The first social Passivhaus in Dunoon.

DEVECI, G.

2009

The first social Passivhaus in Dunoon

This design was created in order to meet the need for affordable, good quality and low-energy family housing. The overall design typology follows the traditional built form of fishing villages, where gables are facing the sea in an effort to reduce weather exposure and prevailing winds. The massing arrangement creates a two-storey "street of double gables", with a gap between each in order to accommodate south-facing, one-bed units with exclusive use of roof gardens. The design team sought to respond to local conditions while demonstrating key characteristics of good contemporary architecture, and with a special effort being made to ensure that the architectural form and proportions were in harmony with the essence of Scottish vernacular architecture. The scheme is the first in the UK to be officially accredited by the German Passivehaus Institut, the certificate being issued in November 2009.

Material in this portfolio is currently taken from a single source:

1. A case study with descriptive introduction and a range of images (pages 3-23):
    - DEVECI, G. [2009]. The 'tigh-na-cladach': the 'house by the shore', Dunoon.

Further sources may be added to this portfolio at a later date.

The ‘TIGH-NA-CLADACH’

the ‘house by the shore’ | dunoon

Set against magnificent hillside woodland, the site occupies a sea front location in Dunoon that is extremely attractive and commands spectacular views of the Clyde across to Inverkip. It was sold to Fyne Initiatives by Argyll and Bute Council, on the basis that the purchaser would provide affordable housing to meet needs local community, as well as leasing the woodland and providing a small workshop that would accommodate activities of the Bullwood Group. This group provides education for local people with special needs as part of managing the woodland.

The client's aims were to develop proposals that would facilitate the provision of affordable, good quality and low-energy designs of one, two and three bedroom family houses to be sold as 'Homestake' (shared equity). This scheme will allow first time buyers to purchase between 51-80% of the property, leaving the remaining 'golden' share within the ownership of Fyne Initiatives. Community participation took place at Park Hotel Dunoon in November 2007, when three design options of terraced and semi-detached houses were presented to seek local community reactions.

The overall design typology follows the traditional built form of fishing villages arrangement where gables are facing the sea in an effort to reduce weather exposure and prevailing winds. Although white render finish is the most common tradition, there are many examples in coastal areas where contrasting colours are used that add a strong sense of place and vitality. The massing arrangement creates a two storey 'street of double gables' with a gap between to accommodate south facing one-bed units with exclusive use of roof gardens.

The design team sought to respond to local conditions, whilst at the same time ensuring that the output is being of our time by demonstrating key characteristics of good contemporary architecture. It is innovative and responds creatively to the demands of this waterfront site. A special effort was made to ensure that the architectural form and proportions were in harmony with the essence of Scottish vernacular architecture.

The scheme is the first in the UK to be officially accredited by the German Passive House Institute. It's criteria demand that total energy use, including space heating and all the appliances and domestic hot water is less than 120 kWh/m2/ year. The heating requirement is reduced by means of passive measures to the point (15 kWh / m2) that there is no longer any need for a conventional heating system. The heating requirement for one of the house is 1,600 kWh/year, which is approximately a tenth of what an average house uses. A solar thermal system further reduces the energy bill for hot water by over 50%. In fact, it is the equivalent of using three car tanks of diesel to heat the house for a year.

It proves that sustainable and energy efficient design is possible on a social housing budget. Affordability was not achieved at the expense of architectural design or construction quality. Indeed, the design solutions we arrived at met the requirements of best practice in environmental sustainability. The contractors were John Brown (Strone) Ltd and the project was completed on time and on budget.

The client's aims were to develop proposals that would facilitate the provision of affordable, good quality and low-energy designs of one, two and three bedroom family houses to be sold as 'Homestake' (shared equity).

