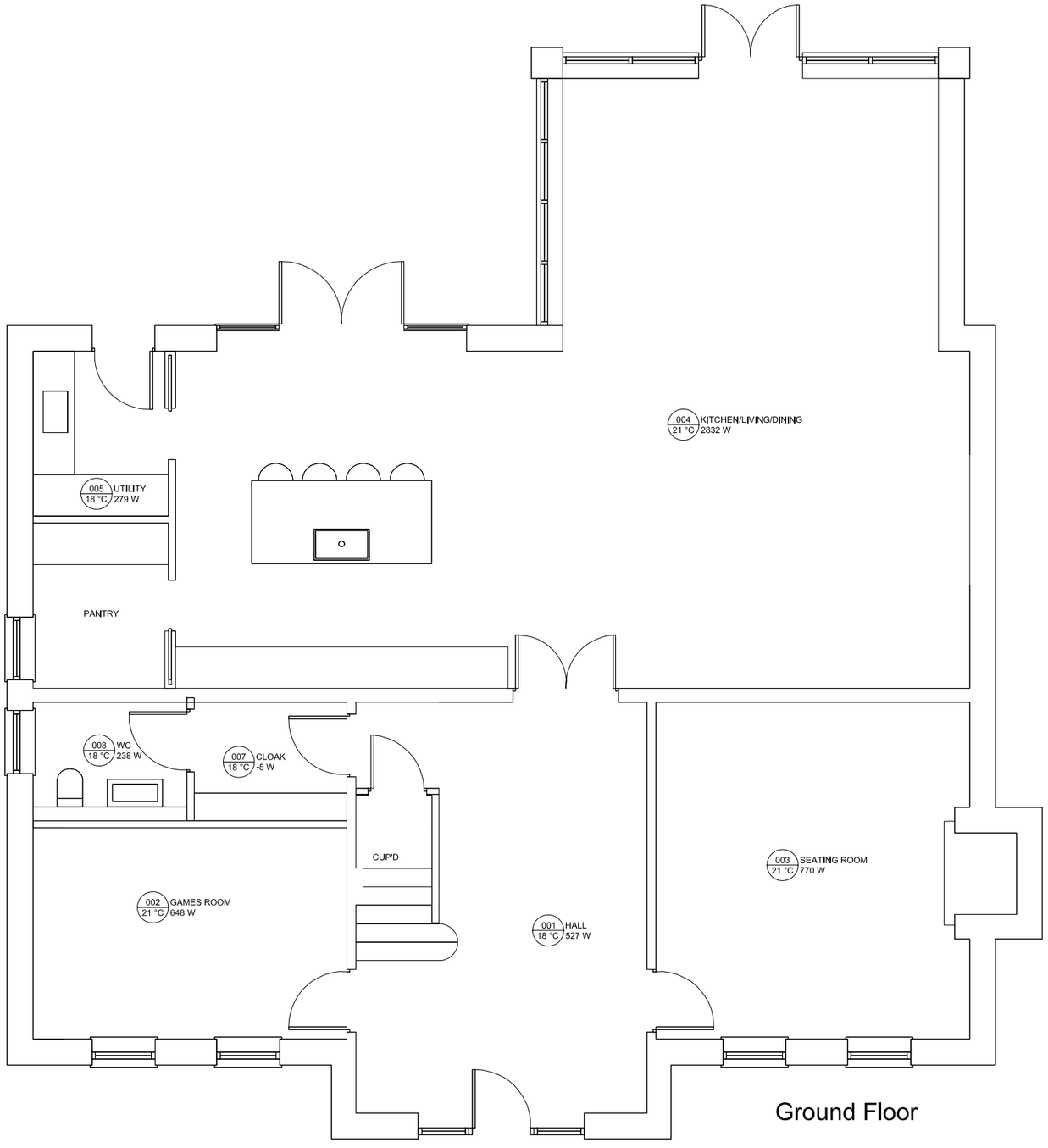

Ground Floor

Outside Temperature -3 °C
Heat Loss for Ground floor 5288
Area for Ground floor 155.96 m²

Room Name	*HALL*	*GAMES ROOM*	*SEATING ROOM*	*KITCHEN/LIVING/DINING*	*UTILITY*	*CLOAK*	*WC*
Room No.	*001*	*002*	*003*	*004*	*005*	*007*	*008*
Room Design Temperature	*18 °C*	*21 °C*	*21 °C*	*21 °C*	*18 °C*	*18 °C*	*18 °C*
Air Change Rate (per hr)	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*1.5*
Room Height (m)	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
Room Area (m2)	*22.59*	*13.82*	*22.67*	*78.24*	*4.57*	*3.77*	*3.8*
Volumetric Losses (Watts)	*194*	*135*	*222*	*766*	*39*	*32*	*98*
Fabric Losses (Watts)	*333*	*512*	*548*	*2066*	*240*	*-37*	*140*
Total Heat Loss (Watts)	*527*	*648*	*770*	*2832*	*279*	*-5*	*238*
Heat Loss (w/m2)	*23.3*	*46.8*	*34*	*36.2*	*61*	*-1.4*	*62.6*

General Notes

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Heat Outputs
Heat outputs are based on the parameters in the tables above. All heat outputs and floor surface temperatures are adjusted per m2 of effective floor area and, unless otherwise stated, are based upon a BS EN-1264 compliant system.

Underfloor Heat outputs may vary from the values stated above depending upon the specific relationship between the following set of values:

a. Design Water Temperature
b. Flow Rate
c. Design Room Temperature
d. Floor Covering
e. Floor Construction
f. Pipework Spacing
g. Net/Effective Heated Floor Area
h. Limits set by BSEN-1264

Floor Surface Temperature
The floor surface temperatures provided are the average zone floor surface temperature based upon the heat outputs stated. Floor surface temperatures may vary in areas of congested/uncontrolled pipe work (i.e. leaving manifolds and in transitional areas such as hallways and corridors), peripheral zones and areas subject to direct sunlight or auxiliary heat sources. Floor surface temperatures are managed by control using thermostats and further influenced by water temperature controls.

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- Prior to installing the floor covering, the floor covering installer shall verify the suitability for installing the floor covering over the UFH system. The floor coverings are stored and installed according to the relevant standards and the manufacturer's instructions.
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- Consideration should be given to movement joints where screed, hardwood or tiled floor areas exceed 40m2
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Thermostats
All thermostat wiring should be BS 7671 compliant. Thermostat positions are intended as indicative only. We recommend that thermostat and sensors are positioned on internal walls, out of direct sunlight and potential thermal gain and not in enclosed spaces (ie behind doors).

REV	DATE	NOTES
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

LEGEND

007 / 20 °C — PRACTICE / 240 W
- Room #
- Room Name
- Heat Loss
- Internal Design Temp

Heat Losses & System Design calculations based upon values indicated on drawing. Please check these & notify us immediately, in case of any variance from actuals. In the absence of actuals data, reasonable assumptions have been made.

