Attachment C

VIA architecture Ltd | Passive House Experts
a. PO Box 1707, Paraparaumu Beach 5252
e. hello@via-architecture.net w. via-architecture.net
t. 022 416 9499

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29 October 2018

Dear Paul,

Luggate Hall – Passive House Feasibility Study

The Passive House feasibility study including architectural concept design and Passive House concept modelling for a new community hall in Luggate is now complete and the results are reported on the following pages.

The feasibility study establishes performance parameters and key specification guidelines for the hall to meet the requirements of the Passive House standard. It also identifies areas that will need developing in more detail.

If you have any questions, please don't hesitate to get in touch.

Best wishes,

Elrond Burrell, Director
BArch (hons), BBSc
Registered Architect (UK)
Certified Passive House Designer

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a. PO Box 1707, Paraparaumu Beach 5252
e. hello@via-architecture.net w. via-architecture.net
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Luggate Hall – Passive House Feasibility Study

Project details	
Client	Queenstown Lakes District Council Private Bag 50072, Queenstown 9348
Client contact	Name: Paul Carter Email: paul.carter@qldc.govt.nz Tel: 021 434 910 Name: Richard Pope Email: Richard.Pope@qldc.govt.nz Tel: 027 406 2487
Project:	J52 Luggate Hall
Project address	51 Main Rd, Luggate 9383 (or adjacent)
Architect / Designer:	Elrond Burrell, VIA architecture Ltd
Date:	29 October 2018
Report Status:	Issued
Version:	v01

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Feasibility Study Limitations

The study consisted of rapidly developing an architectural concept design in consultation with QLDC and then undertaking Passive House concept modelling using the Passive House Planning Package software (PHPP). The study is for the purposes of developing the client brief and the business case. As such, there are a number of limitations to the study.

Brief

An outline brief was provided by QLDC with site location options and key functional and spatial requirements for a new community hall. Developing the architectural concept design led to changes and refinements to the outline brief. Defining the brief was not a core element of the feasibility study and therefore the brief was only developed as far as necessary in order to complete an architecture concept design and the Passive House concept modelling.

The occupant numbers and times are of particular importance for Passive House as people and their activities make a considerable contribution to the total heat input. (In this study, occupants and their activities contribute ~29%, solar heat gain ~55% and the heating system ~16%.) The occupancy will need to be established carefully and in detail.

As the project proceeds, the brief will need be developed in more detail by QLDC and/or their appointed design team.

District Plan

Constraints and requirements of the district plan were not considered in any detail in this study. The focus was on developing a concept design that demonstrated the feasibility of delivering the core functional requirements while meeting the requirements of the Passive House standard.

Additionally, three approximate locations were considered and therefore it is likely the design can be developed to ensure it complies with the district plan in at least one of the considered locations.

Building Code

The concept design has been considered in relation to the building code in general terms, however, a detailed audit of compliance has not been undertaken. Fire escape requirements and the direction of door swings will need particular attention due to the number of occupants and the nature of external doors that are suitable for Passive House.

Passive House modelling

The PHPP concept model has been developed with the intention of demonstrating and optimising how the architectural concept design can meet the requirements of the Passive House standard. Priority has been given to using construction components and methods that are relatively familiar and available in the NZ industry.

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A number of reasonable approximations and assumptions have been used in the modelling. Further details are provided later in the report.

Building performance is specific to the location, orientation and design. Therefore, while this study demonstrates that it is possible to meet the Passive House standard, this is no guarantee that the standard will be reached. It is important that design team selected to take the project forward develop the PHPP model in parallel to the architectural design and use the PHPP model as a design tool to inform the decision-making process.

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Concept Design

The main concept design principles are simplicity, cost effectiveness and accessibility.

The drawings illustrate that these principles can result in an elegant and attractive modern community hall that meets the Passive House standard.

Entrance

The entrance space is generously sized to allow for movement of people, hanging coats and displaying information and memorabilia. The entrance is recessed slightly to provide a degree of shelter from the weather.

The entrance provides direct access to the main hall and the meeting room. This allows for security separation for partial use and for simultaneously use of both spaces by different groups.

Hall

The hall is a multi-purpose space currently indicated as 5.5m high at the ridge and sloping down to 3.9m high on both sides. Four bays of structural frames are lower than this and it does not account for additional structure (eg bracing) or acoustic treatment at ceiling level that might be required.

The hall is not intended for sports use although sporting activities may take place within it. On this basis, no showering facilities are currently included.

The hall is proportioned to be longer than it is wide (1:1.5) to provide for performances with a theatre type set up facing the stage or for multiple other uses. In addition, this proportion gives a long elevation to provide ample daylight and beneficial solar heat gain which is useful for Passive House.

A staging space was added from the initial brief. This is indicated with a raised floor, direct access to storage/wings and a large opening to the main hall. The stage could be closed off with curtains or, if budget permits, a moveable partition. In addition, the stage can be used as chair/table storage for seating that will be used in the main hall. The number of seats/tables and storage requirements are outside the scope of this study.

