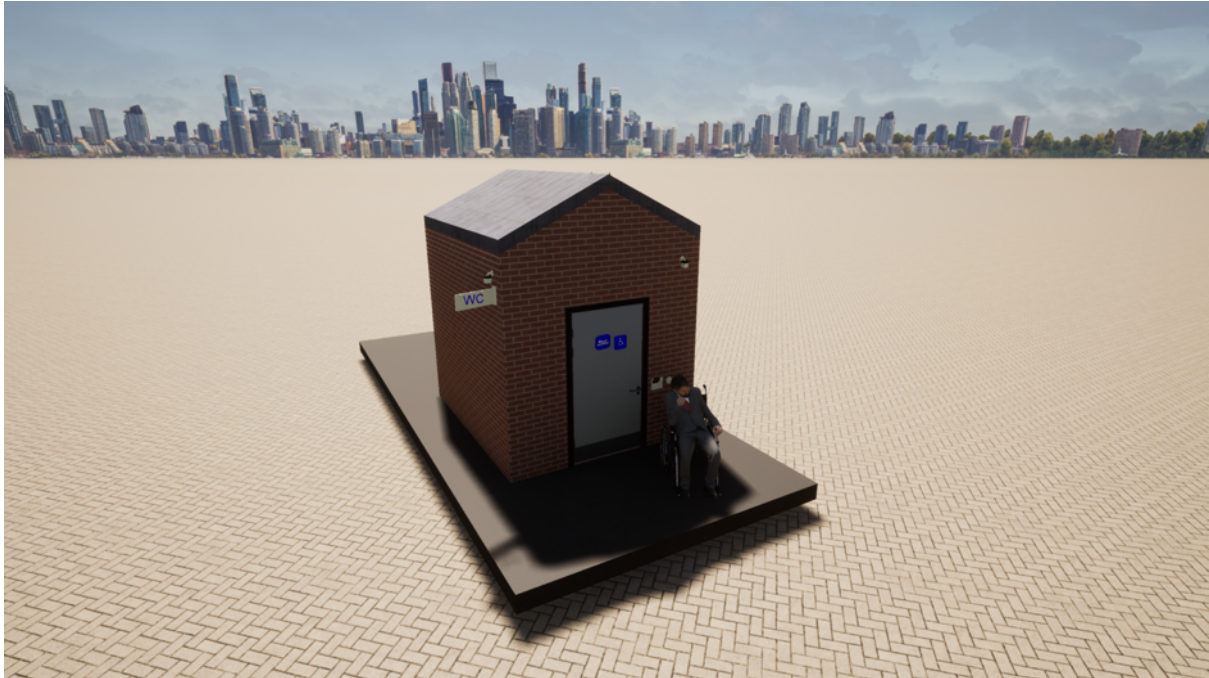


WC And Baby Change Pod Design and Manufacture Specification



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1. Introduction

The project is to develop and design the prototype for an offsite constructed pod that can be used to provide new accessible WC & Baby change Facilities. The pod layout, fixtures and fittings are based on the enhanced accessible WC & baby design developed with Northern Trains Limited. The units are to be used at a selection of Northern Rail Stations.

The overall objective of the project is to provide a service or facility that currently cannot be achieved by conventional building methods without significant cost or interruption in rail service. This has led to us outlining key design objectives that were referred to at each stage of design and development.

For more clarity this document should be read in conjunction with the design plans provided

1.1 List of Supporting Documents

- 01. Steel Frame**
- 02. GRP Cladding**
 - 02.a. Cladding Fixing Points**
- 03. GRP Hip Roof**
 - 03.a. GRP Gable Roof**
 - 03.b. GRP Curved Roof**
- 04. Electrical Plan**
 - 04.a Electrical Elevations**
- 05. Services**
- 06. Base Template**
- 07. Plumbing Plan**
- 08.GRP Floor**

2. Design Objectives

- The unit must be long lasting, impact and vandal resistant.
- Best possible fire and safety standards. Safety is the highest priority
- Visually inkeeping to a range of vastly different environments
- interchangeable texture GRP (Glass Reinforced Plastic) exterior panels and roof with a range of different texture and colour options
- Minimal external maintenance requirements
- Constructed using a portal frame design allowing internal and external walls to be fitted to a steel structure.
- A sealed floor to ensure no water ingress from the internal of the pod into critical service areas of the pod
- Strictly no timber used in any part in the construction of the unit
- A manageable overall unit weight to ensure ease of delivery
- Internally easily cleaned and maintained
- A lifetime of over 25 years

4. Manufacturing Overview

The unit will be manufactured by using off site construction techniques (fig 3.) The structure will consist of 6 major construction steps.

