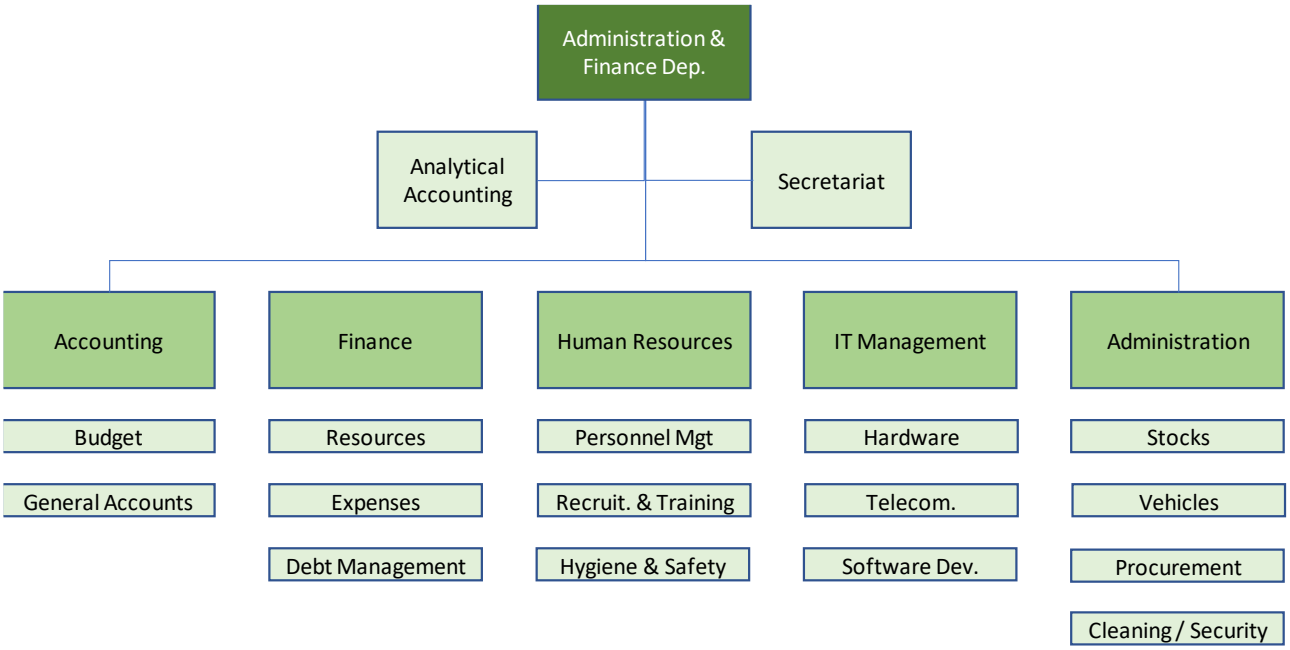
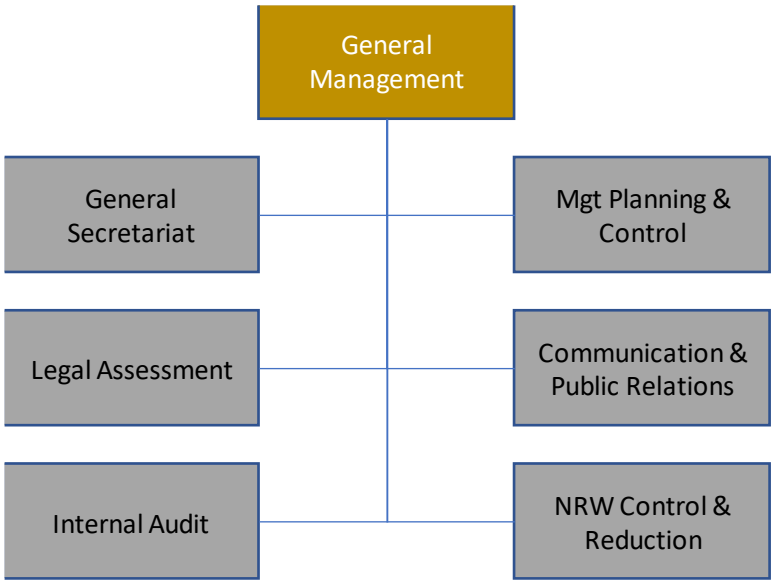


Figure 25
Starting figure for the review of the organizational chart – Cross-cutting Units



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