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Glass and Glazing Federation

INDUSTRY GUIDANCE
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A Guide to Good Practice

Specification and installation of conservatories within the United Kingdom

Message from the Conservatory Association Chairman

This Good Practice Guide has been developed by the GGF's Conservatory Association (CA) Technical Group to help all those in industry who design, manufacture, supply or install domestic conservatories and similar glazed extensions.

Dependent on the location or type of the proposed building, it may be exempt from Building Regulations, however the advice given in this guide is based on all building works conforming to the guidance shown in the appropriate Approved Documents (AD), Technical Handbooks and Technical Booklets. The building embodies considerable technology in the manufacture of the components and their correct assembly to produce a structure that can adequately resist the effects of imposed wind and snow loads. It must be appreciated that wind loads vary across the British Isles, from sheltered locations with low wind speeds, to those in highly exposed areas. Likewise, snowfalls vary considerably across the United Kingdom from south to north and west to east. The building should be able to withstand the effects of driving rain while remaining watertight throughout, including at the junction with the parent dwelling. Therefore the construction must reflect the likely exposure conditions and the imposed loads to be expected at any given location. The building's thermal movements relative to the parent dwelling needs to be allowed for, together with differences in ground movement with respect to seasonal changes in sub-soil water content.

Many buildings are built in areas where underground drainage, gas supplies, electric cables and water service pipes enter or run parallel with the dwelling. In these circumstances it is imperative that the underground services are not damaged, nor should such services damage the building. To meet this requirement the substructure of the building will need to bridge over or otherwise suitably accommodate any service that runs beneath. Alternatively it may be possible to divert the existing services around the new building.

Some glazed buildings, by their nature, perform differently than conventional extensions using conventional house construction detailing. It is possible to benefit from solar heat gain and this may provide a thermal buffer to the house during colder periods. In common with issues relating to the heating of dwellings, the type of occupancy pattern should also be considered when designing the building.

We trust you will find the information contained in this Good Practice Guide to be of benefit to the general Glazed Extension sales and supply chain.

Mark Hanson,

Chairman,

GGF Conservatory Association

Conservatory Association

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Introduction

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1.1 Scope

This Good Practice Guide aims to clarify and emphasize the good practices that are required for the successful installation of conservatories and other glazed extensions to domestic dwellings. Wherever the term conservatory is used, the information is specifically related to the accepted definition of a conservatory and where the term glazed extension is used, the information may be applicable to any substantially glazed extension including conservatories and orangeries.

This guide provides guidance on the statutory requirements, the design, the site surveying, the construction and the installation of the superstructure including the roof.

It is anticipated that this document will assist all persons in the industry involved in the supply chain, including the sale to the consumer, the design of the structure, the manufacture of components and the completion of the building on site.

This Good Practice Guide provides:

- For GGF members, the guidance on Good Practice contained in this guide is mandatory when supplying and installing Conservatories and substantially glazed extensions. The requirements shown in this Good Practice Guide is mandatory for all GGF members and must form the basis of contracts made between members and consumers for the sale and installation of conservatories or substantially glazed extensions.
- For those organisations who are not members of the GGF, the guidance given in this guide provides the recommended approach when selling and installing these types of buildings.
- Details of the legal requirements in terms of Planning, Building Control and other issues such as building near sewers are covered in Section 2 and Annex B of this guide.

1.2 Definitions of conservatories and substantially glazed extensions

1.2.1 Conservatory

Although the definition of a conservatory has been removed from Approved Document L1B for England, the other countries within the UK have maintained the definition as being a substantially glazed extension to an existing building. This guide defines the existing building as a dwelling and substantial glazing as being 50% of new walls, except those required to be fire-resistant, glazed with transparent materials and 75% of the roof glazed with either transparent or translucent materials. Although not contained within the Building Regulations for England, it is generally accepted that this definition is still valid for England and is used by many Local Authority Building Control Bodies.

Based on the above definition, conservatories will normally have glazed wall frames, either floor to roof ring-beam or dwarf walls built of opaque materials with glazed wall frames above. A doorset(s) may also be incorporated in the glazed wall frames. The roof will normally be an engineered roof, designed and manufactured to provide not only the areas to be glazed but to also provide the required strength and rigidity to ensure the finished conservatory, as a whole, is capable of functioning as a stable usable addition to the dwelling.

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1.2.2 Enhanced conservatory

As the market for glazed extensions has developed and matured, conservatory designers, in particular roof manufacturers, have developed enhancements to the standard conservatory to meet the aesthetic aspirations of homeowners. These enhanced conservatories retain the advantages of standard conservatories in terms of the reduced legislative requirements of exempt conservatories and ease of construction but have improved aesthetics and functionality. The conservatory industry has developed a number of products that address these needs and these buildings are no longer just conservatories but may be considered, aesthetically, as a cross-over between a conservatory and an orangery.

Enhanced conservatories may incorporate additional external lightweight guttering/façade details to

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replicate those found on orangeries whilst maintaining the structural roof system seen in standard conservatories. Internally, pelmets or high-level shelving may be installed around the perimeter of the conservatory and these may also incorporate lighting features such as downlighters. The pelmets may be finished in a variety of ways such as plaster or timber.

A number of manufacturers have also developed specific 'named' products or modular build systems to mimic the visual features usually associated with orangeries such as opaque wall panels, pilasters and corner assemblies.

There has also been a desire to improve the thermal and solar performance of conservatory roofs, retaining heat in the cooler months whilst reducing the effects of solar gain (heating) in warmer sunnier months. To this end, a number of products are now marketed to provide a building with a wall structure similar to a conservatory but with a solid, highly insulated roof that may have a range of decorative finishes such as slate or tile. Due to the accepted definition of a conservatory and the need to have a substantial area of the roof glazed, these structures are not usually exempt from Building Regulations and require Building Regulation approval through a recognised Building Control Body. **Refer to Annex C.**

Although these buildings may be able to be built under the same legislative requirements as conservatories, the modifications and the intended use may result in the building no longer meeting the requirements for exemption from the Building Regulations. This is particularly relevant if the enhanced conservatory is to be opened permanently to the existing dwelling or has a solid roof.

In terms of Planning Permission, if a standard conservatory of identical size can be built under Permitted Development (refer section 2.4.7), an enhanced conservatory may also be built without obtaining planning consent, provided the requirements of the Permitted Development Legislation are met.

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1.2.3 True orangery

Originally an **orangery** or **orangerie** was a building in the grounds of fashionable residences from the 17th to the 19th centuries, were given a classicising architectural form and used to over-winter tender container trees, usually citrus trees.

The orangery has now developed into a contemporarily designed, fully structural building, attached to a residence and, given they are usually thermally efficient and unlike many conservatories, are open to the existing residence has become an integral part of the living space.

There are two main types of orangery. The first is built with brick or block piers with a parapet wall above the perimeter flat roof with roof lights or lanterns incorporated in the roof. The second uses similar flat roof technology with roof lights or lanterns but these are fitted directly to glazed wall frames or solid infill panels and corner panels.

Both types of orangery will be subject to Building Regulation control if they are opened permanently to the existing house and do not meet the general glazing requirements of a conservatory previously described.
The flat roof area of both types of orangery will be designed and manufactured using structural beams, usually either timber or aluminium, to cope with the larger spans and loads associated with this type of building. The beam structure is insulated and then covered with a suitable deck board and finished with a proprietary weather-proof finish. Gutters and hoppers are incorporated to clear rainwater from the surface of the flat roof.

The flat roof (with minimal pitch to remove water) incorporates roof lights or lanterns that may be manufactured from timber, aluminium, steel or PVC-U, glazed with energy efficient Insulating Glass Units (IGU's). The roof lights or lanterns are usually installed on a raised perimeter beam around the opening area(s), which is weather-proofed as part of the flat roof system.

Where a parapet wall is used around the perimeter of the orangery, it is usual for this to be capped with copings, either natural stone or concrete copings. Roof drainage in a parapet construction is usually achieved using an integral box gutter. Where a parapet wall is not used, the flat roof is finished in a conventional manner with fascia, soffits and guttering. Soffits are often moulded to provide a classical, traditional look to the finished building.

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1.2.4 Other types of glazed extensions

1.2.4.1 Porch

Adding a porch to any external door of a house is considered to be permitted development, not requiring an application for planning permission, provided the following limits and conditions are met:

1. Ground area of the porch, measured externally, not to exceed three square metres.
2. Highest part of the porch not to exceed three metres.
3. No part of the porch to be within two metres of any boundary that fronts a highway.

Extract from Planning Portal – Class D – The erection and construction of a porch outside any external door of a dwelling house.

Note: It is the homeowners' responsibility to confirm whether the Permitted Development rights have been removed from the property by an Article 4 direction.

Porches under 30 square metres are exempt from Building Regulation control provided the conditions for exempt conservatories are met.

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1.2.5 Terminology used for substantially glazed extensions

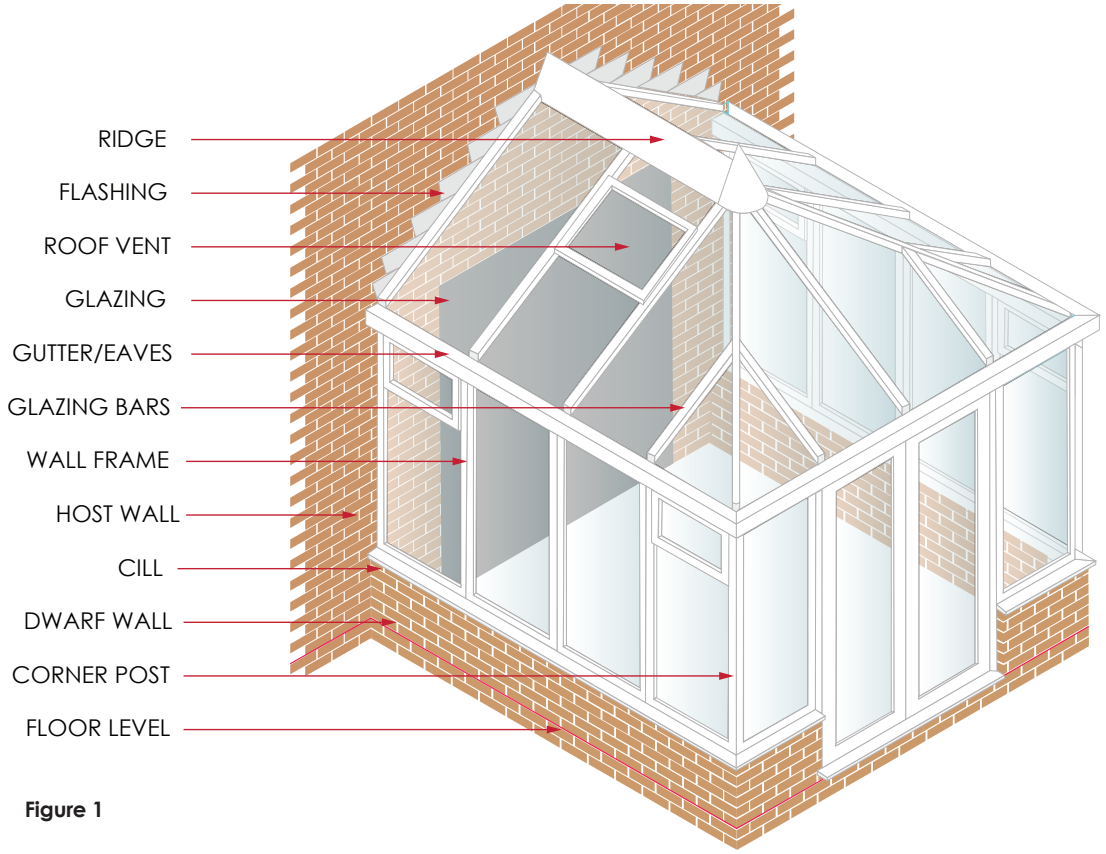

Figure 1

1.3 Responsibilities

1.3.1 The contracted retailer

A contract will be drawn-up between the contracted retailer and the client and the contracted retailer is responsible for ensuring the client is aware of all aspects relating to the design and expected performance of the finished building and the building process, with estimated start and completion dates.

The contracted retailer should undertake a survey of the site prior to the final design and manufacture of the glazed extension. It is essential that the information gathered at contract and survey stage, is correctly recorded, interpreted and transferred to a specific final set of drawings. These will form part of the sales contract.

It may be necessary for the contracted retailer to consult with a systems company and/or a component fabricator to provide a satisfactory final structural design for the building.

The initial contract may be supplemented by the design drawings and the details contained in the contract may be modified, in agreement with the client, should the survey and design process identify changes to the original proposal. The initial contract value given at the point of sale may vary once a final design has been agreed following the site survey by the contracted retailer.

A copy of the design drawings should be provided to the customer and the GGF also recommend that the customer have an opportunity to review and discuss

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these along with any other questions related to the construction of the glazed extension.

A meeting with the client to ensure the final design meets their requirements may be necessary and to obtain final signature(s) from the client to confirm their acceptance of the final 'to-be-built' design. Manufacture of the glazed extension components (wall frames and roof) should not commence until the client has agreed the final design and has signed it off and agreed any variations to the original contract agreed at time of sale.

The construction of the building is undertaken in key stages, some of which may be using sub-contract teams to complete specific works such as base construction, electrics, plastering etc., and it is vital that the contracted retailer, if their contract incorporates these sub-contractor items, plans and co-ordinates the work effectively.

The contracted retailer has overall responsibility for ensuring the suitability and compatibility of all components used on the installation, this includes the suitability of all glazing sealants with glazing materials and also the overall structural integrity of the finished structure and the integrity of the individual components used within the conservatory.

On the 6th October 2015 the Construction (Design and Management) Regulations 2015 (CDM 2015) changes came into effect and these now incorporate dwellings. It is now necessary for the contracted retailer to take on the responsibilities of the Principle Contractor in relation to these regulations. CDM 2015 makes the Principle Contractor responsible for preparing a simple 'Construction Phase Plan', organise the works (including all sub-contract works incorporated in the contract) and ensuring all trades work together to ensure health and safety of all persons during the construction of the building.

1.4 Customer contract

As glazed extensions to homes become more individual and sophisticated to meet clients' specific needs, their complexity increases and it is vital that the information obtained at both the sales stage and subsequent survey and design stages is correctly interpreted and transferred to customer specific drawings and these are reflected in the final contract between the client and contracted retailer.

The product requirements and design specifications form part of the customer's contract and will detail the schedule of works the contracted retailer is responsible for and should be signed by both the client and an authorised representative of the contracted retailer. The Glass and Glazing Federation's Model Terms and Condition of Contract are contained in Annex A including the extension to the standard terms relating to Substantially Glazed Extensions.

Clients must be given sufficient time to review any changes made to the original design or contract signed at time of sale. The contracted retailer should ensure the client fully understands what they are signing-up to and any issues are clarified and noted. This will ensure that any subsequent issues raised by the client can be explained.

The Contract should make clear the scope of the works that the contracted retailer is responsible for and, where some of the works are to be carried out by another entity and do not form part of the contract, are specifically excluded within the contract terms. For example, if a separate contract for the construction of the conservatory base has been placed with another entity it is not included in the contract for the erection of the conservatory and no responsibility is accepted for the quality of those works.

The GGF publish Model Terms and Conditions of Contract for use by contracted retailers when selling Substantially Glazed Extensions. These may be used in the form given or may form the basis of contracted retailers own contracts. These are regularly updated to reflect all changes in consumer legislation and contracted retailers should review their contract terms and conditions on a regular basis to ensure they comply with current consumer legislation. **Refer to Annex A.**

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1.5 Reference guide to key stages

1 Be aware of statutory requirements
• Planning Permissions • Building Regulations • Health, Safety and Environmental Requirements Reference Section 2
2 Survey the site
• Ground assessment • Site exposure category • Measurement survey • Photographic record of site Reference Section 3
3 Identify appropriate specification
• Design appropriate foundations, floors and walls • Design wall frames • Design roof structure • Specify glazing requirements Reference Sections 4 and 5
4 Confirm detailed final contract
• Check all relevant drawings and specifications • Obtain all relevant statutory approvals • Gain approval of design from the client including final design sign-off Reference Sections 4 and 5
5 Construct to agreed contract design and specification
• Construct the building • Verify construction details are as agreed with client • Photographic record of finished building • Issue documented aftercare and maintenance instructions Reference Section 6

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2.1 General guidance

Certain types of building changes to a dwelling may be made without the need to apply for full planning permission. These are allowed under Permitted Development Rights and are described later in this guide.

A full planning application would normally be processed within 10 – 12 weeks and applications are required to restrict the over development of a property and to ensure that the proposal is both sympathetic in design and suitable for the layout of the original property. Local Authorities will also determine the impact on any neighbouring properties during the application process.

Whilst there are many kinds of alterations and additions to houses that do not require full planning permission, the following should be considered before any works are started.

2.2 Considerations when planning an extension

2.2.1 Neighbours

Neighbours should be informed about the intended work and any issues raised by them should be addressed if possible. They are likely to be concerned about proposed building that might affect their enjoyment of their property. For example, the proposed building could take away some of their light or spoil a view from their windows. If the intended building seriously overshadows a neighbour's window and that window has been there for a number of years, you may be affecting their "right to light" and this could result in legal action or at the very least an unhappy neighbour.

Some of the neighbour's concerns may be able to be addressed by making alterations to the proposal. Even if the proposal is not changed, it is better to have involved neighbours with the proposal before you apply for planning permission or, in the case of permitted development, before building works start.

If it is proposed to erect the building under the temporary extension to permitted development rights, the local planning authority will inform your immediate neighbours (sides and rear) and allow them to comment on the proposed building.

If full planning consent for the work is necessary, the council will allow all of your neighbours to comment on the proposed building and where appropriate raise objections.

If it is necessary to access the proposed building site via a neighbouring property, it will be necessary to obtain agreement from the neighbour before starting work.

2.2.2 Design

Planning regulations require new extensions to be designed so that their appearance matches, as far as is practical, the existing house. A well-designed building or extension will be much more attractive to a homeowner and their neighbours. It is also likely to add more value to the house when selling it at a later date. The local planning authority generally approve extensions but with a standard condition imposed that ensures any new materials match as close as possible to any existing structure. This requirement also applies to building under permitted development rights.

2.2.3 Crime prevention

The existing home may be considered secure home against burglary and some precautions such as installing security locks to windows may already have been taken. However, alterations and additions to a house may make it more vulnerable to crime. For

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example, an extension with a flat roof, or a new porch, could give access to upstairs windows which previously did not require a lock. Ensure that all accessible windows are secure, bearing in mind other requirements such as means of escape in the event of fire. Also, if an alarm is fitted, it may need to be extended to cover the new building.

2.2.3 Lighting

If external lighting for security or other purposes is planned, it must be ensured that the intensity and direction of light does not disturb others. Many people could suffer directly as a result of poorly-designed lighting. Ensure that beams are not pointed directly at windows of other houses. Security lights fitted with passive infra-red detectors (PIRs) and/or timing devices should be adjusted so that they minimise nuisance to neighbours and are set so that they are not triggered by traffic or pedestrians passing outside the property.

2.2.4 Covenants

Covenants or other restrictions in the title to the property or conditions in the lease may require someone else's agreement before carrying out works to the property. This may be the case even if an application for planning permission is not required. Advice from the Local Authority may be beneficial in ensuring any covenants are not infringed.

2.2.5 Consents

Whether or not an application for planning permission is required, there may be other consents or approvals required before work can commence. Again seeking professional advice at the outset could prevent major disruption and inconvenience at a later date.

2.3 Planning definitions

2.3.1 Principal elevation

In most cases, the principal elevation will be that part of the house which fronts (directly or at an angle) the main highway serving the house (the main highway will be the one that sets the postcode for the house concerned). It will usually contain the main architectural features such as bay windows or a porch serving the main entrance to the house. Usually, but not exclusively, the principal elevation will be what is understood to be the front of the house.

There will only be one principal elevation on a house. Where there are two elevations that may have the character of a principal elevation (for example, on a corner plot), a view will need to be taken as to which of these forms the principal elevation.

Note: In such cases the second elevation will also be subject to the restrictions under Class A if it is a side elevation and fronts onto a highway.

2.3.2 Dwelling house

The term does not include buildings containing one or more flats or a single flat contained within a building. Note, however, that for the purposes of this guidance, the word "house" is used rather than "dwelling house" unless the legislation is quoted directly.

2.3.3 Building

Includes any part of a building and includes any structure or erection, but does not include mechanical plant or machinery or gates, fences, walls, or other means of enclosure.

2.3.4 Original

Means a building as it existed on 1 July 1948 where it was built before that date, and as it was originally built when constructed after that date.

2.3.5 Existing

Means a building as it existed immediately before any future development (e.g. a house extension) is undertaken. The existing house will include previous development of the house, whether undertaken as permitted development or as a development resulting from a planning permission granted by the local authority.

2.3.6 Ground level

Ground level is the surface of the ground immediately adjacent to the building in question. Where the ground level is not uniform (e.g. on a sloping site), the ground level is the highest part of the ground surface immediately adjacent to the existing building.

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2.3.7 Extension

For the purpose of this guide, the term 'extension' covers all ground floor brick built extensions, conservatories or orangeries of any form and garage conversions.

2.3.8 Article 4 direction

Article 4 directions are made when the character of an area of acknowledged importance would be threatened and are most common in conservation areas but could also occur within a National Park, the Broads, an area of outstanding natural beauty or World Heritage sites. Planning consent is normally required in these areas.

2.3.9 Highway

A highway will usually include public roads (whether adopted or not) as well as public footpaths and bridleways, but would not include private driveways. The extent to which an elevation of a house fronts a highway will depend on factors such as:

- The angle between the elevation of the house and the highway. If that angle is more than 45 degrees, then the elevation will not be fronting a highway;
- The distance between the house and the highway - in cases where that distance is substantial, it is unlikely that a building can be said to "front" the highway. The same may be true where there is a significant intervening area of land in different ownership or use between the boundary of the curtilage of the house concerned and the highway.

2.4 Planning

2.4.1 Planning permission

This relates as to whether or not a particular structure can be built in a particular place and is concerned with the visual impact and size of the structure but not the technical integrity of the construction.

If Permitted Development in England and Wales, as described below, is not applicable to the proposed extension, it will be necessary to apply for and obtain full planning consent from the Local Authority prior to starting any works. Details of this process can be obtained from the local authority and, once submitted, a legal time limit of 8 weeks is applied for a result to be given.

It should be noted that the replacement of an existing conservatory, even on a like-for-like basis may need planning permission. This must be checked with the local planning office before proceeding with the replacement conservatory.

2.4.2 Full planning consent

There are a number of reasons why an extension to a property may require full planning consent and these include:

- Extensions (including previous extensions) and any other building must not exceed 50% of the total area of land around the original house. The term original house means the house as it was first built or as it stood on July 1st 1948 (if it was built before that date). Although you may not have built any extension to the property, a previous owner may have done so and this should be considered in any application process.
- Extensions forward of the principal elevation or forward of the side elevation of a house.
- Maximum eaves height should be no higher than the eaves of the existing house. Additionally, the highest part of the extension should be no higher than the roof ridge line of the existing property.
- Single storey rear extensions must not extend beyond the rear wall of the original house by more than 3 metres if attached and by more than 4 metres if a detached house, although this has been temporarily relaxed by the UK Government until 31st March 2019 to 6 metres and 8 metres respectively.
    - (See also neighbour notification scheme)
- The maximum height of a single storey rear extension is 4 metres.
- Maximum eaves height of an extension within two metres of the boundary is three metres. (Eaves height is calculated from the immediate ground

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level and to the point where the vertical frame dissects the slope of the roof of any extension).

- Maximum eaves and ridge height of extension no higher than existing house.
- Side extensions to be single storey with maximum height of four metres and width no more than half that of the original house.
- Roof pitch of extensions higher than one storey to match existing house.
- No verandas, balconies or raised platforms.
- On designated land[1] no permitted development for rear extensions of more than one storey; no cladding of the exterior; no side extensions.

[1] Designated land' includes National Parks and the Broads, Areas of outstanding Natural Beauty, Conservations Areas and World Heritage Sites.

2.4.3 Like for like replacement extensions

In many instances it may be necessary to replace an existing conservatory or extension and the homeowner should give consideration to the new structure and the revised planning laws of 1st October 2008. Unless it is clear that previous planning consent was given and that the new structure falls in to the permitted development category, the Local Authority planning office should be consulted to confirm the planning requirements.

It is worth noting that Local Authority legislation is still being interpreted differently and it is always wise to adopt a careful and sensible approach to the construction of a conservatory or glazed extension.

2.4.4 Garage conversions

If a homeowner wishes to alter the internal space within an existing part of the building, such as converting an integral garage into habitable space, you can do so under Permitted Development rights providing you are not increasing the overall footprint of the dwelling. Planning applications are usually only concerned with volume structure increases, however, in certain instances the Local Authority may request an application made on the basis of the following;

- Change of use.
- Loss of car parking space.
- Impact on front of property.

2.4.5 Porches

A porch can be constructed outside of any external door and without planning consent but subject to the following;

- Ground area to be measured externally and not to exceed $3m^2$.
- Highest part of porch not to exceed 3 metres.
- No part of the porch to be within 2 metres of any boundary that fronts a highway.

2.4.6 Verandahs

A verandah should be classed in the same context as

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a conservatory when applying planning rules. It is important however that the term verandah when used to describe a covered area attached to a conservatory is not used in the same context as "verandah, balcony or raised platform" as these are viewed by Local Authorities as requiring planning consent in all cases as they are considered to be above ground level.

2.4.7 Permitted development rights

Since 1st October 2008 in England and Wales, homeowners have been able make certain types of changes or additions to their homes without the need to apply for planning permission. These are called Permitted Development (PD) Rights.

Although in principle permitted development rights apply to all dwellings, these can be removed at the discretion of the Local Authority under an Article 4 Direction and have often been removed from new housing developments when the original planning consent was given. Permitted development rights may also be restricted in locations such as conservation areas, national parks, areas of outstanding natural beauty or world heritage sites (often referred to as 'designated land' see note[1]. Listed buildings will usually also require planning consent for the addition of a glazed extension.

Permitted development rights can only be used once and if other extensions have been built under permitted development rights, a new glazed extension will require planning consent. It is always prudent to enquire with the local authority whether they have been removed early in the proposed glazed extension development process.

It is the responsibility of the homeowner to disclose to the contracted retailer if permitted development rights have been used, removed or restricted on the property. The homeowner should check any covenants on the property deeds and consult the local authority planning department.

The requirements relating to permitted development are as follows (extensions including conservatories and orangeries):

- No more than half the area of land around the 'original house' would be covered by additions or other buildings.
- No extension forward of the principal elevation or side elevation fronting a highway.
- No extension to be higher than the highest part of the roof.
- Single-storey rear extension must not extend beyond the rear wall of the 'original house' by more than three metres if an attached house or by four metres if a detached house.
- Maximum height of a single storey extension of 4 metres.
- Maximum eaves height of an extension within two metres of the boundary of three metres.
- Maximum depth of a rear extension of more than one storey of three metres from the rear wall of the 'original house' including ground floor.
- Maximum eaves and ridge height of the extension is no higher than existing house.
- Side extensions to be single storey with maximum height of 4 metres and width no more than half that of the original house.
- Roof pitch higher than one storey to match existing house.
- No verandahs, balconies or raised platforms.
- On designated land, no permitted development for rear extensions of more than one storey and
    - No cladding of the exterior walls and
    - No side extensions.

2.4.7.1 Larger extensions under Permitted development rights

In 2013 a temporary extension to the size limits were agreed and this has now been extended to 30th May 2019. To benefit from the extension of permitted development rights, the extension must be **COMPLETED** on or before 30th May 2019. The maximum dimensions beyond the rear wall were extended to 6 metres for attached houses and 8

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metres for detached houses. These larger extensions must follow a different process for approval. The requirements for these larger extensions are:

- Notify the local planning authority.
- A plan of the site showing the proposed development.
- A written description of the proposal which includes the length that the extension extend beyond the rear wall of the original house, the height at the eaves and the height at the highest point of the extension.
- Contact address and e-mail address of the installer/contractor if they are willing to receive correspondence by e-mail.

2.4.7.2 Neighbour notification scheme

On receipt of the above details, the Local Authority planning department will:

- Serve a notice on the immediate adjoining properties (those properties which share a boundary with the proposed development property including the rear boundary).
- Provide the adjacent property owners with details of the proposed development.
- Confirm when the application was received and when the 42 day determination period ends.
- Confirm how long the adjacent property owners have to make objections (minimum 21 days) and the date by which any objections must be received.
- Send a copy of the notice to the installer/ contractor.
- When completed the homeowner must notify the completion date to the Local Authority in writing.

In the event of the local authority receiving an objection within 21 days from an adjacent neighbour in respect to a larger glazed extension, the Local Authority will take this into account and make a decision about whether the impact on the amenity of all adjacent properties is acceptable. No objections other than the effect on the amenity will be considered.

The Local Authority planning department will notify the homeowner in writing that either no objections have been received from adjacent neighbours and therefore the development can go ahead or objections based on the impact on the amenity of a neighbour are sufficient to refuse permitted development.

If the homeowner has not heard within the 42-day determination period, the development may proceed.

If the development is refused due to the effect that it will have on the amenity of adjacent neighbours, the homeowner may appeal.

If the development goes ahead, the extension must be built in accordance with the details approved by the local authority or if no objection were received or no determination received within 42 days, the development must reflect the details provided to the local authority. If any changes are required to the original details submitted by the homeowner, these must be approved in writing by the Local Authority.

The extension must accord with all other limitations and conditions which apply to a rear extension allowed under permitted development. These are set out in the Order under Conditions to Class A: A.3 and include for example the requirement that the extension (excluding conservatories) must be constructed using materials of a similar appearance to those used in the construction of the rest of the house.

Given the timeframe involved in confirming approval for a larger extension, the GGF recommends that a full planning application is made prior to exploring the application under the neighbour notification scheme. Although this route may have a longer processing time, commonly between 10 and 12 weeks, the homeowners' rights to build under the neighbour notification scheme have never been challenged in the case of dispute and as such the expected result of a challenge cannot be verified by existing case law. Furthermore under the neighbour notification scheme the homeowner would still be responsible for ensuring all other forms of lawful development have been met

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and that all works must be **COMPLETED** prior to 30th May 2019. The full planning consent route will provide surety in all aspects of planning application and approval for the homeowner.

2.4.7.3 Certificate of lawful development

In most cases it is possible to decide whether or not a proposed project qualifies as permitted development (PD). However, there will inevitably be instances where the decision is less clear cut.

If there is any ambiguity or question over whether your proposal passes the PD tests, there are a number of options. It may, for instance, be possible to alter your plans to ensure they meet PD limits and conditions or alternately an application for a Lawful Development Certificate (LDC) may be made. This is not the same as planning permission but is proof that the building work is lawful.

This option is well worth considering if there is any doubt whether the proposed project is allowed under PD rights. If the property is sold at a later date, an LDC may be helpful to answer queries raised by potential buyers or their legal representatives. As such, it is important that all paperwork and records relating to your property are clear and up to date.

Refer to Figures to see whether Permitted Development Rights may be appropriate in England, Wales, Scotland and N. Ireland.

SECTION 2:

Statutory Requirements - England

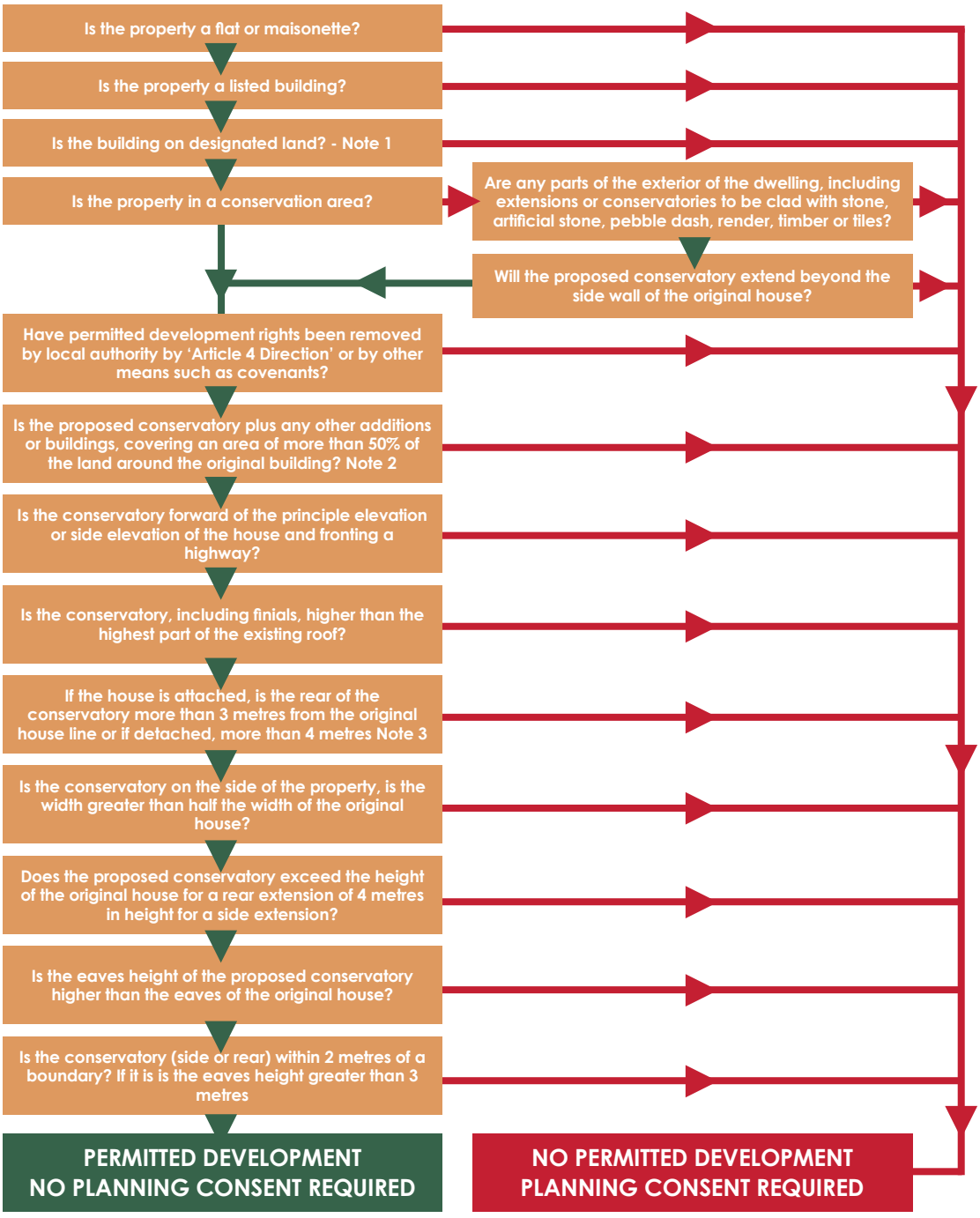

Figure 2: - Is planning Permission Required in England?

Note 1 – 'Designated land' includes National Parks and the Broads, Areas of outstanding Natural Beauty, conservations areas and World Heritage Sites

Note 2 – 'Original Building' means the house as it was first built or as it stood on 1 July 1948 (if it was built before that date). Although the current owner may not have built an extension to the house, a previous owner may have done so.

Note 3- Temporary extension to these limits to 6 metres and 8 metres respectively apply until 30th May 2019

Please note that the above is given as a guide only and confirmation of rights under 'permitted development' must be checked with local planning office.

