



**Warblington School – Planning Additional Information
Rev. P1**

C09314

September 2021

**Read in conjunction with:-
The Heritage Statement
The Planning Supporting Statement**

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P1	Listed Building Consent	September 2021

Prepared by:

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Property name: Warblington School

Property address: Southleigh Rd, Havant PO9 2RR

Works: BACs System Buildings. BBI01 Ventilation, Thermal Comfort and Indoor Air Quality.

1.0 Feasibility

1.1 Introduction

The feasibility prepared in advance of the submission for town Planning and Listed Building Consent, is not in a format which is suitable for submission as part of this application. But listed below is a summary of the detailed considerations:-

- Introduction and description of the historic a Listed building status of the buildings
- Brief to consider options to improve the internal environmental conditions within the BACs constructed buildings
- A summary of conservation related constraints, which included:-
 - Techniques and materials to be appropriate to the fabric should be considered.
 - Interventions should maximise the life expectancy of significant building fabric consistent with sustaining its significance.
 - Interventions should be reversible, if technically feasible and practicable.
 - Interventions should contribute to or at least not compromise the sustainability of future management and maintenance.
 - Respect the listing description that the façade of these buildings is the key element of significance, and therefore proposals seek to minimise impact on the façade.
- A Description of the site
- A schedule of existing drawings and images
- A detailed report of the Historic England Listing, which is repeated in the Heritage Statement
- A Description of the Building environmental performance, which is repeated in the Planning design Statement.

1.2 Tas Model

The TAS model identified where works are required to mitigate the effects of environmental issues.

- Improvements to Thermal Insulation
 - The buildings suffer from extremely low levels of thermal insulation. The windows are single glazed, and the corrugated façade cladding is backed up internally with asbestos boarding.

- The pitch roofs to both buildings are believed to be original and have minimal insulation.
- The proportion of glazing to floor area is very high. In the three storey Classroom Block it is 40% in the central classrooms, and 50% in the corner classrooms and in the two Storey Classroom Block it is 44%, with each Science classroom occupied a corner position in the building, providing glazing to two sides of each room.
- The façade system is formed of aluminium vertical box sections, with very slender aluminium framed windows. Glazing is fixed internally by screwed in extruded aluminium angles. Owing to the slenderness of the frames, and the size of the angles, it is considered to be difficult to double glaze the existing façade system with standard components.
- Options to improve levels of thermal insulation could include;
 - Creation of an independent internal wall lining which avoids mechanical fixings into the façade system. Critical to the functioning of this solution would be ventilation of the façade void created between old face and new internal lining. This would require inlet vents at the bottom and outlet vents at the top and to create the route vertically, holes would be required through the slab edges, which may have conservation implications. The vented façade, coupled with appropriate levels of vent control, could be utilised to generate passive solar gain the winter months. Couple with the above could be the addition of secondary glazing internally. This could be considered as part of an independent Upgrade roof insulation.
 - Addition of roof insulation. This would have minimal impact on the façade, and of the visual appearance of the building.
- Improvements to Weathertightness
 - There is the potential to dismantle elements of the façade, in order to enhance its weathertightness. Many of the sections are simply bolted, screwed or riveted together, and sealant strips such as compriband could potentially be added to junctions known to be weak. A trial area could be agreed with the conservation officer to test the viability of this proposal, however there are inherent risks associated, most significantly the potential to damage elements of the facade during disassembly or reassembly
- Measure to improve ventilation rates to achieve compliance with BB101.
 - The existing building suffers from inadequate ventilation. Many of the classrooms are served only via side and bottom hung single glazed casement windows set within the BAC framing system, most of which are on restrictors.

