MAX FORDHAM

Fitzjohn Avenue, Hampstead - Pegasus Life

s106 Energy Efficiency & Renewable Energy Plan

12th May 2016

Max Fordham LLP
42/43 Gloucester Crescent
London
NW1 7PE

T +44 (0)20 7267 5161
F +44 (0)20 7482 0329

maxfordham.com

ISSUE HISTORY

Issue	Date	Description
*	12/05/16	Draft for design team review

MAX FORDHAM LLP TEAM CONTRIBUTORS

Engineer	Role
M Nutley	Senior Partner
P Taylor	Project Engineer
J Baldry	Project Engineer
K Clemence	Engineer
S Hayes	BREEAM Pre Assessment

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1.0 EXECUTIVE SUMMARY

This Energy Efficiency and Renewable Energy Plan sets out the measures that have been incorporated in the Fitzjohn's Avenue project contract documents in order to reduce carbon emissions. These include measures that are inherent in the building to reduce the carbon emissions of the development, and further measures which will allow the building users (Pegasus Life and residents) to monitor energy use and inform ways to further reduce carbon emissions in operation.

The project is the demolition of the existing building on site and the construction of a new specialist accommodation for older people. The facility comprises 33 flats for older people, and communal facilities, including a lounge, a health and wellbeing facility, guest suite and associated staff facilities. The development will also include basement level car storage, cycle and mobility scooter parking for residents, visitors and staff, and a communal garden.

Throughout the design process the design team have applied the energy hierarchy from the Camden CPG3 ('Be Lean', 'Be Clean' and then 'Be Green') in order to reduce carbon emissions. The design team has continued to apply this hierarchy as the design has developed following planning. This report summarises the measures incorporated including any changes in strategy since planning.

1.1 Targets

The development is due to comply with the following:

- Part L 2013
- London Plan
- BREEAM New Construction Excellent
- CPG3 including a 20% reduction in CO2 emissions from renewable energy sources

1.2 Carbon Dioxide Emissions Assessment

The below summarise the calculated anticipated annual CO_2 emissions of the development as a whole as tendered at stage E. The development continues to not exceed the 67 Tonnes of CO_2 emissions per annum stated in in the Sustainability and Energy Statement submitted in December 2014.

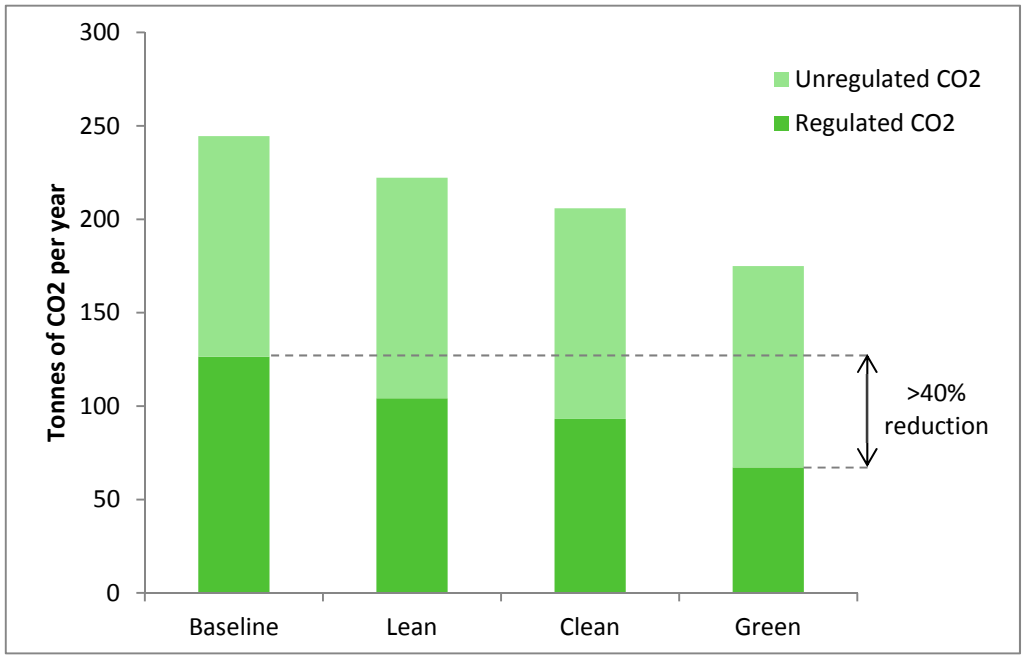
These calculations and resultant emissions values are based on use of approved software and methodologies including Stroma FSAP and IES.

	Whole development CO_2 emissions (Tonnes CO_2 per annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliance ('Baseline')	126	118
After energy demand reduction ('Lean')	104	118
After energy efficient systems ('Clean')	93	113
After renewable energy ('Green')	**67**	108

Table – Carbon Dioxide Emissions after each stage of the energy hierarchy

	Whole development Regulated Carbon Dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction ('Lean')	22	17.6%
Savings from energy efficient systems ('Clean')	11	10.6%
Savings from renewable energy ('Green')	26	27.9%
Total Cumulative Savings	59	46.9%

Table – Regulated carbon dioxide savings from each stage of the energy hierarchy



Graph – Regulated and unregulated CO_2 emissions at each stage of the Energy hierarchy