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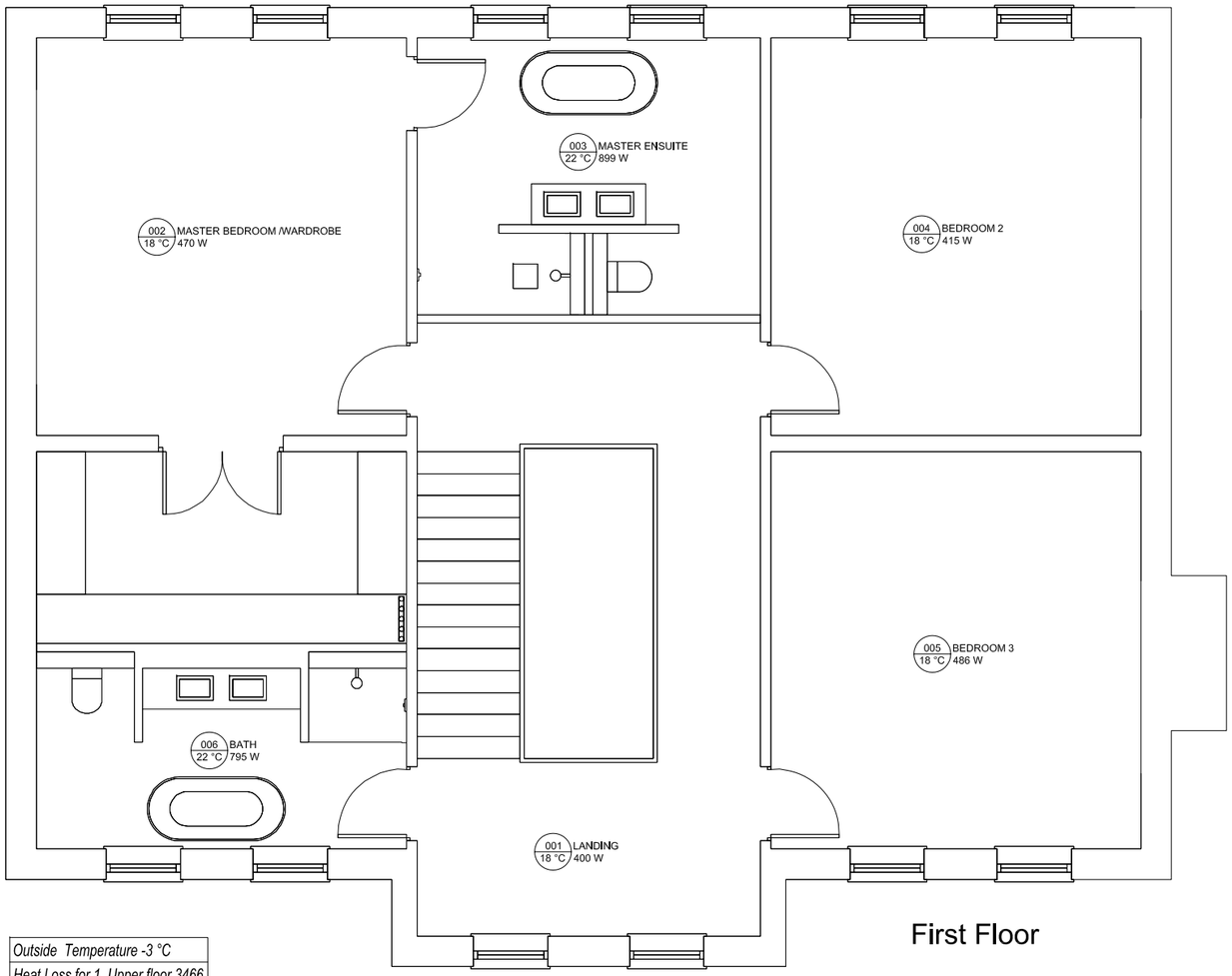
Warm-Flo Limited
Unit 55, Team Valley Business Centre, Earlsway, Gateshead, NE11 0QH
email - sales@warm-flo.com

PROJECT		
DRAWING	Ground Floor	
DATE : 11/11/25	Heatloss	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



First Floor

Outside Temperature -3 °C
Heat Loss for 1. Upper floor 3466
Area for 1. Upper floor 132.81 m²

Room Name	*LANDING*	*MASTER BEDROOM /WARDROBE*	*MASTER ENSUITE*	*BEDROOM 2*	*BEDROOM 3*	*BATH*
Room No.	*001*	*002*	*003*	*004*	*005*	*006*
Room Design Temperature	*18 °C*	*18 °C*	*22 °C*	*18 °C*	*18 °C*	*22 °C*
Air Change Rate (per hr)	*0.5*	*0.5*	*1.5*	*0.5*	*0.5*	*1.5*
Room Height (m)	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
Room Area (m2)	*31.53*	*32.98*	*13.92*	*22.05*	*22.02*	*10.31*
Volumetric Losses (Watts)	*270*	*283*	*426*	*189*	*189*	*315*
Fabric Losses (Watts)	*130*	*188*	*473*	*227*	*297*	*480*
Total Heat Loss (Watts)	*400*	*470*	*899*	*415*	*486*	*795*
Heat Loss (w/m2)	*12.7*	*14.3*	*64.6*	*18.8*	*22.1*	*77.1*

General Notes

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c. Design Room Temperature
d. Floor Covering
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f. Pipework Spacing
g. Net/Effective Heated Floor Area
h. Limits set by BSEN-1264

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- Note: m^2k/w x 10 = Tog Rating: e.g 0.1 m^2k/w = 1.0 Tog
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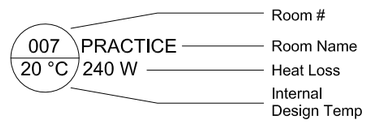
P01	11/11/25	Issued for Approval
REV	DATE	NOTES

SOURCE DRG REF:	----------
DESIGN REF:	----------

LEGEND



Heat Losses & System Design calculations based upon values indicated on drawing. Please check these & notify us immediately, in case of any variance from actuals. In the absence of actuals data, reasonable assumptions have been made.

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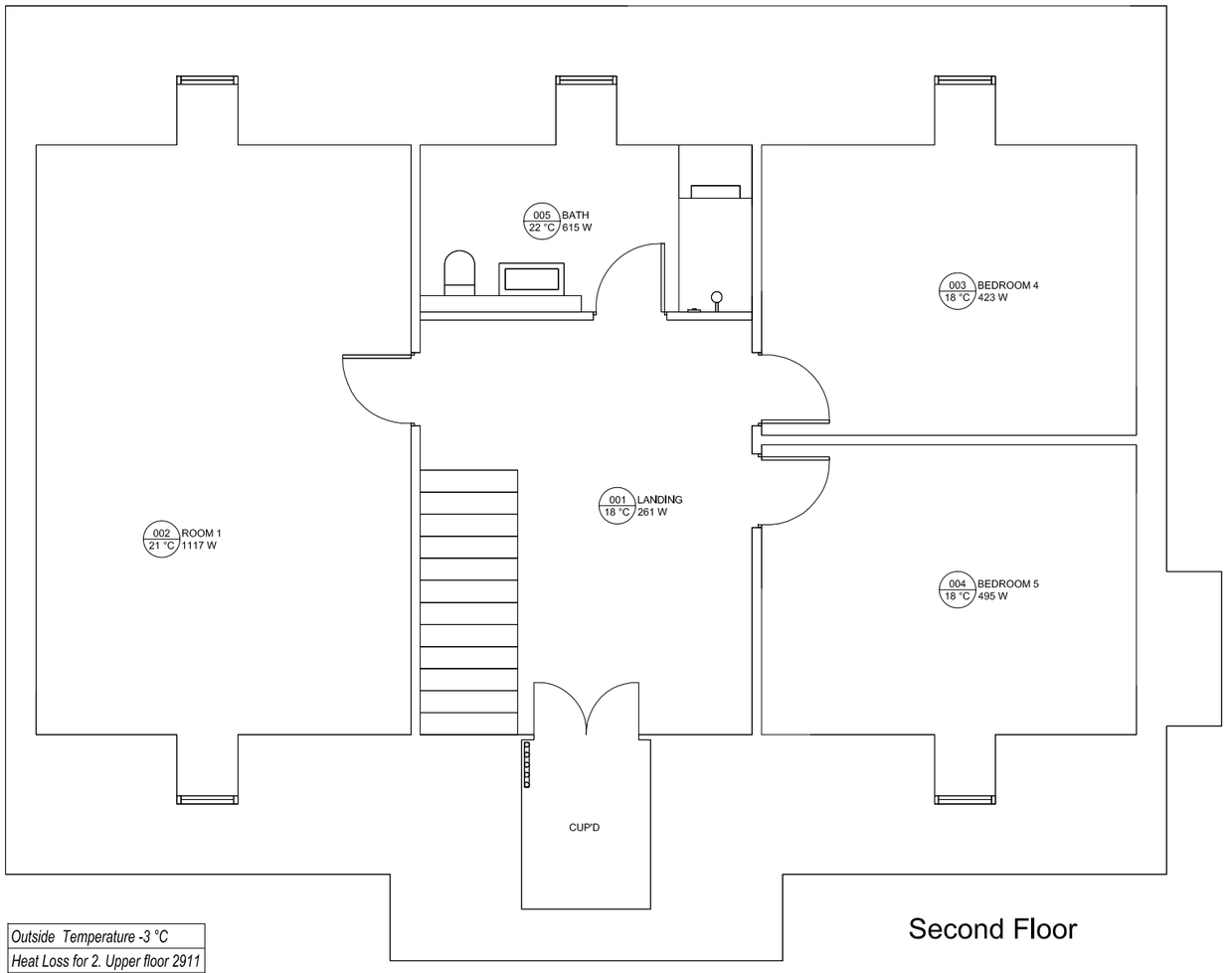
PROJECT		
DRAWING	First Floor	
DATE : 11/11/25	Heatloss	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