- Adjustment and repair of restrictors and opening lights. Whilst this may generate marginal improvements to ventilation, the number and location of opening lights and requirement for restrictors due to height restrictions would prevent this option generating significant improvements to vent rates.
- In order to retain the character and fabric of the elevation, a centralised supply system serving classroom NVHR units should be investigated to both buildings. A single point of supply / extract for each building could be located in an area where the original cladding fabric is no longer in place, or in an area where the wall penetration would be less visually intrusive and therefore less harmful to the aesthetic of the buildings. The use of NVHR units to each classroom would not only mitigate the poor levels of ventilation, but it would also enable the use of blinds to the windows without impacting on fresh air volumes, and it would enable the provision of a new heating system which is life-expired in both buildings.
- Whilst this will enable compliance with air supply criteria, the addition of cooling may still require consideration
- Measures to passively reduce Solar Gain to achieve compliance with BB101.
- Addition of cooling plant
- Passive measures to reduce Overheating
 - None of the elevations to either building have any form of external solar shading, and the resultant solar gain is therefore extremely high, particularly in the South and West facing classrooms. The three-storey block has eaves level brackets projecting from the façade. Their function is unclear, however as these are on the north elevation it is unlikely that they formed any form of solar shading system.
 - Internally the classrooms either have curtains or blinds, both of which inhibit ventilation through the openable windows.
 - The most effective way in which to mitigate against solar gain is to prevent direct sunlight reaching the elevation. Typically, this is achieved through either horizontal or vertical brise soleil attached to the façade of the building. Due to the significance of the façades of these buildings, other passive solar shading methods require consideration, such as;
 - Tree planting to the South and West elevations. - *This option is considered to be not viable due to external space constraints, time required for the tree planting to become effective and inability to guarantee consistent performance benefit.*

- An independent shading structure constructed in front of the South and West facing elevations of each building - *This option is considered to be not viable due to external space constraints, impact on external elevations and high anticipated cost.*
- Exposure of the structural soffit and utilise the ventilation system to carry out night-time purging. Removal of ceilings will require acoustic mitigation (tops of partitions and general absorption) and may result in decreased floor to floor separation. - *This option was considered to be not viable due to the impact on floor to floor acoustic separation.*
- The addition of an internal façade lining as noted in 2.1A would have the added benefit of enabling the provision of interstitial blinds, preventing direct sunlight reaching the inner glazing. - *This option was considered to be not viable due to space impact, high cost, and added complexity brought about through the creation of a 'greenhouse' façade void, requiring additional ventilation, necessitating works which would impact upon listed façade.*
- Application of solar control to Glazing.
- Addition of roof insulation, reducing solar gain through the roof.

1.3 Tas Modelling Outputs

- OPTION 1: Roof Insulation + Glazing solar treatment

Add: Roof Insulation to achieve U value of 0.18 W/m²/k and externally applied solar control to all windows.

This Option results in a Pass for 21 out of 41 rooms on overheating criteria, however, has no provision to improve current inadequate ventilation rates.

- OPTION 1A: Roof Insulation + Glazing solar treatment + Cooling to 28degC

This Option results in a Pass for all rooms on overheating criteria. The cooling load is predicted to be 155Kw. NB: *This option does not address fresh air supply rates.*

- OPTION 1B: Roof Insulation + Glazing solar treatment + Cooling + Fresh Air without heat/coolth recovery.

This Option results in a Pass for all rooms on overheating criteria and can be designed to provide adequate ventilation rates. The cooling/vent load is predicted to be 198Kw.

- OPTION 1C

As 1B above plus provision adequate fresh air with heat/coolth recovery.

This Option results in a Pass for all rooms on overheating criteria and can be designed to provide adequate ventilation rates. The cooling/vent load is predicted to be 173Kw.

- OPTION 1D: Roof Insulation + Glazing solar treatment + Ventilation

This Option results in a Pass for 33 out of 41 rooms on overheating criteria.

Cooling loads above are based on holding teaching spaces and offices at temperatures of no more than 28°C (with a maximum external temperature of 35°C)

The preferred option is 1C, but the Design Development stage should look to reduce the need for cooling, by improving solar control, thermal insulation and maximise ventilation air change rates.

Two proposals for a ventilation strategy have been considered. Option 1 comprises centralised plant with ducted supply to individual rooms. The second option places NVHR boxes in each room with an external louvre to each individual space. These have been shared with the local Conservation Officer who confirmed that the centralised system was preferable due to the reduced impact on the façade, but this is further explained in item 5.0 below.

2.0 Roof Void Insulation

The Tass model at Feasibility identified areas where cost effective thermal insulation could be provided.