2.0 PASSIVE MEASURES

Investment in building design and fabric specification has continued to be prioritised over high technology mechanical and electrical systems. As detailed in the MFLLP Employers Requirements tender documentation and corresponding design team tender information the following building parameters have been incorporated on the project:

Building Fabric Parameter	Maximum Permissible Part L1A/L2A 2013 values	Notional Building Part L1A/2A 2013 values	Proposed values
Wall U-value (W/m^2K)	0.30/0.35	0.18/0.26	0.15
Window U-value (W/m^2K)	2.0/2.2	1.4/1.6	1.27
Ground Floor U-value (W/m^2K)	0.25	0.13/0.22	0.11
Roof U-value (W/m^2K)	0.20/0.25	0.13/0.18	0.11
Air Permeability $m^3/hr.m^2$	10	5/3	2
Thermal bridging y-value	0.15	0.08	0.08
Window g-value	N/A	0.63/0.55 top-lit	<0.4 throughout

Additionally the design team have progressed the design incorporating the following design features in the tender design package to provide passive environmental comfort in both winter and summer:

- Most living areas have external façades with openable windows aiding natural ventilation when required. Cross ventilation is possible within flats.
- Light coloured curtains/blinds have been specified to all windows.
- Bathrooms and kitchens have been located centrally generally, with occupied spaces (living room and bedroom) located close to the façade to get the best use of the available daylight.
- The floor-to-ceiling heights have been optimised to provide good daylight penetration into the back of the perimeter rooms.
- Sufficient measures are included in the design to passively reduce the risk of overheating to slight/insignificant within SAP modelling. Additionally as elderly people are more susceptible to extremes in temperature, such as very hot weather, mechanical cooling is incorporated into all flats, further reducing the risk of overheating.

3.0 ENERGY EFFICIENT SERVICES

Energy efficient services are specified in the project tender documents for the development in line with the proposals originally made in the Sustainability and Energy Statement submitted in December 2014. These include:

3.1 Mechanical Ventilation

Mechanical ventilation with heat recovery has been specified throughout the apartments. This reduces the heating demand significantly during winter and thus reduces the carbon emissions of the building. The system specified has a very low specific fan power (SFP) to minimise electrical consumption and a high heat recovery efficiency to maximise heat recovery. A summer-time bypass has been specified to make use of free cooling during summer and minimise the risk of overheating.

3.2 Lighting

Light levels have been selected and designed to to ensure that they are appropriate to the space and chosen to minimise over-illumination and unnecessary energy use. High efficiency light sources will be used throughout.

All communal area lighting will be under the control of both presence detecting passive infra reds (PIRs) and daylight dimming. This will ensure that the areas are only lit when occupied, and during daylight hours appropriate lux levels will be maintained.

3.3 Power

White and general goods installed as part of the base build will be selected for their energy efficiency (BREEAM credit Ene 08). Users will be educated in order to ensure that power is used efficiently. Devices will be switched off when they are not required. A building user guide is to be produced for the development (BREEAM credit Man 04).

Energy meters have been specified within the MFLLP Employers Requirements tender documentation for installation for all major energy uses including water consumption. The meters will allow benchmarking of the building and will enable the building managers to target energy saving through user education. See also section 5.0.

Circulation pumps for the building systems have been specified within the MFLLP Employers Requirements tender documentation to be equipped with variable speed drives to reduce pumping power.

3.4 Controls

A building management system (BMS) in the communal areas and on central systems has been specified within the MFLLP Employers requirements. See section 5.0.

Efficient and user friendly controls have been specified throughout the apartments. The controls have been kept as simple and as intuitive as possible to ensure that they are used by residents.

3.5 Heating, Cooling and DHW

The heating and active cooling remains as proposed in the "Sustainability and Energy Statement" issued in December 2014. In this the use of CHP was discounted and high COP electric air source heat pumps selected to supply both heating and cooling to residents through fan coil units.

Following further analysis the scheme has been developed to incorporate the domestic hot water into the electric air source heat pumps in addition to the space heating/cooling, an option which was outlined in appendix 5 of the Sustainability and Energy Statement submitted in December 2014. It was established after the planning stage that this improved the energy performance of the development, raising BREEAM Ene1 score from 7 to 9, whilst reducing capital cost by reducing the number of systems to be installed and plant space required. Additionally this results in a more efficient use of materials and space by designing out a system and therefore the associated plant and pipework. It is anticipated that bills to residents will be lower overall, making the proposal more financially viable.

4.0 RENEWABLE TECHNOLOGIES

The development incorporates two renewable technologies: High COP air source heat pumps and photovoltaic arrays. These two technologies work well in tandem as they cater for differing loads (thermal and electrical) and are therefore not working in competition.

Details of the air source heat pumps and photovoltaic arrays can be found in the MFLLP Employers Requirements T series and V series documents respectively.

The specified air source heat pumps are to be highly efficient with the following efficiencies or better: space heating/process hot water seasonal performance factor (SPF) 4.0; space cooling energy efficiency ratio (EER) 3.5; domestic/process hotwater heating seasonal performance factor (SPF) 2.5. The air source heat pumps will provide both space heating and domestic hot water to the majority of spaces, and additionally pool heating.

The specified PV array is to be sufficient to offset 7170kgCO_2/year. Based on a provisional panel selection this equates to 72 PV panels, for which an array layout has been shown on the MFLLP drawing V[90]008. The PV installation shall be connected into the development and metered as shown in schematic V[20]020.

