1. LIST OF SCHEDULES

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LIST OF SCHEDULES

Air Handling Unit Schedule

Tag	AHU-01	AHU-02	AHU-03
Location		Secondary Clarifier Room	Headworks
Area Served	Existing Building	Secondary Clarifier	Headworks
Type	Existing Custom	Heat Recovery	Heat Recovery (Explosion Proof)
Manufacturer	Silent Air	Venmar	Venmar
Model	Custom	HRV3000i	HRV6500i
Supply Fan			
Volume *(L/s)*		1750	1227 / 2455
ESP *(Pa)*		125	125
Fan Type			
Fan Speed (rpm)		1125	485 / 967
Motor Power *(kW)*		2.25	3.75
Power Supply		575/3/60	575/3/60
Return Fan			
Volume *(L/s)*		1750	1350 / 2700
ESP *(Pa)*		100	100
Fan Type			
Speed (rpm)		1100	500 / 1000
Motor Power *(kW)*		2.25	3.75
Power Supply		575/3/60	575/3/60
Minimum Outdoor Air (cfm)		100%	100%
Heat Recovery Section			
Outside Air Temp. (°C)		-42	-42
Exhaust Air Temp. (°C)		18	22
Leaving SA Temp. (°C)		-3.0	0.5
Heating Coil Section			
Type		Reheat	Reheat
Coil Capacity (kW)		*46.0*	*109.0*
EAT (°C)		-3.0	0.5
LAT (°C)		18.0	18.0
Max Face Velocity (m/s)		2.5	2.5
Media		50 / 50 Propylene Glycol / Water	50 / 50 Propylene Glycol / Water
Rows		2	2
Arrangement			
Supply Outlet			
Return Inlet			
Outdoor Air Inlet			
Relief Air Outlet			
Physical Data			
Overall Length *(mm)*			
Overall Width *(mm)*			
Overall Height *(mm)*			
Overall Weight *(kg)*			

LIST OF SCHEDULES

Fan Schedule

Tag	EF-01	EF-02	EF-03
Function	Aerobic Tank #1 Exhaust	Aerobic Tank #2 Exhaust	Anoxic Tank #1 Exhaust
Location			
Volume *(L/s)*	1560	1560	150
E.S.P. Press *(Pa)*	375	375	375
RPM			
Motor Power *(kW)*	1.12	1.12	0.375
Power Supply (V/Ph/Hz)	575/3/60	575/3/60	120/1/60
Drive	Belt	Belt	Belt
Type	In Line	In Line	In Line
Manufacturer	Greenheck	Greenheck	Greenheck
Model	BDF 100	BDF 100	CSP 228
Control	Continuous	Continuous	Continuous
Accessories & Remarks			

Exhaust Air Fan Schedule

Tag	EF-04	VF-01	
Function	Anoxic Tank #2 Exhaust	Electrical Room & Generator Room Ventilation	
Location		Clarifier Room	
Volume *(L/s)*	150	1000	
E.S.P. Press *(Pa)*	375	250	
RPM		1041	
Motor Power *(kW)*	0.375	0.75	
Power Supply (V/Ph/Hz)	120/1/60	575/3/60	
Drive	Belt	Belt	
Type	In Line	In Line	
Manufacturer	Greenheck	Greenheck	
Model	CSP 228	BDF 100	
Control	Continuous	Cooling Thermostat	
Accessories & Remarks		Inlet filter	

LIST OF SCHEDULES

Unit Heater and Cabinet Unit Heater Schedule

Tag	UH-09	UH-10	UH-11	UH-12	UH-13	UH-14
Location	Headworks Lower Fl.	Headworks Lower Fl.	SPARE	Headworks Upper Fl.	Clarifier Room	Clarifier Room
Heating Medium	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.		50 / 50 Prop. Gly.	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.
Capacity *(kW)*						
Liquid Entering Temp *(°C)*	88	88		88	88	88
Liquid Leaving. Temp *(°C)*	77	77		77	77	77
Design Liquid Flow *(L/s)*						
Liquid P.D. *(kPa)*						
Air Flow *(L/s)*						
RPM						
Motor Power *(W)*						
Power Supply (V/Ph/Hz)	120/1/60	120/1/60		120/1/60	120/1/60	120/1/60
Arrangement	Horizontal	Horizontal		Horizontal	Horizontal	Horizontal
Manufacturer	Engineered Air	Engineered Air		Engineered Air	Engineered Air	Engineered Air
Model						
Accessories & Remarks	Exp. proof motor	Exp. proof motor		Exp. proof motor		