The site set against magnificent hillside woodland, the site occupies a sea front location in Dunoon that is extremely attractive and commands spectacular views of the Clyde across to Inverkip. It was sold to Fyne Initiatives by Argyll and Bute Council, on the basis that the purchaser would provide affordable housing to meet needs local community, as well as leasing the woodland and providing a small workshop that would accommodate activities of the Bullwood Group. This group provides education for local people with special needs as part of managing the woodland. Community participation took place at Park Hotel Dunoon in November 2008, when three design options were presented to seek local community reactions.

Fyne Initiatives Ltd has fully adopted the principles and aims of 'sustainable development' as a core objective and expects the designs to meet the requirement of Scottish government's Sustainable Development Policy. In this proposal the sustainability and innovation aims were meet by:

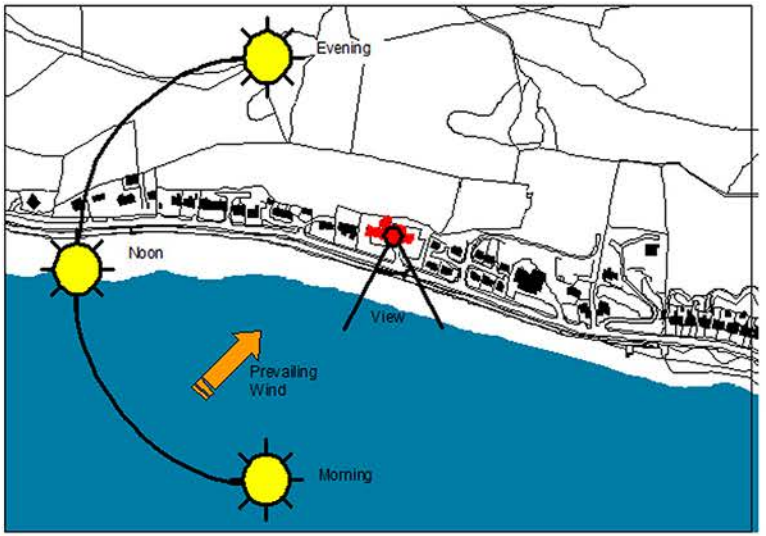
- Respecting the landscape character and distinctive identity of the location.
- Encouraging local participation, social inclusion and a sense of local ownership.
- Emphasise social inclusion by providing real gains for all groups in society, including young, people with disabilities and the elderly.
- Striking the right balance between density and provision of green open space.
- Applying best available technology for design to reduce waste and energy use.
- Making a quantifiable contribution to the reduction of greenhouse gases.
- Using local resources, both human and physical, to implement the development.
- Adopting best UK practice for sustainable development through partnering.
- Developing an attractive and acceptable design aesthetic of which local people can feel proud.