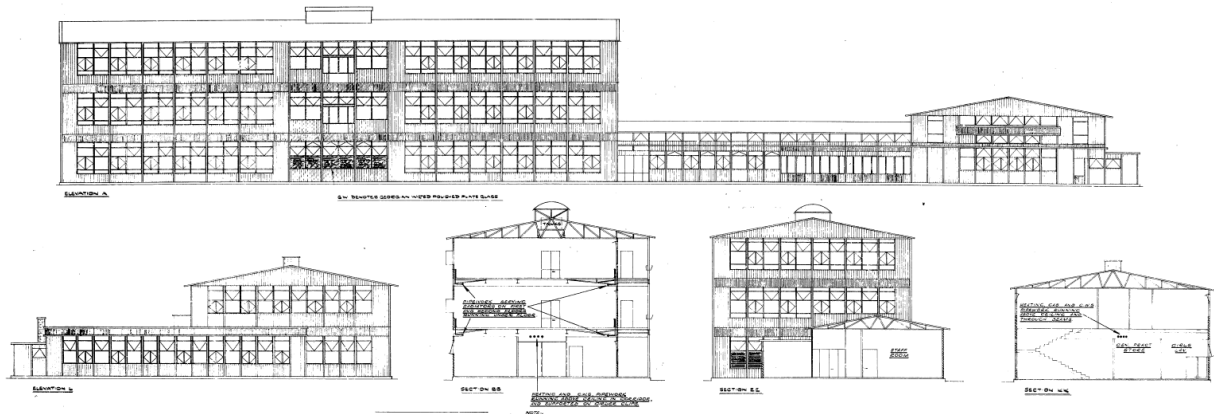
The roof void over the two-storey and three-storey buildings has a 100mm thick insulation quilt laid over the existing suspended ceiling grid. The proposal is to overlay with a further 200mm thick of a similar product. The roof covering is aluminium roof sheets, laid over a rubber type underlay. To avoid condensation, ventilation louvres have been shown added to the gable ends at high level.

3.0 Façade Brackets

To the gable ends of the two-storey and three-storey buildings, there are projecting brackets. Could they historically have been a provision for shading? There is no evidence for this.



The gables face north / south on the three-storey building, and to the east on the two-storey building. These brackets are not shown on the Microfiche drawings from 1953.



4.0 External Façade Redecorations

Warblington school is supported by the Local Authority Service Level Agreement, which is a programme of planned and reactive repair and maintenance, which includes external redecoration.

This project coincides with the cyclical time scale for external redecoration, and there is an efficiency to be gained by combining this work into the main project programme.

The scope of works for the BACs buildings is the vertical cladding panels, window frames and rainwater goods. The colour scheme will not change significantly, and therefore the external redecorations should be consider as maintenance.

5.0 Ventilation Louvres

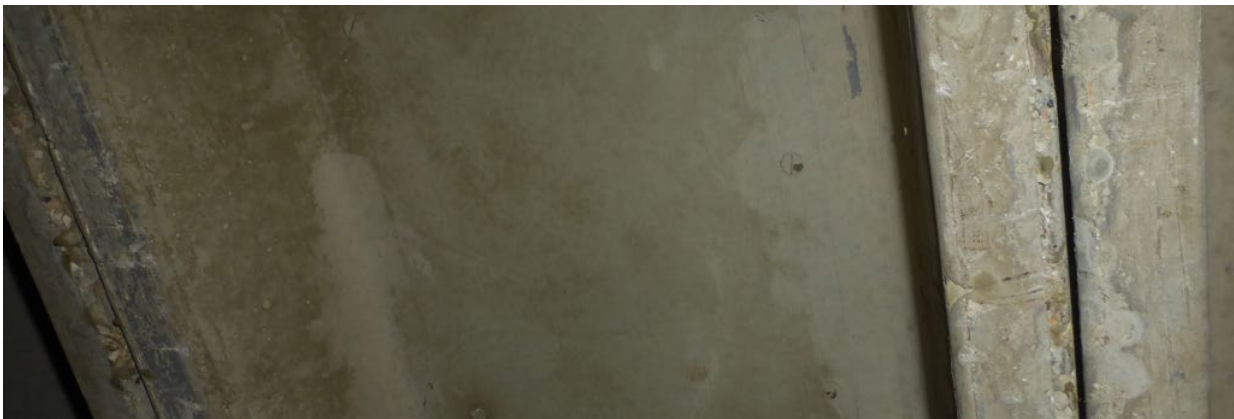
At feasibility stage, various proposals for a ventilation strategy were considered

1, Centralised ventilation plant with combined louvres discharging through less critical areas of the façade such as the roof turret. Ductwork would then distribute through corridor ceilings supplying individual rooms.

