

# The Design and Build for **PERFORMANCE:** Passive house

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# Passive House: OCC's Journey

## OVERVIEW



**OCC's Progress to date**



**Strategies Employed**



**Challenges & Learnings**



**Residential Case Study**



# PROGRESS

## 01 Identifying the problem

In 2021 Traditional Building Delivery Was Not Achieving Results for OCC, Buildings overheating & Buildings not performing as designed



## 02 Implemented Passive House lead designs

Invested in case study housing estate, Thornhill Kinvara using passive house as the design basis for ICF homes.

## 03 Construction Process Improvement

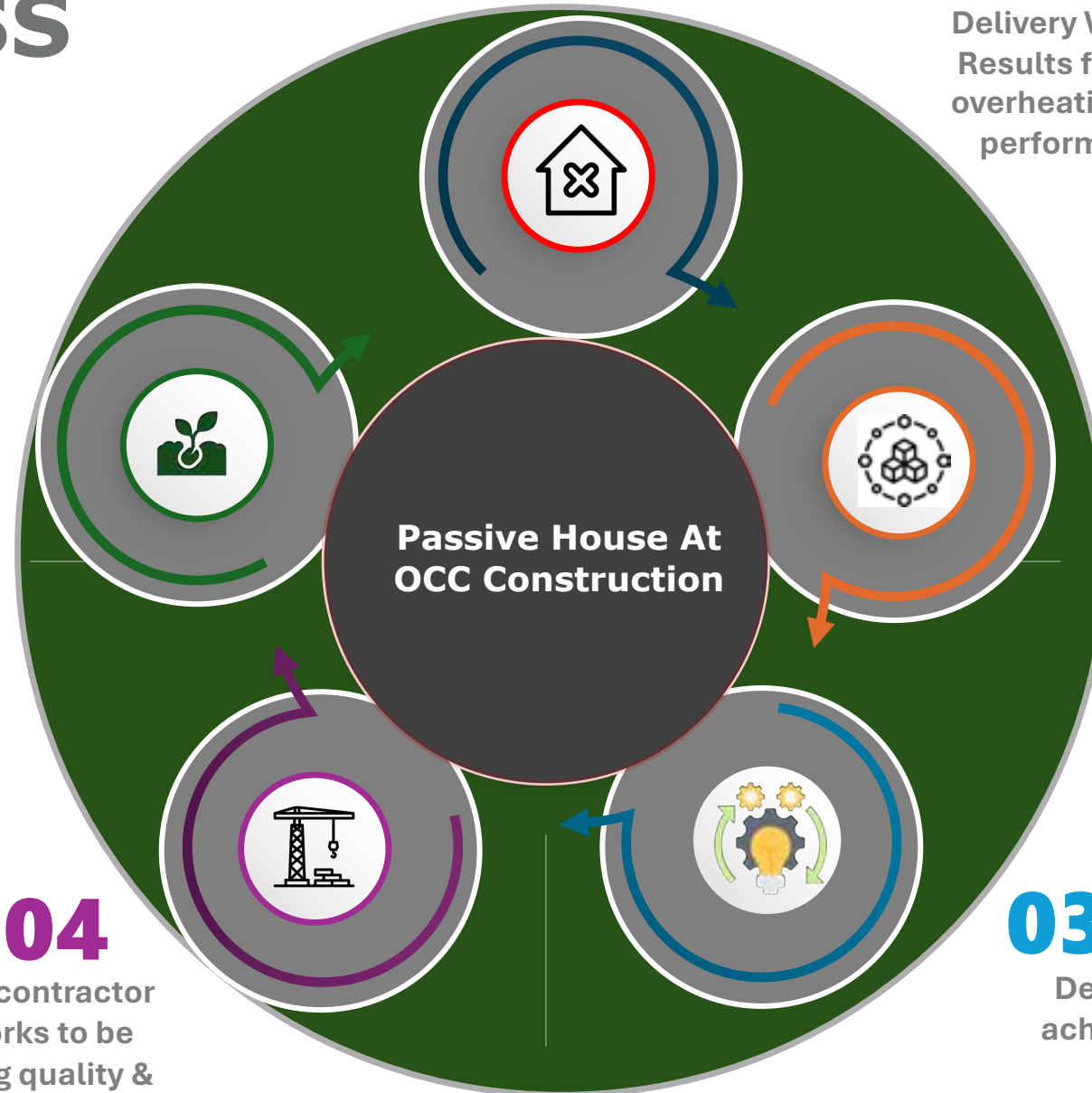
Developed our own LGS system to achieve better air-tightness results.

## Sustainability Improvement 05

Utilising Passive House principals to save energy & waste on all projects, building efficiency into design procurement & delivery.


## Design & Delivery Process Improvement 04


Collaborative planning from contractor & design team to reduce works to be carried out on-site, improving quality & results.