Second Floor

Outside Temperature -3 °C
Heat Loss for 2. Upper floor 2911
Area for 2. Upper floor 101.68 m²

Room Name	*LANDING*	*ROOM 1*	*BEDROOM 4*	*BEDROOM 5*	*BATH*
Room No.	*001*	*002*	*003*	*004*	*005*
Room Design Temperature	*18 °C*	*21 °C*	*18 °C*	*18 °C*	*22 °C*
Air Change Rate (per hr)	*0.5*	*0.5*	*0.5*	*0.5*	*1.5*
Room Height (m)	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
Room Area (m2)	*20.82*	*34.58*	*17.03*	*17*	*8.94*
Volumetric Losses (Watts)	*178*	*339*	*146*	*146*	*274*
Fabric Losses (Watts)	*82*	*779*	*277*	*349*	*341*
Total Heat Loss (Watts)	*261*	*1117*	*423*	*495*	*615*
Heat Loss (w/m2)	*12.5*	*32.3*	*24.9*	*29.1*	*68.8*

General Notes

Pipework layout / system performance
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b. Flow Rate
c. Design Room Temperature
d. Floor Covering
e. Floor Construction
f. Pipework Spacing
g. Net/Effective Heated Floor Area
h. Limits set by BSEN-1264

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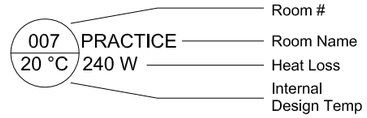
P01	11/11/25	Issued for Approval
REV	DATE	NOTES

SOURCE DRG REF:	----------
DESIGN REF:	----------

LEGEND



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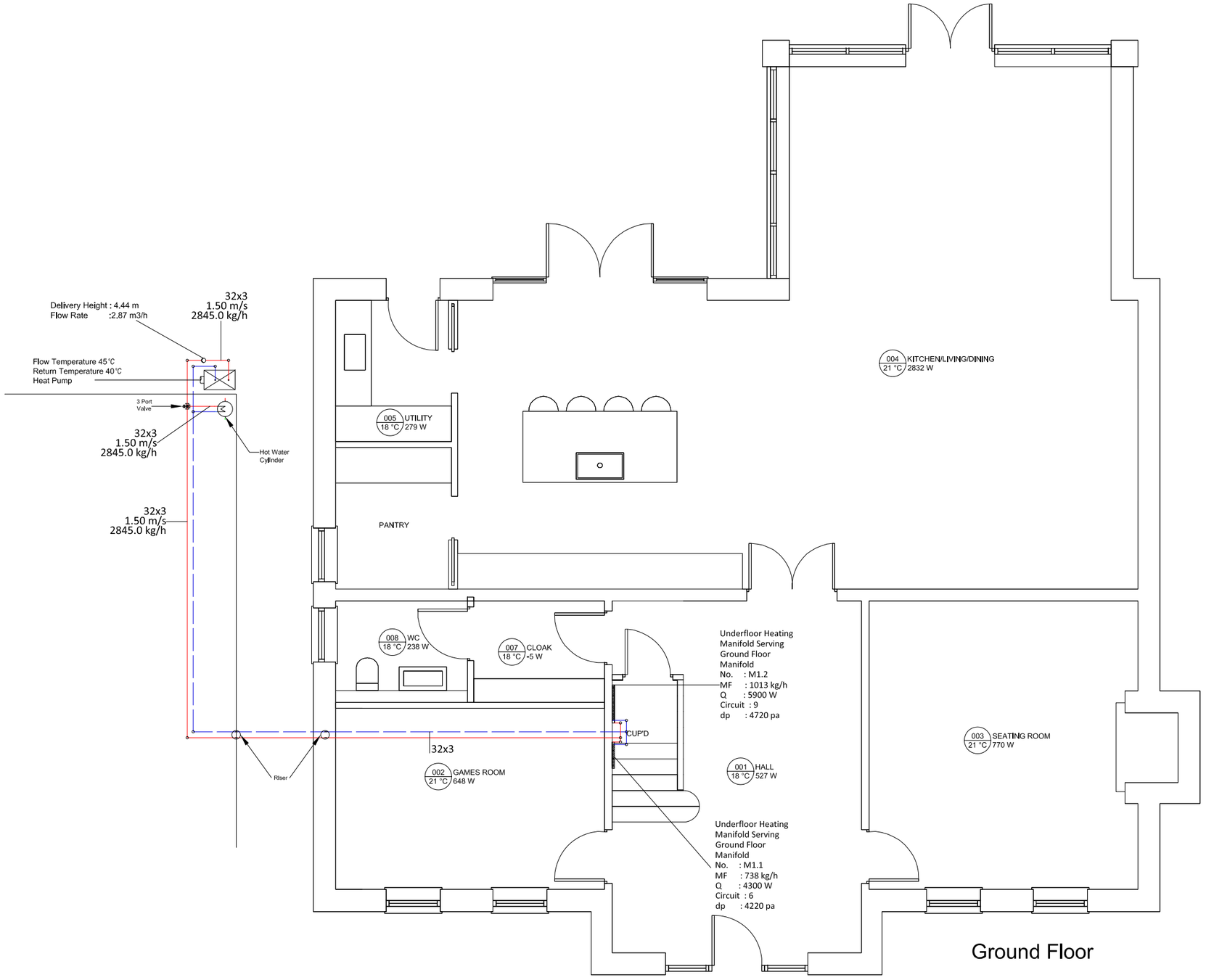
PROJECT		
DRAWING	Second Floor	
DATE : 11/11/25	Heatloss	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



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REV	DATE	NOTES
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

Flow
Return
Radiator
Hot Water Cylinder
Heat pump
UFH MANIFOLD
Riser / Drop Location for Pipe

WARM-FLO
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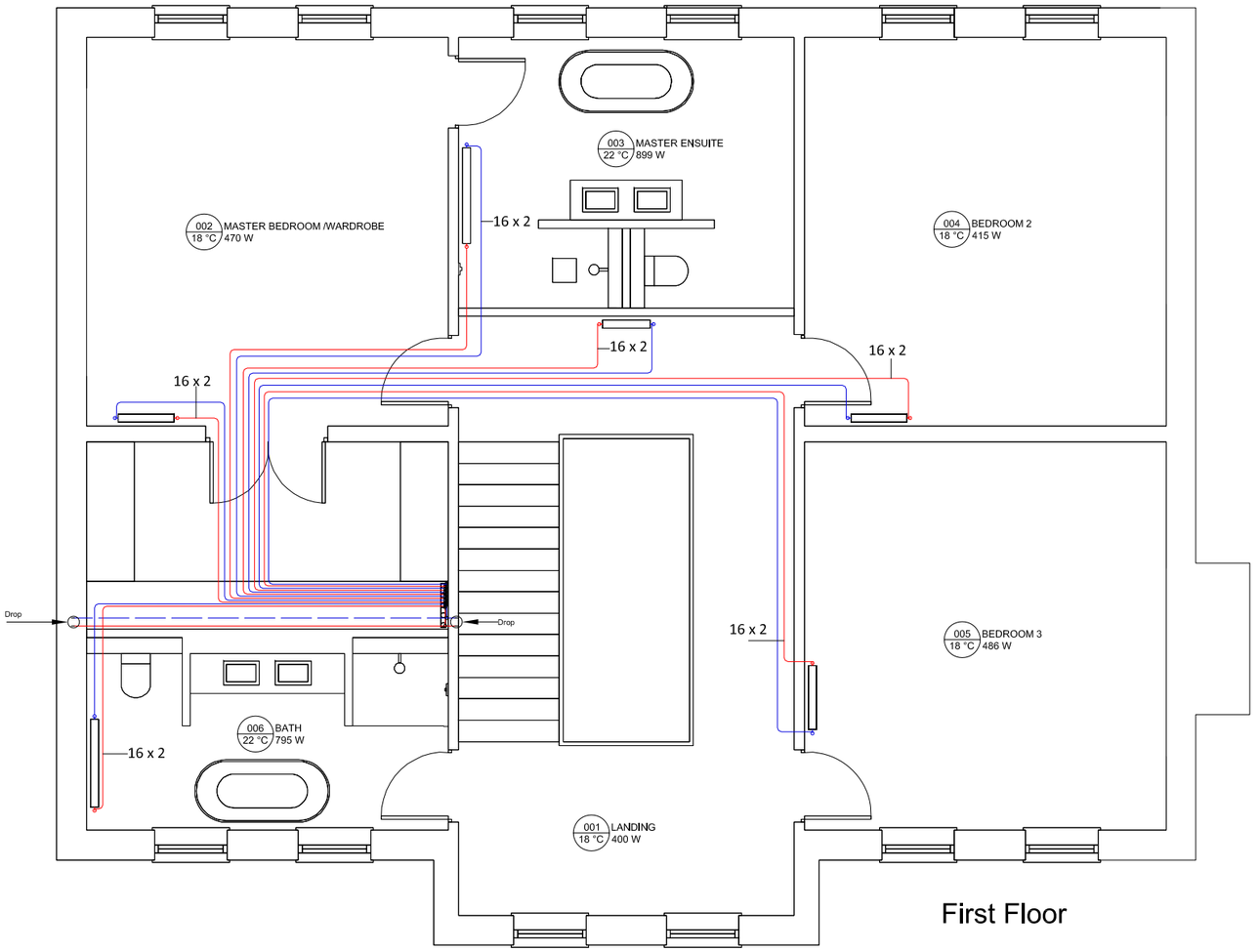
PROJECT		
DRAWING	Ground Floor	
DATE : 11/11/25	Heating Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