SECTION 2:

Statutory Requirements - Wales

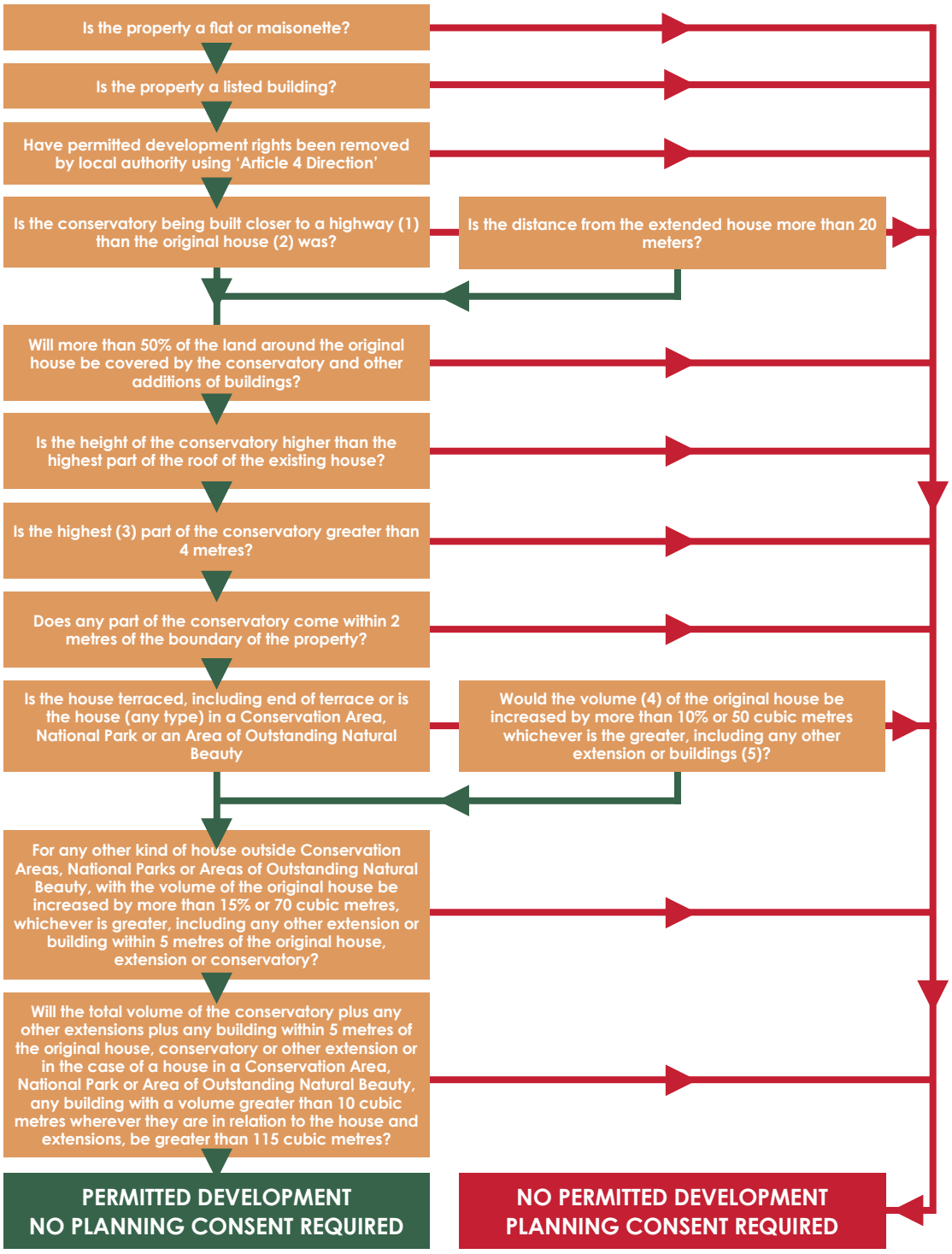

Figure 3: - Is planning Permission Required in Wales?

(1) – The term 'Highway' includes all public roads, footpaths, bridleways and byways.

(2) – 'Original Building' means the house as it was first built or as it stood on 1 July 1948 (if it was built before that date). Although the current owner may not have built an extension to the house, a previous owner may have done so.

(3) – Highest part includes all finials and trims

(4) – Volume is measured externally

Please note that the above is given as a guide only and confirmation of rights under 'permitted development' must be checked with local planning office

SECTION 2:

Statutory Requirements - Scotland

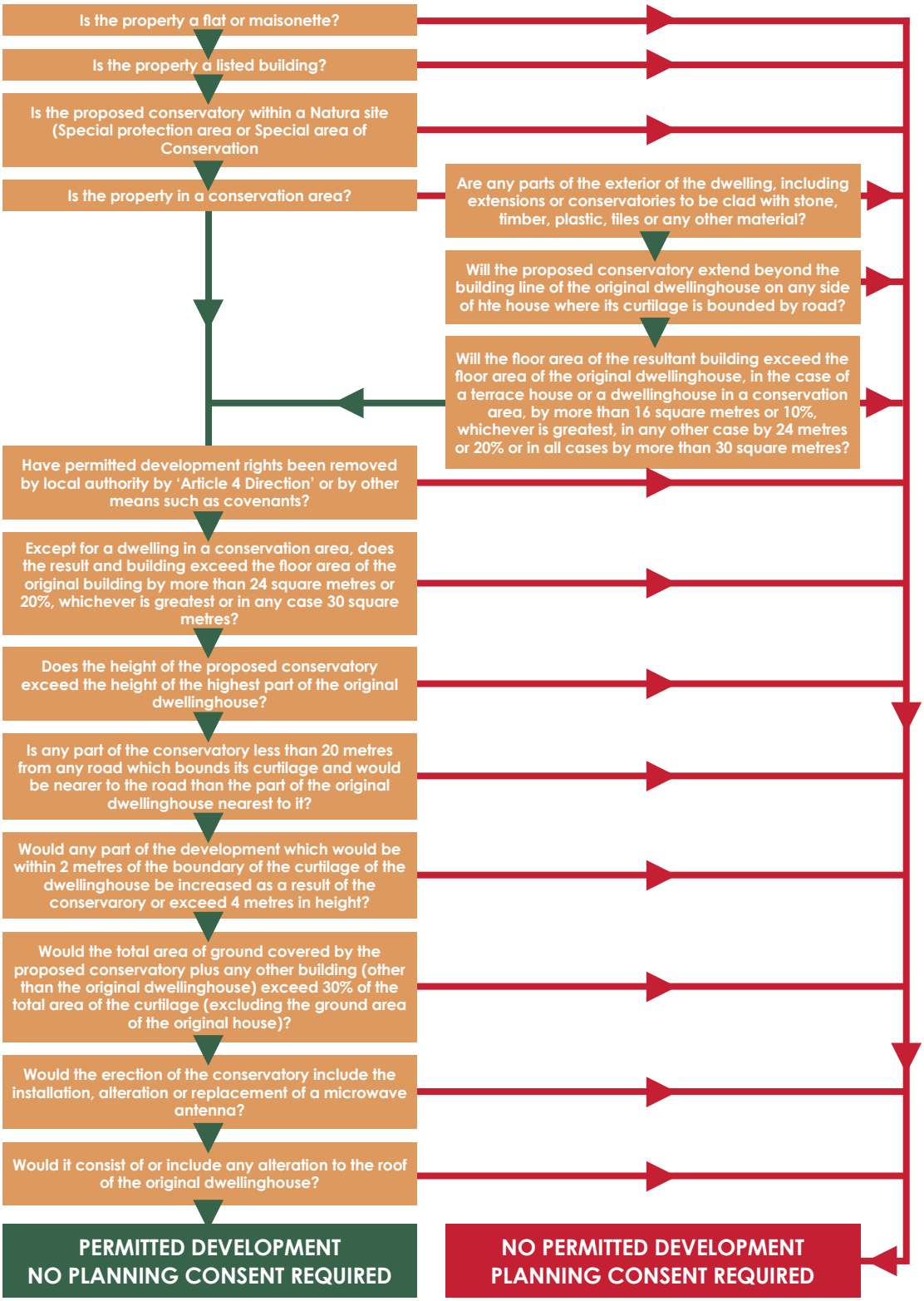

Figure 4: - Is planning Permission Required in Scotland?

Please note that the above is given as a guide only and confirmation of rights under 'permitted development' must be checked with local planning office.

SECTION 2:

Statutory Requirements - Northern Ireland

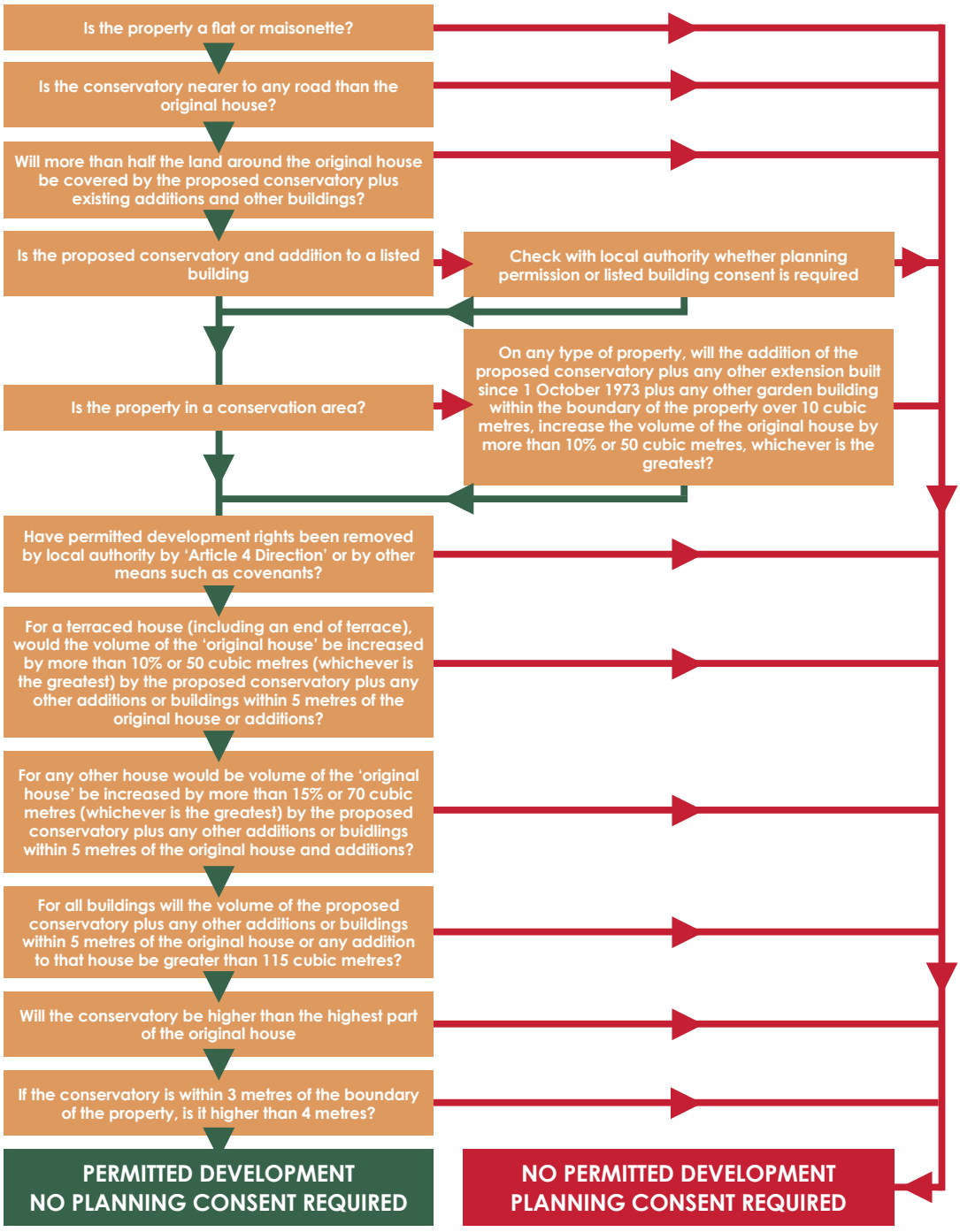

Figure 5: - Is planning Permission Required in Northern Ireland?

Note 1 – The 'original house' is defined as the house plus any extensions as they stood 1 October 1973.

Note 2 – If any existing extension to the original house or the proposed glazed extension comes within 5 metres of another building belonging to the original house (e.g. garage, shed or greenhouse), the volume of that building will be treated as if it were part of the glazed extension and counts against the allowance for additions and extensions.

Note 3 – If you live in a listed building or in a conservation area, all additional buildings which are more than 10 cubic metres in volume, regardless of distance from the original house, are treated as extensions and reduce the allowance for extending without planning permission.

Note 4 – Any building added to the property which is more than 10 cubic metres in volume and within 5 metres of the house will be treated as an extension of the house, and so reduces the allowance for further additions to the house without planning permission.

Please note that the above is given as a guide only and confirmation of rights under 'permitted development' must be checked with local planning office.

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2.5 The Party wall etc. Act 1996

This Act comes under Civil Law and is not therefore administered or controlled by either the Planning or Building Control Departments.

The Party Wall etc. Act 1996 provides a framework for preventing and resolving disputes in relation to party walls, boundary walls and excavations near neighbouring buildings. The Party Wall Act came into force on 1st July 1997 and applies throughout England and Wales.

Note: Scotland and Northern Ireland rely on common law rather than legislation to settle party wall disputes. Neighbouring owners can negotiate to allow work to proceed although access can be forced through the courts if necessary.

The Act covers shared walls between semi-detached and terraced houses, or structures such as the floors between flats or maisonettes, plus garden boundary walls. In addition to alterations affecting the structures directly, the effect of any excavations within 3-6 metres of the boundary can be covered by the Act if the foundations are considered to be likely to have an impact (based on depth).

A building owner proposing to start work covered by the Act must give adjoining owners notice of their intentions in the way set down in the Act. Adjoining owners can agree or disagree with what is proposed and where they disagree, the Act provides a mechanism for resolving disputes.

The Party Wall Act is separate from obtaining planning permission or building regulations approval and could typically cover:

- A new building on or at the boundary of 2 properties.
- Work to an existing party wall or party structure.

However, the most common application of the Party Wall Act covering Extensions, Conservatories and Orangeries is;

- Excavating and constructing foundations for a new building or structure within 3 metres of a neighbour's building or structure where that work will go deeper than the neighbour's foundations.

Note: If it can be proven that your excavation is no deeper than the neighbouring structure then the Party Wall Act would not apply even if building close to or immediately adjacent to any structure).

It is always a good idea to discuss proposals with neighbours in advance of serving notice. If you get approval from the neighbour, they may simply consent to the work and you will incur no fees. However, it is still necessary to comply with the terms of the Act. For example, avoiding unnecessary inconvenience, providing temporary protection for adjacent buildings and properties where necessary and compensating neighbours for any loss or damage if it is caused by the work.

If the adjoining owner refuses to consent to the work or if they refuse or fail to respond, you are deemed to be in dispute and the owner should be contacted and an agreement negotiated. They may write and issue a counter-notice, requesting certain alterations to the work, or set conditions such as working hours. If an agreement is reached, put the terms in writing and exchange letters, and work can begin.

If an agreement cannot be reached, a surveyor will need to be engaged to arrange a Party Wall Award that will set out the details of the work. Hopefully, the neighbour will agree to use the same surveyor – an 'agreed surveyor' and only a single set of fees will be incurred. However, the neighbour has the right to appoint their own surveyor at the expense of the developer. If each side's surveyor still cannot agree, a third surveyor will need to be retained to adjudicate.

Remember...disputes can be very costly, so keep neighbours well informed.

Explanatory booklets are available from Local Council offices and information can be sourced from the planning portal website.

2.6 Right of light

Under the circumstances that Planning Permission is required there are guidelines that the Local Authority may consider regarding "Right of Light" to an adjoining property's existing windows. This consideration may limit the projection of the glazed extension.

However, the "Right of Light" guidelines (45 degree Code) may be applied but these guidelines are not

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covered by Statute.

2.7 Extra consents that may be required

There may be extra consents that are required due to other factors, for example Water Authority Byelaws. The following situations should be considered:

- Local Authority consent.
- Neighbours' consent.
- Original builder's consent.
- Local Water Authority approval, in particular building near to sewers since the transfer of private sewers to the Sewerage Undertakers in England and Wales. Refer to Annex B.
- Restricted covenant.
- Conservation area consent.
- Listed building consent.

2.8 Building Regulations – England and Wales

2.8.1 Exempt extensions

In England and Wales a conservatory may be exempt from general Building Regulations provided it meets the following requirements detailed in Approved Document L1B clause 3.15 states:

3.15 - Regulation 9 of the Building Regulations exempts some conservatory and porch extensions from the **energy efficiency requirements**. The exemption applies only for conservatories or porches:

- which are at ground level
- where the floor area is less than 30m^2
- where the existing walls, doors and windows in the part of the **dwelling** which separates the conservatory are retained or, if removed, replaced by walls, windows and doors which meet the **energy efficiency requirements**; and
- where the heating system of the **dwelling** is not extended into the conservatory or porch

It should be noted that independent heating systems may be installed in conservatories provided they are not connected to the dwelling's heating system.

If heating is to be installed, this should be considered at the design stage, particularly important if solid fuel heating is being considered. The proposed installation should be installed by a qualified plumber, electrician or HETAS engineer and advice should be taken from the approved Installer.

It is also generally accepted that an exempt conservatory will also be:

- solely for domestic purposes
- is single storey and built at ground level
- the conservatory does not require any associated work that involves the re-siting of any manholes/ inspection chambers or underground drainage and wet plumbing facilities (toilets, showers, wet rooms) are not incorporated into the scheme
- the roof of the conservatory is significantly glazed (>75%) with either transparent or translucent materials
- the walls of the conservatory are also substantially glazed (>50%) with transparent materials

Additionally;

- If replacing an existing conservatory that has already had the existing physical barrier removed and if a thermal benefit can be proved then the addition of any new structure will be exempt from Building Regulations.
- Widening of or creating new apertures that involve the insertion of a structural lintel and irrespective of the addition any thermal barrier being re-instated, will require either a building notice or full regulations approval. It is always recommended that professional advice should be taken before any such work is undertaken.

It is important to note that although a conservatory may be exempt from Building Regulation control, the glazing in the conservatory must meet the requirements for safety glazing in critical locations to either:

- Break in a way unlikely to cause injury.
- Resist impact without breaking.
- Be shielded or protected from impact.

In practice this will mean using Safety Glazing Material

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in compliance with BS 6262-4 (shielding must protect both the inside and the outside of the glass) in critical locations in internal and external walls. Further details of how compliance can be achieved are contained in Approved Document K (AD K), Protection from falling, collision and impact, requirement K4. Refer to BS 6262-4 or Figure 6 below to identify vulnerable glazing locations.

Note: It is a requirement for the GGF Conservatory Association Members that, where appropriate, all glazing should conform to the requirements of BS 6262-4

Thermally toughened or laminated glazing should also be used in overhead glass to the roof, ideally thermally toughened outer pane for resistance to breakage and laminated internal pane for containment of glass should the outer pane be broken.

It may also be necessary to consider the need for containment glazing where the level difference between the finished floor of the glazed extension and the external ground level is greater than 600mm. Details of how this can be achieved are contained in Approved Document K, Section 4: Guards and Barriers, also refer to GGF Datasheet 7.2 - Guidelines for the Use of Glass in Protective Barriers for additional information.

If a new electrical circuit is being installed in a glazed extension or an existing circuit servicing a kitchen or bathroom is extended, the works must be carried out by a member of a 'competent persons scheme' or notified to the building control department of the Local Authority. Additional sockets from an existing circuit may be fitted without reference to the above in areas except kitchens and bathrooms but it would be good practice to ensure they are protected by a suitable circuit breaker as they are likely to be used to extend power into the garden for mowers etc.

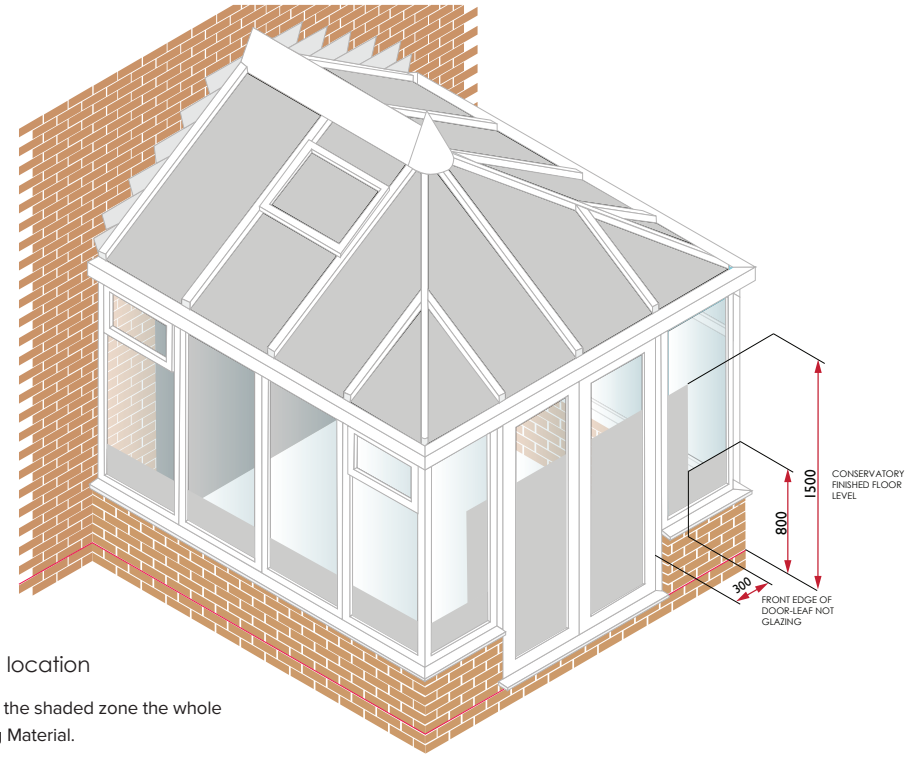

Figure 6:- Critical glazing location

If any part of a pane falls within the shaded zone the whole pane must be of Safety Glazing Material.

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2.8.1.1 Modification to existing dwelling

Should the construction of the glazed extension require material modification to the existing dwelling, i.e. change to or the addition of a structural opening, relocation of public drains (see Annex B), separate approval solely for the modifications must be gained from Local Authority Building Control (LABC) and the local Water Company. This type of work may be done under building notice approval rather than full plans approval.

Note: Means of Escape
Where a conservatory is being installed, care must be taken to ensure that existing means of escape from the 1st floor level or from an inner room on the ground floor, are not compromised by the addition of the conservatory. Alternatives means in accordance with Approved Document B must be considered.

2.8.1.2 Permanent ventilation

Care must be taken when positioning the glazed extension. It must be established whether any permanent ventilation for combustion appliances would be covered by the glazed extension. These permanent ventilators provide air to ensure efficient combustion for open-flued appliances such as water heaters and in the case of flueless appliances, air to ensure efficient combustions and a means for the products of combustion to escape to the outside.

Where a permanent ventilator will be covered by a glazed extension, a Gas Safe registered engineer or plumber should be consulted and alternative means of permanent ventilation provided.

2.8.1.3 Flue outlets

The heat generated from a flue outlet can affect some materials adjacent to it and therefore the fitting of some form of deflector plate would be advisable, provided it is fitted in accordance with Gas Safe recommendations or other statutory regulations.

Existing flue outlets that discharge within or near the footprint of the proposed glazed extension may need to be re-sited.

Only a competent person (Gas Safe registered) who has the necessary training and experience of heat producing appliances should undertake this work. On completion of the work the boiler must be checked for correct working.

Boiler flues must never discharge into the conservatory. It is important not to position the conservatory too close to these appliances as it may affect their efficiency and the safety of the householder. The surveyor can get advice and guidance from a Gas Safe registered engineer or plumber and reference Approved Document J and BS 5440-2:2009 on this matter.

For information and guidance regarding combustion appliances and the siting of gas flues, refer to the relevant National Building Regulation guidance documents as follows:

- England – Approved Document J England.
- Wales – Approved Document J Wales.
- Scotland – Technical Handbook – Domestic – Clause 3.20.
- Northern Ireland – Technical Booklet L.

2.8.2 Non-exempt extensions in England and Wales

If a glazed extension is not exempt from the requirements of Building Regulations in England and Wales, it will need to comply with the requirements of all parts of the current Building Regulations.

In accordance with Building Regulations Part L1A:2010 the thermal elements will need to be as follows:

Wall	0.28 W/m2 K
Floor	0.22 W/m2 K
Window, roof window or rooflight	1.6 W/m2 K or WER band C or better
All doors	1.8 W/m2 K

It would also be considered good practice for elements of exempt conservatories to meet the above requirements as they are designed to reduce the cost and environmental impact of heating domestic dwellings.

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Note: To achieve a wall U-value of 0.28 W/m2 K the wall, if constructed as a conventional cavity wall, will need to be 300mm overall thickness although an exempt glazed extension does not need to achieve this level. Other forms of wall construction may result in walls being less than 300mm in width whilst achieving the required 0.28 W/m2 K.

Note: Where a glazed extension is no longer an exempt building the limitation on the size of glazed areas detailed in Approved Document L1B usually applied to extensions is not applicable.

2.9 Building Regulations Scotland

There are significant differences between the exemption criteria for the Building Regulations in Scotland and those for England and Wales. The major differences are:

- conservatories over 8 square metres (measured internally) floor area require a building warrant and will need to comply to the Scottish Building Regulations 2010
- conservatories over 50 square metres will need to comply with the Scottish Non-domestic Building Regulations 2010
- a conservatory containing a fixed combustion appliance or flue outlet is not exempt
- a conservatory within 1 metre of a boundary is not exempt
- any alteration to dividing elements between the house and conservatory will need to comply with the thermal requirements of Parts 6.2.9 to 6.2.12 of Scottish building codes (even if the opening width is not being changed)

2.10 Building Regulations Northern Ireland

The criteria for exemption from Building Regulations in Northern Ireland are mainly the same as those for England and Wales but the requirements for glazing in critical areas are referenced in Technical Booklet V:2000. Requirements relating to combustion appliances are given in Technical Booklet L:2006.

2.11 Reference information Section 2

Statute Law

Town and Country Planning Act 1990

The Town and Country Planning (Tree Preservation Order) Amendment) Regulations 1988

Party Wall Act 1996

The Building regulations within England and Wales are controlled by the Department for Communities and Local Government (DCLG). Further information can be found at www.communities.gov.uk or www.planningportal.gov.uk

The Building Regulations within Scotland are controlled by Scottish Government, further information can be found at www.gov.scot/topics/built-environment/building/building-standards

The Building Regulations within Northern Ireland are controlled by the Department of Finance and Personnel (DFPNI). Further information can be found at www.dfpni.gov.uk

SECTION 3:

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Section Contents

The site survey is important in order to evaluate the site and to determine the work to be undertaken to ensure the glazed extension can be constructed to the appropriate specification, in line with the customer's expectations and with minimum delays due to unexpected conditions found during the build process. It is vital that all sections shown above should be evaluated during the on-site survey prior to ordering of materials and commencement of any works.

3.1 Access and storage requirements

Once on site the following access requirements need to be determined:

- As the property is approached note the general width of access i.e. whether a very narrow lane or gateway may restrict access to delivery vehicles. Also note any parking restrictions if delivery vehicles will be unloading from the highway.
- Is there a drive at the property upon which building materials could be placed without restricting the client's access or causing damage to the surface?
- Is the property detached, semi-detached or terraced?
- Is there access to the rear of the property? If there is access either down a side path or through the rear of the garage, is it wide enough for a standard wheelbarrow and other plant? If the only access is through the property, what protection will be required to the floor, decorations and furnishings? The size of manufactured components of the glazed extension should be considered.
- Is there sufficient space for a waste disposal skip and, if it is to be positioned on the client's drive, is there any likelihood of damage to the drive surface or is protection required? If the skip is to be positioned on the road, this should be clearly stated on the survey document as it may be necessary to obtain a permit from the Local Authority and if it is to be left overnight then adequate lighting will have to be provided.
- Will the installer/contractor be mixing concrete by hand or having ready mix concrete delivered, and if so, where can such material be dropped and where can other materials be safely and securely stored? Is there anywhere suitable for wash out and cleaning following the mixing or delivery of concrete?
- Temporary storage may be required for delivery of the superstructure.
- The provision of welfare facilities for operatives should be considered.

The proposed access requirements and storage facilities should be discussed with and agreed with the client.

3.2 Evaluating the site

3.2.1 Existing buildings

The existing dwelling and any nearby structures (neighbouring dwellings, detached garages, sheds etc.) should be surveyed and an assessment made whether the proposed new building will possibly affect their stability or interfere with the amenity of the occupiers. Particular consideration should be given to the following:

- Will any demolition be required before excavation of the site can take place, including an existing conservatory?
- Who will undertake this work and is planning permission required?
- If the property is listed, does the listing include the buildings (including an existing conservatory) being

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demolished and is planning permission or listed building consent required?

- Is the property in a conservation area and is permission required to replace the existing conservatory?
- A health and safety risk assessment should be carried out. If it cannot be positively confirmed that materials do not contain asbestos, samples must be taken and submitted for analysis and special measures must be taken.
- Where asbestos cannot be positively identified as not being present, the guidelines contained in the GGF's Code of Practice in relation to working with asbestos should be followed.
- Examples where asbestos may be present: soffits, rainwater goods, infill panels, corrugated roof, pipe lagging etc.
- If there is an existing structure to be removed, does it contain electrical and plumbing services, which need to be terminated and who will undertake this work?
- Determine the existing access requirements and those required by the customer. Consideration should be given to specific customer requirements e.g. wheelchair access.
- If an existing building is to be removed and be replaced by a glazed extension, does the property have an external finish such as render and will the new glazed extension cover the same wall area?
- If the house wall needs to be made good after the glazed extension has been installed, what arrangements will be made and who will complete these works?

A careful visual inspection of the existing property, in particular house walls should be made and supporting photographs taken. Particular note should be made of any defects such as:

- Settlement cracks within the house wall or existing patio area with photographs showing details of defects. Such defects may highlight the general ground conditions that need to be taken into account when designing the new structure. Any defect identified must be brought to the client's attention, otherwise the customer may hold the installer and contractor responsible after the installation.
- The host wall should be structurally capable of supporting the new structure and withstanding the dynamic loadings (such as wind and snow) from the new glazed extension.
- Check the condition of existing gutters and unions, any damage should be noted, photographed and the customer made aware of the condition.

Tip - Check the condition of the driveway and take photographs. Any existing damage should be noted and pointed out to the customer.

3.2.2 Existing services

Tip - Existing power lines should not be enclosed. Seek advice from the utility supplier in this case.

Determine the location of existing drains, sewers and rodding points. It may be beneficial to use scanning equipment to ensure all underground services that may affect the glazed extension build are located. Any services located should be accurately marked on the drawings and if possible supported with photographs.

Tip - The position of any proposed steps or ramps may conflict with existing manholes.

Identify the location and condition of any existing electrical cabling, plumbing and other utility installations, that may affect the installation and are relevant to the scope of works contained in the contract. These should be assessed regarding suitability for the proposed work.

Should it be necessary to re-position sewers, these

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works would normally be completed under the instruction of the local sewerage undertaker and where appropriate, a 'Building Notice' given to Building Control Body (BCB). The responsibility for foul sewers has passed to the local water companies in their role as sewage undertaker. Therefore in such circumstances, local Building Control will notify the sewerage undertaker.

3.2.2.1 Sewers

On 1st October 2011 all private sewers and lateral drains in England and Wales were transferred to the local sewerage undertaker by the Government by a Statutory Instrument: '2011 No. 1566 – Water Industry, England and Wales – The Water Industry Schemes for Adoption of Private Sewers) Regulations 2011'.

The legislation affects England and Wales only.

This legislation was enacted to transfer responsibility for the maintenance and repair of some sewers and lateral drains from homeowners to sewerage undertakers.

The GGF, through Water UK, the representative body for water companies and sewerage undertakers, have agreed a straightforward national protocol that will apply to all dwelling extensions in England and Wales including conservatories to enable building near to these transferred assets.

For full guidance details and examples of the forms required by the sewerage undertakers, refer to: **Annex B.**

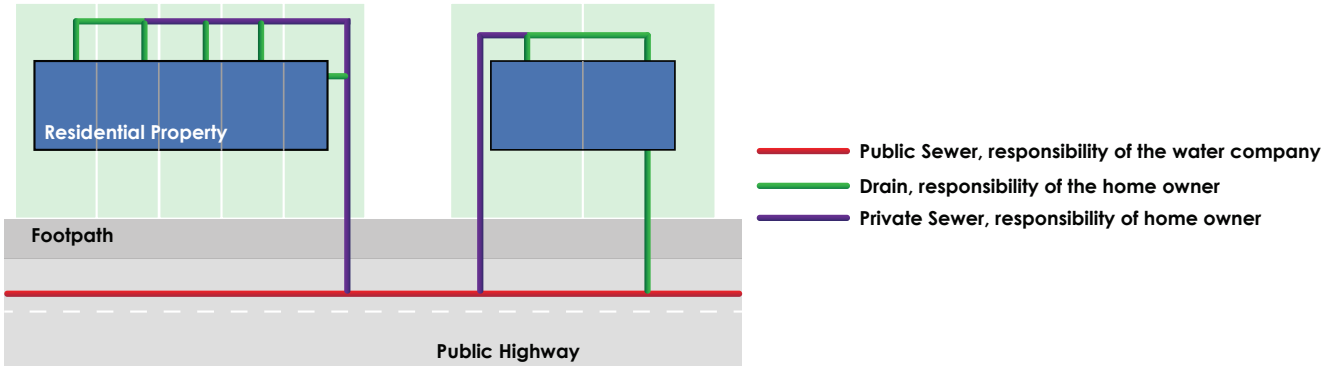

Figure 7: - Responsibilities prior to the transfer on 1st October 2011

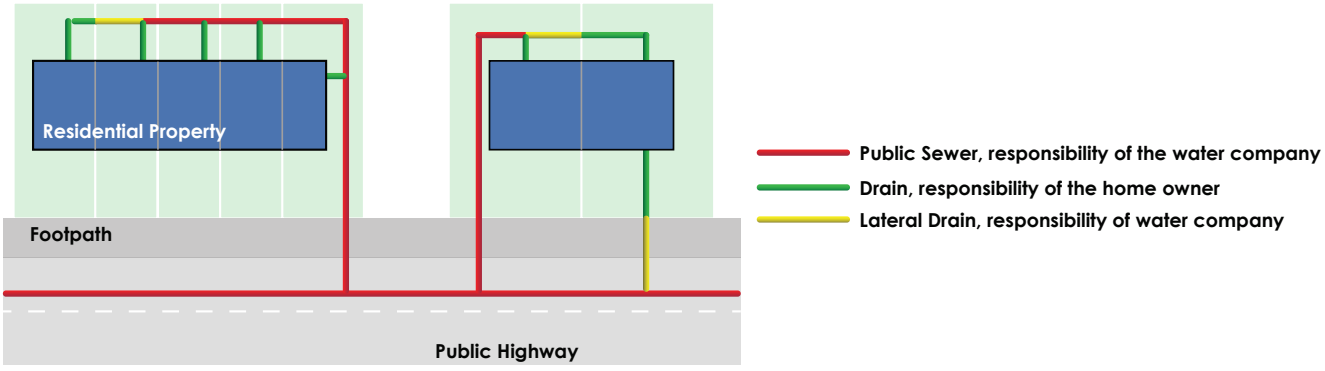

Figure 8: - Responsibilities after 1st October 2011 in relation to gravity sewers only

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3.3 Ground assessment

3.3.1 Ground condition

A careful assessment of the ground conditions is essential, as this will influence the type and depth of foundations for the glazed extension.

The type of foundation required is dependent on local ground conditions and the surveyor should always establish the type and specification of the existing property foundations to enable an informed judgement on the type and depth of foundation to be built.

In some instances specialist foundations may be required for the conservatory, e.g. due to reclaimed land, poor ground conditions, or the presence of trees or rock in the area, Building control or a Civil/Structural engineer may need to be contacted.

- The foundations of the existing and any adjacent dwellings should be established as soon as practical. This will be a guide as to the type of foundation suitable for the glazed extension and will also indicate whether a party wall agreement may be necessary.
- It is recommended that, where practical, an inspection pit is dug to expose the existing house foundations to enable a full assessment to be made for the new glazed extension foundations.
- Confirm with the customer, and if possible with neighbours, whether any trees or large shrubs have been removed within the preceding 12 months, including those in neighbouring gardens.
- Due care must be taken when considering building near trees. Guidance contained in NHBC Guide, section 4.2 - Foundations - 'Building near trees' should be consulted.
- Are any trees which may be affected by the position of the glazed extension, protected by a Tree Preservation Order (TPO)?
- The ground may be subject to soil shrinkage or heave. This is caused by the natural seasonal changes in water content of the soil. This usually occurs in clay soils and the presence or removal of trees may affect this. These conditions should be catered for in the foundation design.
- Is there an existing patio area to take up? Will this material be re-used or will this need to be removed from site?
- On sloping sites, does the ground need to be excavated or in-filled?
- What are the implications of building the glazed extension foundations in regard to Health and Safety legislation?

3.3.2 Difficult ground or unusual existing foundations

Where the following conditions are found or known to exist, specialist advice should be sought from a qualified structural, civil or a specialist geotechnical engineer:

- Is the house or will the proposed glazed extension be built on made-up ground?
- Where the existing property is known to have non-standard foundations, e.g. raft or pile foundation
- Has the house previously suffered from subsidence?
- Is the house in an area subject to mining subsidence?
- Is the house in an area prone to landslip?