Meeting room

The meeting room can be accessed directly from the entrance or from the hall. The meeting room also has access to the toilets and the kitchen without needing to go through the hall.

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Kitchen

The kitchen is intended to be fitted out with multiples of domestic-scale appliance. (For example, 2 hobs, 2 ovens, 2 sinks, 2 fridge/freezer.) This will provide adequate provision for cooking, teaching and reheating for large events.

Using domestic-scale appliances rather than commercial catering appliance has the following advantages: lower capital costs, flexibility, accessibility and energy efficiency.

- Flexibility: smaller groups can use only what they need thereby minimising energy consumption, cleaning, maintenance and wear and tear.
- Accessibility: no specialist training or skills are required, domestic-scale appliances are familiar.
- Energy efficiency: only the appliances needed can be used and the ventilation requirements are considerably less.

Ideally, for energy efficiency, induction hobs are installed. Understandably, budget constraints may prevent this. Regardless of the type of hob used, recirculation rangehoods with carbon filters would be the standard approach for Passive House so the heat given off by cooking is retained in the building. The main ventilation system would extract from the kitchen with the extract terminal at a reasonable distance from cooking to minimise the amount of grease that may enter the system. However, this will need carefully consideration in relation to the planned use of the kitchen to ensure recirculation rangehoods will be capable of maintaining good indoor air quality.

Toilet Provision

The toilet provision is based on a maximum occupancy being for a 'theatre' type arrangement with approximately 230 people in the building. It was decided with QLDC that all toilets would be accessible and unisex for maximum flexibility. Therefore, seven individual toilet rooms measuring 1.6m x 1.9m with a toilet and hand basin have been included.

This needs to be developed in more detail as the project progresses.

Plant space

A mezzanine plant space over the stage was initially considered. This was ruled out so that the stage space could have additional height, so the overall building height could be kept close to 6m and so that the plant space was easily accessible without the need for a ladder or staircase.

Subsequently, the plant space was located between the stage and the kitchen. It has been sized to accommodate the ventilation system and have space for heating and hot water provision. It is adjacent an external wall which is the ideal location for a Passive House ventilation system so the ducts to the outside are as short as possible. Additionally, the location has enough height for internal ducts to rise above ceiling level and then distribute to all areas of the building.

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Passive House plant equipment is very quiet, however, the internal walls enclosing the plant space should be insulated to reduce the chance any incidental sound transmission to the stage or hall.

Materiality

No consideration has been given to specific materials for the building, other than where necessary for the Passive House modelling. This is deliberate to avoid distracting from the functionality and performance of the concept design and to avoid constraining future design development.

The main structure indicated inside the hall space is fully within the thermal envelope of the building and therefore has no impact on the Passive House modelling. It could be timber, glulam, steel, or a hybrid. The connections between the main structure and the thermal envelope will need careful consideration to prevent compromising the continuity of the air barrier on the inside of the thermal envelope. Additionally, the lighter the structure the better so that the insulated floor slab can be thickened and reinforced locally rather than additional foundations being required. Additional foundations will increase costs and may result in unwanted thermal bridging which can also add cost to resolve.

Future Expansion

The concept design is a simple extruded form with repeating structural bays. This allows for future extension by adding structural bays at either end.

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Passive House Concept Modelling

Passive House concept modelling is focussed on establishing if the design meets the thermal requirements of the Passive House standard, rather than the total energy requirements. It is the thermal requirements that determine the building envelope specification, including windows, and ventilation specification. This gives an accurate picture of how the design will perform in terms of comfort, heating requirements and any overheating risk or cooling requirements.

Three options for building location and orientation were considered. (See drawing A01 Site Location.) Although the starting point was to replace the existing hall in the same location (Option A), for Passive House modelling the design orientated north is taken as the base case (Option C) for simplicity.

As you can see from the table below the base case (Option C) successfully meets the thermal requirements of the standard with the specifications set out later in the report.

Locating the new building on the existing tennis court and orientating it to suit (Option B) also successfully meets the thermal requirements.

Unfortunately, building the new hall on the same location and with the same orientation as the existing hall does not meet the thermal requirements of the standard. With a different design, elevations (ie window placement), layout and thermal envelope specification it might be possible. However, the scope of this study did not include such a detailed exploration. Additionally, the district plan requirements (not considered in this study) may rule out building on the existing location due to the increase in building size within the property boundaries.

	Heating Demand kWh/(m²a)	**Heating Load W/m²**	**Frequency of overheating (% hours over 25 C)**
Passive House	15	10	10
Option A East (110°)	20	12	1
Option A West (110°)	19	12	1
Option B (23°)	15	11	1
Option C (0°)	14	11	1

Note: Option A was modelled with the long façade (and therefore the main glazing) of the hall space facing east and also with the plan flipped so the same façade faced west.

Prints of the PHPP Verification sheet for each option are included in the appendices.