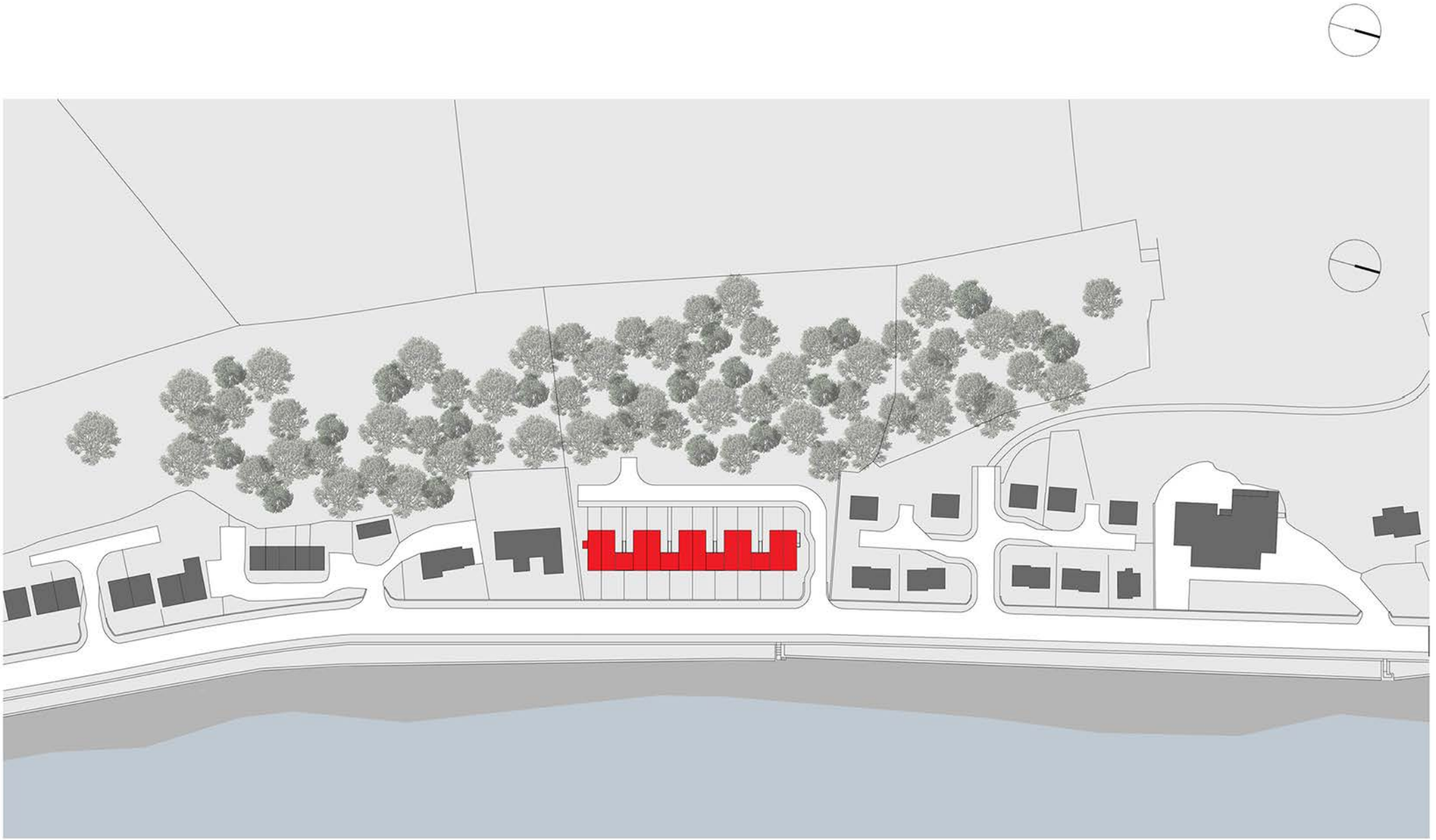
We believe these houses are carefully located and worthy of their setting. The design team sought to respond to local conditions, whilst at the same time ensuring that the output is being of our time by demonstrating key characteristics of good contemporary architecture. The architectural form and proportions respect the fine tradition of Scottish vernacular architecture. They are also contemporary and socially and culturally sustainable designs that represent excellent value for the owners. They represent use of the best building technology available today for a sustainable way of living. The design would make a positive contribution to the built cultural heritage of the Dunoon area.

The scheme is the first in the UK to be officially accredited by the German Passive House Institute. The calculations that based on PHPP, shown the overall energy consumption as 36.4 kWh/(m2a), which included the space heating, domestic hot water, household and auxiliary power. The heating demand is only 15 kWh/(m2a) and a total of 1,750 kWh/a for the whole building.

It proves that sustainable and energy efficient design is possible on a social housing budget. Affordability is inconsistent with sustainability and it was not achieved at the expense of architectural design or construction quality.