3.3.3 Drainage

Identify and plot any existing underground drainage and services. Lifting of manhole covers is essential for the identification of the direction and depth of existing drainage runs and a visual check on neighbouring gardens may also prove to be helpful.

3.3.4 Radon, Methane and Carbon Dioxide

In addition to assessing the structural ground conditions, the surveyor should establish whether there are any local requirements for Radon or Methane gas preventative measures.

Check whether the house is built on a 'brown field' site, this will often be an indication of possible land-fill and therefore the risk of methane.

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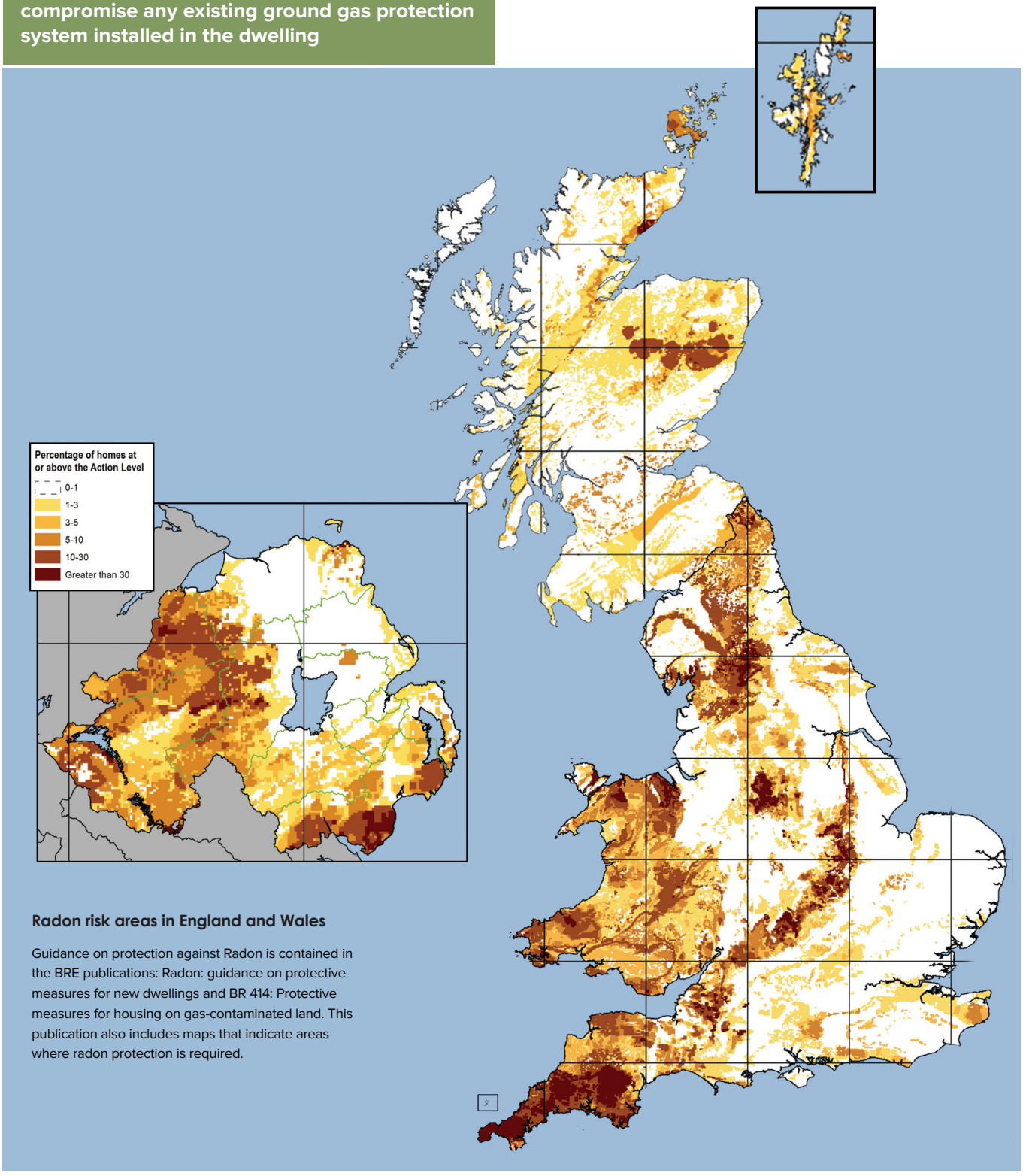
The construction of the conservatory must not compromise any existing ground gas protection system installed in the dwelling



Radon risk areas in England and Wales

Guidance on protection against Radon is contained in the BRE publications: Radon: guidance on protective measures for new dwellings and BR 414: Protective measures for housing on gas-contaminated land. This publication also includes maps that indicate areas where radon protection is required.

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3.4 Measurement survey

This will entail neat line drawings and include the following:

- Details of the particular elevations of the property against which the glazed extension is to be situated in both plan and elevation. A Datum Line (DL) should be established, clearly marked on the drawing and used for all site and setting-out measurements.
- A datum point or Setting Out Point (SOP) should be established on an established DL e.g. the existing house wall to which the new building will be attached, from which all measurements and setting-out is taken. This point should ideally be a feature on the existing building such as a corner, if not a permanent feature, it should be permanently marked for future reference.
- A secondary SOP may be established to enable triangulation to be used to locate all other positions.
- Accurate positioning of all existing windows, service pipes, drains and other objects must be highlighted, including heat producing appliances.
- Any special brickwork or corbelling/render stop details must be clearly identified, as these will indicate whether special packers are required prior to the wall-frames being fitted. The dimensions between each feature should be clearly indicated on the drawing of the proposed new building. It is useful for the site measurement survey to be backed up with adequate photographs.
- Check the overall height of the proposed glazed extension and ensure that the roof and the required flashing will fit underneath existing windows or the eaves of the property.
- Check whether the house wall is vertically plumb, if not make an allowance when designing the glazed extension. Refer to section 3.4.1.
- Check the position of all rainwater pipes, cables, airbricks, extractors and soil vent pipes. The surveyor should consider these when designing and specifying the flashing detail at the abutment of the glazed extension roof and the existing house.

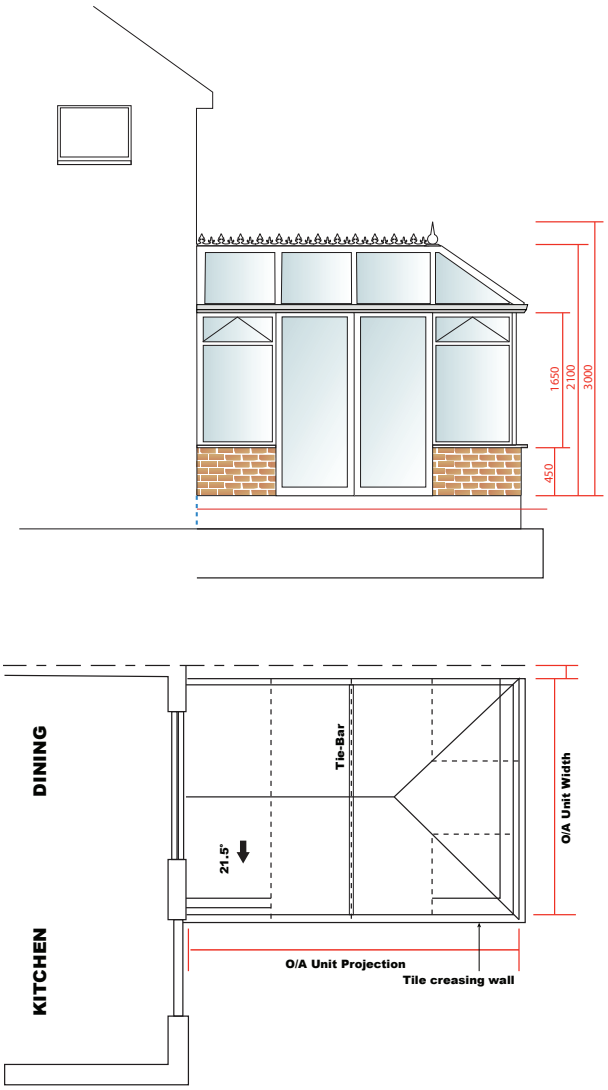

Figure 9:- Measurement and survey

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- The general condition and type of the existing wall and site exposure should also be noted to assess whether the installation of cavity trays is necessary and type of flashings required, taking into account local construction methods. Areas where cavity trays are generally installed when extensions are added to existing buildings are likely to be high weather exposure areas and moisture penetration is likely if cavity trays are not installed. It is also important to consider all other junctions with the original building such as where dwarf walls abutt existing walls to ensure suitable measures are taken to avoid moisture ingress.
- If the glazed extension design has roof(s) that incorporate box gutters, due regard must be given to their structural support, rainwater capacity and accessibility for maintenance. The surveyor should ensure there is adequate provision for discharge outlets from all gutters and box gutters.
- If the new glazed extension roof and the existing dwelling roof form a valley and a box gutter is to be installed, the existing roof/soffit/fascia must be assessed to ensure they are capable of supporting the new structure. It may be necessary to consider modifying and strengthening the existing roof to adequately support the new structure.
- If moving a projecting obstruction (e.g. soil and vent pipe) is not feasible, it will be necessary to cater for the obstruction when designing the glazed extension. Soil vent pipe flashing kits are readily available and these are designed to fit around the stack and seal to the roofline.

Tip - Check the position of any box gutter supports for conflict with existing windows and doors.

3.4.1 Check for existing walls for plumb and square

If the house wall leans forward then all setting out dimensions for the projection of the base must be taken from the vertical plumb line as demonstrated in

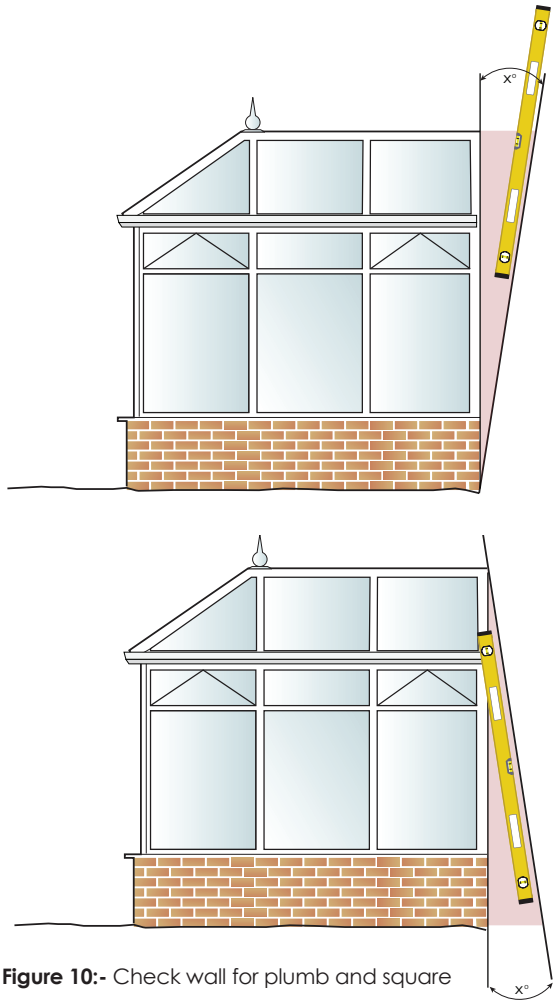

Figure 10:- Check wall for plumb and square

Figure 10. If the house wall leans backward, this indicates that some form of extension to the ridge will be needed as indicated in Figure 10. Whether the wall leans inwards or outwards, packers to the side frames and roof will be required as indicated in Figure 10.

However, any leaning wall should be further investigated to ensure it is structurally stable and able to support the glazed extension and withstand wind and snow loads imposed on it by the glazed extension.

It may be advisable to specify an in-fill/packer component to be fixed to the rear of the side frames, which abut the house wall. This will give the facility, if required, to secure a rainwater pipe (RWP) at this position to prevent it interfering with the window frame.

Adjacent walls and corner details should also be checked for squareness to the host wall, e.g. a garage wall opposite the house being abutted by a box gutter.

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3.5 Other design specification requirements

The surveyor should check the aspect and orientation of the glazed extension and the relative position of any surrounding buildings and other tall objects (trees etc.), that may cast shadows on the glazed extension. It is vitally important at this stage to ensure adequate provision for high level ventilation is provided for cooling in the summer months. Dependent on the anticipated levels of Solar heat gain, methods of reducing this through the use of Solar control glazing should be considered along with the installation of automatic roof windows with rain sensors and the installation of blinds.

The glazed extension may have three aspects, i.e. three elevations, consider which elevation is dominant as this will assist with an assessment for any solar control measures necessary.

Refer to section 5.4.7 for detailed considerations.

3.6 Health and safety requirements

The surveyor must provide relevant site data to allow the designer to analyse the conservatory structure for wind and snow loadings, e.g. altitude, location, exposure, topography and other relevant features. If the surveyor is unsure a suitably qualified person should be consulted.

The surveyor must, when reviewing site conditions and the proposed build, consider the Health and Safety requirements of the site, not only for operatives but also the client, their family, visitors to the property and the general public around the property.

Since the inclusion of domestic dwellings in the Construction (Design and Management) Regulations in 2015 (CDM 2015), a Construction Phase Plan must be written covering all works the Contracted Retailer is directly responsible for and also taking into account any other contractors who may be working on-site at the same time. The information gathered by the surveyor will form the basis of this Construction Phase Plan.

3.7 Site specific risk assessment

It would be prudent at this early stage, to complete a detailed risk assessment for both the site and the building process to determine potential areas of risk to enable action to be taken in good time to remove or mitigate the risk. This will help to avoid site delays or failure of the installed glazed extension in the future. A generic risk assessment covering all the major processes on site is contained in Annex E.

3.8 Survey documentation

Survey documentation should include the following:

- General site condition survey including details of any enabling works required prior to the construction phase.
- A sewer survey where existing sewers are within 3 metres of the proposed building including completed check list - **Refer to Annex B.**
- Detailed site plan to enable a final design to be agreed showing all service locations including gas flues, rainwater and soil pipes, waste pipes and gullies.
- Specification sheet for base detailing types of foundation, floor and brickwork including brick match where required.
- Specification sheet for superstructure including all wall frames, doorsets and roof including glazing specification.
- Site risk assessment.
- Provisional construction phase plan.

3.9 Reference information Section 3

Gas Safe technical services and BS 5440.
BRE publications: Radon: guidance on protective measures for new dwellings and BR 414: Protective measures for housing on gas-contaminated land.
Building regulations Approved Documents A, B, C, J
BRE Digest 240 Low-rise buildings on shrinkable clay soils part 1.
BRE Digest 241 Low-rise buildings on shrinkable clay soils part 2.
BRE Digest 298 Low rise building foundations.
NHBC Standards Chapter 4.2 Building near trees.
HSE – Construction Phase Plan - http://www.hse.gov.uk/pubns/cis80.pdf.

SECTION 4:

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4.1 Compliance with Building Regulations

In all countries within the UK, buildings should be constructed in accordance with the Building Regulations and Standards applicable to the location of the proposed building. Where a proposed conservatory is exempt from Building Regulation control, the construction should comply with these requirements to ensure the structure is well built, can withstand the loadings imposed on it and can ensure a reasonable level of health and safety of persons in or about the building. By building in compliance with the relevant guidance issues in each country, this requirement will be achieved.

The following areas are critical in achieving this requirement and the examples given are based on the requirements within England and Wales. Requirements in Scotland and Northern Ireland are similar:

4.1.1 Structure

Loading

A1. (1) The building shall be constructed so that the combined dead, imposed and wind loads are sustained and transmitted to the ground:

a) Safely; and

b) Without causing such deflection or deformation of any part of the building, or such movements of the ground, as will impair the stability of any part of another building.

(2) In assessing whether a building complies with sub paragraph (1) regard shall be given to the imposed and wind loads to which it is likely to be subjected in the ordinary course of use for the purpose for which it is intended.

Ground movement

A2. The building shall be constructed so that the ground movement caused by:

a) Swelling, shrinkage or freezing of the sub-soil; or

b) Land-slip or subsidence (other than subsidence arising from shrinkage, insofar as the risk can be reasonably foreseen), will not impair the stability of the building.

4.1.2 Fire Safety

Means of warning and escape

B1. The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times.

Note: Existing escape routes or egress provisions must not be compromised by the new building.

External spread of fire

B4. (1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

4.1.3 Site preparation and resistance to contaminants and moisture

Preparation of site and resistance to contaminants

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C1. (1) The ground to be covered by the building shall be reasonably free form any material that might damage the building or affects its stability, including vegetable matter, topsoil and pre-existing foundations.

(2) Reasonable precautions shall be taken to avoid danger to health and safety caused by contaminants on or in the ground, or to be covered by the building and any land associated with the building.

(3) Adequate sub-soil drainage shall be provided if it is needed to avoid

(a) the passage of ground moisture to the interior of the building

(b) damage to the building, including damage through the transport of water-borne contaminants to the foundations of the building

(4) For the purpose of this requirement, 'contaminant' means any substance which is or may become harmful to persons or buildings including substances which are corrosive, explosive, flammable, radioactive or toxic.

Resistance to moisture

C2. The walls, floors and roof of the building shall adequately protect the building and people who use the building from harmful effects caused by:

(1) Ground moisture

(2) Precipitation including wind driven spray

(3) Interstitial and surface condensation

(4) Spillage of water from or associated with sanitary fittings or fixed appliances

4.1.4 Ventilation

Means of ventilation

F1 (1) There shall be adequate means of ventilation provided for people in the building

4.1.5 Combustion appliances and fuel storage systems

Air supply

J1 Combustion appliances shall be so installed that there is an adequate supply of air to them for combustion, to prevent overheating and for the efficient working of the flue.

Discharge of products of combustion

J2 Combustion appliances shall have adequate provision for the discharge of products of combustion to the outside air.

Protection of buildings

J4 Combustion appliances and fluepipes shall be installed and fireplaces and chimneys shall be so constructed and installed, as to reduce to a reasonable level of risk of people suffering burns or the building catching fire in consequence of their use.

4.1.6 Protection from falling, collision and impact

Stairs, ladders and ramps

K1 Stairs, ladders and ramps shall be so designed, constructed and installed as to be safe for people moving between different levels in or about the building.

Protection from falling

K2 (a) Any stairs, ramps, floors and balconies and any roof to which people have access, and

(b) Any light well, basement area or similar sunken area connected to a building shall be provided with barriers where it is necessary to protect people in or about the building from falling.

Protect against impact with glazing

K4 Glazing (N1 in Wales) with which people are likely to come into contact whilst moving in or about the building shall;

(a) if broken on impact, break in a way which is unlikely to cause injury; or

(b) resist impact without breaking; or

(c) be shielded or protected from impact

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Note: K4 is an extract from AD K in England but reference AD N in Wales.

4.2 Special circumstances

Where the following conditions have been identified by the surveyor or are known to exist:

- Made up ground.
- Weaker type of soil with low bearing capacity to greater than normal depths.
- Wide variation in sub-soil within local area.
- Where the existing property is known to have non-standard foundations.
- Where excessive ground shrinkage or heave will occur.
- Where the house is built on non-standard foundations.

A more sophisticated foundation detail may be required. These will require the services of a Structural/Civil Engineer. Such alternative foundations are:

- Reinforced raft foundation.
- Piled foundation.

Note: If raft or piled foundations are to be used and the original house foundations are of a different type or if both the house and new foundations are raft, advice should be taken to ensure differential movement does not occur or is accounted for in the design.

4.3 Underground drainage and rainwater disposal

As most conservatories are usually sited either at the rear or the side of the original building, then it is possible that the foundations may interfere with existing underground services such as foul sewers or surface water drainage.

Tip - Check whether the existing drainage system is a combined foul and rainwater system

Every care must be taken during excavation to prevent damage to underground services, which may or may not have been highlighted on the survey document.

Where underground foul sewers are present, an assessment must be completed and approval from the local sewerage undertaker (Water Company) should be obtained as detailed in Annex B.

The exact requirements for protection to existing underground foul sewers will be based on the requirements of Approved Document H, section H1 or the water company's specific requirements. Access to the foul sewer for maintenance should be maintained as required by the water company.

New rainwater drains should be laid to fall and connect into an existing drainage system where possible. Access for maintenance should always be considered and provided as necessary. Where connection to an existing drain is not possible, suitable discharge to local watercourse or soak away should be considered.

Existing manholes within the conservatory floor area may be raised and fitted with a double sealed cover, with provision for floor finish. It must be confirmed with the local water authority that this is allowed, they may insist on the manhole being relocated outside the conservatory perimeter.

The condition of the existing manholes should be checked and any remedial/strengthening building work carried out if it is not being relocated.

4.4 Substructure design

The majority of domestic glazed extension installations can be constructed using conventional concrete foundations (see Figure 12,13,14). However, each company will have its' own preferred method based, at least in part, on knowledge of local ground conditions and local working practices.

4.4.1 General

From the survey information and site measurement documents, it will now be possible to design the actual base for the glazed extension. The critical points requiring detailed attention are as follows:

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- Setting Out Point (SOP) and Datum Line (DL).
    - These were determined at survey stage and give the datum point and dwelling wall from where all site measurements are taken. The SOP on the DL will show where the glazed extension is to be positioned on the property. It will usually be an existing feature (opening reveal, corner of building etc.) or a set dimension from a fixed feature.
- The relative floor level of the glazed extension in relation to the house floor level.
- The relative DPC level of the glazed extension in relation to the DPC level of the property.
- Consideration must be given to the level of exposure of the existing building corners where the glazed extension abuts, to ensure moisture penetration through brickwork does not occur. Conservatory abutments should be set in from corners subject to severe weather exposure.
- The general ground level in relation to the house DPC level. The DPC level of the glazed extension should be at least 150mm above the external ground level. Where this cannot be achieved, it will be necessary to either lower the external ground level around the outside of the glazed extension or alternatively build either a french drain (gravel filled trench 150mm wide by 150mm deep) or lay a concrete gully around the perimeter wall of the glazed extension to avoid damp penetration above DPC level.
- The general lie of the external ground level and whether it falls away from or towards the glazed extension.
- Sloping sites can produce several possible problems. For instance, if the ground level is much lower than the proposed glazed extension level, it may not be feasible to install a ground supported floor slab in the glazed extension due to the amount of in-fill required. If a suspended floor is to be constructed, this will probably add to the cost of the base work. If the site is sloping away from the existing building, it may result in additional height to the glazed extension wall below floor level. If the external land is falling towards the glazed extension then serious excavation will be necessary plus possibly the building of a retaining wall to give support to the remaining bank of high-level ground.

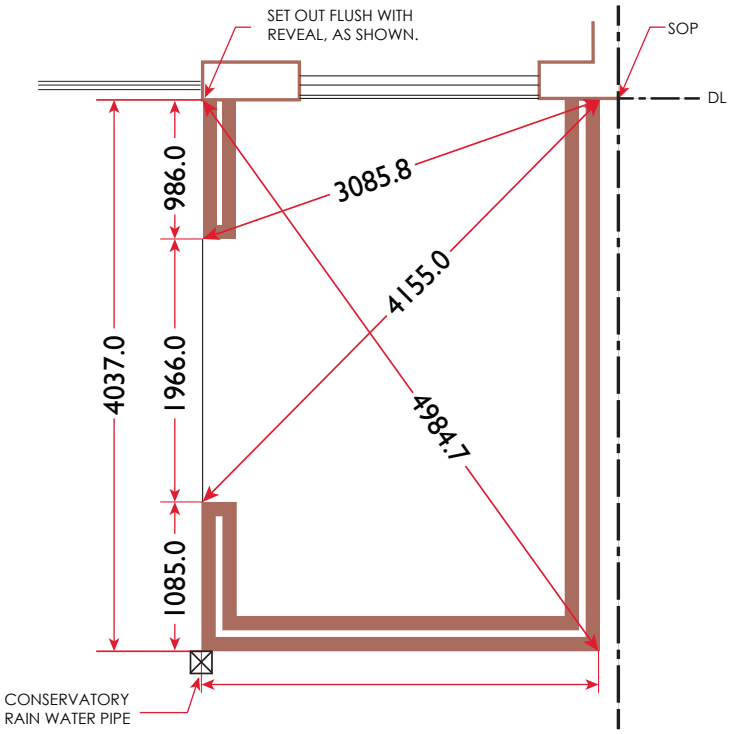

Figure 11: - Setting out point (SOP) and Datum Line (DL)

- If French doors or a single door open out and the land falls away, you will need to build a landing/ platform (generally the width of the door(s)) and with a projection equivalent to the swing of the door plus a minimum of 400mm. This will allow for the client to safely step out before walking down the steps. Steps will be required wherever the floor level of the glazed extension is more than 150mm higher than the external ground level. Approximately one step is required for every 150mm increment in height. If the overall height of the steps is more than 600mm it will be necessary to fit a hand rail/balustrade to each side of the set of steps, and this should always conform to Building Regulations (Approved Document K {ADK}).

4.4.2 Foundations of plain concrete (England and Wales)

From section 2E: Foundations of plain concrete -

Approved Document A, (AD A) Conditions relating to the ground:

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2E1 There should not be:

a) non-engineered fill (as described in BRE Digest 427) or wide variation in ground conditions within the loaded area; nor

b) weaker or more compressible ground at such a depth below foundation as could impair the stability of the structure

Unless there is evidence of poor subsoil conditions on the site, a traditional concrete strip footing or trench fill foundation placed under the walls of the glazed extension will normally suffice. The new foundation should be constructed in such a way that it does not undermine the foundations of the main building. Ideally the strip foundation should be poured at the same depth as those of the existing dwelling. Where poured at the same depth, the new strip foundation should overlap the top of the existing foundation by 150mm and this depth should be maintained for 300mm past the edge of the foundation (Figure 14).

4.4.4 Minimum width, thickness and depth of strip foundations

The minimum width of foundation should be designed to suit the wall construction, the conditions of the ground they are bearing on and the loads imposed on the ground by the glazed extension.

The imposed load can be simply determined by reference to Table 4 in BS 8103-1:1995.

Extracts from Table 4 – Wall load categories for floors to 4.5 m and roof to 9 m

Number of storys	Upper floor	Ground floor construction	Front/rear walls	Gable walls
	Type	Type	Load arrangements on walls	Load arrangements on walls
	Type	Type	Ground floor & roof	Ground floor & roof
1	N/A	GS SLAB (1)	A	B
1	N/A	TIMBER	B	B
1	N/A	PRECAST	C	C
1	N/A	IN SITU (2)	C	D

Note: (1) GS denotes 'ground supported'

(2) IN SITU denotes reinforced supported slab

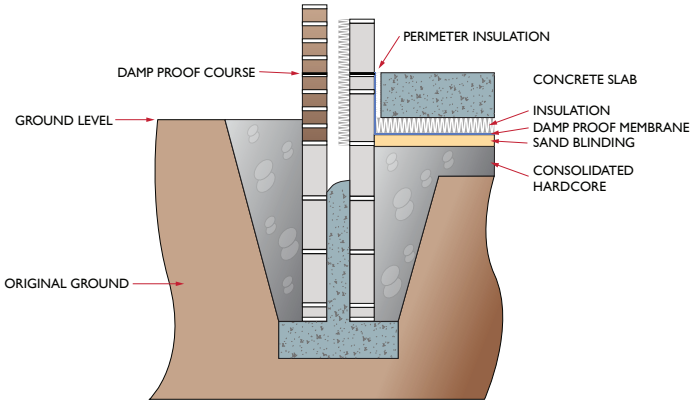

Figure 12: - Ground bearing floor with insulation below slab

Note: insulation can be installed above slab with DPM between insulation and slab

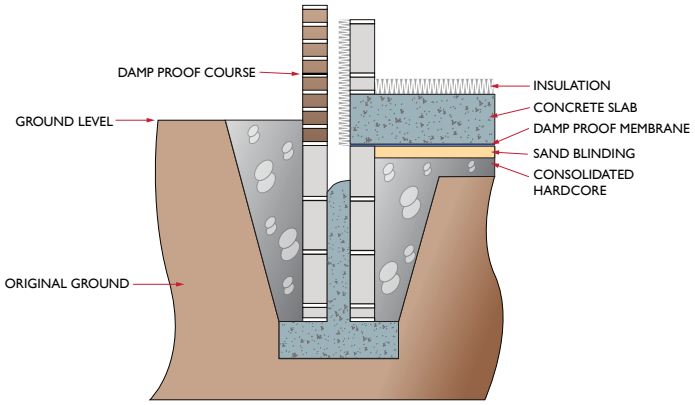

Figure 13: - Suspended floor with insulation above slab

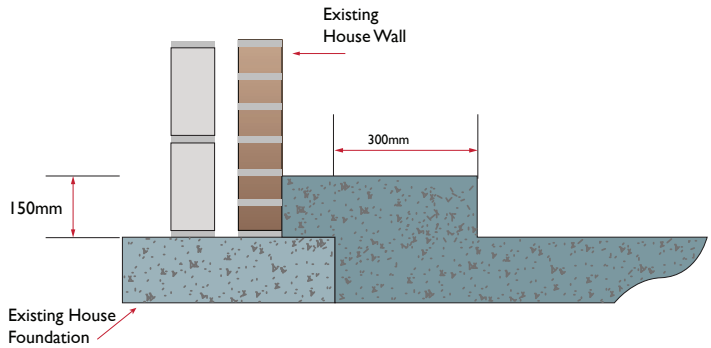

Figure 14: - New foundation stepped over existing house foundation

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Extracts from Table 7 – Identification of ground material and minimum foundation widths for wall load categories

Rock or soil		Simple field test	Minimum foundation width in mm, for load category (kN per metre run)			
Type	Condition		**A (20)**	**B (30)**	**C (40)**	**D (50)**
Rock	Hard	Requires at least a pneumatic or other mechanically operated pick for excavation	Equal to width of wall			
Gravel Sand	Compact	Requires pick for excavation. Wooden peg 50mm square hard to drive in more than 150mm	250	300	400	500
Clay Sandy clay	Stiff	Cannot be moulded in the fingers. Requires pick or pneumatically operated spade for excavation	250	300	400	500
Clay Sandy clay	Firm	Can be moulded with substantial pressure with the fingers and excavated with a spade	300	350	450	600
Sand Silty sand Clayey sand	Loose	Dry lumps may have slight cohesion but easily breaks up in fingers. Readily excavated with spade. 50mm peg can be easily driven in.	400	600		
Silt Clay Sandy clay Silty clay	Soft	Easily moulded in the fingers and readily excavated	450	650		
Silt Clay Sandy clay Silty clay	Very Soft	Exudes between fingers when squeezed in fist	600	800		
Peat	-----	Refer to specialist for advice and design				
Made Ground	-----					

NOTE: In no case should the foundation width be less than the width of the wall nor should the wall over-sail the foundation.

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The minimum depth of foundations should be determined as the greatest of the following:

- A depth to the bearing stratum but generally not less than 600mm.
- In clays subject to seasonal moisture movement, a depth not less than 1.0 metre.
- In sands, chalk and other frost-susceptible soils, a depth below the zone of frost action, which may normally be taken as a minimum of 450mm. In upland areas and other areas known to be subject to long periods of frost an increase in depth is advisable.
- Where the foundation trench is adjacent to a service trench (e.g. water, sewage etc.), a 45 degree line taken downwards from the bottom corner of the trench nearest the service trench, must pass below the excavation depth of the corner of the service trench nearest the new foundation. **Refer to Detail (a) in Annex B.**

The depth of foundations must also take due consideration of the influence of nearby vegetation and trees. Specialist advice on the type and depth of foundations to be located near trees and bushes is given in the NHBC Standards Chapter 4.2 – Building near trees.

Where a strip footing is being used, the minimum depth of concrete must be the greater of either 150mm or ½ the difference between the total foundation width and the total wall thickness.

Where trench fill concrete foundations are being used, the concrete should not finish less than 150mm below finished external ground level.

Where it is necessary to step the foundations, the following must be adhered to:

- Strip footings must be overlapped by either the thickness of the concrete, twice the step height or 300mm, whichever is the greatest.
- Trench fill foundations must be overlapped by either twice the step or 1 metre, whichever is the greatest.

In general, the wall should be positioned such that the centre line of the wall is in line with the centre line of the foundation. However, in certain circumstances this may not be possible, e.g. when building on a boundary and it is not possible to excavate over the boundary. In such cases the wall can be offset from the centre line but the centre line of the wall must be within the middle 1/3 of the width of the foundation.

Where the wall has projections such as piers, the foundation should be excavated such that the distance from the face of masonry to the edge of the concrete foundation is maintained.

In some situations, due to the type of soil on site, it may not be possible to use simple concrete foundations. In these circumstances it will be necessary to consider the use of more specialist foundations such as reinforced raft or piled foundations.

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4.4.5 Raft foundations

If there is evidence of non-uniform ground conditions on the site, a raft foundation may have been specified.

This design of foundation spreads the load from the structure over a larger area than strip foundations and has the advantage of reducing differential settlements over the site. However, there is potential for differential movement between a new raft foundation and the original house foundation, in particular if the house foundation is also of raft construction.

Tip - Construction on brown-field sites normally requires the use of raft or piled foundations.

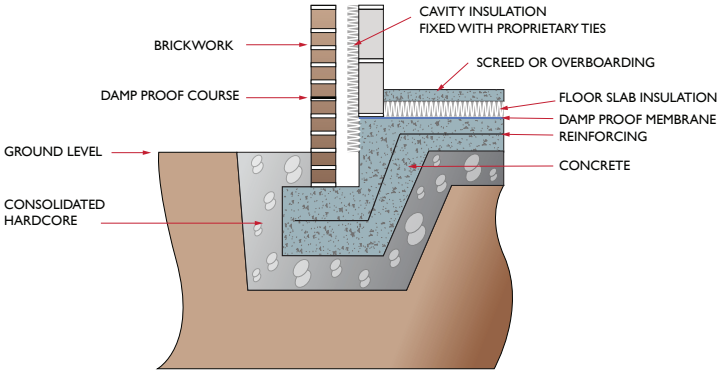

Figure 15: - Typical example of Raft foundation

Note: Normally the raft foundation consists of a reinforced concrete slab.

Specialist advice should be sought regarding the design and suitability of this type of foundation.

4.4.6 Pile foundations

Pile foundations are used to carry and transfer the load of the structure in ground conditions such as shrinkable clays, brown-field sites, infill sites and or waste tips to a solid load bearing strata. They are a substitute where conventional foundations would need to be so deep that they would be uneconomical. The main types of materials used for piles are steel and concrete, normally shaped as a tube. These tubes are driven, drilled or jacked into the ground, often filled with concrete and then the top of the pile is connected to a cap beam.

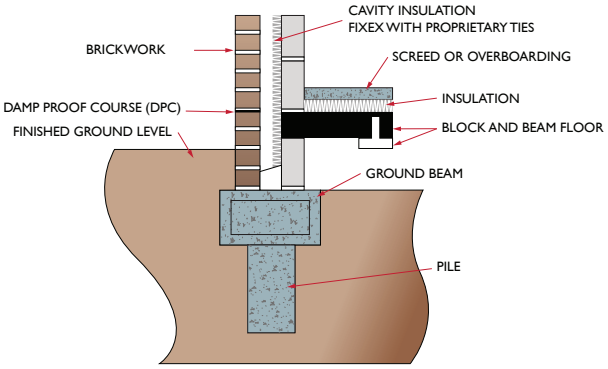

Figure 16: - Typical example of Pile foundation

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4.4.7 Wall design

There are three distinct different styles of conservatory:

1. A full height panel conservatory, where the frames sit on a perimeter plinth of brickwork, at DPC/ conservatory finished floor level.

2.A dwarf cavity wall conservatory, where the frames sit on a wall, which is usually between 450mm/600mm high above internal floor level. A conservatory with dwarf wall construction and especially where a reasonable matching brick is available, will create an impression of the conservatory being part of the original house.

- The height of the dwarf wall needs to be carefully considered. This should be expressed as a height above the internal floor level of the conservatory or the conservatory DPC.
- All external walling, whether dwarf or full height, should give protection against rain penetration. Solid walls should be of a sufficient thickness to resist rain. Cavity walls may be used or the wall protected by an impervious or weather-resisting cladding.
- Consideration should be given to providing continuity between the DPC/DPM of the host house and the conservatory to form an impermeable barrier.
- Check the coursing of the house brickwork to ensure the conservatory coursing will match the original house if possible. On modern properties the coursing is usually in increments of 75mm. On older properties (pre 1970s), imperial size bricks may have been used. These may be difficult or impossible to obtain and the modern metric equivalent may not provide exact coursing.
- The surveyor should incorporate the above in the base specification to avoid oversight of these issues.