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REV	DATE	NOTES
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

Flow
Return
Radiator
Hot Water Cylinder
Heat pump
UFH MANIFOLD
Riser / Drop Location for Pipe

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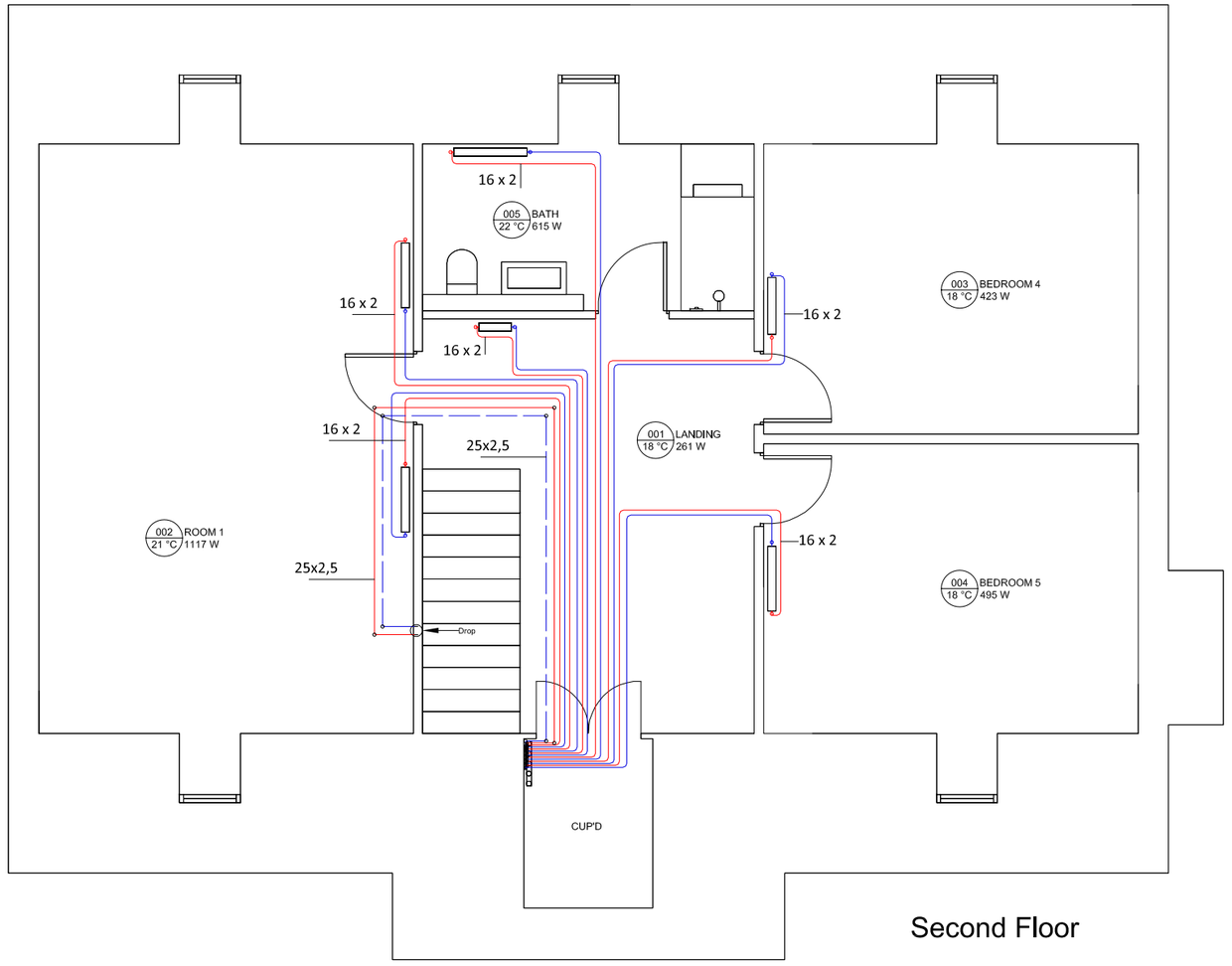
PROJECT		
DRAWING	First Floor	
DATE : 11/11/25	Heating Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



Second Floor

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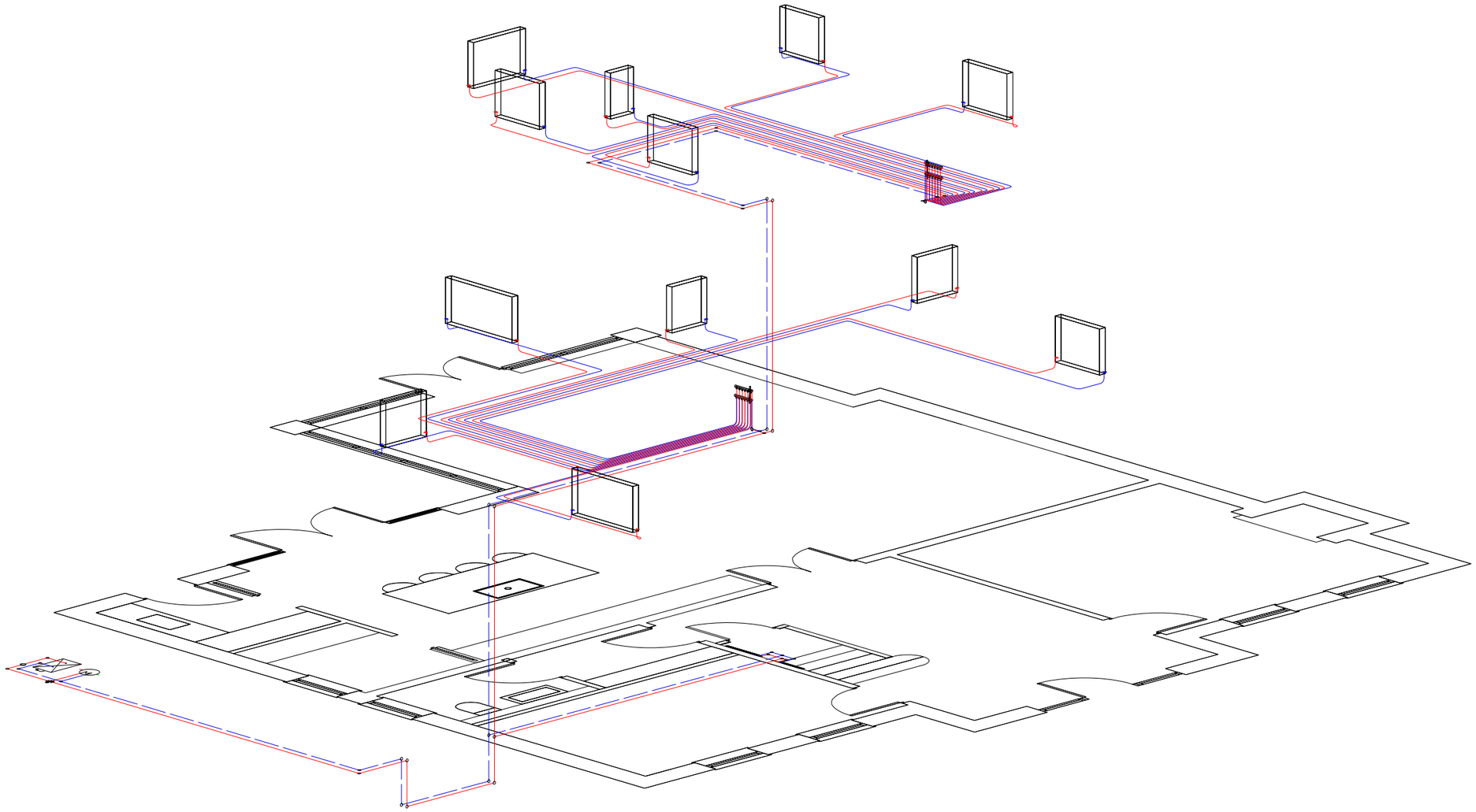
REV	DATE	NOTES
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

