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Strategic Environmental and Social Assessment Study for Integrated Solid Waste Strategy

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Lake Qaraoun Pollution
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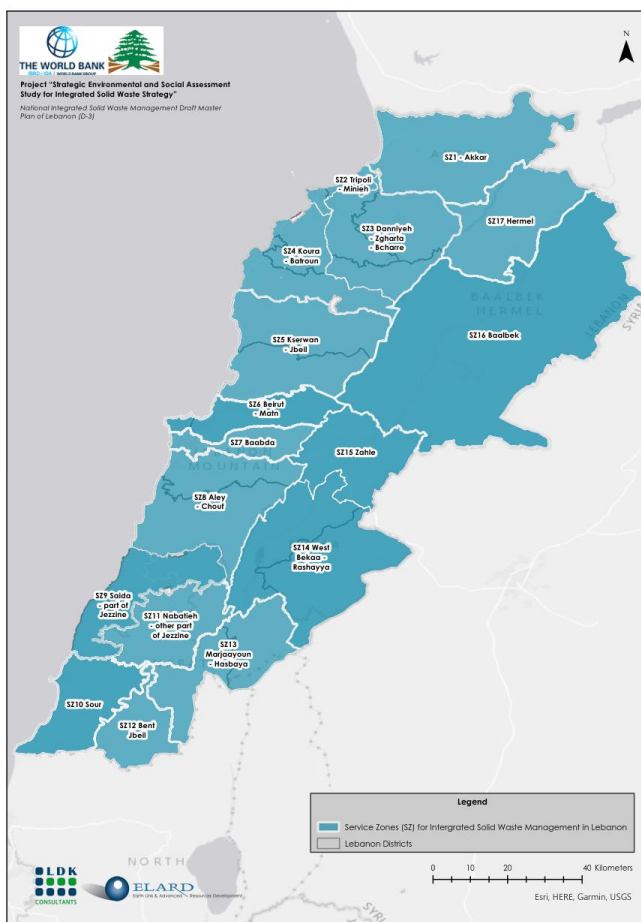
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Executive Summary

Lebanon moves towards a more efficient, sustainable, and cost-effective integrated waste management system, turning waste into valuable resources, putting an end to open dumping and burning and creating healthier environments for the benefit of the Lebanese people. In this context, the National Integrated Solid Waste Management (NISWM) Draft Master Plan provides specific activities and infrastructure measures/projects related to waste collection and transport, reuse, recycling, recovery and disposal, aligning with the objectives and targets set in the NISWMS¹.

The planning framework of the NISWM Draft Master Plan, outlined in §2, encompasses the essential planning attributes required for the establishment of the National Integrated Municipal Waste Management System. This comprehensive framework addresses various aspects, including:

- Identifying waste types (§2.1)
- Defining the planning area and the planning time periods (§2.2 and 2.3)
- Projecting municipal waste generation (§2.4 and Annex 1)
- Defining the MWM Service Zones (§2.5)



- SZ1 Akkar
- SZ2 Tripoli - Minieh
- SZ3 DanniyeH - Zgharta - Bcharre
- SZ4 Koura - Batroun
- SZ5 Keserwan - Jbeil
- SZ6 Beirut - Matn
- SZ7 Baabda
- SZ8 Aley - Chouf
- SZ9 Saida - part of Jezzine
- SZ10 Sour
- SZ11 Nabatieh - other part of Jezzine
- SZ12 Bent Jbeil
- SZ13 Marjaayoun - Hasbaya
- SZ14 West Bekaa - Rashayya
- SZ15 Zahle
- SZ16 Baalbek
- SZ17 Hermel

¹ LDK Consultants and ELARD, (2023). Final Draft National Integrated Solid Waste Management Strategy Report (D-2B), Project “Strategic Environmental and Social Assessment Study for Integrated Solid Waste Strategy”, Lake Qaraoun Pollution Prevention Project, World Bank.

- Establishing quantitative targets for Lebanon at the end of each planning period (§2.6, Annex 2 and 3)

Year	2028	2033	2043
MWM quantitative targets	(tn/y)	(tn/y)	(tn/y)
Total MW collected quantities (street-cleaning & collection)	2,686,026	2,821,753	3,457,862
MW quantities diverted from landfills or dumpsites	≥ 335,753	≥ 705,438	≥ 1,901,824
MW quantities disposed of in landfills or dumpsites	≤ 2,350,273	≤ 2,116,315	≤ 1,556,038
<i>MW quantities disposed of: 1. in landfills</i>	≤ 2,061,525	≤ 2,116,315	≤ 1,556,038
<i>MW quantities disposed of: 2. in dumpsites</i>	≤ 288,748	0	0
Biodegradable waste quantities disposed of in landfills (or dumpsites)	≤ 1,575,858	≤ 1,418,989	≤ 1,901,824
Biodegradable waste quantities diverted from landfills	≥ 225,123	≥ 472,996	≥ 1,159,248
<i>Biowaste of biodegradable waste stream diverted from landfills</i>	≥ 183,724	≥ 386,016	≥ 946,071
<i>Paper/Cardboard of biodegradable waste stream diverted from landfills</i>	≥ 41,398	≥ 86,981	≥ 213,177
Re-use & recycling of MW	≥ 283,940	≥ 488,107	≥ 1,495,352
Reuse / recycling of dry recyclables (paper, metal, plastic and glass)	≥ 104,298	≥ 179,294	≥ 549,281
Biowaste home-composting (recycling)	≥ 36,745	≥ 77,203	≥ 189,214

- Defining the Municipal Waste Management Scheme (§2.7)

- Expansion of **street-cleaning and collection services** to the whole country population;
- Set-up of **separate collection system**: 3-bins system for curbside collection of dry recyclables (paper/cardboard, plastic, metals, glass), biowaste, and residual commingled municipal waste;
- Establishment of **Drop Off, Reuse and Repair Centers** (paper/cardboard, plastic, metals, glass, bulky, textiles/clothes, toys, bulky waste, etc.);
- Establishment of **Transfer Stations (TSs)**;
- Upgrade of existing or establishment of new **Material Recovery Facilities (MRFs) for sorting separately collected dry recyclables**;
- Upgrade of existing or establishment of new **Biological Treatment Facilities (BTFs)**, i.e., Anaerobic Digestion (AD) and/or composting facilities, **for recycling separately collected biowaste**;
- Upgrade of existing or establishment of new **Mechanical Biological Treatment Facilities (MBTs) for commingled MW**, which will consist of a combination of:
 - Mechanical treatment** where the commingled MW is treated with view to sort out the organic fraction and recover recyclable materials (paper & cardboard, plastic, metals, glass) with the production of waste derived fuels; and
 - Biological treatment** which refers to the use of anaerobic (AD) and/or aerobic (composting) technologies to process the organic fraction of the commingled MW.
- Establishment of **Sanitary Landfills (SLFs)**, and
- Landfill and Dumpsite Rehabilitation.**

