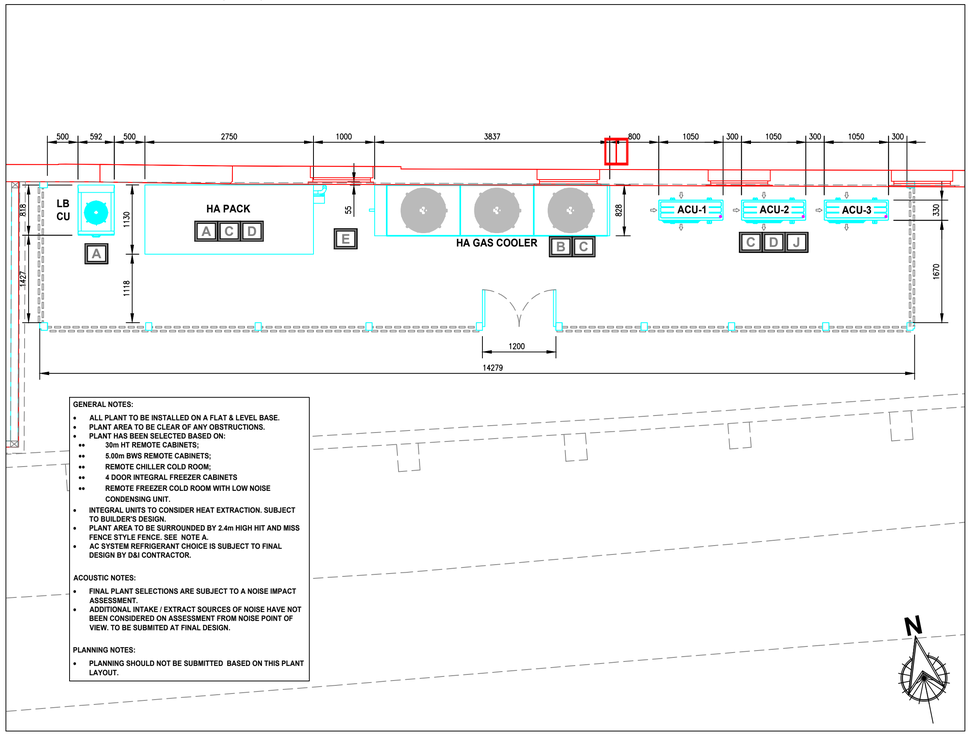
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DO NOT SCALE FROM THIS DRAWING.

GROUND FLOOR LEVEL (1:50)



GENERAL NOTES:

- ALL PLANT TO BE INSTALLED ON A FLAT & LEVEL BASE.
- PLANT AREA TO BE CLEAR OF ANY OBSTRUCTIONS.
- PLANT HAS BEEN SELECTED BASED ON:
  - 30m HT REMOTE CABINETS;
  - 5.00m BWS REMOTE CABINETS;
  - REMOTE CHILLER COLD ROOM;
  - 4 DOOR INTEGRAL FREEZER CABINETS
  - REMOTE FREEZER COLD ROOM WITH LOW NOISE CONDENSING UNIT.
- INTEGRAL UNITS TO CONSIDER HEAT EXTRACTION. SUBJECT TO BUILDER'S DESIGN.
- PLANT AREA TO BE SURROUNDED BY 2.4m HIGH HIT AND MISS FENCE STYLE FENCE. SEE NOTE A.
- AC SYSTEM REFRIGERANT CHOICE IS SUBJECT TO FINAL DESIGN BY D&I CONTRACTOR.

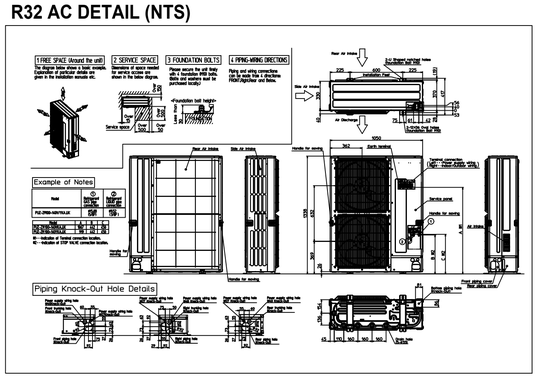
ACOUSTIC NOTES:

- FINAL PLANT SELECTIONS ARE SUBJECT TO A NOISE IMPACT ASSESSMENT.
- ADDITIONAL INTAKE / EXTRACT SOURCES OF NOISE HAVE NOT BEEN CONSIDERED ON ASSESSMENT FROM NOISE POINT OF VIEW. TO BE SUBMITED AT FINAL DESIGN.