Ferry
Pier
DUNOON
FIRTH OF CLYDE
Site
Bullwood Road

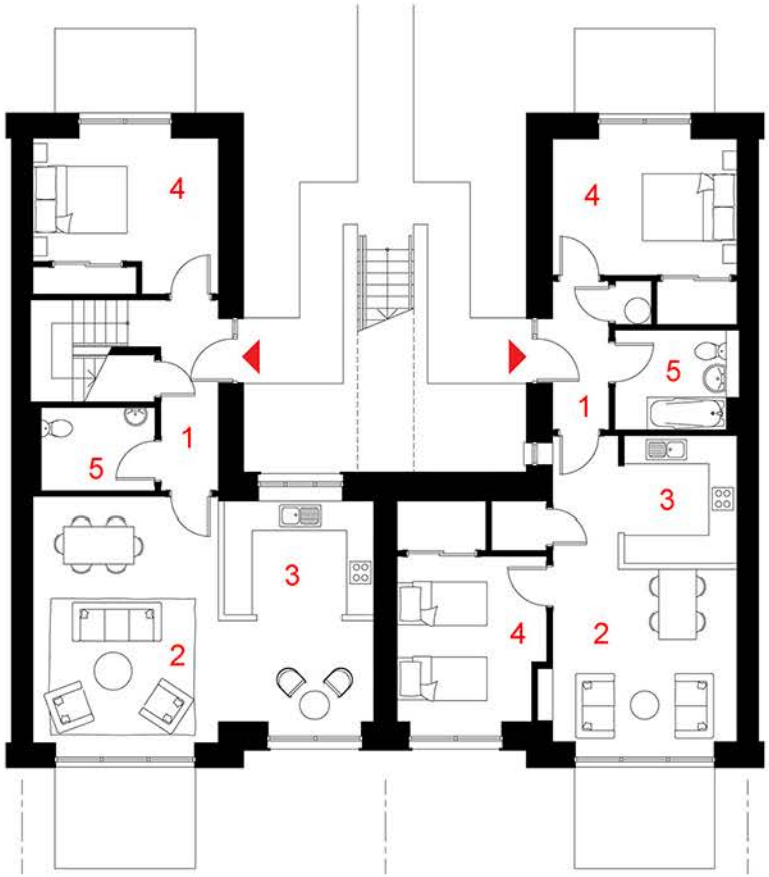

Evening
Noon
View
Prevailing
Wind
Morning



'TIGH-NA-CLADACH' | DUNOON | SITE PLAN

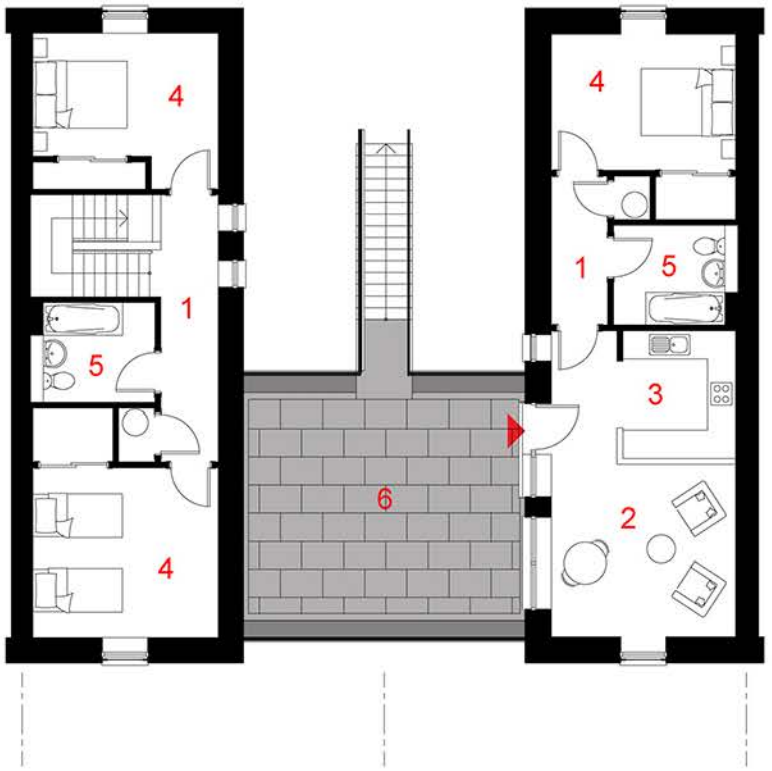
TYPE	BEDROOMS	PERSONS	AREA	NO.	PARKING
D	2	4	104 sq.m	1	2.25 per unit
E	3	6	120 sq.m	4	2.25 per unit
F	2	4	69 sq.m	4	2.25 per unit
G	1	2	52 sq.m	5	1.5 per unit
H	Office for Bullwood Group		52 sq.m	1	2.26 per unit
			Total	15	28
			Garden Area to be min 100m2		