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Heating Demand

The specific Heating Demand is annual amount of heating needed to maintain the building at 20 C throughout. Passive House certification can be via compliance with the Heating Demand or the Heat Load. Complying with both is not required. Both option C and B meet the Passive House requirement of 15 kWh/(m^2a) or less.

Heat Load

The specific Heat Load for Options B and C is 11 W/m^2 which provides the basis to size the heating system.

The treated floor area (TFA) of the concept design is 348.5 m^2 which gives a total Heat Load of 3.8 kW which is the amount of heating needed to maintain the building at 20 C during the coldest times.

As this is a concept stage feasibility study only, this should be treated with some caution. However, if the final design meets the Passive House requirements the Heat Load is likely to be around this amount.

In developing the design attention should be given to the occupancy patterns and likely use of the spaces in the building. Heating should be provided where people are likely to be relatively inactive for periods of time and where there will be small groups of people relative to the size of the space. Heating controls should be local to the space, accessible and simple to use so people can control their immediate environment. This is important psychologically even if hardly ever needed for practical reasons.

It may be worth considering the heating required to maintain 22 C if groups of elderly or young children or others with a greater need for warmth will be using the building. As modelled, this would increase the Heat Load to 12 W/m^2 or a total Heat Load of 4.2 kW.

Please note that the Heat Load is the peak which is indicated in the PHPP as approximately 2 months of the year in the middle of winter (June, July). The Heat Load halves for the months either side and then drops to almost nothing for five months (November – March).

The heating could be provided with a combination of the following

- a post heater element in the ventilation system (electric or hydronic)
- an air source heat pump (air conditioning)
- electric panel heaters

I would recommend against in-slab heating (underfloor heating). It would be an unnecessary cost and complication. Additionally, it has a very slow response time and there is a high risk of it overrunning. This could cause the hall to get uncomfortably warm while wasting energy.

Heating the ventilation air can provide a good background temperature, however, it won't be enough for the whole Heat Load and some localised heating would still be required. This is useful for occupant comfort and different use patterns, in any case. In a Passive House building

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with a continuous airtight and insulated envelope, radiant heating is actually experienced as radiant heat rather than convection that is more typically experienced in buildings.

I suggest that some localised radiant heating be provided in the hall and the meeting room as a minimum.

Overheating

The modelling indicates 1% frequency of overheating (87 hours per year over 25 C) which is very good. Passive House allows for up to 10%, however, best practice is 2% or less.

The overheating percentage is total hours over 25 C. If the temperature goes over 25 C for 6 hours a day on average, then 87 hours is spread over 15 days, for example. (It could be more some days, less other days.) The nature of the occupancy in a community hall means this could vary quite considerably depending on the number of people in the building and their activities. This is something that needs careful attention and development as the design progresses.

The model also shows a daily internal temperature fluctuation of 5.7 C which isn't too high. (The smaller the fluctuation the better.) I tested the overheating set point and the model predicts that it only gets to 26 C inside.

This is based on all the following measures being implemented:

- Ventilation running continuously <u>without</u> heat recovery when outdoor air is over 20 C. (This is an automatic function of many systems)
- When the outside air temperature is going above 20 C or over, the doors and windows are closed to keep the hot air out.

Only the geometry of the building has been modelled as shading. As Hawea Flat and Lake Hawea are to the north, shading from surrounding mountain ranges was not modelled. If adjacent buildings, trees or landforms shade the building this may reduce the overheating frequency. They may also increase the heating requirements, of course.