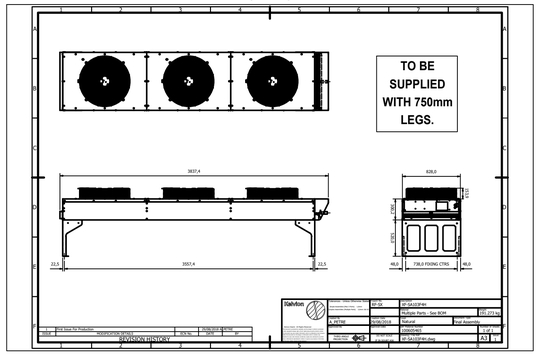
PLANNING NOTES:

- PLANNING SHOULD NOT BE SUBMITTED BASED ON THIS PLANT LAYOUT.

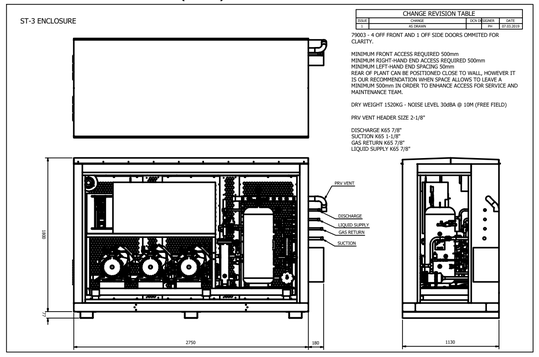
R32 AC DETAIL (NTS)



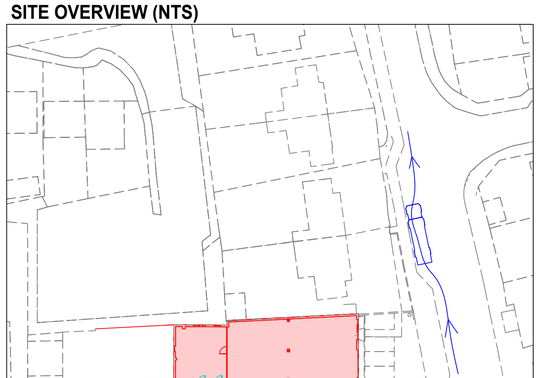
R744 GAS COOLER DETAIL (NTS)



R744 PACK DETAIL (NTS)



SITE OVERVIEW (NTS)



R744 PLANT ENGINEERING SCHEDULES

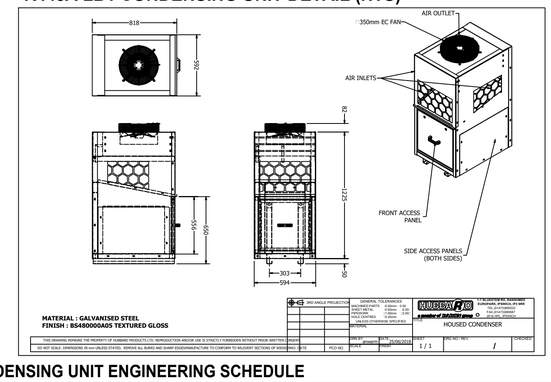
Plant Supplier	[-]	Space Engineering	**Pack Evaporator Capacity**	[kW]	36.95 (HT) / 0 (LT)
Pack Model Reference	[-]	ST-3A	**Refrigerant**	[-]	R744
Primary Pack controller	[-]	RDM -PR0650	**Total Refrigerant Charge**	[kg]	TBC
Full Back-Up Pack controller	[-]	RDM -PR0650	**PED Category**	[-]	IV