2, NVHR ventilation boxes in each room with an external louvre to each individual space.

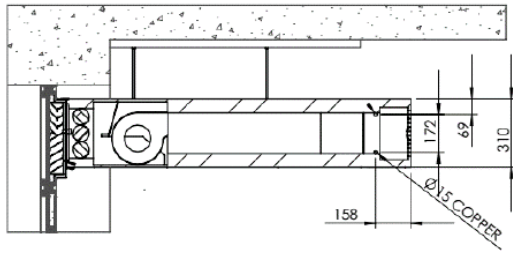
3, Any consideration to extract through the cladding or spandrel panels was quickly discounted due to significant intervention of the existing fabric, unknow materials within the external wall make up, and insufficient space due to the steel framed structure.

During design development the first option subsequently discounted. From centralised ventilation plant 400mm dia ductwork would be required to each classroom, and then a 2m x 2m hole through the floors to exhaust the ductwork to the roof turret would have been a significant intervention.



The upper floor construction is pre-cast concrete planks with waffle type edge thickening, which span onto steel beams on grid lines. These beams are the full depth of the ceiling voids.

The second option to provide individual units located in each room is preferred. They will be Mistrale MFS/128 supplied by Gilberts of Blackpool, suspended from the floor / roof structure above with a louvre directly weathered into the window system.



There will be two of these smaller units per classroom. The new external louvres are bespoke and made to fit exactly to replace the glass in the top pane. This has the potential to be reversible.

This is considered to provide the best solution, with minimum building fabric intervention, and is an essential part of the project, to provide BB101 compliance for ventilation, thermal comfort and indoor air quality in schools.

It will also satisfy planning guidance to “contribution to the quality of life of existing and future generations”, “sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation” and “securing its optimum viable use”.

6.0 Replacement Windows and Glazing Alternatives

This section supersedes Section 5 of the planning Supporting statement rev P4.

The replacement windows and glazing details have developed since the initial application.

6.1 Windows

The proposal replaces the non-original aluminium top hung windows, which have failed and are not suitable for repair. The standard modern aluminium window submitted is not considered suitable. An alternative window system is now preferred. The Ferro Finestra W20, will provide slimmer sightlines, and a reduced front to back dimension. This is detailed on drawings C09314 – 601P9 and 602 P5.

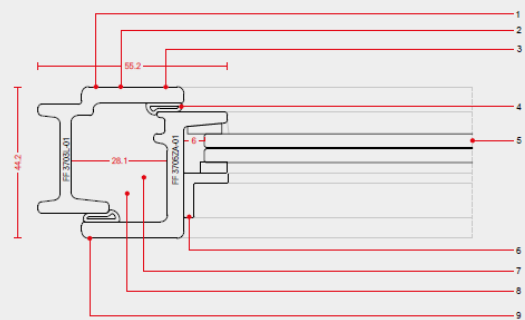
FerroFinestra W20

FerroFinestra W20 takes its origin from the British "Universal Range". It is a complete line of hot-rolled steel profiles that gives a modern twist to the historic design of the 20th Century. Used both for external openings and internal partitions, it maintains stylistic continuity between the choices of the building envelope and those of the interior design. The wide range of possible finishes, from the industrial effect of "natural" steel to coating, guarantees great design creativity.



MAIN FEATURES

1. hot rolled steel profile - high precision production lines
2. solid profile with a thickness from 3 to 5 mm
3. both internal and external overlapping sightline
4. self-adhesive non-shrinking gaskets
5. profile depth compatible with insulating glass up to 21 mm
6. wide choice of glazing beads, for different design of the window
7. wide range of exclusive fittings, both contemporary and reproduced from original designs of the modern era
8. side-hung windows opening inwards and outwards, horizontal pivoting windows, folding doors
9. "natural steel" surface finish, for an industrial look of internal partitions, besides coating in any RAL or customized colours