- Establishing Operational & Technical Parameters of the MWM Projects/Facilities (§2.8 and Annex 4)

Priority is given to the establishment of MWM facilities at sites already designated for MWM activities. In instances where new MWM Facilities are necessary, priority should be given to areas already utilized for MWM activities. This approach minimizes the need for new lots and allows for the utilization of existing equipment and infrastructure. Alternatively, new facilities should be situated in the most suitable zones, according to a clear list of physical planning, technical, environmental, techno-economic and social criteria (please refer to Annex 3 of the Draft NISWMS). Additionally, it's advisable to retain and upgrade

existing MWM facilities whenever feasible, taking into account environmental, technical, economic, and social considerations.

Considering the Strategic Planning Framework (§2), the analysis that was performed in the context of the NISWM Draft Master Plan for the identification of the Integrated MWM System, presented in §3, defined the technical (number, coverage zones, required design capacities (estimation based on the MWM quantitative targets) and proposed location/siting zones) and operational features of the MWM Project/Facilities in each Service Zone (§3.1).

Type of Project / Facility	Proposed Project / Facility	Proposed Location (L) - Project's / Facility's Coverage Area ² (CA)	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	Required Design Capacity (RDC)	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ1 Akkar											
Curbside MW Collection	3-bins system ³	L: LMWMP CA: SZ1	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	104 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
			52			52					
MRFs	Akkar MRF ⁷¹ (new or upgrade existing S/S-C facility)	L: Akkar District CA: SZ1	-	20	tn/d	New MRF construction or upgrade existing facility	85	tn/d	Operation	155	tn/d
				5,000	tn/y		26,250	tn/y		48,250	tn/y
BTFs	Akkar BTF ⁴ (new or upgrade existing S/S-C facility)	L: Akkar District CA: SZ1	-	20	tn/d	New BTF construction or upgrade existing facility	100	tn/d	Operation	200	tn/d
				5,690	tn/y		29,840	tn/y		60,940	tn/y
Transfer Stations (TSs) ⁵	-	-	-	-	-	-	-	-	-	-	-
MBTs	Srar MBT (upgrade)	L: Srar Mun., Akkar District CA: SZ1	-	465	tn/d	Upgrade existing facility - operation	345	tn/d	Operation	285	tn/d
				144,990	tn/y		107,330	tn/y		87,750	tn/y
						<i>Existing Design Capacity Srar MBT (tn/d):</i>			300	tn/d	
SLFs	Srar SLF (upgrade)	L: Srar Mun., Akkar District CA: SZ1	Upgrade existing SLF	136,700	tn/y	Operation	128,900	tn/y	Operation	107,000	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	Srar, Mishmish, Fnaydek Dumpsites (3) (1st priority)	L: Srar Mun., Mishmish Mun., Fnaydek Mun., Akkar District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ1 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

² The coverage area of a Municipal Waste Management facility refers to the geographical area or region that the facility serves or is intended to serve.

³ dry recyclables (paper/ cardboard, plastic, metals, glass), biowaste, and residual commingled MW

⁴ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Masha, Akkar Attika, Fnaydek, Mishmish, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

⁵ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ2 Tripoli - Minieh											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ2	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	27 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 14	-	-	New Centers construction 13	-	-	Operation	-	-
MRFs	Minieh MRF (upgrade existing MBT to MRF)	L: Raouda-Aadoua Mun., Minieh - Danniye District CA: SZ2	Upgrade existing facility	25	tn/d	Upgrade existing facility - operation	120	tn/d	Operation	220	tn/d
				7,110	tn/y		37,310	tn/y		68,570	tn/y
BTFs	Minieh BTF (new)	L: Minieh Region, Minieh - Danniye District CA: SZ2	New BTF construction	30	tn/d	New BTF construction - operation	140	tn/d	Operation	280	tn/d
				8,080	tn/y		42,410	tn/y		86,610	tn/y
TSs ⁶	-	-	-	-	-	-	-	-	-	-	-
MBTs	Tripoli MBT (upgrade)	L: Trablous Jardins Mun., Tripoli District CA: SZ2	Upgrade existing facility	665	tn/d	Upgrade existing facility - operation	490	tn/d	Operation	400	tn/d
				206,090	tn/y		152,560	tn/y		124,720	tn/y
<i>Existing Design Capacity Tripoli MBT (tn/d):</i>										500	tn/d
SLFs	Deir Aamar SLF (new)	L: Deir Aamar Mun., Minieh - Danniye District CA: SZ2	Continuing Tripoli LF operation ⁷ - new SLF construction	194,200	tn/y	Operation	183,200	tn/y	Operation	152,000	tn/y
LFs Closure / Rehabilitation	Tripoli LF	L: Trablous Jardins Mun., Tripoli District CA: Unknown	Continue Tripoli LF operation	194,200	tn/y	Closure and rehabilitation works ⁸	-	-	-	-	-
Dumpsites Rehabilitation	Tripoli and Adweh Dumpsites (2) (1st priority)	L: Tripoli District and Minieh Region of Minieh - Danniye District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ2 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

⁶ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

⁷ It is assumed that Tripoli Landfill will cater to the needs in the short term.