		Day Time HT	Day Time LT	Night Time HT	Night Time LT		Day Time	Night Time
Required evaporator capacity	[kW]	29.40	-	20.58	-	Gas Cooler Sound Pressure Level @10m	[dB(A)]	24	24
Lowest Evaporating Temperature	[°C]	-5	-	-	-	Pack Sound Level Pressure Level @ 10m	[dB(A)]	30	30
Suction Pressure Penalty	[K]	1	-	-	-				
Suction Saturated Temperature	[°C]	-6	-	-	-	Design Low Pressure	[Bar]	60	
Suction Usefull Superheat	[K]	10	-	-	-	Design Intermediate Pressure	[Bar]	60	
Suction Non-Usefull Superheat	[K]	10	-	-	-	Design High Pressure	[Bar]	120	

Ambient Temperature	[°C]	35	15	Pack Type	[-]	Housed Standard
Intermediate Pressure (+5 °C)	[Bar]	39.69	39.69	Pack Dimensions	[mm]	2750 (W) x 1130 (D) x 1877 (H)
Discharge Pressure Penalty	[K]	1	1	Pack Weight	[kg]	1520
Gas Cooler Absolute Pressure	[Bar]	95.2	61.38	Pack Location	[-]	External Plant Area
Gas Cooler Outlet Temperature	[°C]	37	23	Receiver Capacity	[L]	60
Total Heat Rejection	[kW]	62.15	43.50	Receiver Location	[-]	Pack

Gas Cooler Manufacturer	[-]	Kelvion		Application	[-]	**HT**	**LT**
Gas Cooler Model	[-]	GF-SA103F4H-063M		Compressor	[-]	Emerson Stream	N/A
Gas Cooler Location	[-]	External Plant Area		Lead Compressor	[-]	4MTL-07_[INV]	N/A
Number of Fans	[pc.]	3		Quantity	[pc.]	1	N/A
Fan Diameter	[mm]	630		Inverter Frequency	[Hz]	50	50
Start Current per Fan	[A]	0.3		Compressor Capacity	[kW]	13.07	N/A
Full Load Current per Fan	[A]	0.3		Evaporator Capacity	[kW]	12.38	N/A
Electrical Connection	[V/ph/Hz]	380/3/50		Compressor Mass Flow	[kg/s]	0.0913	N/A
Refrigerant Charge	[kg]	5.95		Power Input	[kW]	7.87	N/A
Length	[mm]	3924		Running Current	[A]	14.84	N/A
Width	[mm]	828		Maximum Operating Current	[A]	17.50	N/A
Height	[mm]	1220		Heat Rejection	[kW]	20.94	N/A
Leg Height	[mm]	750					
Fin Material	[-]	AlMg		Secondary Compressor(s)	[-]	4MTL-07	N/A
Pipe Connections	[“]	(1-1/8) / (1-1/8)		Quantity	[pc.]	2	N/A
Wet Weight	[kg]	201.95		Drive Frequency (per unit)	[Hz]	50	N/A
Maximum Rotation	[rpm]	1140		Compressor Capacity (per unit)	[kW]	12.97	N/A
External Static Pressure	[Pa]	0		Evaporator Capacity (per unit)	[kW]	12.29	N/A
Nominal Capacity	[kW]	61.7	41.3	Compressor Mass Flow (per unit)	[kg/s]	0.0906	N/A
Required Rotation	[rpm]	430	430	Power Input (per unit)	[kW]	7.64	N/A
Air Flow	[m3/s]	3.6	3.6	Running Current (per unit)	[A]	13.04	N/A
Control Voltage	[V]	4	4	Maximum Operating Current (per unit)	[A]	17.50	N/A
RDM Reduction	[%]	60	60	Heat Rejection (per unit)	[kW]	20.61	N/A

R448A LB1 CONDENSING UNIT DETAIL (NTS)



R448A CONDENSING UNIT ENGINEERING SCHEDULE

Condensing Unit - Single Temperature (LB)