5.0 METERING AND BUILDING MANAGEMENT

The metering and BMS in combination will allow the site operator/facilities management team to optimise building operation.

5.1 Metering

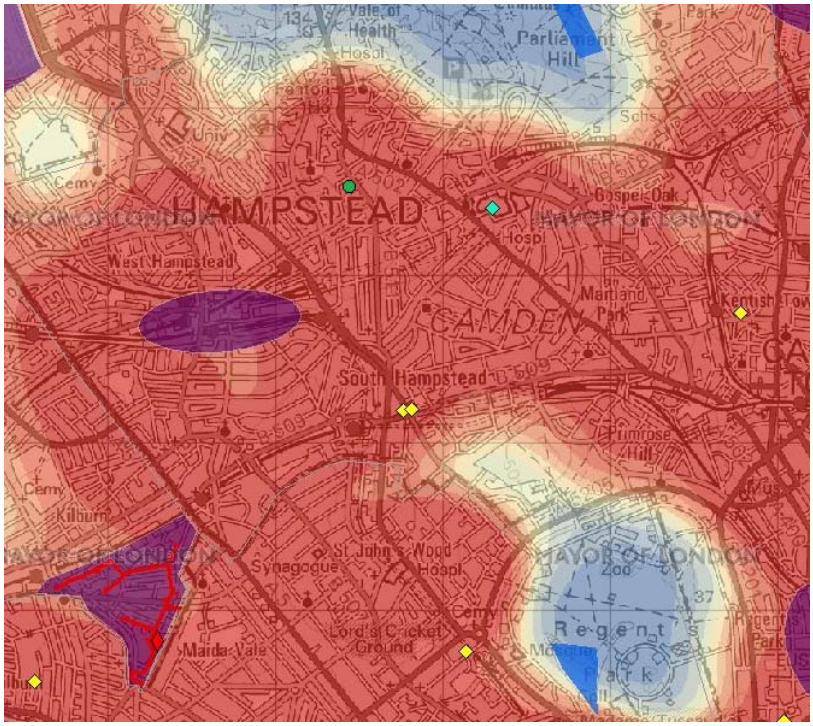
The development electricity, water and heating/cooling is all metered as shown in schematics V[20]020, S[10]020, T[31]020, T[62]020, T[90]020 (see appendix). This includes metering of the PV installation intake on the main panel board, and metering of each air source heat pump to aid in the monitoring of energy and carbon emissions savings. Residents have individual electricity, water and heat meters allowing personal monitoring of usage.

5.2 BMS

A BMS system has been specified in the MFLLP specification A[--]7001. This will enable the heating, cooling and domestic hot water systems to respond to the demand dynamically and run more efficiently. Control set points have been specified in the communal spaces to achieve the target conditions for human comfort and the preservation of materials without unnecessary energy use

6.0 FUTURE CONNECTIVITY TO ENERGY NETWORKS

It was established previously that there were no existing networks, or proposed opportunity zones within range of the Fitzjohn's avenue development. A follow up search of the London Heat Map (below) demonstrates there have been no changes in the heat network opportunities in the intervening time (Fitzjohn Avenue site indicated by green circle).



As stated in the Sustainability and Energy Statement submitted in December 2014, future connectivity of the systems proposed in the project tender to a district heating network would be possible through the use of an additional water-source heat pump.

7.0 FUTURE INFORMATION

The building owner will endeavour to provide future information to the Council, where required, in the form of technical reports or otherwise, including the appointment of specialist consultant advice where necessary.

8.0 APPENDIX

Selected MFLLP tender documents. Other documents available on request.

DETAILS OF METERS TO FLATS (APPLIES TO ALL FLATS):

FLAT UTILITY METER BY THAMES WATER

TANK C5B4

HUT3

ROOF

RISER

FLAT F1

FLAT F2

TO BMS

FOURTH FLOOR FLATS

FLAT E1

FLAT E2

THIRD FLOOR FLATS

FLAT D1

FLAT D2

FLAT D3

SECOND FLOOR FLATS

FLAT C1

FLAT C2

FIRST FLOOR FLATS

FLAT B1

FLAT B2

GROUND FLOOR FLATS

LOWER GROUND FLOOR FLATS

FLAT A1

FLAT A2

LOWER GROUND CORRIDOR

LOWER GROUND TANK ROOM

TANK C5B4

HUT3

ROOF

RISER

FLAT G1

FLAT G2

TO BMS

FIFTH FLOOR FLATS

FLAT F3

FLAT F4

FLAT E3

FLAT E4

FLAT E5

FLAT D4

FLAT D5

FLAT D6

FLAT C3

FLAT C4

FLAT C5

FLAT B3

FLAT B4

FLAT B5

BREAK TANK FOR POOL PLANT ROOM & WATER SERVICES. SERVICES FROM THIS POINT ARE BY POOL SPECIALIST

POOL PLANT ROOM

TANK C5B3

OUTSIDE

HUT2

HUT1

35ø	0.5 L/S	
CU		

PLANT ROOM A/05

WHB

PZR

WH3

TO DRAINAGE

POOL PLANT ROOM

TANK C5B2

TO POOL PLANT

TO BMS

DRENCH SHOWER

WELLNESS CENTRE 'FACE WASH ALTAR'

FILLING LOOP FOR LTHW – SEE T[31]020

TO BMS

WC

WHB

SHOWER

TREATMENT AREA

SHOWERS IN POOL AREA

SUPPLY TO STEAM ROOM

SUPPLY TO SAUNA

SAUNA AND STEAM ROOM SUPPLY: FLOW RATES TBC BY DEVINS. BACKFLOW PROTECTION BY DEVINS

AERATED SHOWERS; 8 L/MIN MAX.

