

Lebanese University Campus - Hadath

1.3.2.6 - Work Parcel 1 - List of HVAC Equipment

Technical Areas-Bldg(T1,T2&T3)- O & M Ref: 1.5.1 - Set 13 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-T3-1)	14 T.R	1	Variable Air Volume AHU with Supply air flow 2248 lps, External Static pressure 327.4 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-T3-2)	16 T.R	1	Variable Air Volume AHU with Supply air flow 2400 lps, External Static pressure 434 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-T3-3)	22 T.R	1	Variable Air Volume AHU with Supply air flow 3536 lps, External Static pressure 402 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (CRAHU-T3-1)	7 T.R	1	Constant Air Volume AHU with Supply air flow 1800 lps, External Static pressure 125 Pa, with 2 coils (heating / cooling) & electrical reheat of 4 Kw & electrical humidifier of 4 Kg/Hr	✓
	Air Handling Unit (CRAHU-T3-1)	7 T.R	1	Constant Air Volume AHU with Supply air flow 1348 lps, External Static pressure 125 Pa, with 2 coils (heating / cooling) & electrical reheat of 4 Kw & electrical humidifier of 4 Kg/Hr	✓
	Split Unit (CRAC-T3-1)	7.7 T.R	1	DX	✓
	Split Unit (CRAC-T3-2)	5.9 T.R	1	DX	✓
Ventilation	split unit	18000 BTU/hr	1	MDV	✓
	split unit	28000 BTU/hr	1	climasmart	✓
	F-T1-1	15300 Lps @ 260 Pa	1	Centrifugal	✓
	F-T1-2	200 Lps @ 137 Pa	1	Centrifugal	✓
	F-T1-3	400 Lps @ 82 Pa	1	Centrifugal	✓
	F-T1-1	15300 Lps @ 260 Pa	1	Centrifugal fan	✓
	F-T1-2	200 Lps @ 137 Pa	1	Roof Type Fan	✓
	F-T1-3	400 Lps @ 82 Pa	1	Roof Type Fan	✓
	F-T3-1	1690 Lps @ 112 Pa	1	Roof Type Fan	✓
	F-T3-2	270 Lps @ 75 Pa	1	Roof Type Fan	✓
	F-T3-3	509 Lps @ 75 Pa	7	Propeller	✓

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Technical Areas-Bldg(T1,T2&T3)- O & M Ref: 1.5.1 - Set 13 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
	F-T3-5	267 L.ps @ 65 Pa	1	Propeller	✓
	F-T3-7	243 L.ps @ 70 Pa	1	Propeller	✓

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Technical Areas-Bldg(T1,T2&T3)- O & M Ref: 1.5.1 - Set 13 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	F-T3-8	584 Lps @ 75 Pa	2	Propeller	✓
	F-T3-9	660 Lps @ 131 Pa	1	Inline Centrifugal	✓
	F-T3-13	1787 Lps @ 75 Pa	1	Propeller	✓
	F-T3-14	2150 Lps @ 220 Pa	1	Centrifugal	✓
	F-T3-15	2350 Lps @ 190 Pa	1	Centrifugal	✓
	F-T3-15A	2350 Lps @ 246 Pa	1	Centrifugal	✓
	F-T3-18	8950 Lps @ 200 Pa	8	Axial	✓
	FAF-T3-01	19750 Lps @ 225 Pa	4	Axial	✓
	F-T3-20	8290 Lps @ 215 Pa	2	Centrifugal	✓
Cooling	End Suction Pumps (P-T3-1)	6 Lps @ 18.5 m Head	2	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-T3-2)	3 Lps @ 12 m Head	2	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-T3-3)	1.1 Lps @ 6 m Head	2	Circulators for Heat exchanger	✓
	Circulator Pumps (P-T3-4)	2.6 Lps @ 6 m Head	2	Circulators for Hot water storage tank	✓
	Expansion Tank (EX-T3-1)	300 Lps	1	Expansion tank for heating system	✓
	Hot Water Storage Tank (HWT-T3-1)	3000 Liter	1	Vertical Type Hot Water Storage Tank of 2.6 Lps flow	✓
	Heat Exchanger (HEX-T3-1)	115.4 Kw	1	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
Piping System & Insulation	Black Steel	-	-	Dia 25mm to Dia 160mm	✓
	Galvanized Steel	-	-	Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation	-	-	15mm to 65 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure	-	-	-	✓
	GSD-Low Pressure	-	-	-	✓
	Fiber Glass insulation	-	-	Blanket type/40 mm thick	✓
	VAV-1	0-230 Lps		With Thermostat	✓
	VAV-2	235-470 Lps		With Thermostat	✓
	VAV-3	475-660 Lps		With Thermostat	✓
	VAV-4	665-1040 Lps	10	With Thermostat	✓
	VAV-5	1045-1320 Lps	1	With Thermostat	✓
	VAV-6	1325-1890 Lps		With Thermostat	✓
Valves	Gate Valves	-	-	20mm to 125mm	✓
	Balancing Valves	-	-	20mm to 50mm	✓