ex. Steps
to Dunoon
West
Bay
Bullwood Road (A815)
to Innellan



3 Bed Unit- Ground Floor

2 Bed Unit- Ground Floor



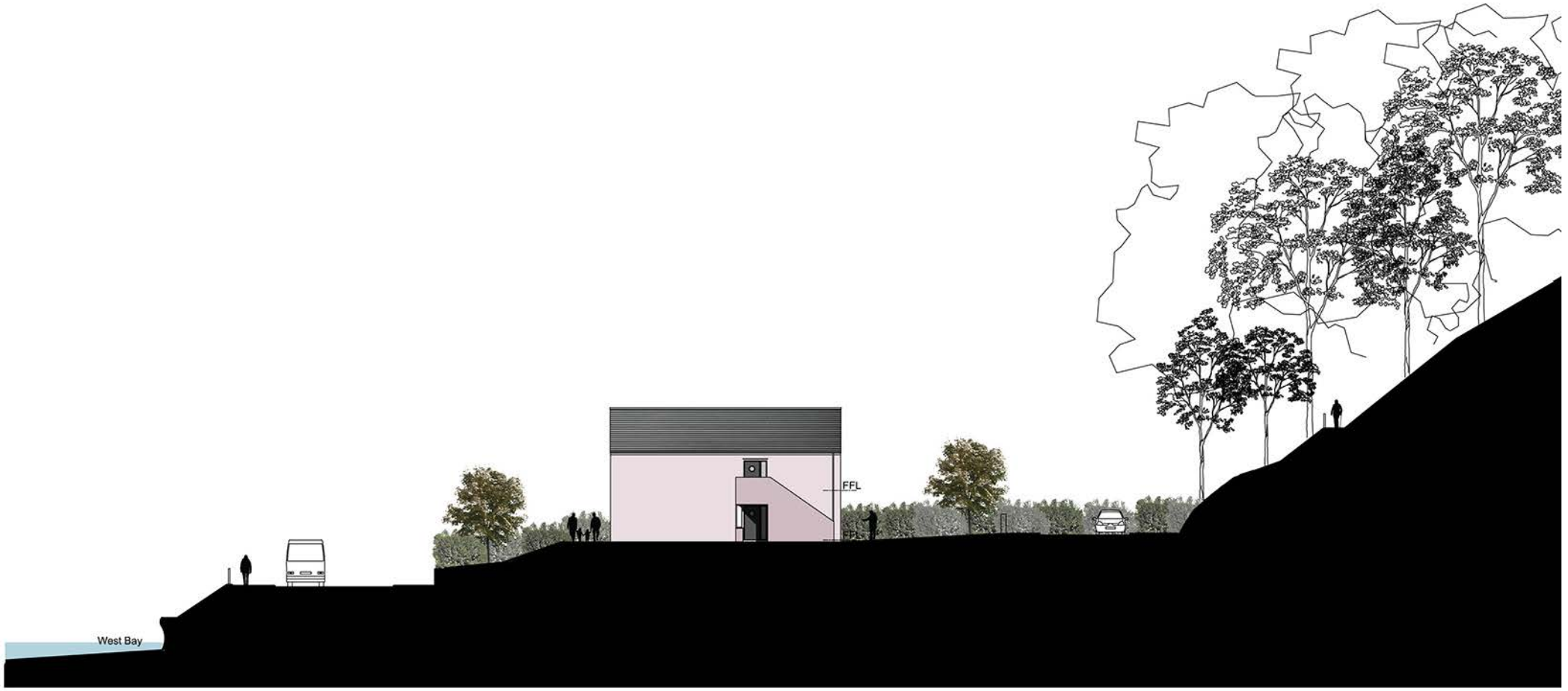
3 Bed Unit- First Floor

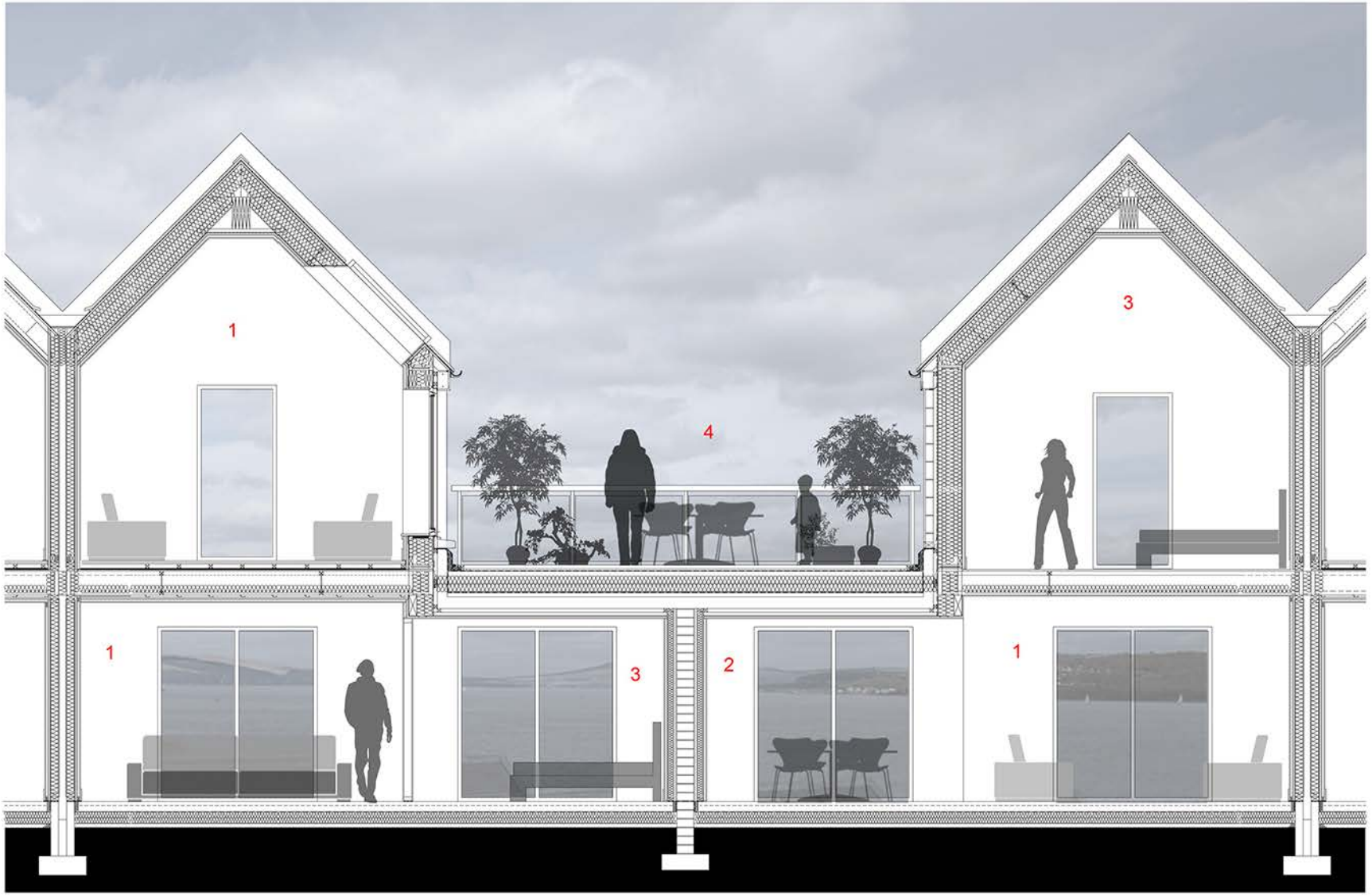
1 Bed Unit- First Floor

Key
1 Hall
2 Living/Dining
3 Kitchen
4 Bedroom
5 Shower Room
6 Roof Garden

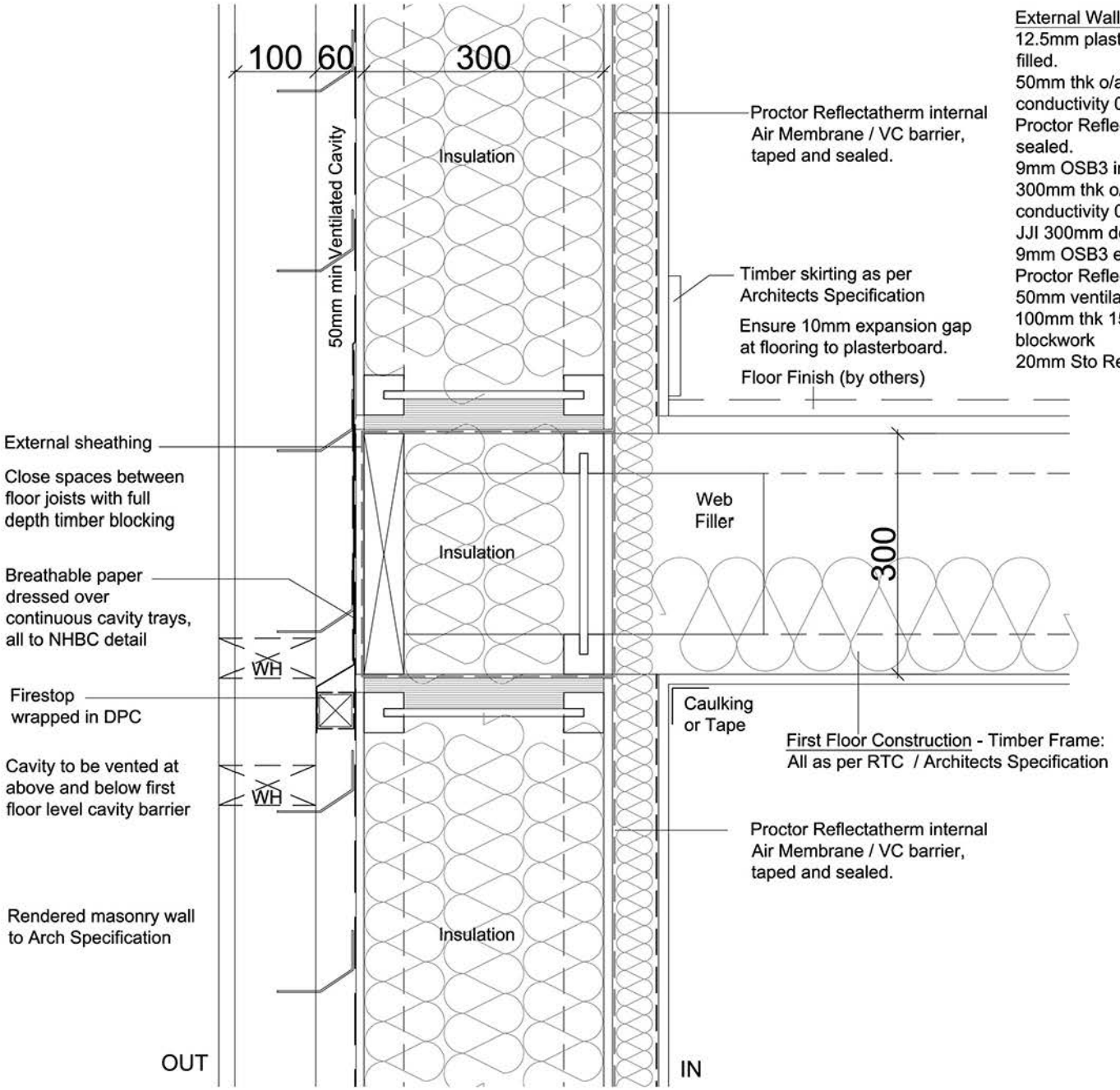
'TIGH-NA-CLADACH' | DUNOON | EAST ELEVATION

‘TIGH-NA-CLADACH’ | DUNOON | SITE SECTION





1 Living/ Dining Room
2 Dining Area
3 Bedroom
4 Roof Garden



External Wall Construction:
12.5mm plasterboard with vapour control layer, screw fixed, tape & filled.
50mm thk o/a Kingspan Thermawall TW55 insulation (thermal conductivity 0.022 W/mK)
Proctor Reflectatherm internal Air Membrane / VC barrier, taped and sealed.
9mm OSB3 internal sheathing
300mm thk o/a Owens Corning Mineral Wool Insulation (thermal conductivity 0.022 W/mK), fitted tightly between studs.
JJI 300mm deep o/a timber 'I' Studs at 600mm ctrs.
9mm OSB3 external sheathing
