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External cladding assessment

This memo provides the results following a desktop assessment of the proposed replacement of the existing cladding system at the Lighthouse, Manchester.

Minimum specifications for the new proposed cladding systems are recommended to match the performance of the existing systems.

Existing cladding system

The existing facade construction across the scheme comprises:

- 12.5 mm plasterboard (assumed normal density 640 kg/m³) with 3 mm internal skim
- 60 mm Internal framing system (clear cavity)
- 150 mm fibreglass insulation quilt (bridged by Steel Framing System)
- 10 mm Cementitious sheathing board
- 60 mm Rocksilk R545 Mineral Wool insulation slab (bridged by horizontal top hat profiles)
- Tyvek Supro Breather membrane

The existing facade system has two external finishes installed in front of Tyvek breather membrane, as summarised in Table 1.

Table 1 Existing external facade finishes

External finishes	
Aluminium rainscreen cladding	Timber weatherboard cladding
• 60mm ventilated cavity (bridged by vertical top hat profiles) • 35mm AME Proteus HR rainscreen cladding panels	• 42mm ventilated cavity (bridged by vertical timbers) • 20mm timber cladding (assumed surface mass of 9.8 Kg/m² (eg plywood)

Cladding replacement proposals

The following constructions are to be retained from the existing facade system:

- 3 mm internal skim finish
- 12.5 mm plasterboard (assumed normal density 640 kg/m³)
- 60 mm Internal framing system (clear cavity).

The proposed new constructions will be built off these retained internal elements, the constructions of which are summarised in Table 2.

Table 2 Proposed facade finishes

Proposed new external finishes	
Aluminium rainscreen cladding	Timber weatherboard cladding
• 150 mm mineral wool insulation quilt (bridged by Steel Framing System) • 10 mm cementitious sheathing board • 60 mm mineral wool insulation slab (bridged by horizontal top hat profiles) • Breather membrane • 60 mm ventilated cavity (bridged by vertical top hat profiles) • 3 mm aluminium rainscreen cladding panels	• 150 mm mineral wool insulation quilt (bridged by Steel Framing System) • 10 mm cementitious sheathing board • 60 mm mineral wool insulation slab (bridged by horizontal top hat profiles) • Breather membrane • 42 mm Ventilated cavity (bridged by vertical top hat profiles) • 10 mm Cedral fibre cement planks

Assessment results

Predicted sound insulation performance of existing facade constructions

An assessment to estimate the expected performance of the existing facade construction has been undertaken in the numerical modelling software Insul.

The expected performance of the overall existing cladding system for both the rainscreen and timber weatherboard cladding has been presented in Figure 1.

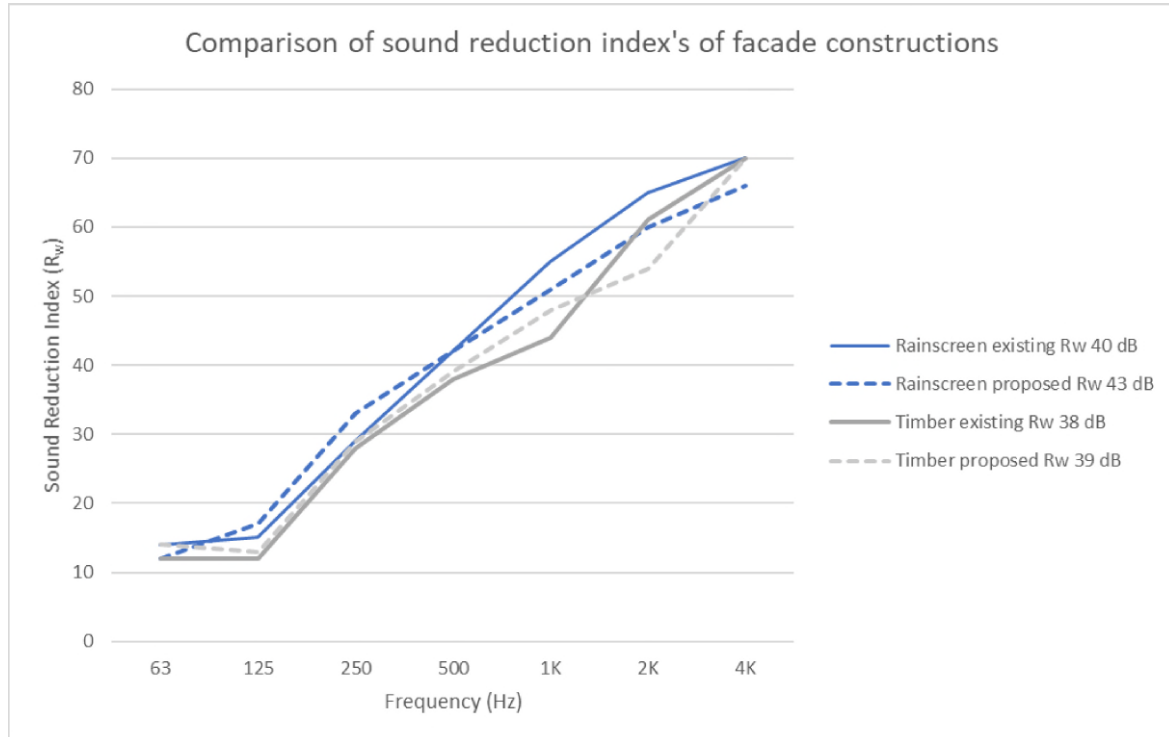


Figure 1 Prediction of cladding performances for proposed and existing timber and rainscreen constructions

Modelling assumptions/guidance

Figure 1 shows that while there is some variation in sound reduction performance over individual frequency bands, improvements in the overall sound reduction for the proposed constructions are expected subject to the following specifications:

- The 150 mm mineral wool insulation quilt is specified to achieve a density of at least 30 kg/m³
- 10 mm Cementitious sheathing board is specified to have a density of at least 1200 kg/m³
- 60 mm breather membrane should be specified to achieve a density of at least 45 kg/m³
- Cedral fibre cement planks should have a surface mass of at least 10 kg/m²
- Both the rainscreen and timber cladding panels should have minimal airgaps, and equivalent to those of the AME Proteus HR system. I.e, gaps where the panels clip to the framing system only.