Lebanese University Campus - Hadath**1.3.2.6 - Work Parcel 1 - List of HVAC Equipment**

Technical Areas-Bldg(T1,T2&T3)- O & M Ref: 1.5.1 - Set 13 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Valves	3 Way Valves	—	—	20mm	✓
	Globe Valves	—	—	20mm	✓

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1.3.2.6 - Work Parcel 1 - List of Plumbing Equipment

Technical Areas-Bldg(T1,T2&T3) - O & M Ref: 1.5.1 - Set 13 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Soft Water	Water Softener (WS-T3-1)	0.5 lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 36 L	✓
Drainage	Submersible Pump (P-T3-52)	3.45 lps @ 9 m head	2	One acting as standby	✓
Drainage	Submersible Pump (P-T3-53)	3.5 lps @ 8 m head	2	One acting as standby	✓
	Submersible Pump SP-T1		2	One acting as standby	✓
Hot Water	Circulator pumps (P-T3-51)	1.6 l lps @ 9.06 m head	2	Hot Water storage tank circulator pumps one acting as stand by	✓
	EWI-T-1	200 Liter	1		✓
	EWI-T1	200 Liters	1		✓
Piping System & Insulation	PVC			16mm to 50mm DN	✓
	Copper			15mm to 54 mm DN	✓
	Cast Iron			75mm to 110mm DN	✓
	Polypropylene			50mm to 110mm DN	✓
	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓
	Fiber Glass Insulation			25mm to 67mm thickness	✓

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1.3.2.6 - Work Parcel 1 - List of Plumbing Equipment

Technical Areas-Bldg(T1,T2&T3) - O & M Ref: 1.5.1 - Set 13 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Valves	Ball Valves			15mm to 40mm	✓
	Globe Valves			15mm to 40mm	✓
	Gate Valves			25mm to 200mm	✓
Sanitary Fixtures & Accessories	Drinking Fountain				✓
	Lavatory Mixer LAV-1				✓
	Lavatory Tap LAV-2				✓
	Lavatory Mixer LAV-3				✓
	Sink Mixer				✓
	Sink Tap				✓
	Mop Sink Tap				✓
	Shower Mixers				✓
Sanitary Fixtures & Accessories	Bib Cock Perineal Hose				✓
	Angle Valves/Flexibles				✓
	WC Flush Valves				✓
	Urinal Flush Valves				✓
	Flush Tanks				✓
	Hand Dryers				✓
	Liquid Soap Dispensers				✓
	Paper Towel Dispenser				✓

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1.3.2.7 - Work Parcel 1 - List of HVAC Equipment

