

# Building Regulations Part O TM59 Overheating Analysis

prepared for



**DAVIDSONS  
HOMES**

## BURBAGE SITE OVERHEATING STRATEGY

Based on analysis of Plot 94

Report prepared by: Kamil Hamela, MSc  
14/11/2023

## Amendments

| Version   | Date       | Change                 | Prepared By  | Verified by  |
|-----------|------------|------------------------|--------------|--------------|
| Version 1 | 14/11/2023 | Original Specification | Kamil Hamela | Glenn Shewan |



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The overheating assessment was carried out using DesignBuilder v7.2.0.032 software and EnergyPlus simulation engine.

## 1. Executive Summary

A Building Regulations Part O/TM59 overheating analysis has been carried out at design stage, on 3-bedroom, 2 storey, detached dwelling using natural ventilation, **to prove that the specific strategy is proposed to dwellings that have limited window openings and could pose potential health risk by overheating.** The overheating assessment has been carried out on as built orientation to a dwelling that needs to be assessed with windows closed to all façades during day, and all façades except for North during night. The construction details used were as per construction notes and attached Build Standards.

The house **complies** with requirements of Building Regulations Part O TM59 Overheating analysis with openable windows as detailed in Case #1, limited due to noise issues. The requirements to overcome overheating in the dwelling are:

- Maximum G value (solar factor) of whole window assembly = **0.46**,
- First floor windows openable at 650 mm (risk of falling) to North façade at nighttime,
- System 3 ventilation trickle rate included for kitchen / bathroom / toilets,
- Cooling system to kitchen dining,
- Additional mechanical ventilation to bedroom 2 and master bedroom to achieve 45 l/s and 55 l/s, respectively,
- **Noise impact has been considered**, and overheating mitigation strategy for the house is proposed,
- front door closed all the time.

The aim of overheating assessment is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. The guidance and procedures are written for the purposes of protecting health and welfare. Following this guidance does not guarantee the comfort of building occupants.

The recommended definitions for the criteria should be explained to clients and there may be circumstances where stricter limits are appropriate for a particular building or building type.

## 2. Notes - assumptions

### Security

If windows / doors are left fully open during the day and or night, depending upon where these are located, it could pose a security risk (ground floor or over easily accessible roofs and terraces). If this is the case, then these windows will need to have some form of external security such as fixed louvres.

For this assessment, all windows other than bedrooms windows will be closed during night-time hours. All bedroom windows are not classed as easily accessible and can be considered for natural ventilation during night-time hours (if not limited by noise).

### Pollution

The pollution issues have not been assessed; if identified, window openings will need to be assessed if those can still be used for overheating strategy.

### Noise

Noise impact have been assessed; please see the window schedule, as well as Appendix E for noise restriction to certain façades.

### Protection from falling

All windows satisfy the protection from falling criteria and can be used for natural ventilation.

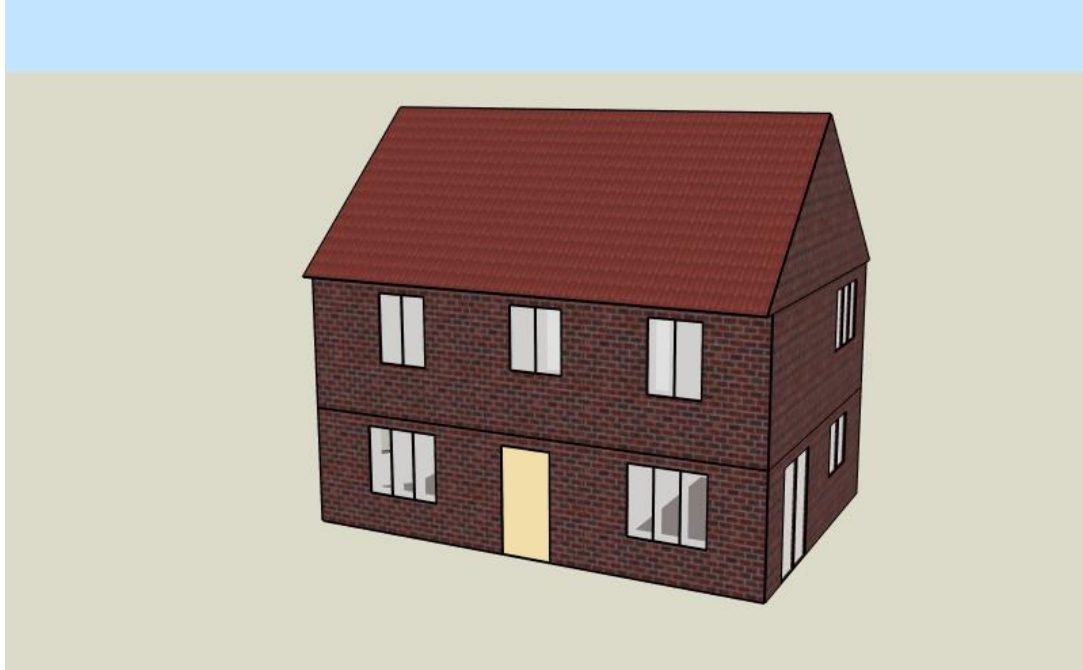
### Protection from entrapment

All openings have been designed to ensure no entrapment issues.

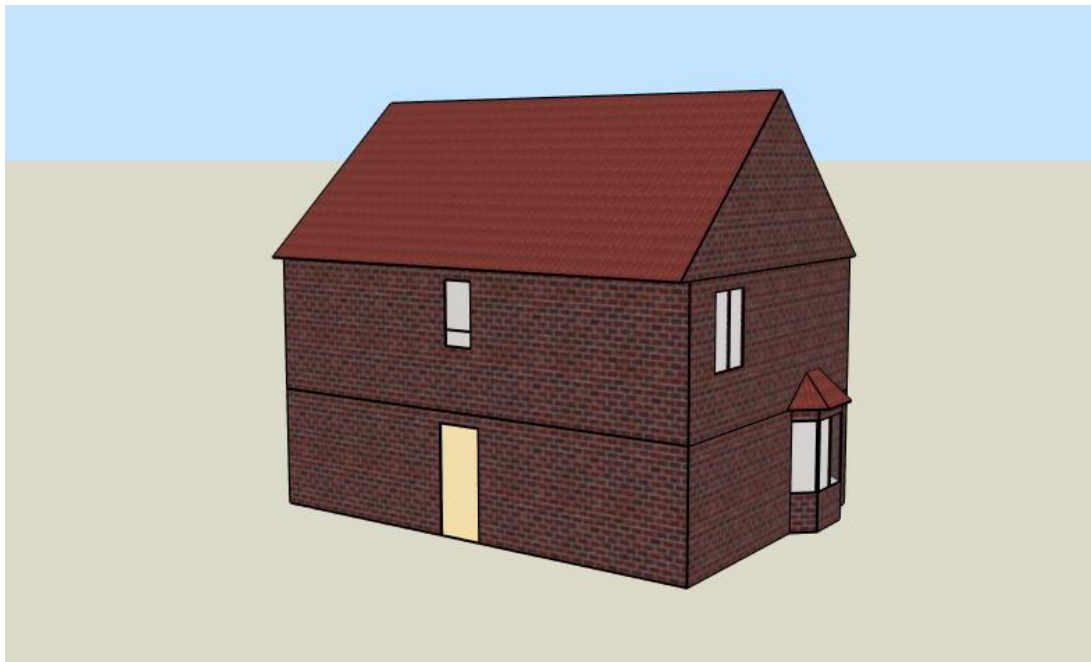


### 3. Visualisation

#### Visualisation – Front



#### Visualisation – Rear



## 4. Information used in the thermal modelling assessment

TM59 Criteria as detailed in section 3.

Occupancy schedules and internal gains as per TM59 guidelines.

Window opening to follow occupancy schedules.

Part O requirement as summarised in section 4 and detailed in Appendix D.

Construction as detailed in Build Standards Appendix A

- Cavity Wall = 0.18 W/m<sup>2</sup>K
- Floor = 0.12 W/m<sup>2</sup>K
- Joists = 0.11 W/m<sup>2</sup>K
- Rafters = 0.12 W/m<sup>2</sup>K
- Doors = 1.20 W/m<sup>2</sup>K
- Windows = 1.30 W/m<sup>2</sup>K
- Air Tightness = 5 m<sup>3</sup>/hr/m<sup>2</sup>@50Pa

Changes to the design incorporated into the thermal model to ensure compliance:

- Maximum G value of whole window assembly = 0.46
- Mechanical ventilation to bedroom 2 and master bedroom,
- Cooling system to kitchen dining.

**Birmingham and Nottingham Weather data used (DSY1 2020 High 50).** Please see Appendix C for weather data map and covered locations.