Step 1: The construction of the portal steel frame. The frame will be constructed out of steel and all joints are welded together. The design of the framework is critical to the project as it will support all the internal items.

Step 2: Installation of the GRP floor into the portal structure. The floor will be attached to the steel frame by use of both mechanical fixings and adhesive.

Step 3: Installation of the internal and external walls along with first fix. The external walls will be attached to the steel frame by both mechanical fixings and adhesive. The first fix for electrical plumbing and waste along with any other communication wiring will be installed. The internal hygienic boarding will then be attached to the steel framework using adhesive material. The cavity between the walls will be filled with insulation.

Step 4: Installation of the roof and ceiling mounted equipment. The roof will be directly mounted to the steel frame using both mechanical and adhesive methods. The internal trims and sealant will be installed to the internal boarding at this stage.

Step 5: All internal items will be fitted at this point. This includes electrical and plumbing fit out.

Step 6: The door is fitted, and the unit is sealed. The unit will und undergo its final testing in preparation for dispatch to site for installation.

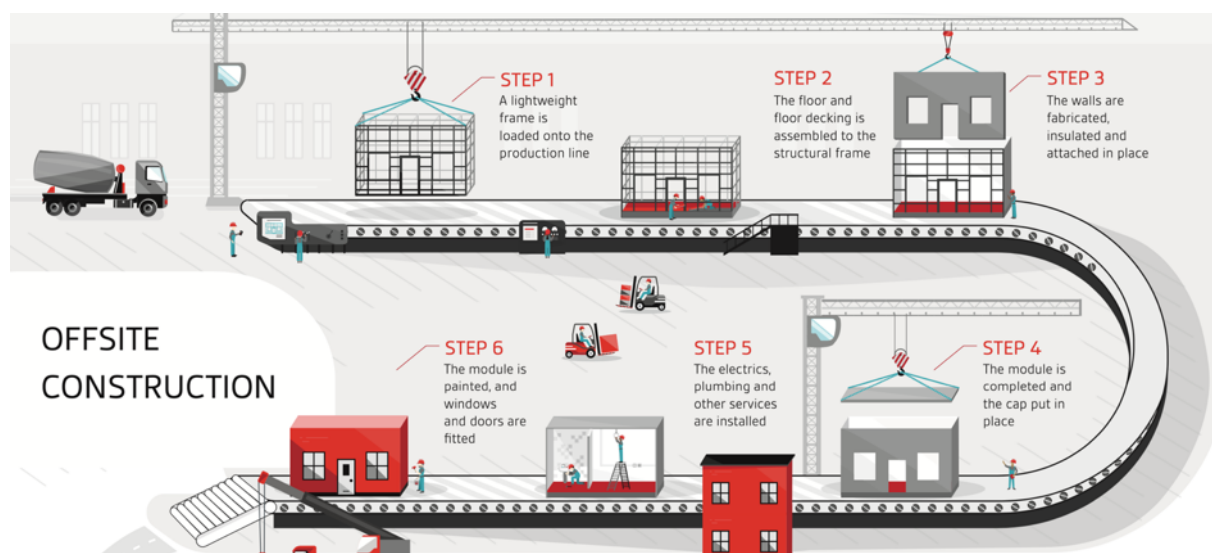


Fig 3. Offsite Construction Process

5. Steel Frame Design - (Refer to document:01.Steel Frame)

The construction of the unit should not use any timber in its construction. To achieve the required strength characteristics, it is essential that a steel portal frame is constructed to support the GRP parts along with the internal components.

The frame will be constructed by welding box steel section together to create a framework. All welding is carried out it must be performed by Coded welders and a record of this must be kept and recorded with each unit.

The portal frame will be built to BS EN 13920 for the manufacturing of the structural steel fabrications

The unit will have lifting points built into the framework so it can be transported and lifted into place. The approved plan has lifting points will be capable of taking 200% of the unit's total weight.