Restaurant & Functional Housing (Bldg U2)- O & M Ref: 1.5.1 - Set 15 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-U2-1)	15.6 T.R	1	Constant Air Volume AHU with Supply air flow 2970 lps, External Static pressure 248 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-U2-2)	54 T.R	1	Constant Air Volume AHU with Supply air flow 6975 lps, External Static pressure 332 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-U2-3)	112 T.R	1	Constant Air Volume AHU with Supply air flow 14685 lps, External Static pressure 233.4 Pa, with 2 coils (heating / cooling)	✓
	Fan Coil Unit (FCU-U2-1)	3 T.R	8	Horizontal concealed type FCU, 705 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-U2-1A)	1.5 T.R	2	Horizontal concealed type FCU, 355 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-U2-2)	2 T.R	11	Horizontal concealed type FCU, 550 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-U2-3)	1 T.R	21	Horizontal concealed type FCU, 325 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-U2-4)	3 T.R	1	Horizontal concealed type FCU, 780 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-U2-4A)	1.5 T.R	2	Horizontal concealed type FCU, 390 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
Ventilation	(F-U2-1)	100 Lps @ 105 Pa	7	Roof type fan	✓
	(F-U2-2)	208 Lps @ 100 Pa	1	Roof type fan	✓
	(F-U2-3)	120 Lps @ 113 Pa	8	Roof type fan	✓
	(F-U2-4)	480 Lps @ 126 Pa	1	Roof type fan	✓
	(F-U2-5)	97 Lps @ 104 Pa	1	Roof type fan	✓
	(F-U2-6)	2060 Lps @ 159 Pa	1	Roof type fan	✓

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1.3.2.7 - Work Parcel 1 - List of HVAC Equipment

Restaurant & Functional Housing (Bldg U2)- O & M Ref: 1.5.1 - Set 15 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	(F-U2-7)	2020 Lps @ 290 Pa	1	Roof type fan	✓
	(F-U2-8)	3600 Lps @ 191 Pa	1	Fire rated roof type fan	✓
	(F-U2-9)	1050 Lps @ 138 Pa	1	Roof type fan	✓
	(F-U2-10)	183 Lps @ 109 Pa	1	Roof type fan	✓
	(F-U2-11)	150 Lps @ 137 Pa	1	Roof type fan	✓
	(F-U2-12)	71 Lps @ 97 Pa	1	Roof type fan	✓
	(F-U2-13)	167 Lps @ 113 Pa	1	Roof type fan	✓
	(F-U2-14)	243 Lps @ 77 Pa	1	Roof type fan	✓
	(F-U2-15)	71 Lps @ 97 Pa	1	Roof type fan	✓
	(F-U2-16)	167 Lps @ 113 Pa	1	Roof type fan	✓
	(F-U2-17)	66 Lps @ 100 Pa	1	Roof type fan	✓
	(F-U2-18)	689 Lps @ 124 Pa	1	In Line Centrifugal fan	✓
	(F-U2-19)	960 Lps @ 127 Pa	1	In Line Centrifugal fan	✓
	(F-U2-20)	4000 Lps @ 189 Pa	1	In Line Centrifugal fan	✓
	(F-U2-21)	965 Lps @ 105 Pa	1	In Line Centrifugal fan	✓
	(F-U2-22)	355 Lps @ 137 Pa	1	Roof type fan	✓
	(F-U2-23)	2200 Lps @ 128 Pa	1	Propeller type fire rated fan	✓
	(F-U2-24)	10515 Lps @ 167 Pa	1	Centrifugal fan	✓
	(F-U2-25)	220 Lps @ 120 Pa	1	Roof type fan	✓
	(F-U2-26)	244 Lps @ 128 Pa	1	In Line Centrifugal fan	✓
	(F-U2-27)	720 Lps @ 133 Pa	1	In Line Centrifugal fan	✓
	(F-U2-29)	1660 Lps @ 144 Pa	1	In Line Centrifugal fan	✓
	(F-U2-30)	600 Lps @ 118 Pa	1	Roof type fan	✓
	(F-U2-31)	63 Lps @ 45 Pa	1	Propeller type fan	✓
	(F-U2-32)	63 Lps @ 45 Pa	1	Propeller type fan	✓
	(F-U2-33)	70 Lps @ 40 Pa	1	Propeller type fan	✓