Pack Supplier	Hubbard	**Day Time Ambient Temp. (°C)**	35°C	**Night Time Ambient Temp. (°C)**	26°C	**SST (°C)**	-31 LT	**Refrigerant**	R448A Mid Point
Pack Model	Low Noise CU	**Day Time Condensing Temp. (°C)**	43°C	**Night Time Condensing Temp. (°C**	37°C	**Suction Line Penalty (K)**	1	**New/Existing**	New
Pack Controller	RDM	**Day Time Pack THR: (kW)**	5.43	**Night Time Pack THR (kW)**	3.801	**Pack Capacity (kW)**	2.65 (LT)	**Installation Date**	TBC

Comp No.	Compressor Model	Compressor Manufacturer	New/ Existing	Compressor Capacity (kW)	Design Current (A)	Full Load Current (A)	Power Input (kW)	THR (kW)	Electrical Connection	Housed or Unhoused?	Length (mm)	Width (mm)	Height (mm)	Weight (Kg)	Sound Pressure Level Day @ 10m dB(A)	Sound Pressure Level Night @ 10m dB(A)	PED Category
LT Compressors																	
1	ZF13K4E-TFD	Copeland	New	2.65	5.61	8.00	2.75	5.43	380 / 3 / 50	Housed	592	818	1357	TBC	23	18	III
			LT Compressor Totals	**2.65**	-	-	-	**5.43**									

Refrigerant : R32

Note: Only engineers who have been trained in the safe handling and use of mildly flammable A2L refrigerants should work on this system

- Work on this system in a well ventilated area or outside
- Use a local leak detector to indicate if there is refrigerant in the air around the system before and during work on this system (place it at low level - R32 is heavier than air)
- Ensure there are no sources of ignition (flames or sparking electrical components) with 3M (10 ft) of your working area, however, this can be reduced should there be sufficient air movement
- If replacing components, use like for like replacements
- Take great care when brazing to ensure all refrigerant has been removed from the system

Use refrigerant grade R32

R32 AC UNIT ENGINEERING SCHEDULE

Air Conditioning - Outdoor Units (Pipework to be pressure tested to 41.5Bar Tightness and 45.7Bar Strength)

System Ref	Model	Manufacturer	New/ Existing	Type	Position	Max Current (A)	Start Current (A)	Electrical Connections	Running Load (A)	FUSE RATING (A)	Refrigerant Charge (kg)	Minimal Room Area (m2)	Connections (S / L)	Maximum Working Pressure (Bar)	Length (mm)	Width (mm)	Height (mm)	Net Weight (kg)	Air Flow (m3/s)	External Maximum Static Pressure (Pa)	Noise Pressure Level (dBA @ 1m)	Refrigerant
ACU-1	PUZ-ZM140YKA	Mitsubishi Electric	New	Power Inverter 3ph	External Plant Area	13.7	6	380-415V / 50HZ / 3ph	5.34 (Cooling) 6.27 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	131	2	0	50 (Cooling) 52 (Heating)	R32
AcU-2	PUZ-ZM140YKA	Mitsubishi Electric	New	Power Inverter 3ph	External Plant Area	13.7	6	380-415V / 50HZ / 3ph	5.34 (Cooling) 6.27 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	131	2	0	50 (Cooling) 52 (Heating)	R32
ACU-3	PUZ-ZM140YKA	Mitsubishi Electric	New	Power Inverter 3ph	External Plant Area	13.7	6	380-415V / 50HZ / 3ph	5.34 (Cooling) 6.27 (Heating)	16	4	N/A	(5/8") / (3/8")	41.5	1050	370	1338	131	2	0	50 (Cooling) 52 (Heating)	R32

