Semi-Detached Dwelling, Ireland

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Reflect 140 House by Cygnum Timber Frame
Built throughout Ireland

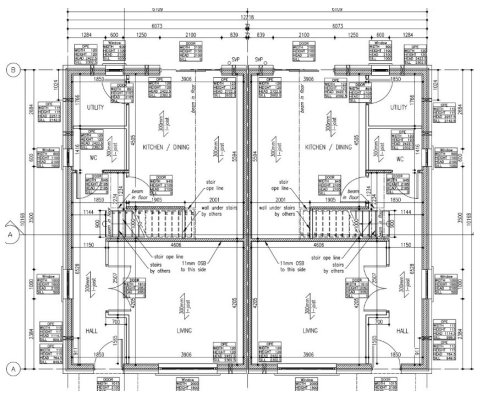
Cygnum Timber Frame Houses (prefabricated off site)

Existing Baseline Design

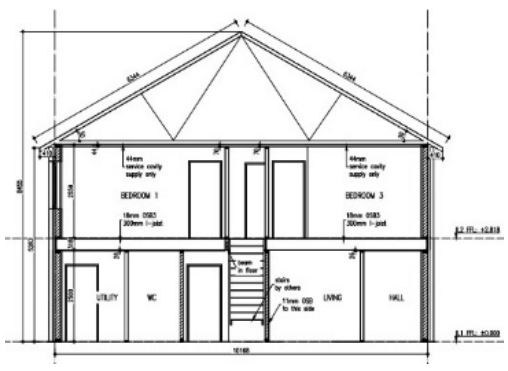
Two storey platform frame house largely constructed off-site. External wall panels are load bearing timber with non-loading bearing brick outer leaf, with internal load bearing walls at ground floor only. OSB boards provide racking resistance. Service cavities are formed with timber battens. Floors are I-Joists with OSB subflooring. Roof is constructed of prefabricated timber roof trusses. Timber Volume 15.1 m³

Design Modified to DfD/A and DfD/R

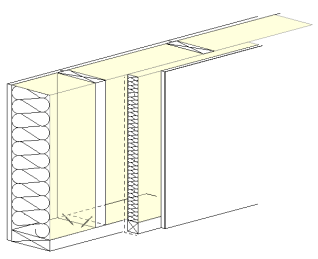
Rather than preassembled panels, the design is reimagined as a stick build platform frame construction. Following extended use through a more flexible layout the intention is that the building would be disassembled into individual timber elements. To maximize potential reuse, these elements will be kept as close to their original size as possible and possibly oversized to allow for spacing as per Eurocode 5 on reassembly.



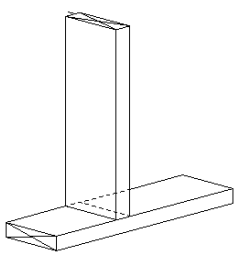
1A – Cygnum Floor Plan



1B – Cygnum Building Section



1C – Build up of Cygnum Wall (Walsh)



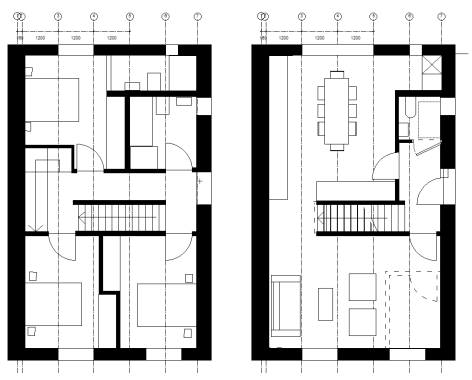
1D – Stud to Bottom Rail (Walsh)

Obstacles to DfD/R

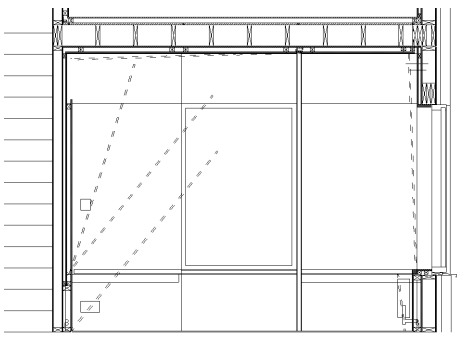
- Configuration of spaces makes alternative use difficult
- Service runs are not organised to enable replacement/maintenance
- Large panelized system means reuse of panels must be highly specific
- Current general layout plan leads to high variability of unit lengths (1A)
- Highly engineered reducing range of potential uses. For example, roof structure difficult to adapt for conversion of roof (1B)
- Some elements such as studs too narrow to allow for screw fixing in certain locations (1D)
- First floor formed of I-joists are unlikely to be reusable
- T&G flooring difficult to remove individually
- Floor cassettes nailed very frequently making removal difficult

45% of Wood for Reuse*

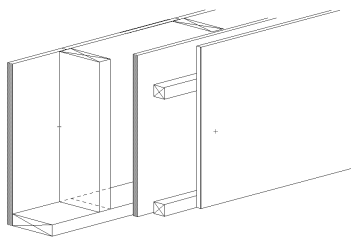
*** Solid Timber over 1m**



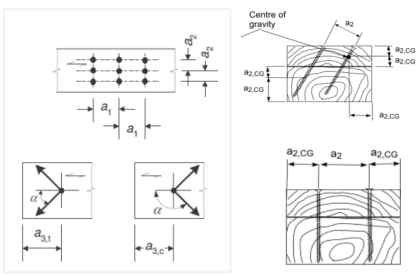
2A - Revised Floor Plans (Walsh)



2B – Revised Partial Section (Walsh)



2C – Revised External Wall Assembly (Walsh)



2D – Eurocode Spacing Requirements

Improvements to DfD/A and DfD/R

- Layout allows for future reconfiguration (2A)
- Framed roof sized for loading allows future use of roof space
- Services centralised
- Use of full-size standardized materials for future market, reducing difficult to reuse small sections (2B)
- Select more robust materials with greater longevity to increase opportunity for reuse, such as solid joists rather than Masonite I Joists
- Locally removable internal lining to allow for adaptability of services to extend lifespan and reduce waste. (2B/2C)
- Determine the frequency that connections can be made in a stud or joist as a result of reuse through a review of Eurocode 5 (2D).
- Potentially utilize wood nails.
- Prepare Material Inventory & Disassembly Plan

65% of Wood for Reuse*

*** Solid Timber over 1m**

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