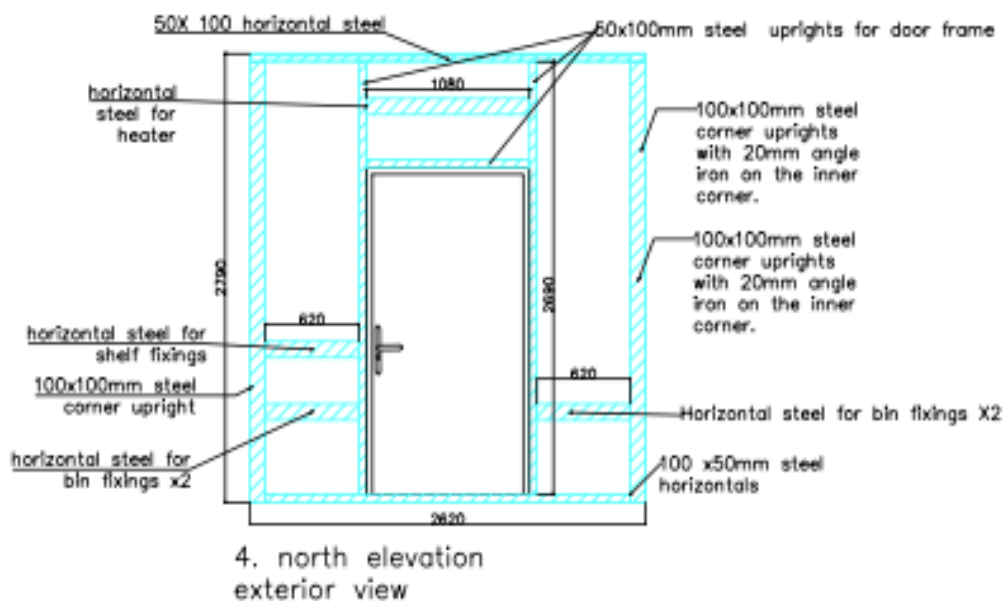


Fig 4. Steel Frame front elevation

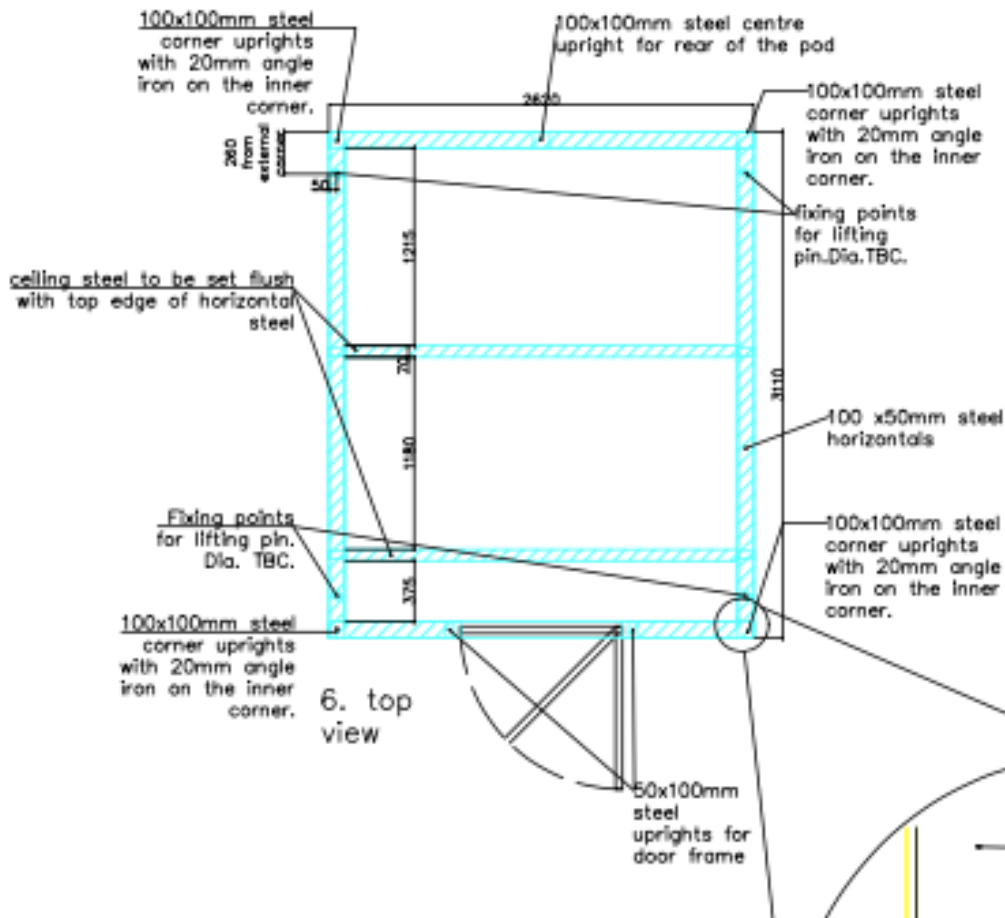


Fig 5. Steel Frame top view

6. Portal Frame Material Specification

The steel frame will be coated in a rust and fireproof coating before any internal or external cladding has been installed

7. Wall, Roof, and Floor Design

The floor, external walls and roof are all custom GRP moulded products. Using fiberglass for this will ensure a long-life product with minimal external maintenance. Using certain specified products, the GRP parts of the units can be impact and vandal resistant. It is also important that a range of mouldings are available

7.1 Floor

The floor in total is 50mm thick. The floor must be capable of taking a load of at least 500kg in the centre of the part with little to no deformation. The floor must be attached to the rest of the pod by both mechanical fixings and adhesive. The floor must comply with Class 1 fire regulations. The floor will be made entirely of GRP there for it will be the barrier between internal and external damp.

