

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

28<sup>th</sup> November 2024, University Of Galway



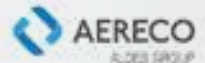
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# Simon Bell

HLM Architects



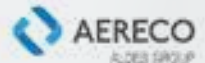
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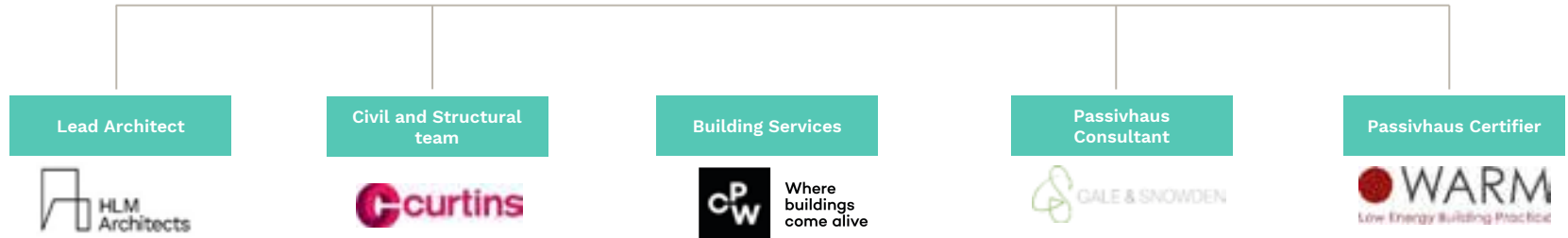
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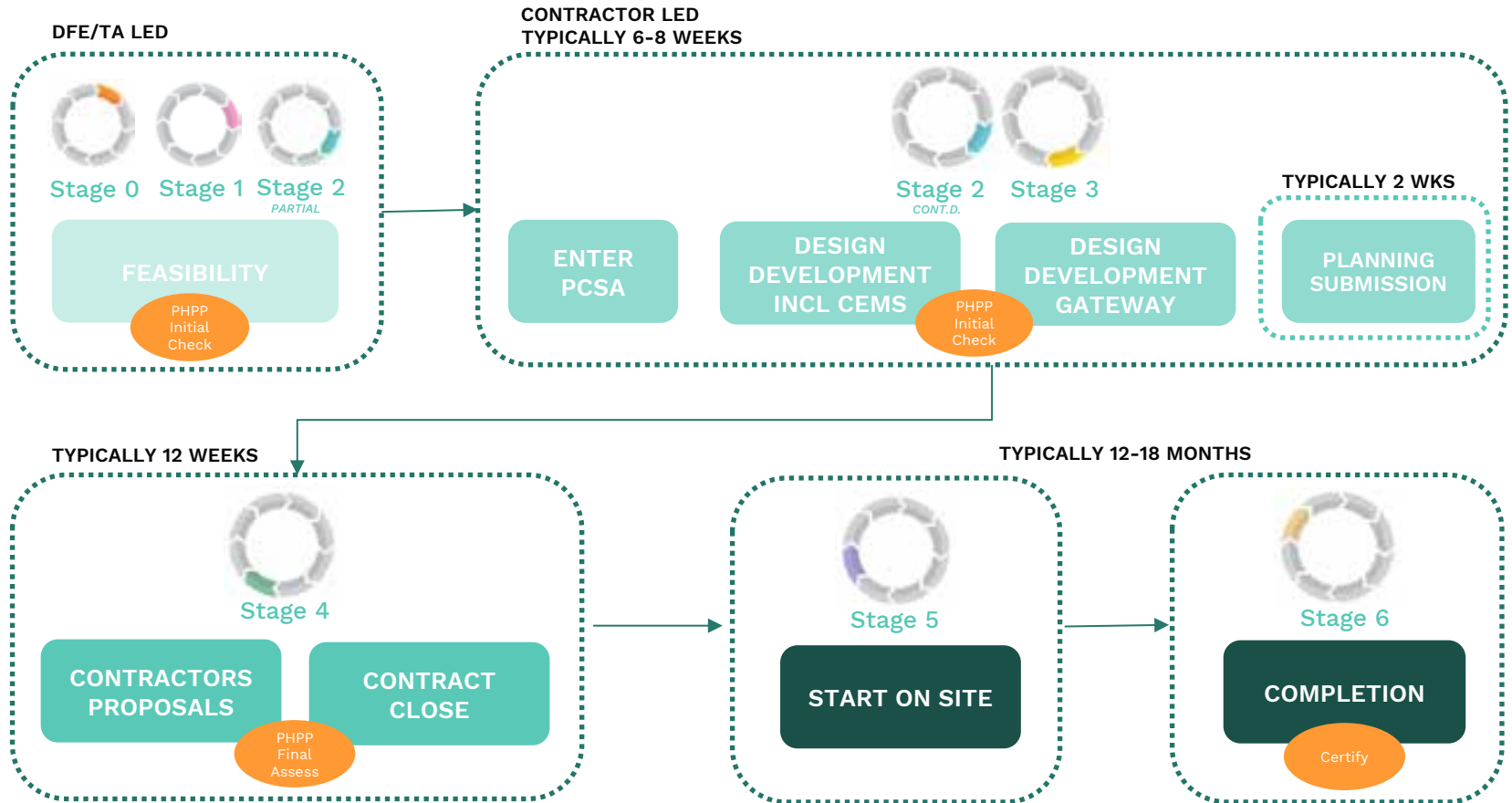
# Trent View College