⁸ Located on the shoreline, which leads to a big waste leakage to the environment. Closure and rehabilitation is proposed when reaching its full capacity. No data is available with regards to its remaining capacity.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ3											
Danniyeh - Zgharta - Bcharre											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ3	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	68 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
MRFs	Zgharta MRF ⁹ (new or upgrade existing S/S-C facility)	L: Zgharta District CA: SZ3	34	10	tn/d	34	50	tn/d	Operation	90	tn/d
			New MRF construction or upgrade existing facility	2,890	tn/y	New MRF construction or upgrade existing facility - operation	15,140	tn/y		27,820	tn/y
BTFs	Zgharta BTF ⁷⁶ (new or upgrade existing S/S-C facility)	L: Zgharta District CA: SZ3	New BTF construction or upgrade existing facility	15	tn/d	New BTF construction or upgrade existing facility - operation	60	tn/d	Operation	115	tn/d
			3,280	tn/y	17,210	tn/y	35,140	tn/y			
TSs ¹⁰	-	-	-	-	-	-	-	-	-	-	-
MBTs	Hwakir MBT (new) or Majdalaiya MBT (new)	L: Hwakir or Majdalaiya Mun., Zgharta District (in the vicinity of Hwakir or Majdalaiya SLF) CA: SZ3	-	270	tn/d	-	200	tn/d	New MBT construction - operation	165	tn/d
				83,600	tn/y		61,890	tn/y		50,600	tn/y
SLFs	Hwakir SLF (new) or Majdalaiya SLF (new)	L: Hwakir or Majdalaiya Mun., Zgharta District CA: SZ3	New SLF construction	78,800	tn/y	New SLF construction - operation	74,400	tn/y	Operation	61,700	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	Kfar Chellane Dumpsite (1) (1st priority)	L: Danniyeh Region of Minieh - Danniyeh District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ3 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

⁹ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Medjlaya, Meryata, Zgharta, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

¹⁰ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)			
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit	
SZ4												
Koura - Batroun												
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ4	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-	
DRR MW Centers	63 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-	
MRFs	Batroun/Koura MRF ¹¹ (new or upgrade existing S/S-C facility)	L: Batroun or Koura District CA: SZ4	New MRF construction or upgrade existing facility	32	10	tn/d	New MRF construction or upgrade existing facility - operation	40	tn/d	Operation	70	tn/d
				2,220	tn/y	11,640	tn/y	21,400	tn/y			
BTFs	Batroun/Koura BTF ⁷⁸ (new or upgrade existing S/S-C facility)	L: Batroun or Koura District CA: SZ4	New BTF construction or upgrade existing facility	10	10	tn/d	New BTF construction or upgrade existing facility - operation	45	tn/d	Operation	90	tn/d
				2,520	tn/y	13,240	tn/y	27,030	tn/y			
TSs ¹²	-	-	-	-	-	-	-	-	-	-	-	
MBTs	Batroun/Koura MBT (new)	L: Batroun or Koura District (in the vicinity of Batroun/Koura SLF) CA: SZ4	-	210	210	tn/d	-	155	tn/d	New MBT construction - operation	125	tn/d
				64,310	tn/y	47,600		tn/y	38,920		tn/y	
SLFs	Batroun/Koura SLF (new)	L: Batroun or Koura District CA: SZ4	New SLF construction	60,600	tn/y	New SLF construction - operation	57,200	tn/y	Operation	47,500	tn/y	
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	
Dumpsites Rehabilitation	Batroun Dumpsite (1) (1st priority)	L: Batroun District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-	
	Non-Priority dumpsites	L: SZ4 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-	

¹¹ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Bsarma, Bichmezzine, Amioun, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

¹² No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)				
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit		
SZ5 Keserwan - Jbeil													
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ5	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-		
DRR MW Centers	89 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 45	-	-	New Centers construction 44	-	-	Operation	-	-		
MRFs	Keserwan MRF ¹³ (new or upgrade existing S/S-C facility)	L: Keserwan District CA: Keserwan District of SZ5	-	15	tn/d	New MRF construction or upgrade existing facility - operation	75	tn/d	Operation	135	tn/d		
	Jbeil MRF ¹⁴ (new or upgrade existing S/S-C facility)	L: Jbeil District CA: Jbeil District of SZ5	-	4,310	tn/y		35	tn/d		41,510	tn/y		
BTFs	Keserwan BTF ⁸⁰ (new or upgrade existing S/S-C facility)	L: Keserwan District CA: Keserwan District of SZ5	-	10	tn/d	New BTF construction or upgrade existing facility - operation	85	tn/d	Operation	60	tn/d		
	Jbeil BTF ⁸¹ (new or upgrade existing S/S-C facility)	L: Jbeil District CA: Jbeil District of SZ5	-	1,900	tn/y		25,680	tn/y		18,280	tn/y		
BTFs	Keserwan BTF ⁸⁰ (new or upgrade existing S/S-C facility)	L: Keserwan District CA: Keserwan District of SZ5	-	20	tn/d	New BTF construction or upgrade existing facility - operation	40	tn/d	Operation	170	tn/d		
	Jbeil BTF ⁸¹ (new or upgrade existing S/S-C facility)	L: Jbeil District CA: Jbeil District of SZ5	-	4,890	tn/y		11,310	tn/y		52,430	tn/y		
TSs ¹⁵	-	-	-	-	-	-	-	-	-	-	-		
MBTs	Ghosta MBT (upgrade)	L: Ghosta Mun., Keserwan District CA: Keserwan District of SZ5	-	400	tn/d	Upgrade existing facility - operation	300	tn/d	Operation	245	tn/d		
	Hbaline MBT (upgrade)	L: Hbaline Mun., Jbeil District CA: Jbeil District of SZ5	-	124,760	tn/y		92,360	tn/y		75,510	tn/y		
											<i>Existing Design Capacity Ghosta MBT (tn/d):</i>	250	tn/d
											<i>Existing Design Capacity Jbeil MBT (tn/d):</i>	80	tn/d
SLFs	Ghosta SLF (new)	L: Old non-operational Ghosta Landfill, Ghosta Mun., Keserwan District CA: Keserwan District of SZ5	New SLF construction	117,600	tn/y	Operation	111,000	tn/y	Operation	92,100	tn/y		

¹³ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Kaslik/USEK, Antoura, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Keserwan MRF and BTF.

¹⁴ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Jbeil, Blat, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Jbeil MRF and BTF.