WELLNESS CENTRE

BIN STORE

TANK C5B1

BCW TO GYM HYDROBOXES

FROM GYM CALORIFIER C1 SEE T[31] 020

GYM

TANK C5B3

TANK C5B1

WASH-DOWN POINT

BASEMENT STAIRWELL

GUEST SUITE

HUT1

HUT2

OUTSIDE

GROUND FLOOR FLATS

COMMUNAL KITCHEN

TO DISH WASHER

SINK

WH1

TO DRAIN

TO DRAINAGE

RECEPTION WC

WH4

WC

WHB

TO BMS

PZR

STAFF FACILITIES

SHOWER

WC

WHB

WH2

TO DRAINAGE

42ø	1.5 L/S	
CU		
76ø	4.6 L/S	
CU		

TO BMS

UTILITY METER FOR LANDLORD'S SUPPLY

125ø	36.5 L/S	
CU		

PULSE SPLITTER REQUIRED TO PROVIDE 2NO OUTPUTS FROM METER

125ø	36.5 L/S	
HPPE		

SITE PIPEWORK TO TERMINATE IN A PN16 FLANGED END FOR CONNECTION BY THAMES WATER

FROM WATER MAINS

CHECK METER IN PAVEMENT

TO LEAK DETECTION PANEL

BELOW GROUND

HPPE

CU

FIRE SUPPLY TO SPRINKLER TANK – SEE S[63]020

>1m

PWC1

TANK BT1
54ø INLET
76ø OUTLET

LS

T

O/F PIPE

WARNING PIPE

DRAIN VALVE

TO BMS

LD1 PANEL

FROM METER AT SITE BOUNDARY

DCV

DC

SC

54ø	1.5 L/S	
CU		
76ø	5 L/S	
CU		
159ø	36.5 L/S	
CU		

PUMP CONTROL PANEL

CP

BOOSTER SET

DPS

AV

NRV

ACC VSL

ACC VSL AV1

FLX

LSV

TP

DC

KEY:

- MAINS / BOOSTED COLD WATER
- DOMESTIC HOT WATER FLOW
- DOMESTIC HOT WATER RETURN
- SC STOPCOCK
- CV CHECK VALVE
- DCV DOUBLE CHECK VALVE
- DC DRAIN COCK
- IV ISOLATION VALVE
- M METER
- AIR VENT
- PWC1 PHYSICAL WATER CONDITIONER
- MIXED HOT & COLD WATER SUPPLY POINT WITH ISOLATION VALVES AND THERMAL MIXING VALVE
- COLD WATER POINT WITH ISOLATING VALVE
- PZR PRESSURE REDUCING VALVE
- MOTORISED TWO PORT VALVE
- LD1 PANEL LEAK DETECTION PANEL
- PRESSURE RELIEF VALVE
- EXPANSION VESSEL
- WHX WATER HEATER, REF X
- PRESENCE DETECTOR
- HUT# HOSE UNION TAP & REF – SEE S[––]500

NOTES

1. SEE T[90]020 FOR BCW PIPEWORK WITHIN FLATS
2. ALL FLOW RATES SHOWN ARE PEAK DIVERSIFIED FLOW RATES
3. ALL CHECK METERS (NOT UTILITY METERS) TO HAVE A BACNET CONNECTION TO BMS FOR MONITORING
4. ALL WATER POINTS TO HAVE INDIVIDUAL ISOLATING VALVES, EVEN IF NOT SHOWN ON DRAWING

NOTES:

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	date	description	eng
D	18/03/16	STAGE E VE – REMOVED SECONDARY WATER METERS TO FLATS – CHANGES CLOUDED	KC
C	20/11/15	STAGE E – ADDENDUM, ADDED CAT 5 BREAK TANKS AND EXTERNAL HOSE UNION TAPS	KC
B	27/10/15	STAGE E	KC
A	02/10/15	DRAFT STAGE E – ADDED PIRS TO WCS AMENDED METER STRATEGY	KC
*	13/07/15	STAGE E COORDINATION	KC

MAX FORDHAM

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London
NW1 7PE
T. +44 (0) 20 7267 5161
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maxfordham.com

Registered in England No. OC300026
Registered Office 42-43 Gloucester Crescent London NW1 7PE