# CONTRACTOR LED DESIGN & BUILD TEAM



Appointed April 2021, through DfE Construction Framework, MV Band

# DfE PROCESS





# First Uk Passivhaus SEND School inc Hydrotherapy Pool



112 Post 16 pupil college

Heating Demand  
**13.8 kWh/m<sup>2</sup>a**

Heating Load  
**9.8 W/m<sup>2</sup>**

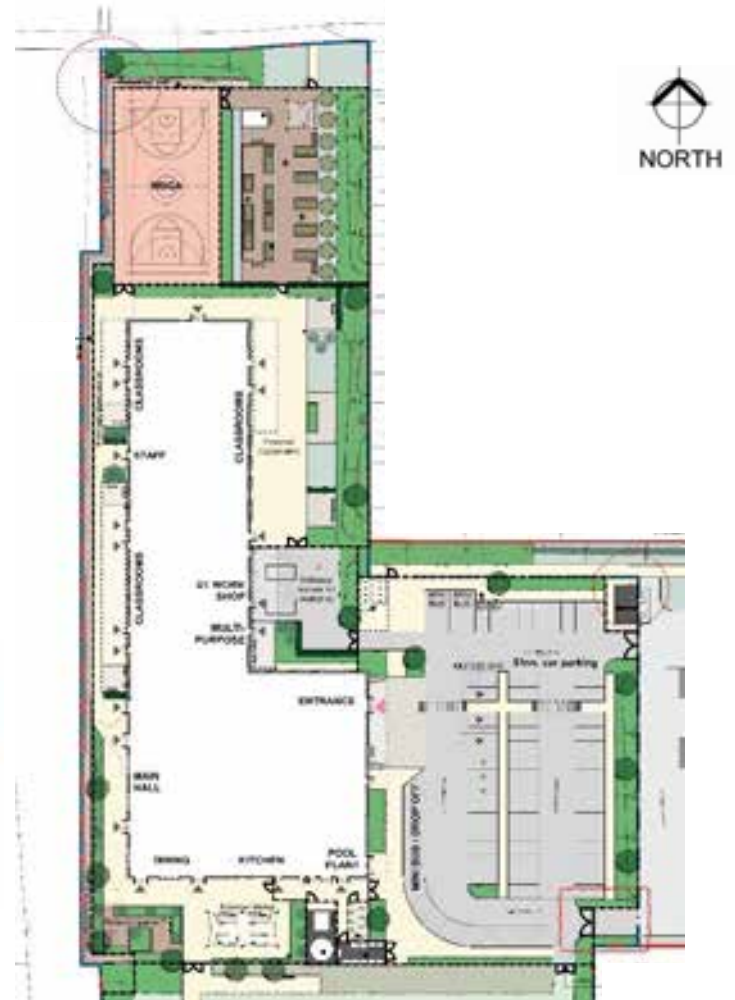
Airtightness  
**0.5 ach n50**

Overheating  
**0%**

Primary Energy Renewable  
**60 kWh/m<sup>2</sup>a**

## Orientation

- Inherited Concept Design
- Orientation not optimal
- Footprint optimised as much as possible
- Passivhaus must be considered from project inception to ensure it can be delivered cost effectively