Window details

- Inside reveal = 220 mm
- Outside reveal = 50 mm
- Window coefficient of restriction = 0.65

Occupied zones included in assessment:

- Bedrooms
- Living / Dining areas

**Bedrooms over 10 m<sup>2</sup> – double bedroom**

**Bedrooms under 10 m<sup>2</sup> – single bedrooms**

**Assessor qualifications:**

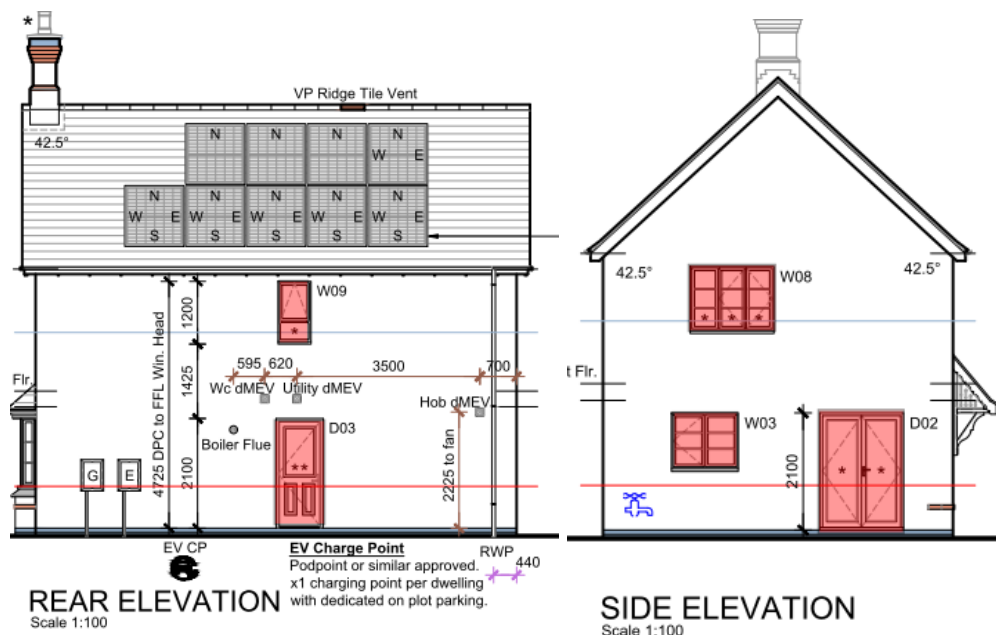
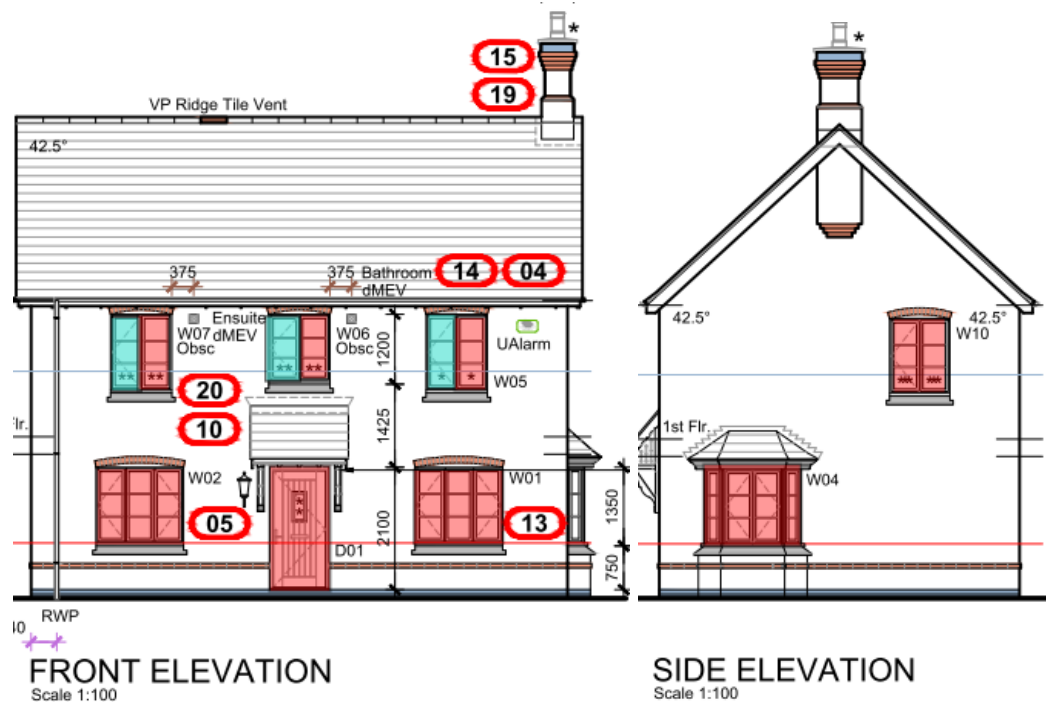
Kamil Hamela, MSc, BEng

OCDEA

NDEA Level 3/4/5

DesignBuilder Training: Minimise Overheating Risk

## 5. Window Schedule



### Legend:

**Red** – fixed or assumed closed

**Blue** – Left or right and top openable at 650 mm (risk of falling) at nighttime only

## 6. Results

### Notes

Criterion A must be equal to or less than 3%

Criterion B must be equal to or less than 32 hours

### BIRMINGHAM - FRONT SOUTH

| Floor  | Zone             | Criterion A (%) | Criterion B (hrs) | Pass/Fail |
|--------|------------------|-----------------|-------------------|-----------|
| Ground | Kitchen / Dining | 1.71            | -                 | Pass      |
| Ground | Sitting          | 2.26            | -                 | Pass      |
| First  | Bedroom 2        | 0.61            | 28.67             | Pass      |
| First  | Bedroom 3        | 1.36            | 17.83             | Pass      |
| First  | Master Bedroom   | 1.09            | 29.50             | Pass      |

|  |                                   |
|--|-----------------------------------|
|  | Air Conditioning                  |
|  | Additional mechanical ventilation |

## 7. Conclusion

Using the floor plans, elevations, data provided, assumptions relating to the window/door openings, Part O requirements and TM59 process criteria, the original design of the dwelling passed the dynamic simulation using natural ventilation.

Using natural ventilation as a solution to overheating, the main items included in the assessment are:

- window openings as detailed in section 7 – window schedule,
- maximum G value of window assembly = **0.46**,
- First floor windows openable at 650 mm (risk of falling) to North façade,
- System 3 ventilation trickle rate included for kitchen / bathroom / toilets,
- Cooling system to kitchen dining,
- Additional mechanical ventilation to bedroom 2 and master bedroom to achieve 45 l/s and 55 l/s, respectively,
- **Noise impact has been considered**, and overheating mitigation strategy for the house is proposed,
- weather data based on Nottingham and Birmingham,
- no internal blinds or shades included in assessment,
- Noise and pollution not considered in the overheating template assessment,
- internal doors closed for security and privacy but assumed opened at 50% for 5% of the time to allow occupant movement in and out of building / rooms,
- Front door to remain closed.

The aim of overheating assessment is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. The guidance and procedures are written for the purposes of protecting health and welfare. Following this guidance does not guarantee the comfort of building occupants.

The recommended definitions for the criteria should be explained to clients and there may be circumstances where stricter limits are appropriate for a particular building or building type.

## 8. Reference documents

*Building Regulations Part O Approved Document*

TM59 *Design methodology for the assessment of overheating risk in homes (2017)*; Publisher: CIBSE

*The discharge coefficient calculator, available online at: <https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>.*



## 9. Appendix

|            |                                                 |
|------------|-------------------------------------------------|
| Appendix A | Build Standards                                 |
| Appendix B | Data used to produce assessment                 |
| Appendix C | Weather Data Map                                |
| Appendix D | Building Regulations Part O – Thermal Modelling |
| Appendix E | Window Schedule                                 |
| Appendix F | Plans / Elevations                              |



## Appendix A

### Technical Report – Design Stage Assessment

| Floor               | U-value W/m <sup>2</sup> K | Notes:                                                                                                          |
|---------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------|
| Ground Floor (B&B)  | 0.12 – 0.14                | Jablite Floor System                                                                                            |
| Upper Floor Exposed | 0.12                       | - 250 mm mineral wool batten insulation between joists (0.035),<br>- 25 mm rigid foam below joists (0.022 W/mK) |

| Wall           | U-value W/m <sup>2</sup> K                       | Notes:                                                                                                                                        |
|----------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Cavity Wall    | 0.18                                             | - Brick outer skin,<br>- 150 mm Knauf Supafil 34,<br>- 100 mm low density inner blockwork (0.15 W/mK),<br>- plasterboard/skim finish on dabs. |
| Timber Wall    | 0.13                                             | - 90 mm rigid foam insulation between studs,<br>- 90 mm rigid foam insulation across studs,<br>- plasterboard and skim finish                 |
| Dormer Cheeks  | 0.26                                             | - 27 mm Gyproc Thermaline,<br>- 100 mm PIR between timber studs,<br>- 12 mm plywood.                                                          |
| Wall to Garage | 0.23<br>0.30 with 62.5 mm insulated plasterboard | - 82.5 mm insulated plasterboard,<br>- 100 mm low density blockwork (0.15 W/mK)<br>- plasterboard and skim finish.                            |

| Roof                      | U-value W/m <sup>2</sup> K | Notes:                                                                                                                                           |
|---------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Roof insulated at Joists  | 0.11                       | - 400 mm mineral wool (0.044 W/mK)                                                                                                               |
| Roof Insulated at Rafters | 0.12                       | - 150 mm rigid foam between rafters,<br>- 50 mm rigid foam below rafters (0.022 W/mK),<br>- Double plasterboard and 11 mm OSB between insulation |

| Openings - U-value W/m <sup>2</sup> K |                                                          |
|---------------------------------------|----------------------------------------------------------|
| Windows                               | U-Value 1.30, G value = 0.46<br>Source: BFRC Certificate |
| Doors                                 | U-Value 1.30                                             |
| Rooflights                            | 1.40 / G value = 0.46<br>Source: Manufacturer data       |

## Appendix B

### Data Used to produce model

The analysis has been carried out based on the details provided in plans, elevations, window, and door schedules plus several additional assumptions relating to the TM59 assessment process. The details of which are shown in the body of the report above but also include: -

**Weather** - The overheating analysis has been carried out using the DSY1\_2020 High50 weather as per TM59 requirements.