6.2 Glazing

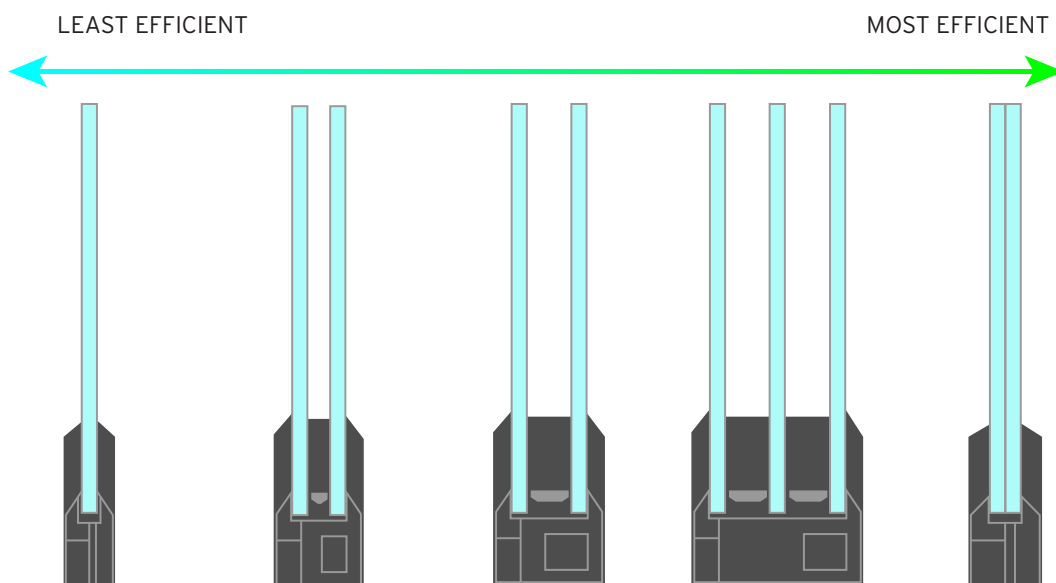
A preferred glazing product has been identified and is considered preferable for the replacement of the glass to the existing frames, and also for use in the replacement W20 windows shown above.

Fineo combines best in class performance with appealing aesthetics. Its slim profile means it can integrate seamlessly into existing frames or into new windows. It has an extended guarantee which due to its vacuum cavity and sealed edge detail will not fail or fog up. The outer pane will receive a solar control treatment.

Technical brochure attached



Compare Fineo With Traditional Glazing



	Single Glazing	Slim Double Glazing	Double-Glazing	Triple Glazing	FINEO
Thickness	4mm	11mm	28mm	36mm	6.7mm
U-Value (W/m²K)	5.8	1.9	1.2	0.8	0.7
Light Transmission	90	80	80	71	80
Sound Reduction Rw (C;Ctr) dB	29 (-2; -3)	31 (-2; -5)	31 (-2; -5)	32 (-1; -5)	35 (-2;-5)

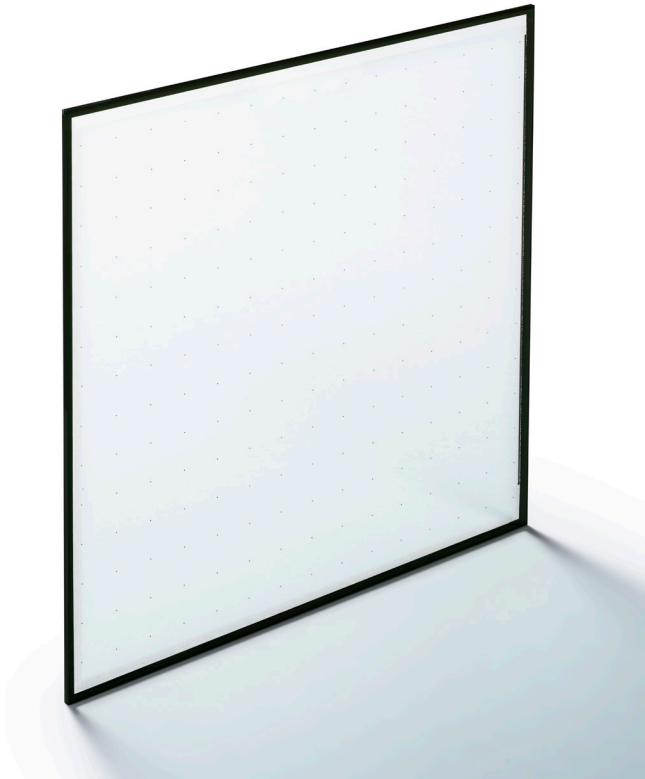
Summary:

- 8 Times more efficient than single glazing and 12.5% more efficient than a 36mm triple-glazed unit.
- Slightly better light transmission than double-glazing and better light transmission than triple glazing.
- 34% perceived noise reduction compared to single glazing and 18% better than double and triple glazing.
- Better solar gain when compared to triple glazing and just slightly less effective than double glazing.
- Manufactured in Belgium.

What’s so special about it?

What does this mean for you?

SLIM, AESTHETICAL DESIGN	■ a ‘light’ appearance similar as monolithic glass ■ no vacuum evacuation port ■ suitable for retrofitting(*) of existing windows
OUTSTANDING THERMAL INSULATION	■ U-value of 0.7 W/(m .K) ■ regardless of inclination (i.e. sloped or roof glazing)
DURABLE INVESTMENT	■ designed performance for several decades
MORE NATURAL DAYLIGHT	■ delivering increased indoor light comfort
HARNESSING MORE FREE SOLAR ENERGY	■ lower energy consumption ■ lower emissions
INCREASED ACOUSTIC ATTENUATION PERFORMANCE	■ offer increased acoustic indoor comfort ■ performance in the lower frequency spectrum for traffic noise
LEAD FREE AND RECYCLEABLE	■ 100% recycleable ■ embraces the circular economy



(*) retrofitting: replace the existing glass with a Fineo glazing, fully preserving the initial window frame provided the window frame is in a properly functioning state.

Ultimate slim design for maximum indoor comfort



Light and energy performance (1)

FINEO by AGC	Tot. Thickness [mm]	EN 410				EN 673
		LT (%)	LR ext (%)	LR int (%)	g [-]	Ug W/(m².K)
Fineo 6	6,7	80	14	14	0,62	0.7
Fineo 8	7,7	79	14	14	0,61	
Fineo 10	9,7	79	14	14	0,60	
Fineo 12	11,7	78	14	14	0,60	

Acoustic attenuation performance (2)

FINEO by AGC	EN ISO 10140	
	Rw [C ; Ctr] [dB]	Rw + Ctr [dB]
Fineo 8	35 (-2;-5)	30
Fineo 10	36 (-2;-3)	33
Fineo 12	36 (-1;-2)	34



Dimensions	Maximum	1.5m x 2.5m or 1.6m x 2.4m
	Minimum	0.2m x 0.2m
Shape	Standard	Square or rectangle
	Shapes	2020
Laminated safety glazing	Available	
	Option: patterned or monumental glass	

(1) These data are calculated using spectral measurements compliant with standards EN 410 and ISO 9050 (1990). The U-value is calculated according to standard EN 673 and measured conform EN 674. Emissivity is measured as per standards EN 673 (Annex A) and EN 12898.

(2) These sound reduction indexes correspond to a Fineo sample measuring 1.23m x 1.48m as per EN ISO 10140-3. The testing is carried out under laboratory conditions. In-situ performance may vary depending on the actual glazing dimensions, frame system, noise sources, etc.

Compare Fineo With Other Slim Double-Glazing

	Overall Thickness	Glass Thickness	Cavity	Gas	U-Value	Guarantee	FINEO
FINEO Vacuum Glazing	6.7mm	3mm	0.1mm	NONE	0.7	15 Yrs	Efficiency Improvement
Other Slim Double-Glazing	11mm	3mm	4mm	Krypton	1.9	5 Yrs	63%
	12mm	4mm	4mm	Krypton	1.9	5 Yrs	63%
	13mm	4 mm	5mm	Krypton	1.7	5 Yrs	59%
	14mm	4mm	6mm	Kyrpton	1.5	5 Yrs	53%
	16mm	4mm	8mm	Krypton	1.3	5 Yrs	46%



Fineo keeps older properties warmer and quieter, whilst maintaining the original aesthetic of the period property.

Fineo can be retrofitted into any timber framed window, transforming them with unobstructed views, as there is **no visible vacuum cap**.

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