3.Modular wall systems as below

- Modular conservatory walls are usually built off-site and are installed onto a prepared base. The modular walls are manufactured in a similar manner to timber or metal framed house walls but of suitable dimensions for conservatories similar to dwarf walls or full height walls or columns and corner assemblies. A variety of external finishes to match or contrast with the existing dwelling wall. If brick, the effect will normally be achieved using 'slip' bricks on exterior grade sheeting. If render or similar applied finish is required, this will be applied onto mesh covered external sheeting. The inner part of the modular wall system should be fully insulated and finished with plasterboard or similar decorative board. Some systems are available that are based on Structural Insulated Panel systems (SIPs).
- A number of off-site manufactured modular systems are available. Advice should be taken from the manufacturers to ensure a suitable detail is used.
- Some system will have third party approval from independent certification bodies such as the British Board of Agrément (BBA).
- All systems should be approved by either a Local Authority Building Control (LABC) or an independent Building Control Body.

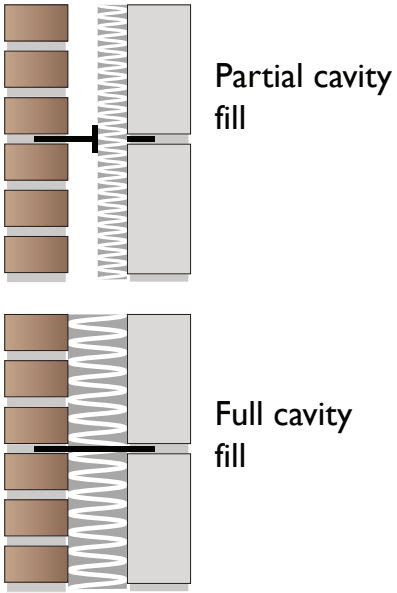

Figure 17 - Cavity fills

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4.4.8 Thermal performance of walls

Although many conservatories are exempt from the thermal requirements of Approved Document L in England and Wales, it is good practice, wherever practical, to meet the thermal requirements for walls as stated in AD L. For walls this is given in section 2.8.2.

In England and Wales, any conservatory that is not exempt from building regulations will need to fully comply with the requirements of AD L.

A variety of methods of construction may achieve compliance. Advice and guidance can be obtained from material suppliers on the appropriate wall construction and specification to meet the target U values.

However, it should be pointed out to the customer that a cavity dwarf wall will reduce the internal floor area of the conservatory (owing to the thickness of the wall). This may be a consideration if the overall external size of the conservatory is restricted due to the space available on site.

Improved thermal performance of dwarf walls may be achieved without sacrificing internal floor area by using modular timber framing systems or SIPs panels.

4.4.9 Door positions

On a faceted conservatory, many clients will request the position of the doors to be in one of the front bay facets. This is not always practical and may affect the clients' use of and the structural stability of the conservatory owing to the following issues:

- Size of front bay facets.
- Clear access through the conservatory.
- Optimum use of space within the conservatory will affect where the door should be positioned.
- Obstructions such as soil and vent pipes or gas vents may need to be avoided.
- Where the door jamb is close to an external brickwork corner of the conservatory, there may be issues sourcing or fabricating the correct shaped bricks.
- If the door, in particular sliding or bi-fold doors, are positioned in the middle wall of a three sided conservatory, consideration needs to be given to the effect this will have on the structural stability of the conservatory. Research has shown that when doors are positioned in this elevation or in one of the facets of a conservatory, the ability of the conservatory to resist deformation due to wind loading is greatly reduced. If doors are to be located in these areas, the inclusion of wind-post or structural goal-posts must be considered.

4.4.10 Floor design

As the glazed extension floor will generally be at the same level as the dwelling, safe access should be considered if steps are required to the adjoining house. The floor design should take into account any insulation requirements, under floor heating or channels for central heating pipe work to be extended (non-exempt conservatories only). If the existing dwelling floor and the new glazed extension floor are to be level, consideration should be given to a level or low threshold being installed in the connecting door.

4.4.11 Thermal performance of floors

As with walls, exempt conservatories do not need to meet a specified floor U-value but the new floor should not be worse than the floor in the existing house and it is good practice to design the floor to the current requirements of AD L. The current requirement is given in section 2.8.2.

4.4.11.1 Ground bearing floor slab

A ground bearing solid floor would generally be specified when the distance between the external ground level and internal floor level is not greater than 600mm. This is because of the amount of "in-fill" required to build up the floor area within the glazed extension. The procedure for the floor construction should be as follows:

a. All vegetation and topsoil should be removed from the ground area within the glazed extension wall.

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b. The over-site concrete slab should be laid level to accept the final finish. This may be timber, plywood or chipboard on insulation or a sand and cement screed, to accept a tiled or similar finish. The concrete slab should be at least 150mm in thickness and laid over insulation that should rest on a Damp-Proof Membrane (DPM) of 1200 gauge thickness. The DPM should be laid over 50mm of sand blinding on at least 150mm of well compacted hardcore.

c. The edges of the DPM should be dressed vertically around the perimeter of the proposed floor slab and taken up to meet any existing DPC in the existing house wall. The inner leaf of the rising perimeter wall to the glazed extension should be fitted with a wide DPC overlapping the inner face of the wall by 100mm. This overlap of the DPC should be turned down and lapped over the edge of the DPM before the concrete floor is cast. It is important that any existing airbricks within the house wall are ducted out under the new floor slab to the perimeter of the glazed extension walls, or re-sited adjacent to the new glazed extension to maintain under floor ventilation to the property.

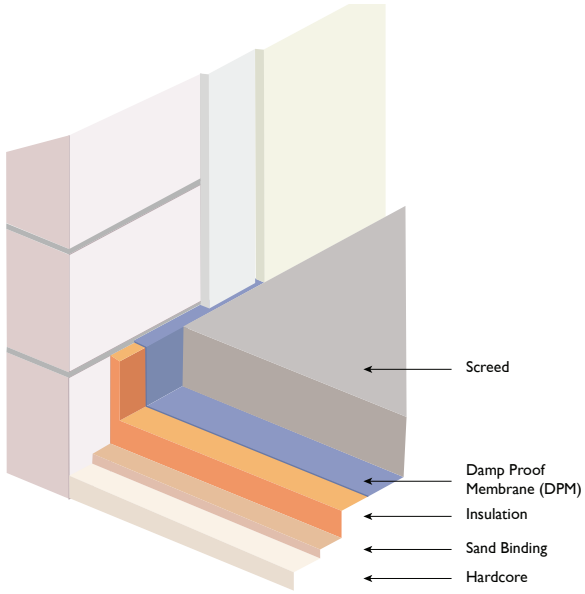

Figure 18: - Thermal Performance of floors

4.4.11.2 Suspended floor slab

Where site conditions of over 600mm exist between ground level and glazed extension floor level or the ground does not have sufficient load bearing capacity to support a ground bearing concrete slab, it may be advantageous to install a suspended floor of timber or reinforced concrete construction. This will have under floor ventilation if the floor is of timber construction and may have ventilation included if the existing house is ventilated below floor level. If the existing house has under-floor ventilation (air-bricks below DPC), provision must be made to extend these to the outside of the glazed extension.

Reinforced concrete suspended floors, pre-cast concrete beam and block suspended floors and suspended timber floors should be supported on the external masonry walls and, where necessary, intermediate walls which incorporate adequate provision for the free flow of under floor ventilation.

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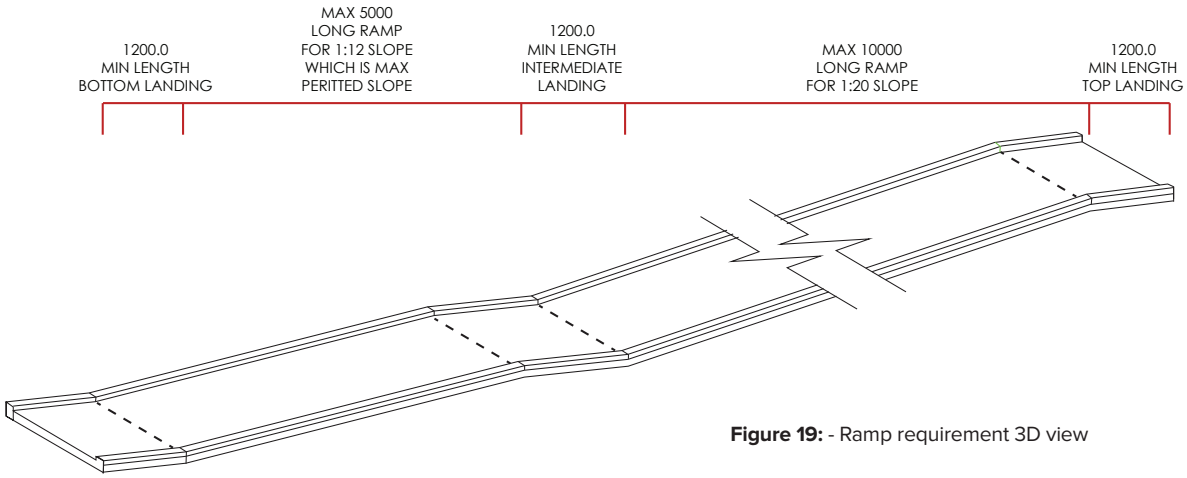

Figure 19: - Ramp requirement 3D view

4.4.12 Disabled access

Design Considerations

The provision of an approach which can be used by disabled people, including wheelchair users will often be a matter of practicability. Variations in topography, available plot area, or the distance from the point of access, may all influence the type of approach that can be provided.

Gradients should be as shallow as practicable, as steep gradients create difficulties for some wheelchair users who lack strength to propel themselves up a slope or have difficulty in slowing down or stopping when descending.

Some people need to be able to stop frequently; for instance to regain strength, breath or to ease pain.

Wheelchair users need adequate space to stop on landings, to open and pass through doors without having to reverse into circulation routes or face the risk of rolling back down the slopes.

Some people have a weakness on one side leading to a requirement for support at both sides of ramps.

If the total rise of a ramped approach is too high it can be unacceptably tiring for wheelchair users and some people with walking difficulties, even if a number of rest landings are provided.

It is important that the surface of an approach available to a wheelchair user should be firm enough to support the weight of the user and his or her wheelchair and smooth enough to permit easy manoeuvre. It should take into account the needs of stick and crutch users. Loose laid materials such as gravel and shingle are unsuitable for the approach.

The gradient of the ramp flight and its going between landings are in accordance with table (1) and Figure (20).

Limits for Ramp Gradient

Going on a flight	Max Gradient	Maximum Rise
10m	1:20	500mm
5m	1:15	333mm
2m	1:12	150mm

Table 1:

Note: For goings between 2m and 10m it is acceptable to interpolate between gradients i.e: 1.14 for a 4m going or 1:19 for a 9m going.

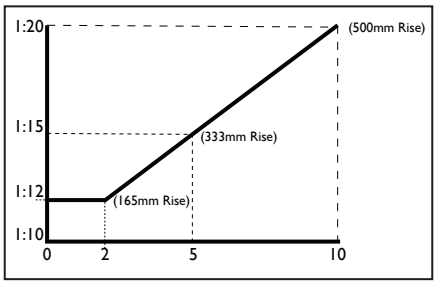

Figure 20: - Relationship of ramp gradient to the going of a flight

The ramp should have a surface width between wall, upstands or kerbs or at least 900mm.

There must be a landing oat the foot and the head of the ramp at least 1200mm long and clear of any door swings or other obstructions. Any intermediate landings should be at least 1200mm long and clear of any door swings or obstructions; there is a handrail on both sides.

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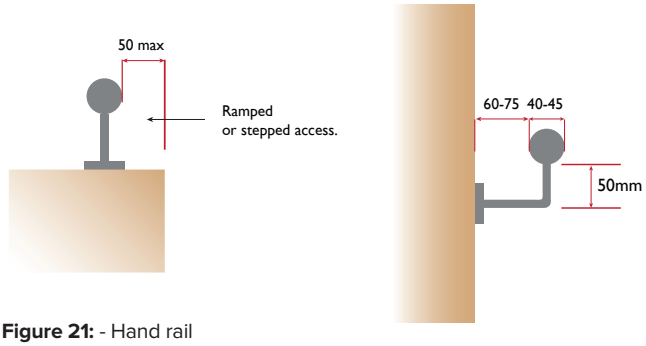

Figure 21: - Hand rail

Hand Rail Design - Both SIdes

The vertical height to the top of the upper handrail from the pitch line of the surface ramp or a flight of step is between 900mm and 1000mm and from the surface of a landing is between 900mm land 1100mm.

Figure 22:

NB. Disabled Access Requirements.

Accessibility must not be made any worse than existing. The provision of disabled access should be considered, taking note of the requirements of the owner within the site survey.

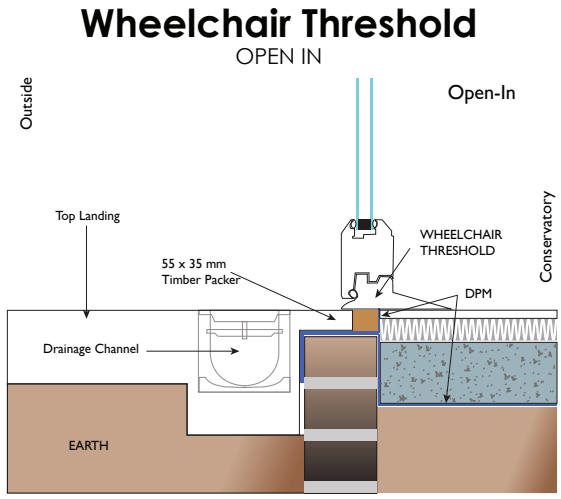

Figure 23:

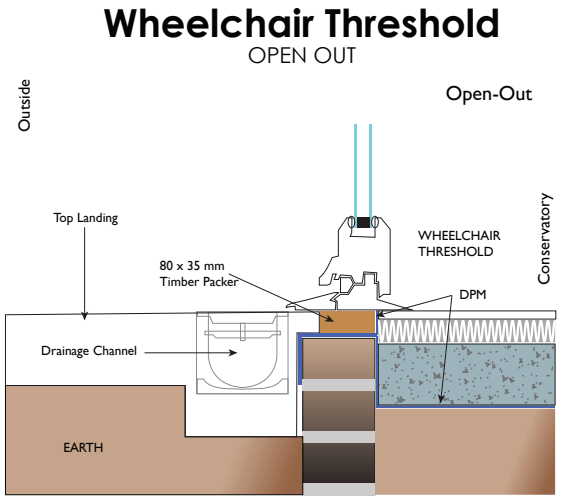

Figure 24:

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4.4.13 Design specification and drawing(s)

As conservatories become more sophisticated and individually designed to meet the customer's specific requirements, it is essential that the information gathered at the sales, contract and survey stages, is correctly recorded, interpreted and transferred to a specific customer drawing.

The drawing should show all of the following elements:

- Overall external dimensions in width, depth and height.
- The position of the glazed extension in both plan and elevation in relation to the existing property and boundaries.
- A clear Setting Out Point (SOP).
- Details of any underground drainage and other services in soil to be re-directed or modified.
- Position of gas flues.
- Details of electricals to be isolated.
- Specific dimensions showing the relative levels between floor and ground level and the height of the glazed extension wall to the underside of the window frame sill.
- An accurate interpretation of the styles and sizes of windows.
- Position, sizes and swing of all doors.
- Overall height of the glazed extension in relation to the existing property and any existing bedroom window(s) or in the case of a bungalow the existing eaves level.

The following information should also be recorded:

- A general specification of materials to be used, in particular external finishes.
- Any pre-installation demolition required and by whom.
- Clarification of any additional associated trades and suppliers requirements (electricians, plasterers, flooring specialists and plumbers) and by whom.

This is not an exhaustive list.

It is important that the drawing and any variations have been submitted to the customer for their signature and approval. Any revisions must be explained to and signed by the customer to avoid any future misunderstandings.

The suitability of the foundation specification and confirmation that it is built to specification is to be verified by the surveyor or person responsible and be recorded within the installation checklist.

4.5 Site control

Although each company will have their own laid down procedures on how each individual glazed extension installation is to be programmed, managed and controlled on site, the following pointers can be used as a series of guidelines to ensure all aspects of the installation from design to build completion on site are covered.

For simplicity it may be worth breaking down the installation process into the following headings:

- Preparation of customer approved drawings.
- Compliance with all necessary statutory requirements.
- Creation of the 'Construction Phase Plan' (CDM 15).
- Compilation of base material schedule.
- Program and delivery of base materials.
- Setting out on site.
- Base installation.
- Signing off base works.
- Compilation of superstructure and roof material schedule.
- Program and delivery of superstructure and roof.
- Superstructure and roof installation.
- Programming and attendance on site of third party trades.
- Completion with signed satisfaction note.

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4.6 Setting out on site

In terms of setting out the site, it is vital that the 'Base Team' have in their possession, when attending site on the first day, the latest version of the conservatory drawing(s) and the final specification of the conservatory.

Other essential documents such as risk assessments must also be made available when work commences on site.

The best policy is to ensure a “For Build” stamped approved drawing is the only drawing on site and is used to set-out. The base drawing supplied by the installer should give confirmation of the triangulation measurements, to provide a further check of accuracy on site. This is particularly important for facetted designs.

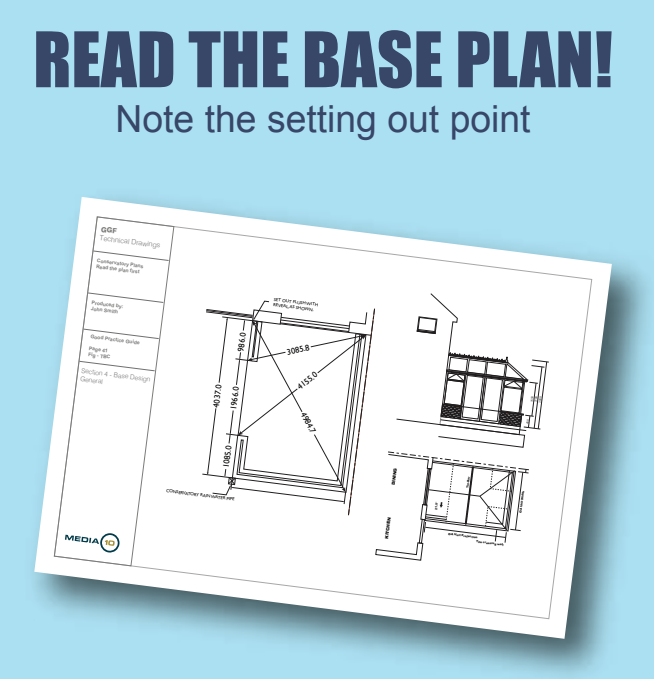
It must be remembered at this stage to check the plumbness of the host wall is as detailed in the survey section of this document and make due allowance accordingly.

The second important task in setting out is to accurately determine the required glazed extension finished floor level in relation to the existing house floor level.

It is also important during this setting out stage to re-check vertical measurements against the house wall to ensure the new building will fit underneath any existing soffits and upper storey windows.

Should problems be identified at this stage, alterations to the base design can be made to overcome them prior to building works starting or it may be possible to alter the superstructure prior to it being manufactured. Should problems become apparent at this early stage, it is essential that these are communicated to the relevant personnel to delay manufacture until a solution has been found and agreed with all parties, in particular the customer, as this will result in a further revision that will supersede the signed “For Build” drawing.

Tip - Check the thickness of the conservatory floor finish to properly determine the finished floor level.



All excavated spoil should be barrowed to the waste disposal skip, having ensured adequate protection for existing lawns and drives.

4.7 Drainage

Any drainage identified on the base drawing should be excavated and identified to determine its exact run and depth. Reference to Annex B relating to building near sewers should be made.

If the drainage requires re-routing around the glazed extension, this work should be carried out prior to the main base work commencing and in a way that will maintain services to the property and any neighbouring properties. It is advisable that the applicant consults the water company before plans are submitted in order to find out what further work may be needed to protect the sewer. **Refer to Annex B**

If the drainage run simply consists of an underground pipe passing underneath the area of the glazed

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extension, it may only be necessary to excavate to the underside of the pipe, assuming good ground conditions exist and incorporate a standard “bridging over” detail for the foundation.

Any manhole, that is going to remain within the glazed extension floor area, may be raised and fitted with a double seal screw down cover, subject to water company approval.

If a timber suspended floor or an insulated chipboard floor is to be fitted within the glazed extension, then it will be necessary to form a removable section within the finished floor covering for possible future access requirements to any manhole beneath.

In certain water areas, the local provider of sewage services no longer allow manholes to be incorporated within extensions and conservatories but will insist that the manhole is relocated outside to ensure easy access for servicing of the sewers.

If the glazed extension is to have a solid floor construction with a screed and tile finish, it would require a recessed double seal screw down cover set at finished floor level to receive the screed and tile as per the rest of the glazed extension floor area.

If the drawing calls for a new gully or soak-away for the rainwater discharge from the glazed extension roof, this should be installed at base work stage.

Some domestic properties are allowed to have what is termed “a combined drainage system”. This means that rainwater is allowed to be discharged into the foul drainage system, assuming of course that the foul drainage system has the capacity for the increased discharge. If in doubt check with the local Building Control Department or Water Company to clarify this point, as penalties for contravention of the regulations can be very severe.

Should a soak away be required it should be positioned a minimum of 5 metres from the nearest point of any building or roadway and be constructed in accordance with Approved Document H (AD H).

4.8 Soil stacks

Where possible any existing soil stack, existing services, ventilation inlets and outlets, discharge outlets, etc. should be diverted to outside the footprint of the proposed glazed extension. Soil stacks will be a "controlled service" and building control notification may be required, particularly if new underground connections are required.

Where an existing soil stack cannot be diverted, provisions should be made to weather seal any penetrations through the roof or walls. Soil pipe flashing kits are readily available and are designed to fit around the stack and seal to the roofline. The use of air admittance devices to avoid the need to take a soil pipe through the glazed extension structure may be considered.

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4.9 Brickwork to DPC

The next stage is to lay the footings brickwork, which may be in the form of trench block, common brickwork or concrete blocks up to a level of 150mm below ground level. However, it should be noted on the survey document the type of brickwork construction below DPC on the original house. In many cases today, one will find that standard facing brick has been used even below DPC level and in these cases it would be necessary to match this detail to maintain conformity with the existing building. In these cases it is essential to check the frost rating of the actual facing brick to be used.

Bricks and blocks laid below DPC shall be frost resistant.

If service pipework such as sewer runs are encountered, these must either be re-located or built-over in an approved manner to prevent the new structure from exerting pressure on them and causing damage. **See below or refer to Annex B.**

The DPC level should be at least 150mm (two brick courses) above the external ground level. If this cannot be achieved then one of the following options must be adopted:

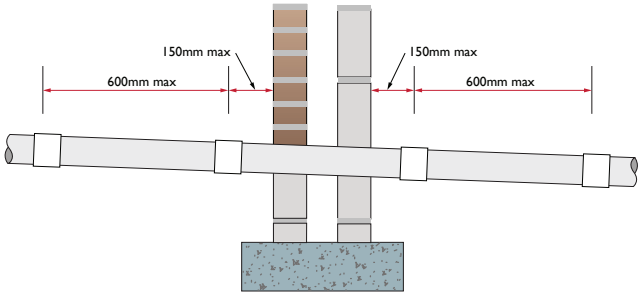
- The external ground level must be lowered to achieve the required dimension; or
- A French drain or gravel filled channel, approximately 150mm deep by 150mm wide, must be formed around the perimeter of the glazed extension to avoid damp penetration above DPC level caused by rain splashing; or
- A rainwater gully with a grating can be provided and should be set at the lowest point to avoid ponding.

4.10 Masonry walls – construction

All masonry walls should be tied to the existing host walls using a proprietary wall start system or by 'toothing-out' existing brickwork and bonding in new brickwork.

Cavity walls in coursed brickwork or block work shall have skins at least 90mm thick and cavities at least

(a) Short length of pipe bedded in wall, joints formed within 150mm of either wallface. Adjacent rocker pipes of max length 600mm with flexible joints.



(b) Arch or lintelled opening to give 50mm space all round the pipe

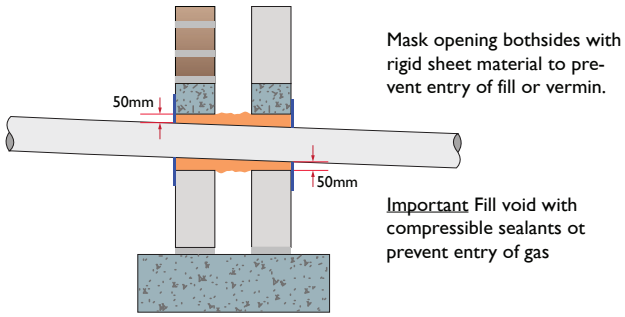


Figure 25:- Extract from Approved Document H – Pipes penetrating walls

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100mm wide. Exempt conservatories, although ideally built to the same standard as non-exempt conservatories, can, where space is at a premium, wall may be built with cavities less than 100mm.

Cavity walls shall incorporate approved walls ties.

Wall ties should be selected which are adequately stiff yet sufficiently flexible to allow some relative movement between the two leaves. Ties should conform to BS EN 845-1.

In external cavity walls, the ties should be embedded to a minimum depth of 50mm. For walls in which both leaves are 90mm or thicker, the ties should be at a maximum spacing of 900mm horizontally and 450mm vertically and the ties should be evenly distributed over the wall area, normally in a staggered pattern (Density of 2.5 ties per sq. metre).

Additional ties should be provided in the following situations:

- Within 225mm of the vertical edge of all window and door openings and at 300mm maximum centres vertically.
- At vertical unreturned edges, including movement joints at 300mm maximum centres vertically.
- At sloping unreturned edges, such as at the roof verge.
- At narrow piers.

BS EN 1996-1-1, and BS EN 1996-1-3 will provide further details.

Figure 26: - Example of structural steel posts with ring-beam

4.10.1 Full height masonry walls

Full height walls must be structurally stable. This may be achieved by having brick piers, corners or return ends acting as a buttress wall.

All masonry built piers and corners must be designed in such a way that they are self-supporting and are capable of withstanding the dead-loads (structure) and imposed-loads (wind, snow etc.) transferred to them from the glazed extension walls and roof.

Piers and corners may need to be reinforced with steel posts, located within the cavity, with steel base plate bolted to the foundation brickwork, blockwork or concrete slab.

Brickwork above windows and doors should be closed by an appropriate lintel or load-bearing ring beam. Where a parapet wall is being formed, this should be closed below the coping and a suitable DPC incorporated to prevent moisture penetration from above.

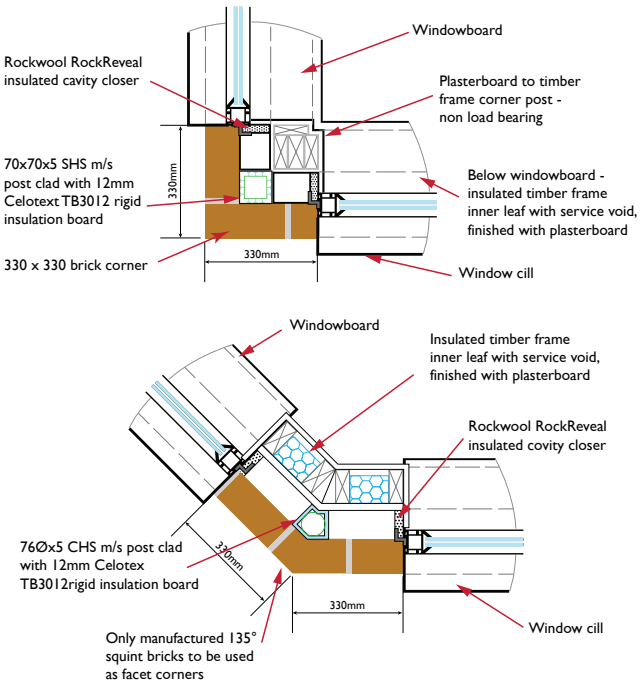

Figure 27: - Typical corner post arrangements

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4.10.2 Masonry walls – acting as a retaining wall

Where a dwarf wall or a wall supporting the floor construction also acts as a retaining wall, as may occur on a sloping site, the height of retained soil shall be less than 1 metre and not exceed four times the effective thickness of the wall.

The retained height is calculated as the difference in ground levels above fully compacted backfill on either side of the wall.

Retained height for unfilled cavity walls should be less than or equal to 1metre and not more than four times the thickness of the two leafs, e.g. 4 (100mm + 100mm).

Retained height for filled cavity walls should be less than or equal to 1metre and not more than four times the overall thickness of the wall, e.g. 4 (100mm + cavity + 100mm).

4.10.3 Efflorescence

Efflorescence occurs naturally in some types of masonry and may occur on external brickwork or exposed internal brickwork. It is not harmful and usually disappears over time. Efflorescence typically appears as a white powdery deposit on brick faces. This can be distinguished from other stains as it will tend to disappear when rubbed with a wet thumb. It is caused by salts within the brick and mortar being dissolved and then deposited on the surface as the brick dries out.

Any efflorescence that occurs is temporary although it may last for some time. Efflorescence is removed most effectively by brushing with a dry brush. If the efflorescence becomes wet either through rain or by attempting to wash, the salt will be taken back into solution and will penetrate back into the brickwork. These salts may reappear later as efflorescence as the brickwork dries out again.

4.11 Damp proof measures

The finished floor level of the glazed extension should be similar to that of the parent dwelling. The glazed extension floor construction should contain adequate

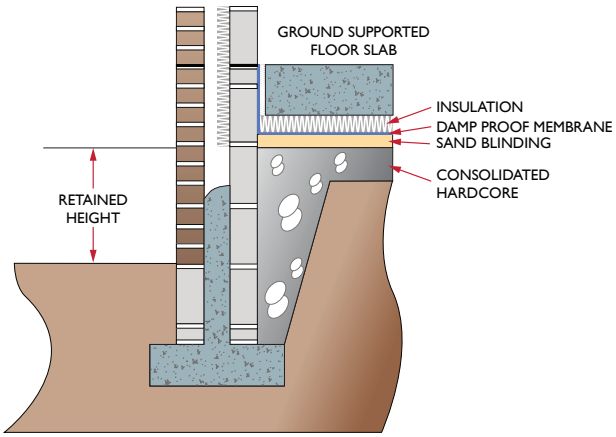

Figure 28: - Masonry walls - acting as a retaining wall

provisions to resist the passage of moisture from the ground. Plastic Damp Proof Membrane (DPM) should be a minimum 1200 gauge.

The void to suspended floors usually requires ventilation to prevent timber decay or damp penetration. The DPC level to the walls should be at least 150mm above the external ground level. Where DPC and DPM meet they should be taped together rather than just lapped.

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4.12 Effects of a sloping site

If the site is sloping either towards or away from the existing property then other considerations will have to be taken into account when designing and constructing the glazed extension base.

Sloping away from the house – such conditions will require detailed measurement during survey stage to determine the height of "build up" required for the glazed extension base wall. It may then be necessary to form a "stepped" footing below ground level to minimise excavation of the site, provided that the ground on which the foundation is to bear is not "made up". The additional "build up" will have to be taken into account when calculating quantities of facing bricks and other materials for the contract. Such site conditions will almost certainly result in a suspended floor construction.

Sloping towards the building – the main concern for this type of site condition is the amount of excavated spoil to be removed prior to commencement of base work.

A retaining wall will also need to be built or incorporated in the glazed extension base wall to protect the glazed extension from the loading that will be imposed on it from the higher ground level. This wall may become part of the glazed extension dwarf wall, in which case the design will need to incorporate measures to prevent moisture ingress from the raised ground and also drainage to deal with water run-off from the higher ground. Alternatively the retaining wall may be independent from the glazed extension wall, possibly incorporating paving at a suitable level or an extension to a paved area. This method should also address the issue of removing water run-off from around the base of the glazed extension.

4.13 Signing off base works

To ensure good practice and structural integrity when such work is being undertaken, some form of supervision and/or checking procedure should be instigated.

This should incorporate a dimensional check based

Figure 29: - Sloping site

on the setting out point (SOP), the oversite floor level in relation to the existing house floor, check that the oversite floor is level within tolerance, check the foundations are built as designed and the dwarf wall (if appropriate) is built to the correct height, is level and finished correctly.

The finish of the base works should conform to the standards contained within NHBC guide - General information - chapter 9.2 - A consistent approach to finishes.

When the base works have been completed and approved, these should be signed off and recorded. Until this stage has been completed the superstructure must not be constructed.

4.16 Reference information Section 4

Clay bricks or blocks conforming to BS EN 771-1

Calcium silicate bricks conforming to BS EN 771-2

Concrete bricks or blocks conforming to BS EN 771-3 or BS EN 771-4

Square dressed natural stone conforming to BS EN 771-6

Manufactured stone conforming to BS EN 771-5

The wall shall be constructed in accordance with BS EN 1996-2

Ties should conform to BS EN 845-1+A1

Mortar mix should conform to BS EN 1996-2

Strength Class M 4 according to BS EN 998-2

NHBC Standards - Chapter 9.2 - 'A consistent approach to finishes'

SECTION 5:

Superstructure Design

Section Contents

Due care and consideration for all parties and all the components involved with the glazed extension needs to be undertaken, to ensure the structure is treated as a single complete project. This co-ordination will ensure the original design is achieved on site.

Refer to manufacturers guidelines to ensure the correct specification is achieved. An independent product approval will show the components comply with the appropriate national standard or technical specification.

The contracted retailer has responsibility for ensuring the overall structural integrity and the integrity of the individual components used within the glazed extension.

5.1 Loading

The superstructure should be designed and constructed to withstand the design vertical dead and imposed loads including snow and the lateral loads imposed by wind. The general design shall conform to the requirements detailed in Eurocode 1 (BS EN 1991-1-1, 2, 3 and 4).

As a general rule, most of the UK can be divided into two basic snow loading regions, 0.6kN and 0.8kN per square metre. Extremes of altitude may vary this snow load and should be highlighted on the survey.

Greater than normal wind loads may occur due to the location of the site, i.e. near the summit of a hill or the crest of a cliff. These instances should have been noted at survey stage. Estimated wind loading may be calculated using tables contained in BS 6262-3.

The structural members of the glazed extension shall be designed in accordance with the appropriate material specific design codes as follows:

It is most important that in making assessments about a particular conservatory frame, that the site conditions have been considered. The surveyor should highlight extremes of altitude and exposure to wind to the conservatory designer

a) Structural timber – BS EN 14081-1

b) Sloping and vertical patent glazing – BS 5516 -1 and BS 5516-2

c) Masonry – BS EN 1996 parts 1, 2 & 3

d) Structural steel – BS EN 1993

e) Structural aluminium – BS EN 1999-1-1

f) Structural steel or aluminium components - BS EN 1090-1

g) Third party certification by UKAS accredited certification bodies such as BBA provide a useful method of ensuring product performance.

Note: Structural steel and aluminium components when sold separately should have a Declaration of Performance (DoP) and be CE labelled in accordance with BS EN 1090-1:2009+A1:2011

SECTION 5

Superstructure Design

5.1.1 Structural stability

The stability of a glazed extension is its ability to resist the expected loading conditions without serious deflection or permanent deformation.

Most conservatories will be attached to an existing building, which will provide support. Special attention should be given to structures that do not gain additional support from an existing building to ensure they have adequate lateral stability. It is important to ensure the wall frames and roof are fixed to the existing house structure, using the correct method of fixing and to allow, where necessary, a flexible joint to accommodate any differential movement between the house and the glazed extension.

The host wall and building to which the glazed extension will be attached should have been assessed at survey as their condition and ability to resist the wind and snow load forces transferred from the glazed extension. This may require the services of a civil or structural engineer. Some system companies or individual manufacturers may have software available to provide this analysis.

Tie Bars, if specified in the design, are important elements of the conservatory structure, and should be fitted as advised by the conservatory supplier. Any amendment to the position or fitting details of the tie bar should be checked first, to avoid invalidating the warranty and affecting the structural performance of the conservatory.

Conservatories with gable ends will need to be designed and built so as to provide lateral support to the gable end. Refer to section 5.5.

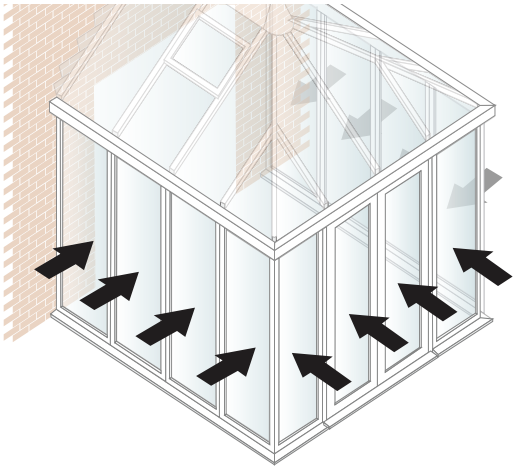

Figure 30: - Wind loading on conservatory wall

Box gutters may need support along their length; brick piers, gallows brackets or structural posts can achieve this.