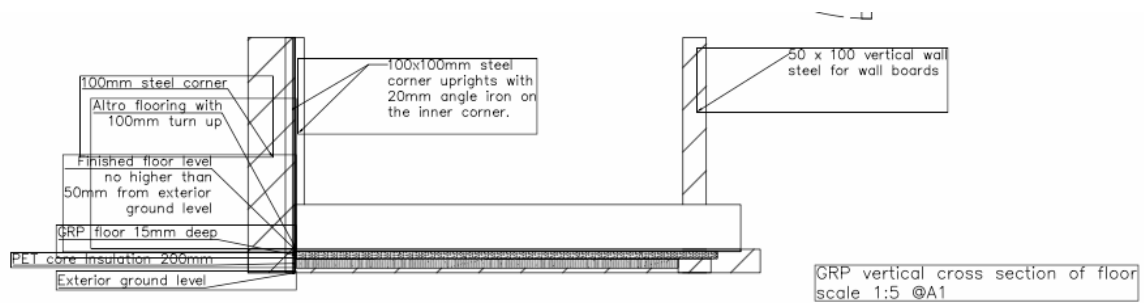


Fig 6. Floor Diagram (Refer to document: 08.GRP Floor)

7.2 External Wall Cladding

 (Refer to document: 02 GRP Cladding/ 02a GRP Fixing Points)

The outer construction of the shell must be a bespoke GRP (Glass reinforced plastic) construction. The outer walls must be of bespoke design to the project and able to come in a range of textures, finishes and colours that suit a range of environments of which the units are placed. These textures include woodgrain/shiplap effect, brick, and modern smooth finishes. These finishes must be realistic as possible. Pictures of proposed textures must be provided with tender submission.

The outer walls design must allow for the outer panels to be removable for replacement due to damage or so the units can be repurposed in different locations by replacing the external fibreglass section with another texture or colour option.

The outer walls must be vandal resistant and able to take a significant level of impact and force. To ensure this the fibreglass used in these external panels must be of a thickness of at least 8-10mm.

The walls must comply with Class 1 fire regulations

The external walls will have threaded bolts moulded into the GRP panels. These bolts will then be passed through sections of the steel frame and fastened into place

7.3 GRP Roof

 (Refer to document: 03, 03a, 03b)

The roof design must allow for it to be to be removable for replacement due to damage or so the units can be repurposed for different locations by replacing the external fibreglass section with another texture or colour option. The roof design must also ensure that there are no areas for ingress or external storage. Water flow from the roof must be directed away from the door.

The roof must be vandal resistant and able to take a significant level of impact and force. To ensure this the fibreglass used in these external panels must be of a thickness of at least 8-10mm. No core material is to be used in the construction of the roof panel.

The roof must comply with Class 1 fire regulations

The roof will have threaded bolts moulded into the GRP panels. These bolts will then be passed through sections of the steel frame and fastened into place

8. Wall Roof and Floor Material Specification

8.1 Gelcoat

The Gelcoat used in the construction of the wall and roofing units must be resistant to impact and vandal attacks and allow for an easily cleanable and maintainable surface. The gelcoat must also be a low styrene emission product.

8.2 Resin

The resin should be compliant to class 1 fire regulations and Lloyds approved. The resin must be a low styrene emission product. Batch numbers must be stored and recorded. The system used to record this data must be included in the submission tender.

8.3 Fibreglass

All fibreglass including roving and chop strand matt used in the units must be Lloyds approved

8.4 Fibreglass Manufacturing Techniques

The parts can be manufactured using grp moulding techniques including hand wet layup, spray up or resin infusion.

8.5 Eco-Friendly Credentials

The manufacture of the fibreglass sections of the units must be made from a recycled PET resin.

The units must be as eco-friendly as possible using recycled products in all possible applications. Any composite core used in the construction of the pod must be a recycled PET product.

All resins and gelcoats must be low styrene emission products

9. Electrical (Refer to document: 04 Electrical Plan, 04a Electrical Elevations)

Electrical designed, installed and tested in accordance with the requirements of BS7671: 2018 – IET Wiring Regulations (18th Edition). Electrical certificate to be provided on completion/delivery of each unit.