## The envelope

Floor U-Value 0.1 W/m<sup>2</sup>K

- Fully insulated raft slab

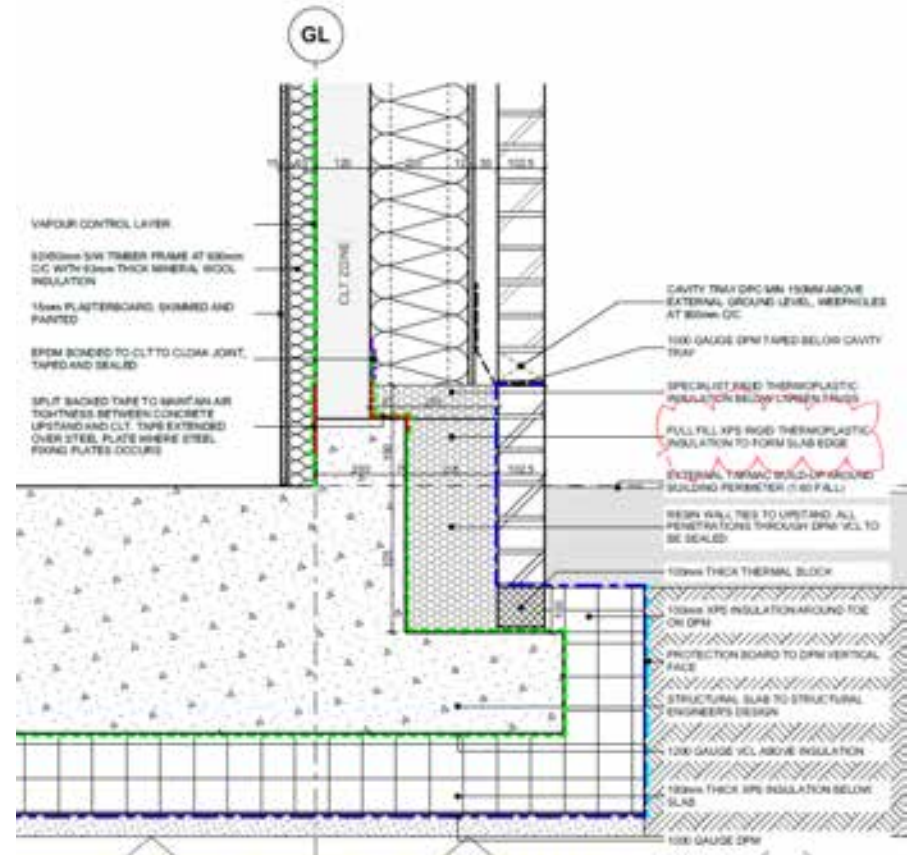
Walls – U-value 0.115 – 0.15 W/m<sup>2</sup>K

- Structural CLT external walls
- Timber I Joist supporting timber and brick cladding,
- Triple glazed windows and doors,

Roof – U-Value 0.1 W/m<sup>2</sup>K

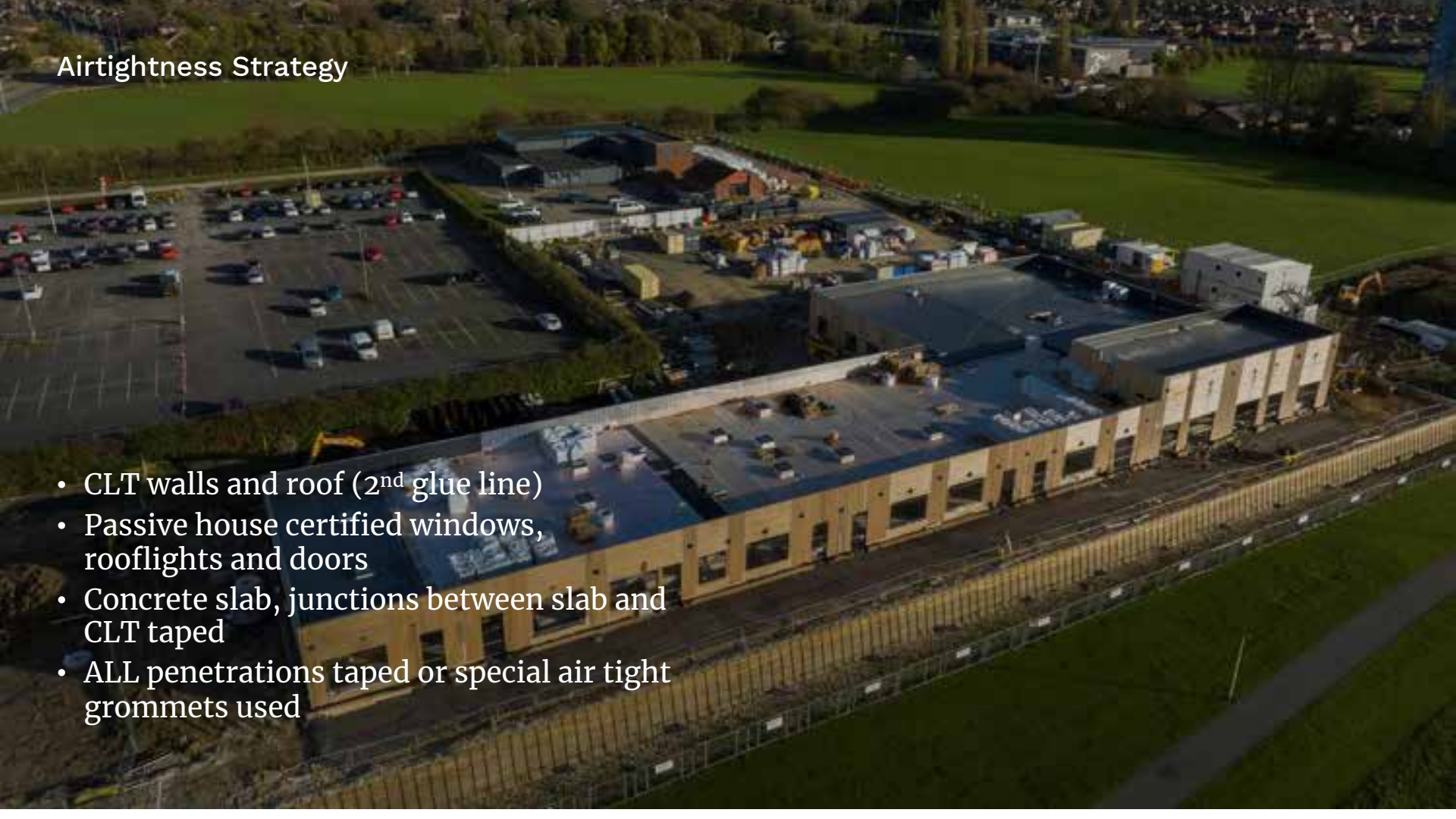
- Structural CLT roof cassettes
- Steelwork internally to support roof, internal metal stud partitions for speed