PLEASE NOTE
R32
REFRIGERANT USED ON THIS SITE

PLEASE NOTE
CO_2 (R744)
REFRIGERANT USED ON THIS SITE

NOTE:
FOR FULL DETAIL OF REFRIGERATION AND AIR CONDITIONING COMPLIANCE REFER TO THE LATEST CO-OPERATIVE SPECIFICATION

0 1 2 3 4 5
METRES 1:50

ALL WORK TO COMPLY WITH THE LATEST CO-OP REFRIGERATION SPECIFICATION

PLANT NOTES

A — PLANT - COMPRESSOR PACK AND LIQUID RECEIVER
- COMPRESSOR PACKS SHALL COMPRISE OF COMPRESSORS, LIQUID RECEIVER, OIL SEPARATOR AND CONTROL PANEL WITH INTEGRATED ROM CONTROL SYSTEM, DISCHARGE PIPE WORK, SUCTION PIPE WORK WITH SUCTION FILTER(S) AND ALL INTERCONNECTING PIPE WORK AND SHUT OFF VALVES REQUIRED FOR SAFE OPERATION.
- THE MAJOR PACK COMPONENTS SHALL BE SELECTED AND SIZED BY THE PACK MANUFACTURER TO ENSURE ENERGY EFFICIENT, LEAK FREE OPERATION.
- COMPRESSOR PACKS WILL BE SUPPLIED CHARGED WITH THE CORRECT OIL TO THE MIDDLE OF THE OIL RESERVOIR SIGHT GLASS.
- PACKS ARE TO BE DELIVERED WITH A HOLDING CHARGE OF DRY GEN FREE NITROGEN AT 2BAR.
- THE CONTROL PANEL WILL BE COMPLETE WITH ALL NECESSARY CONTROLS AND EQUIPMENT TO OPERATE THE PACK COMPONENTS AND GAS COOLER, HOUSED WITHIN SUITABLY IP RATED ENCLOSURE, COMPLETE WITH EXTRACT FAN (IF DEEMED NECESSARY BY MANUFACTURER) AND INTAKE FILTER, INTERLOCKING MAINS ISOLATOR AND WARNING LABELS.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE COMPRESSOR PACKS.
- THE REFRIGERATION CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY , POSITIONING AND CONNECTION OF THE REFRIGERATION EQUIPMENT AND REFRIGERATION SERVICES.
- ANY CHANGE TO EQUIPMENT SUPPLIER / DETAILS TO BE COMMUNICATED TO ORWELL DESIGN ASSOCIATES IMMEDIATELY TO AVOID CO-ORDINATION ISSUES ON SITE.

B — PLANT - GAS COOLER
- FANS / MOTORS ARE TO BE ENERGY EFFICIENT AND OF VARIABLE SPEED, E.G. EC OR INVERTOR CONTROLLED
- PACK CONTROLLER MUST BE CAPABLE OF OPERATING THE EC FAN CONENSER VIA 0-10V SIGNAL.
- MANUFACTURERS STANDARD COLOUR FINISH IS ACCEPTABLE UNLESS SITE CONDITIONS DICTATE OTHERWISE
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE CONDENSER.
- THE CONDENSER FAN SPEED FOR DAY AND NIGHT OPERATION MUST BE SET AND CHECKED BY THE REFRIGERATION CONTRACTOR. RUN SPEED AND CONTROL VOLTAGE ARE INDICATED ON THE CRO LAY OUT. FOR EXAMPLE, SHOULD THE NIGHT SET POINT BE 4.3V, THIS WOULD BE 43% AND THE ROM CONTROL SET POINT SHOULD BE SET TO 57. 10V OR 100% WOULD REQUIRE THE ROM SET POINT TO BE 0.

C — PLANT - SUPPORT
- ALL REFRIGERATION PLANT SHALL BE INSTALLED ON A FLAT AND LEVEL BASE, PROVIDED BY OTHERS. ANTI-VIBRATION PADS TO BE SUPPLIED BY THE REFRIGERATION CONTRACTOR.
- A REINFORCED FLAT AND LEVEL WORKING AREA IS TO BE POSITIONED ADJACENT TO THE PLANT HOUSING FOR COMPRESSOR REMOVAL.
- SECONDARY SUPPORT STEEL WORK FOR NEW PLANT TO BE DETAILED AND SUPPLIED BY THE STRUCTURAL ENGINEER, WHERE NECESSARY.
- ALL PLANT IS TO BE FIXED TO ITS SUPPORTS.