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1.3.2.7 - Work Parcel 1 - List of HVAC Equipment

Restaurant & Functional Housing (Bldg U2)- O & M Ref: 1.5.1 - Set 15 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Cooling	End Suction Pumps (P-U2-1)	31.58 Lps @ 26.5 m Head	2	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-U2-2)	12.52 Lps @ 27.52 m Head	2	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-U2-3)	5.5 Lps @ 13.2 m Head	2	Circulators for Heat exchanger	✓
	Circulator Pumps (P-U2-4)	1.5 Lps @ 13.8 m Head	2	Circulators for Hot water storage tank	✓
	Expansion Tank (EX-U2-1)	500 Lps	1	Expansion tank for heating system	✓
	Hot Water Storage Tank (HWST-U2-1)	1250 Liter	2	Vertical Type Hot Water Storage Tank of 0.75 Lps flow	✓
	Heat Exchanger (HEX-U2-1)	579.2 Kw	1	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
Cooling /Heating	split unit	12000 BTU/hr	1	TROPICAL GOLDEN STAR	✓
	split unit	18000 BTU/hr	7	CLIMASMART	✓
	split unit	24000 BTU/hr	2	CLIMASMART	✓
	split unit	30000 BTU/hr	2	CLIMASMART	✓
Piping System & Insulation	Black Steel			Dia 25mm to Dia 160mm	✓
	Galvanized Steel			Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation			15mm to 65 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure	-	-		✓
	GSD-Low Pressure	-	-		✓
	Fiber Glass insulation	-	-	Blanket type/40 mm thick	✓
	VAV-1	0-230 Lps	-	With Thermostat	✓
	VAV-2	235-470 Lps	-	With Thermostat	✓
	VAV-3	475-660 Lps	-	With Thermostat	✓
	VAV-4	665-1040 Lps	-	With Thermostat	✓
	VAV-5	1045-1320 Lps	-	With Thermostat	✓
	VAV-6	1325-1890 Lps	-	With Thermostat	✓
Valves	Gate Valves	-	-	65mm to 80mm	✓
	Ball Valves	-	-	25mm to 50mm	✓
	Balancing Valves	-	-	80mm	✓
	3 Way Valves	-	-	20mm	✓
	Globe Valves	-	-	20mm	✓

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1.3.2.7-Work Parcel 1- List of Plumbing Equipment

Restaurant & Functional Housing (Bldg U2)- O & M Ref: 1.5.1 - Set 15 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Soft Water	Water Softener (WS-U2-1)	0.5 lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm. & resin volume 36 L.	✓
Drainage	Submersible Pump (P-U2-52)	3.45 lps @ 9 m head	2	One acting as standby	✓
Hot Water	Circulator pumps (P-U2-51)	0.63 lps @ 24 m head	2	Hot Water storage tank circulator pumps one acting as stand by	✓
Piping System & Insulation	PVC			16mm to 50mm DN	✓
	Copper			15mm to 54 mm DN	✓
	Cast Iron			75mm to 110mm DN	✓
	Polypropylene			50mm to 110mm DN	✓
	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓
	Fiber Glass Insulation			25mm to 67mm thickness	✓
Valves	Ball Valves			15mm to 50mm	✓
	Gate Valves			110mm	✓
	Globe Valves			15mm	✓
Sanitary Fixtures & Accessories	Drinking Fountain				✓
	Lavatory Mixer LAV-1				✓
	Lavatory Tap LAV-2				✓
	Lavatory Mixer LAV-3				✓
	Sink Mixer				✓
	Sink Tap				✓
	Mop Sink Tap				✓
	Shower Mixers				✓
	Bathub Mixer				✓
	Jacuzzi Mixer				✓
	Bib Cock Perineal Hose				✓
	Angle Valves/Flexibles				✓
	WC Flush Valves				✓
	Urinal Flush Valves				✓
	Flush Tanks				✓
Sanitary Fixtures & Accessories	Hand Dryers				✓
	Liquid Soap Dispensers				✓
	Paper Towel Dispenser				✓