LIST OF SCHEDULES

Tag	UH-15	UH-16	UH-17	UH-18	UH-19	
Location	Clarifier Room	Clarifier Room	Clarifier Room	Clarifier Mech. Rm.	Electrical Room	
Heating Medium	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.	50 / 50 Prop. Gly.	
Capacity *(kW)*						
Liquid Entering Temp *(°C)*	88	88	88	88	88	
Liquid Leaving. Temp *(°C)*	77	77	77	77	77	
Design Liquid Flow *(L/s)*						
Liquid P.D. *(kPa)*						
Air Flow *(L/s)*						
RPM						
Motor Power *(W)*						
Power Supply (V/Ph/Hz)	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60	
Arrangement	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	
Manufacturer	Engineered Air	Engineered Air	Engineered Air	Engineered Air	Engineered Air	
Model						
Accessories & Remarks						

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Boiler Schedule

Tag	B-03	B-04	
Manufacturer	Weil McLain	Weil McLain	
Model	BL788WF	BL788WF	
Heating Input *(kW)*	599.3	599.3	
Rated Heating Output *(kW)*	478.3	478.3	
EGT *(°C)*	77	77	
LGT *(°C)*	88	88	
Flow Rate *(L/s)*	12.1	12.1	
Heating Media	50 / 50 Propylene Glycol / Water	50 / 50 Propylene Glycol / Water	
Electrical (V/ph/Hz)	120/1/60	120/1/60	
Motor *(kW)*	0.56	0.56	
Remarks			

Convector and Radiator Schedule

Tag	WF-1		
Location	Various		
Fluid Entering Temp *(°C)*	88		
Fluid Temperature Drop *(°C)*	11		
No. of Rows/Passes	2 @ 305 O/C		
Height *(mm)*	610		
Capacity *(kW/m)*	1.671		
Type	Wall fin radiation		
Manufacturer	Engineered Air		
Model	WF-1A		
Accessories & Remarks			

NOTE: Capacities shown are actual capacities using 50% propylene glycol.

Tank Schedule

Tag	TK-01	TK-02	TK-03
Service	Glycol Fill Tank	Glycol Expansion Tank	Fuel Storage Tank
Location	Upper Floor Mechanical Room	Upper Floor Mechanical Room	Outside Building
Type	Custom Atmospheric	Expansion Tank	Double Walled
Capacity *(litre)*	170		10,000
Diameter *(mm)*	500		3070
Height/Length *(mm)*	1150		1524
Manufacturer		Expanflex	Durex
Model			VAGST-F
Accessories & Remarks			C/w access stair and landing. See specifications and drawings for additional details.

Tag	TK-04	TK-05	
Service	Fuel Day Tank	Effluent Water Pressure Tank	
Location	Upper Floor Mechanical Room	Existing Mechanical Room	
Type	Atmospheric Steel	Expansion Tank	
Capacity *(litre)*	1135	307	
Diameter *(mm)*	585 (oval width)	533	
Height/Length *(mm)*	1195 / 1830	1575	
Manufacturer	Westeel	Myers	
Model	250	WR240	
Accessories & Remarks	See specifications and drawings for additional details.	30 mm system connection	

Pump Schedule

Tag	P-07	P-08	P-09	P-10
Function	Sump Pump	Sump Pump	Glycol Heating	Glycol Heating
Location	Cake Bin Room Sump	Cake Bin Room Sump	Clarifier Mechanical Room	Clarifier Mechanical Room
Type	Submersible	Submersible	In-line	In-line
Impeller	Cast Iron	Cast Iron		
Casing	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Medium Pumped	Waste Water	Waste Water	Heating Glycol	Heating Glycol
Design Pressure *(kPa)*				
Max. Operating Temp. *(°C)*	60	60	150	150
RPM	1750	1750		
Design Flow Rate *(L/S)*	3.75	3.75	12.1	12.1
Discharge Head *(kPa)*	65	65	104.5	104.5
Suction/Discharge Sizes *(mm)*	50	50		
Motor Power *(kW)*	0.45	0.45	2.25	2.25
Power Supply (V/ph/Hz)	120/1/60	120/1/60	575/3/60	575/3/60
Manufacturer	Hydromatic	Hydromatic	Armstrong	Armstrong
Model	SK60	SK60		
Remarks	Connect to existing control panel with P-08.	Connect to existing control panel with P-07.		

