

REGIONAL DEVELOPMENTS

DESIGNING WITH THE VERNACULAR IN RELATION TO PLANNING & PASSIVHAUS - AN IRISH PERSPECTIVE

Irish Vernacular Design

The typical Irish cottage that was built and continuously used between the mid-nineteenth and mid-twentieth centuries (around 1860-1960) witnessed the turbulent period when Ireland transformed from being part of the Union with Britain to an independent republic [McGarry 2017]. The typical design of this cottage together with explanation is shown below (Figure 1):

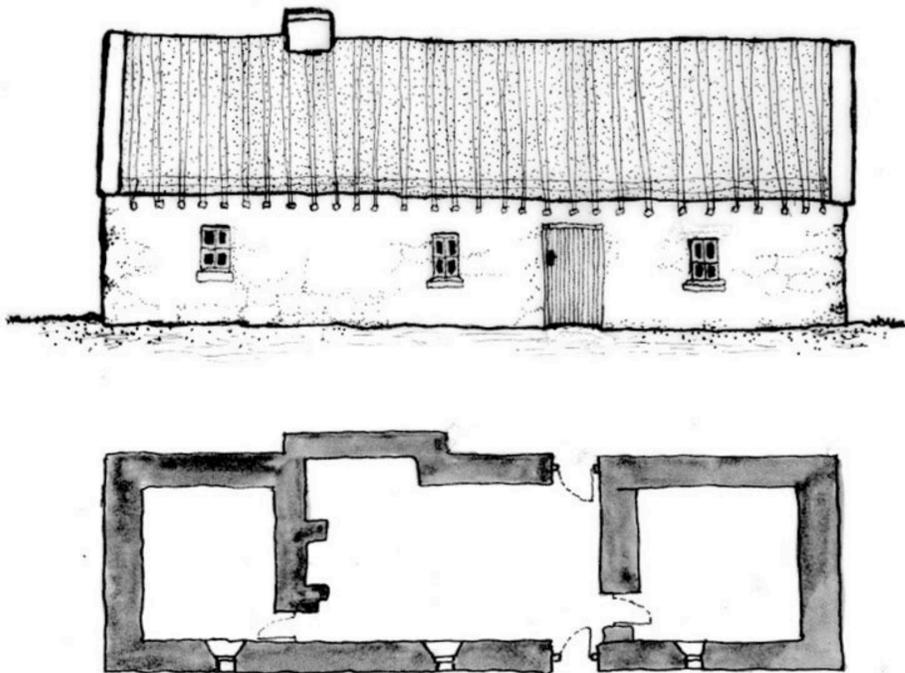


Figure 1: The traditional Irish cottage prevalent across the northern half of Ireland is characterised by a central living area which contained the principal cooking, eating and sitting space. This space contains a projecting 'outshot', which housed a bed. This central space is then flanked on either side by two bedrooms (drawing by Dr Marion McGarry and used with permission)

- If we look at the Heat Loss Form Factor of a cottage of this type using the following calculation:

Heat Loss Form Factor = Heat Loss Area / Treated Floor Area
 Treated Floor Area = 39.8m²
 Heat Loss Area (total surface area of the thermal envelope) = 264.11m²

Therefore Heat Loss Form Factor = 102.9m² / 39.8m² = 6.636

The Heat Loss Form Factor is a number generally between 0.5 and 5, with a lower number indicating a more compact building. Passivhaus buildings aim to achieve 3 or less. Once the Form Factor is over 3, achieving the Passivhaus Standard efficiently becomes noticeably more challenging. [Burrell 2015].

It is not surprising that the Heat Loss Form Factor is high; this is a combination of the building being detached, the low treated floor area compared to the surface area which includes the high thickness of walls, the outshot projection and the thermal envelope at roof level. The resulting heat loss form factor also conforms to the accepted generality that the larger the building the easier it is to achieve the Passivhaus standard.

Rural House Design Guidelines - Form

Many Counties across Ireland now have Rural Design Guidelines. These started with the Cork Design Guide [Cork CoCo 2004] and were replicated on a County-by-County basis where the main concepts in rural house design were copied with specific local planning requirements also included. The example I will be referring to in this poster is the Mayo Rural Housing Design Guidelines published by Mayo County Council [Mayo CoCo 2008]

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The principles of rural house form in County Mayo can be summarised as follows:

- Narrow depth plan (typically around 6.5-7.5 metres in depth)
- The mass broken into several smaller forms rather than one large form (Figure 2) [Mayo CoCo 2008]:

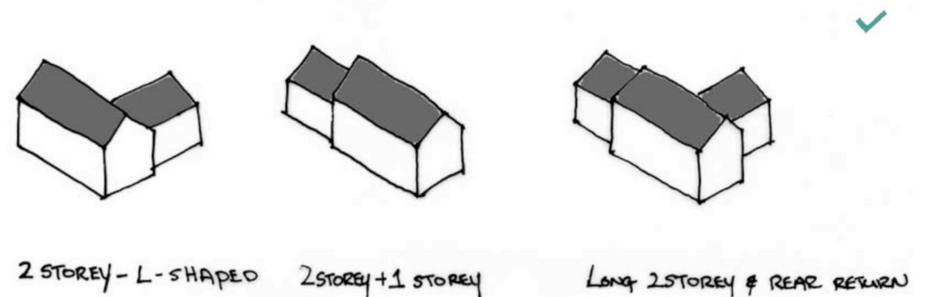


Figure 2: Mayo County Council guidelines on breaking larger mass down into several smaller forms [Mayo CoCo 2008]

Contemporary design solutions adhering to the rural house planning guidelines

Below is an example of a project the author is currently designing that adheres to the Mayo County Council Rural House guidelines and was recently granted planning permission. (Figure 3 (left)):

If we therefore prepare a similar Heat Loss Form Factor calculation we find:

Treated Floor Area = 173.9m²
 Heat Loss Area (total surface area of the thermal envelope) = 632.45m²

Therefore Heat Loss Form Factor = 632.45m² / 173.9m² = 3.637

The increase in the Treated Floor Area (resulting in the increased size of house due to current living requirements) whilst retaining the same scale, proportions and geometry has resulted in an improvement in heat loss form factor of practically double

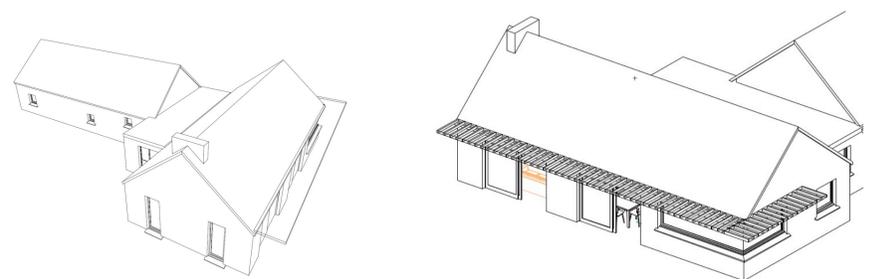


Figure 3: 3D View of house design by author showing larger mass broken down into several traditional forms

It is fortunate that many rural design principles align directly with the Passivhaus criteria; in particular the requirement to adopt 'simplified' forms, materials and detailing greatly helps the requirement to detail with Thermal Bridge Free Design:

"The general approach should be one of simplicity, avoiding over-elaboration of elevational treatments and using a restricted palette of details and materials." [Mayo CoCo 2008]

There are however a few areas that need to be carefully detailed in order to balance the rural house guidelines with the Passivhaus criteria. These include as an example the detailing of a roof (Mayo Rural Design guide [Mayo CoCo 2008] (Figure 4)):

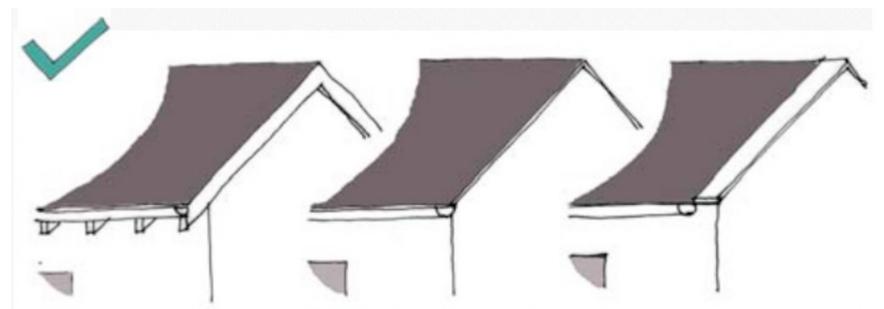


Figure 4: Mayo County Council guidelines on suitable roof to wall junction details [Mayo CoCo 2008]

The general requirement by Mayo County Council to 'clip' back the eaves and soffit typically to 75mm means that the common method of having a 'deeper' eaves as a shading element to reduce overheating would not be acceptable.

This is why in our 'contemporary' traditional design (Figure 3. right) we have kept this minimal soffit and have created a shading element in the form of a brise-soleil that is separate to the principal roof form.