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1.3.2.8 - Work Parcel 1 - List of HVAC Equipment

Central Parking (Bldg U3) - O & M Ref: 1.5.1 - Set 14 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix.1.5.1
Ventilation	(F-U3-01A)	7995 Lps @ 192 Pa	1	Centrifugal type exhaust Fan	✓
	(F-U3-01B)	7995 Lps @ 192 Pa	1	Centrifugal type exhaust Fan	✓
	(F-U3-02)	5330 Lps @ 123 Pa	1	Propeller Fan	✓
	(F-U3-03)	4172 Lps @ 120 Pa	1	Propeller Fan	✓
	(F-U3-04)	18760 Lps @ 260 Pa	1	Centrifugal type exhaust Fan	✓
	(F-U3-05)	16800 Lps @ 282 Pa	1	Centrifugal type exhaust Fan	✓
	(F-U3-06)	18760 Lps @ 175 Pa	1	Centrifugal type exhaust Fan	✓
	(F-U3-07)	16800 Lps @ 175 Pa	1	Centrifugal type exhaust Fan	✓
	(EF-U30-1)	30 Lps @ 75 Pa	2	Roof extractor type fan	✓
	(EF-U30-2)	75 Lps @ 75 Pa	1	Roof extractor type fan	✓
	(EF-U30-3)	30 Lps @ 75 Pa	1	Roof extractor type fan	✓
Cooling/ Heating	Split system air conditioner (SSAC-9)	0.75 T.R	1	Heat pump,electric type,wall mounted mini splits	✓
	Split system air conditioner (SSAC-12)	1 T.R	2	Heat pump,electric type,wall mounted mini splits	✓
	Split system air conditioner (SSAC-18)	1.5 T.R	1	Heat pump,electric type,wall mounted mini splits	✓
cooling /heating	split unit	12000 BTU/hr	1	YORK	✓
	split unit	42000 BTU/hr	2	YORK	✓
Piping System & Insulation	Black Steel	-	-	Dia 25mm to Dia 160mm	✓
	Galvanized Steel	-	-	Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation	-	-	15mm to 65 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure	-	-	-	✓
	GSD-Low Pressure	-	-	-	✓
Valves	Gate Valves	-	-	20mm to 125mm	✓
	Balancing Valves	-	-	20mm to 50mm	✓
	3 Way Valves	-	-	20mm	✓
	Globe Valves	-	-	20mm	✓

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1.3.2.8 - Work Parcel 1 - List of Plumbing Equipment

Central Parking (Bldg U3) - O & M Ref:1.5.1 - Set 14 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Drainage	Submersible Pump (P-U3-51)	5 lps @ 7 m head	2	One acting as standby	✓
Piping System & Insulation	PVC			16mm to 50mm DN	✓
	Copper			15mm to 54 mm DN	✓
	Cast Iron			75mm to 110mm DN	✓
	Polypropylene			50mm to 110mm DN	✓
	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓
	Fiber Glass Insulation			25mm to 67mm thickness	✓
Valves	Ball Valves			15mm to 50mm	✓
	Gate Valves			65mm to 110mm	✓
	Y-Valves			80mm	✓

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1.3.2.9-Work Parcel 1- List of HVAC Equipment

Eastern Parking (Bldg V1) -O & M Ref: 1.5.1 - Set 14 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	F-V1-1	5700 Lps @ 100 Pa	2	Propeller Fan	✓
	F-V1-2	6800 Lps @ 100 Pa	2	Propeller Fan	✓
	F-V1-3	11390 Lps @ 200 Pa	2	Fire rated exhaust fan	✓
	F-V1-4	16800 Lps @ 180 Pa	2	Fire rated exhaust fan	✓
	F-V1-8	8880 Lps @ 100 Pa	4	Propeller Fan	✓
	F-V1-EX1	50 Lps @ 110 Pa	1	Centrifugal fan	✓
	F-V1-EX2	3000 Lps @ 150 Pa	2	Centrifugal fan	✓