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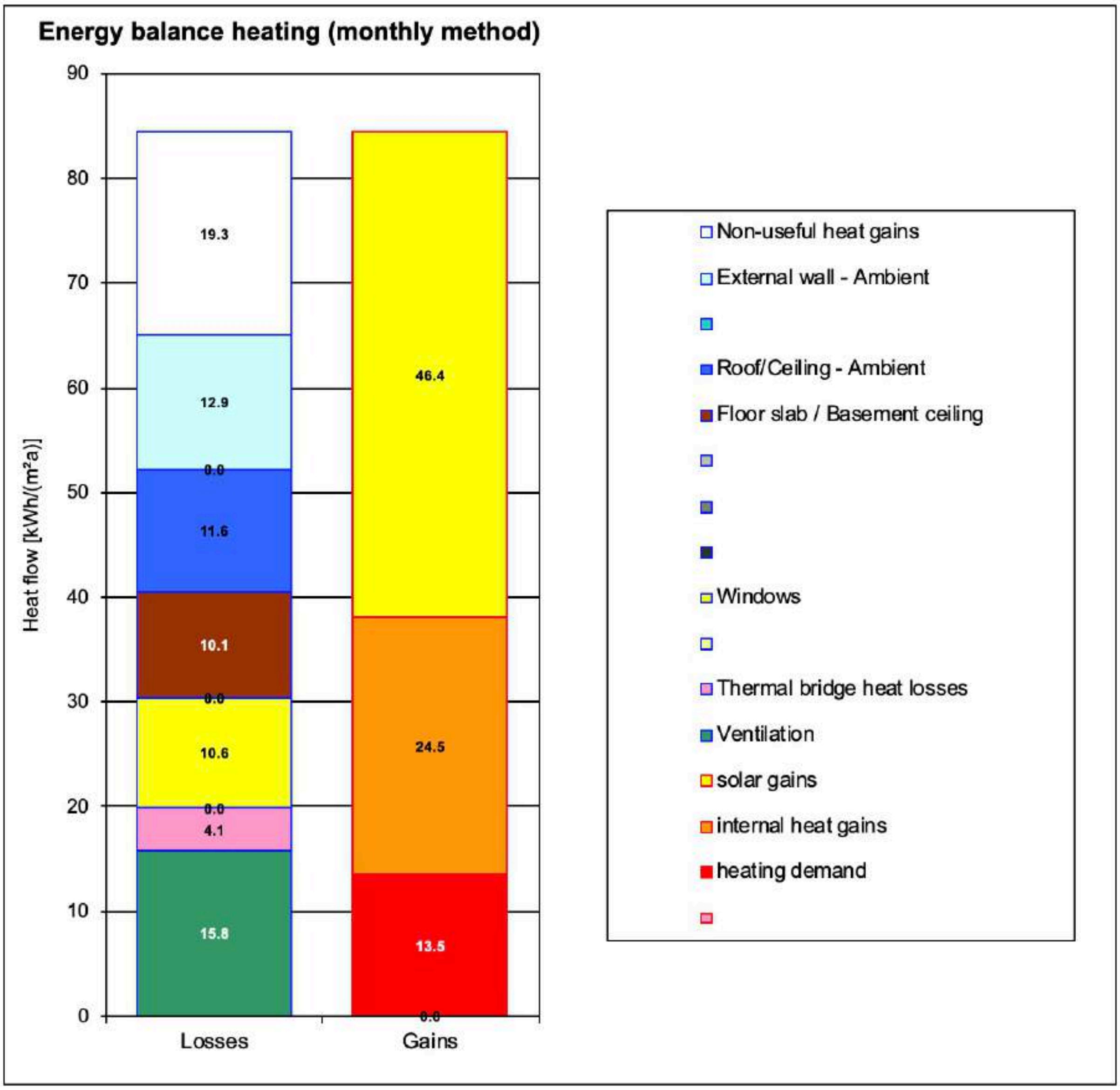
Heat Balance

The heat balance graph indicates where heat is being gained and where it is being lost. The graph for Option C is below, and it is clear the solar gains easily outstrip the losses leading to the overheating.

The main losses are from the ventilation, which includes infiltration (15.8 kWh/(m^2.a)) and the external walls (12.9 kWh/(m^2.a)) and then the roof (11.6 kWh/(m^2.a)). This is mainly because of the rate of ventilation modelled for the number of occupants and the large building surface area for infiltration. The ventilation rate needs carefully development in relation to the building occupancy as the design progresses. Additionally, a blower door test result lower than 0.6 ach could be acheived and shouldn't necessarily be too challenging with this size of building.



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Cooling

Although it doesn't seem necessary at this stage, you may also consider active cooling to manage the overheating. The specific Cooling Demand for Option C is 2 kWh/(m^2a) which meets the requirements of the Passive House standard and the Cooling Load is 4 W/m^2.

Much like the heating, the Cooling Load is what the cooling system should be sized for. With a treated floor area of 348.5 m^2 the total Cooling Load is 1.4 kW which is the amount of cooling needed to maintain the building below 25 C during the hottest times.

Humidity

Humidity is not an issue for the design.

Comfort

No comfort issues are flagged in the PHPP model.

Domestic Hot Water

Domestic Hot Water design and calculations have not been included in the Passive House modelling at this stage.

Primary Energy

Renewable (PER) or Non-renewable Primary Energy (PE) calculations have not been included in the Passive House modelling at this stage.

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Design Specifications

The following is what the PHPP model is based on (cladding and finishes have limited impact on the thermal performance and are ignored generally).

Note: some proprietary components and products have been used in the model for convenience as the dimensional and thermal data is readily available. The performance (U-value / R-value) is what is critical and may be achieved with different components and products.

Roof – External cladding and purlins etc, 17mm plywood or OSB taped to be 'windtight', hyJoist HJ360 90 rafters at1200mm centres fully filled with glass fibre insulation (Knauf JetStream Max Blown 28kg/m^3), airtight to the underside with membrane, battens, linings etc.
U-value 0.098 W/(m²K). Equivalent to R10.2

External Walls – External cladding and battens etc, 12mm plywood or OSB taped to be 'windtight', LIB 200.88 engineered timber I-beam studs at 400mm centres, cantilevered 50mm over the slab edge, fully filled with glass fibre insulation (Knauf JetStream Max Blown 28kg/m^3), airtight to the inside with a suitable membrane, 45mm horizontal timber battens at 600mm centres fully filled with glass fibre insulation (Knauf Masonry Wall R1.5), wall linings etc.
U-value 0.148 W/(m²K). Equivalent to R6.8