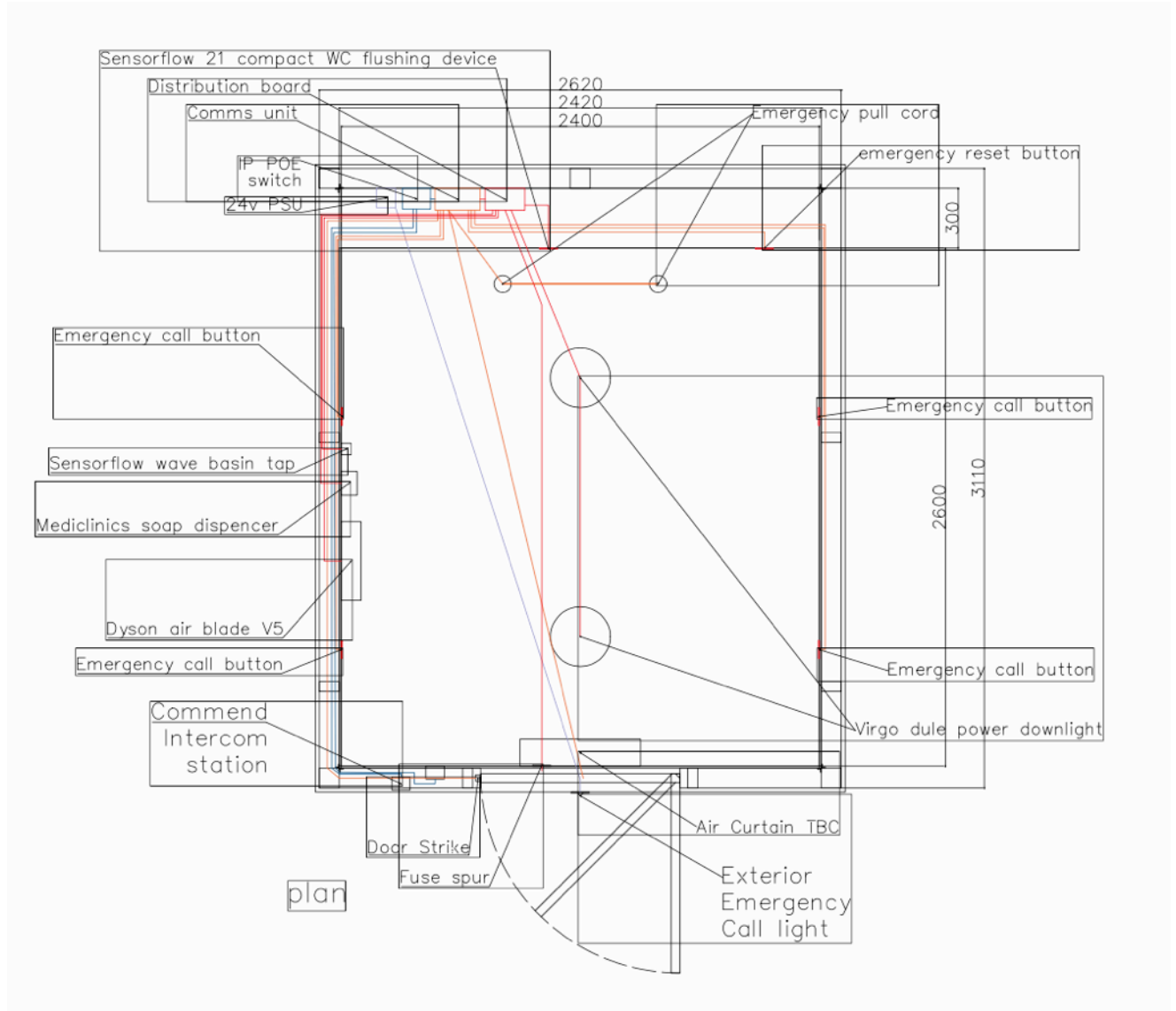


Fig 7. Electrical Diagram

10. Plumbing (Refer to document: 07. Plumbing Plan)

Plumbing will be installed as per plan and pressure tested once installed. All pipes and connectors will be John Guest speed fit.