Cooling /Heating	split unit	9000 BTU/hr	1	YORK	✓
	split unit	12000 BTU/hr	1	YORK	✓
	split unit	18000 BTU/hr	1	MDV	✓
	split unit	19000 BTU/hr	1	YORK	✓
	split unit	24000 BTU/hr	2	YORK	✓

Piping System & Insulation	Black Steel	-	-	Dia 25mm to Dia 160mm	✓
	Galvanized Steel	-	-	Dia 20mm to Dia 50mm	✓

Ducting System & Insulation	GSD- Medium Pressure	-	-	-	✓
	GSD-Low Pressure	-	-	-	✓

Valves	Gate Valves	-	-	20mm to 125mm	✓
	Balancing Valves	-	-	20mm to 50mm	✓
	3 Way Valves	-	-	20mm	✓
	Globe Valves	-	-	20mm	✓

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1.3.2.9-Work Parcel 1- List of Plumbing Equipment

Eastern Parking (Bldg V1)-O & M Ref: 1.5.1 - Set 14 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Drainage	Pump (P-V1-51)	2.6 lps @ 12 m head	2	Submersible	✓

Piping system	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓

Valves	Ball Valves			15mm to 40mm	✓
	Gate Valves				✓
	Globe Valves			15mm	✓

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1.3.2.10 - Work Parcel 1 - List of Plumbing Equipment

Water Tower-Bldg(V2)

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Piping	Ductile Iron			80 mm to 350 mm DN	✓
Valves	Ball Valves			80mm to 350 mm DN	✓
	Gate Valves			80mm to 350 mm DN	✓

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1.3.2.11 - Work Parcel 1 - List of HVAC Equipment

Main Pumping Station (Bldg V3)- O & M Ref:1.5.1 - Set 1 / Div 6

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	F-1	1250 Lps @ 75 Pa	1	Inline Centrifugal type exhaust Fan	✓
	F-2	460 Lps @ 75 Pa	2	Inline Centrifugal type exhaust Fan	✓
	F-3	1220 Lps @ 75 Pa	1	Inline Centrifugal type exhaust Fan	✓
	F-4	1890 Lps @ 75 Pa	1	Inline Centrifugal type exhaust Fan	✓
	F-5	75 CFM @ 60 Pa	1	Inline Centrifugal type exhaust Fan	✓
Cooling /Heating	Split Unit	35000 BTU/hr	2	YORK	✓
	Split Unit	48000 BTU/hr	1	MEDIA	✓
Piping System & Insulation	Black Steel	-	-	Dia 25mm to Dia 160mm	✓
	Galvanized Steel	-	-	Dia 20mm to Dia 50mm	✓
Ducting System & Insulation	GSD- Medium Pressure	-	-	-	✓
	GSD-Low Pressure	-	-	-	✓

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1.3.2.11 - Work Parcel 1 - List of Plumbing Equipment

Main Pumping Station (Bldg V3)- O & M Ref:1.5.1 - Set 1 / Div 6

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Drainage	Submersible Pump	15 lps @ 15 m head	2	One acting as standby	✓
Piping System & Insulation	PVC	—	—	16mm to 50mm DN	✓
	Ductile iron	—	—	80 mm to 350 mm DN	✓
	Cast Iron	—	—	75mm to 110mm DN	✓
	Polypropylene	—	—	50mm to 110mm DN	✓
	Galvanized Steel	—	—	20mm to 80mm DN	✓
	HDPE	—	—	50mm to 200mm DN	✓
	BSP	—	—	15mm to 42mm DN	✓
Valves	Ball Valves	—	—	20mm to 40mm	✓
	Pressure Relief Valves	—	—	50mm	✓
	Gate Valves	—	—	50mm	✓
Sanitary fixtures & accessories	Lavatory Mixer LAV-1	—	—	—	✓
	Emergency shower	—	—	—	✓
	Angle Valves/Flexibles	—	—	—	✓

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1.3.2.12 - Work Parcel 1 - List of HVAC Equipment