¹⁵ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ5 Keserwan - Jbeil											
	Hbaline SLF (upgrade)	L: Hbaline SLF, Hbaline Mun., Jbeil District CA: Jbeil District of SZ5	Continuing Hbaline SLF operation ¹⁶	51,800	tn/y	Expansion (new SLF cells construction) - operation	48,900	tn/y	Operation	40,600	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	Hbaline, Balloune Dumpsites (2) (1st priority)	L: Hbaline Mun., Jbeil District and Balloune Mun., Keserwan District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ5 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

¹⁶ It is assumed that the existing cell of Hbaline SLF will cater to the needs in the short term.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ6											
Beirut - Matn											
Curbside MW Collection	3-bins system	L: Local MWM Plans (LMWMP) CA: SZ6	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	53 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
			27			26					
MRFs	Beirut/Matn MRF (new or upgrade existing S/S-C facility) ¹⁷	L: Beirut District or Matn District CA: SZ6	New BTF construction or upgrade existing facility	55	tn/d	Operation	280	tn/d	Operation	510	tn/d
			16,380	tn/y	86,100		tn/y	158,260		tn/y	
BTFs	Coral BTF ¹⁸ (upgrade)	L: Bourj Hammoud Mun., Matn District SA: SZ6	Upgrade existing facility	60	tn/d	Operation	315	tn/d	Operation	645	tn/d
			18,620	tn/y	97,880		tn/y	199,900		tn/y	
TSs ¹⁹	-	-	-	-	-	-	-	-	-	-	-
MBTs	Beirut/Matn MBT: a) Karantina Mechanical Treatment Facility (upgrade)	L: Karantina at Medawar Mun., Beirut District CA: SZ6	Upgrade existing facility	1,525	tn/d	Operation	1,130	tn/d	Operation	925	tn/d
				475,100	tn/y		352,110	tn/y		287,870	tn/y
				<i>Existing Design Capacity Karantina (tn/d):</i>			1,800	tn/d			
	b) Coral BTF ¹⁸ (upgrade)	L: Bourj Hammoud Mun., Matn District CA: SZ6	Upgrade existing facility	910	tn/d	Operation	680	tn/d	Operation	515	tn/d
283,890				tn/y	212,060		tn/y	159,920		tn/y	
				<i>Existing Design Capacity Coral (tn/d):</i>			750	tn/d			
			<i>Proposed Total Design Capacity Coral (for separately collected biowaste and biowaste from comingled waste) (tn/d):</i>			1,160	tn/d				
SLFs	Abou Mizane SLF (new) and/or Bsalim SLF (new)	L: Abou Mizane Mun., and/or Bsalim Mun., Matn District CA: SZ6	Continuing Jdeideh LF operation ²⁰ - new SLF(s) construction	447,700	tn/y	Operation	422,900	tn/y	Operation	350,800	tn/y
LFs Closure / Rehabilitation	Jdeideh LF	L: Matn District CA: SZ6	Continuing LF operation	447,700	tn/y	Closure and rehabilitation ²¹	-	-	-	-	-
Dumpsites Rehabilitation	Beit Chabab Dumpsite (1) (1st priority)	L: Matn District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: Matn District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

¹⁷ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Bikfaya, Bsalim, Bouchrieh, Roumieh, Beit Meri, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF.

¹⁸ The Coral CF is proposed to be upgraded to serve as a BTF for separately collected biowaste and a BTF for biowaste sorted from comingled MW at Karantina Mechanical Treatment Facility.

¹⁹ No TS for the transportation of comingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the SLF or MBT. However, it is recommended during the development of the Local MW plan to determine whether a TS is required in Beirut District to transport comingled MW or MBT residuals to the proposed new LF(s), considering economic, financial, technical (e.g. waste volumes, etc.) aspects to ascertain the project's' necessity and feasibility.

²⁰ It is assumed that Jdeideh Landfill will cater to the needs in the short term.

²¹ Located on the shoreline, which leads to a big waste leakage to the environment. Closure and rehabilitation is proposed when reaching its full capacity. No data is available with regards to the landfill's remaining capacity.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ7											
Baabda											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ7	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	43 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun.(LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
MRFs	Baabda MRF ²² (new or upgrade existing S/S-C facility)	L: Baabda District CA: SZ7	New MRF construction or upgrade existing facility	22	40	tn/d	New MRF construction or upgrade existing facility - operation	21	205	tn/d	Operation
				12,010	tn/y	63,050		tn/y			
BTFs	Baabda BTF ⁸⁹ (new or upgrade existing S/S-C facility)	L: Baabda District CA: SZ7	New BTF construction or upgrade existing facility	45	tn/d	New BTF construction or upgrade existing facility - operation	230	tn/d	Operation	470	tn/d
				13,650	tn/y		71,680	tn/y		146,380	tn/y
TSs ²³	-	-	-	-	-	-	-	-	-	-	-
MBTs	Baabda MBT (new)	L: Baabda District (in the vicinity of Baabda SLF) CA: SZ7	New MBT construction	1,120	tn/d	Operation	830	tn/d	Operation	680	tn/d
				348,320	tn/y		257,840	tn/y		210,800	tn/y
SLFs	Baabda SLF (new)	L: Baabda District CA: SZ7	New SLF construction	328,200	tn/y	Operation	309,700	tn/y	Operation	256,900	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	-(1st priority)	-	-	-	-	-	-	-	-	-	-
	Non-Priority dumpsites	L: SZ7 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

²² The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Hazmieh, Roeiset Ballout, Haret el Sett, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF or BTF.

²³ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ8											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ8	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	130 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun.(LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
MRFs	Amrousieh MRF (upgrade)	L: Choueifat El-Amrousieh Mun., Aley District CA: Aley District of SZ8	Upgrade existing facility	20	tn/d	Upgrade existing facility - operation	90	tn/d	Operation	170	tn/d
				5,350	tn/y		28,080	tn/y		51,610	tn/y
	<i>Existing Design Capacity Amrousieh MRF (tn/d):</i>									1,500	<i>tn/d</i>
	Soueijan MRF (upgrade existing MBT to MRF²⁴)	L: Jdeidet Ech-Chouf Mun., Chouf District CA: Chouf District of SZ8	Upgrade existing facility	15	tn/d	Upgrade existing facility - operation	55	tn/d	Operation	100	tn/d
			3,140	tn/y	16,480		tn/y	30,300		tn/y	
<i>Existing Design Capacity Soueijan MBT (tn/d):</i>									60	<i>tn/d</i>	
BTFs	Aley BTF²⁵ (new or upgrade existing S/S-C facility)	L: Aley District CA: Aley District of SZ8	New BTF construction or upgrade existing facility	20	tn/d	New BTF construction or upgrade existing facility - operation	105	tn/d	Operation	210	tn/d
				6,080	tn/y		31,920	tn/y		65,190	tn/y
	Chouf BTF²⁶ (new or upgrade existing S/S-C facility)	L: Chouf District CA: Chouf District of SZ8	New BTF construction or upgrade existing facility	15	tn/d	New BTF construction or upgrade existing facility - operation	65	tn/d	Operation	125	tn/d
			3,570	tn/y	18,740	tn/y	38,260	tn/y			
TSs²⁷	-	-	-	-	-	-	-	-	-	-	
MBTs	Naameh MBT (new)	L: Naameh Mun., Aley District (in the vicinity of Naameh SLF) CA: Aley District of SZ8	New MBT construction	500	tn/d	Operation	370	tn/d	Operation	305	tn/d
				155,110	tn/y		114,820	tn/y		93,870	tn/y
	Baasir MBT (new)	-	295	tn/d	-	220	tn/d	180	tn/d		

²⁴ Soueijan MBT should be upgraded to an MRF, considering that the distance with the proposed landfill (Baasir SLF) is a limiting factor for operations. In order for Soueijan MBT to continue operating as an MBT, a new landfill must be established near the facility instead of the Baasir SLF.