architect
SERGISON BATES ARCHITECTS

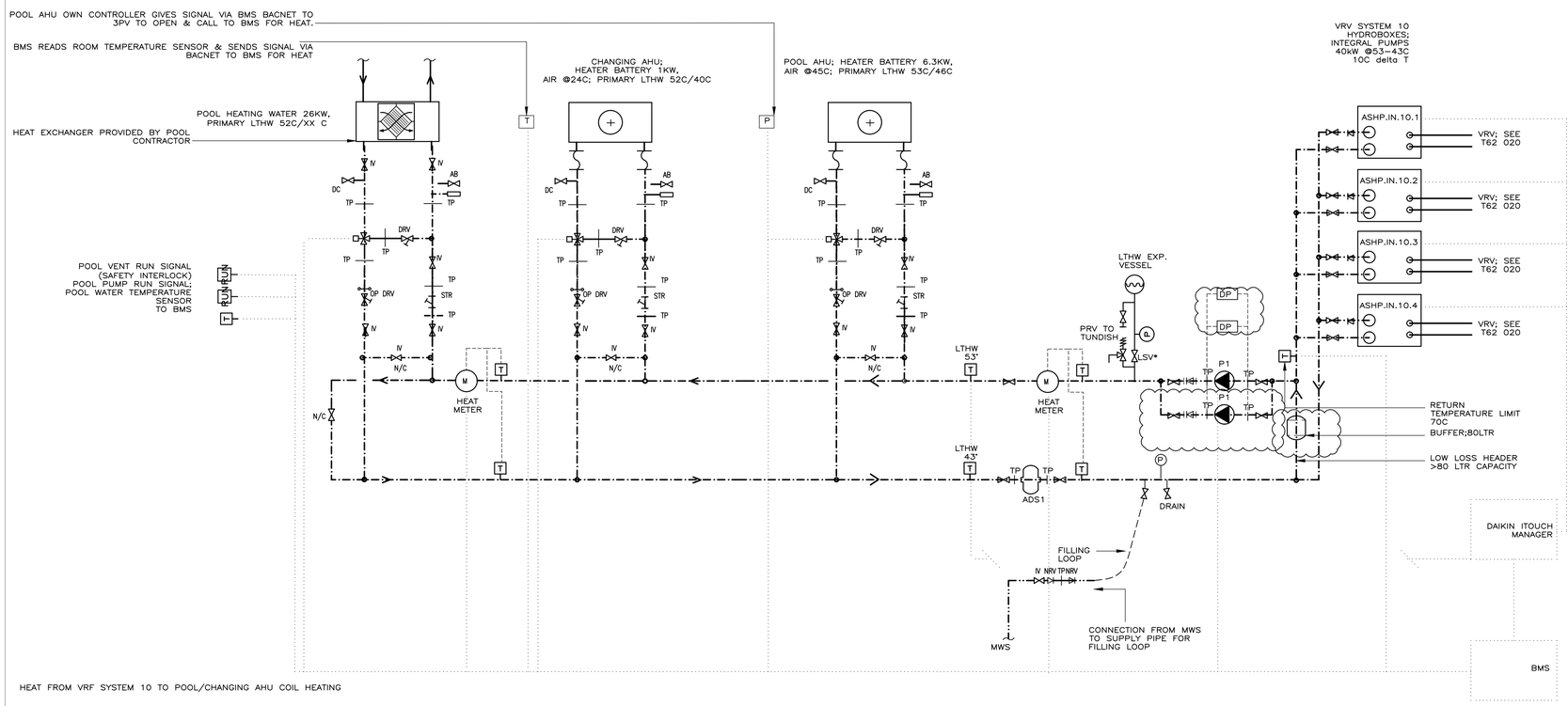
job title
FITZJOHN'S AVENUE
PEGASUS LIFE

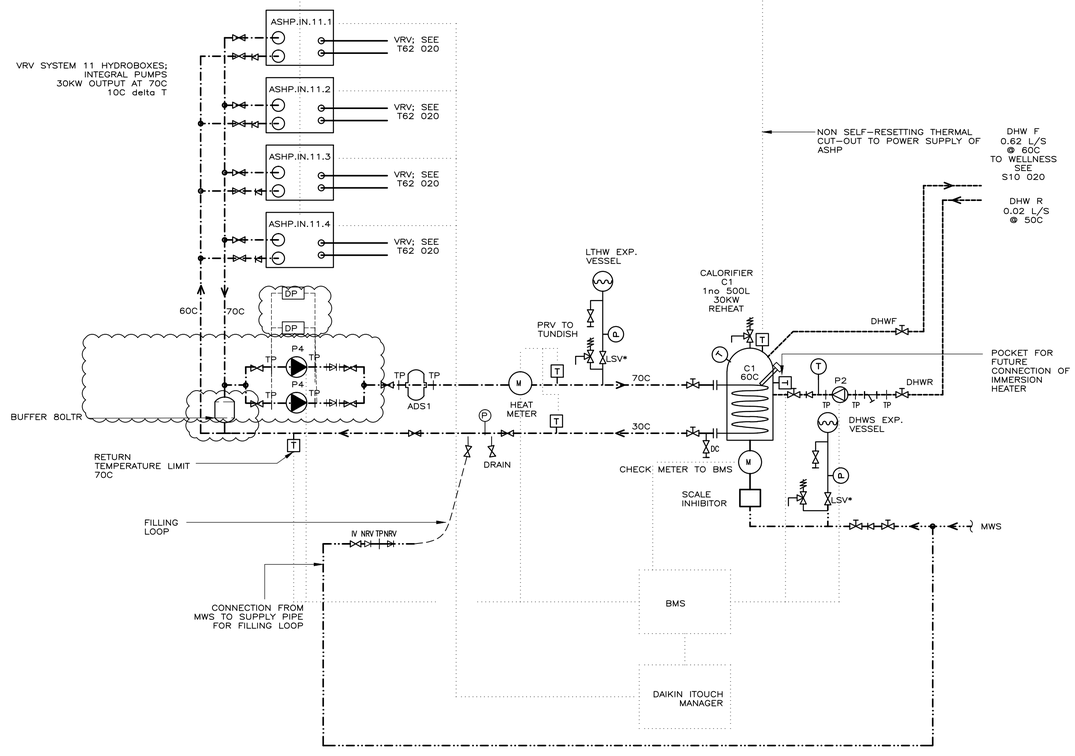
project leader	date	scale (at A1)
MN	OCT 15	NTS

drawing title
MAINS WATER SCHEMATIC

job no	dwg no	rev
J4901	S[10]020	/D

SCALE BAR : 0.05m





NOTES ON HAZARDS/ ACCESS/ MAINTENANCE
TEXT EDIT

SCALE BAR : 0.05m

NOTES:

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2. SERVICES STRATEGIES, EQUIPMENT LOCATIONS & SIZES AND CONTAINMENT ROUTES ARE TO BE DEVELOPED FURTHER BY CONTRACTOR & VRF SUPPLIER

3. ALL SETTING OUT TO BE AGREED WITH THE ARCHITECT

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LEGEND:

- ISOLATING VALVE
- PRESSURE REDUCING VALVE
- PRV
- DRAIN COCK
- LS LEVEL SENSOR
- OPEN VENT
- BALLCOCK
- ISOLATION VALVE
- DOUBLE REGULATING VALVE
- DRAIN COCK
- NON RETURN VALVE
- DOUBLE CHECK VALVE
- FLOW MEASUREMENT VALVE
- PRESSURE RELIEF VALVE
- INLINE STRIANER
- PUMP
- AUTOMATIC AIR VENT
- TEST POINT
- T TEMPERATURE GAUGE
- P PRESSURE GAUGE
- T TEMPERATURE SENSOR
- DRAIN TO TUNDISH
- VACUUM BREAKER
- THERMOSTATIC MIXING VALVE VALVE
- CONTROLS WIRING
- DHW
- HEATING SECONDARY FLOW
- REFRIGERANT PIPEWORK
- MWS

rev	date	description	eng
A	27/10/15	STAGE E– ADD PUMPS; BUFFERS	BD
*	02/10/15	DRAFT STAGE E	BD

MAX FORDHAM

Max Fordham LLP
Carver's Warehouse
77 Dale Street
Manchester
M1 2HG
T. +44 (0) 161 312 8071
F. +44 (0) 20 7482 0329
maxfordham.com

Registered in England No. OC300026
Registered Office 42-43 Gloucester Crescent London NW1 7PE

architect
SERGISON BATES

job title
FITZJOHN'S AVENUE

project leader	date	scale (at A1)
DWN	DATE	1:1

drawing title
COMMUNAL AREAS
LHTW SCHEMATIC

job no	dwg no	rev
4901	T[31]020	/A

POWER PANELS FOR ROOF PLANT IN ELEC RISER

ROOF

ROOF FIFTH FLOOR

FOURTH FLOOR

EACH APARTMENT'S HYDRO BOX IS SUPPLIED WITH 1PHASE POWER

& CONNECTED TO DIAKIN I TOUCH MANAGER/BACNET MODBUS FOR DEMAND CONTROL & MONITORING. INSERT PCB CARD INTO EACH HYDROBOX

THIRD FLOOR

SECOND FLOOR

FIRST FLOOR

GROUND

LOWER GROUND

CAR STACKER

SYSTEM 01 — EX, M

SYSTEM 02 — EX, M

SYSTEM 03 — EX, M

SYSTEM 04 — EX, M

SYSTEM 04 — HB, HB — EACH APARTMENT'S HYDRO BOX; 9kW LTHW @45C (HTG) OR @65C (DHW); 8kW COOL @5C — APARTMENT F.01, APARTMENT F.02

SYSTEM 03 — HB, HB — APARTMENT E.01, APARTMENT E.02

SYSTEM 02 — HB, HB, HB — APARTMENT D.01, APARTMENT D.02, APARTMENT D.03

HB, HB — APARTMENT C.01, APARTMENT C.02

SYSTEM 01 — HB, HB — APARTMENT B.01, APARTMENT B.02

APARTMENT A.01, APARTMENT A.02

SYSTEM 11 — EX, EX, M, M

SYSTEM 10 — EX, EX, EX, EX, M, M, M, M

SYSTEM 05 — EX, M

SYSTEM 06 — EX, M

SYSTEM 07 — EX, M

SYSTEM 08 — EX, M

SYSTEM 09 — EX, M

SYSTEM 09 — HB, HB — APARTMENT G.01, APARTMENT G.02

SYSTEM 08 — HB, HB — APARTMENT F.03, APARTMENT F.04

SYSTEM 07 — HB, HB, HB — APARTMENT E.03, APARTMENT E.04, APARTMENT E.05

SYSTEM 06 — HB, HB, HB — APARTMENT D.04, APARTMENT D.05, APARTMENT D.06

SYSTEM 05 — HB, HB, HB — APARTMENT C.03, APARTMENT C.04, APARTMENT C.05

HB, HB, HB — APARTMENT B.03, APARTMENT B.04, APARTMENT B.05

SYSTEM 11 — GF COMMUNAL DUCTED FCUS; 18.5 KW COOLING; 25.7W HTG — BS, BS

TO BMS

PIR

SYSTEM 10 — HB, HB, HB, HB — POOL LTHW & AIR HEATING SEE T31 020 FOR CONTINUATION

POOL PLANT ROOM &LG PLANT — ELEC, ELEC

ENTRANCE, LOUNGE, LOBBY & MANAGERS

WELLNESS POOL HALL

WELLNESS CHANGING & LOBBY

GUEST SUITE — GUEST FCU 8kW HTG 5.7kW COOL — BS

GYM — GYM & TRX FCUS 1.3kW HTG 9.3kW COOL — BS — HB, HB, HB, HB — WELLNESS HTG & DHW SEE: S10 020 AND T31 020 FOR CONTINUATION