D — PLANT - LABELS
- ALL REFRIGERATION EQUIPMENT WITH AN EQUIVALENT REFRIGERATION CHARGE OF 5 TONNES CO2 OR MORE MUST BE SHOWING THE FOLLOWING INFORMATION - **REFRIGERANT TYPE INSTALLED, ENTRAINED V OLUME, REFRIGERANT GWP.**
- PRESSURE EQUIPMENT DIRECTIV E LABELS - ALL APPLICABLE NEW REFRIGERATION SHALL CARRY A DECLARATION OF CONFORMITY AND AN ASSEMBLY LABEL SHOWING THE FOLLOWING INFORMATION - **HIGH/LOW SIDE MWP, HIGH/LOW SIDE TEST PRESSURES, REFRIGERANT TYPE AND CHARGE, REFRIGERANT GWP.**
- REFRIGERATION CONTRACTOR SHALL SUPPLY AND FIX PERMANENT TRAFFOLYTE TYPE LABELS TO ALL ITEMS OF PLANT, EQUIPMENT, CONTROL PANELS AND COLD STORES CLEARLY IDENTIFYING THE ITEM AND INDICATING THE SY STEM NUMBER, IF APPLICABLE.

E — PLANT - OPERATION AND MAINTENANCE ACCESS
- ACCESS SHOULD BE SUITABLE FOR AN ENGINEER CARRYING A TOOLBOX / HANDTOOLS.
- PROTECTED WALKWAY S TO BE PROVIDED AND DETAILED FOLLOWING CONFIRMATION OF ROOF ACCESS POSITION
- ACCESS STAIRS AND STEEL WALKWAY TO BE SUPPLIED AND INSTALLED BY OTHERS.
- ADEQUATE TASK LIGHTING TO BE SUPPLIED AND INSTALLED BY OTHERS FOR MAINTENANCE AND ACCESS.
- EXTERNAL HOUSED REFRIGERATION PLANT TO BE PROVIDED WITH INTERNAL LIGHTING WITH GENERAL ROOF ACCESS ROUTE LIGHTING PROVIDED BY OTHERS.
- PLANT POSITIONS TO BE REVIEWED FOR FIRE ALARM REQUIREMENTS BY THE MAIN CONTRACTOR.

F — PLANT - MACHINERY ROOM VENTILATION
- VENTILATION SHOULD BE PROVIDED TO -
  - **A)** PREVENT THE PLANT FROM OVERHEATING. A THERMOSTAT SHOULD BE PROVIDED IN THE PLANTROOM TO REGULATE THE TEMPERATURE.
  - **B)** ENSURE THE PLANTROOM IS VENTILATED IN THE EVENT OF A REFRIGERANT LEAK, AND WHEN MAINTENANCE IS BEING PERFORMED. THE OPERATION SHOULD BE AUTOMATIC IN THE EVENT OF A LEAK CONTROLLED BY A SIGNAL FROM THE GAS DETECTION BY STEM. MANUAL OVERRIDES SHOULD BE PROVIDED BOTH INTERNALLY AND EXTERNALLY OF THE AREA FOR SERVICE PERSONNEL AND SHOULD BE CLEARLY IDENTIFIED.
  - **C)** THE AIR VOLUME REQUIRED FOR REFRIGERANT REMOVAL WILL, AS A GUIDE, BE BETWEEN 10 AND 15 AIR EXCHANGES PER HOUR. PLEASE REFER TO SITE SPECIFIC CALCULATIONS AS THE VENTILATION REQUIREMENTS FOR HEAT EXTRACTION COULD BE HIGHER THAN THIS V ALUE.

NOTES
- **1)** VENTILATION FANS TO BE ELECTRICALLY FED FROM AN ESSENTIAL SERVICES SUPPLY. INTAKE FROM HIGH LEV EL, EXTRACT FROM LOW LEVEL, LOCATION TO ENSURE NO AIR RECIRCULATION.
- **2)** FAN OPERATION CAN BE TWO SPEED TO PROVIDE V ARIATION BETWEEN HEAT EXTRACT AND REFRIGERANT EXTRACT.
- **3)** UTILISING ONE AIR CIRCULATION FAN WITH ON/OFF CONTROL MAY LEAD TO UNACCEPTABLE SWINGS IN TEMPERATURE WITHIN THE PLANT ROOM. NOT ALL EQUIPMENT WILL OPERATE AT THE SAME TIME DUE TO LOAD CHANGES AND THEV ARYING AMBIENT TEMPERATURES. IT MAY BE ADVISABLE TO INSTALL A NUMBER OF AIR CIRCULATING FANS AND CONTROL V IA A MULTI-STEP THERMOSTAT OR ALTERNATIV ELY TO USE SPEED CONTROL FANS).