If the box gutter is being fitted to an existing fascia, check the condition and strength of the rafters and boards to determine if any additional support is required.

Special consideration needs to be given to conservatory designs that incorporate large glazed door areas such as sliding and folding doors, in particular when these are located in a conservatory wall between two other conservatory walls. In these circumstances the use of wind-posts, steel goal posts or specialist engineered structures must be incorporated to ensure structural stability. These structural elements, if purchased separately, should be manufactured and tested in accordance with the requirements of BS EN 1090, have a Declaration of Performance (DoP) and be CE labelled.

5.2 Materials

All the materials used for each part of the glazed extension should be suitable for their intended location and use. The three primary structural framing materials used are aluminium, PVC-U and timber or a combination thereof. Glass, polycarbonate or other recognized flat roofing materials are also used as glazed extension roof finishes. The materials and

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combinations are designed to provide the structural requirements of the building and should not be substituted without prior consultation with the product designer to ensure the performance will be suitable. Steel can also be used in a glazed extension, however, this is primarily as reinforcing or structural beams or goal-posts to provide the required structural strength and stability.

5.2.1 Aluminium

Aluminium is widely used as the principal glazed extension roofing framework because of its strength and lightweight properties. It is often clad with PVC-U to assist with weathering and thermal performance. The roof structure may also be clad with aluminium profiles.

Aluminium extruded sections shall be produced using aluminium alloy complying with BS EN 755-9. Complete aluminium framed glazed extension systems, often powder coated, are now available in dual colour to provide the visual appearance required by the client.

All exposed aluminium profiles shall be finished with one of the following treatments:

- A powder coating complying with BS 6496
- A liquid organic coating to BS 4842
- Anodizing complying with BS 3987

The thermal performance is enhanced by the use of polyamide or polyurethane barriers (also known as thermal breaks).

5.2.2 PVC-U

PVC-U has excellent durability and requires very low maintenance without the need for special coatings.

PVC-U is used to manufacture wall frames and can be reinforced with aluminium or galvanized steel for additional strength. It is also used in glazed extension roofs where, in most cases, it is reinforced with structural aluminium supports.

PVC-U rainwater and drainage systems are similarly the most widely used and will match the PVC-U in the glazed extension and should meet BS EN 12200-1.

Specifications for extrusions used for roof and wall frames:

White PVC-U extrusions should comply with BS EN 12608, (the scope of this standard includes specifications for colour fastness and mechanical properties).

Foil laminated extrusions are available in a wide range of colours and should comply with the requirements of BS 7722, or should have an independent product approval by a recognized Certification Body. Foil laminated profiles are available in a range of colours and textured finishes to complement the finished appearance of the building.

5.2.3 Steel

Steel can be used as a structural material within the glazed extension construction. The following criteria should be adopted.

- Hot rolled steel sections when tested in accordance with BS EN 10002-1 shall have ultimate strength between 355N/mm^2 and 510N/mm^2.
- Formed sections shall be produced from steel sheet complying with BS1449-1. Pre-galvanized sheet should have a minimum sheet thickness of 1.2mm and complying with the tolerances within BS ISO 16162.
- Components made from mild steel should be protected against corrosion by one of the following types of finishes:

    a) Hot dip galvanizing to BS EN ISO 1461.

    b) Zinc sprayed coating to BS 2569-1.

    c) Powder coating shall comply with BS 6497.

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5.2.4 Timber

Timber can be used for both the main glazed extension roof members and the wall frames since it has both structural and aesthetic properties. The roof members are finished with proprietary metal cappings and/or gasket systems.

The timber used should comply with BS EN 942. This standard defines the classification of sections as:

- Window frames and main glazed extension members Class J50
- Casements and sashes Class J40
- Small section beads (less than 15mm sq.) Class J10

Adhesives used in the manufacture of timber components should meet the requirements of BS EN 204 (type D3 minimum). Any laminated timber should use a BS EN 204 Type D4 adhesive.

The moisture content appropriate to the end use of the glazed extension is important in order to avoid problems resulting from shrinkage or swelling after installation. It is recommended that the external joinery should have an initial moisture content of between 13% and 19%.

5.2.4.1 Preservatives and finishes

The durability of some timber species can be improved by treatment with preservatives. The formulations of preservatives and the methods of treatment should comply with BS 8417. Treatment should be carried out after any machining of the timber sections is completed. External finishing systems will further protect against moisture and UV light, while providing a wide range of colour options. Only exterior quality paint and stain finishes should be used (BS 644 Annex A provides advice and recommendations for finishing of external joinery).

In the geographical areas listed below, the softwood timber in the conservatories should be adequately treated to prevent infestation by the House Longhorn beetle:

- The Boroughs of Bracknell Forest, the parishes of Sandhurst and Crowthorne, Elmbridge, Spelthorne, Surrey Heath, Rushmoor, the area of the former district of Farnborough, Woking, the Districts of Hart, the parishes of Hawley, Yateley, and Runnymede.

5.3 Glazing

Note: For practical purposes and as a requirement for the GGF Conservatory Association Members, all glazing must conform to BS 6262.

The specification of the wall frame and roof glazing should consider safety, wind and snow loading conditions, thermal insulation, solar control and aesthetics. Refer to BS 6375-1 to determine wind loadings for the UK.

5.3.1 Vertical glazing

Glazed extension glazing shall meet the requirements of Approved Document K, sections K2 – Protection from falling and K4 – Protection against impact with glazing, of the Building Regulations in England,

Tip - For very large areas of full height glazing that may be confused for an open door, consider manifestation (marking) to make the glazing apparent.

Approved Document N in Wales, Technical Handbook section 4.8.2 and Technical Booklet V in Northern Ireland. Locations of safety glazing is provided in the documents referenced above or BS 6262-4.

5.3.2 Overhead glazing

The glazing materials selected for glazed extension roofs shall comply with GGF Data Sheet

7.1. Non-Vertical Overhead Glazing: Guide to the Selection of Glass from the Point of View of Safety

Consideration should be given to the installation of low maintenance glass (see 5.3.5 below) in glazed extension roofs.

Glazed extension roofs fitted with low maintenance glazing must be constructed with a minimum pitch to ensure the correct operation of the low maintenance glazing. The glazing manufacturer should be consulted to establish the minimum pitch required.

5.3.3 Insulating glass units (IGUs)

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IGUs shall comply with **BS EN 1279 Glass in building, Insulating Glass units and be installed in accordance with the GGF Data Sheet 4.2. System Design and Glazing for Insulating Glass Units.**

5.3.4 Plastics glazing materials

Plastics glazing sheet materials shall be installed in accordance with **BS 5516 – Code of Practice for design of sloping and vertical patent glazing.** Specific guidance to the design and selection should be sought from the system manufacturer.

5.3.5 Reduced maintenance coatings
(may be referred to as 'Self-cleaning glass')

Low maintenance glazing will aid the removal of dirt and actively breaks down and loosens particles of organic dirt. The degree of the 'self-cleaning effect' will vary according to the type of deposit and the level of exposure of the glass to water and sunlight.

These types of glazing will typically have a special external coating and should be installed and maintained in accordance with the manufacturers' literature. Any sealants and glazing trims must be compatible with the coating. The compatibility of patination oil used on lead flashings and glazing materials and coatings must be ensured.

5.3.6 Applied glass films

Films may be applied to the glazing to alter its solar control or light transmitting characteristics. Refer to manufacturers' information or GGF Data Sheets for further information. If laminated glass has been included in the building, a thermal compatibility assessment should be carried out to ensure the level of risk of thermal fracture is acceptable.

5.3.7 Fire-resisting glazing

Where glazed extension walls are located on or in the proximity of the property's boundary or close to another building, the use of fire-resisting wall frames, including glazing, should be considered in accordance with the requirements of Building Regulation B4 'External fire spread'.

5.4 Environmental performance

Conservatories by their nature perform differently than orangeries or extensions using conventional house construction. They will benefit from solar heat gain and will provide a thermal buffer to the house during colder periods, but will also suffer from heat loss through the glazing and roof at these times. Substantially glazed structures may also suffer from overheating due to solar gain during the summer and this should be considered when choosing the type of structure, the specification of glass to be installed and the provision of ventilation in the roof.

Good design can maximise the usability of the glazed extension and the potential to benefit from the solar heat gain it can provide during cooler periods. Heat gain during warmer periods can be effectively managed with good ventilation and the correct glazing specification.

5.4.1 Thermal separation – England and Wales

If the building is exempt from Building Regulations it must be thermally separated from the dwelling by a wall, window, door or a combination of these. Where the thermal separation is to be modified by the inclusion of a new opening for a doorset or similar, the thermal elements installed must have U-values in accordance with those in the relevant tables in AD L1B.

Where there is no thermal separation between the glazed extension and the dwelling, the glazed extension will be treated as an integral part of the dwelling and the relevant Building Regulations will apply.

5.4.2 Conservatory heating – England and Wales

If a conservatory is heated and the heating is an extension to the dwelling's heating system, even if fitted with isolation valves and separate thermal controls, the conservatory is not exempt from Building Regulations and will need to be built in accordance with the relevant regulations.

If the conservatory heating is totally separate from the dwelling heating system, the conservatory, provided all other criteria are met, will be exempt from Building

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Regulations.

The client should be informed that if heating is intended to be installed following the completion of the building by the contracted retailer, depending on the type of heating being installed, the building may then become subject to Building Regulation Control and it would be advisable to obtain advice on any heating proposal.

5.4.3 Thermal performance

The U-value is a measure of the rate of heat flow through a material or a combination of materials and is measured in watts per square metre per degree kelvin (centigrade). The lower the value, the lower the heat flow. In terms of a building, this represents the heat loss through the external building elements.

Substantially glazed structures lose most heat through the external windows, doors and glazed roofs and apart from the framing material through conduction, heat is lost through the Insulating Glass Units (IGUs) in the following three ways:

- Radiation – The interior of the building radiates heat in the form of infrared radiation from the internal structure and furnishings and some of this passes through the glazing in windows or doorsets to the exterior. The amount of heat loss by this method can be significantly reduced by the introduction of a low-emissivity coating to the glass used in the IGU that will reflect the infrared radiation emitted by the building interior back into building. Low-emissivity coatings vary in performance dependent on the manufacturer and the coating used.
- Conduction – This occurs in two ways in an IGU, across the cavity through the cavity gas and around the edge of the glass unit, through the spacer bar and edge seals.
    - The conduction across the cavity can be reduced by replacing the air with a heavier gas, usually Argon but other Noble gases can be used. The amount of heat conducted across the cavity is dependent on the cavity width, generally the wider the cavity, the less heat is lost, however, heat loss by convection is effected by the cavity width, see below.
    - The conduction around the edge of the IGU can be reduced by the use of thermally efficient warm edge spacer bars.
- Convection – Heat is transferred from the warm inner surface of the IGU to the cavity surface of the inner pane through conduction. The warm cavity surface of the inner pane warms the gas in the cavity and as warm gas rises, a convection current develops which moves this warmer air to and across the top of the cavity and this then drops down the cavity face of the outer pane of glass loosing heat to the cooler outer pane of glass. The outer pane of glass conducts this heat to the outside face and heat is then dissipated to the external environment. The cooled gas in the cavity drops further to the bottom of the cavity and circulates to the warm face of the inner glass pane and the process continues. The use of a heavier cavity gas such as Argon will reduce this effect but the ideal width of the cavity for Argon filled units, to prevent convection currents is 14-16mm.

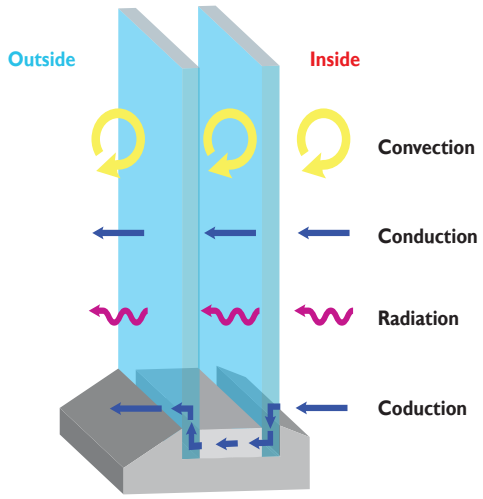

Figure 31: - Thermal Performance

The superstructure glazing should meet the following elemental U-value:

- In England and Wales, it is recommended that the maximum U-value of the glazing, vertical or sloping and other thermal elements, should be as shown in section 2.8.2.

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- Most conservatories in Scotland will be subject to Building Regulations and the relevant U-values contained in those will be used.

It is Good Practice for exempt conservatories to be built using the U-values contained in relevant building regulations.

5.4.4 Solar control (Infrared)

When an IGU is exposed to sunlight, in the same way as the building losses heat through infrared radiation, the building will also gain heat from the infrared radiation from the Sun. This radiation is produced from a very high temperature object and therefore the wavelength is different to that emitted from the lower temperature internal structure and furnishings of the building. Even where a low-emissivity coating described above is incorporated in the IGU, it is not designed to control this higher frequency infrared radiation from the Sun and therefore a significant amount passes through the glazing and warms the interior of the building.

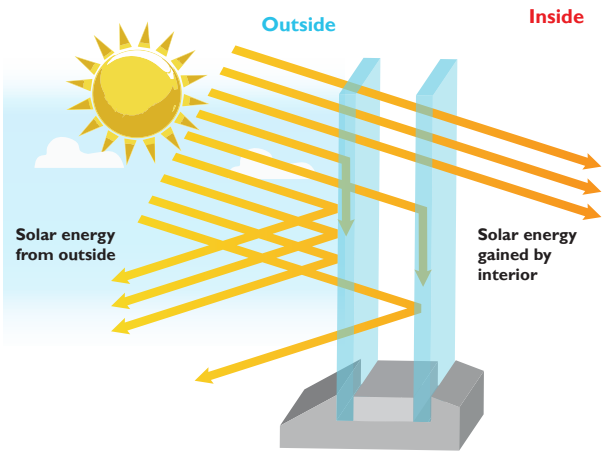

Figure 32: - Solar control (infrared)

Where a building with significant amounts of glazing may be exposed to sunlight, the correct choice of glazing is essential to provide an efficient method of controlling overheating and increasing the usable time in the glazed extension.

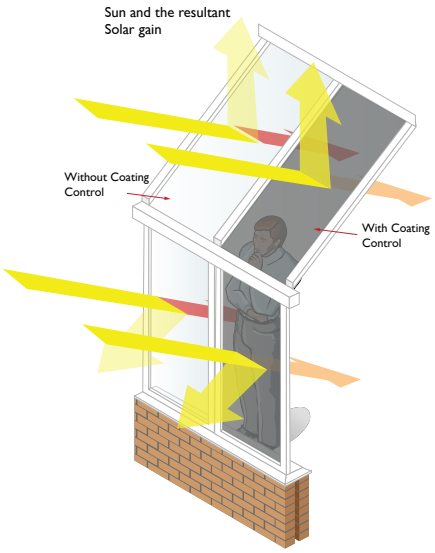

Figure 33: - Solar gain

Solar energy transmittance of the glazing (g-value) is a measure of the solar radiation that passes through it, expressed as a number between 0 and 1 or as a percentage (%). The lower this figure, the less solar energy it transmits.

The aspect of the glazed extension (N, S, E or W) and shading needs to be considered when assessing the degree of solar control which needs to be incorporated into the glazing specification. Shading from trees and surrounding property will affect the exposure of the site to the Sun and the resultant solar gain.

Adequate ventilation is essential to provide functioning conservatory, helping to avoid condensation and excessive heat buid-up in sunny weather.

Thermal insulation without solar control may result in overheating in sunnier months due to the solar heat gain being trapped inside the glazed extension.

However, there may be a conflict between the need to control overheating in the warmer, sunnier months and the need to reduce the heat loss in cooler, lower light level months.

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5.4.5 Light transmission (visible)

Visible light entering the glazed extension can be controlled by the glazing specification or the installation of blinds. The performance value of the glazing will be between zero (0), for no light transmitted and one (1) for full transmission. This may also be expressed as a percentage.

Consider the amount of glare that may occur in the glazed extension and whether the adjoining rooms will require or supply extra visible light. Internal surface finishes (walls, units, worktops and floors) must be considered as the colour and gloss levels of these will affect the amount of glare experienced by the occupants.

Privacy glass or obscure glazing can be used where the glazed extension is near to a boundary or may be overlooked.

Note: When specifying glazing to control solar gain and/or light transmission of the glazing, consideration should be given to the amount of reflection from both an external and an internal point of view. Control coatings to glass do not absorb all of the reduced light but reflects it back and therefore the viewer will see this reflected light as a mirror image of the background behind the viewer.

5.4.6 Ventilation

Conservatories maximise the benefits from solar heat gain during winter but may require increased ventilation and shading in summer. Achieving a thermal balance is the goal and this will involve careful selection of glazing specification and provision of suitable and adequate ventilation.

Purge ventilation

Tip - Roof vents are an effective means of ventilation and may be thermostatically controlled.

Ventilation to the glazed extension and adjacent room is provided by opening lights.

The adjacent habitable room and glazed extension should have a rapid ventilation area at least equal to 1/20th of the combined floor area of the habitable room adjacent to the glazed extension and glazed extension.

Some of the purge ventilation should open at high level, 1.5m or above floor level to provide cross-flow ventilation which can help prevent heat build-up in the glazed extension.

Consider the position of opening vents in the walls and the use of opening roof vents to aid ventilation and prevent overheating during sunny periods.

Background ventilation

Background ventilation, in the form of trickle ventilators or air bricks in the existing dwelling windows covered by a conservatory shall be replicated in the conservatory. It is recommended to use a form of trickle ventilation within conservatories to compensate for this.

Mechanical ventilation

Extract fans can aid natural ventilation and should be installed at high level. Consider the means of introducing air into the glazed extension at low level to balance air inflow and outflow.

Roof ventilation

Roof vents provide good ventilation particularly for south-facing locations to reduce heat build–up from solar gain during sunnier periods.

Existing under-floor ventilation

Where the dwelling has a suspended floor and there are existing provisions for under-floor ventilation that would be obstructed by the glazed extension base, provisions should be made in the glazed extension substructure for the continuity of the under-floor ventilation. Alternatively, new provisions for under-floor ventilation should be made outside the glazed extension base.

5.4.7 Specification guidance

There are many design factors which therefore have to be taken into account when optimising the environmental, comfort and energy-efficiency aspects of a glazed extension. It is also necessary to take into account the orientation of and the level of exposure to the Sun of each side of the glazed extension when deciding on the type of glazing and means of

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ventilation to be installed. It is important to note, and to ensure the client is made aware that the ideal glazing solution may not be the same specification on all elevations and therefore the appearance on all sides of the glazed extension may be different. Gain agreement of the client prior to installation.

North facing (primary elevation)

Glazing should maximise the benefits of solar gain

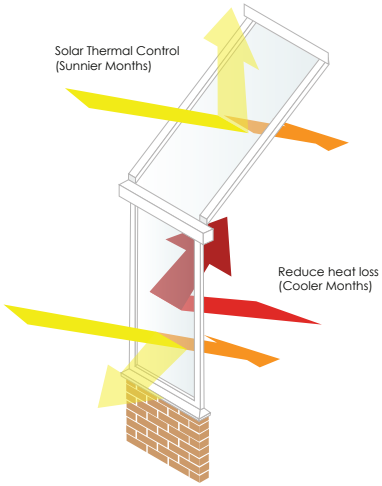

Figure 34: - Solar thermal control

from the Sun and minimise heat loss. North facing wallframe glazing with a high solar heat gain factor (g-value) and low U-value is desirable, whereas side wallframes facing East and West may benefit from lower solar gain to reduce heat gain in mornings and afternoon/evenings in sunnier months.

Roof glazing may require solar control if there is no external shading and the roof is exposed to direct sunlight in sunnier months.

East and West facing (primary elevation)

Where there is little external shading, solar heat gain through wall glazing can be significant in the morning (east facing) and evening (west facing). In general it is beneficial to maximise this using glazing with a high solar heat gain (g-value), while designing to dissipate excessive heat build-up through ventilation and higher U-value glazing. High U-value glass will however increase heating requirements during periods of low solar gain, and may increase condensation risk when external temperatures are low.

The same principles apply to the roof glazing, although there may be an increased need for reduced solar gain to make the environment as comfortable as possible.

South facing (primary elevation)

Minimising overheating during sunnier months is a major design objective and requires combining the benefits of solar control glazing, ventilation and dissipation of heat through the building structure. Advanced glazing products aim to keep the glazed extension warm in winter and cool in summer by combining low U-value glazing with high levels of solar control (low g-value).

In roofs there should be ample ventilation (e.g. two roof vents), using roof glazing with a high degree of solar control, lower light transmission glazing and/or blinds may also be required, to reduce glare.

It should be noted that the installation of blinds must be completed by a competent person and the method of fitting should be approved by the manufacturer(s) of the roof and wall-frames to ensure the guarantees provided by them are not invalidated. The effects of blinds on glazing, in particular laminated glass should be considered and they may increase heat retention in the Insulating Glass Units and cause the laminated glass to fracture due to thermal shock. A thermal assessment should be carried out to establish the risk of thermal fracture occurring.

5.4.8 Air conditioning

Tip - The cost of energy used for cooling (air conditioning) can be 3 times that used for heating.

Air conditioning systems use additional energy and therefore careful consideration should be given to maximising the efficiency and effectiveness of the other control methods to reduce the cost of cooling. The installation of a combination of solar controlled opening vents, suitably designed shading, blinds and

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solar control glass can perform almost as effectively as air conditioning without the associated additional running costs.

5.4.9 Condensation

Condensation occurs when moisture suspended in air comes into contact with a cooler surface. It can appear on any surface, including glass, walls, tiled floors, vinyl covered solid floors and metal bars. Condensation can and does occur within conservatories and is more likely to occur in late autumn, winter and early spring months when the temperature difference between the interior of the glazed extension and outside are likely to be greatest.

The following factors will assist when dealing with condensation:

- Do take steps to ensure the newly built glazed extension “dries out” thoroughly. In summer keeping doors and windows open (when safe to leave open).
- Do allow air to circulate freely within the glazed extension, using opening windows and roof vents to provide rapid ventilation and the use of ventilators within the structure will assist.
- Condensation may be reduced by incorporating trickle ventilation into the walls, eaves and ridge zones.
- When drying out a new glazed extension, forced ventilation (electric powered extractor fans) may assist by increasing the natural airflow.
- Do not use open flame heating appliances (calor gas stoves, etc.) to dry out the glazed extension, these appliances increase the amount of water vapour in the air.
- Water in plants will contribute to the moisture in the air, which can lead to condensation. If there are large numbers of plants, which are regularly watered, ensure there is adequate ventilation.
- Glass with a lower U-value reduces heat loss through the glass units and this will assist in reducing the condensation in a glazed extension.

Advice regarding condensation can be obtained from the GGF’s guidance document - Condensation - Some Causes, Some Advice

5.5 Wall frames

The wall-frame of a glazed extension is arguably the most important aesthetic aspect of the glazed extension, and combining these aesthetics with the required structural support for the roof and the lateral stability is of paramount importance in any design. The wall-frame should be functional, safe, strong and durable. Windows and doors must be secure, weather resistant, provide controllable ventilation and be easy to operate.

In the case of a gable end conservatory or the side elevations of a lean to conservatory, care needs to be taken when specifying the wall frames. Larger frames must have sufficient stiffness to prevent undue flexing under lateral wind load. Any vertical load from the roof is catered for by mullion stiffeners and/or additional gable beams may be required to form a gable truss capable of resisting these loads. Advice from systems suppliers should be sought regarding the specific capabilities of their components. Many roof system companies can provide ring-beams, portal frames etc. with enhanced stability and structural capacities to carry and transfer loadings from the roof to the base without imposing additional loadings on wall-frames that are not designed to carry these additional loadings.

Windows and doors should comply with the relevant material standard (e.g. BS 7412 for PVC-U, BS 644 for timber etc.) and should meet the weathering and loading (wind and snow) requirements for the location shown in BS 6375-1 and BS 6262-3. PVC-U wall frames on most conservatories will require additional integral aluminium or steel supporting framework. These are required to provide the vertical support to the roof and to assist in transferring snow and wind loads to the base structure; these components also provide stiffness to the side frames to resist lateral wind loads. To ensure good practice and structural integrity, some form of verification and/or checking procedure for the independent supporting framework should be undertaken, this should be designed and

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installed in accordance with manufacturer's instructions and recorded on the Installation checklist. The connection system for the windows, roof and doors should allow for thermal expansion of the wall-frames whilst maintaining the weatherability of the window and door components. Details of the specific system should be obtained from the systems supplier.

5.5.1 Wall-frame types

Side hung/top hung casements

For the more contemporary glazed extension, the side hung casement maximises on ventilation and provides an outward opening window of significant size and proportion. The side hung casement offers a totally unrestricted view from the glazed extension and can be further complemented by dummy vents to achieve an equal sight line throughout. Side hung casements have restrictive parameters in comparison to the tilt and turn window. Top hung casements have varying height and width restrictions but again individual manufacturer approvals apply.

Top hung fanlight vents

Fanlight vents are designed for a more traditional style of conservatory, providing ventilation yet retaining maximum security for peace of mind. When used alongside the dummy fanlight vent they provide a perfect balanced sight line replicating many traditional characteristics.

Tilt and Turn

The tilt and turn window offers increased opening sizes over any traditional opening fanlight/casement. The dual function of this window allows it to tilt inwards for restricted ventilation through the top of the vent and as a secondary function opens fully inwards to maximise the full frame opening either for ventilation or ease of access. The tilt and turn window can be manufactured to suit the majority of frame heights whilst the width of the vent should follow the line of the roof rafters immediately above (ideally 800mm to 900mm centres but no more than 1000mm wide) these dimensions could be increased in the gable of a frame but subject to manufacturer approval.

Transoms and mullions

These separate the casements/vents etc. in both in horizontal and vertical orientation and can be used in a variety of applications. The transom is a horizontal member that divides either two panes of glass; it may be used to separate two opening windows or may simply be used at high level as a desired design feature. Equally the mullion, whilst identical in section, provides a vertical break between two panes or side hung casement/ tilt and turn windows.

Doors

All doors, where possible, should incorporate multiple locking systems, either through solid steel hook bolts engaging at the top, middle and bottom of the jamb of the frame or through projecting shoot bolts into the head and bottom rail frame members with a central deadlock. The cylinder used should be of a high security standard and security hinges should be of robust construction with either interlocking pins within the hinges or dogbolts to resist the attacks to the hinge side of the door leaf.

Positioning

- The ideal location of any door is very much dependent on the chosen style of conservatory and is determined by the individual's required furniture layout within the conservatory and any external influences such as the patio layout etc. Notwithstanding, doors should not be located for example, in the front facet of a Victorian style where the projection of the conservatory is greater than the width. Positioning the doors on the front facet creates a corridor effect from the house doors to the conservatory doors. Realistically, no furniture can be placed in this 'corridor' and the usable area within the conservatory is effectively reduced. Additionally, the facet size may be insufficient to allow a reasonable sized opening and this could also affect the stability of any dwarf walls. It is recommended that wherever possible and practical to do so, any door configuration should be positioned adjacent to the house wall.

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Styles

- Double leaf doors - Double doors, otherwise known as French doors, will optimise a natural walk through and should ideally be in overall widths from 1400mm to 2000mm wide but in any event should always line through with roof rafters to enhance the aesthetic appearance of the structure. Additional consideration should be given to the threshold type and ensure that the correct type of threshold is selected. This will ensure that the amount of frame visible above the floor level does not present an unnecessary "trip" factor for the user. Manufacturers will provide guidance to the client in these situations.
- Single Leaf Doors - Single leaf doors are less common due to the restricted functionality and by virtue of the fact that they do not tend to complement the conservatory design.
- Sliding Patio Doors - The sliding panel opens over either a fixed pane or another sliding panel, combinations may be 2 or 3 panels in depth. However, due to door handles and doors stops, the opening size will be restricted in width and therefore sliding patio doors are not widely used in conservatory applications. Patio doors are ideal when either the internal or external space is restricted preventing hinged doors from operating effectively.
  If sliding patios doors are specified, the security of the doors should be considered and an anti-jacking device combined with a multi-locking point system should be specified to resist potential intruders.
- Bi-Fold Doors - Bi-Fold doors offer the ultimate choice in terms of opening options and configurations enabling the customer to open up the glazed extension and reduce the barrier between the indoors and outdoors. The doors comprise of a number of door leafs and are mounted in a frame either extruded in the required colour, foil wrapped to give the desired appearance or painted to match the wall-frames. Bi Fold doors can fold either outwards or inwards and some designs can be selected with a separate primary door which will enable the user to use their doors without opening up the entire Bi-Fold doorset.
- Hardware - Hardware for the windows and doors shall meet the requirements of the appropriate window and door standards detailed in Section 5.2 above. *Further guidance is given in the GGF Datasheet 6.7 Hardware specification.* When specifying hardware for use in a glazed extension, consideration should be given to any safety and security requirements that may apply to the installation.

Tip - Check the style and handing of furniture in the existing property when specifying window and door hardware for the conservatory.

5.6 Glazed roofs - conservatories

The vast majority of new conservatories now feature highly engineered roofs glazed with Insulating Glass Units. The glass roof must be watertight, durable and be able to deal with the wind and snow loadings at the location. It is the contracted retailer's responsibility to ensure that the structural performance of the finished glazed extension is fit for purpose – the underwriting of this may be provided by a fabricator, a system company, the engagement of an independent structural engineer or independent third party certification such as BBA certification.

5.6.1 Materials/supply

The materials generally used in glass roofs are aluminium profiles extruded in an appropriate structural grade alloys to BS EN 755-9:2008 – these extrusions are generally capped and clad with either PVC-U profiles or in powder coated aluminium sections. Where possible, some degree of thermal separation is necessary to prevent cold bridging.

Conservatory roofs can also be manufactured in structural grade timber – generally speaking, the weathering detailing is undertaken by other materials such as lead flashing or a proprietary rafter glazing system to ensure adequate sealing of the glazing.

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The vast majority of glazed extension roofs are made in the factory from CAD drawings where the loadings etc. have been carefully calculated. Occasionally, due to design and/or size, a roof may need to be partially or wholly fabricated on site – this method is not without risk.

5.6.2 Building Regulations/Standards

There are no Standards (British or European) for conservatory roofs and therefore in the absence of Standards, specifiers and buyers should use third party certified products. BBA is a typical third party certifier and have been assessing conservatory roof systems since 1996.

Since the introduction of the Construction Products Regulations (CPR) which made CE Marking mandatory for construction products where a harmonised European Standard (hEN) exists to allow the product to be placed on the European market, structural steel and aluminium products, when sold separately and fall within the scope of BS EN 1090, must comply with this regulation. These products must have a Declaration of Performance (DoP) issued and the product must be CE labelled. Some custom made elements used in glazed extension/orangery buildings such as portal frames, goalposts and support posts/legs, if sold as separate products, are affected by this legislation and should have a DoP and be CE labelled.

5.6.3 Performance factors

When assessing the performance of any roof – either when choosing a system supplier – or when assessing a specific product for a specific project – the following criteria should be considered;

5.6.3.1 Strength and stability

The system must have adequate strength to resist wind and snow loads in accordance with relevant Eurocodes.

5.6.3.2 Weathertightness

The roof system will resist the passage of wind and rain and can be used in the exposure conditions relevant to the project.

5.6.3.3 Condensation risk and thermal insulation

The possibility of condensation should be assessed and the risk minimised by specifying roofs with a good thermal performance (U-value).

5.6.3.4 Durability

Individual system companies will have varying guarantee periods (typically 10 years) but BBA certified products are deemed to have a service life expectancy in excess of 25 years although this is not the guarantee period.

5.6.4 Technical specification of the roof

5.6.4.1 Description

The roof must be designed and fabricated to suit the exposure conditions of the site itself, this may be assessed by providing the site post code to the roof manufacturer. The various structural components used in a glass roof can be combined into a wide variety of shaped glazed extensions with differing footprints, differing pitches and with multiple intersecting roof slopes.

5.6.4.2 Components

A roof system comprises a number of parts, only the most common are listed here:

- Ridge beam member – including wallplates on lean-to conservatories.
- Glazing bar profiles – these are used against host walls, for hip joints and as transom bars.
- Tie bars and tie wires – used to add further structural support to the side frames to prevent the roof finial point dropping and the frames being pushing outwards when loaded.
- An aluminium eaves beam or ring beam – special versions exist for gable fronted designs. PVC-U or aluminium standard gutter is attached to this using special purpose made brackets. To allow further spanning, particularly over wide door openings, ‘super duty’ versions of eaves beams may be incorporated in the design. If these do not provide

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the necessary strength due to the span or loadings, a portal frame or goal post arrangement may be necessary.

- Valley profiles – where two roof slopes intersect, often at varying pitches.
- Boxgutters – these can be used where a glazed roof abuts a masonry host wall or where the glazed roof meets an existing tiled roof. A critical ingredient when a design needs a box gutter is the issue of support for the box gutter. A brick pier or gallows type bracket of special custom fabrication may be needed to provide the correct support when the box gutter is long, jointed or where there are tie bar positions.
- Roof vent or roof window – this is within the slope (pitched) part of the roof.
- Cleats, bolts, screws, anchor fixings –these are usually supplied with the pre-fabricated roof kit.
- Flashing – this can be lead, treated with patination oil or a proprietary flashing system can be used. This seals the glazed roof to the host wall.

5.6.4.3 Manufacturing and quality assurance

A majority of glazed extension roofs are manufactured 'off site' in a specialist roof fabrication facility and delivered as a kit with a comprehensive installation guide to aid on site assembly. When choosing a specialist roof fabricator, consider one with a fully operational QA system (ideally ISO 9001 or similar) covering;

- quality control of incoming stock/materials
- monitoring the ongoing production process and verification it is in line with the quality plan
- specified plan to handle non-conformities
- checking and testing equipment to ensure correct calibration of production machines
- QA plan is checked and updated on an ongoing basis and preferably, independently audited

5.6.4.4 Delivery and site handling.

The roof structure is usually delivered to site in flat packed parcels with each one clearly marked and displaying the manufacturer's brand/logo. Insulating Glass Units are usually delivered direct from the IGU manufacturer on specialist transport with trained glass handling logistics staff. The roof structure and IGUs should be stored in a clean area, in the manner recommended by the manufacturers and suitably protected prior to installation.

Always consider the weight of any glass units to be handled during installation and use the correct Personal Protection Equipment (PPE) when handling IGUs. The roof manufacturer will provide details of the weight for the structure and glass. Consideration should always be given to the use of the correct access equipment to allow safe installation to protect passers-by, occupants of the house and the fitters themselves.

5.6.5 Design considerations

The glass roof described in section 5.7 is designed to be used for all conservatories attached to domestic dwellings.

The glass roofs described in this section are designed to be installed by qualified fitters working within Health and Safety guidelines.

5.6.5.1 Strength and stability

The structural performance of any chosen roof system should have been verified based on the assumption that the supporting walls have sufficient strength and stiffness. The design assumes simply supported connections fixed in plan and elevation. Excessive movement of the supporting framework will cause distortion and significant deflection under design loading. A suitably qualified and experienced person should be entrusted to establish the proposed wall frame suitability to support the roof.

The structural capacity of the components of any system should be verified in accordance with BS EN 1991-1 and the deflections of the members limited to span/200 for glazed roof and span/100 for polycarbonate roofs.

It is always preferable to look at the wind and snow

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loads at a specific location/postcode – some roof systems will assume a basic imposed wind load of 0.75 kN/m2 and a basic snow load of 0.75 kN/m2. The magnitude of these loads for particular locations will depend on a number of factors and should be determined by a suitably competent person as described in accordance with BS EN 1991-1-3 and BS EN 1991-1-4 and their associated national annexes.

By choosing a third party certified roof system, structural testing has been used to confirm adequacy of the connections and full scale tests carried out to verify the correlation between predicted performance based on the manufacturer's designs methodology. The third party certification confirms that the manufacturers design methodology is acceptable.

5.6.5.2 Weathertightness

There are no standards or guides applicable to conservatory roofs. Therefore, third party certified systems in their assessment make use of use of BS 6375-1: 2015 and if BBA certified, MOAT No 1: 1974 giving the results shown in Table 1. The gradings are based on the assumption that the conservatory is installed in accordance with the system manufacturers' technical manuals.