LIST OF SCHEDULES

Tag	P-11	P-12	P-13	P-14
Function	Sump Pump	Sump Pump	Sump Pump	Sump Pump
Location	Headworks Sump	Headworks Sump	Clarifier Sump	Clarifier Sump
Type	Submersible Explosion Proof	Submersible Explosion Proof	Submersible	Submersible
Impeller				
Casing				
Medium Pumped	Screenings	Screenings	Waste Water	Waste Water
Design Pressure *(kPa)*				
Max. Operating Temp. *(°C)*				
RPM				
Design Flow Rate *(L/S)*				
Discharge Head *(kPa)*				
Suction/Discharge Sizes *(mm)*				
Motor Power *(kW)*				
Power Supply (V/ph/Hz)			120/1/60	120/1/60
Manufacturer	Myers	Myers	Myers	Myers
Model				
Remarks	Provide control panel with P-12	Provide control panel with P-11	Provide control panel with P-14	Provide control panel with P-13

LIST OF SCHEDULES

Tag	P-15	P-16	P-17	P-18
Function	Fuel Oil Pump	Fuel Oil Pump	Effluent Water Booster Pump	Effluent Water Booster Pump
Location	Clarifier Room	Clarifier Room	Upper Floor Mechanical Room	Upper Floor Mechanical Room
Type	Positive Displacement	Positive Displacement	Vertical In Line	Vertical In Line
Impeller			304 Stainless	304 Stainless
Casing			304 Stainless	304 Stainless
Medium Pumped	Fuel Oil	Fuel Oil	Filtered Effluent Water	Filtered Effluent Water
Design Pressure *(kPa)*			1725	1725
Max. Operating Temp. *(°C)*			120	120
RPM			3450	3450
Design Flow Rate *(L/S)*			4.05	4.05
Discharge Head *(kPa)*			586	586
Suction/Discharge Sizes *(mm)*			50	50
Motor Power *(kW)*			3.75	3.75
Power Supply (V/ph/Hz)			575/3/60	575/3/60
Manufacturer	Viking	Viking	Myers	Myers
Model			MV8-50	MV8-50

LIST OF SCHEDULES

Tag	P-19			
Function	Effluent Water Booster Pump			
Location	Upper Floor Mechanical Room			
Type	Vertical In Line			
Impeller	304 Stainless			
Casing	304 Stainless			
Medium Pumped	Filtered Effluent Water			
Design Pressure *(kPa)*	1725			
Max. Operating Temp. *(°C)*	120			
RPM	3450			
Design Flow Rate *(L/S)*	4.05			
Discharge Head *(kPa)*	586			
Suction/Discharge Sizes *(mm)*	50			
Motor Power *(kW)*	3.75			
Power Supply (V/ph/Hz)	575/3/60			
Manufacturer	Myers			
Model	MV8-50			

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Air Outlet Schedule

Type	Description	Manufacturer	Model
S-1	600 mm Square cone ceiling diffuser, steel construction, lay-in inverted T-bar ceiling or surface mounted, off-white baked enamel finish.	E.H. PRICE	SIZE/SCD/31/3C/B13
S-2	Louvred face supply air grille, extruded aluminum construction, sidewall mounted, off-white baked enamel finish	E.H. PRICE	SIZE/22D/C/L/A/B13
S-3	Heavy duty aluminum supply grille c/w 76 mm deep extruded aluminum air foil blades. Aluminum finish.	E.H. PRICE	SIZE/302/S/A/B15
R-1	Egg Crate return/transfer air grille, extruded aluminum border and frame, sidewall/ ceiling mounted, off-white baked enamel finish.	E.H. PRICE	SIZE/80A/F/A/B13
E-1	Heavy duty exhaust grille, extruded aluminum construction, drywall or duct mounted, off-white baked enamel finish.	E.H. PRICE	SIZE/97/S/A/B13

END OF SECTION

DIVISION 16
ELECTRICAL

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DIVISION 16 - ELECTRICAL

1. GENERAL

1.1 Work Included

.1 Complete and operational electrical system as required by the drawings and as herein specified.

1.2 Related Work

.1	General Requirements:	Division 01
.2	Site Work:	Division 02
.3	Concrete:	Division 03
.4	Doors and Windows:	Division 08
.5	Finishes:	Division 09
.6	Specialties:	Division 10
.7	Process Equipment:	Division 11
.8	Mechanical:	Division 15
.9	Instrumentation and Control	Division 17

1.3 Drawings and Specifications

.1 The General Conditions, Supplementary Conditions and Division 01 are a part of this specification and shall apply to this Division.

.2 The intent of the drawings and specifications is to include all labour, products and services necessary for complete work, tested and ready for operation.

.3 Symbols used to represent various electrical devices often occupy more space on the drawing than the actual device does when installed. In such instances, do not scale locations of devices from electrical symbols. Install these devices with primary regard for usage of wall space, convenience of operation and grouping of devices.

.4 These specifications and the drawings and specifications of all other divisions shall be considered as an integral part of the accompanying drawings. Any item or subject omitted from either the specifications or the drawings but which is mentioned or reasonably specified in and by the others, shall be considered as properly and sufficiently specified and shall be provided.

.5 Provide all minor items and work not shown or specified but which are reasonably necessary to complete the Work.

.6 If discrepancies or omissions in the drawings or specifications are found, or if the intent or meaning is not clear, advise the Consultant for clarification before submitting tender.