Ground floor – 150mm reinforced concrete slab on 250mm EPS Foamex Styroboard H-grade on DPM, sand blinding etc.
U-value 0.142 W/(m²K). Equivalent to R7.0

Glazing – Viridian - PlaniTherm XN (4/14/:4/14/:4 90% Ar) triple glazing with warm edge spacers.
Glass U-value 0.64 W/(m²K), g-value 0.56. Equivalent to R 1.6

Window frames – Smartwin Passive House certified wood aluminium as supplied by SEDA windows & doors.
Frame U-value from 0.53 W/(m²K) to 0.93 W/(m²K). Equivalent to R 1.9 / 1.1

Door frames – As per the windows. Entrance doors all assumed to be fully glazed.

Windows and doors have an average U-value of 0.78 W/(m²K) including the frame, glazing and installation. Equivalent to R 1.3

Double vs Triple Glazing

Initial modelling indicated that very high-performance double glazing would be suitable, and this may still be the case. The double glazing used was Saint-Gobain Planitherm with a U-value of 1.04 W/(m²K) and a g-value of 0.52, with Smartwin frames of a similar performance to that noted above for the triple glazing.

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However, once the ventilation assumptions were developed further in this study, it became apparent that triple glazing would be required. Switching to double glazing for Option C as modelled increases the Heating Demand to 17 kWh/(m²a) and the Heating Load to 12 W/m^2.

As the design is further developed it may be possible to refine the ventilation requirements and other aspects of the design so that high-performance double glazing can be used and still meet the Passive House requirements.

Shading – shading from the geometry of the building has been included. Glass is modelled set back 100mm from the outside face of the cladding. No site shading from trees or adjacent buildings or surrounding mountain ranges has been included.

Thermal Bridges – No thermal bridges have been modelled or calculated. The following thermal bridges have been measured and assigned conservative (assumed) values as follows:

- Repeating thermal bridges (eg timber framing) – included within assembly U-value calculations
- Window and door installation including thresholds – included as 0.040 W/mK (frames recessed in the wall framing) within the window calculations. Additional thermal bridging will be included for thresholds once the details have been developed.
- Ground floor perimeter (geometry / detail) – 0.200 W/mK
- Roof edge / eaves (geometry / detail) – 0.040 W/mK
- Wall vertical corners (geometry / detail) – 0.040 W/mK

Ventilation – The scope of the feasibility study did not allow for a detailed calculation of the occupancy of the building and an assumption had to be made. Therefore, the maximum design air flow rate was set to 900m^3/h which results in a standard air flow rate of 692m^3/h or 0.49 air changes per hour. If the ventilation rate is lower than this and closer to 0.3 air changes per hour (the typical ventilation rate suggested for Passive House) the heating requirements reduce slightly.

This ventilation rate falls within the range of a Swegon Gold RX 07 (supplied in NZ by Green Solutions) Passive House certified ventilation unit.

It is also possible that a Zehnder ComfoAir XL 2200 (supplied in NZ by Fantech) Passive House certified ventilation unit might be suitable. However, it has a narrower range of efficient air flow rates listed and so might not cover all the ventilation requirements.

Therefore, the PHPP model is based on a Swegon Gold RX 07 providing balanced ventilation for the whole building. This achieves an effective heat recovery efficiency of 84.7%.

Note: two completed Passive House community hall projects in the UK of a similar size have Swegon Gold RX 07 ventilation units.

Airtightness - a blower door test result of 0.6 ach is assumed. A lower (better) result will reduce the heating demand slightly and increase overheating slightly.

Treated Floor Area (TFA) – this has been measured as 348.5 m^2.

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Heat Loss Area – this has been measured as 1169.45 m^2. This results in a heat loss form factor of 3.4 which reflects the single storey high volume nature of the design. A heat loss form factor below 3 indicates a design that is inherently very efficient.

Orientation - the orientation of the elevation labelled as "North" has been modelled as 110 degrees east of north for Option A, 23 degrees east of north for Option B, 0 degrees east of north for Option C,

Climate – the project location falls within the Passive House climate zone for Queenstown Lakes.

Reference – VIA architecture Stage B1 drawing set dated 26 October 2018.

Glossary – see Passive House Glossary provided for explanation of some of the technical terms in this report.