Door / Windows - U-Value min 0.8W/m<sup>2</sup>K





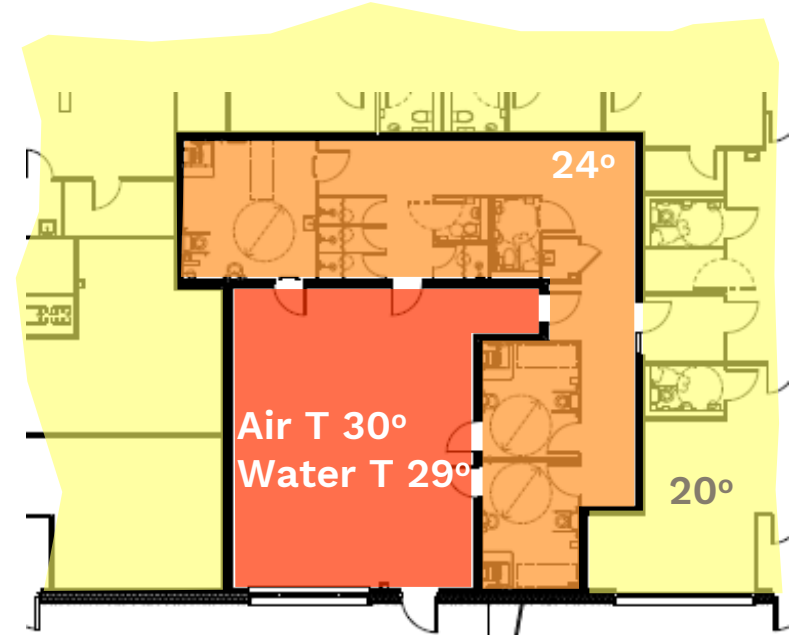
## Airtightness Strategy

An aerial photograph of a large industrial building under construction. The building has a long, low profile with a flat roof and light-colored exterior walls. A parking lot filled with cars is visible to the left. The surrounding area includes green fields and some trees. The image is used as a background for a presentation slide about airtightness strategy.

- CLT walls and roof (2<sup>nd</sup> glue line)
- Passive house certified windows, rooflights and doors
- Concrete slab, junctions between slab and CLT taped
- ALL penetrations taped or special air tight grommets used

## The Hydrotherapy Pool

- Hydrotherapy Pool deemed a process element and is excluded from the PHPP model
- Qualitative assessment undertaken on pool area
- Pool plant adjacent to pool to minimise heat loss through ducts/pipes
- Internal walls (U-Value  $0.3\text{W/m}^2\text{K}$ ) inc airtightness membrane to minimise heat loss between pool & wider school
- Air temp close to water temp to reduce evaporation rates, reducing air volumes required to maintain RH –
- Enhanced hygiene criteria frsi =  $>0.85$



## MEP Strategy

### Space Heating


- ASHP via MVHR
- Boost panels in classrooms

### DHW

- ASHP for Pool and Kitchen Areas
- Point of use direct electric in classroom areas

### Ventilation

- 85% efficient AHU with Heat Recovery
- Supply and extract to each room
- Sensor controlled Volume Air Flow Dampers to each classroom
- Boost function in classrooms to address SEND requirements



Trent View College





# Hydrotherapy Pool





# Vehicle Workshop







- Delivered without any DfE derogations
- Airtight building
- Energy Efficient Building
- Comfortable building
- Certification almost over the line
- Happy Client and Building Users



# Thank you

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