	BS 6375-1 Test Pressure	BBA Moat No. 1 Grading (2) (3) Pa
Watertightness(1)	300 Pa	E3(2)

Table 2:

(1) A value for air permeability is not given as it will vary depending on the nature of the supporting walling structure.

(2) E3 indicates water leakage occurring between 300 Pa and 499 Pa.

To achieve the classifications given in Table 1, particular attention must be paid to the correct fitting of all gaskets and weatherseals, and to the detailing of sealants and flashings.

Trickle ventilators fitted to the ridge, wall plate or eaves will help to equalise the internal and external air pressures to reduce air infiltration through other parts of the roof and wall frames

5.6.5.3 Ventilation and solar heat gain

As outlined in section 5.4.6, ventilation in a glazed extension is a must. Some roof systems have integral trickle ventilation provided through the ridge and eaves system. Additional background ventilation may be provided through trickle ventilators in the head of the window and door units.

An adjacent habitable room may be ventilated through an adjoining conservatory if the ventilation openings have an area appropriate to Building Regulations requirements.

Opening roof vents can be included where required to provide greater levels of ventilation.

Solar heat gain through the roof panels may provide a useful additional heat input during winter conditions; however, summertime internal temperatures will also be raised. To limit the latter effect, the following design factors should be considered:

- orientation - south facing conservatories will experience higher levels of solar heat gain than north facing ones.
- aspect ratio of the floor plan of the glazed extension.
- area of opening lights and doors to area of floor expressed as a percentage.

5.6.5.4 Condensation risk and thermal insulation

Additional general guidance is contained in section 5.4.9.

A glazed roof structure can suffer temperature reduction in the cooler months at night, when heat radiation from the external surfaces may lead to the possibility of internal condensation forming. However, the effects may be minimised by in-built ridge and eaves ventilators and by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature during these periods.

Roof glazing bars have higher U-values and consequently may be subject to occasional winter condensation, though the use of PVC-U cladding on the aluminium will help to reduce this. In general, if the temperature and humidity within the glazed extension

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are maintained within the normal domestic band from 10°C to 25°C and from 40% to 65% RH, respectively, the potential occurrence of condensation will be reduced.

5.6.5.5 Security against intrusion

This guidance is based around the retention of a secure lockable exterior door and secure lockable windows to the existing dwelling. However, where the existing doors and/or windows are permanently removed or where the existing doors and windows into the existing dwelling do not provide the level of security desired by the client, high security wall-frames and doors may be specified. These wall-frames and doors should be manufactured to the enhanced security requirements demonstrated by testing to PAS 24 or following the guidance given in the design guides published by Secured by Design (SBD).

Roof glazing panels are retained by glazing bar top cappings or glazing beads. Ideally the removal of these glazing retainers should require the use of a special tool to deter potential access by removal of the roof glazing. Where a roof vent is fitted with a screw closing mechanism, it provides reasonable security against unauthorised entry by the opportunist intruder.

The use of one pane of laminated glass with a classification of P1A or better, when tested to BS EN 356, will provide additional resistance against unauthorised access.

5.6.5.6 Behaviour in relation to fire

Any glass used can be regarded as a non-combustible material and therefore can be taken as having a Class 0 performance rating. Polycarbonate sheet used in the conservatory roof achieves a Class 1 rating when tested to BS 476-7: 1997 and is therefore classed as a TP (a) rigid thermoplastic.

The spread of flame across PVC-U cappings is limited, and in the event of a fire will tend to char and may fall away. The use of this material in the construction of a conservatory roof would not accelerate the development of a fire.

5.6.5.7 Safety

Where a glass roof is specified, Insulting Glass Units incorporating thermally toughened safety glass or laminated glass, tested and classified in accordance with BS EN 12600 should be used. The positioning of the hand-operated controls of the opening vent should comply with the recommendations of BS 8213-1: 2004

5.6.5.8 Supporting structure

Previous sections have dealt with window frame/side wall materials. All supporting side frames incorporating window profile material, i.e. PVC-U, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The wall-frames and solid wall must provide conservatories with overall lateral stability and resistance to axial loading.

5.6.5.9 Durability

Evidence is available on the performance in the UK of UPC-U similar to that used in the internal and external claddings, over a period of 15 years in windows and in excess of 20 years in other external applications. Such evidence indicates that a conservatory roof should have a service life of ‘at least 25 years’. Slight colour change or surface dulling may occur within the overall service life of the roof.

Polycarbonate roof sheets, aluminium glazing bars and other components, including the roof vent hinges, locking mechanism and flashing, will have similar durability.

Where conservatory roofs are to be installed in areas subject to particularly aggressive conditions, for example, in coastal locations or near sources of industrial pollutants, replacement of components may be necessary within the service life of the conservatory roof. Polycarbonate roof sheet replacement may be necessary where prolonged exposure to direct sunlight causes degradation.

The gaskets and sealants may require replacement within the service life of the conservatory roof.

The external surface temperature of the conservatory

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roof reached will be dependent upon a number of factors including;

- orientation — south facing and ‘sun-trap’ locations with restricted air movement
- dark woodgrain finishes will reach a higher temperature than lighter shades
- shading by trees or other buildings.

The external temperature of the conservatory roof may vary across the conservatory which may lead to variations in the degree of colour change or surface dulling.

5.6.5.10 Additional design considerations for glazed extensions roofs

For consumers who seek a mixture of plastered ceiling with a glazed roof and an Orangery style building when viewed from the outside.

There are choices to be made when designing and specifying an orangery style building. Firstly, there is what is called an 'Enhanced Conservatory' and this is essentially a typical glass roofed conservatory onto which internally is added a lightweight internal perimeter pelmet or shelving system which may be plasterboarded and skimmed and externally, the perimeter guttering system may be hidden by an external fascia

Secondly there is the traditional orangery roof which consists of a flat roof perimeter in the middle of which is an atrium, skylight or ribbon roof glazing. These are usually based on individual structural designs although some systemised constructions are now coming to the market. Orangery roofs of these type are more typically construction projects rather than an assembly of pre-fabricated parts.

A more detailed analysis of these options is as follows:

1. Enhanced Conservatory

This type of roof is generally a proprietary prefabricated glazed roof system onto which is attached either timber studwork or other appropriate framing to form a pelmet or shelf around internal perimeter where the wall-frames meet the roof.

The studwork or framing is then clad, either with plasterboard and then skimmed or with other forms of panelling such as PVC-U. When finished, downlighters and cabling may be inserted to distribute other services such as cable T.V. or sound systems.

These pelmets can be varied in depth to reduce the visible glazed roof area to the clients’ requirements. This may be to restrict the amount of light and/or solar gain through the glazed room or to create a particular aesthetic effect such as a lantern light or narrow ribbon light.

Some installers construct their own pelmet in timber studwork but consideration should be given to the correct support of this studwork and potential deflection of roof glazing bars with the subsequent deflection of the pelmet, this may result in damage to the roof and cracking of the plaster finish.

Many installers use the roof manufacturer to supply a proprietary framing system which draws its support solely from the roof that has been designed to support it.

Both methods outlined above have the option to insert mineral wool insulation quilt into the pelmet cavity to further improve insulation, making the conservatory even more ‘room like’ and ensuring the back of the pelmet cannot be viewed from bedrooms above or from neighbouring properties.

Roof system companies now also offer the option of a perimeter shelf, clad in either PVC-U or aluminium which is attached to the roof ring beam giving the impression of a perimeter pelmet. The shelf can be of various widths and the wider ones can be used to display ornaments etc. The shelves are finished on the top face as well and therefore when be viewed from above, give a finished view.

Additionally, some proprietary roof systems now have the option of a decorative feature on the outside of the roof, often called a cornice. This provides an attractive finish and hides the PVC -U

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gutter and the glazing bar ends.

2. Traditional Orangery Roof

This style of Orangery will require Building Regulation approval.

When constructing a conventional orangery roof, installers will usually either:

- Construct the roof from scratch using structural timbers or composite beams with structural steel components or:
- Use timber cassette decks with off-site manufactured portal frameworks to achieve the desired structural roof design.

Whichever method is chosen, one or more glazed rooflights/lantern lights are fastened to timber kerbs. These glazed lights usually feature thermally efficient glazing and solar control glass.

To complete the conventional orangery roof, a separate weatherproofing activity is completed using a variety of weatherproof exterior finishes.

The elevational appearance of a conventional orangery room usually takes one of two forms as follows:

- A masonry parapet is formed by continuing the cavity walls above the height of the orangery roof, weatherproofed and capped using copping stones. Rainwater from the roof may be disposed of via a hidden boxgutter located either behind the parapet or below the rooflights. Hoppers through the parapet walls may also be used to dispose of the rainwater externally. The flat portion of the roof must be laid to fall to ensure rainwater flows to the gutter.
- The cavity wall is finished below the orangery roof, the roof construction continues to the outer face of the wall with an appropriate fall to promote rain run-off and an external gutter installed around the perimeter of the roof. This gutter may be hidden behind a fascia detail.

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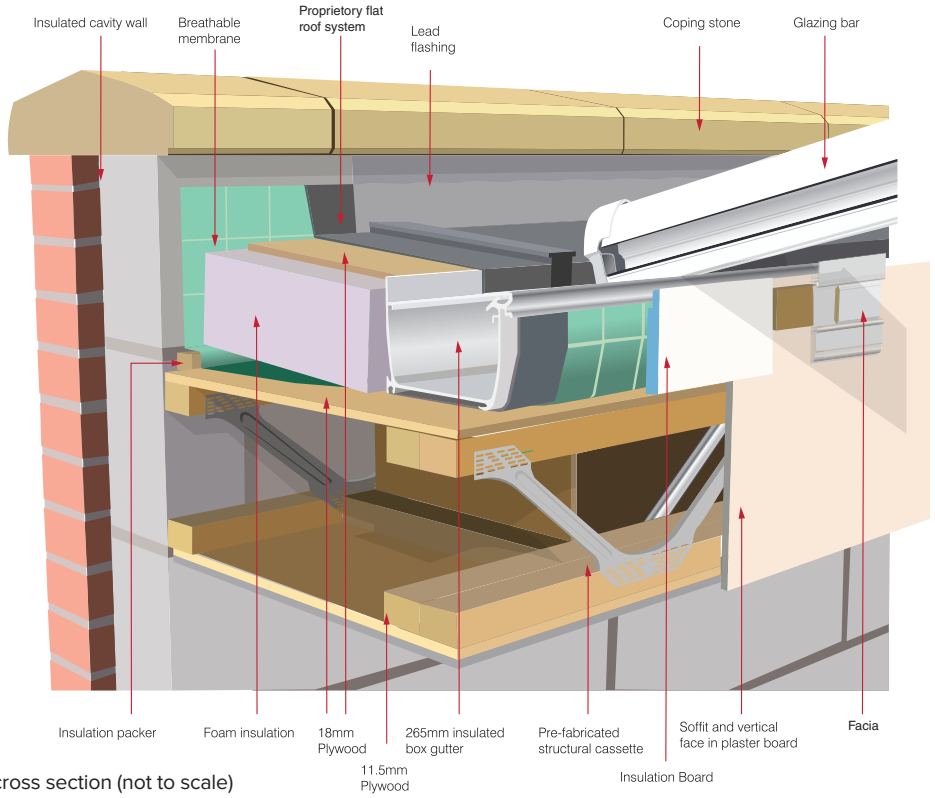

Figure 35: - Parapet cross section (not to scale)

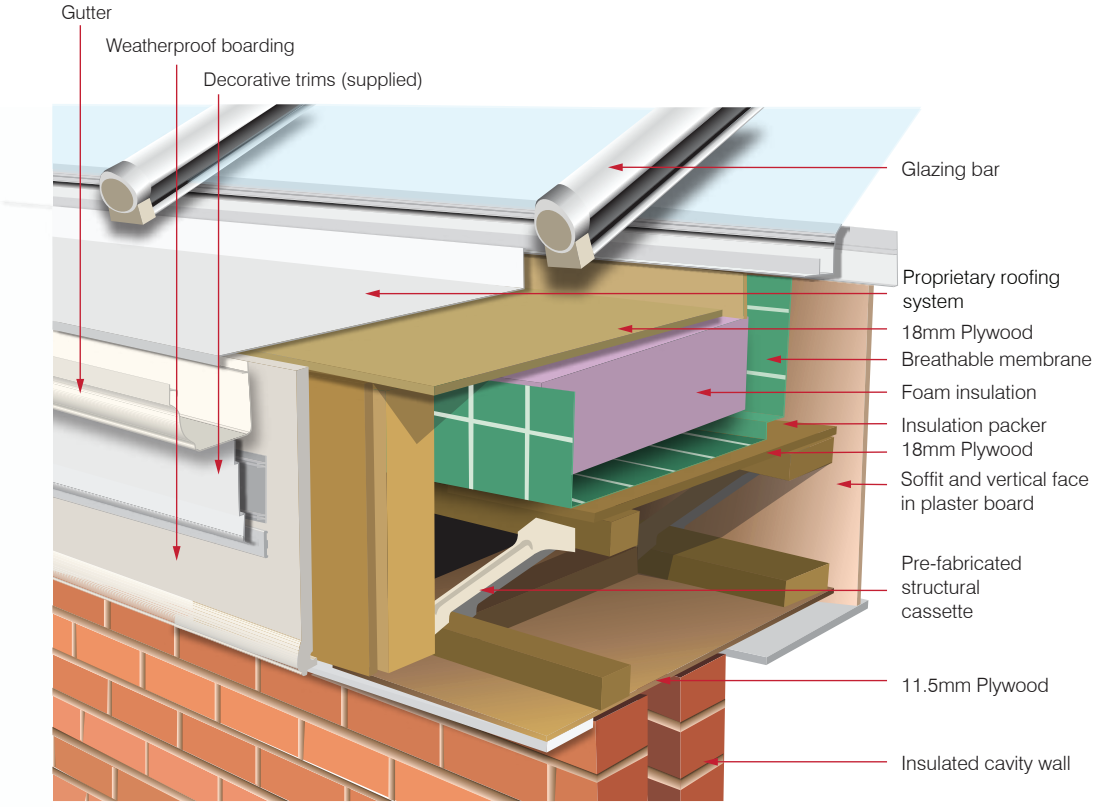

Figure 36: - Parapet cross section (not to scale)

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5.7 Weather tightness

The glazed extension shall be designed to withstand exposure to extreme weather conditions applicable to its location to ensure the structure can perform adequately for many years, e.g. sea front, exposed high altitude locations, etc.

The walls, floors and roof of the glazed extension shall be adequate to resist the passage of moisture to the inside of the building.

Due consideration shall be given to the weather exposure of the wall and the built in features such as windows and doors to ensure an adequate watertight seal between the masonry and frames.

5.7.1 Door thresholds and DPC

Careful consideration must be given to the weathering detail at door thresholds. Thresholds are usually positioned at DPC/finished floor level. Particular care must be taken where the external patio height is such that standing water on the patio may be driven by wind into the joint between the brickwork and door threshold. Provision must be made by either lowering the patio height to allow a 150mm step between the patio level and DPC level of the new building or include provision for a drainage channel around the outside perimeter of the glazed extension. This drainage channel may be a purpose made drain with grating or formed as a french drain filled with chippings or shingle.

5.7.2 Vertical DPC

Horizontal moisture penetration into or through the existing dwelling wall is a risk and a vertical damp proof course should be installed. In high exposure locations, this vertical DPC should be slotted into a 35mm deep channel cut into the house wall and attached to the wall frame of the conservatory.

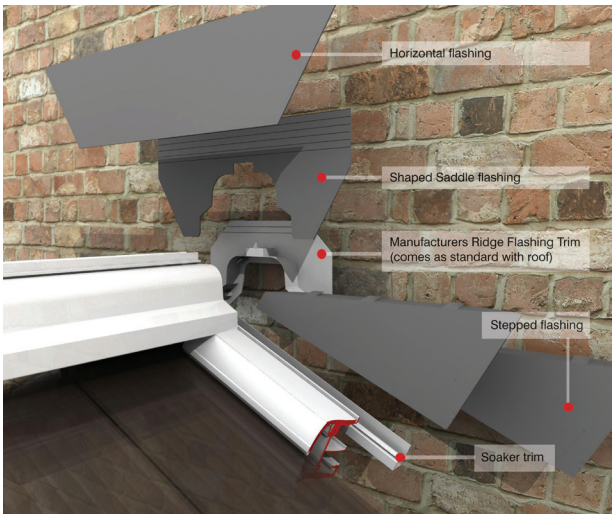
5.7.3 Roof flashing

Where the glazed extension roof is connected to an existing property, flashing will be incorporated to ensure a waterproof seal between the glazed extension roof and the existing property. Traditionally most flashings are fabricated on site from lead rolls, though proprietary systems are also available.

Materials that can be used for flashings are:

Lead sheet, this should comply with BS EN 12588 for lead and lead alloy rolled sheet for building purposes. The thickness of the flashing should be between 1.75 and 2.0mm.

Guidance can be sought on flashing details from the Lead Sheet Association's technical manuals or BS 6915.



Lead flashings may be treated with patination oil to prevent oxidation and staining from water run off onto the glazed extension.

Proprietary purpose-made flashings, which are integrated into the conservatory roof design, typically PVC-U, other thermoplastic, proprietary sealant based adhesive flashing tapes or metals may be used. It is recommended that these products should have an independent assessment by a recognized building products approval body.

5.7.4 Cavity trays

Glazed extensions are built after the main dwelling is completed. A risk assessment should be carried out at survey to determine whether the existing dwelling is subject to high levels of exposure to wind driven rain and whether existing window and door openings have cavity trays fitted above them. In modern buildings, this is usually evident by the presence of weep holes

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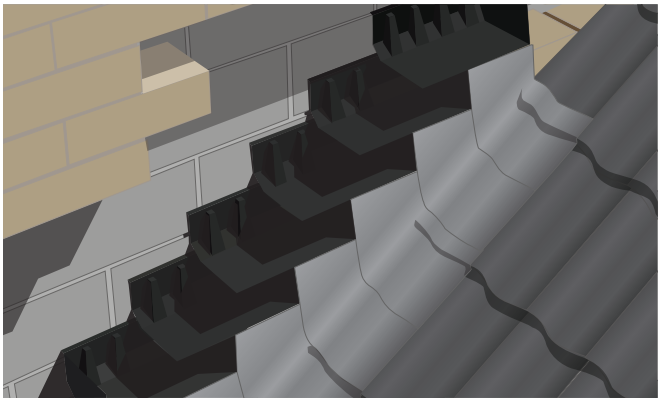

above the openings. If the risk assessment has shown the property may be subject to water penetration through the external walls by wind driven rain, cavity trays should be specified at the survey and must be installed. If required, they should comply with BS 8215. If the new building is subject to Building Regulations, the installation of cavity trays will almost always be a requirement.

Any cavity tray installed should always be linked to the roof flashing. Any existing mortar gaps in the property should be noted and sealed in agreement with the client.

Note: If cavity trays are not initially installed and the requirement for them becomes apparent once the glazed extension is in use, cavity trays can be installed at a later date but the cost of these remedial works will be significantly higher than if installed during the initial construction.

5.8 Electrical safety

The installation of new power lighting circuits must comply with the requirements or Approved Document Part P Electrical Safety - dwellings (2006 edition).

Approved Document Part P covers all electrical work in domestic dwellings. This includes the installation of a new circuit, any work in a kitchen or bathroom and any work undertaken outside the property (for example, in a garage or garden).

In order to comply, such installations will need to be:

- Designed and installed to protect against mechanical and thermal damage.
- Designed and installed so that they will present no electrical shock and fire hazard.
- Tested and inspected to meet relevant equipment/ installation standards.

Part P applies only to installations designed to operate at low voltage or extra-low voltage.

Advice should be sought from a Registration Body such as ELECSA (www.elecsa.org.uk) or an appropriately qualified electrician who will assess the existing electrical circuit for compliance as well as the new installation.

5.9 Fire safety

5.9.1 Roofing materials

The roof covering and profiles need to be Class 1 rated to BS 476 part 7 (similarly AA rated to Part 3 or classed TP(a) or TP(b) or BS476:3 2004). There are compliant polycarbonate, glass products and profiles on the market.

5.9.2 Egress window

Where there is a means of escape from 1st floor level this should not be compromised by addition of a glazed extension. Also care must be taken to ensure an egress window fitted to an inner room on the ground floor is not compromised by the addition of a glazed extension.

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5.10 Protection from falling, collision and impact

5.10.1 Steps and stairs

It is recommended that for the convenience of children, the less able and elderly, steps should be limited to a maximum rise of 150mm with a tread depth of between 280mm and 420mm where the site allows.

5.10.2 Ramps

Should not be steeper than 1:12, with a preferred incline of 1:20. See earlier section 4.4.12 regarding disabled access.

Handrails must be provided where the total rise of the steps or ramp exceed 600mm in dwellings. The handrail height should be between 900mm and 1000mm measured to the top of the handrail from the nosing pitch line of the steps or surface of the ramp.

Handrails should give firm support and allow a firm grip.

5.10.3 Containment and guarding

Where the difference in levels between the internal finished floor level and the external ground level is 600mm or greater, containment is necessary to prevent injury by falling. Containment may be provided by the inclusion of robust glass such as 6mm or 10mm (dependent on the free path in front of the glazing) thermally toughened glass, laminated glass or the inclusion of a physic barrier such as vertical railings.

Window openings in the wall frames where the lower edge of the opening is less than 800mm above finished floor level will also require to have a barrier fitted to prevent falling.

5.11 Snow guards

Consideration should be given to the installation of snow guards to the host property to reduce the likelihood of glass roof breakage caused by falling snow or ice during thaws. Snow guards will also help prevent damage caused by roof tile slippage.

5.12 Reference information section 5

Class 1 rated to BS 476 part 7 (similarly AA rated to Part 3 or classed TP(a) or TP(b) or BS476:3 2004).

SECTION 6:

Superstructure Assembly

Section Contents

6.1 Site control

The speed and efficiency of the on-site installation will depend on the control exercised by the installation team.

Tip - Check whether the glazing has a coating, e.g. self-cleaning and follow the manufacturer's instructions to avoid damaging the coating.

It is essential that a comprehensive material schedule be raised; this will ensure all relevant components are available for delivery to site at the appropriate time. Any shortages will cause undue delay to the completion of the building, create additional cost and result in an unhappy client.

6.2 Health and safety

Site safety is particularly important, the installer shall be responsible for the safety of the installation staff, the customer and members of the public.

Changes to the Construction, Design and Management Regulations in 2015 (CDM 15) now require a simple but detailed construction phase plan to be produced detailing all trades that will work on site, the risks associated with the works being carried out by these trades with planned timescales for each, and how they relate to one another. A detailed risk assessment must be carried out for each phase and wherever possible risks removed or reduced to a minimum. Refer to Annex E.

6.3 Material storage

The survey document should indicate the agreed on-site storage area for the delivered superstructure.

The installer shall ensure that all materials are stored safely, so reducing the risk of damage and cause no harm to the client or family or pose a danger to any persons in or about the site. Special care is required in determining the location where glass is to be stored and the method of stacking any glass.

6.4 Superstructure installation

The erection procedure for the new building will differ dependent on the type of construction material and style of the building and therefore advice should be sought from the system supplier.

In all installations of the superstructure, work should commence with checking the overall height to the apex of the glazed extension, ensuring that it will fit and not obstruct any high-level windows or the roof soffit line.

The base and any dwarf brick wall (if present) should be checked to ensure that it has been constructed to the correct structural and dimensional specification including door opening positions and sizes.

The next critical stage is to lay out the perimeter sill of the wall-frames on the base or brickwork. If sills are supplied over length, it is essential to check prior to cutting, that the sub-sills fit the brickwork. A check should also be made to ensure it is dimensionally correct to receive the wall-frames.

Sills should be located, levelled and fixed in place. A mortar bed may be used to support the sill and any structural member required to transfer the vertical loading to the base should be incorporated and fixed at this stage.

Assembly of the wall-frames can now take place and all fixings should be in accordance with manufacturers' recommendations.

After checking the wall frames are vertical and plumb, the eaves/perimeter ring beam can be fitted. The sequence of erection and glazing of the conservatory roof will be in accordance with the roof system supplier's manual.

SECTION 6:

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6.5 Follow on trades

Each contracted retailer will have their own policy with regards to the follow on trades, such as electrical or plastering requirements.

Such trades must be programmed to attend site at the specific stages as detailed in the Construction Phase Plan to prevent delays in the completion of the installation.

6.6 Finishing off

It is always recommended that sufficient time is allocated for “finishing off”, this work includes carefully checking the installation and ensuring that all windows and doors operate and close correctly and all ironmongery functions with ease.

Tip - Good communication is vital. Try to keep the customer informed of arrangements at all times.

It is important to ensure the customer is familiarised with how these products operate.

This guide recommends that the NHBC standards be adopted for the acceptable quality of finish to the new building; reference should be made to the following chapters within the NHBC Standards publication:

Chapter 9.1 – A consistent approach to finishes

Chapter 9.2 – Wall and ceiling finishes

Chapter 9.3 – Floor finishes

Chapter 9.4 – Finishes and fitments

Chapter 9.5 – Painting and decorating

SECTION 7:

Maintenance

7.1 Routine maintenance

The maintenance requirements of the glazed extension may include the following items:

7.1.1 Glass cleaning

Float glass is used in most double glazed units, and therefore it is recommended that hand jewellery is removed prior to cleaning and no metal scrapers should be used in the cleaning process.

Any household glass cleaner may be used with a soft cloth and it is recommended that heavy external grime be initially removed with a solution of soap and water. It should be noted that external leading will oxidize. This is a natural phenomenon and cannot be avoided.

Tip - Check whether the glazing has a coating, e.g. self-cleaning and follow the manufacturer's instructions to avoid damaging the coating.

Low maintenance glass has a treatment applied to the outermost surface of the glass unit and works in 2 ways. Once activated by sunlight (usually within 5 – 7 days of installation) the treatment will breakdown organic dirt and secondly, when rain falls on the surface of the glass, the water does not form into droplets but spreads across the glass as a film. This film washes away the remains of the organic dirt and any other dust that has accumulated on the glass as it drains from the glass. The glass surface will also dry quicker and with fewer smears than standard glass.

Where low maintenance glass is fitted, occasional manual cleaning will be required where the amount of organic dirt deposits are large or when there has been little rainfall to complete the second part cleaning action. Where organic dirt is not being broken down effectively by the self-cleaning coating, this may be cleaned manually using soap and water. No metal cleaning scrapers or abrasive compounds should be used as these may damage the self-cleaning coating and reduce its effectiveness. When rain has not fallen to clean away the loose dirt on the glass surface, water may be sprayed using a hosepipe to supplement natural rainfall.

7.1.2 Aluminium and PVC-U frame cleaning

Wash frames every few months with soap and water to remove grime and atmospheric deposits. If necessary, use a non-abrasive proprietary cleaner to remove stubborn blemishes.

Note: Avoid all solvent based or abrasive cleaners.

7.1.3 Timber frame cleaning

Coated surfaces should be regularly maintained and washed down with soap and water, to remove surface pollution. Some 'chalking' of the opaque finish will occur over time due to natural corrosion of the moisture vapour permeable opaque finish and this should be removed in accordance with the manufacturers' recommendations. This is quite normal and does not detract from the systems performance. The original colour of the glazed extension finish can be easily restored by the application of an additional coat of the moisture vapour permeable finish.

7.1.4 Roof maintenance.

Glazed extension roofs can be re-glazed and the gaskets replaced, but these operations should be carried out by qualified installers, using similar materials to those originally supplied. If damage occurs to a roof vent, the furniture and fittings can be readily replaced by releasing the fixing screws and changing the fitting.

Internal and external claddings can be cleaned using water containing household detergent. If dirt is allowed to build up on the members over long periods it may become more difficult to restore the surface appearance. Care should be taken, when using proprietary materials for cleaning the glazing, to ensure that deposits are not allowed to remain on the PVC-U where they may cause discolouration and damage to the surface. In addition, care must be taken to avoid damage to, or discolouration of, the members when stripping paint from adjacent surfaces, for example, by means of a blowlamp, paint stripper or mechanical stripper.

Paints can adversely affect the impact strength of the PVC-U cladding and the application of dark colours

SECTION 7:

Maintenance

could lead to a risk of thermal distortion. Therefore on-site painting is not recommended.

The roof vent locking mechanisms and hinges should be lubricated periodically to minimise wear and to ensure smooth operation, as recommended by the roof system fabricator.

Should it be necessary, any roof panels can be readily replaced by the removal of the glazing bar top capping using a special tool or long nosed pliers. Low pitch roofs are likely to require more frequent cleaning than those with a higher pitch; a greater pitch aids removal of dirt and debris by rainwater. Low maintenance glass needs to be installed at a minimum pitch to be effective.

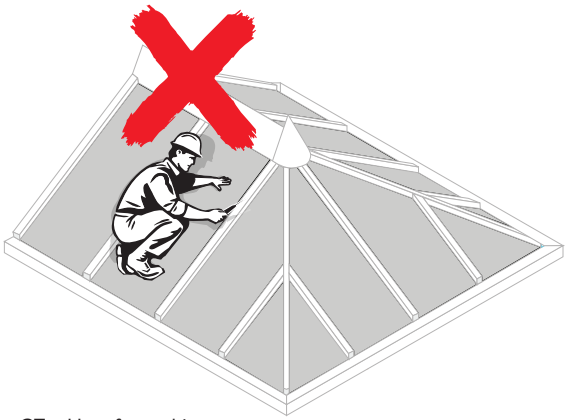

Figure 37: - Unsafe working practice

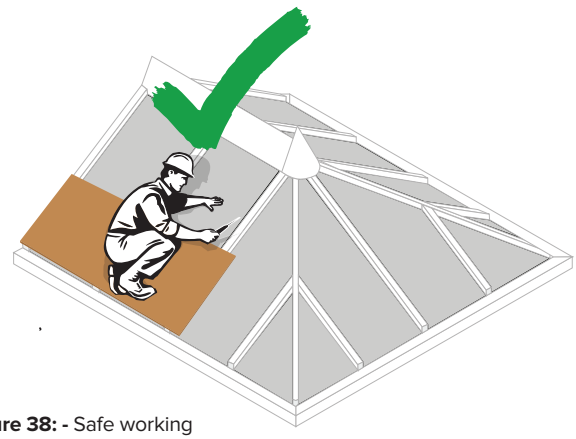

Figure 38: - Safe working practice

7.1.5 Roof glazing

For glass roofs the same advice as above applies.

For plastic glazing sheet materials:

- Use a solution of lukewarm water with a mild non-abrasive soap.
- Use a soft sponge to remove any grime and dirt from the sheet.

Always check with the manufacturers guidelines.

Attention should always be made to the safety aspect of any maintenance work to the conservatory roof.

Clear guidelines as follows must be observed:

- Do not walk on the conservatory roof - always use a crawl board to spread the load
- Do not lean ladders against the PVC-U frames, glazing or guttering.

If in doubt call in a specialist contractor.

7.1.6 Drainage slots

Most double glazing frames are designed with an in-built drainage system, comprising of openings (slots or holes) within the wall-frame profiles or the underside of bottom timber glazing beads, that allow any water which has ingressed into the profiles or the glazing rebates to drain to the outside without compromising the integrity of the glazing system. To maintain the efficiency of this system, the openings must not become restricted or blocked by dirt and other debris. Periodically, remove dirt, clear the drainage openings and in PVC-U or aluminium systems the operation of the drainage system may be checked by gently pouring water into the drainage slots located in the lower frame members visible when opening sashes are in the open and observing the water exiting the profile either through the face drains or over the surface of the sill. This method cannot be used on timber wall-frames.

Note: Depending on the system used, the drainage openings may be on the face of the profile and covered with a push-fit cover or they may be concealed on the lower edge of the profile and may be located between the profile and the sub-sill.

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7.1.7 Weather seals

During maintenance and cleaning ensure the weather seals fitted to the doors and windows do not become dislodged from their location grooves. If this occurs, slide back into position immediately to avoid damage when the window or door is closed. If the weatherseals are broken or damaged, ensure prompt replacement by contacting your installer. Seals formed by gun applied sealants should be checked to ensure they have not become damaged, are still in good condition and still provide an effective seal.

Please note that some discolouration of the mastic seal is a natural occurrence and cannot be avoided.

Note: Sealants have a limited life expectancy and replacement of sealants is part of the buildings maintenance regime.

7.1.8 Guttering

It should be noted that the perimeter guttering and box gutters on conservatories will be laid level, with no fall. This is part of the design of the product and is perfectly acceptable, and complies with BS EN 12056. Therefore on occasions there will be standing water in the gutter system. It is important that all gutters and their respective outlets are regularly cleaned of any debris such as leaves etc.

7.1.9 Door/window fittings

For lubrication of handles and hinges etc. use a light machine oil lubricant for moving parts and petroleum jelly where indicated in the specific product lubrication instructions.

Lock cylinders' where required, should be lubricated with graphite dust.

When installed, brass work is fully protected with lacquer. In time, through normal wear and tear, this lacquer will wear, may peel or be scratched. This will cause the brass below to become tarnished. Never use abrasive cleaning agents as this will accelerate the rate at which the lacquered surface wears or becomes damaged.

SECTION 8:

The Environment, Waste Management and Re-cycling

Section Contents

8.1 The environment

It is vital that the impact of our actions on the environment is considered and the installation of a glazed extension is no exception. The installation will have environmental impacts during the manufacture of the materials used in its' construction, the effects of the groundworks for the glazed extension base, the energy and consumables used during assembly and finally the ability of materials to be re-cycled at their 'end of life'.

Modern manufacturing techniques used in the manufacture of the base materials used to manufacture components such as PVC-U, timber, aluminium, glass etc. maximise the efficient use of these finite resources and ensure re-cycling of waste material generated during the manufacturing cycle.

Raw materials such as timber are now generally sourced from sustainable suppliers, whose credentials can be checked and proof of origin obtained.

The use of these base materials in the manufacture of the component parts of the glazed extension such as wall frames, roofs, insulating glass units etc. is also closely controlled using optimised control systems to minimise material waste and the small amount of waste produced is returned to the supplier and re-cycled wherever possible. Returned materials are also re-cycled into the manufacturing process.

The design and specification of materials and subsequently, the component parts, aims to produce thermally efficient products that will keep energy use within the finished glazed extension to a minimum, thereby keeping carbon emissions to a minimum.

In the UK, many of the component parts of the glazed extension are assembled in efficient manufacturing units, located to reduce the transport carbon footprint of both materials to the manufacturing site and components from that site to the glazed extension location.

By following the principles contained in this Good Practice Guide, the effects of the erection and subsequent use of the glazed extension on the environment will be kept to a minimum.

8.2 Waste Management

The construction process on site will inevitably result in the generation of waste material in the form of spoil from the demolition of existing buildings on site, excavation of the foundations, packaging and other waste from site operations.

Wherever possible, waste should be separated and disposed of separately through specialist re-cycling contractors.

8.3 End-of-Life

Many of the materials used in the construction of a glazed extension such as glass, PVC-U and aluminium can be re-cycled. Re-cycling of many of these materials is not limited to a single time, they can be re-used many times to produce other products.

SECTION 9:

Terminology

Base

The term is an industry term used to define the foundations and sub structure of the glazed extension.

Contracted retailer

The organisation, which has the contractual liability to the customer for the design, supply and installation of the glazed extension.

Dead load (self-weight)

The load due to the weight of all walls, permanent partitions, floors, roofs and finishes including services and all other permanent construction.

Crown/spider

This is the cover piece for the location where the roof glazing bars, ridge and eaves beams abut.

Cavity trays

A series of damp proof courses that bridge a wall cavity to direct moisture to the external face of a wall

Cavity wall

A wall comprising of two skins of masonry (brick and/or block), tied together with proprietary metal ties.

Damp Proof Course (DPC)

A propriety moisture resistant strip built within the wall to resist damp usually 150mm above ground level to prevent moisture from the ground rising in the wall by capillary attraction.

Damp Proof Membrane (DPM)

A moisture resistant layer, which is usually positioned underneath the concrete floor slab to prevent dampness penetration/moisture permeation from the ground to the inside of the glazed extension.

Exempt Conservatory (England and Wales)

A single storey, ground floor part of a domestic building, which is less than 30m^2 in area.

It has not less than three quarters (75%) of its roof area and not less than one half (50%) of its external wall area made from translucent material.

It is not connected to the dwellings heating system.

External doors, windows or wall are fitted between the main building and the conservatory to provide a complete thermal separation.

It contains no permanent sleeping accommodation, sanitaryware, kitchen appliances or fixed gas appliances.