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Appendices

Stage B1 Drawings - issued separately

Layout
J52_SK01 Layout Options 1
J52_SK02 Layout Options 2

Sketch drawings
J52_SK03 Floor Plan
J52_SK04 Elevations
J52_SK05 Sections
J52_SK06 Exterior Perspectives
J52_SK07 Interior Perspectives

Concept Drawings
J52_A01 Site Location
J52_A02 Floor Plan
J52_A03 Elevations
J52_A04 Sections
J52_A05 Ventilation
J52_A06 Future Expansion
J52_A10 Exterior Perspectives
J52_A11 Interior Perspectives

PHPP Verification Sheets

J52_VIA_PHPP_LuggateHall_v01_Verification_AE
J52_VIA_PHPP_LuggateHall_v01_Verification_AW
J52_VIA_PHPP_LuggateHall_v01_Verification_B
J52_VIA_PHPP_LuggateHall_v01_Verification_C

References / Precedents

Garway Community Centre
Wereham Village Hall

Attachment C

Passive House Verification

OPTION A_East

Building:	Luggate Community Hall (Feasibility)
Street:	51 Main Road
Postcode/City:	9383 Luggate
Province/Country:	NZ-New Zealand
Building type:	Community Hall
Climate data set:	NZ0006b-Queenstown
Climate zone:	3: Cool-temperate; Altitude of location: 345 m
Home owner / Client:	Queenstown Lakes District Council
Street:	Private Bag 50072
Postcode/City:	9348 Queenstown
Province/Country:	NZ-New Zealand

Architecture:	VIA architecture Ltd (Feasibility)	**Mechanical engineer:**	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand
Energy consultancy:	VIA architecture Ltd	**Certification:**	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand

Year of construction:	2019	Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	2.8	IHG cooling case [W/m²]:	2.8
No. of occupants:	30.0	Specific capacity [Wh/K per m² TFA]:	60	Mechanical cooling:	

Specific building characteristics with reference to the treated floor area

The PHPP has not been filled completely; it is not valid as verification

					Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	348.5				
Space heating	Heating demand	kWh/(m²a)	20	≤	15	-	no
	Heating load	W/m²	12	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	1	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	8	≤	120		yes
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	3	≤	-	-	-
	Generation of renewable energy (in relation to pro-jected building footprint area)	kWh/(m²a)	0	≥	-	-	

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Classic? no

Task:	First name:	Surname:	Signature:
1-Designer	Elrond	Burrell	
	Issued on:	City:	
		Paraparaumu Beach	

Attachment C

Passive House Verification

OPTION A_West

Building:	Luggate Community Hall (Feasibility)
Street:	51 Main Road
Postcode/City:	9383 Luggate
Province/Country:	NZ-New Zealand
Building type:	Community Hall
Climate data set:	NZ0006b-Queenstown
Climate zone:	3: Cool-temperate; Altitude of location: 345 m
Home owner / Client:	Queenstown Lakes District Council
Street:	Private Bag 50072
Postcode/City:	9348 Queenstown
Province/Country:	NZ-New Zealand

Architecture:	VIA architecture Ltd (Feasibility)	Mechanical engineer:	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand
Energy consultancy:	VIA architecture Ltd	Certification:	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand

Year of construction:	2019	Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	2.8	IHG cooling case [W/m²]:	2.8
No. of occupants:	30.0	Specific capacity [Wh/K per m² TFA]:	60	Mechanical cooling:	

Specific building characteristics with reference to the treated floor area — The PHPP has not been filled completely; it is not valid as verification

		Unit	Value		Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	348.5				
Space heating	Heating demand	kWh/(m²a)	19	≤	15	-	no
	Heating load	W/m²	12	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	1	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	8	≤	120		yes
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	3	≤	-	-	-
	Generation of renewable energy (in relation to pro-jected building footprint area)	kWh/(m²a)	0	≥	-	-	

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Classic? no

Task:	First name:	Surname:	Signature:
1-Designer	Elrond	Burrell	
	Issued on:	City:	
		Paraparaumu Beach	

Attachment C

Passive House Verification

OPTION B

Building:	Luggate Community Hall (Feasibility)
Street:	51 Main Road
Postcode/City:	9383 Luggate
Province/Country:	NZ-New Zealand
Building type:	Community Hall
Climate data set:	NZ0006b-Queenstown
Climate zone:	3: Cool-temperate; Altitude of location: 345 m
Home owner / Client:	Queenstown Lakes District Council
Street:	Private Bag 50072
Postcode/City:	9348 Queenstown
Province/Country:	NZ-New Zealand

Architecture:	VIA architecture Ltd (Feasibility)	**Mechanical engineer:**	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand
Energy consultancy:	VIA architecture Ltd	**Certification:**	
Street:	PO Box 1707	Street:	
Postcode/City:	5252 Paraparaumu Beach	Postcode/City:	
Province/Country:	NZ-New Zealand	Province/Country:	NZ-New Zealand

Year of construction:	2019	Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	2.8	IHG cooling case [W/m²]:	2.8
No. of occupants:	30.0	Specific capacity [Wh/K per m² TFA]:	60	Mechanical cooling:	

Specific building characteristics with reference to the treated floor area

The PHPP has not been filled completely; it is not valid as verification

		Unit	Value		Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	348.5				
Space heating	Heating demand	kWh/(m²a)	15	≤	15	-	yes
	Heating load	W/m²	11	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	1	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	8	≤	120		yes
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	3	≤	-	-	-
	Generation of renewable energy (in relation to pro-jected building footprint area)	kWh/(m²a)	0	≥	-	-	