#### TM59 Overheating criteria

Modelling was based on natural ventilation

Construction details taken from SAP calculations as detailed in Build Standard Appendix A.

Modelling is based on Category III:

- I = vulnerable
- II = New Build
- III = Existing Building

Heat Gains as detailed in TM59

**Software** - The TM59 overheating analysis has been carried out using Design Builder Energy Plus software version 7.2

#### Occupancy Schedule

Occupancy schedules as detailed in TM59



## Appendix C

### Weather Data Map



**Nottingham Weather Dataset**  
**Birmingham Weather Dataset**

## Appendix D

### Building Regulations Part O - Thermal Modelling

Details taken from Building Regulations Part O

#### Summary

This approved document is Approved Document O: Overheating. It gives guidance on how to comply with Part O of the Building Regulations.

#### Application

Residential (dwellings) Dwellings, which includes both dwellinghouses and flats.

#### Intention

The aim of requirement O1 is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. In the Secretary of State's view, requirement O1 is met by designing and constructing the building to achieve both of the following. a. Limiting unwanted solar gains in summer. b. Providing an adequate means of removing excess heat from the indoor environment.

NOTE: The guidance and regulations are written for the purposes of protecting health and welfare. Following this guidance does not guarantee the comfort of building occupants. In the Secretary of State's view, compliance with requirement O1 can be demonstrated by using one of the following methods.

- a. The simplified method for limiting solar gains and providing a means of removing excess heat, as set out in Section 1.
- b. The Dynamic Thermal Modelling method, as set out in Section 2.

#### Section 2: Dynamic thermal modelling

This section details a dynamic thermal modelling method for demonstrating compliance with requirement O1. It provides a standardised approach to predicting overheating risk for residential buildings using dynamic thermal modelling as an alternative to the simplified method in Section 1.

The methodology is suitable for all residential buildings. It may offer the designer additional design flexibility over the solutions in Section 1 in the following situations.

- a. Residential buildings with very high levels of insulation and airtightness.
- b. Residential buildings with specific site conditions that mean the building is not well represented by the two locations in paragraph 1.3, for example Manchester city centre (see Appendix C). NOTE: Local microclimates may not be well reflected by the geographically closest weather file.
- c. Residential buildings that are highly shaded by neighbouring properties, structures, or landscape.

#### Dynamic thermal modelling method

To demonstrate compliance using the dynamic thermal modelling method, all of the following guidance should be followed.

- a. CIBSE's TM59 methodology for predicting overheating risk.
- b. The limits on the use of CIBSE's TM59 methodology set out in paragraphs 2.5 and 2.6.
- c. The acceptable strategies for reducing overheating risk in paragraphs 2.7 to 2.11.

The building control body should be provided with a report that demonstrates that the residential building passes CIBSE's TM59 assessment of overheating. This report should contain the details in CIBSE's TM59, section 2.3.

NOTE: Appendix B of this approved document includes a compliance checklist. The designer may use this checklist to demonstrate compliance to the building control body.

#### Limits on CIBSE's TM59 modelling

CIBSE's TM59 method requires the modeller to make choices. The dynamic thermal modelling method in this section applies limits to these choices, which are detailed in paragraph 2.6. These limits should be applied when following the guidance in CIBSE's TM59.

All of the following limits on CIBSE's TM59, section 3.3, apply.

- a. When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following.
  - i. Start to open when the internal temperature exceeds 22°C.
  - ii. Be fully open when the internal temperature exceeds 26°C.
  - iii. Start to close when the internal temperature falls below 26°C.
  - iv. Be fully closed when the internal temperature falls below 22°C.
- b. At night (11pm to 8am), openings should be modelled as fully open if both of the following apply.
  - i. The opening is on the first floor or above and not easily accessible.
  - ii. The internal temperature exceeds 23°C at 11pm.
- c. When a ground floor or easily accessible room is unoccupied, both of the following apply.
  - i. In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely, following the guidance in paragraph 3.7 below.
  - ii. At night, windows, patio doors and balcony doors should be modelled as closed.
- d. An entrance door should be included, which should be shut all the time.

#### Acceptable strategies for reducing overheating risk:-

##### Limiting solar gains

Solar gains in summer should be limited by any of the following means.

- a. Fixed shading devices, comprising any of the following.
  - i. Shutters.
  - ii. External blinds.

- iii. Overhangs.
  - iv. Awnings.
- b. Glazing design, involving any of the following solutions.
- i. Size.
  - ii. Orientation.
  - iii. g-value.
  - iv. Depth of the window reveal.
- c. Building design – for example, the placement of balconies.
- d. Shading provided by adjacent permanent buildings, structures or landscaping.

Although internal blinds and curtains provide some reduction in solar gains, they should not be taken into account when considering whether requirement O1 has been met.

Foliage, such as tree cover, can provide some reduction in solar gains. However, it should not be taken into account when considering whether requirement O1 has been met.

#### Removing excess heat

Excess heat should be removed from the residential building by any of the following means.

- a. Opening windows (the effectiveness of this method is improved by cross-ventilation).
- b. Ventilation louvres in external walls.
- c. A mechanical ventilation system.
- d. A mechanical cooling system

The building should be constructed to meet requirement O1 using passive means as far as reasonably practicable. It should be demonstrated to the building control body that all practicable passive means of limiting unwanted solar gains and removing excess heat have been used first before adopting mechanical cooling. Any mechanical cooling (air-conditioning) is expected to be used only where requirement O1 cannot be met using openings.

NOTE: Any method to reduce overheating risk in residential buildings must comply with all other parts of the Building Regulations. Particular attention should be paid to the requirements of Part F and the guidance in Approved Document F, Volume 1: Dwellings on noise and maintenance.

NOTE: A system for purge ventilation should be provided in each habitable room to demonstrate compliance with Part F of the Building Regulations. The guidance in Section 1 of Approved Document F, Volume 1: Dwellings should be followed for the minimum standards for purge ventilation. A larger amount of purge ventilation may be required than that in Approved Document F, Volume 1: Dwellings in order to satisfy requirement O1 on providing an adequate means to remove excess heat from the indoor environment.



## TM59 Natural Ventilation Criteria

### **Natural Ventilation Assessment Process taken from CIBSE TM59 2017 “Design Methodology for the assessment of overheating risk in homes”**

The details used in the assessment of TM59 - Criteria for homes predominantly naturally ventilated. Compliance is based on passing both of the following two criteria:

(a): For living rooms, kitchens, and bedrooms: the number of hours during which  $\Delta T$  is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3% of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

(b): For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a failure).

Occupied hours should be totalled, as described in CIBSE TM59, as 3672 hours per year for bedrooms (24/7 for the May–September dates covered) and 1989 hours per year for living rooms (13 hours per day for 153 days May–September). This provides a useful check that profiles have been correctly applied.

## Part O Dynamic

### **THERMAL MODELLING EXPLAINED**

The intention of the regulation is to protect health and welfare of occupants of a building by reducing the occurrence of high indoor temperatures. The scope of buildings included in the regulations are residential dwellings, houses, and flats. The requirement is met by designing and constructing the building to achieve both of the following:

- Limiting unwanted solar gains in summer,
- providing an adequate means of removing excess heat from the indoor environment.

Compliance with the requirement of Part O can be demonstrated by using dynamic thermal modelling. The thermal modelling method considers the design and construction of the building and models the effect of the following on reducing the indoor temperatures:

- external shutters / blinds,
- fixed shading / overhangs / fins / awnings,
- glazing size, orientation, G value, opening sizes and window reveals,
- shading from adjacent properties,
- thermal mass.



Building Regulations Part O also has specific limits that need to be used within the thermal modelling process:

- temperature ranges,
- occupancy profiles.

Details can be found in Appendix D.