# WHY CHANGE TO PASSIVE VS NZEB

 **Cost Control** – Greater Cost certainty for the end user on energy demand, property value increased with certification.

 **Superior Quality, Testing & Certification** – All materials that are passive certified manufactured to factory tolerances tested and certified before site construction guarantee results.

 **Sustainability**– Advanced modelling decreases overspend on building components. Buildings achieving lower energy demand.

 **Project Risk Avoidance** – PHPP Design review carried out pre-construction avoids overheating & performance issues at handover

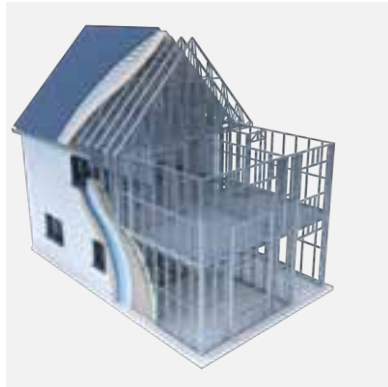


# CURRENT STRATEGIES EMPLOYED

OCC Construction has invested significantly in MMC, aiming to maximise the capabilities of latest technology in materials and modern methods of construction to exceed Passive House Certification

## FACADE IMPROVEMENT

## OPERATIONAL IMPROVEMENTS



### LIGHT GAUGE STEEL

OFF-SITE  
CONSTRUCTION 3-5+  
STORIES

THERMAL BRIDGE  
FREE CONSTRUCTION



### ICF

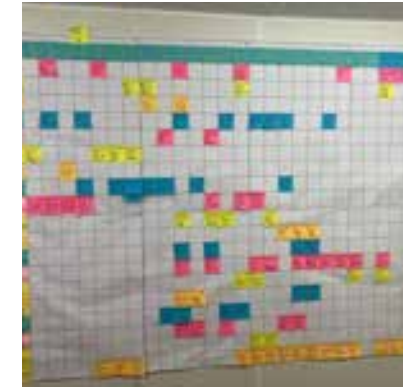
ON-SITE  
CONSTRUCTION 1-2  
STORIES

THERMAL BRIDGE FREE  
CONSTRUCTION



### AIR TO AIR HEATING SYSTEMS + PV

NILAN COMPACT P  
SYSTEM WITH SMART  
ELECTRIC HEATING &  
PV PANELS

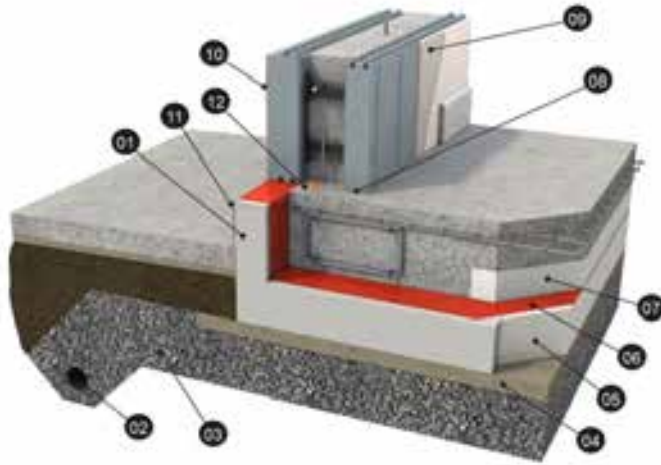


### LEAN LAST PLANNER INTEGRATING PASSIVE HOUSE

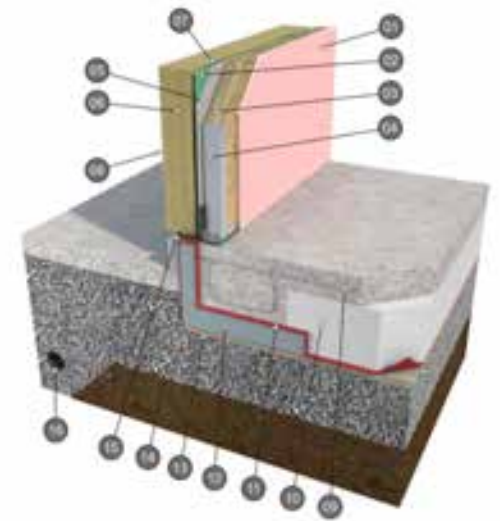
EDUCATE ALL SITE TEAM  
ON THEIR COMMITMENT TO  
AIRTIGHTNESS &  
THERMAL BRIDGE  
CONSTRUCTION

CO-ORDINATING TRADES  
TO PREVENT RE-WORKS.