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Classic? yes

Task:	First name:	Surname:	Signature:
1-Designer	Elrond	Burrell	
	Issued on:	City:	
		Paraparaumu Beach	

Attachment C

Passive House Verification

OPTION C

Building:	Luggate Community Hall (Feasibility)		
Street:	51 Main Road		
Postcode/City:	9383	Luggate	
Province/Country:		NZ-New Zealand	
Building type:	Community Hall		
Climate data set:	NZ0006b-Queenstown		
Climate zone:	3: Cool-temperate	Altitude of location:	345 m
Home owner / Client:	Queenstown Lakes District Council		
Street:	Private Bag 50072		
Postcode/City:	9348	Queenstown	
Province/Country:		NZ-New Zealand	

Architecture:	VIA architecture Ltd (Feasibility)		**Mechanical engineer:**		
Street:	PO Box 1707		Street:		
Postcode/City:	5252	Paraparaumu Beach	Postcode/City:		
Province/Country:		NZ-New Zealand	Province/Country:		NZ-New Zealand
Energy consultancy:	VIA architecture Ltd		**Certification:**		
Street:	PO Box 1707		Street:		
Postcode/City:	5252	Paraparaumu Beach	Postcode/City:		
Province/Country:		NZ-New Zealand	Province/Country:		NZ-New Zealand

Year of construction:	2019	Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	2.8	IHG cooling case [W/m²]:	2.8
No. of occupants:	30.0	Specific capacity [Wh/K per m² TFA]:	60	Mechanical cooling:	

Specific building characteristics with reference to the treated floor area

The PHPP has not been filled completely; it is not valid as verification

		Unit	Value		Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	348.5				
Space heating	Heating demand	kWh/(m²a)	14	≤	15	-	yes
	Heating load	W/m²	11	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	1	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	8	≤	120		yes
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	3	≤	-	-	-
	Generation of renewable energy (in relation to pro-jected building footprint area)	kWh/(m²a)	0	≥	-	-	

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Classic? yes

Task:	First name:	Surname:	Signature:
1-Designer	Elrond	Burrell	

Issued on:	City:
	Paraparaumu Beach

Attachment C

Garway Community Centre - Ventilation

Photos from Elrond Burrell

External view

Swegon Gold RX 07 installation

Wereham Village Hall - Ventilation

Plan & photo from Parsons Whittley

Floor Plan (Room 7 is the plant room)

Swegon Gold RX 07 installation

Attachment C




ID: 5733

General Information

Certified building - Passive House new build

Certifier
Kym Mead, MEAD Ltd

Building type
public building | church

Location
UK - PE33 9AP King's Lynn (East of England)

Description
New Build Passivhaus Village Hall comprising main hall, kitchen, 2 meeting rooms toilets and store, in all around 380 sq M

Number of appartments / units :
1

Treated Floor Area according to PHPP
374 m^2

Construction type
masonry construction

Year of construction
2018

Other parties involved

Architecture
Parsons + Whittley Architects

Building services
Alan Clarke

Craftsperson / parties involved

Attachment C

Walker Construction Services Ltd

Thermal envelope

Exterior wall
Timber Cladding on battens
225mm EPS Insulation
200mm Aircrete Blockwork (0.11)
13mm Plaster Finish

U-value = 0.117 $W/(m^2K)$

Basement floor / floor slab
50mm Screed
150mm Reinforced Concrete Slab
300mm DOW Floormate Insulation (0.033)
U-value = 0.104 $W/(m^2K)$

Roof
15mm Plasterboard
25mm Acoustic Roll
13mm Service Void
11mm OSB/3
350mm Mineral Wool Insulation between joists (0.04)
Roof Finish
U-value = 0.124 $W/(m^2K)$

Frame
Ecohaus Internorm , Home Pure KF410 & HF310

U_w-value = 0.808 $W/(m^2K)$

Glazing
U_g-value = 0.53 $W/(m^2K)$
g -value = 50 %

Mechanical systems

Ventilation
Swegon , GOLD RX 07

Heating installation
Daikin Altherma air source heat pump and radiator system

Domestic hot water
Hot water is generated by the heat pump and stored in a vacuum insulated unvented hot water cylinder installed in the cleaners cupboard

PHPP values

Air tightness
n_{50} = 0.3/h

Attachment C

Annual heating demand

14 kWh /(m^2a) calculated according to PHPP

Heating load

10 W/m^2

Primary energy requirement

42 kWh /(m^2a) on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP

PER demand

17 kWh /(m^2a) on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP

Attachment C

WEREHAM
Village Hall

Home About What's On Café Events Hall Hire Heritage Committee Advertising Contact

Hiring the Village Hall

The following spaces are available to hire. It is also possible to book the village hall in its entirety.

To commence your booking click on the 'Make a Booking' button.