Flashing

To form an abutting weatherproof and durable construction detail between the new roof structure and the existing house wall.

Foundation

Means of distributing the structural loadings from the glazed extension structure safely onto the ground.

Glazing bars

A member, by which infill glazing or opaque panels are supported, retained and made weather tight and secure.

Installer/contractor

The individual or team of people who carry out the base construction and installation of the glazed extension superstructure and may be directly employed or subcontracted by the Contracted Retailer.

Roofing systems supplier

The organisation responsible for designing and supplying the components used in the manufacture of the glazed extension roof.

Solid floor

A concrete floor slab constructed and supported directly from the ground.

Stability

Stability is the ability of a building or structure to withstand the forces generated by a combination of loading conditions without serious deflection or permanent deformation and the capability to transfer the reactions of such loadings to the ground. These

SECTION 9:

Terminology

loads being the self-weight of the structure and superimposed loadings of the wind, snow and access as recommended and defined in BS EN 1991-1-1, BS EN 1991-1-3, BS EN 1991-1-4 .

Surveyor

The person responsible for the site evaluation and measurement to ensure the glazed extension to be manufactured and built will be suitable for the site conditions.

Suspended floor

Floor construction raised and suspended above the internal ground level and generally supported by the perimeter cavity walls, with possibly load bearing internal masonry walls to reduce the span of the floor.

Tie bars

A metal bar connecting two components together to resist mutually opposing forces pulling the components apart.

Window/door system fabricator

The organisation responsible for the fabrication of the window and door modules.

Window/doors system supplier

The organisation responsible for designing and supplying the components used to manufacture the window and door modules within the glazed extension.

SECTION 10:

Bibliography and Reference Documents

British Standard reference	British Standard title
BS 476-7	Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products
BS 644	Timber windows. Fully finished factory-assembled windows of various types. Specification
BS 1186-2	Timber for and workmanship in joinery. Specification for workmanship
BS 1449-1.1	Steel plate, sheet and strip. Carbon and carbon-manganese plate, sheet and strip. General specification
BS 2569-2	Specification for sprayed metal coatings. Protection of iron and steel against corrosion and oxidation at elevated temperatures.
BS 3987	Specification for anodic oxidation coatings on wrought aluminium for external architectural applications
BS 4842	Specification for liquid organic coatings for application to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with liquid organic coatings
BS 4873	Aluminium alloy windows and doorsets. Specification
BS 5516-1	Patent glazing and sloping glazing for buildings. Code of practice for design and installation of sloping and vertical patent glazing
BS 5516-2	Patent glazing and sloping glazing for buildings. Code of practice for sloping glazing
BS 5440-1	Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases). Specification for installation of gas appliances to chimneys and for maintenance of chimneys
BS 5440-2	Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases). Specification for the installation and maintenance of ventilation provision for gas appliances
BS 6073-2	Precast concrete masonry units. Guide for specifying precast concrete masonry units
BS 6093	Design of joints and jointing in building construction. Guide
BS 6206	Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings (NOTE: Partially withdrawn, applies to plastic sheets only)
BS 6262-1	Glazing for buildings. General methodology for the selection of glazing
BS 6262-2	Glazing for buildings. Code of practice for energy, light and sound
BS 6262-3	Glazing for buildings. Code of practice for fire, security and wind loading
BS 6262-4	Glazing for buildings. Code of practice for safety related to human impact
BS 6262-6	Glazing for buildings. Code of practice for special applications
BS 6262-7	Glazing for buildings. Code of practice for the provision of information
BS 6375-1	Performance of windows and doors. Classification for weathertightness and guidance on selection and specification
BS 6375-2	Performance of windows and doors. Classification for operation and strength characteristics and guidance on selection and specification

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British Standard reference	British Standard title
BS 6375-3	Performance of windows and doors. Classification for additional performance characteristics and guidance on selection and specification
BS 6496	Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with powder organic coatings
BS 6510	Steel-framed windows and glazed doors. Specification
BS 6915	Design and construction of fully supported lead sheet roof and wall coverings. Code of practice
BS 7412	Specification for windows and doorsets made from unplasticised polyvinyl chloride (PVC-U) extruded hollow profiles
BS 7722	Surface covered PVC-U profiles for windows and doorsets. Specification
BS 7950	Specification for enhanced security performance of windows for domestic applications
BS 8213-1	Windows doors and rooflights. Design for safety in use and during cleaning of windows, including door-height windows and roof windows. Code of practice
BS 8213-4	Windows, doors and rooflights. Code of practice for the survey and installation of windows and external doorsets
BS 8215	Code of practice for design and installation of damp-proof courses in masonry construction
BS 8529	Composite Doorsets. Domestic external doorsets. Specification
PAS 24	Enhanced security performance requirements for door assemblies

European Standard reference	European Standard title
BS EN 204	Classification of thermoplastic wood adhesives for non-structural applications
BS EN 607	Eaves gutters and fittings made of PVC-U. Definitions, requirements and testing
BS EN 755-9	Aluminium and aluminium alloys. Extruded rod/bar, tube and profiles. Profiles, tolerances on dimensions and form
BS EN 771-1	Specification for masonry units. Clay masonry units
BS EN 771-2	Specification for masonry units. Calcium silicate masonry units
BS EN 771-3	Specification for masonry units. Aggregate concrete masonry units (dense and light-weight aggregates)
BS EN 771-4	Specification for masonry units. Autoclaved aerated concrete masonry units
BS EN 771-5	Specification for masonry units. Manufactured stone masonry units
BS EN 771-6	Specification for masonry units. Natural stone masonry units
BS EN 845-1 + A1	Specification for ancillary components for masonry. Ties, tension straps, hangers and brackets
BS EN 948	Hinged or pivoted doors. Determination of the resistance to static torsion

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European Standard reference	European Standard title
BS EN 998-2	Specification for mortar for masonry. Masonry mortar
BS EN 1090-2	Execution of steel structures and aluminium structures. Technical requirements for the execution of steel structures
BS EN 1279-1	Glass in building. Insulating glass units. Generalities, dimensional tolerances and rules for the system description
BS EN 1279-2	Glass in building. Insulating glass units. Long term test method and requirements for moisture penetration
BS EN 1279-3	Glass in building. Insulating glass units. Long term test method and requirements for gas leakage rate and for gas concentration tolerances
BS EN 1279-4	Glass in building. Insulating glass units. Methods of test for the physical attributes of edge seals
BS EN 1993-1-10	Eurocode 3. Design of steel structures. Material toughness and through-thickness properties
BS EN 1993-3	Eurocode 3. Design of steel structures. General rules. Supplementary rules for cold-formed members and sheeting
BS EN 1994-1-1	Eurocode 4. Design of composite steel and concrete structures. General rules and rules for buildings
BS EN 1995-1-1 + A1	Eurocode 5. Design of timber structures. General. Common rules and rules for buildings
BS EN 1995-1-2	Eurocode 5. Design of timber structures. General. Structural fire design
BS EN 1996-1-1	Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures
BS EN 1996-2	Eurocode 6. Design of masonry structures. Design considerations, selection of materials and execution of masonry
BS EN 1996-3	Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures
BS EN 1997-1	Eurocode 7. Geotechnical design. General rules
BS EN 10143	Continuously hot-dip coated steel sheet and strip. Tolerances on dimensions and shape
BS EN 12056-1	Gravity drainage systems inside buildings. General and performance requirements
BS EN 12056-2	Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation
BS EN 12056-3	Gravity drainage systems inside buildings. Roof drainage, layout and calculation
BS EN 12150-1	Glass in building. Thermally toughened soda lime silicate safety glass. Definition and description
BS EN 12150-2	Glass in building. Thermally toughened soda lime silicate safety glass. Evaluation of conformity/ product standard

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BS EN 12200-1	Plastics rainwater piping systems for above ground external use. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system
BS EN 12588	Lead and lead alloys. Rolled lead sheet for building purposes
BS EN 12608	Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors. Classification, requirements and test methods
BS EN 13438	Paints and varnishes. Powder organic coatings for galvanized or sherardised steel products for construction purposes
BS EN 14351-1 + A1	Windows and doors. Product standard, performance characteristics. Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics
BS EN 14449	Glass in building. Laminated glass and laminated safety glass. Evaluation of conformity/ product standard
BS EN 14609	Windows. Determination of the resistance to static torsion
BS EN 15228	Structural timber. Structural timber preservative treated against biological attack

ISO Standard reference	ISO Standard title
BS EN ISO 6892-1	Metallic materials. Tensile testing. Method of test at ambient temperature
BS EN ISO 7389	Building construction. Jointing products. Determination of elastic recovery of sealants
BS EN ISO 7390	Building construction. Jointing products. Determination of resistance to flow of sealants
BS EN ISO 8339	Building construction. Sealants. Determination of tensile properties (extension to break)
BS EN ISO 9046	Building construction. Jointing products. Determination of adhesion/cohesion properties of sealants at constant temperature
BS EN ISO 9047	Building construction. Jointing products. Determination of adhesion/cohesion properties of sealants at variable temperatures
BS EN ISO 10563	Building construction. Sealants. Determination of change in mass and volume
BS EN ISO 10590	Building construction. Sealants. Determination of tensile properties of sealants at maintained extension after immersion in water
BS EN ISO 12543-1	Glass in building. Laminated glass and laminated safety glass. Definitions and description of component parts
BS EN ISO 12543-2	Glass in building. Laminated glass and laminated safety glass. Laminated safety glass
BS EN ISO 12543-3	Glass in building. Laminated glass and laminated safety glass. Laminated glass
BS EN ISO 12543-4	Glass in building. Laminated glass and laminated safety glass. Test methods for durability
BS EN ISO 12543-5	Glass in building. Laminated glass and laminated safety glass. Dimensions and edge finishing
BS EN ISO 12543-6	Glass in building. Laminated glass and laminated safety glass. Appearance

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Building Regulations Approved Documents (England and Wales)	
Approved Document A (AD A)	Structural Safety
Approved Document B (AD B) Note: England and Wales separate versions	Fire Safety – Volume 1 Dwellinghouses
Approved Document C (AD C)	Resistance to contaminants and moisture
Approved Document C (AD C)	Resistance to contaminants and moisture
Approved Document E (AD E)	Resistance to sound
Approved Document F (AD F)	Ventilation
Approved Document H (AD H)	Drainage and waste disposal
Approved Document J (AD J)	Heat producing appliances
Approved Document K (AD K)	Protection from falling, collision and impact
Approved Document L (AD L) Note: England and Wales separate versions	Conservation of fuel and power
Approved Document M (AD M)	Access to and use of buildings
Approved Document N (AD N) Note: Wales only	Glazing - Safety in relation to impact, opening and cleaning
Approved Document P (AD P)	Electrical Safety
Approved Document Q Note: England only for New Dwellings	Unauthorised access

Domestic Building Regulations (Scotland)	
Section 1	Structure
Section 2	Fire
Section 3	Environment
Section 4	Safety
Section 5	Noise
Section 6	Energy

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Building Regulations Northern Ireland – Technical Booklets	
Technical Booklet B	Materials and workmanship
Technical Booklet C	Site preparation and resistance to contaminants and moisture
Technical Booklet D	Structure
Technical Booklet E	Fire safety
Technical Booklet F	Conservation of fuel and power
Technical Booklet G	Resistance to passage of sound
Technical Booklet H	Stairs, ramps, guarding and protection from impact
Technical Booklet J	Solid waste in building
Technical Booklet K	Ventilation
Technical Booklet L	Combustion appliances and fuel storage systems
Technical Booklet N	Drainage
Technical Booklet P	Sanitary appliances, unvented hot water storage systems and reducing the risk of scalding
Technical Booklet R	Access to and use of buildings
Technical Booklet V	Glazing

ANNEX A:

Model Terms and Conditions of the Contract

The Glass and Glazing Federation produce Model Terms and Conditions of Contract for Conservatories, for inclusion in customer contracts. These terms and conditions are reviewed on a regular basis to ensure legislative changes to consumer rights are incorporated.

The Model Terms and Conditions are produced in two formats. The first one for GGF Members which incorporates additional requirements to meet the GGF Consumer Code of Practice and other requirements of Membership. The second is one for non-members which includes the basic legislative requirements.

GGF Members may access their Model Terms and Conditions of Contract for Conservatories for GGF Members through the Members' area of the GGF website using their unique login at www.ggf.org.uk. These are provided to GGF Members without charge.

Non-members may access the Model Terms and Conditions of Contract for Conservatories for non-members through the GGF online shop by clicking on "Visit the GGF Shop" at www.ggf.org.uk or e-mailing modelcontract@ggf.org.uk.

All users of these Model Terms and Conditions should regularly check the GGF website to ensure they have the latest versions of these documents and where necessary review their own contracts to ensure they incorporate and any legislative changes.

Images of some other publications available from the GGF shop

ANNEX B:

Building near Sewers or Lateral Drain

Background

In October 2011, the Government decided to transfer the ownership of private sewers and lateral drains in England and Wales to the Sewerage Undertakers (referred to as the Water Companies in this document). Because many of these assets are in rear gardens, the transfer led to a greatly increased risk of house extensions and conservatories encroaching on or damaging public sewers and lateral drains.

It is the homeowner's responsibility to ensure these assets are protected from any damage caused either during building works or subsequent damage caused by loads imposed on them by the building or ground movement

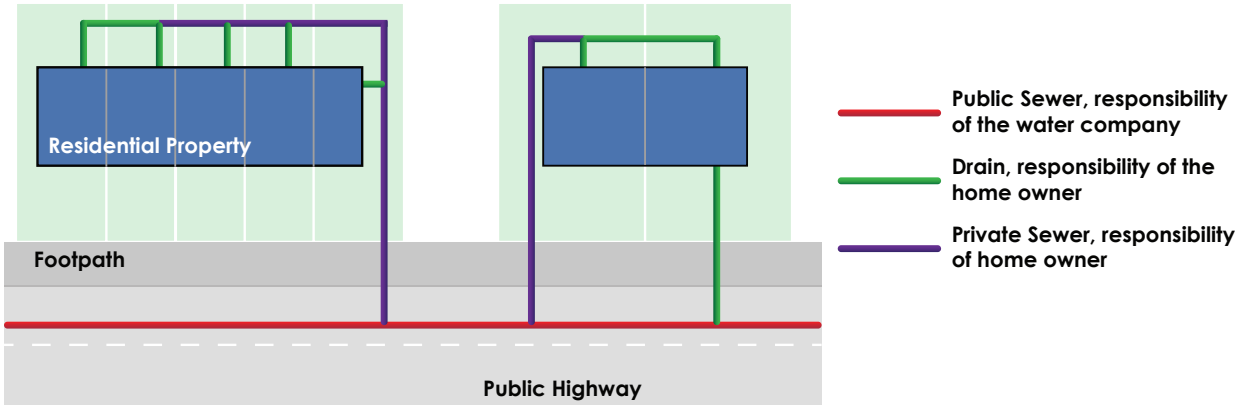


Figure 39: - Diagram showing the responsibilities prior to the transfer on 1st October 2011

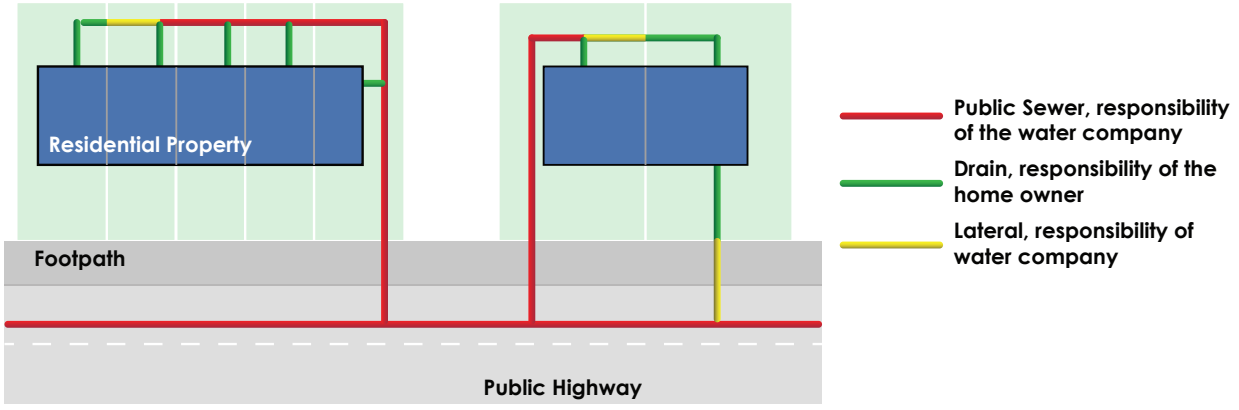


Figure 40: - Diagram showing new responsibilities after 1st October 2011 in relation to gravity sewers only

caused by the building works. As a matter of good practice, these principles should apply equally to private drainage which is not owned by the Water Companies.

This Annex sets out the approach to take in order to ensure that these risks are satisfactorily managed.

Although there is no legal requirement for the homeowner to apply for and receive approval for proposed building works (which is sometimes by way of a formal 'Build-over Agreement'), it is beneficial for the Water

ANNEX B:

Building near Sewers or Lateral Drain

Company to be consulted and for any building works to be constructed in a manner approved by the Water Company. This process will help to avoid subsequent claims that the building works have damaged the sewer and more generally, protecting the Water Company's pipes will also help protect the building work that has been carried out.

The procedures in this Annex are intended to address the issues raised by companies employed by homeowners to construct an additional building(s) attached to an existing domestic property. These procedures are also aimed at reducing the vast variation in the requirements imposed by the various Water Companies in England and Wales when applying for approval when building near to these assets.

Approval of proposed building works

Working closely with the GGF, Water UK, the representative body of Water Companies in the UK, has formulated a standard approach supported by all the Water Companies in England and Wales in relation to building near their assets. This approach is based on identifying a category of building works which, with limited exceptions, will receive automatic consent from the Water Company. This approach will be implemented by the majority of the Water Companies by the end of 2016. Guidance will be provided by the individual Water Company, typical guidance and homeowner declaration are shown below.

The process is shown in the flowchart below and is based on a site assessment carried out by the contracted retailer and the homeowner at the early design/sales stage and/or site survey. This site assessment uses a simple 'tick box' approach and dependant on the presence or sewers or lateral drains within 3 metres of the proposed structure, a simple inspection of them should enable the form to be completed. In some cases, however, it may not be possible accurately to answer the questions without either exposing the pipes in question or carrying out a CCTV survey.

Each Water Company may present these requirements in a different way due to differences in their own internal systems but they will all adopt the same (or a more lenient) approach for the category of building works meeting the criteria for consent.

On completion of the site assessment and the Declaration made by the homeowner, provided all the Water Company's consent criteria are met, the proposed building should be approved by the Water Company. The Water Company will issue a letter confirming their approval of building within 3 metres of the sewer/lateral drain.

As a minimum, the Water Company is likely to approve the proposed construction once in receipt of the completed check list and application where:

- the sewer or lateral drain is of gravity type
- the invert depth is less than that shown in their guidance document
- the sewer or lateral drain is 150 mm diameter or less
- the other criteria set by the Water Company are met

The Water Company will levy a charge to approve the application [Note: Water Companies are not in a position to approve the construction as a whole] and the level of charge will be determined by the relevant Water Company. The forms for this procedure are available directly from the relevant Water Company. A sample declaration with guidance for a Water Company is shown below. Even where a survey has been completed and all the consent criteria are met, the Water Company may, due to specific local knowledge, such as a history of blockages, require additional investigations to be carried out and this may result in additional requirements to be fulfilled before they

ANNEX B:

Building near Sewers or Lateral Drain

issue an approval for the works.

Where there is no evidence of the presence of a sewer or lateral drain within 3 metres of the proposed building, there is no requirements for the Water Company to be contacted unless, during base excavation, a sewer or lateral drain is exposed. Under these circumstances the Water Company will need to be informed and the process described above will need to be followed.

Where a proposed new building falls within 3 metres of a sewer or lateral drain, the building base must be built in accordance with Approved Document H, section H4 to ensure proper protection of the Water Company's assets. Copies of Approved Document H can be downloaded from either;

http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_H_2015.pdf for England or

http://gov.wales/topics/planning/buildingregs/publications/part-h-drainage/?lang=en for Wales

The guidance in these document details:

- Foundation depth requirements where building near or over sewers and lateral drains.
- Method of bridging over a sewer or lateral drain.
- Suggested methods of ensuring loads are not transferred onto sewers and lateral drains passing through foundation walls.
- Methods of ensuring ground bearing floor slabs do not impose additional loads onto sewers and lateral drains passing beneath them.

Where it is not possible to meet the consent criteria, most Water Companies will work with you to amend the building proposal so that it can satisfy their requirements. Even if this is not possible, the building may be able to proceed if a formal Building Over agreement is entered into. This agreement would specify the conditions that would need to be met to allow the building over.

Under certain circumstances, if specific base construction design cannot be agreed or the proposed design cannot be changed to enable the Water Company to approve it, the Water Company may refuse to enter into a build-over agreement and under these circumstances it is advisable not to proceed with the construction as legal action may be taken by the Water Company.

ANNEX B:

Building near Sewers or Lateral Drain

Building near sewer and lateral drain process

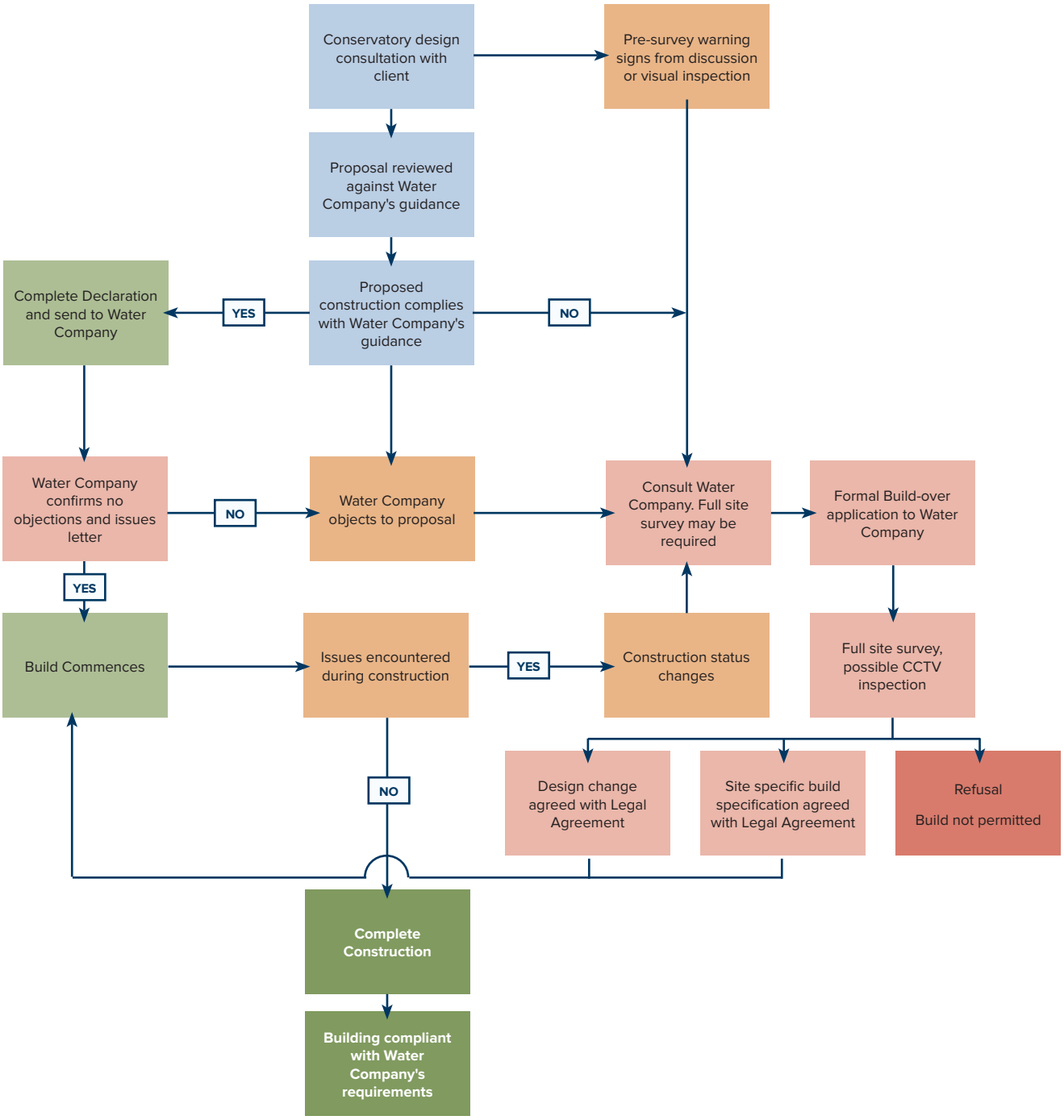


Figure 41: - Building near Sewer and Lateral Drain Process

ANNEX B:

Building near Sewers or Lateral Drain

You will to need to establish and confirm	Consent to build over (close to) will be considered if	Consent to build over (close to) will not be considered if	Further advice
1. The type of building works	Your development involves a single or double storey residential extension, conservatory, annex or garage which is attached to an existing property	If your development involves the construction of a new residential property, the extension of industrial and commercial property or any detached ancillary building or structure	We cannot permit a build over/close to the sewer/ drain for the following:- • New residential properties • Extensions of industrial and commercial properties • Detached ancillary buildings or structure • If the pipe to be built over/close to is found to be defective and not repaired • If your proposal utilises specialist foundations other than strip/ trench fill • The size of the pipe is greater than 225mm diameter • The diameter, direction, material or gradient changes beneath area of proposed build and cannot be removed/ replaced • If you are unable to relocate the access point i.e. access is on junction of sewers or a change in direction • Your proposal involves an infill structure from one boundary to another where there are already structures both sides
2. Are you aware of any problems with the pipework which you plan to build over	You are not aware of any problems such as blockages, flooding, or odour emanating from the pipework	You are aware of historic problems	This can potentially be resolved if it's established that the defect has / can be resolved or no problems are identified within the local network e.g. it is a repeated blockage
3. Are you aware of the existence of an easement or restricted covenant which prohibits building works	You are not aware of any easements or restrictive covenants which relate to the pipework which you propose to build over/ close to	You are aware of an easement or restrictive covenants which relate to the pipework which you propose to be built over/ close to	**Please see detail (b)** which provides an example of an easement on a title plan. This is explained in more detail within our guidance notes
4. Pipe Condition (where existing pipework is not being replaced)	Pipe is in good condition. This can be established by exposing the length of pipe which will be built over or close to, or the completion of a an internal CCTV survey	The pipework is found to be defective and is not repaired	This can potentially be resolved if the pipe is replaced. For further information please see our guidance note
5. The Sewer or lateral drain is a gravity pipe	The pipe freely flows and is not pressurised	The pipe is a pressurised main	This can potentially be resolved if the sewer can be diverted and the customer is prepared to enter into Sewer Diversion Agreement in accordance with S.185 Water Industry Act 1991
6. Depth of the pipe from the existing ground level to the pipe channel (invert)	2 metres or less	Greater than 2 metres	This can potentially be resolved if it can be demonstrated that the development does not place any additional load on the pipe. Consent for building works over or close to the sewer/drain which are deeper than 2 metres, will be issued via Agreement.

ANNEX B:

Building near Sewers or Lateral Drain

You will to need to establish and confirm	Consent to build over (close to) will be considered if	Consent to build over (close to) will not be considered if	Further advice
7. Size of the pipe, the pipe's internal diameter. These typically relate to standard sizes, 100, 150, 225mm or the equivalent 4, 6, 9 inches	If the pipe has an internal diameter of 150mm or less (6 inch) consent will be issued via letter. If the pipes internal diameter is 225mm (9 inch, consent issued via an Agreement	If the pipes internal diameter is larger 225mm (9 inch)	This can potentially be resolved if either the size or shape of the Building works is altered or the sewer/drain is diverted using the Diversion process. Please see the Developer Services Section of our website for more detail of the diversion process.
8. The pipe material	Clay, plastic, concrete	Pitch Fibre, brick, asbestos cement	This can potentially be resolved if the pipework is replaced before building works commence
9. The pipe consistency under the new building	The pipe does not change in diameter, direction, material or gradient beneath the proposed new building	Diameter, direction, material or gradient clearly changes beneath (or close to) the area of proposed build	This can potentially be resolved if the pipework is replaced and / or realigned before building works commence
10. Existing access points. This relates to manholes, inspection chambers and rodding eyes	Your building will not be over the existing access point and is a minimum 500mm from the new build	You are unable to meet minimum 500mm clearance requirement or the existing access will be under the new building	This can potentially be resolved if the affected access can be repositioned or the shape of the build / extension is adjusted to meet this requirement. **See detail (c)**
11. Overall length of pipe (sewer/ drain) with no external access, only applicable for terraced properties where building works over a sewer are proposed across the whole width of the garden	You do not intend to build across the full width of your garden. If you do, external access to the sewer is available via the adjacent neighbour's garden.	You intend to build across the full width of your garden and your neighbours have also done the same. This will result in a situation where there is no external access to the sewer across three or more adjoining properties.	This can potentially be resolved if suitable alternative access arrangements to the public sewer network can be provided by amending the shape of your building. **See detail (d)**
12. The type of foundation which you intend to use	Your building relies on traditional strip or trench fill foundations	Your building will utilise another form of foundation design e.g. Pad, Piling, Raft, Cantilever etc.	This can potentially be resolved if a detailed assessment of the foundation and their impact on the pipe is needed. Consent issued via Agreement
13. Foundation position Distance between the pipe and foundations	The foundation design protects the pipe where it crosses over. **See detail (e)**. The foundations which support the wall which do not cross the sewer, must have a minimum, 500mm horizontal clearance between the edge of the new foundations and pipe	Your foundation design cannot achieve 500mm clearance from the pipe.	This can potentially be resolved if after detailed assessment of the foundation and their impact on the pipe is needed. Consent issued via Agreement.
14. Depth of your foundation in relation to the pipe	Your foundations are designed to be at least 150mm below the pipe when located within 1 metre (horizontally) of the pipe.	Required foundation depth cannot be achieved	This can potentially be resolved if alternative foundation proposals are submitted and agreed. Consent issued via Agreement **See detail (f)**
15. Protecting the pipe where walls/ foundation are built over. Not applicable for instances of building close to	Your foundation design complies with the Standards set out within H1 Building Regulations and Welsh Water - Supplementary technical drawing. **See detail (g)**	Your design cannot provide 300mm of cover between the underside of the new floor and the pipe.	This can potentially be resolved if the sewer can be diverted and the customer is prepared to enter into a Sewer Diversion Agreement in accordance with S.185 Water Industry Act 1991
16. Distance between the floor of the new building and pipe	Your design incorporates a minimum of 300mm headroom between the underside of the new floor slab and the pipe. **See detail (h)**	Your design cannot provide 300mm of cover between the underside of the new floor and the pipe.	This can potentially be resolved if the sewer can be diverted and the customer is prepared to enter into a Sewer Diversion Agreement in accordance with S.185 Water Industry Act 1991

ANNEX B:

Building near Sewers or Lateral Drain

Build Over or close to a Public Sewer or Lateral Drain

Declaration of works at: _____

_____

I/we confirm that _____ **&** _____

–

are the owners of the above property and confirm the following:

1. Water Company's' consent is required to build over or near a public sewer or lateral drain at the residential property detailed above.

The development involves (insert X where applicable).

A single storey extension..... ☐

A double storey extension..... ☐

A conservatory..... ☐

A garage attached to the dwelling..... ☐

A demountable shed..... ☐

Other..... ☐

Please specify_____

2. I/we are not aware of any history of blockages, flooding, odour or other operational issues with the sewer/lateral drain..... ☐
3. I/we are not aware of any easements or restrictive covenants which could prohibit building works over or close to the sewer or lateral drain..... ☐
4. I/we have either verified that the sewer/lateral drain which I/we propose to build over or near is in good condition as confirmed by CCTV survey..... ☐
   or
   I/we intend to verify the condition of the sewer/lateral drain by exposing the whole length of the pipe which is intended to be built over, I/we acknowledge that liability for rectifying any defects with the sewer/lateral drain rests with me/us. I/we have viewed and understood **'the Water Company's'** sewer replacement advisory note..... ☐
5. The sewer/lateral drain is gravity based foul, storm water or combined from domestic properties only (not pressurised)..... ☐
6. The depth of pipe, from existing ground level to pipe channel (invert) is less than 2 metres..... ☐
7. The diameter of the sewer/lateral drain is 150mm or less..... ☐

ANNEX B:

Building near Sewers or Lateral Drain

8. The sewer/lateral drain is either:
    - Clay..... ☐
    - Concrete..... ☐
    - Plastic..... ☐
    - Other..... ☐

    Please specify _____

9. There is no change in diameter, direction, material or gradient beneath the area of the proposed building. I/we have viewed and understood **'the Water Company's'** guidance on how this can be established ..... ☐
10. The proposed building will be a minimum 500mm clear of any public access point (manhole, inspection chamber or rodding eye)..... ☐
11. The proposed building does not involve an infill structure from one boundary to another where there are already structures to both sides, e.g. an extension/conservatory which extends across the whole width of the garden, in instances where adjoining terraced properties have also done this..... ☐
12. The proposed building will utilise strip or trench filled foundations..... ☐
13. Excluding where the sewer may pass through a load bearing wall, 500mm clearance will be achieved between the edge of the new foundations and the sewer/lateral drain..... ☐
14. Where the foundations are within 1 metre of the sewer/lateral drain (horizontally), they will be formed at a depth of no less than 150mm below the invert level..... ☐
15. If the sewer/lateral drain passes through a load bearing wall, it will be protected in line with Approved Document H, section H4 (Building Regulations 2010) and /or supplementary technical drawing set out in our guidance..... ☐
16. A minimum of 300mm headroom will be achieved between the underside of a suspended floor slab and the crown of the sewer/lateral drain, as detailed in our guidance document..... ☐

I/we confirm that my/our development proposals comply with the above points. I/we also accept that any discrepancies with the information relied within this declaration, which is later revealed, or any failure to adhere to elements such as establishing pipe condition (repairing any defects), will render the **'Water Company's** consent invalid.