The plumbing will be installed to the principles outlined in BS 6700:2006

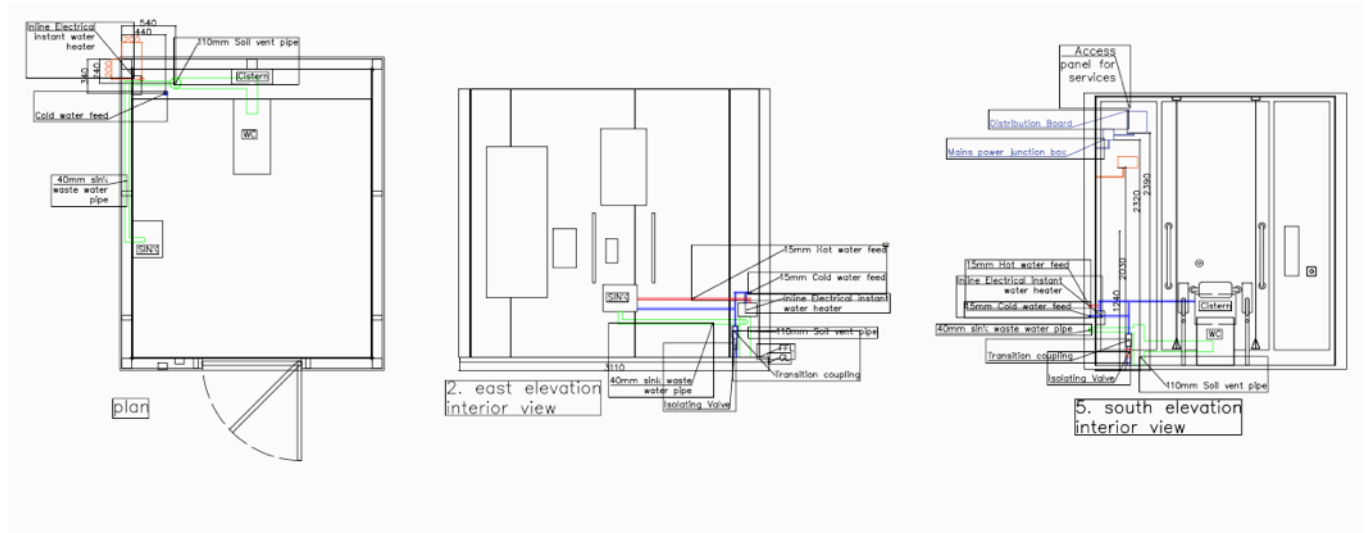


Fig 8. Plumbing Diagram (Refer to document:

11. Insulation Specification

The insulation is placed in the wall cavity and above the ceiling in the roof cavity.

100mm Glass fibre mineral wool insulation

Density: 10kg/m³

Weight/m²: 1kg

Thermal Conductivity: 0.043W/mK

R-Value: 2.33m²K/W

Fire Rating (Reaction to Fire): A1(Non-combustible)

12. Lighting, Heating and Ventilation

12.1 Lighting

As per the below calculations the lighting will be provided by a 50W light source (can be achieved by two 25W units. For the overall area this gives us 8.01 W/m²

The chosen downlight for this application is the Virgo Dual-Power Downlight.