Proctor Reflectashield breather wall membrane, taped and sealed
50mm ventilated cavity and stainless steel wall ties
100mm thk 1500 kg/m3 to be min 7.3 KN/mm2 to BS 6073 concrete blockwork
20mm Sto Render Flex Cote System

First Floor Construction - Timber Frame:
All as per RTC / Architects Specification

Scottish Passive House Centre
Crossway, Hillend Industrial Park,
Dalgety Bay, KY11 9JE, Scotland

Authorised by the
Passivhaus Institut
Dr. Wolfgang Feist
Rheinstr. 44/46
D-64283 Darmstadt

Certificate

The Passive House Institute certifies the building

Tigh-Na-Cladach (House by the Shore), Bullwood Road, Dunoon, PA23 7QL, Scotland

Principal: **FYNE INITIATIVES LIMITED**
81 Victoria Street, Rothesay, Isle of Bute, PA20 0AP, Scotland

Architect: **Prof. Gokay Deveci**
Robert Gordon University, Aberdeen, Scotland

Mechanical Services: **Dynamight Passive Solutions**
Crossway, Hillend Industrial Park, Dalgety Bay, KY11 9JE, Scotland

as a

Quality Approved Passive House

The planning of this building meets the criteria for Passive Houses set up by the Passive House Institute.