²⁵ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Aitat, Abey, Chartoun, Ainab, Majdel Baana, Chahhar, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Aley BTF.

²⁶ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Brih, Kfar Qatra, Baadaran, Batloun, Mazboud, Jiyeh which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Chouf BTF.

²⁷ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ8											
	Aley - Chouf										
		L: Baassir Mun., Chouf District (in the vicinity of Baasir SLF) CA: Chouf District of SZ8		91,040	tn/y		67,400	tn/y	New MBT construction - operation	55,100	tn/y
SLFs	Naameh SLF (new)	L: Old non-operational Naameh Landfill, Aain Drafil Mun., Aley District SA: Aley District of SZ8	Continuing Costa Brava LF operation ²⁸ - new SLF construction	146,200	tn/y	Operation	137,900	tn/y	Operation	114,400	tn/y
	Baasir SLF (new)	L: Baassir Mun., Chouf District CA: Chouf District of SZ8	New SLF construction	85,800	tn/y	New SLF construction - operation	81,000	tn/y	Operation	67,200	tn/y
LFs Closure / Rehabilitation	Costa Brava LF	L: Choueifat El-Oumara and Choueifat El-Quoubbeh Mun., Aley District CA: Unknown	Continuing Costa Brava LF operation	146,200	tn/y	Closure and rehabilitation ²⁹	-	-	-	-	-
Dumpsites Rehabilitation	- (1st priority)	-	-	-	-	-	-	-	-	-	-
	Non-Priority dumpsites	L: SZ8 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

²⁸ It is assumed that Costa Brava Landfill will cater to the needs in the short term.

²⁹ Located on the shoreline, which leads to a big waste leakage to the environment. Closure and rehabilitation is proposed when reaching its full capacity. No data is available with regards to its remaining capacity.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)			
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit	
SZ9												
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ9	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-	
DRR MW Centers	80 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 40	-	-	New Centers construction 40	-	-	Operation	-	-	
MRFs	Saida/Jezzine MRF³¹ (new or upgrade existing S/S-C facility)	L: Saida or Jezzine District CA: SZ9	-	10 3,060	tn/d tn/y	New MRF construction or upgrade existing facility - operation	55 16,030	tn/d tn/y	Operation	95 29,460	tn/d tn/y	
BTFs	Saida/Jezzine BTF⁹⁸ (new or upgrade existing S/S-C facility)	L: Saida or Jezzine District CA: SZ9	-	15 3,470	tn/d tn/y	New BTF construction or upgrade existing facility - operation	60 18,220	tn/d tn/y	Operation	120 37,210	tn/d tn/y	
TSs	Jezzine TS³² (new) (for comingled MW)	L: Jezzine, Room, Anane Mun., Jezzine District (indicative) CA: part of Jezzine District of SZ9	New TS construction	-	-	Operation	-	-	Operation	-	-	
MBTs	Saida MBT/IBC (-)	L:Saida Ed-Dekermane Mun., Saida District CA: SZ9	Operation	285 88,540	tn/d tn/y	Operation	215 65,540	tn/d tn/y	Operation	175 53,580	tn/d tn/y	
										<i>Existing Design Capacity Saida MBT/IBC (tn/d):</i>		550 tn/d
SLFs	Marwanieh SLF (new)	L: Marwanieh Mun., Saida District CA: SZ9	New SLF construction	83,500	tn/y	Operation	78,700	tn/y	Operation	65,300	tn/y	
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	
Dumpsites Rehabilitation	Sarafand, Jezzine, Ghaziye, Saida Dumpsites (4) (1st priority)	L: SZ9 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-	
	Non-Priority dumpsites	L: SZ9 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-	

³⁰ Part of Jezzine District: Ain Majdalain, Kfar Houne, Bkassine, Qaitoule, Roum, Jernaya, Lebbaa, Sfarai, Midane, Jarmaq, Wadi Jezzine, Aazour, Aariye, Haitoura, Benouati, Bteddine el Loqch, Mjaydel, Maknouiye, Sidoun, Zhalta, Sabah, Karkha, Kfar Falous, Machmouche, Sniye, Kfar Jarra, Deir El Qattine – Haidab, Deir El Qattine – Haidab, Homsiyeh, Raimat - Deir Chkedif, Anane.

³¹ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Zrerieh, Ansarieh, Sarafand, Bqosta, Kharayeb, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

³² A TS for the transportation of comingled MW is required considering that MW is to be transferred at a distance of more than 30 km radius or more than 40 km kilometer distance from the landfill or MBT. The precise capacity and location of the facility should be determined through the Local MWM Plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ10	Sour										
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ10	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	61 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
MRFs	Ain Baal MRF ³³ (upgrade MBT to MRF and BTF)	L: Bazouriyeh Mun., Sour District CA: SZ10	31	15	tn/d	30	55	tn/d	Operation	100	tn/d
			-	3,190	tn/y	Upgrade existing facility - operation	16,730	tn/y		30,740	tn/y
			<i>Existing Design Capacity Ain Baal MBT (tn/d):</i>						150	tn/d	
BTFs	Ain Baal BTF ¹⁰⁰ (upgrade MBT to MRF and BTF)	L: Bazouriyeh Mun., Sour District CA: SZ10	-	15	tn/d	Upgrade existing facility - operation	65	tn/d	Operation	125	tn/d
			-	3,620	tn/y	19,010	tn/y	38,830		tn/y	
			<i>Existing Design Capacity Ain Baal MBT (tn/d):</i>						150	tn/d	
TSs ³⁴	-	-	-	-	-	-	-	-	-	-	-
MBTs	Nfakhiyeh MBT (new)	L: Nfakhiyeh Mun., Sour District (in the vicinity of Nfakhiyeh SLF) CA: SZ10	-	300	tn/d	New MBT construction	220	tn/d	New MBT construction - operation	180	tn/d
			-	92,380	tn/y		68,390	tn/y		55,910	tn/y
SLFs	Nfakhiyeh SLF (new)	L: Nfakhiyeh Mun., Sour District CA: SZ10	New SLF construction	87,100	tn/y	New SLF construction - operation	82,200	tn/y	Operation	68,200	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	Deir Qanoun El Aain, Abbasye Dumpsites (2) (1st priority)	L: SZ10 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ10 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

³³ Considering the location of the Ain Baal MBT, it is recommended to be converted to an MRF (for sorting of separately collected dry recyclables) and a BTF (for separately collected biowaste) and that a new MBT is established in the vicinity of the Nfakhiyeh SLF.