Utility Tunnel (Bldg V4)

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	(F-V4-1)	8160 Lps @ 75 Pa	5	Propeller	✓
	(F-V4-2)	8160 Lps @ 75 Pa	5	Propeller	✓
Piping System & Insulation	Black Steel			Dia 25mm to Dia 160mm	✓
	Galvanized Steel			Dia 20mm to Dia 50mm	✓
Ducting System & Insulation	GSD- Medium Pressure				✓
	GSD-Low Pressure				✓

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1.3.2.13 - Work Parcel 1 - List of HVAC Equipment

Underground Wester Parking and Central Catering - (Bldg X) - O & M Ref: 1.5.1 - Set 16 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Ventilation	F-X1-01	22660 Lps @ 255 Pa	1	Centrifugal Fan	✓
	F-X1-2	12978 Lps @ 254 Pa	1	Centrifugal Fan	✓
	F-X1-02	12450 Lps @ 230.8 Pa	1	Centrifugal Fan	✓
	F-X1-03	12980 Lps @ 302 Pa	1	Centrifugal Fan	✓
	F-X1-04	8800 Lps @ 255 Pa	1	Centrifugal Fan	✓
	F-X1-05	4330 Lps @ 82 Pa	3	Propeller	✓
	F-X1-06	7480 Lps @ 82 Pa	4	Propeller	✓
	F-X1-07	5280 Lps @ 82 Pa	4	Propeller	✓
	F-X2-01	22660 Lps @ 224.9 Pa	1	Centrifugal Fan	✓
	F-X2-03	12980 Lps @ 272.3 Pa	1	Centrifugal Fan	✓
	F-X2-04A	3365 Lps @ 133 Pa	1	In Line Centrifugal fan	✓
	F-X2-04B	3515 Lps @ 151 Pa	1	In Line Centrifugal fan	✓
	F-X2-05	1582 Lps @ 88 Pa	1	Roof type fan	✓
	F-X2-06A	4065 Lps @ 245.9 Pa	1	Smoke Exhaust Fan	✓
	F-X2-06B	3415 Lps @ 239 Pa	1	Smoke Exhaust Fan	✓
	F-X2-07	5675 Lps @ 191 Pa	1	Roof type fan	✓
	F-X2-10	3415 Lps @ 300 Pa	1	Smoke Exhaust Fan	✓
	F-X2-10A	2870 Lps @ 240 Pa	1	Smoke Exhaust Fan	✓
	F-X2-10B	3415 Lps @ 250 Pa	1	Smoke Exhaust Fan	✓
	F-X2-10D	2500 Lps @ 278 Pa	1	Smoke Exhaust Fan	✓
	F-X2-12A	628 Lps @ 93 Pa	1	Roof type fan	✓
	F-X2-12B	722 Lps @ 115 Pa	1	Roof type fan	✓
	F-X2-13	1587 Lps @ 140 Pa	1	Roof type fan	✓
	F-X2-16	497 Lps @ 40 Pa	1	Propeller Fan	✓

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1.3.2.13 - Work Parcel 1 - List of HVAC Equipment

Underground Wester Parking and Central Catering - (Bldg X) - O & M Ref: 1.5.1 - Set 16 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Cooling/Heating	Split Unit	12000 BTU/hr	1	YORK	✓
	Split Unit	18000 BTU/hr	4	YORK	✓
	Split Unit	18000 BTU/hr	1	CLIMASMART	✓
Heating	Circulator Pumps (P-X2-1)	14.4 Lps @ 19.7 m Head	2	Circulators for Hot water storage tank	✓
	Hot Water Storage Tank (HWST-X2-1)	7830 Liter	3	Horizontal Type Hot Water Storage Tank of 4.78 Lps flow	✓
Piping System & Insulation	Black Steel	—	—	Dia 25mm to Dia 160mm	✓
	Galvanized Steel	—	—	Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation	—	—	15mm to 65 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure	—	—	—	✓
	GSD-Low Pressure	—	—	—	✓
	Rock wool insulation	—	—	Blanket type/40 mm thick	✓
Valves	Gate Valves	—	—	110mm	✓
	Balancing Valves	—	—	20mm to 50mm	✓
	3 Way Valves	—	—	20mm	✓
	Globe Valves	—	—	20mm	✓