Building Regulations Part O also requires that the following items are considered as part of the overheating assessment:

- noise at night,
- pollution,
- security,
- protection from falling,
- protection from entrapment.



## Appendix E

### Window Schedule

25254 – Open Window Schedule

| Plot No. | Daytime (Living Rooms) |      |       |      | Night-time (Bedrooms) |      |       |      |
|----------|------------------------|------|-------|------|-----------------------|------|-------|------|
|          | North                  | East | South | West | North                 | East | South | West |
| 1        | O                      | O    | C     | C    | O                     | O    | C     | C    |
| 2        | C                      | C    | C     | C    | C                     | C    | C     | C    |
| 3        | O                      | C    | C     | C    | O                     | O    | C     | C    |
| 4        | N/A                    | C    | C     | O    | O                     | O    | O     | O    |
| 5        | O                      | O    | N/A   | C    | O                     | O    | O     | O    |
| 6        | O                      | O    | C     | N/A  | O                     | O    | O     | O    |
| 7        | O                      | N/A  | C     | N/A  | O                     | O    | O     | O    |
| 8        | O                      | N/A  | C     | N/A  | O                     | O    | O     | O    |
| 9        | O                      | N/A  | C     | O    | O                     | O    | O     | O    |
| 10       | O                      | C    | N/A   | O    | O                     | O    | O     | O    |
| 11       | N/A                    | O    | N/A   | C    | N/A                   | O    | C     | C    |
| 12       | O                      | N/A  | C     | C    | O                     | O    | C     | N/A  |
| 13       | O                      | O    | C     | O    | O                     | O    | C     | O    |
| 14       | C                      | C    | C     | O    | O                     | O    | C     | O    |
| 15       | O                      | C    | C     | O    | O                     | C    | O     | O    |
| 16       | O                      | C    | C     | O    | O                     | O    | C     | O    |
| 17       | O                      | C    | O     | O    | O                     | O    | O     | O    |
| 18       | O                      | C    | C     | O    | O                     | O    | O     | O    |
| 19       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 20       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 21       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 22       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 23       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 24       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 25       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 26       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 27       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 28       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 29       | O                      | C    | O     | O    | O                     | O    | O     | O    |
| 30       | O                      | C    | O     | C    | O                     | O    | O     | O    |
| 31       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 32       | O                      | C    | C     | O    | O                     | O    | C     | O    |
| 33       | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 34       | N/A                    | C    | C     | C    | O                     | O    | O     | O    |
| 35       | O                      | C    | N/A   | O    | O                     | O    | O     | O    |
| 36       | N/A                    | C    | O     | O    | O                     | O    | O     | O    |
| 37       | O                      | C    | N/A   | O    | O                     | O    | O     | O    |
| 38       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 39       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 40       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 41       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 42       | O                      | O    | O     | O    | O                     | O    | O     | O    |
| 43       | O                      | C    | C     | O    | O                     | O    | O     | O    |
| 44       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 45       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 46       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 47       | O                      | O    | O     | O    | O                     | O    | O     | O    |

| Plot No. | Daytime (Living Rooms) |      |       |      | Night-time (Bedrooms) |      |       |      |
|----------|------------------------|------|-------|------|-----------------------|------|-------|------|
|          | North                  | East | South | West | North                 | East | South | West |
| 48       | O                      | C    | O     | O    | O                     | O    | O     | O    |
| 49       | O                      | C    | N/A   | O    | O                     | O    | O     | O    |
| 50       | O                      | C    | N/A   | O    | O                     | O    | O     | O    |
| 51       | N/A                    | C    | O     | O    | O                     | O    | O     | O    |
| 52       | O                      | C    | C     | C    | O                     | O    | O     | O    |
| 53       | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 54       | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 55       | O                      | C    | C     | C    | O                     | C    | C     | O    |
| 56       | N/A                    | C    | C     | O    | N/A                   | C    | C     | O    |
| 57       | O                      | C    | N/A   | O    | O                     | C    | N/A   | O    |
| 58       | N/A                    | C    | O     | O    | N/A                   | O    | O     | O    |
| 59       | O                      | C    | N/A   | O    | O                     | O    | N/A   | O    |
| 60       | O                      | O    | C     | O    | O                     | O    | O     | O    |
| 61       | O                      | C    | C     | O    | O                     | O    | O     | O    |
| 62       | O                      | C    | O     | O    | O                     | C    | O     | O    |
| 63       | O                      | C    | O     | O    | O                     | C    | O     | O    |
| 64       | O                      | C    | O     | O    | O                     | C    | O     | O    |
| 65       | O                      | C    | O     | O    | O                     | C    | O     | O    |
| 66       | O                      | C    | C     | C    | O                     | C    | O     | O    |
| 67       | O                      | C    | C     | C    | O                     | C    | C     | O    |
| 68       | C                      | C    | C     | C    | O                     | C    | C     | O    |
| 69       | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 70       | C                      | C    | C     | C    | O                     | C    | C     | O    |
| 71       | O                      | C    | N/A   | C    | O                     | C    | N/A   | O    |
| 72       | N/A                    | C    | O     | C    | N/A                   | C    | C     | O    |
| 73       | O                      | C    | N/A   | C    | O                     | C    | N/A   | O    |
| 74       | N/A                    | C    | C     | C    | N/A                   | C    | C     | O    |
| 75       | C                      | C    | N/A   | C    | O                     | C    | N/A   | O    |
| 76       | N/A                    | C    | C     | C    | N/A                   | C    | C     | O    |
| 77       | C                      | C    | N/A   | C    | O                     | C    | N/A   | C    |
| 78       | N/A                    | C    | C     | C    | N/A                   | C    | C     | C    |
| 79       | C                      | C    | C     | C    | C                     | C    | C     | C    |
| 80       | C                      | C    | C     | C    | C                     | C    | C     | C    |
| 81       | C                      | C    | C     | C    | C                     | C    | C     | C    |
| 82       | C                      | C    | C     | C    | C                     | C    | C     | C    |
| 83       | C                      | C    | C     | C    | N/A                   | C    | C     | C    |
| 84       | C                      | C    | C     | C    | N/A                   | C    | C     | C    |
| 85       | C                      | C    | C     | C    | O                     | C    | N/A   | C    |
| 86       | C                      | C    | C     | C    | O                     | C    | N/A   | C    |
| 87       | N/A                    | C    | C     | C    | N/A                   | C    | C     | C    |
| 88       | N/A                    | C    | N/A   | C    | N/A                   | C    | N/A   | C    |
| 89       | C                      | C    | N/A   | C    | O                     | C    | N/A   | O    |
| 90       | O                      | C    | C     | C    | O                     | C    | C     | O    |
| 91       | O                      | C    | C     | C    | O                     | C    | C     | O    |
| 92       | O                      | C    | O     | C    | O                     | C    | O     | O    |
| 93       | O                      | C    | C     | C    | O                     | C    | O     | O    |
| 94       | C                      | C    | C     | C    | O                     | C    | C     | C    |
| 95       | O                      | C    | N/A   | C    | O                     | C    | N/A   | C    |

| Plot No. | Daytime (Living Rooms) |      |       |      | Night-time (Bedrooms) |      |       |      |
|----------|------------------------|------|-------|------|-----------------------|------|-------|------|
|          | North                  | East | South | West | North                 | East | South | West |
| 96       | N/A                    | C    | C     | C    | N/A                   | C    | C     | C    |
| 97       | O                      | C    | C     | N/A  | O                     | C    | C     | N/A  |
| 98       | O                      | N/A  | C     | N/A  | O                     | N/A  | C     | N/A  |
| 99       | O                      | N/A  | C     | N/A  | O                     | N/A  | C     | N/A  |
| 100      | O                      | N/A  | C     | C    | O                     | N/A  | C     | C    |
| 101      | N/A                    | C    | C     | C    | N/A                   | C    | C     | C    |
| 102      | N/A                    | C    | N/A   | C    | N/A                   | C    | N/A   | C    |
| 103      | C                      | C    | N/A   | C    | O                     | C    | N/A   | C    |
| 104      | N/A                    | C    | C     | C    | N/A                   | C    | C     | C    |
| 105      | N/A                    | C    | N/A   | C    | N/A                   | C    | N/A   | C    |
| 106      | C                      | C    | N/A   | C    | O                     | C    | N/A   | C    |
| 107      | O                      | C    | C     | C    | O                     | C    | C     | C    |
| 108      | O                      | C    | C     | C    | O                     | C    | C     | C    |
| 109      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 110      | O                      | N/A  | C     | C    | O                     | N/A  | C     | O    |
| 111      | O                      | C    | C     | N/A  | O                     | C    | C     | N/A  |
| 112      | O                      | N/A  | C     | C    | O                     | N/A  | C     | C    |
| 113      | O                      | C    | C     | N/A  | O                     | C    | C     | N/A  |
| 114      | O                      | N/A  | C     | C    | O                     | N/A  | C     | C    |
| 115      | O                      | C    | C     | N/A  | O                     | C    | C     | N/A  |
| 116      | O                      | N/A  | C     | C    | O                     | N/A  | C     | C    |
| 117      | O                      | C    | C     | N/A  | O                     | C    | C     | N/A  |
| 118      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 119      | O                      | O    | C     | O    | O                     | O    | C     | O    |
| 120      | O                      | O    | C     | O    | O                     | O    | C     | O    |
| 121      | O                      | N/A  | C     | O    | O                     | O    | C     | N/A  |
| 122      | O                      | C    | C     | N/A  | O                     | N/A  | C     | C    |
| 123      | O                      | C    | C     | C    | O                     | C    | C     | C    |
| 124      | O                      | C    | O     | C    | O                     | O    | O     | C    |
| 125      | O                      | C    | C     | C    | O                     | O    | O     | C    |
| 126      | O                      | C    | C     | C    | O                     | O    | O     | C    |
| 127      | O                      | C    | C     | N/A  | O                     | O    | C     | N/A  |
| 128      | O                      | N/A  | C     | C    | O                     | N/A  | C     | O    |
| 129      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 130      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 131      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 132      | O                      | C    | C     | C    | O                     | O    | C     | O    |
| 133      | C                      | C    | C     | C    | O                     | O    | C     | O    |
| 134      | C                      | C    | C     | C    | O                     | O    | C     | O    |
| 135      | C                      | C    | C     | C    | O                     | O    | C     | O    |