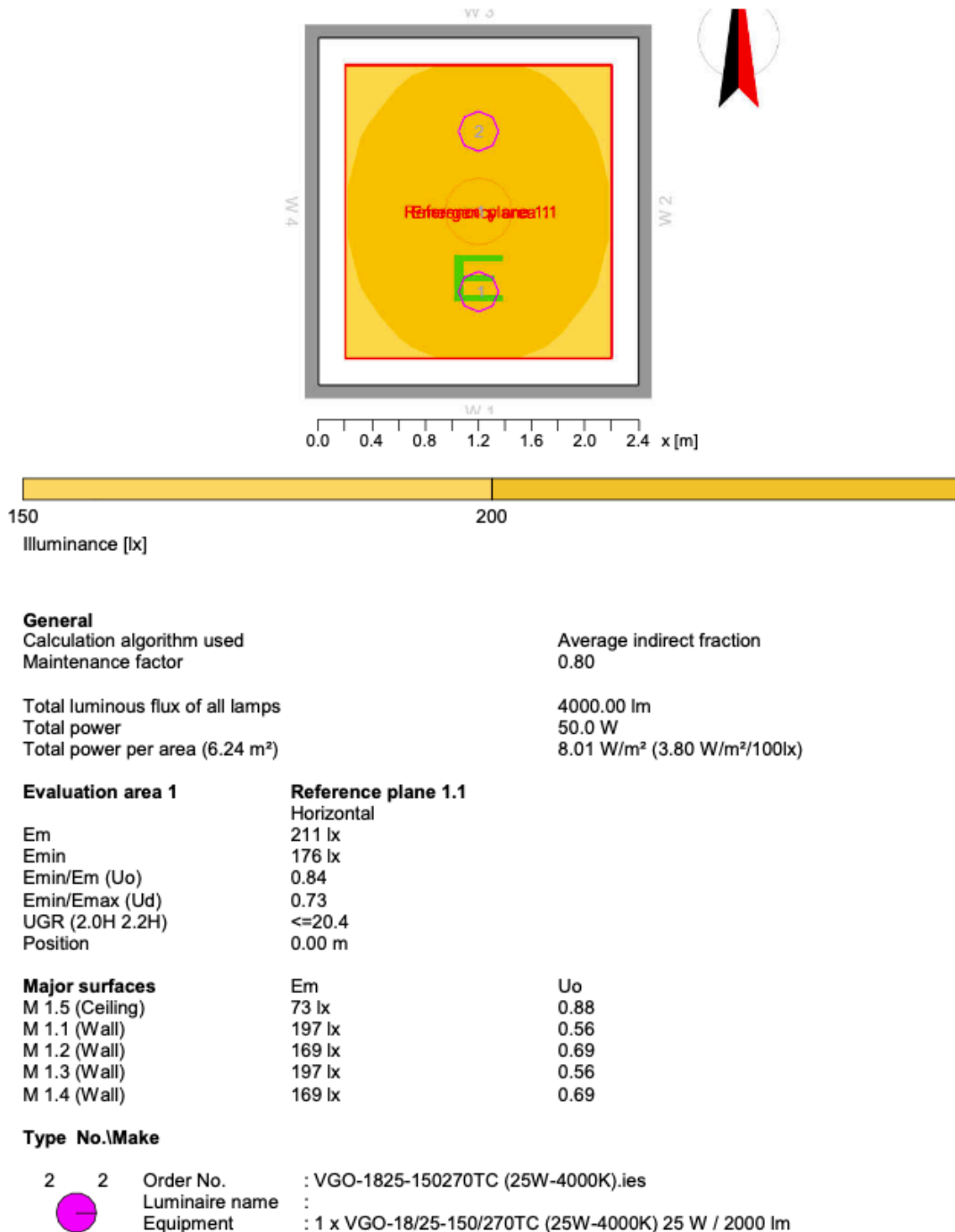


Fig 10. Lighting Calculations

12.2 Heating

Heating will be provided by a 2kW downflow heater

12.3 Ventilation

Ventilation in the unit will be provided by a wall mounted fan giving airflow of 90M³/h

13. Door Specifications

Steeldor single personnel door-sets are designed for internal and external use to enable entry and exit. Each is built to order, individually constructed with a choice of hardware, frame, threshold and panel options, including louvre, vision, over and side panels - information sheets available on request.

Typical Steeldor single personnel door-set specification

Rebate frame
(See Figs. 1 & 2) Typical door configuration consists standard rebate frame assembly, for either single or double door-sets. Made from lightweight, high tensile 'Rustec' steel and powder coat finish, it also has an "Adjust-2-Fit" side expander system that offers 6 adjustable fixing positions.

Various frame depths and styles available - including double rebate frames (see frame specification sheet).
Manufactured from 1.6 mm thick 'Rustec' steel.
Single rebate 104mm wide frame with additional rebate for flush lip.
A minimum of six fully adjustable fixing points are provided to each jamb - extra fixings available on request.
Unique 'Adjust-2-fit' side channels with each frame.

Leaf
45mm door leaf thickness, fitted with a flush lipped astragal for added security. Comprising of 2 x 1.2mm 'Rustec' steel sheets, the leaf is internally bonded with a dutch fold stitch welded system providing greater stability and protection against de-lamination.
42mm thick 'Hexatex' core.

Industrial door threshold - 96mm
(See Fig. 3) Standard aluminium threshold is DDA approved and is fitted with a neoprene seal for outward opening door-sets.

UNIQUE RANGE FEATURES

- 10-12 day lead time
- Up to 2.5m high
- 1 year warranty
- Same day quote
- Structural Hexatex Core
- 3.1 W/m²K U-value

Weight
31kg/m² with honeycomb core.

Door ironmongery
BS 7352 Grade 13 stainless steel, twin bearing template drilled butt hinges with integral high security dog bolts are fitted as standard with CE marking. Other hardware on request.

Finish
Supplied inclusive of a powder coated finish in a standard colour. Full range of RAL and BS colours available. Marine Grade finish as an option in salt laden coastal or high chlorination locations.

Seals
Strongdor self adhesive P-seal provided as standard.

Side panels and over panels (optional)
Solid, glazed and louvred side and over panels available.

Fig. 1 Single rebate frame assembly

Size	Depth (D)
Min	80mm
Max	250mm

STRONGDOR
SECURED BY *Steel*

Single door	Size range
Height	450 to 2250mm
Width	450 to 1330mm

Height	2250 to 2500mm
Width	400 to 1150mm

Larger bespoke sizes are also available in the Steeldor+ range. See specification sheet for details.

Standard single personnel door configuration



Other options on request.