Flow
Return
Radiator
Hot Water Cylinder
Heat pump
UFH MANIFOLD
Riser / Drop Location for Pipe

WARM-FLO
SPECIALIST UNDERFLOOR HEATING STORE
Warm-Flo Limited
Unit 55, Team Valley Business Centre, Earlsway, Gateshead, NE11 0QH
email - sales@warm-flo.com

PROJECT		
DRAWING	Second Floor	
DATE : 11/11/25	Heating Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



REV	DATE	NOTES
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PROJECT		
DRAWING	Isometric	
DATE : 11/11/25	Heating Network	
DRAWN : AC	CHECK : JT	SCALE: N.T.S @A3

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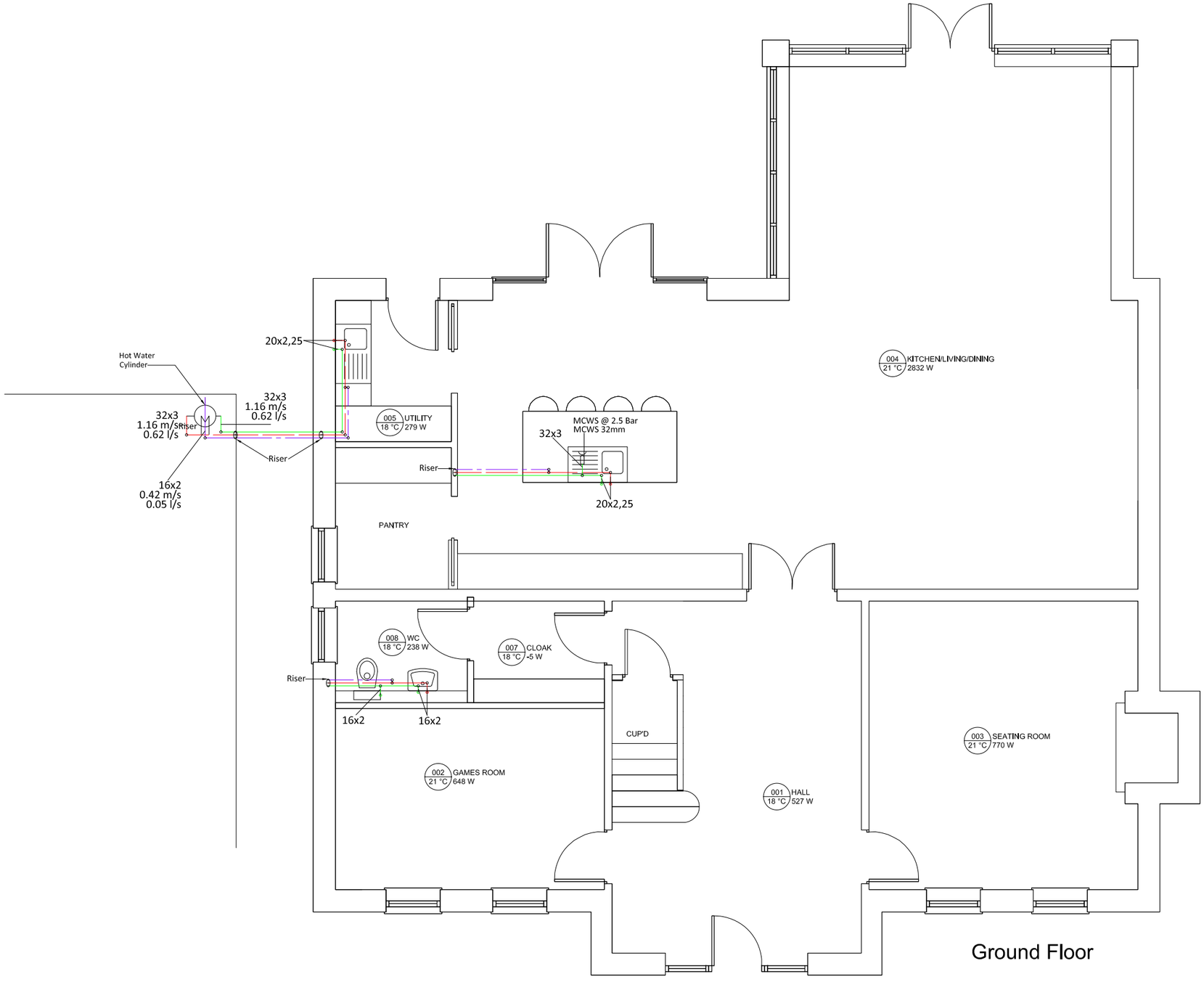

Ground Floor

General Notes

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REV	DATE	NOTES
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

Cold Water Pipes
Hot Water Pipes
Secondary Circulation
Hot Water Cylinder
Heat pump
Riser / Drop Location for Pipe