Note: Needs to be read in conjunction with drawings 25254\_04\_120\_06 and 07

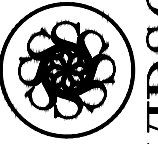
**Key**

|               |
|---------------|
| Open window   |
| Closed Window |
| N/A           |

## Appendix F

### Plans and Elevations





**NOTE TO HOUSE PURCHASERS -  
PROPERTY MISDESCRIPTIONS ACT 1991**  
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Date:

Description:

Floor Area: 1025 sq/ft

Rev:

Spec:A2

House Type: DH313B-5

Sales Name: THE FORD

Description: Elevations

Scale: 1/100 Date: June 22 Drawn: GD

NOTE: FIRE ESCAPE WINDOWS ARE NOT REQUIRED TO FIRST FLOOR - HALF HOUR INTERNAL DOORS TO HABITABLE ROOMS

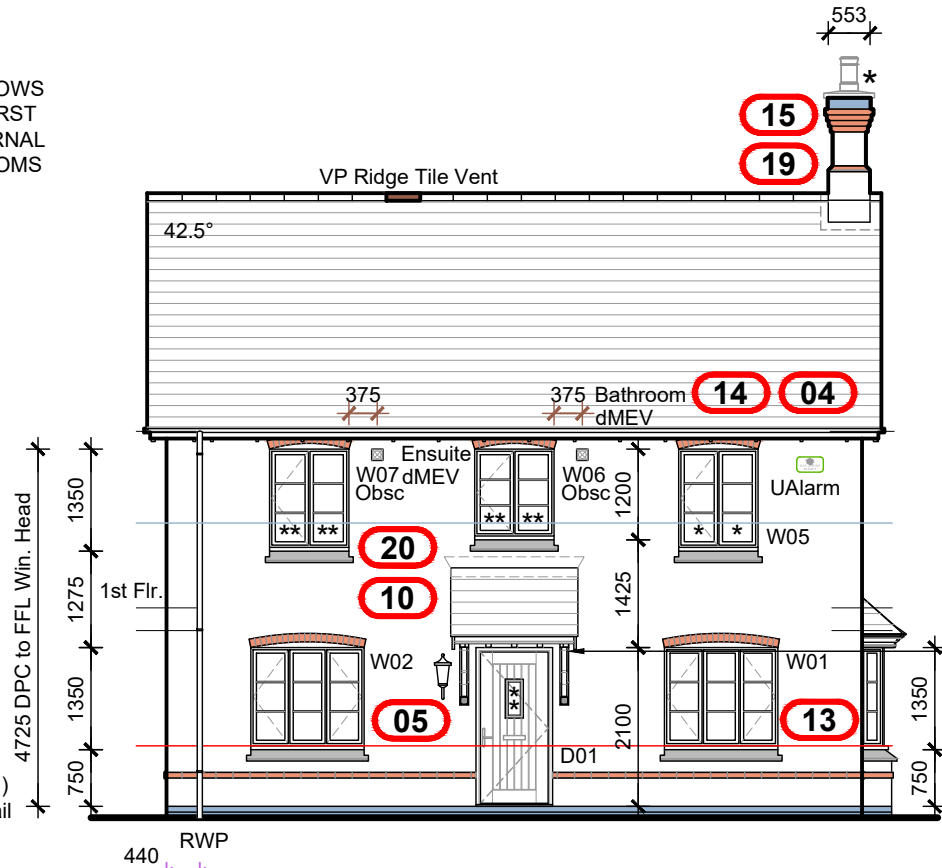
All glazing below 800mm from finished floor to be toughened and in accordance with Part K ( Building Regulations )

All glazing below 1100mm from finished floor to be toughened and in accordance with Part O ( Building Regulations )

140mm Victorian sloped concrete cill, painted.  
( Refer to Separate Detail )

Cavity trays and code 4 lead flashing to all abutments

Principle Entrance Min clear opening 775mm, Level approach at max gradient 1:20min 900mm width  
( Part M Building Regulations )  
Refer to material finishes detail



FRONT ELEVATION

Scale 1:100

**GUARDING**

Non climbable fixed guarding to W05, W06, W07, W08 & W10 from FFL. Guarding to be sized to prevent the passage of 100mm sphere and resist the forces of stated in BS6399 and BS6180.

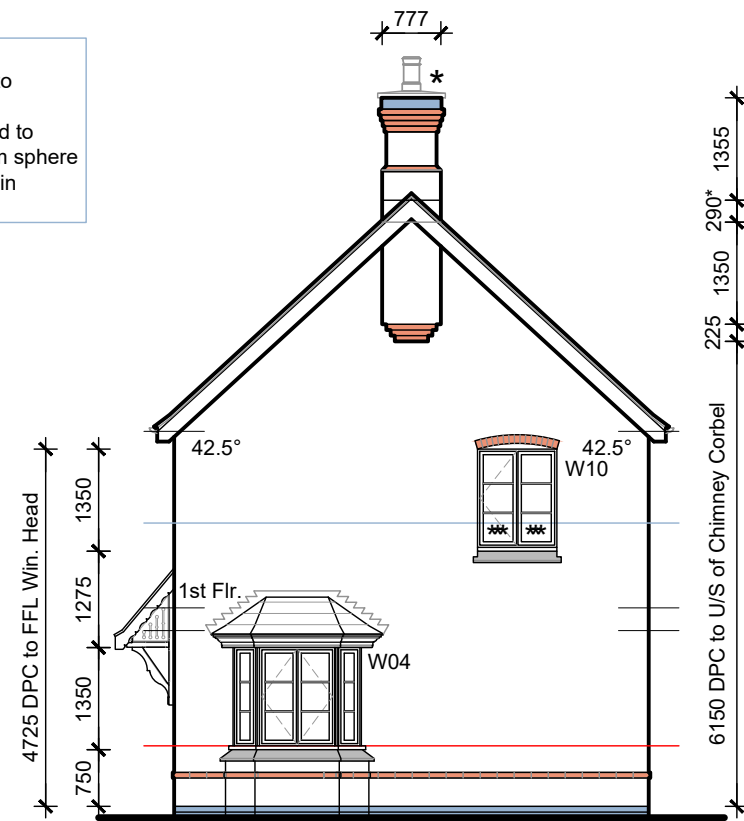
W01, W02, W05, W06  
W07 & W10

75mm arch former to be used to build 102mm brick arches. Arch former to be used in conjunction with insulated cavity lintel, supplied by lintel manufacturer

Bay Window Type B - Timber  
( Refer to Detail WD-01-03 ). Roof to be tiled with plain tiles. Refer to Build Release for tile specification. Tiles to be mitered at hip.

Canopy Type A  
( Refer to Detail ET-01-01 )

All windows & external doors to comply with Part Q ( Building Regulations ) where applicable. Refer to window / door schedule



SIDE ELEVATION

Scale 1:100

**GRP Chimney Type A [Barge Board] - 42.5°**

- \* Optional Non functional GRP chimney 777.5mm x 552.5mm ( Refer to Planning Layout for positioning & Detail CT-02-01 / 02 for installation ). Chimney to be corbelled centrally over cavity wall and fixed to trusses through fixing plate. Note: Chimney can not be used with Spandrel Panel, gable wall must be built traditionally.