With appropriate execution it will conform to the following standards:

- The building features excellent complete thermal insulation and first grade connection details with respect to building physics. Estival heat protection has been considered. The heating demand is limited to

15 kWh per m² living area and year or a heating load of max. 10W/m²

- The building shell features excellent air tightness proven according to ISO 9972 which guarantees to be free of draught as well as little energy consumption. Air change rate of the building shell at 50 pascal pressure differential is limited to

0.6 ach, in reference to the building's volume

- The building features a controlled ventilation system with high class filters, highly efficient heat recovery and low electric power consumption. Thus, excellent air quality together with low energy consumption are achieved.
- The demand in primary energy for heating, warm water, ventilation and household electricity totals with standard use less than

120 kWh per m² living area and year

This certificate is to be used together with the certification documents only. From these the precise data of the building can be obtained.

Passive Houses offer high comfort in summer as well as in winter conditions and can be heated with little effort, e.g. by heating of supply air. The building shell of a Passive House is evenly warm on the inside, inside surface temperatures are hardly different from room air temperatures. By means of the high grade air tightness drought appearance is impossible in normal use. The ventilation system steadily provides good air quality. Heating costs in a Passive House are very low. Due to little energy consumption Passive Houses offer a high rate security against future rise in energy prices and energy scarceness. Moreover the environment is ideally protected as energy resources are spent very economically and only small amounts of carbondioxide (CO_2) and other concentrations are emitted.

issued:
Dalgety Bay, November 11, 2009

Ingo Theoboldt