³⁴ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)			
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit	
SZ11 Nabatieh – other part of Jezzine³⁵												
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ11	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-	
DRR MW Centers	46 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-	
			23			23						
MRFs	Nabatieh MRF ³⁶ (new or upgrade existing S/S-C facility)	L: Nabatieh District CA: SZ11	-	10	tn/d	New MRF construction or upgrade existing facility - operation	50	tn/d	Operation	95	tn/d	
				2,930	tn/y		15,390	tn/y		28,280	tn/y	
BTFs	Nabatieh BTF ¹⁰³ (new or upgrade existing S/S-C facility)	L: Nabatieh District CA: SZ11	-	15	tn/d	New BTF construction or upgrade existing facility - operation	60	tn/d	Operation	115	tn/d	
				3,340	tn/y		17,500	tn/y		35,730	tn/y	
TSs ³⁷	-	-	-	-	-	-	-	-	-	-	-	
MBTs	Kfour MBT (upgrade)	L: Kfour Mun., Nabatieh District CA: SZ11	-	255	tn/d	-	185	tn/d	Upgrade existing facility - operation	145	tn/d	
				79,530	tn/y		57,260	tn/y		44,700	tn/y	
			<i>Existing Design Capacity Kfour MBT (tn/d):</i>								250	tn/d
SLFs	Kfour SLF (new) or Mazraat Bsaffour SLF (new)	L: Kfour Mun. or Mazraat Bsaffour Mun., Nabatieh District CA: SZ11	New SLF construction	70,600	tn/y	Operation	66,600	tn/y	Operation	55,200	tn/y	
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	
Dumpsites Rehabilitation	Kfour Dumpsite (1) (1st priority)	L: Kfour En-Nabatieh Mun., Nabatieh District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-	
	Non-Priority dumpsites	L: SZ11 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-	

³⁵ Other part of Jezzine District: Rihane, Aaramta, Aaichiye, Mliikh, Louaiziye, Sejoud.

³⁶ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Kfar Sir, Ansar, Haboush, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

³⁷ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ12 Bent Jbeil											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ12	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	36 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
MRFs	Bent Jbeil MRF ³⁸ (new or upgrade existing S/S-C facility)	L: Bent Jbeil District CA: SZ12	-	5	tn/d	New MRF construction or upgrade existing facility - operation	25	tn/d	Operation	45	tn/d
				1,450	tn/y		7,600	tn/y		13,960	tn/y
BTFs	Bent Jbeil BTF ¹⁰⁵ (new or upgrade existing S/S-C facility)	L: Bent Jbeil District CA: SZ12	-	10	tn/d	New BTF construction or upgrade existing facility - operation	30	tn/d	Operation	60	tn/d
				1,650	tn/y		8,630	tn/y		17,630	tn/y
TSSs ³⁹	-	-	-	-	-	-	-	-	-	-	-
MBTs	Elb El Karnel MBT (new)	L: Rmaich Mun., Bent Jbeil District (in the vicinity of Elb El Karnel SLF) CA: SZ12	-	155	tn/d	-	115	tn/d	New MBT construction - operation	90	tn/d
				48,240	tn/y		34,660	tn/y		26,970	tn/y
SLFs	Elb El Karnel SLF (new)	L: Rmaich Mun., Bent Jbeil District CA: SZ12	New SLF construction	45,700	tn/y	New SLF construction - operation	43,100	tn/y	Operation	35,800	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	-(1st priority)	-	-	-	-	-	-	-	-	-	-
	Non-Priority dumpsites	L: SZ12 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

³⁸ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Ain Ebel, Kherbet Selem, Aitaroun, Bent Jbeil, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

³⁹ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ13											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ13	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	42 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 21	-	-	New Centers construction 21	-	-	Operation	-	-
MRFs	Marjaayoun MRF⁴⁰ (new or upgrade existing S/S-C facility)	L: Marjaayoun District CA: Marjaayoun District of SZ13	-	5	tn/d	New MRF construction or upgrade existing facility - operation	25	tn/d	Operation	45	tn/d
				1,450	tn/y		7,570	tn/y		13,910	tn/y
MRFs	Hasbaya MRF⁴¹ (new or upgrade existing S/S-C facility)	L: Hasbaya District CA: Hasbaya District of SZ13	-	5	tn/d	New MRF construction or upgrade existing facility - operation	15	tn/d	Operation	25	tn/d
				770	tn/y		4,040	tn/y		7,430	tn/y
BTFs	Marjaayoun BTF¹⁰⁷ (new or upgrade existing S/S-C facility)	L: Marjaayoun District CA: Marjaayoun District of SZ13	-	10	tn/d	New BTF construction or upgrade existing facility - operation	30	tn/d	Operation	60	tn/d
				1,640	tn/y		8,600	tn/y		17,560	tn/y
BTFs	Hasbaya BTF¹⁰⁸ (new or upgrade existing S/S-C facility)	L: Hasbaya District CA: Hasbaya District of SZ13	-	5	tn/d	New BTF construction or upgrade existing facility - operation	15	tn/d	Operation	35	tn/d
				880	tn/y		4,600	tn/y		9,380	tn/y
TSs	Marjaayoun TS⁴² (new)	L: Marjaayoun District CA: Marjaayoun District of SZ13	New TS construction	-	-	New TS construction - Operation	-	-	Operation	-	-
MBTs	El Majidieh MBT (new)	L: El Majidieh Mun., Hasbaya District (in the vicinity of El Majidieh SLF) CA: SZ13	-	165	tn/d	-	120	tn/d	New MBT construction - operation	95	tn/d
				50,560	tn/y		36,340	tn/y		28,270	tn/y
SLFs	El Majidieh SLF (new)	L: El Majidieh Mun., Hasbaya District CA: SZ13	New SLF construction	47,900	tn/y	New SLF construction - operation	45,200	tn/y	Operation	37,500	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	- (1st priority)	-	-	-	-	-	-	-	-	-	-
	Non-Priority dumpsites	L: SZ13 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

⁴⁰ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Meis El Jabal, Qabriha, Taibeh, Qlaia, Kham, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Marjaayoun MRF and BTF.