Breathable roof membrane to entire roof

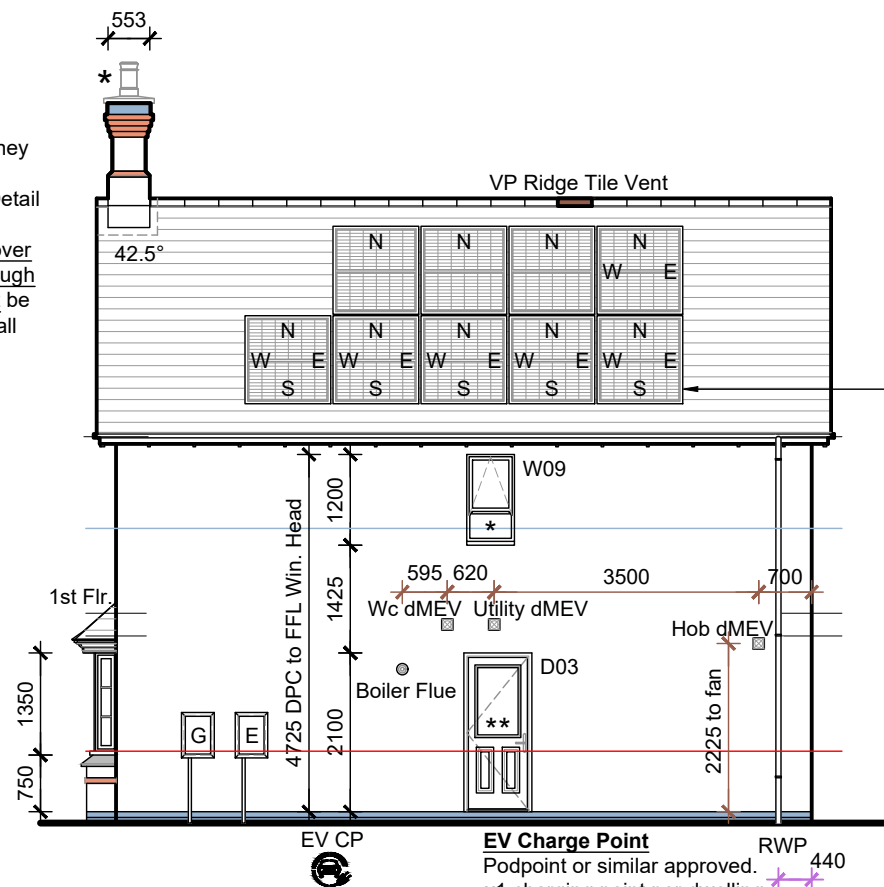
- 03 Denotes Health and Safety reference ( please refer to Health and safety sheet for details )

- \* Toughened and clear glass
- \*\* Toughened and obsc. glass

Black rainwater goods

Building Regulations  
Part L 2022 Solution  
Worcester Bosch Greenstar Life Combi with flue gas recovery unit.

Boiler to be fitted inline with manufacturers protective zones & technical guidance.



REAR ELEVATION

Scale 1:100

**Double Glazed Unit**

[Standard] Spec:  
4mm Pilkington Optifloat Clear  
U Value: 1.30 W/m²K  
G Value: 0.45

**Double Glazed Unit**

[Barrier] Spec:  
6.8mm Pilkington Optilam Laminated Glass  
U Value: 1.30 W/m²K  
G Value: 0.45

**Solar Panels**

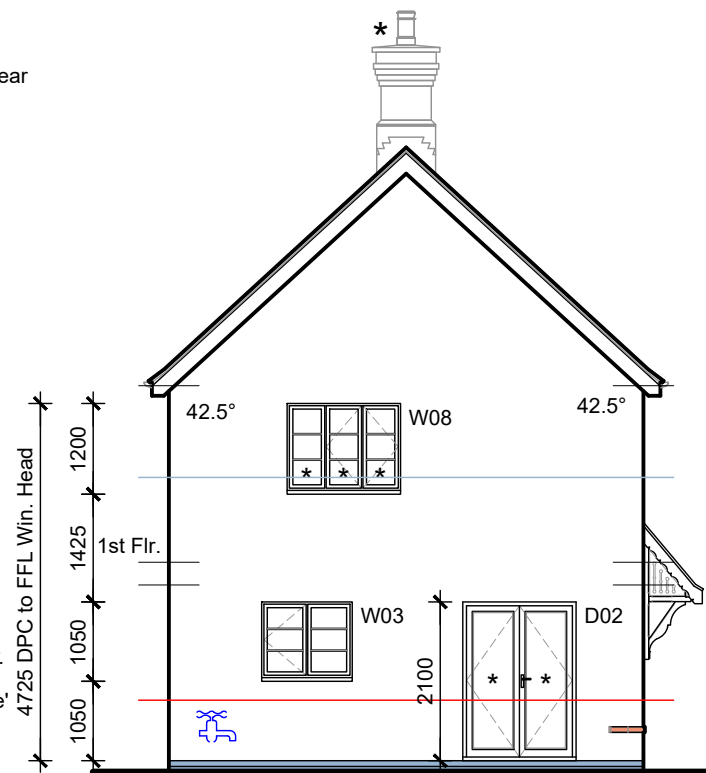
Wattage: 400 Wp  
Orientation: Portrait  
North: 3.4 kWp  
No of Panels: 9  
East / West: 2.38 kWp  
No of Panels: 6  
South: 1.7 kWp  
No of Panels: 5

Refer to Site Build Release for number of solar panels required for plot. North orientation shown for clarity.

uPVC 150mm Fascia 'White'  
uPVC 300mm Soffit 'White'  
( Refer to Separate Detail )

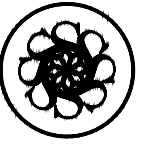
Mechanically fixed dry ridge tile throughout

All external vents to colour match brickwork



SIDE ELEVATION

Scale 1:100



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Date:

Description:

Rev:

Floor Area: 1025 sq/ft

Spec:A2

House Type: DH313B-5

Sales Name: THE FORD

Description: Ground Floor Plan

Scale: 1/50 Date: June 22 Drawn: GD

Floor Plan Notes

Masonry Key

- Facing Brickwork + M4 Mortar ( Refer to Materials Schedule for Brick Type )
- 3.6N/mm² Blockwork + M4 Mortar
- Full Fill Insulation ( Refer to Construction Notes for Specification )

Refer to Plumbing & Heating Design for heating specification.

Building Regulations Part L 2013 Solution - Gas Boiler with Weather Compensator.  
Boiler to be fitted inline with manufacturers protective zones & technical guidance.

Internal Partition Key

- Standard Stud Wall  
63x38mm studwork at 600mm vertical c/c's with 12.5mm plasterboard ( 400mm centres to wet rooms )
- Acoustic Stud Wall  
63x38mm studwork at 600mm vertical c/c's with 12.5mm plasterboard and 50mm acoustic mineral fibre insulation ( 400mm centres to wet rooms )
- Double Stud Service Wall  
x2 63x38mm studwork to allow services to radiators, sockets & light switches. Studs at 600mm vertical c/c's with 12.5mm plasterboard and 2.5mm skim to both sides.
- Ply Pattressing  
9mm ply required to allow for fixing of Radiators, Kitchen Units, Boiler, Sanitary, Bath Taps and Stair Handrails. Where radiators are back to back 12.5mm ply is required to both sides. Half height studs required to stud partitions to support ply sheet
- Moisture Resistant Plasterboard

Building Regulations Part L 2021 Solution - Air Source Heat Pump.  
ASHP to be installed on 75 x 600mm concrete base, fitted with anti- vibration large feet, and a soakaway. ASHP to be fitted inline with manufacturers protective zones & technical guidance.

Bay Window Type C  
Bay to be built in accordance with ( Detail WD-01-03 ) Refer to site specification for roof construction

Principle Entrance Min clear opening 775mm, Level approach at max gradient 1:20min 900mm width ( Part M Building Regulations ). Refer to External Finishes

**HEATING LAYOUT**  
Refer to 3rd party heating layout for radiator position and size.

**NOTE: FIRE ESCAPE WINDOWS ARE NOT REQUIRED - HALF HOUR INTERNAL DOORS TO HABITABLE ROOMS**

WC Basin to be mounted to wall (260 x 360mm max. size for Part M Compliance). Chrome bottle trap waste to taken through wall, concealed within Store.