STAFF FACILITIES — ELEC

DIRECT ELECTRIC SPACE HEATING IN GENERAL PLANT AREAS WHERE REQUIRED — ELEC

DIRECT ELECTRIC SPACE HEATING IN GENERAL PLANT AREAS WHERE REQUIRED

DIRECT ELECTRIC WATER AND SAPCE HEATING IN STAFF FACILITIES

DIRECT ELECTRIC WATER HEATING IN KITCHEN & MANAGERS WC

TEMP & FAN SPEED CONTROL

EVERY VRF COMPONENT ON COMMUNAL SYSTEMS IS LINKED TO CENTRALISED ITOUCH MANAGER TO ALLOW METERING AND CONTROL OF SET POINTS

GENERALLY IN COMMUNAL AREAS, TEMPERATURE CONTROL IS FROM CONCIERGE ITOUCH MANAGER PANEL. NO LOCAL ADJUSTMENT REQUIRED (WITH EXCEPTION OF GUEST SUITE)

TEMPERATURE & OCCUPANCY CONTROL

VRF SYSTEMS CONTROL PANEL/PC FOR SYSTEM CONTOL & MONITORING. LINK TO BMS PANEL

NB ALL REFRIG/LTHW PIPEWORK AND CONTROLS WIRING THROUGHOUT BUILDING IS *EXCLUDED* FROM DAIKIN QUOTATION.
ALL DIRECT ELECTRIC HEATING IS ALSO EXCLUDED FROM DAIKIN QUOTES
REFER TO T[90]500 FOR SUMMARY

DETAILED DESIGN BY DAIKIN

SCALE BAR : 0.05m

KEY:

- EX — EXTERNAL CONDENSER UNIT/ LOW TEMP HEAT PUMP
- HB — INTERNAL HYDROBOX/ HIGH TEMP HEAT PUMP, WITH LTHW/CHW CONNECTIONS TO DHW CYLINDER AND FCUS
- INDIRECT CYLINDER
- HIGH STATIC PRESSURE DUCTED FAN COIL UNIT WITH VRF COIL; WALL/CEILING CONCEALED. PLUS BS BOX
- POWER PANEL
- LTHW HEATER BATTERY IN DUCT
- CHW COOLING BATTERY IN DUCT
- LTHW HEAT EXHANGER
- BS — BS SWITCHING BOX
- SHOWER/DHW OUTLETS
- 3NO VRF PIPES (SUCTION, DISCHARGE & LIQUID)
- 2NO LTHW (F&R)
- 2NO DHW (F&R)
- SYSTEM BOUNDARY

NOTES:
1. THIS IS A DESIGN INTENT DRAWING. DESIGN TO BE DEVELOPED BY VRF SUPPLIER.
2.REFER TO T[90]500 FOR SUMMARY OF HTG/COOL/DHW SYSTEMS

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C	27/10/15	STAGE E	PL
B	02/10/15	DRAFT STAGE E	PL
A	21/05/15	STAGE D	BD
*	08/05/15	STAGE D COSTING	BD
	date	description	eng

MAX FORDHAM

Max Fordham LLP
42-43 Gloucester Crescent
London
NW1 7PE
T. +44 (0) 20 7267 5161
F. +44 (0) 20 7482 0329
maxfordham.com

Registered in England No. OC300026
Registered Office 42-43 Gloucester Crescent London NW1 7PE