⁴¹ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Kawkaba, Rachaya Foukhar, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the Hasbaya MRF and BTF.

⁴² A TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of more than 30 km radius or more than 40 km kilometer distance from the landfill or MBT. The precise capacity and location of the facility should be determined through the Local MWM Plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)				
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit		
SZ14													
West Bekaa - Rashaya													
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ14	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-		
DRR MW Centers	58 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-		
MRFs	West Bekaa/Rashaya MRF ⁴³ (new or upgrade existing S/S-C facility)	L: West Bekaa District CA: SZ14	New MRF construction or upgrade existing facility	10	tn/d	New MRF construction or upgrade existing facility - operation	50	tn/d	Operation	90	tn/d		
				2,820	tn/y		14,810	tn/y		27,220	tn/y		
BTFs	West Bekaa/Rashaya BTF ¹¹⁰ (new or upgrade existing S/S-C facility)	L: West Bekaa District CA: SZ14	New BTF construction or upgrade existing facility	15	tn/d	New BTF construction or upgrade existing facility - operation	55	tn/d	Operation	115	tn/d		
				3,210	tn/y		16,840	tn/y		34,380	tn/y		
TSS ⁴⁴	-	-	-	-	-	-	-	-	-	-	-		
MBTs	Joub Jannine MBT (upgrade)	L: Joub Jannine Mun., West Bekaa District CA: SZ14	-	265	tn/d	-	195	tn/d	Upgrade existing facility - operation	160	tn/d		
				81,800	tn/y		60,550	tn/y		49,510	tn/y		
										<i>Existing Design Capacity (tn/d):</i>		150	tn/d
SLFs	Joub Jannine SLF (upgrade) or Aanjar SLF (new)	L: Joub Jannine or Aanjar (Haouch Moussa) Mun., West Bekaa District CA: SZ14	Upgrade existing Joub Jannine SLF or new SLF construction	77,100	tn/y	Operation	72,800	tn/y	Operation	60,400	tn/y		
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-		
Dumpsites Rehabilitation	-(1st priority)	-	-	-	-	-	-	-	-	-	-		
	Non-Priority dumpsites	L: SZ14 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-		

⁴³ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Manara, Aitanit, Qaraoun, Aaqaba, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

⁴⁴ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case the West Bekaa and Rashaya Districts are served by the Aanjar SLF, It is recommended to reevaluate the necessity for a TS to transfer the MW from the districts' southern municipalities.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ15											
Zahle											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ15	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	29 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 15	-	-	New Centers construction 14	-	-	Operation	-	-
MRFs	Zahle MRF ⁴⁵ (new or upgrade existing S/S-C facility)	L: Zahle District CA: SZ15	New MRF construction or upgrade existing facility	20	tn/d	New MRF construction or upgrade existing facility - operation	100	tn/d	Operation	180	tn/d
				5,780	tn/y		30,350	tn/y		55,790	tn/y
BTFs	Zahle BTF ¹¹² (new or upgrade existing S/S-C facility)	L: Zahle District CA: SZ15	New BTF construction or upgrade existing facility	25	tn/d	New BTF construction or upgrade existing facility - operation	115	tn/d	Operation	230	tn/d
				6,570	tn/y		34,510	tn/y		70,470	tn/y
TSS ⁴⁶	-	-	-	-	-	-	-	-	-	-	-
MBTs	Zahle MBT (upgrade) and/or Bar Elias MBT (upgrade)	L: Zahlé Haouch El-Oumara Aradi Mun. and/or Bar Elias Mun., Zahle District CA: SZ15	-	540	tn/d	Upgrade existing facilities - operation	400	tn/d	Operation	330	tn/d
				167,670	tn/y		124,120	tn/y		101,480	tn/y
			<i>Existing Design Capacity Zahle and Bar Elias MBT (tn/d):</i>						450	tn/d	
SLFs	a) Zahle SLF (upgrade) and/or Bar Elias SLF (upgrade) or b) Raait SLF (new)	L: a) Zahlé Haouch El-Oumara Aradi Mun. and/or Bar Elias Mun., Zahle District or b) Raait Mun., Zahle District CA: SZ15	Upgrade existing Zahle and/or Bar Elias SLFs or new SLF construction	158,000	tn/y	Operation	149,100	tn/y	Operation	123,700	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	Qabb Elias, Bar Elias Dumpsites (2) (1st priority)	L: Qabb Elias Mun., Bar Elias Mun., Zahle District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-
	Non-Priority dumpsites	L: SZ15 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

⁴⁵ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Taanayel Arc enciel, Majd El Anjar, which are small capacity (<50tn/d) MW sorting or MW sorting/composting facilities should be considered as priority locations for establishing the MRF and BTF.