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1.3.2.13 - Work Parcel 1 - List of Plumbing Equipment

Underground Wester Parking and Central Catering - (Bldg X) - O & M Ref: 1.5.1 - Set 16 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Drainage	Submersible Pump (P-X2-53)	3.66 lps @ 12 m head	2	One acting as standby	✓
	Submersible Pump (P-X2-54)	3.1 lps @ 8 m head	2	One acting as standby	✓
	Submersible Pump (P-X2-55)	1.64 lps @ 7 m head	2	One acting as standby	✓
Hot Water	Circulator pumps (P-X2-52)	0.47 lps @ 12.9 m head	2	Hot Water storage tank circulator pumps one acting as stand by	✓

Piping System & Insulation	PVC	—	—	16mm to 50mm DN	✓
	Copper	—	—	15mm to 54 mm DN	✓
	Cast Iron	—	—	75mm to 110mm DN	✓
	Polypropylene	—	—	50mm to 110mm DN	✓
	Galvanized Steel	—	—	20mm to 80mm DN	✓
	HDPE	—	—	50mm to 200mm DN	✓
	BSP	—	—	15mm to 42mm DN	✓
	Fiber Glass Insulation	—	—	25mm to 67mm thickness	✓

Valves	Ball Valves	—	—	15mm to 50mm	✓
	Gate Valves	—	—	15mm	✓
	Globe Valves	—	—	15mm	✓

Sanitary Fixtures & Accessories	Drinking Fountain	—	—	—	✓
	Lavatory Mixer LAV-1	—	—	—	✓
	Lavatory Tap LAV-2	—	—	—	✓
	Lavatory Mixer LAV-3	—	—	—	✓
	Sink Mixer	—	—	—	✓
	Sink Tap	—	—	—	✓
	Mop Sink Tap	—	—	—	✓
	Shower Mixers	—	—	—	✓
	Bib Cock Perineal Hose	—	—	—	✓
	Angle Valves/Flexibles	—	—	—	✓
	WC Flush Valves	—	—	—	✓
	Urinal Flush Valves	—	—	—	✓
	Flush Tanks	—	—	—	✓
	Hand Dryers	—	—	—	✓
	Liquid Soap Dispensers	—	—	—	✓
	Paper Towel Dispenser	—	—	—	✓

Lebanese University Campus - Hadath**1.3.2.14- Work Parcel 1 - List of HVAC Equipment**

Army and security forces cabinets - (Bldg z)

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
cooling/heating	split unit	12000 BTU/hr	11	Tropical Golden Star	✓
	split unit	18000 BTU/hr	6	Tropical Golden Star	✓
	split unit	18000 BTU/hr	2	YORK	✓
	split unit	24000 BTU/hr	2	Tropical Golden Star	✓
	split unit	24000 BTU/hr	1	YORK	✓
	split unit	24000 BTU/hr	1	PETRA	✓

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in Appendix 1.5.1
Ventilation	ceiling fan	56"	5	multi speed (3) 220V	✓
	exhaust fan	280 m ³ /hr	7	MF 150/6 Punto Filo	✓

Lebanese University Campus - Hadath**1.3.2.14 Work Parcel 1 - List of PLUMBING Equipment**

Lebanese Army and Interior security forces cabinets - (Bldg 2)

System	Equipment	Capacity	Qty	Technical Description	Maintenance instruction provided in O&M Manuals listed in appendix 1.5.1
Domestic water system	Circulating Booster Pump	5 m3/h @ 4 Bar	2	One acting as standby	✗
Water Network	Pressure tank	300 liters	1	2.5->4.5 Bar	✗
	PVC tank	2000 liters	3	—	✗
Toilets	WC		14		✗
	Shower		14		✗
	Lavatory		15		✗