D05 - Provide 10mm air gap under door for ventilation when no window

900mm high balustrade and handrail

2 x 12.5 mm plasterboard with 5mm skim to u/s of staircase for ½ hr fire protection

All horizontal waste pipe runs within floor void to be wrapped in min 25mm sound deadening quilt

Extractor Fans - System 3 ventilation strategy

Soil pipe to be boxed with 2 x 12.5mm plasterboard with 2.5mm skim. Void to be packed with fibreglass insulation quilt

All ceiling joists to be fixed with 16mm British Gypsum RB1 Resilient Bars, 15mm thick plasterboard and 3mm skim finish. Ceiling rear pod to be fixed with 2No. 15mm thick plasterboard and 4mm skim finish

Lintel Key

- Insulated Cavity Lintel
- Box Lintel

Drainage Key

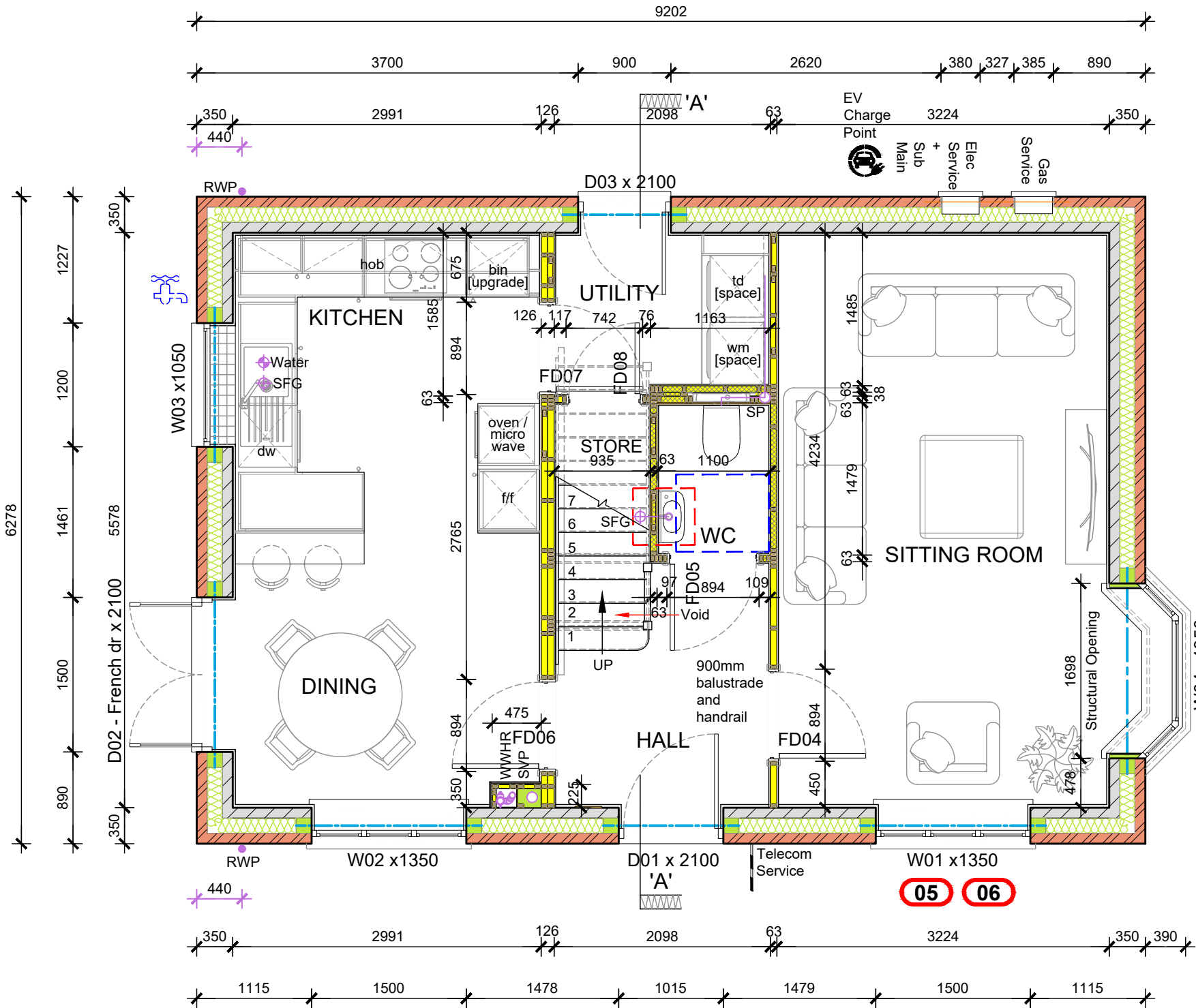
- Water
- SP Soil Pipe
- SVP Soil Vented Pipe
- AAV Air Admittance Valve
- SFG Sealed Floor Gully

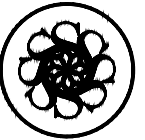
Principle & Rear Entrance Min clear opening 850mm, Level approach at max gradient 1:20min 900mm width - Part M4(2) Building Regulations. Refer to External Finishes drawing.

**01** Denotes Health and Safety reference ( Refer to H&S Sheet for Details )

EV Charge Point

1 Charing point per dwelling with dedicated on plot parking, or 1 charging point per 10 spaces (or part thereof) where the dwelling(s) are served by courtyard or roadside parking. Residential charging points shall be provided with an IP65 rated domestic socket 13amp socket, directly wired to the consumer unit with 32 amp cable to an appropriate RCD. This socket shall be located where it can later be changed to a 32amp EVCP.





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Date:

Description:

Rev:

Floor Area: 1025 sqft

Spec:A2

Drawn: GD

House Type: DH313B-5

Sales Name: THE FORD

Description: First Floor Plan

Scale: 1/50 Date: June 22

Floor Plan Notes

Masonry Key

- Facing Brickwork + M4 Mortar ( Refer to Materials Schedule for Brick Type )
- 3.6N/mm² Blockwork + M4 Mortar
- Full Fill Insulation ( Refer to Construction Notes for Specification )

Refer to Plumbing & Heating Design for heating specification.  
Building Regulations Part L 2013 Solution - Gas Boiler with Weather Compensator.  
Boiler to be fitted inline with manufacturers protective zones & technical guidance.

Internal Partition Key

- Standard Stud Wall  
63x38mm studwork at 600mm vertical c/c's with 12.5mm plasterboard ( 400mm centres to wet rooms )
- Acoustic Stud Wall  
63x38mm studwork at 600mm vertical c/c's with 12.5mm plasterboard and 50mm acoustic mineral fibre insulation ( 400mm centres to wet rooms )
- Double Stud Service Wall  
x2 63x38mm studwork to allow services to radiators, sockets & light switches. Studs at 600mm vertical c/c's with 12.5mm plasterboard and 2.5mm skim to both sides.
- Ply Pattressing  
9mm ply required to allow for fixing of Radiators, Kitchen Units, Boiler, Sanitary, Bath Taps and Stair Handrails. Where radiators are back to back 12.5mm ply is required to both sides. Half height studs required to stud partitions to support ply sheet
- Moisture Resistant Plasterboard

Building Regulations Part L 2021 Solution - Air Source Heat Pump.  
ASHP to be installed on 75 x 600mm concrete base, fitted with anti- vibration large feet, and a soakaway. ASHP to be fitted inline with manufacturers protective zones & technical guidance.

Bay Window Type C  
Bay to be built in accordance with ( Detail WD-01-03 ) Refer to site specification for roof construction

Principle Entrance Min clear opening 775mm, Level approach at max gradient 1:20min 900mm width ( Part M Building Regulations ). Refer to External Finishes

**HEATING LAYOUT**  
Refer to 3rd party heating layout for radiator position and size.

**NOTE: FIRE ESCAPE WINDOWS ARE NOT REQUIRED - HALF HOUR INTERNAL DOORS TO HABITABLE ROOMS**

WC Basin to be mounted to wall (260 x 360mm max. size for Part M Compliance). Chrome bottle trap waste to taken through wall, concealed within Store.

D05 - Provide 10mm air gap under door for ventilation when no window

900mm high balustrade and handrail

2 x 12.5 mm plasterboard with 5mm skim to u/s of staircase for ½ hr fire protection

All horizontal waste pipe runs within floor void to be wrapped in min 25mm sound deadening quilt

Extractor Fans - System 3 ventilation strategy

Soil pipe to be boxed with 2 x 12.5mm plasterboard with 2.5mm skim. Void to be packed with fibreglass insulation quilt

All ceiling joists to be fixed with 16mm British Gypsum RB1 Resilient Bars, 15mm thick plasterboard and 3mm skim finish. Ceiling rear pod to be fixed with 2No. 15mm thick plasterboard and 4mm skim finish