⁴⁶ No TS for the transportation of commingled MW is required considering that MW is to be transferred at a distance of less than 30 km radius or less than 40 km kilometer distance from the landfill or MBT. It is recommended to reevaluate the necessity for a TS during the development of the Local MWM plan. In case one of the proposed SLFs projects is not implemented, TS(s) will be required to meet the needs.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)				
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit		
SZ16													
Baalbek													
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ16	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-		
DRR MW Centers	56 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction 28	-	-	New Centers construction 28	-	-	Operation	-	-		
MRFs	Baalbek MRF ⁴⁷ (new or upgrade existing S/S-C facility)	L: Baalbek District CA: SZ16	-	15 3,490	tn/d tn/y	New MRF construction	60 18,320	tn/d tn/y	Operation	110 33,660	tn/d tn/y		
BTFs	Baalbek BTF ¹¹⁴ (new or upgrade existing S/S-C facility)	L: Baalbek District CA: SZ16	-	15 3,970	tn/d tn/y	New BTF construction	70 20,820	tn/d tn/y	Operation	140 42,520	tn/d tn/y		
TSs ⁴⁸	Northern Baalbek TS (new)	L: Aarsal or Laboueh or Nabi Osmane Mun., Baalbek District (indicative) CA: Northern municipalities ⁴⁹ of SZ16	New TS construction	-	-	New TS construction - Operation	-	-	Operation	-	-		
MBTs	Baalbek MBT (upgrade)	L: Baalbek Mun., Baalbek District CA: SZ16	-	325 101,160	tn/d tn/y	Upgrade existing facility	245 74,890	tn/d tn/y	Operation	200 61,220	tn/d tn/y		
										<i>Existing Design Capacity Baalbek MBT (tn/d):</i>		250	tn/d
SLFs	Baalbek SLF (upgrade) or Deir El Ahmar SLF (upgrade)	L: Baalbek Mun. or Bechwat Mun., Baalbek District CA: SZ16	Upgrade existing SLF	95,400	tn/y	Operation	90,000	tn/y	Operation	74,700	tn/y		
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-		
Dumpsites Rehabilitation	Baalbek Dumpsite (1) (1st priority)	L: Baalbek Mun., Baalbek District CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	-	-	-		
	Non-Priority dumpsites	L: SZ16 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-		








⁴⁷ The district's capital or the most densely populated urban areas within the district should be in close proximity to the proposed facilities. Otherwise, the facilities may be located within the premises of the MBT/SLF. The precise capacity and location of these facilities should be determined through the Local Municipal Waste Management Plan. Deir El Ahmar, which is small capacity (<50tn/d) MW sorting/composting facility should be considered as priority location for establishing the MRF and BTF.

⁴⁸ A TS for the transportation of commingled MW from the Northern municipalities of Baalbeck District is required considering that MW is to be transferred at a distance of more than 30 km radius or more than 40 km kilometer distance to the landfill or MBT. The precise capacity and location of the facility should be determined through the Local MWM Plan. In case the Northern municipalities of Baalbeck District are served by the Hermel SLF (SZ17), no TS is required. In case one of the proposed SLFs projects is not implemented, additional TS(s) will be required to meet the needs.

⁴⁹ Northern municipalities of Baalbeck District: Qaa Ouadi El-Khanzir, Qaa Jouar Maqiye, Deir Mar Maroun, Qaa Baalbek, Qaa Baayoun, Ras Baalbek Es-Sahel, Ras Baalbek Ech-Charqi, Litige, Fekehe, Aarsal, Aain Baalbek, Nabi Osmane, Laboueh, Bajjaje, Zabboud, Halbata, Kharayeb El-Hermel.

Type of Project / Facility	Proposed Project / Facility	Proposed Location - Project's / Facility's CA	ST (2024-2028)			MT (2029-2033)			LT (2034-2043)		
			Activities	RDC	Unit	Activities	RDC	Unit	Activities	RDC	Unit
SZ17 Hermel											
Curbside MW Collection	3-bins system	L: LMWMP CA: SZ17	Gradual establishment - operation	-	-	Establishment - operation	-	-	Operation	-	-
DRR MW Centers	4 Drop-off, Reuse and Repair MW (new)	L: one (1) per mun. (LMWMP) CA: Mun.	New Centers construction	-	-	New Centers construction	-	-	Operation	-	-
			2			2					
MRFs	Hermel MRF (new)	L: Hermel District CA: SZ17	-	5	tn/d	New MRF construction	10	tn/d	Operation	20	tn/d
				590	tn/y		3,060	tn/y		5,610	tn/y
BTFs	Hermel BTF (new)	L: Hermel District CA: SZ17	-	5	tn/d	New BTF construction	15	tn/d	Operation	25	tn/d
				670	tn/y		3,470	tn/y		7,090	tn/y
TSSs	-	-	-	-	-	-	-	-	-	-	-
MBTs	Hermel MBT (new)	L: Hermel Mun., Hermel District (in the vicinity of Hermel SLF) CA: SZ17	-	55	tn/d	-	45	tn/d	New MBT construction - operation	35	tn/d
				16,860	tn/y		12,490	tn/y		10,210	tn/y
SLFs	Hermel SLF (new)	L: Hermel Mun., Hermel District CA: SZ17	New SLF construction	15,900	tn/y	New SLF construction - operation	15,000	tn/y	Operation	12,500	tn/y
LFs Closure / Rehabilitation	-	-	-	-	-	-	-	-	-	-	-
Dumpsites Rehabilitation	- (1st priority)	-	-	-	-	-	-	-	-	-	-
	Non-Priority dumpsites	L: SZ17 CA: Unknown	Closure and rehabilitation	-	-	Closure and rehabilitation	-	-	Rehabilitation	-	-

#	Service Zones	Proposed Projects / Facilities	Short-term Period					Mid-term Period					Long-term Period										
			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	
10		Baasir SLF (new)																					
11	SZ9 Saida - part of Jezzine	Marwaniyeh SLF (new)																					
12	SZ10 Sour	Nfakhiyeh SLF (new)																					
13	SZ11 Nabatieh – other part of Jezzine	Kfour SLF (new) or Mazraat Bsaffour SLF (new)																					
14	SZ12 Bent Jbeil	Elb El Karnel SLF (new)																					
15	SZ13 Marjaayoun - Hasbaya	El Majidieh SLF (new)																					
16	SZ14 West Bekaa - Rashayya	Joub Jannine SLF (upgrade) or Aanjar SLF (new)																					
17	SZ15 Zahle	a) Zahle SLF (upgrade) and/or Bar Elias SLF (upgrade) or b) Raailit SLF (new)																					
18	SZ16 Baalbek	Baalbek SLF (upgrade) or Deir El Ahmar SLF (upgrade)																					
19	SZ17 Hermel	Hermel SLF (new)																					
		Dumpsites and Landfills Rehabilitation																					
-	SZ1 to SZ17	~472 Dumpsites and 3 LFs - Rehabilitation																					

	NS Planning
	Preparatory activities (studies, bids, etc.)
	Construction activities
	Operation
	Rehabilitation activities
	Post-closure activities (monitoring, biogas extraction, etc.)
	Preparatory activities (studies, bids, etc.), construction activities and operation

The long-term Action Plan of the proposed MWM Projects/Facilities categorized by Service Zone is presented in §3.3. This Action Plan includes the whole range of actions proposed to be implemented, divided per planning time-period (short-, mid- and long-term) and the bodies or agencies that will be responsible for the implementation of the action.