WARM-FLO
SPECIALIST UNDERFLOOR HEATING STORE
Warm-Flo Limited
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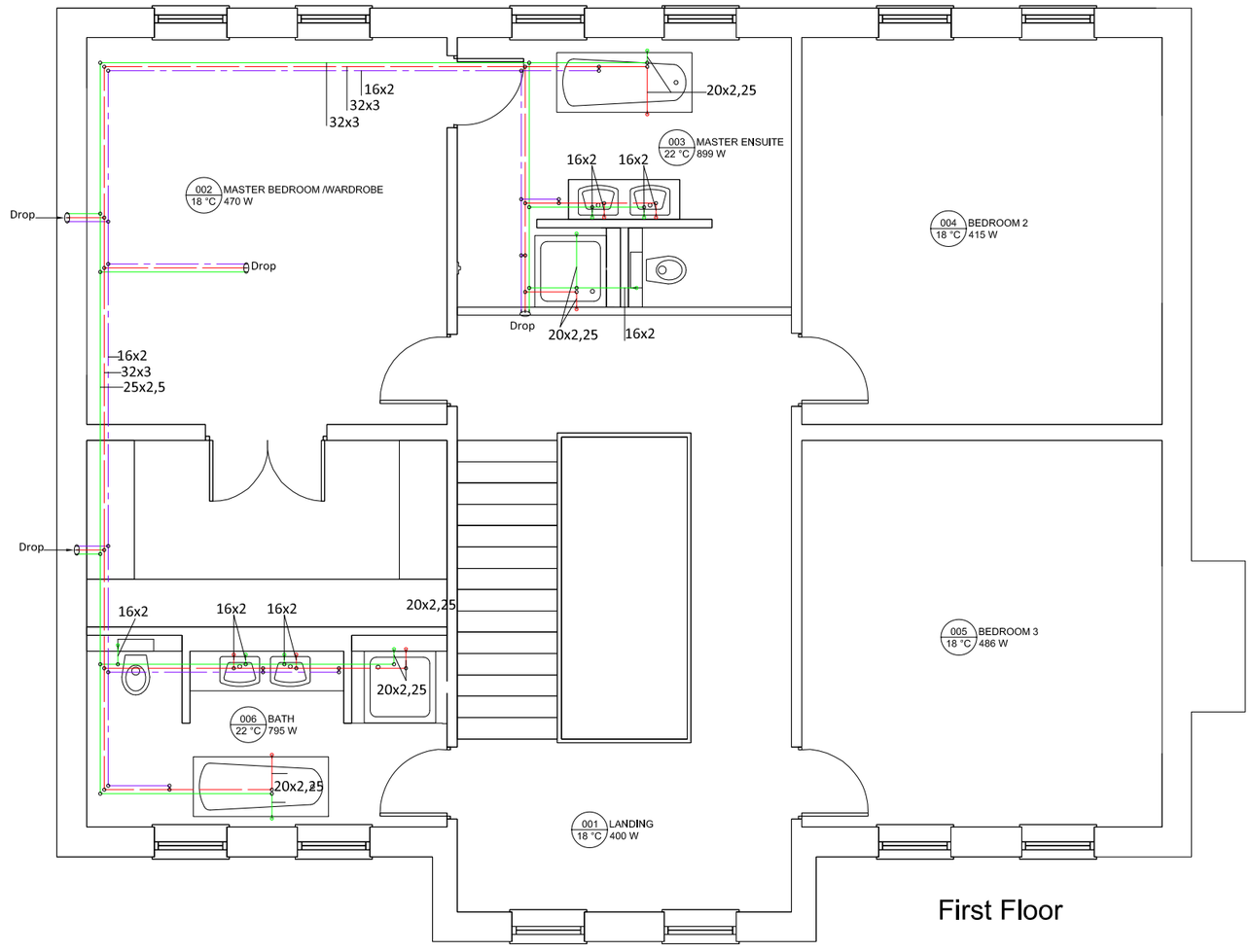
email - sales@warm-flo.com

PROJECT		
DRAWING	Ground Floor	
DATE : 11/11/25	Plumbing Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



First Floor

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REV	DATE	NOTES

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Riser / Drop Location for Pipe

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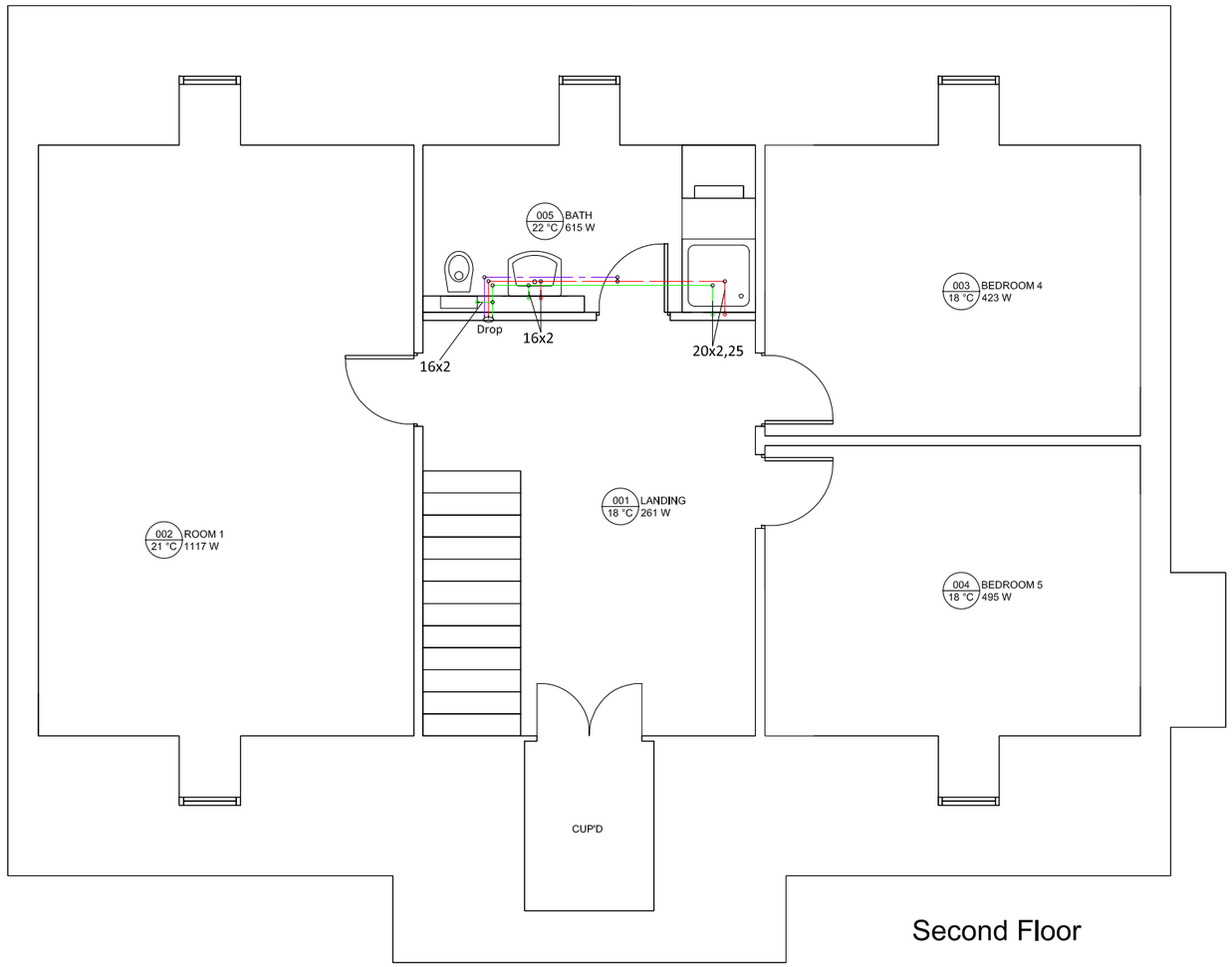
PROJECT		
DRAWING	First Floor	
DATE : 11/11/25	Plumbing Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



Second Floor

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REV	DATE	NOTES

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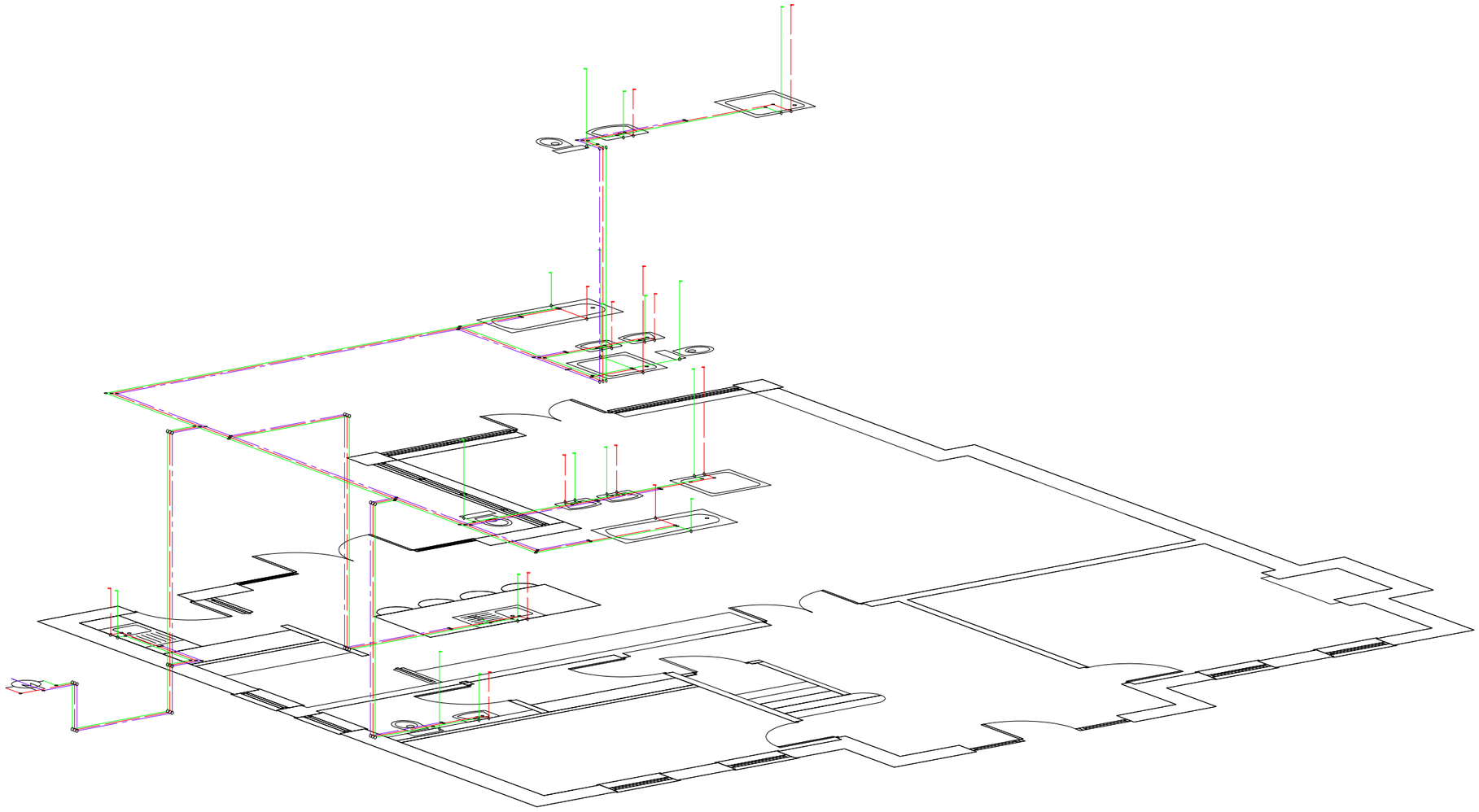
PROJECT		
DRAWING	Second Floor	
DATE : 11/11/25	Plumbing Network	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3