Lintel Key

- Insulated Cavity Lintel
- Box Lintel

Drainage Key

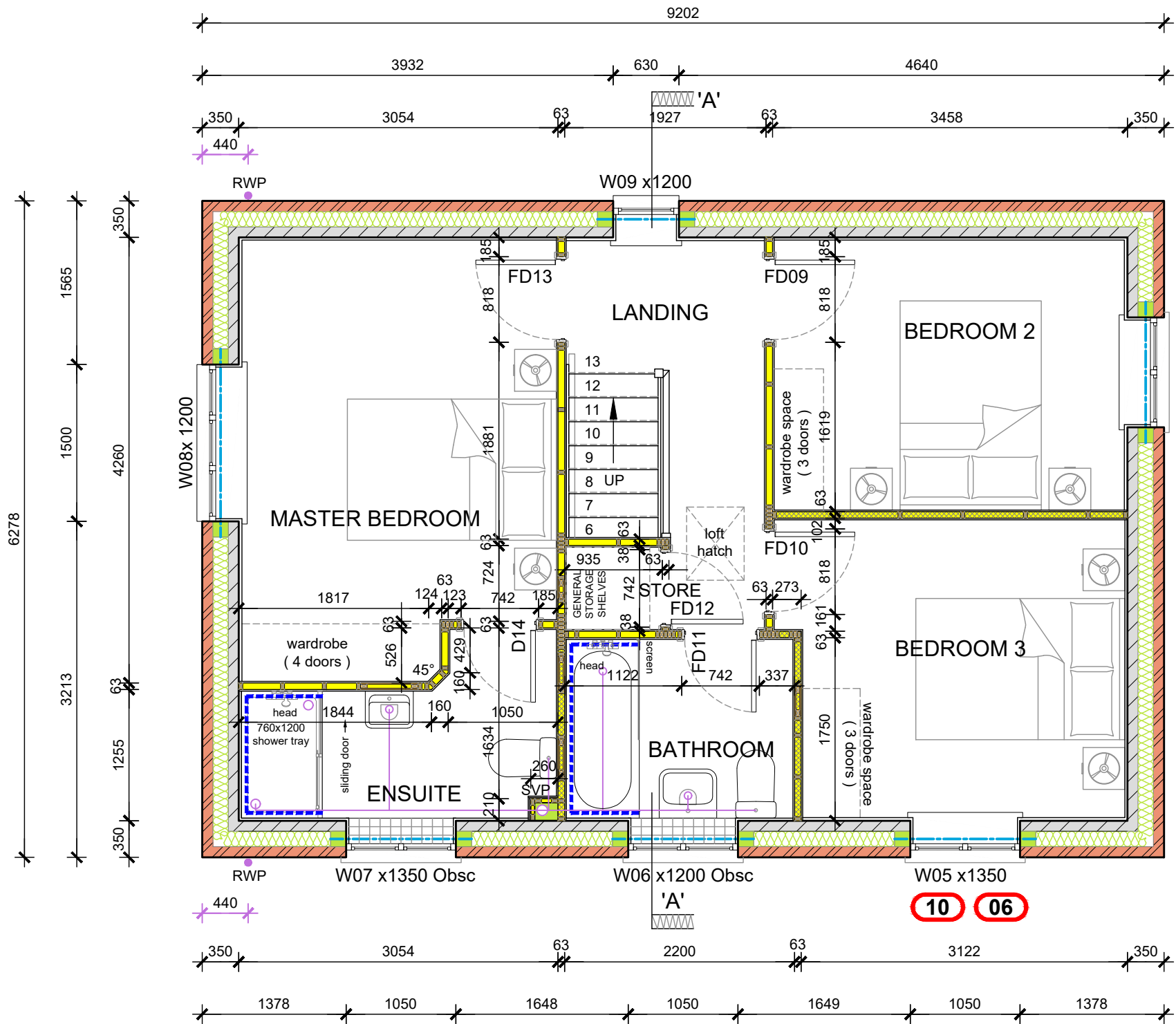
- Water
- SP Soil Pipe
- SVP Soil Vented Pipe
- AAV Air Admittance Valve
- SFG Sealed Floor Gully

Principle & Rear Entrance Min clear opening 850mm, Level approach at max gradient 1:20min 900mm width - Part M4(2) Building Regulations. Refer to External Finishes drawing.

**01** Denotes Health and Safety reference ( Refer to H&S Sheet for Details )

EV Charge Point

1 Charing point per dwelling with dedicated on plot parking, or 1 charging point per 10 spaces (or part thereof) where the dwelling(s) are served by courtyard or roadside parking. Residential charging points shall be provided with an IP65 rated domestic socket 13amp socket, directly wired to the consumer unit with 32 amp cable to an appropriate RCD. This socket shall be located where it can later be changed to a 32amp EVCP.



Roof tiles ( Refer to Materials Schedule for Specification )

5mm continuous ridge ventilation

REFER TO TRUSS PROFILE FOR DIMENSIONAL DESIGN

Proctor Roofshield or Klobber Ltd Permo Air breathable roof membrane to entire roof

**Gable Spandrel Option**  
Spandrel to be formed with 100x50mm timbers with verticals at 600mm centres factory clad with 9mm OSB and breather paper. Refer to manufacturers design and separate detail for installation.

**Open Toe Rafter\***  
10mm Over Ventilator fixed to brickwork to allow continuous ventilation.

150mm x 16mm Flat uPVC Fascia.

35 x 150 x 1000mm Lumbar Rafter. Rafter ends to be sawn off. Where rafter ends are above window openings, rafters **MUST NOT** protrude past top of window heads. Rafters to be fixed to truss.

300 x 9mm uPVC Soffit Board. Soffit Board fixed to lumbar rafter to cloak roofing accessories.

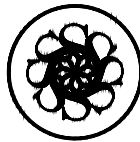
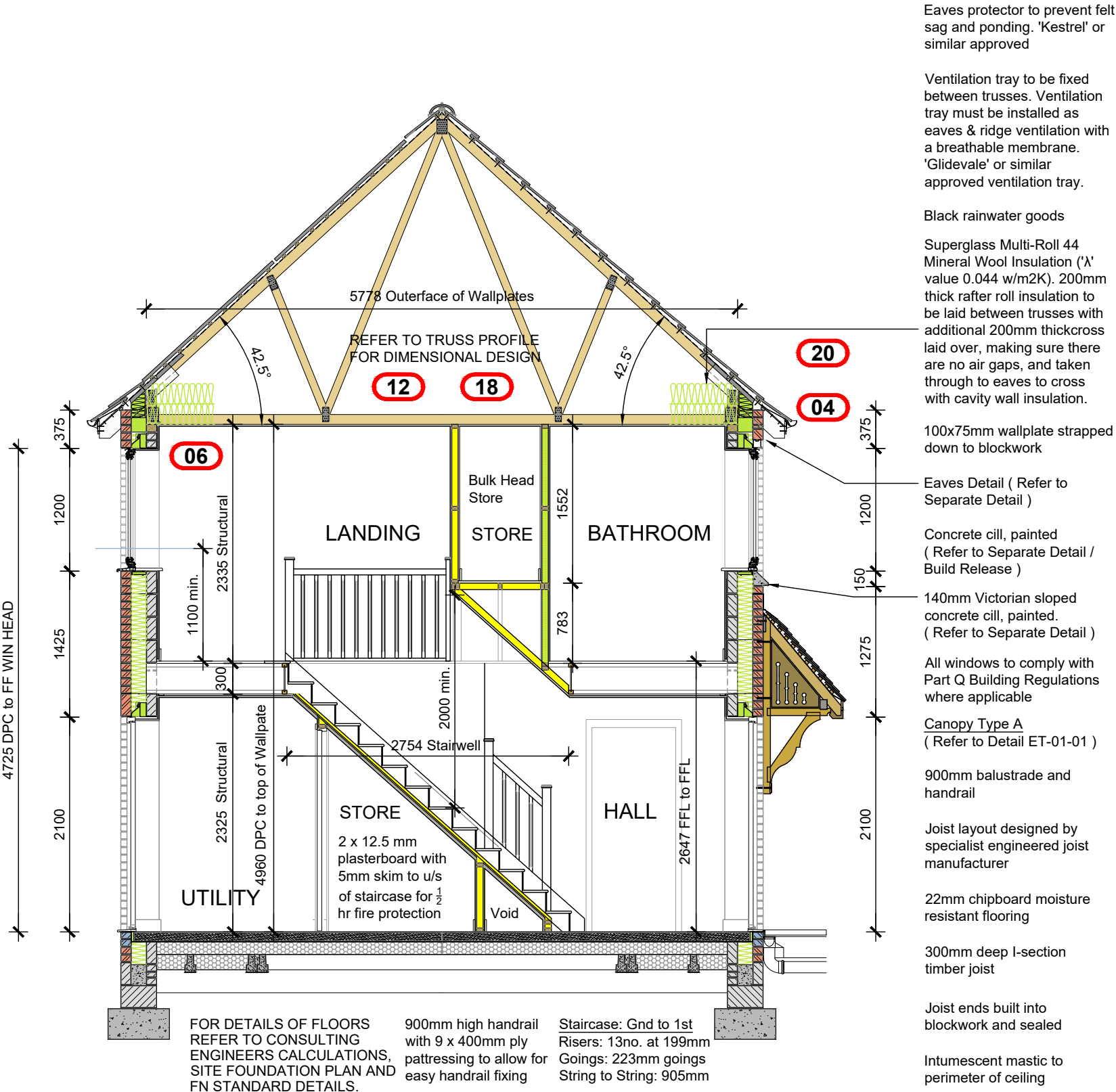
**Barge Board\***  
200 x 16mm Flat uPVC Fascia.

75 x 225mm purlin with 100mm radius. Purlin knotted out for external rafter. Purlin supported through brickwork, fixed back to spandrel panel.

Bargeboards to be cut off level with the underside of open toe rafters.

\*Refer to Build Release for uPVC colours.

Cavity trays and code 4 lead flashing to all abutments



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Date:

Description:

Rev:

Floor Area: 1025 sq/ft

Spec:A2

Drawn: GD

House Type: DH313B-5

Sales Name: THE FORD

Description: Section A - A

Scale: 1/50 Date: June 22