architect
SERGISON BATES ARCHITECTS

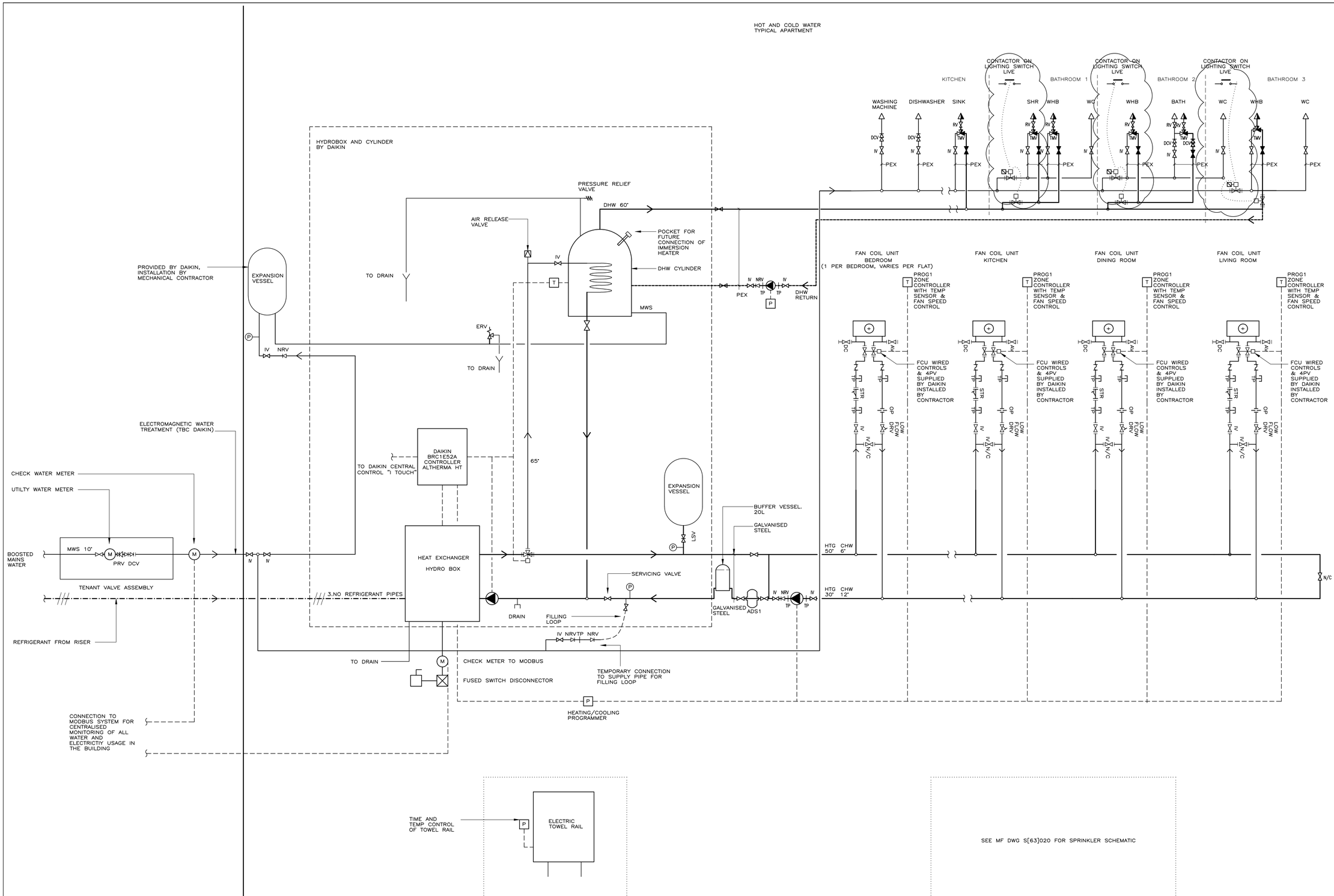
job title
FITZJOHN'S AVENUE
PEGASUS LIFE

project leader	date	scale (at A1)
MN	DATE	NTS

drawing title
VRF HEATING AND COOLING SCHEMATIC

job no	dwg no	rev
J4901	T[62]020	/C

HOT AND COLD WATER
TYPICAL APARTMENT



TIME AND TEMP CONTROL OF TOWEL RAIL

ELECTRIC TOWEL RAIL

SEE MF DWG S[63]020 FOR SPRINKLER SCHEMATIC

LEGEND:

- ISOLATION VALVE
- PUMP
- DRV — DOUBLE REGULATING VALVE
- OP — ORIFICE PLATE
- RELIEF VALVE
- TP — TEMPERATURE/PRESSURE TEST POINT
- STR — STRAINER
- MIXED OUTLET
- HOT WATER OUTLET
- COLD WATER OUTLET
- THERMOSTATIC MIXING VALVE
- NON RETURN VALVE
- DC — DRAIN COCK
- DCV — DOUBLE CHECK VALVE
- THREE PORT VALVE
- P — PROGRAMMER
- T — THERMOSTAT
- IMMERSION HEATER
- N/C — NORMALLY CLOSED
- FUSED SWITCH DISCONNECTOR
- CHECK VALVE
- RV — RESTRICTOR VALVE
- PRV — PRESSURE REDUCING VALVE
- ERV — EXPANSION RELIEF VALVE
- DRAIN
- LSV — LOCK–SHIELD VALVE
- POWER SUPPLY

NOTES:

– THIS DRAWING HAS BEEN DEVELOPED TO RIBA STAGE E AND REPRESENTS THE DESIGN INTENT EMPLOYERS REQUIREMENTS. THE CONTRACTOR IS TO ADOPT, DEVELOP AND COMPLETE THE DESIGN BEFORE CONSTRUCTION SERVICES STRATEGIES, EQUIPMENT SIZES AND LOCATIONS AND CONTAINMENT ROUTES ARE TO BE DEVELOPED FURTHER. ALL SETTING OUT IS TO BE AGREED WITH THE ARCHITECT.

	date	description	eng
C	27/10/15	STAGE E	PPL
B	02/10/15	DRAFT STAGE E AS CLOUDED	PPL
A	21/05/15	NUMER OF DRAINS, ISOLATION VALVES, PUMPS, PROGRAMMERS AMENDED FILLING LOOP AND SUPPLY ADDED	PL
*	08/05/15	STAGE D COSTING	JKB

MAX FORDHAM

Max Fordham LLP
42-43 Gloucester Crescent
London
NW1 7PE
T. +44 (0) 20 7267 5161
F. +44 (0) 20 7482 0329
maxfordham.com

Registered in England No. OC300026
Registered Office 42-43 Gloucester Crescent London NW1 7PE

architect
SERGISON BATES ARCHITECTS

job title
FITZJOHN'S AVENUE
PEGASUS LIFE

project leader	date	scale (at A1)
MN	DATE	NTS

drawing title
MECHANICAL
TYPICAL APARTMENT
SCHEMATIC

job no	dwg no	rev
J4901	T[90]020	/C