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REV	DATE	NOTES
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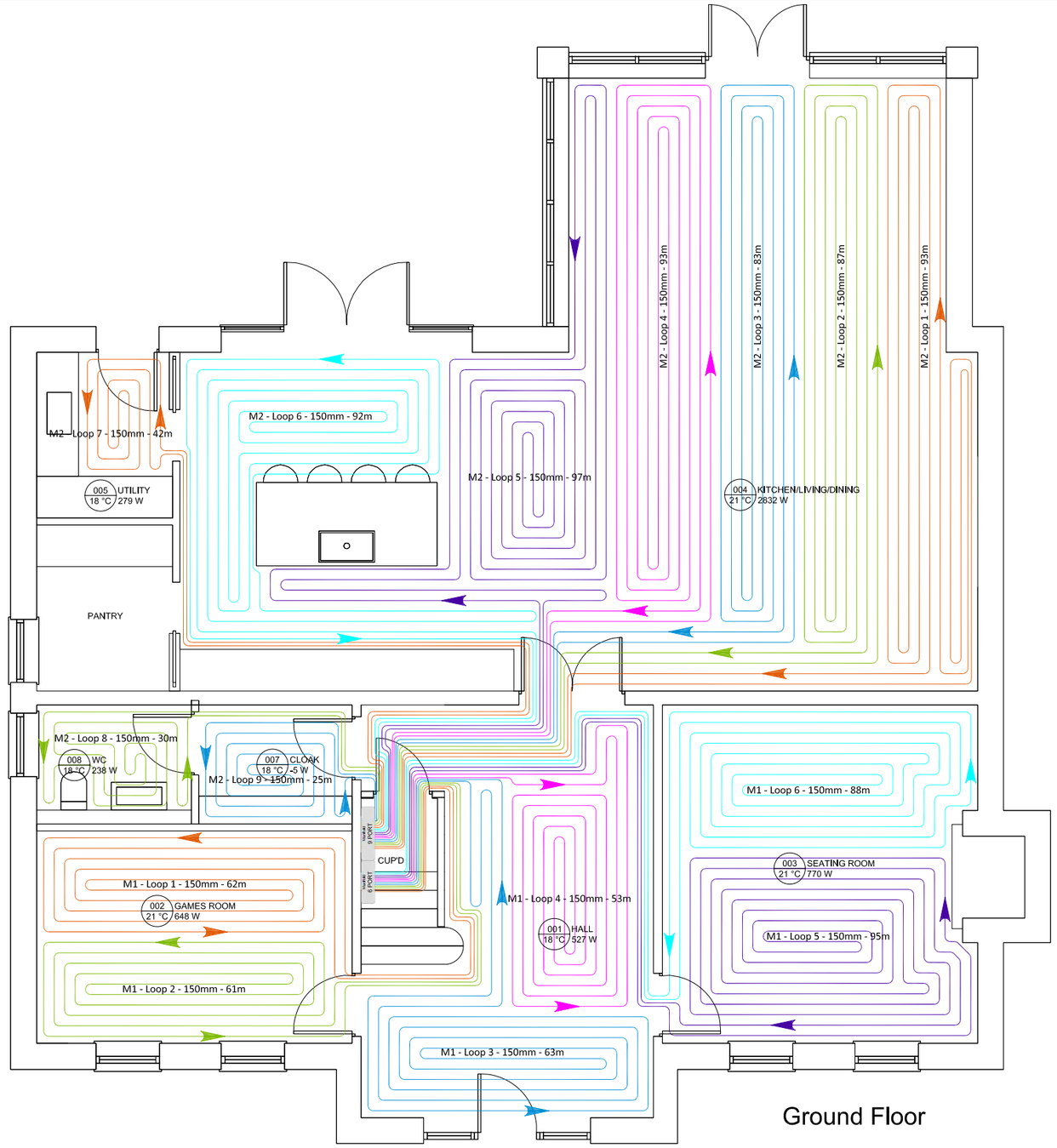
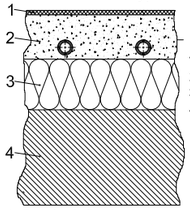
PROJECT		
DRAWING	Isometric	
DATE : 11/11/25	Plumbing Network	
DRAWN : AC	CHECK : JT	SCALE: N.T.S @A3



Floor Construction:

BS EN 1264 - Type A System



1 - Floor covering
2 - Weight bearing & thermal diffusion layer
3 - Thermal insulation
4 - Structural base

1. Typical underfloor heating system construction details are shown above, for further information regarding our other systems please feel free to contact us so we can discuss your options with you.
2. The performance of insulation can vary with different types. Suitability of the overall floor should be confirmed prior to installation.
3. To ensure best results, all heated floor areas require provision of thermal floor insulation which can be subject to building regulations or BS EN 1264, whichever is the higher requirement.
   a. Minimum insulation standards for UFH per BS EN 1264:
   i. Ground or Exposed Floors = 1.25 m2K/W e.g. 50mm EPS (Expanded Polystyrene)
   ii. Upper floors = 0.75 m2K/W e.g. 25mm EPS (Expanded Polystyrene)
4. Perimeter Edge insulation is principally used for purposes of expansion movement and, where applicable, acoustic performance of the floor.
5. Where insulation is not provided under the UFH system, UFH performance will differ from the information provided within this design and further guidance should be sought.
6. For BS EN 1264 type A solid floors with underfloor heating, Expansion / stress relief joints may be required. These should be designed and installed by others.
7. For BS EN 1264 type A screed floors, the minimum cover over under floor heating pipes per BSEN8204 is 35mm with Sand/Cement screed, 25mm with Anhydrite based screed - although manufacturers requirements may differ.
8. For BS EN 1264 type B floor constructions, the heat diffusion material (plate/foil) must be in full contact with the floor deck above.
9. For BS EN 1264 type B constructions, aluminum plate coverage should be at least 80% of the effective occupied floor area.
10. Where required due to the requirements for the notching of joists it is advised that a structural engineer is consulted to verify structural integrity.
11. It is the installers responsibility to ensure that the installation fully complies with BS EN 1264.