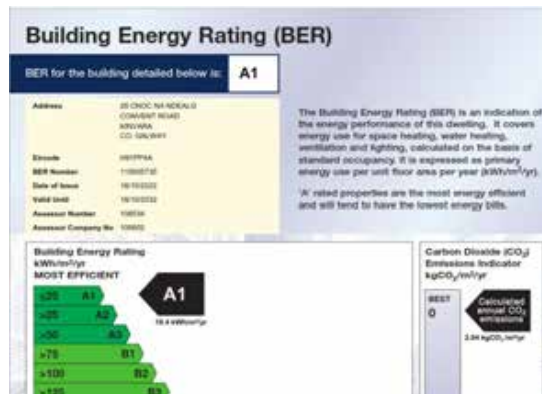
# MMC HOUSING – KINVARA CASE STUDY



ICF Wall Build-up



LGS Wall Build-up





# MMC GALWAY CASE STUDY: DAY 0





# MMC GALWAY CASE STUDY: DAY 1





# MMC GALWAY CASE STUDY: DAY 2



# MMC GALWAY CASE STUDY: DAY 3





# MMC GALWAY CASE STUDY: DAY 4&5

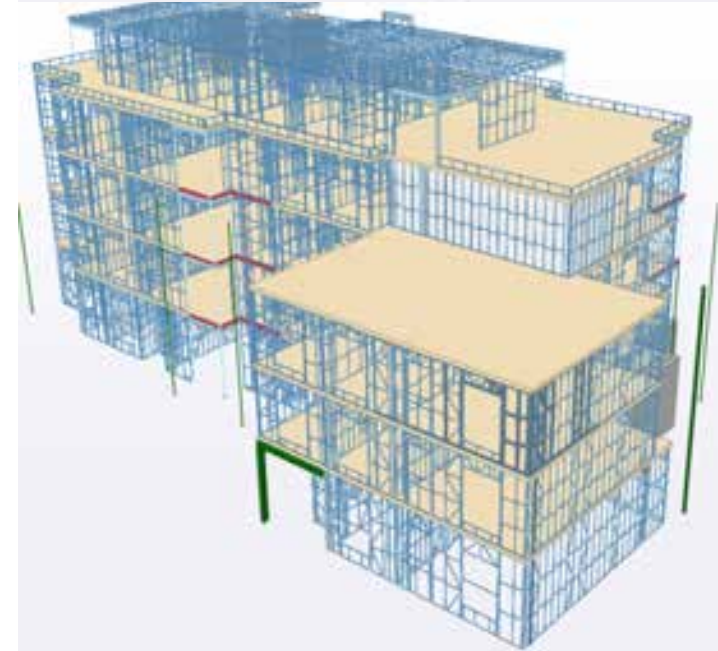
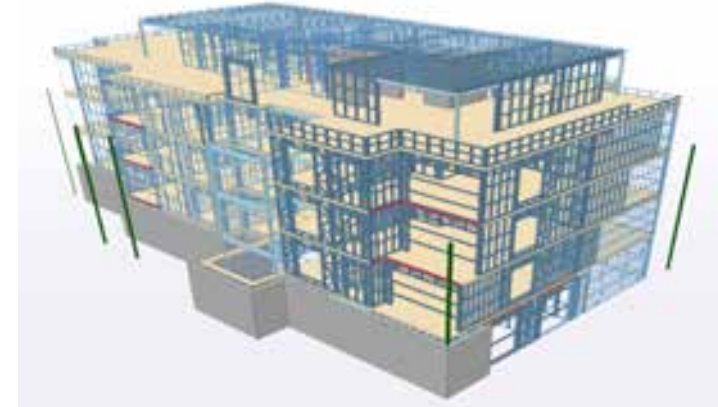






# CHALLENGES & LEARNINGS

- 1. Design for Passive manufacture assembly philosophy –** Greater collaboration from the contractor & design team at planning stage allows a rationalised & efficient design approach, minimises re-works.
- 2. Design Freeze –** Detailed review of pre-construction drawings, Air tightness & thermal details ensuring all building components are accounted for is worth 4x time on-site.
- 3. Continuity & Repetition –** Optimisation of output easily delivering by the same passive house design, results get better each time the site-team works together.
- 4. Education –** Full site team need to understand high level passive house principals, buy-in & commitment required from all trades to achieve air tightness results.



# MMC CAMPUS – MOUNT LUCAS





# SYSTEMS IN USE

1. **3D Primary Structural Systems** – Off-site volumetric buildings.
2. **2D Primary Structural Systems** – Off-site panelised buildings, LGS, Timber Frame.
3. **Pre-Manufactured non-systemised Components** – Piling, ground beams, columns, floorslabs, staircases.
4. **Additive Manufacturing** – 3D Concrete printing.
5. **Non-structural Assemblies** – Bathroom Pods, Utility rooms, M&E assemblies.
6. **Traditional Building Product optimisation** – Pre-cut materials, Insulated concrete formwork.
7. **Site Process Optimisation** – Bim Connected Lean Construction.



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