G — PLANT - LEAK DETECTION
- LEAK DETECTION SENSORS SHALL BE POSITIONED IN CLOSE PROXIMITY TO THE MOST LIKELY SOURCE OF A LEAKS OF REFRIGERANT.
- ALARM THRESHOLDS SHALL BE SET IN LINE WITH CO-OP SPECIFICATION / BS EN378 FOR THE REFRIGERANT(S) WITHIN THE AREA. **NOTE** THIS COULD BE AN A1 OR A2L REFRIGERANT.
- SENSORS SHALL BE ACCESSIBLE FOR CALIBRATION / SERVICE AND PROTECTED FROM DAMAGE. THERE SHOULD BE A FACILITY TO TEST THE ALARM. THE ALARM SHALL BE TESTED IN LINE WITH CO-OP MAINTENANCE STRATEGY AND F-GAS REGULATIONS.
- THE ALARM SYSTEM SHOULD WARN BOTH V ISIBLY AND AUDIBLY WITH A SOUNDER AND BEACON APPROX 1.5MBALA BOVE THE BACKGROUND NOISE LEV EL BOTH INSIDE AND OUTSIDE THE SPACE.
- WHERE LEAK DETECTION IS INSTALLED WITHIN A 'MACHINERY' ROOM, SEE ANNOTATION 'G' TO LINK THE EMERGENCY V ENTILATION SYSTEM ON DETECTION OF A LEAK OF REFRIGERANT.

H — PLANT - MACHINERY ROOM SIGNAGE
- AS A MINIMUM THE FOLLOWING TEXT SHALL BE INCLUDED IN A NOTICE ON ALL PLANTROOM DOORS -

AUTHORISED ACCESS ONLY
NO SMOKING, NAKED LIGHTS OR FLA MES
NO AUTHORISED OPERATION OF THE REFRIGERA TING SY STEM
IF THE BUZZER / SOUNDER ACTIV ATES, EXIT THE SPACE IMMEDIA TELY. CLOSE THE DOOR AND NOTIFY SUPERV ISORY PERSONNEL
DO NOT ENTER OR RE-ENTER THE SPACE UNTIL THE BUZZER / SOUNDER HA S CEA SED AND YOU HAV E BEEN A UTHORISED BY THE SENIOR MA NAGER AND THE REFRIGERA TION CONTRA CTOR

AIR CONDITIONING PLANT

I — AIR CONDITIONING - CONDENSING UNITS - EXTERNAL HIGH LEVEL
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT, FIXING BRACKETS AND ANY ANTI-VIBRATION MOUNTS REQUIRED.

J — AIR CONDITIONING - CONDENSING UNITS - EXTERNAL LOW LEVEL
- A FLAT AND LEVEL SURFACE SHALL BE PROVIDED BY OTHERS.
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT WITH ANY ANTI-VIBRATION MOUNTS.

Revision	Details	Drawn	Date
01	SHELL REVISED	AT	20.10.20
00	FIRST ISSUE BASED ON CO-OP STORE PLAN 'P1F2M0'	BH	20.03.20

Site Address: WOODGATE, WESTGATE ROAD (PC-24818)

Drawing Title: PLANT FEASIBILITY LAYOUT

Refrigeration Contractor: -

Date: 20.03.2020 **Drawn By:** BH

Signature 1: **Signature 2:** **Signature 3:**

Signatures indicate compliance with the latest version of the Check and Verification 00/00/00008 document

Revision: 01 **Scale:** 1:50 @ A1

Drawing No: E3633-CR3 **Contract No:** -

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