P01	11/11/25	Issued for Approval
REV	DATE	NOTES
SOURCE DRG REF:	----------	
DESIGN REF:	----------	

General Notes

Pipework layout / system performance
Colour coding of loops are for identification during installation only
The pipework layout shown is based upon the latest plans provided by the client to 'Warm-Flo', if there are an discrepancies these must be reported to 'Warm-Flo' to ensure the system will perform as designed, failure to do so may effect the output of the system and invalidate the indemnity offered by 'Warm-Flo'.
The layout is designed as a guide, however site conditions may not always enable the design to be followed exactly.
Unless otherwise stated, no heat loss calculations have been made within this design.
Where appropriate, we recommend the use of towel rails in all bathrooms and en-suites due to the potential for limited outputs of effective heated floors in these rooms.

Heat Outputs
Heat outputs are based on the parameters in the tables above. All heat outputs and floor surface temperatures are adjusted per m2 of effective floor area and, unless otherwise stated, are based upon a BS EN-1264 compliant system.

Underfloor Heat outputs may vary from the values stated above depending upon the specific relationship between the following set of values:
a. Design Water Temperature
b. Flow Rate
c. Design Room Temperature
d. Floor Covering
e. Floor Construction
f. Pipework Spacing
g. Net/Effective Heated Floor Area
h. Limits set by BSEN-1264

Floor Surface Temperature
The floor surface temperatures provided are the average zone floor surface temperature based upon the heat outputs stated. Floor surface temperatures may vary in areas of congested/uncontrolled pipe work (i.e. leaving manifolds and in transitional areas such as hallways and corridors), peripheral zones and areas subject to direct sunlight or auxiliary heat sources. Floor surface temperatures are managed by control using thermostats and further influenced by water temperature controls.

Transition pipes
BS EN 1264-3 states that the heat output of transition pipes not serving the room through which they pass shall be limited by design or insulation coverings so that any room temperature should not be increased substantially.
We would recommend that flow pipework in these areas is sleeved.

Attachment system
BS EN 1264-4 states that the pipes and their attachment systems shall be secured such that their horizontal and vertical positions are maintained as planned. BS EN 1264-4 also shows a vertical tolerance of + 5mm at any point, and a horizontal tolerance of +/- 10mm at the attachment points. These requirements are not applicable in areas of bends and deflections.

Holes In floor
BS EN 1264-4 states that each hole in floor shall have been preformed before the floor heating is installed in order to avoid any drilling thereafter.

Floor coverings
- Prior to installing the floor covering, the floor covering installer shall verify the suitability for installing the floor covering over the UFH system. The floor coverings are stored and installed according to the relevant standards and the manufacturer's instructions.
- The floor surface may exceed 27˚C.....this information should be passed to your flooring contractor.
- Consideration should be given to movement joints where screed, hardwood or tiled floor areas exceed 40m2
- Note; $m^2k/w \times 10 =$ Tog Rating: e.g 0.1 $m^2k/w = 1.0$ Tog
- Unless stated otherwise in the tables above:
  - Per BS-EN-1264, a default TOG rating of 1.0 tog is used for system performance
  - Typical TOG rating for TILES = 0.0 tog
  - Typical TOG rating for HARDWOOD = 1.15 tog
  - Typical TOG rating for Carpet and Underlay = 2.15 tog
    Assumes 12mm wool/nylon blend Carpet + 0.8 Tog Underlay.

WHEN CONSIDERING CHANGES TO FLOOR COVERINGS:
New Combined TOG Rating < Listed = INCREASED Output Potential
New Combined TOG Rating > Listed = REDUCED Output Potential = REVIEW Against Heat Demand

Thermostats
All thermostat wiring should be BS 7671 compliant. Thermostat positions are intended as indicative only. We recommend that thermostat and sensors are positioned on internal walls, out of direct sunlight and potential thermal gain and not in enclosed spaces (ie behind doors).

WARM-FLO
SPECIALIST UNDERFLOOR HEATING STORE
Warm-Flo Limited
Unit 55, Team Valley Business Centre, Earlsway, Gateshead, NE11 0QH
email - sales@warm-flo.com

PROJECT		
DRAWING	Ground Floor	
DATE : 11/11/25	UFH Loop Layout	
DRAWN : AC	CHECK : JT	SCALE: 1:75 @A3

M-01	
Manifold Size	6
Flow Temp °C	45
Pressure Drop (kPa)	4.22
Heat Required (kW)	4.3
Area Covered (m2)	57
Downward Losses	10%

Loop Name	Room / Area Name	Floor Construction	Floor Finish	Room Area (net) (m2)	Loop Length (m)	Pipe Spacing (mm)	Heat Loss (watts)	Output Required per Loop (watts)	Thermal Output of Circuit - Actual (W)	Surplus (Deficit) %	Temp Drop (°C)	Average Surface Temp. (°C)	Pressure Drop (kPa)	Volumetric Flow [l/m]
M-01-1	Games Room	A_Screed_Staples	0.15	6.9	62	150	324	292	362	24%	10	26.0	1.2	0.73
M-01-2	Games Room	A_Screed_Staples	0.15	6.9	61	150	324	292	362	24%	10	26.0	1.2	0.73
M-01-3	Hall	A_Screed_Staples	0.1	10.9	63	150	263.5	237	794	235%	10	24.7	3.3	1.31
M-01-4	Hall	A_Screed_Staples	0.1	10.9	53	150	263.5	237	794	235%	10	24.7	2.8	1.31
M-01-5	Sitting Room	A_Screed_Staples	0.15	10.6	95	150	385	347	557	61%	10	26.0	3.6	1.09
M-01-6	Sitting Room	A_Screed_Staples	0.15	10.6	88	150	385	347	557	61%	10	26.0	3.4	1.09

M-02	
Manifold Size	9
Flow Temp °C	45
Pressure Drop (kPa)	4.72
Heat Required (kW)	5.9
Area Covered (m2)	80
Downward Losses	10%

Loop Name	Room / Area Name	Floor Construction	Floor Finish	Room Area (net) (m2)	Loop Length (m)	Pipe Spacing (mm)	Heat Loss (watts)	Output Required per Loop (watts)	Thermal Output of Circuit - Actual (W)	Surplus (Deficit) %	Temp Drop (°C)	Average Surface Temp. (°C)	Pressure Drop (kPa)	Volumetric Flow [l/m]
M-02-1	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	93	150	472	425	620	46%	10	26.0	3.6	1.09
M-02-2	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	87	150	472	425	620	46%	10	26.0	3.3	1.09
M-02-3	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	83	150	472	425	620	46%	10	26.0	3.2	1.09
M-02-4	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	93	150	472	425	620	46%	10	26.0	3.6	1.09
M-02-5	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	97	150	472	425	620	46%	10	26.0	3.7	1.09
M-02-6	Kitchen/Living/D	A_Screed_Staples	0.15	11.8	92	150	472	425	620	46%	10	26.0	3.5	1.09
M-02-7	Utility	A_Screed_Staples	0	2.3	42	150	279	251	275	10%	10	28.6	0.7	0.69
M-02-8	WC	A_Screed_Staples	0	3.1	30	150	238	214	371	73%	10	28.6	0.5	0.67
M-02-9	Cloak	A_Screed_Staples	0	3.7	25	150	0	-	443	0%	10	28.6	0.5	0.73

General Notes

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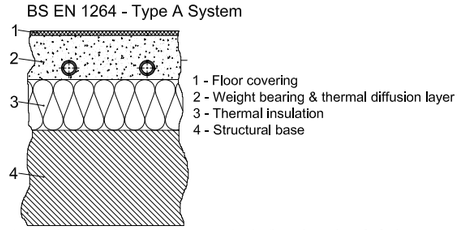
Floor Construction:

BS EN 1264 - Type A System



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8. For BS EN 1264 type B floor constructions, the heat diffusion material (plate/foil) must be in full contact with the floor deck above.
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REV	DATE	NOTES
P03	11/11/25	Plumbing & Heating Pipe Sizing updated
P02	14/10/25	Bill of material Missing
P01	11/11/25	Issued for Approval

SOURCE DRG REF:	----------
DESIGN REF:	----------

WARM-FLO
SPECIALIST UNDERFLOOR HEATING STORE
Warm-Flo Limited
Unit 55, Team Valley Business Centre, Earlsway, Gateshead, NE11 0QH
email - sales@warm-flo.com

PROJECT		
DRAWING	Ground Floor	
DATE : 11/11/25	UFH Table	
DRAWN : AC	CHECK : JT	SCALE: NTS @A3