Signed _____ Dated _____

Signed _____ Dated _____

ANNEX B:

Building near Sewers or Lateral Drain

Typical 'Water Company' Guidance details from Guidance table above

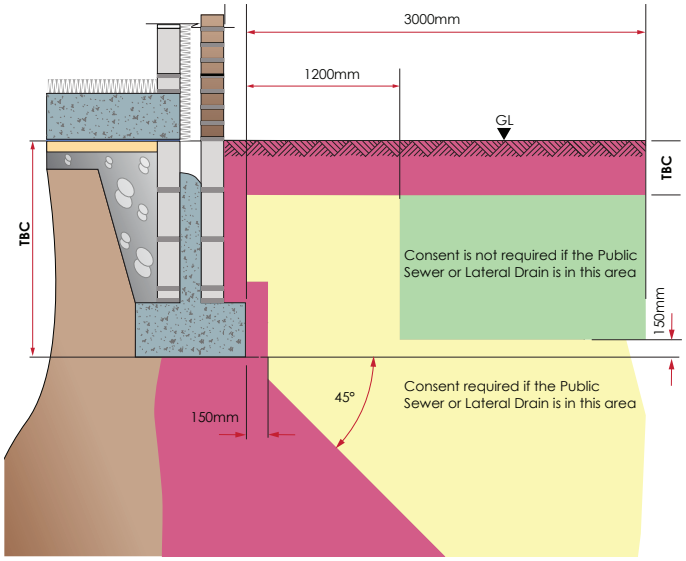


Figure 42: - Detail (a) Build Close to Exceptions

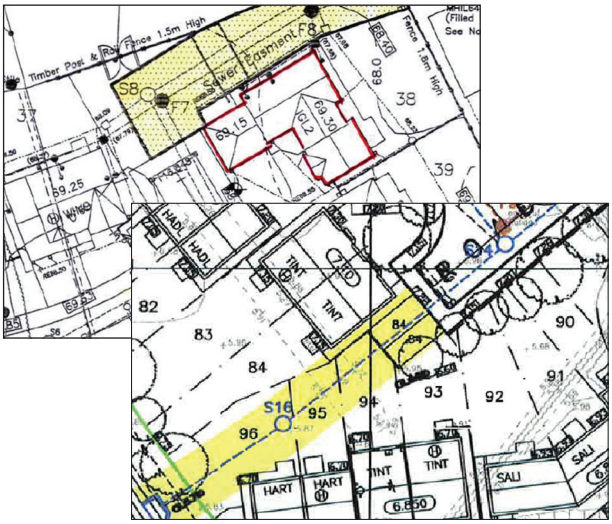


Figure 44: - Detail (b) Are you aware of the presence of easement or restricted covenants which prohibit building

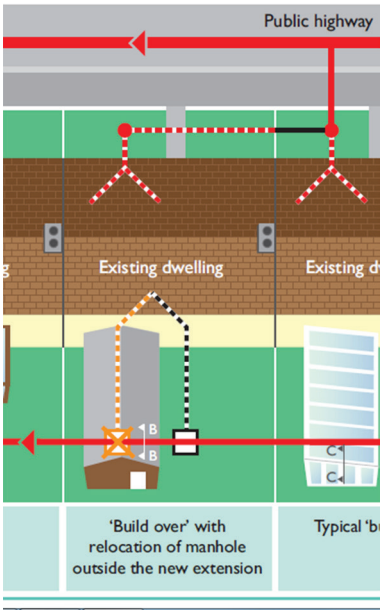


Figure 43: - Detail (c) Existing Access Points – Requirement to be 500mm from the new building

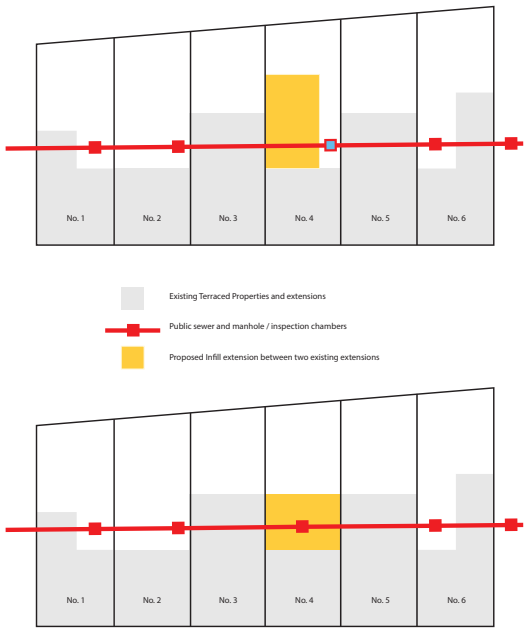


Figure 45: - Detail (d) Length of pipe built over

ANNEX B:

Building near Sewers or Lateral Drain

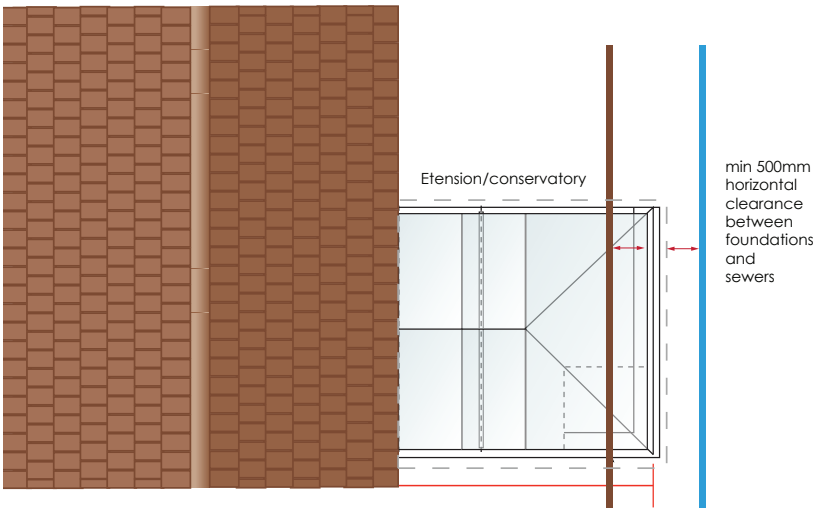


Figure 46: - Detail (e) Foundation near pipes

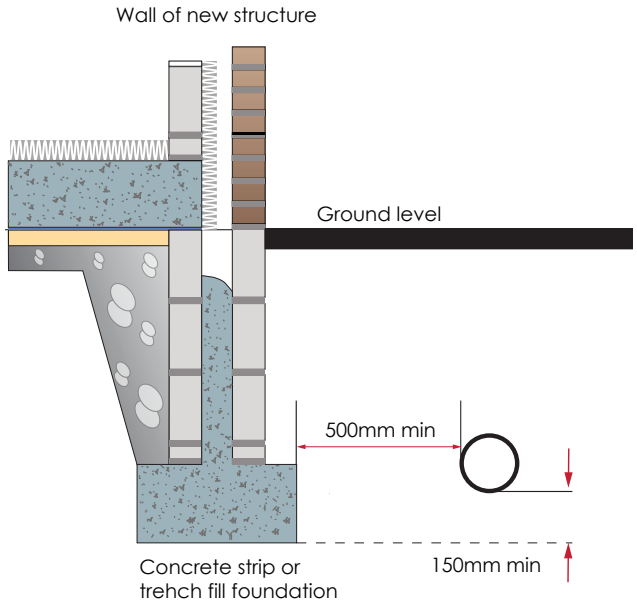
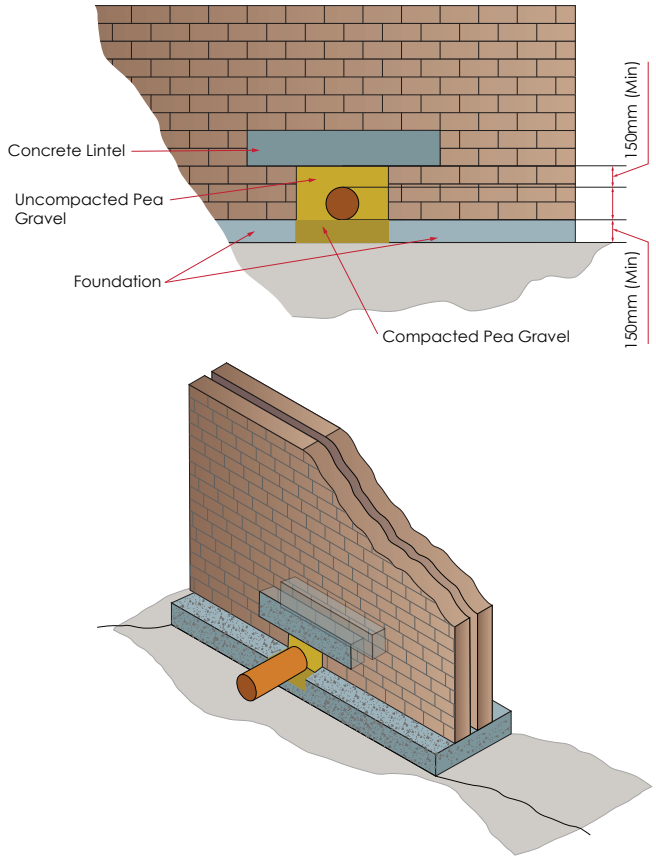


Figure 47: - Detail (f) Depth of your foundation in relation to the pipe

ANNEX B:

Building near Sewers or Lateral Drain



- It should be noted that Northern Ireland Water will NOT consider a proposal to build over a public sewer for a New Building.
- The detail indicated below does not cover all situations which may arise on site and consultation may be necessary with representatives from Northern Ireland Water prior to submitting their proposals along with the application for consideration.
- A Building Over or Near a Public Sewer agreement is required in the constructions within 3m (or $1^{1/2}$ times the depth whichever is greater).
- Although we will consider every case sympathetically, it is probable that permission to build over sewers which are classified as critical sewers will not be given.
- Further information and application forms are available on: **www.niwatter.com/servicesfordevelopers.asp**
- **This sketch is not to scale**

Figure 48: - Detail (g) Protecting the pipe where walls/ foundation are built and cross

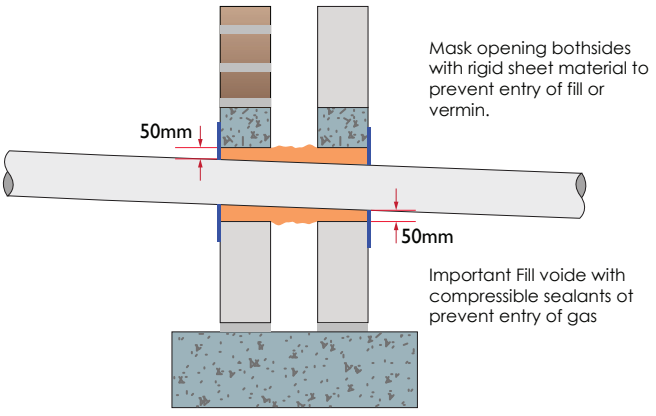


Figure 49: - Arch or lintelled opening to give 50mm space all round the pipe

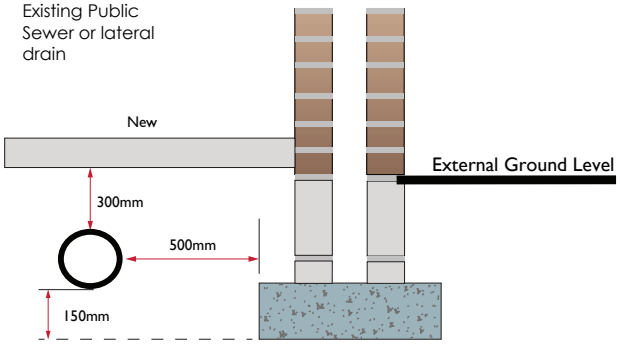


Figure 50: - Detail (h) Distance between the floor of the new building and pipe

ANNEX C:

Conservatory Refurbishment and Renovation

Introduction

With conservative estimates of over 3 million existing conservatories throughout the UK, it is clear that there are substantial opportunities for the on-going maintenance, upgrading and replacement of these structures.

Maintenance

A number of companies specialise in the cleaning and maintenance of conservatory type structures. Cleaning of glazed roofs poses particular issues in relation to health and safety and should only be undertaken by trained professionals using specialist access equipment.

Upgrading existing structures

With the variety of conservatory specifications built during the last 25 years or more years, a number of upgrades may be considered. These upgrades include but are not limited to:

- Conversion of an existing roof structure from polycarbonate glazing to glass using thermally efficient Insulating Glass Units (IGUs).
- Replacement of the existing roof including the structural components, with either a glazed or solid roof.
- Replacement of the entire existing building with one of the same or extended size. This option is considered to be a new build and the main body of this guide should be used.

Upgrading an existing polycarbonate roof to a glass roof using IGUs

Generally upgrading an existing roof glazed with polycarbonate panels to one glazed with thermally efficient IGUs which may incorporate feature such as solar control and low maintenance glazing is relatively straightforward. However, there are some issues that need to be addressed during the survey/design/specification stages.

Crucially, when replacing polycarbonate panels with glass IGUs it is necessary to establish the structural capacity of the existing roof structure in relation to the additional roof loadings due to the increased weight of the glass IGUs. As always, attention to detail is crucial particularly around box gutter supports and ground floor soffits as present in bungalows. Over the last 20 years, roof system companies have introduced more stringent specifications for box gutter spans. When considering an existing installation there may be limited or no existing support and installers may be tempted to rely on this existing detail although, in many cases with older conservatories, this may not be sufficient. It is always good practice to discuss this with the roof system company and establish what is required prior to confirming the price to the consumer. Examples of good support practices include gallows brackets, brick piers or custom designed/fabricated support legs.

Generally speaking, there is no requirement to notify planning authorities or Building Control if simply swapping a polycarbonate roof to a glass roof where the existing wall frames are retained. However, the ability of the existing structure to support the additional weight of the insulating glass units must be assessed to ensure the finished structure is structurally sound and safe for the homeowners or occupiers.

Custom designed gallows brackets are sometimes required

ANNEX C:

Conservatory Refurbishment and Renovation

Upgrading a glazed (polycarbonate or glass) to a solid roof

Homeowners may wish to extend the seasons when their conservatories can used by replacing the existing polycarbonate or glass roof with a more thermally efficient partially glazed or solid roof.

There are a number of systems on the market and they fall into 2 basic types;

- Using the chassis of the existing glazed roof system but using solid insulated factory finished panels externally and insulation slabs internally to create a platform for plasterboard and jointed or skimmed plaster finish. Due to the uncertainty of the original roof's structural capacity and the availability of spares which may be required to complete the renovation due to damage when removing items such as roof bar covers, this option is not generally recommended.
- Systems which are based on replacing the entire existing roof structure using aluminium beams and, for example, structurally insulated panels (SIPS) to create a structure onto which an external tile finish is applied, these may be individual tiles or slates or panels that simulate a tile effect. Internally, additional insulation may be fitted and finished with plasterboard. Glazed areas to allow additional natural lighting can be easily incorporated into these systems.

These systems are relatively new to the market and installers should seek independent certification such as BBA or systems approved by Local Authority Building Control (LABC) or other Approved Independent Inspectors.

IN ALL SITUATIONS, THE REMOVAL OF A GLAZED ROOF AND THE SUBSTITUTION OF A SOLID ROOF CHANGES THE STATUS OF THE CONSERVATORY AND THE LOCAL BUILDING CONTROL OFFICE SHOULD BE CONSULTED TO DETERMINE WHETHER BUILDING CONTROL APPROVAL IS REQUIRED. IT MAY ALSO BE BENEFICIAL TO CHECK WITH THE LOCAL PLANNING DEPARTMENT WHETHER THE CHANGE OF STATUS REQUIRES PLANNING PERMISSION.

To upgrade from a glazed roof to a thermally efficient, Building Regulation compliant solid roof, it may necessary to undertake some additional structural checks on the wall frames and roof, even if these items are not part of the scope of the works.

Wall frames

It is vital that during the survey of the existing structure, the ability of the existing wall frames to carry the additional roof loadings is assessed. The type of material used in their construction will provide information about their ability to carry the greater imposed loads but generally if the wall frames are manufactured from timber, there should not be any issues in relation to additional loading. However if the wall frames are manufactured from PVC-U, the specification of the framing material should be investigated.

The critical issues regarding specification are whether the wall frames are reinforced or not, the type of corner posts and, if fitted, any intermediate posts and the manner in which the vertical loadings are transferred through the sills onto the structure below.

Un-reinforced PVC-U frames

If there is no reinforcement within PVC-U wall frames the normal method of attaching the roof to frame SHOULD NOT be used. In these circumstances the recommended method is a dedicated fixing kit which uses a threaded rod and concealed nuts or alternatively, if the new roof design allows, there may be an option to screw through the head of the frames into a dedicated ring beam using suitable stainless steel screws with a 20mm washer. If this method is used the installer must ensure the screw thread is locating securely into the aluminium ring or eaves beam. The screw thread protruding above the ring or eaves beam should be cut flush to ensure screw

ANNEX C:

Conservatory Refurbishment and Renovation

does not foul the gutter. Either option is suitable.

Reinforced PVC-U frames.

If it has been determined that there is reinforcement to the head of the wall frames, as a minimum, the ring or eaves beam should be screwed directly to the PVC-U frames through the beam, ensuring suitable stainless steel screws engage with the reinforcing within the PVC-U profile.

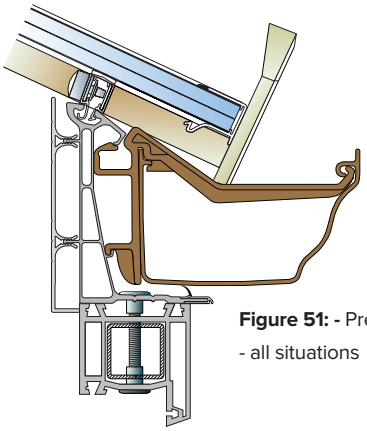


Figure 51: - Preferred method - all situations

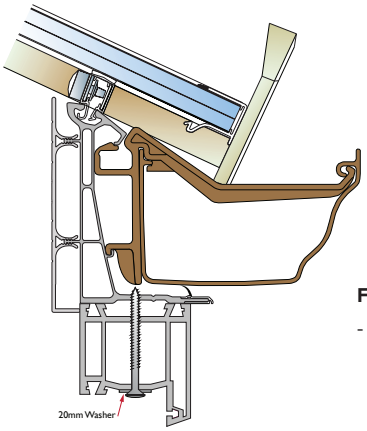


Figure 52: - Preferred method - no reinforcing

Corner posts

Unreinforced PVC-U Frames

If it has been established that there is no reinforcement within the PVC-U wall frames, it is necessary to ensure the corner posts have sufficient structural strength to support the additional loadings associated with a solid roof. The typical dead loading of some solid roofs is, for example, 25 kg/m2 plus minimum snow load, which is typically 60 kg/m2.

> For example on a 6.5m x 6.5m roof the load is 3325 kg, which translates to a maximum loading at each corner of 8.3kN.

Using the table in Figure 54, it can be seen that a PVC-U sleeved corner post using 50mm square, hollow section aluminium reinforcing, with a 2mm wall thickness will be adequate to support this load. The corner post reinforcing wall thickness will usually be greater than this but it should be checked.

At survey stage it may be difficult to confirm the presence of reinforcing inside the PVC-U sleeve until the roof is removed. If new frames are not being installed, it may be advisable to have spare corner posts available to replace the existing corner posts.

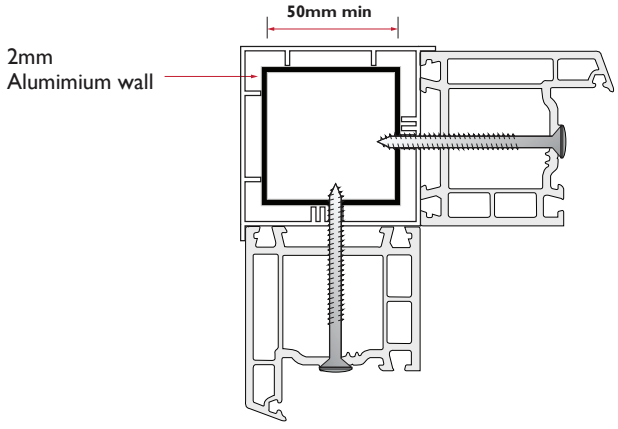


Figure 53: - Typical corner post assembly

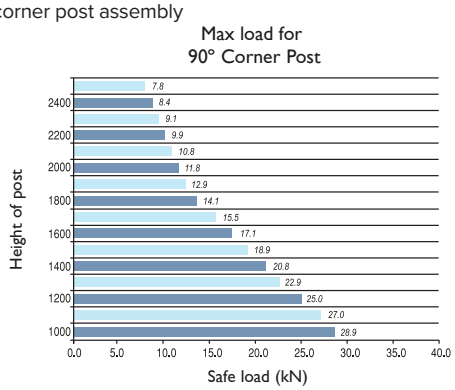


Figure 54: - Safe Working Load (kN)

ANNEX C:

Conservatory Refurbishment and Renovation

Intermediate posts

Reinforced mullions within a run of wall frames perform a number of functions when installed in conservatories:

- They act as a wind post to prevent deflection of the frames by wind loads and provide structural stability to the finished conservatory.
- They carry the roof loading as described above by supporting the roof's ring or eaves beam
- They provide a stable connection of wall frames to each other
- When used as a wind post:
    - The size of the mullion depends on the height of the frame. The system house should be consulted to determine the size and specification of these intermediate posts but as a rule of thumb, full height frames (2100mm) should have a full depth structural post at least 20mm wide.

Adding intermediate posts to an existing conservatory is not usually viable as it would change the overall dimensions of the structure. If the wall frames and doors are also being replaced there is then the opportunity to incorporate newly specified structural mullions within the new design. Should the PVC-U frames be replaced, the insertion of intermediate posts may obviate the need for reinforcement in the wall frame components. When installing corner or intermediate posts, always place a 20mm washer behind the head of the screw as suggested for attaching the eaves or ring beam,

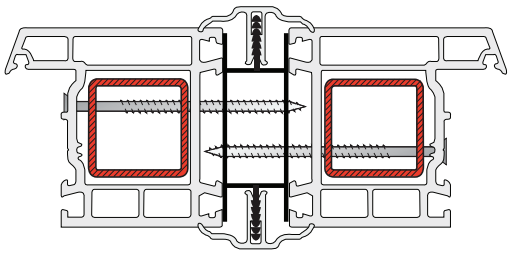


Figure 55: - Typical intermediate post assembly

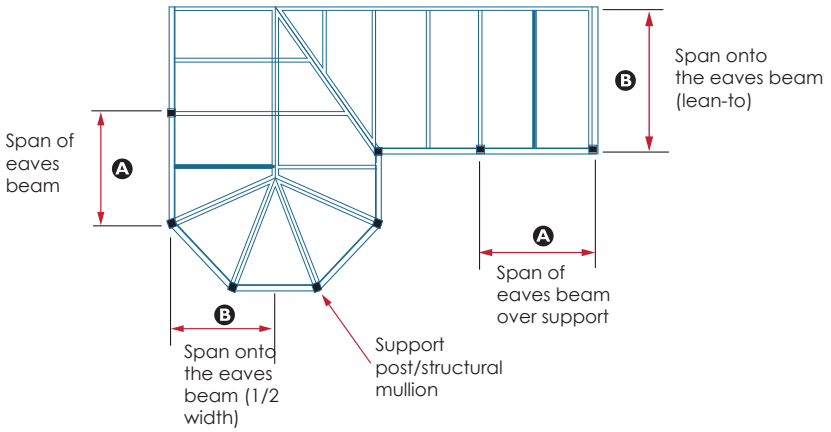


Figure 56: - Span and eaves

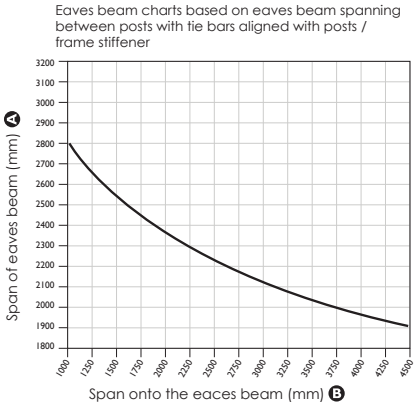


Figure 57: - Graph line makes allowance for different dead load from glazing materials, i.e. Standard eaves beam & Polycarbonate Heavy Eaves Beam & Glass

ANNEX C:

Conservatory Refurbishment and Renovation

Foundations

The foundation design depends on the local ground conditions and advice should be sought from local authority building control or an Approved Independent Building Inspector. However there are some conditions which are necessary and if the existing conservatory foundations do not meet these conditions the existing foundations should be underpinned or the existing base removed and new foundations and base laid. The existing base and foundations should be replaced if:

- The existing foundation depth is less than the minimum of 450mm or deeper based on local site conditions as determined through consultation with building inspectors or the concrete strip foundation depth is less than 150mm.
- There is visible movement between the house wall and the conservatory dwarf wall or cracks in the dwarf wall, this is a clear indication the foundations or base have moved and require remedial works or replacement.
- Remedial works such as mini piling etc. may be undertaken cost effectively if desired.

IF IN DOUBT ABOUT STRUCTURAL COMPLIANCE, PLEASE CONSULT LOCAL BUILDING CONTROL BODY, AN APPROVED INSPECTOR OR A STRUCTURAL ENGINEER.

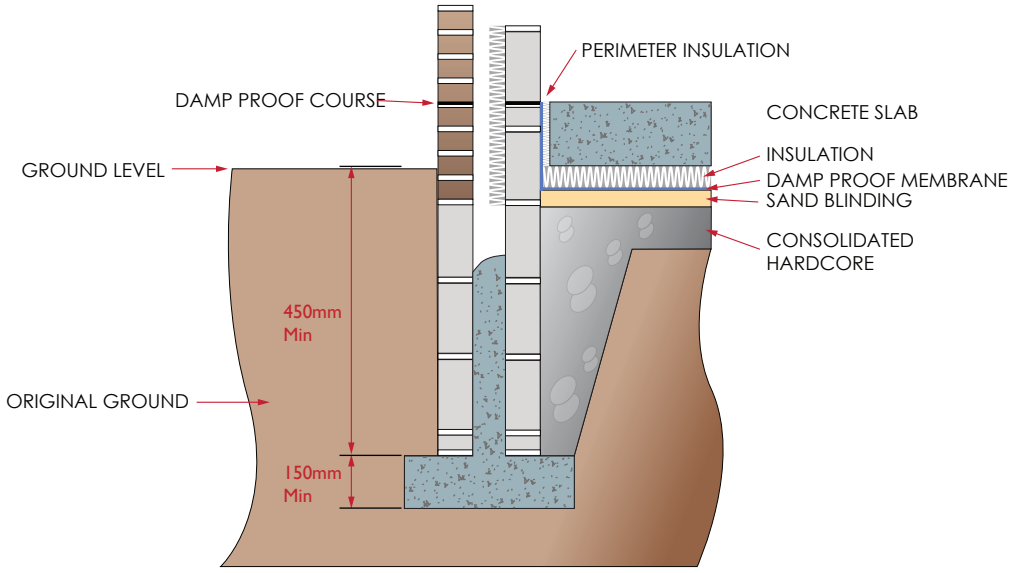


Figure 58: - Minimum foundation requirements

ANNEX D:

Sample of an Installation Inspection Record

Glazed extension contract managers' inspection record

Contract reference _____ Client's name: _____

Installation Team: _____ Inspection date: _____

Grading and action to be taken

Grading	Comments/Action required	Score
Excellent = 3 Good = 2 Poor = 1	Enter comments and any remedial actions required	In accordance with grading

- **Excellent:**
  - Only to be used when the installation team have met and exceeded all expectations. Use of this category implies there is no room for improvement.
- **Good**:
  - The installation team have performed to a reasonable standard with some scope for improvement. The contract manager must advise the installation team where improvements may be made.
- **Poor:**
  - The installation team's performance is unacceptable and immediate corrective action is required. The team should be issued with a warning and must be closely monitored during future builds including training where the need is identified.

General	Comments/Actions	Max score	Actual score
All team members in clean appropriate clothing.			
Installation vehicle clean & tidy inside and out.			
PPE and safety equipment available and in satisfactory working condition.			
Correct access equipment safely erected and team trained in use.			
Client provided with relevant information including where appropriate final invoice.			
Company signage erected correctly.			
Measuring tapes and spirit levels in good condition and calibrated.			
Client's driveway protected and left clean and tidy at end of construction.			
All internal areas of existing house protected by dustsheets where required. External perimeter of the building area protected and tidy			
General comments:	Maximum possible score		
	Actual score		

ANNEX D:

Sample of an Installation Inspection Record

Wall Frame Installation	Comments/Actions	Max score	Actual score
Sill upstands adequately sealed.			
Sill joiners and end caps fitted and sill notched around doors by appropriate amount.			
Frame ends closed off where adjacent to doors, stud in-fills, internal and external walls and any point where water could penetrate and run-off the sill ends and create potential damp penetration.			
All frame fixings visible when a sash or door is opened are counter-bored and capped or positioned within gasket grooves and covered by the gasket.			
Frame fixings are in accordance with BS 8213-4, e.g. for PVC-U fixing at a distance of 150mm ±50mm and at 600mm centres.			
All wall frames fitted plumb, level and square. Maximum tolerance for above and bow is 3mm per 2 metre run.			
Insulating glass units correctly fitted – toe and heeled, gas ports if used in the correct position, glass coatings (low-e, solar control etc.) correctly orientated.			
Glazing beads fitted correctly, in good condition and joints well cut			
All opening sashes operating correctly, plumb and square within the wall frame.			
Gasket fitted correctly and in good condition.			
Fixing brackets used correctly where required.			
All locking points correctly adjusted and fully engaging in keeps.			
All drainage channels and slots clear and not obstructed by swarf and debris. External drainage slot covers fitted where required.			
Windowboards fitted level and jointed to an acceptable standard.			
All profile protective tape removed, all labelling on visible surfaces of profile and glass units. No surface damage to window profiles and glass units, infill panels, roof members and roof glazing panels.			
Any timbers used permanently is the building construction is suitably treated with preservative.			
Check floor is laid to correct level and any floor finishes fitted are correctly finished.			
All skirtings fitted are well cut, jointed and fitted.			
Is the site clean and tidy and overall standard finish of finished building?			
Has the installation team explained the correct operating and maintenance requirements of the products installed?			
General comments:	Maximum possible score		
	Actual score		

ANNEX D:

Sample of an Installation Inspection Record

Door Frame Installation and Operation	Comments/Actions	Max score	Actual score
Door leaves removed from door frame prior to fitting, protected and stored safely.			
Sill firmly supported on base oversite/ brickwork in centre of French doors to ensure shoot-bolt locking cannot be levered free.			
Door frame fitted level and plumb in both planes, checked to ensure no more than 2mm variation from level or plumb and no more than 2mm deflection in the height of the door jambs or across the width of the head or sill.			
Door leaves fitted following all other construction works to prevent damage.			
Door leaves hung in door frame level and square and any overlap of leaf to frame is consistent around the perimeter of the door leaves and is no less than the minimum specified by the manufacturers.			
Check glazing of door leaves by removing beads and ensuring all glass units are toe and heeled correctly and the weight of the door glazing is effectively transferred to the hinges. Check there is no distortion of the door leaf due to weight being incorrectly transferred to hinges. A manual check by loading the non-hinge edge of the door leaf and confirm the door leaf does not distort.			
Has the installation team explained the correct operating and maintenance requirements of the products installed?			
General comments:	Maximum possible score		
	Actual score		

ANNEX D:

Sample of an Installation Inspection Record

Glazed Roof	Comments/Actions	Max score	Actual score
Ring beam bedded on 2 lines of suitable sealant and double sealed where it abuts the existing building. If necessary remove ring beam cloaking to inspect.			
Ring beam is correctly attached to the wall and door frames at maximum 450mm centres. Confirm ring beam is sitting on corner posts and mullions etc. and is installed straight and level. These checks should be carried out prior to glazing.			
Ring beam joints and screw heads correctly sealed inside and out.			
If box gutter is used, check installation and sufficient support has been provided. Check box gutter correctly sealed to existing building (jointed to existing gutter, flashing to existing roof etc.)			
Roof glass units correctly fitted using retaining clips where necessary. Are gas ports, if fitted, located at the lower edge of the glass unit?			
Check fitting of sealed unit end caps using a suitable sealant.			
Check muntin bars are cut to the correct length and installed using a suitable sealant.			
Check installation and sealing of rain baffle(s).			
Check installation and sealing of ridge cap.			
Check rafter cap fitted and jack rafter caps cut and scribed to the hip and correctly sealed.			
Check fitting and sealing of crown bung.			
Is flashing installed into existing brickwork by at least 25mm and correctly into soakers and cavity trays if fitted?			
Check flashings are sealed correctly with an appropriate sealant or mortar.			
Have all lead flashings been treated with patination oil?			
Check installation of guttering and downpipes.			
Is the site clean and tidy with all debris and waste removed?			
Has the installation team explained the correct operating and maintenance requirements of the products installed?			
General comments:	Maximum possible score		
	Actual score		

ANNEX D:

Sample of an Installation Inspection Record

Health and Safety	Comments/Actions	Max score	Actual score
The People on site			
Are the installation team trained and competent to carry out all tasks on site e.g. dealing with asbestos and danger thereof, working at heights and correct use of equipment, erection and use of scaffold towers, erection and use of easi-dec etc.			
Is correct documentation for any sub-contractors complete and demonstrates trained and competent operatives are employed.			
Is correct PPE being used by all personnel on site and is it in good condition?			
Are regular toolbox talks given to promote safe working practices?			
The Finished Building			
Does the finished building pose any danger to the health and safety of persons in or about the building e.g. broken glass etc.			
Has safety glass been installed in the appropriate locations detailed in the Building Regulations and are glass marks visible?			
The Process			
Has access equipment detailed on the survey been used during the construction?			
Has all access equipment been erected and used correctly?			
Is the CDM pack complete and a copy available on site?			
Have only 110V or battery powered electrical tools been used on site?			
General comments:	Maximum possible score		
	Actual score		

ANNEX D:

Sample of an Installation Inspection Record

Inspection Summary		
Inspection Stage	**Max. possible score**	**Actual score**
General		
Wall Frame Installation		
Door Frame Installation and Operation		
Glazed Roof		
Health and Safety		
Overall Inspection Rating		
Overall % Rating (actual/max. possible score) x 100		

Review of results from Summary of Inspections and Action Points		
Rating score %	**Action required**	
	Future Inspections	**Further Action**
0 – 60%	Within 1 week	Identify basic training requirements
60% – 80%	Within 3 weeks	Identify enhanced training requirements
80% +	Normal frequency, ideally approximately 1 month	On-going refresher training and new product training as necessary

Contract Manager's Name		**Installation Team Leader's Name**	
Signature		**Signature**	
Date		**Date**	

ANNEX E:

Generic Risk Assessment

This matrix identifies the type of hazards that can be identified within the scope of the activity and as such is a generic guide. The risks may be perceived differently and the control measures may or may not be suitable. Each project should evaluate the hazards and suitability of controls within the sphere of their operation and not take these as actual without examination

Item	Work Area	Hazard	Risk	Risk Level	Control Measures	Residual Risk Level
1	Excavations	1. Excavation 2. Underground services 3. Manual handling	• Collapse of excavations • Electrocution and disruption from striking underground services • Muscular-skeletal injuries	H	• Batter-back all excavations over 600mm deep • Use a concrete raft system to prevent the need for excavations over 1000mm deep • Obtain underground services drawings from the principle contractor • Ask the Principle Contractor to identify any underground services • Scan the excavation area with radio detection equipment to locate any detectable services • Person using radio detection equipment to be trained and hold a valid certificate • Locate the services by hand digging only, using the radio detection as the dig progresses • Excavators only to be used after services have been located and not within 1m of an electrical or gas service • Excavator operators to be CITB, CTA trained • Dumper drivers to be CITB, CTA trained	L
2	Offloading and transporting materials	1. Manual Handling 2. Glass	• Muscular-skeletal injuries • Cuts and lacerations • Dropping materials	M	• Off-load materials as close to the workface as possible • Use 25kg bags of cement • Use wheelbarrows or hods to transport bricks/blocks, concrete etc. • Remove tripping hazards on route to the workface • Glazing over 1.4m^2 to be carried by 2 people • Larger PVC-U frames to be carried by at least 2 people • Heavy duty gloves required for handling glass and blocks/ bricks	L
3	Concrete works	1. Concrete 2. Steel mesh (where required)	• Cement burns	M	• Use appropriate protective footwear • Use PVC gloves • Ensure appropriate eye/face protection • Immediately wash off any cement products that come into contact with the skin • Use bolt croppers to cut any steel mesh	L

ANNEX E:

Generic Risk Assessment

Item	Work Area	Hazard	Risk	Risk Level	Control Measures	Residual Risk Level
4	Brick/ Blockwork	1. Cutting bricks/ blocks 2. Use of cement 3. Ties	• Eye injuries • Dust and particles from cutting wheels • Dermatitis • Lacerations from fish tail ties	H	• Impact resistant goggles to be used when cutting cold chisels or cutting wheels • Dust mask to be worn when using cutting wheel • Heavy duty gloves required to prevent contact with cement/ mortar • Use tie wires instead of fish tails	L
5	Cavity tray insulation	1. Working at height 2. Cutting out brickwork/ blockwork/ masonry 3. Cement	• Falling from height • Flying particles • Dust • Movement of the remaining brickwork/ blockwork/ masonry • Cuts • Dermatitis	H	• Working at height to take place from a tower scaffold with handrails. Step ladders should not be used for this work. • Instructions on the safe erection of tower scaffolds is required before the scaffold is erected • Only persons trained on abrasive wheels are permitted to replace the abrasive wheel of an angle grinder or petrol driven disc cutter • Impact resistant goggles must be worn when cutting out the brickwork/blockwork/masonry • A dust mask must be worn if an abrasive wheel is being used to cut out the brickwork/blockwork/masonry • No more than 750mm (linear) of brickwork/blockwork/masonry to be removed at any one time • Heavy duty gloves required to prevent cuts and dermatitis	L
6	Erection of uPVC	1. Manual handing 1. Working at height	• Muscular-skeletal injuries • Falling from height	H	• A minimum of 2 people are required to place PVC-U sections and doors • Use the Access Ultra' ladder to access to roof level • All ladders (including step-ladders) to be used on firm, level surfaces • No access beyond the 3rd step from the top of the step-ladder • Have scaffolding erected by qualified scaffolders if the distance from the floor slab to the outside ground level exceeds 1m	L
7	Leadworks	1. Lead 2. Chasing out for lead 3. Working at height	• Absorption of lead • Dust and particles from chasing out • Working at height	H	• No person under the age of 18 to work with lead • Impervious gloves are required to prevent absorption of lead • Skin should be washed before eating, drinking, smoking or using the toilet • Blood tests required at least every six months for those using or handling lead • Goggles and dust masks required when using cutting wheels • Step-ladders used on firm, level surface • No access beyond the 3rd step from the top of the step-ladder	L

NOTES

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