14. Security and Accessibility

As per Commend/Stanley specification

15. Internal Boarding

Hygienic Rigid PVC Wall cladding system

BS476 Part 6 Class 0 when adhered to a non-combustible substrate, BS476 part 7 class 1. EN13501-1 B, s3, d0, Harmonized technical specification EN15102. DIN 4102 – B1, NFP 92-501/M 1 (F), UL94 (USA) File E100599, Fire characteristics. (CH) 5.2, CSE-RF2/75 A (I) EG/VO 1935/2004 Class 1.

15.1 Features and benefits:

- Easy to clean.
- Low maintenance.
- Durable.

- High level of chemical resistance to a wide range of chemicals, consult technical literature for details.
- Manufactured from food safe PVC.
- Full range of fixing profiles, adhesives, and silicones.
- Easy to thermoform, drill and bond.
- 20-year warranty.
- UL 94 (USA) File E100599: ≥ 1 mm.
- Fire behaviour (to DIN 4102- B 1): 1–3 mm.
- Impact strength: No failure.

15.2 Electrical properties:

- Dielectric constant E_r (at 1 kHz) (to VDE 0303 T4): 3.4.
- Dielectric dissipation factor $\tan \delta$ (at 1 kHz) (to VDE 0303 T4): 0.016.
- Surface resistance (to DIN VDE 0303 T30/ DIN IEC 93): $10^{15} \Omega$.
- Volume resistivity (to DIN VDE 0303 T30/ DIN IEC 93): $10^{14} \Omega \times m$.
- Dielectric strength (to DIN VDE 0303 T21) 1 mm sheet: ≥ 23 kV/mm.
- Tracking resistance (to DIN IEC 112): Grade CTI 600.
- Arc resistance (to DIN VDE 0303 T5): Ident. No. 2.2.2.2.

16. Utilities Diagram (Refer to document: 05. Services)

Each pod will be constructed to be installed on a standardised platform. Each platform will have the water, electric and waste protruding from the ground so that the pod can be placed into position and connected to the utilities.

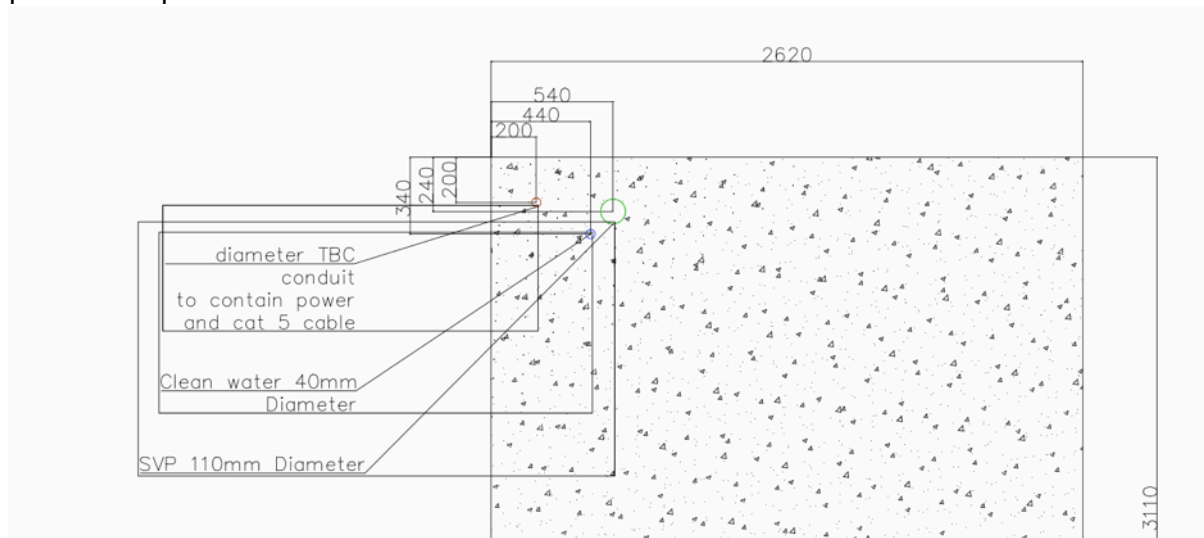


Fig 9. Utilities Diagram (Refer to document:

17. Construction Standards (British Standards)

Steel Frame - BS EN 13920

GRP - Lloyds Approval materials and design principles

Electrical - BS7671: 2018 – IET Wiring Regulations (18th Edition).

Plumbing - BS 6700:2006

18. Fire Safety

GRP - Class 1

Internal Cladding – Class 0

19. Warranty/Guarantee

Steel Frame – 25-year warranty

GRP – 25-year warranty

Internal Boarding – 20-year warranty

All internal consumer items will have their own manufactures warranty provided by the supplier.