.7 Responsibility to determine which Division provides various products and work rests with the Contractor. Additional compensation will not be considered because of differences in interpretation of specifications.

1.4 Quality Assurances

.1 Codes, Rules, Permits & Fees

.1 Comply with all laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to this work.

.2 Comply with all rules of the Canadian Electrical Code, CSA Standard C22.1 and the applicable building codes. Do Overhead Lines in accordance with CAN/CSA-C22.3 No. 1 and Underground Systems in accordance with CAN/CSA-C22.3 No. 7 except where specified otherwise.

.3 Quality of work specified and/or shown on the drawings shall not be reduced by the foregoing requirements.

.4 Immediately after award of contract and prior to installation, verify location, arrangement and point of attachment for service and service entrance equipment with supply authority and inspection departments. Failure to do so will render this Division responsible for any corrections necessary without additional compensation.

.5 Give all required notices, submit drawings, obtain all permits, licenses and certificates and pay all fees required for this work.

.6 Furnish a Certificate of Final Inspection and approvals from inspection authority to the Consultant.

.2 Standard of Workmanship:

.1 Execute all work in a competent manner and to present an acceptable appearance when completed.

.2 Employ a competent supervisor and a sufficient number of licensed tradesmen to complete the Work in the required time.

.3 Arrange and install products to fit properly into designated building spaces.

.4 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

1.5 Submittals

.1 Within 30 days of award of contract, the contractor shall submit a completed equipment procurement schedule which lists the manufacturer and model of equipment, indicating the projected ordering, shop drawing submittal date and delivery dates of all products to meet the required construction schedule.

.2 Submit samples as required where specified in Division 16.

.3 Prior to delivery of any products to job site and sufficiently in advance of requirements to allow ample time for checking, submit shop drawings for review as specified in Division 01. Submit shop drawings for all equipment as required in each section of this specification.

.4 Prior to submitting the shop drawings to the Consultant, the Contractor shall review the shop drawings to determine that the equipment complies with the requirements of the specifications and drawings.

.5 The term "shop drawing" means drawings, diagrams, illustrations, schedules, performance characteristics, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

Indicate materials, methods of construction and attachment of support wiring, diagrams, connections, recommended installation details, explanatory notes and other information necessary for completion of Work. Where equipment is connected to other equipment, indicate that such items have been coordinated, regardless of the section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

Adjustments made on shop drawings by the Consultant are not intended to change the contract price. If adjustments affect the value of the work state such in writing to the Consultant prior to proceeding with the Work.

.6 Manufacture of products shall conform to revised shop drawings.

.7 Keep one complete set of shop drawings at job site during construction.

1.6 Record Drawings

.1 The Contractor shall keep one complete set of white prints at the site office, including all addenda, change orders, site instructions, clarifications and revisions for the purpose of record drawings. As the work on site proceeds, the Contractor shall clearly record in Red Pencil all as-built conditions which deviate from the original contract documents. Record drawings to include circuiting of all devices, conduit and feeder runs (complete with conductor size and number) and locations of all electrical equipment.

.2 Prior to substantial performance, the contractor shall obtain CAD files of all electrical drawings, using AutoCAD Release 2005 and use the services of a competent CAD operator to transfer all as-built information, including: Addenda, Change Orders, Clarifications,

Revisions, Site Instructions and shop drawings. Upon completion, the contractor shall certify, in writing, that the as-built record drawings are complete and that they accurately indicate all electrical services, including exposed as well as concealed items.

.3 Contractor to forward letter of certification and as-built CAD drawings to the Consultant for final review. As-Built drawings to be submitted in the form of one set of CAD files on CD-R and one set of mylar reproducible sepias.

.4 The Contractor is to include all cost for the production of the record drawings.

1.7 Operation and Maintenance Manuals

.1 Reference requirements for Operation and Maintenance Manuals as described in Section 01730

.2 Each section of the manual shall contain the following information:

.1 Descriptive and technical data.

.2 Maintenance and operating instructions for all electrical equipment and controls. (These operating instructions need not be manufacturer's data but may be typewritten instructions in simple language to guide the Owner in the proper operation and maintenance of his installation.)

.3 Lubricating and servicing intervals recommended.

.4 A copy of all wiring diagrams complete with wire coding.

.5 List of spare parts of all electrical equipment complete with names and addresses of sales, service representatives and suppliers.

.6 Copy of test data.

.7 A motor list showing each motor number, name, horsepower, full load amps, overload settings, nameplate, current rating, heater size and type, and current being drawn, on the form specified in Section 16970.

.8 Include type and accuracy of instruments used to obtain test data.

.9 Copy of final inspection certificate.

.10 Copy of the purchase order, showing equipment make and model numbers issued to the manufacturer complete with all addenda . All cost details may be hidden.

.11 Copy of all warranty certificates.

.12 Set of final reviewed Shop Drawings.