Make a Booking

The Main Hall

Attachment C

Key Information

Dimensions 18.0 metres (32'9") x 10.0 metres (59'0")

- Theatre Style – Approx. Capacity 170
- Banqueting Style – Approx. Capacity 150
- Wedding/Dinner-Dance – Approx. Capacity 120
- Standing 230-260 people, depending on the nature of the event.

There is also the potential to erect a marquee along the northern side of the hall, where there are 3 large windows/doors which would increase numbers by 30.

Ask us about our wedding package:
villagehallwereham@gmail.com or call 07497 430005

View Layout Plans

Audio Visual Equipment

Modern audio and visual equipment to support all uses with a plug and play box –

- A Stereo sound system that enables you to plug and play music from your device eg: mobile, laptop, tablet or MP3, providing it is fitted with a headphone connector.
- A front to rear microphone link enables live bands and amateur dramatics to provide their own links between the front microphones and rear position (for use with their mixer device) – no more trailing wires!
- Two radio microphones.
- An induction Loop system for those who wear hearing aids. It is fully automatic and connected to the stereo sound system. Switch located at the front by the Sound Cupboard.
- A full High definition wide screen projection system is provided and images up to 4m can be displayed. Sound is also connected to the stereo sound system via the headphone connector. Connection point at the plug and play box is HDMI compatible.

Sports Equipment

We currently have the following equipment on loan from the Sports Development Department:

- Badminton kwik net and court marker set with associated equipment

Make a Booking

Community Room

Key Information

For local businesses, organisations and community groups which require meeting/conference/training space, supported with AV equipment and conference call equipment. Ideal for hot desking.

There are various options depending on use:

Dimensions 5.5 metres (18'0") x 4.4 metres (14'3")

- Theatre Style – Approx. Capacity 28
- Boardroom Style – Approx. Capacity 16
- Classroom Style – Approx. Capacity 20

Equipment

- The community room is fitted with a stereo sound system and wide screen projector.
- Plus magnetic/white board for meeting purposes.
- Connections are via HDMI (laptop) for all sound.
- Three walls of the room are fitted with wall mounted banks of sockets and LAN connection for laptops.

Make a Booking

Meeting Room

Attachment C

Key Information

Holds up to 4 people max. Ideal for hot desking, health practitioners, interview room.

Dimensions 2.8 metres (9'2") x 2.6 metres (8'6")

- Theatre Style – Not Applicable
- Boardroom Style – Approx. Capacity 4
- Classroom Style – Not Applicable

Equipment

- Medical sink
- Wall mounted bank of sockets and LAN connections
- Wireless laser printer with fax (Apple AirPrint & Google Cloud Print), charges apply

Make a Booking

Entire Village Hall

Key Information

The village hall is available to book in its entirety, which includes all of the above plus sole usage of the foyer area

Equipment

- Wifi enabled Smart TV

Make a Booking

Foyer Area

Key Information

Available for drop in hot desking during open hours – no need to book.

Sole usage of the foyer area is included in bookings for the entire village hall.

Dimensions 5.7 metres (18'6") x 5.7 metres (18'6")

- Informal Reception Style ±30 (12 seated <20 standing)

Make a Booking

Kitchen

Attachment C

Catering / Kitchen

Full catering kitchen that can be shared or hired for sole use.

If the kitchen is essential to your booking, we recommend that you book it out with your hall hire.

If you intend to undertake food preparation or arrange a bar for your event, you will be required to hire the kitchen with your booking, this will ensure sole use of the kitchen for your event.

Bars to be set up in the kitchen only.

WREN resourcing your projects

Kitchen funded by Wren

Equipment

- Tall larder fridge 350l capacity
- Tall larder freezer 350l capacity
- 2 x 4 zone induction hobs
- 2 electric fan ovens with drop down doors.
- Wall mounted water boiler delivering approx. 200 hot drinks per hour.
- Catering dishwasher, 540 plates per hour; 2 or 3 minute wash cycle.
- 2 tier prep table on lockable castors.

Make a Booking

Pricing

The costs of hiring the Hall are:

Main Hall £5 per half-hour
Community Room £4 per half-hour
Meeting Room £3 per half-hour

Exclusive use of the kitchen £25 one-off charge

All bookings are also subject to a 50p online booking fee.

Rooms to be booked half-hourly, with a one hour minimum booking – note that set up, clearing and cleaning must be carried out within the booking period otherwise damage deposit will be lost.

Damage Deposit

Weddings and adult parties will be charged a damage deposit of £250. Similarly, exhibitions and conferences will be charged a damages deposit of £100. For other events a damage deposit of up to £25 *may apply* depending on the nature of the event.

Enquiries

Attachment C

All enquiries please call bookings on 07497 430005.

We are keen to support community groups, to which we may offer preferential rates. Please contact us on 07497 430005 or via email on bookings@werehamvillagehall.co.uk to discuss.

Important Information

Before hiring the Hall please read the following documents (under review):

Terms & Conditions of Hire (including Hire Firehazard Responsibilities)

Equal Opportunities Policy

Children and Vulnerable Adults Policy – coming soon

Bouncy Castle Policy

Make a Booking