



## 15 SINGLE FAMILY HOMES WITH SHARED PARKING IN SANT ANDREU DE LLAVANERES (BARCELONA)

### SPECIFICATION

The new development of 15 homes is located on **plot 5 of El Balís at Sant Andreu de Llavaneres** in Barcelona.

The development is part of a total of 25 homes, of which 10 homes have already been executed as a single building on carrer del Cogoll. The remaining 15 homes are grouped into 2 buildings consisting of a basement, ground and first floors facing carrer de Costa Blanca.

The communal parking is located on the basement.

All homes enjoy a **private garden**, access to the **communal areas** consisting of a **swimming pool and gardened areas with native planting** and a private **solarium** on the roof with **sea views**, which serves as a space to be enjoyed with family and friends.



The development has two types of homes: Type 1 consisting of 14 dwellings with the exception of Type 2 consisting of 1 large dwelling at the corner of carrers de Costa Blanca i del Port.

There are 4 variants of Type 1 (the differences can be appreciated in the gardened areas, which depend of their location on the plot).

All homes have a kitchen-living-dining room on the ground floor and a multifunctional room to be used according to the needs of the family (office, pantry or sleeping area, etc.) and 3 bedrooms on the first floor. Bathing facilities are provided on both floors together with a utility room and cleaner's storage.

All rooms receive light and natural ventilation.

In terms of energy and economic savings, all homes will be equipped with significant thermal insulation, low transmittance glazing to windows, together with an aérothermal air conditioning system, achieving an **A-grade Energy Certification**.

## THE BUILDING & ITS COMPONENTS

### The Terrain

The plot is located on the coast on a terrain of a sandy and silty nature, on a slope that descends towards the south with an average inclination of 7%.



The ground water table has been detected on the site at level 3.7m (with a depth of 9m).

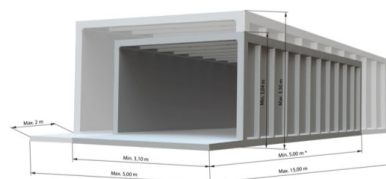
The support of the building up to ground floor level will consist of in-situ construction whilst the structure to the upper floors will consist of industrialized modular construction by Compact Habit.

### Foundations

The first in-situ part is composed of a surface foundation with reinforced concrete HA-25 footings embedded in the ground and braced onto the reinforced concrete HA-30 footings of the in-situ pillar, which support the reinforced concrete HA-30 beams (marine protection implemented as the coast is located less than 5km) and these in turn support the industrialized modules. All beams and pillars form a hyperstatic system with embedded knotted junctions. Perpendicularly, the beams are joined onto the retaining concrete basement wall, which are all below street level.

### Structure

The industrialized modules comprising of prefabricated reinforced concrete HA-50 ribbed walls and slabs are placed on top of the concrete beam framework. The modules are left open at both ends, they come with no façades.



The prefabricated modules are joined together by three families of connectors. On the one hand, the 'cones' that connect the upper module with the lower one and at the same time, the lower one with the beams, responsible for transmitting the cutting forces of the horizontal wind and earthquake forces to the lower modules.

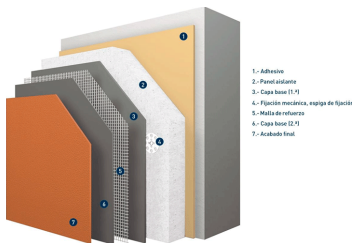
On the other hand, the horizontal union between the modules is made in the upper part of the slab by means of housing a metric thread that allows the horizontal stress to be transmitted between one module and the next successive one.

Finally, there are the bearings which are the elements responsible for transmitting the vertical forces and the beams to the lower module and the beams, and do not transmit any other effort.

# THE BUILDING & ITS COMPONENTS

## The façade

In line with the industrialized construction system of the modules, the façade system will be executed employing dry wall construction using industrialized elements. The façades consist of a double layer of insulation by means of a 40mm external porex thermal insulation and a 60mm internal rockwool insulation separated by and OSB-3 board. In addition, internal linings with an air chamber, vapour barrier and plasterboard will provide the façade with significant insulation and thermal inertia that will later translate into economic savings and a reduction in very important CO2 emissions.



## Openings in façade

The composition of the openings on the façades for the windows will create playful shadows on the surfaces.

Within these openings the minimalist aluminium and glass window assemblies will be placed, flush with the interior wall finish. Motorized blinds and glazed balustrades will be placed on the exterior.

All homes have natural cross ventilation and guarantee between 10 and 12 hours of direct sunlight into the rooms during the winter solstice.

## Minimalist Joinery

Window joinery will be of high quality and with a very low thermal transmittance, a key factor in achieving an A grade in the energy rating certificate. The joinery will be made with thermally broken aluminium windows and doors together with double glazing.

All window assemblies consist of a tilt and turn configuration except those ground floor windows located in the living rooms which consist of a side hung inward configuration to allow a high degree of ventilation control and to facilitate cleaning.



## THE BUILDING & ITS COMPONENTS

### Construction solutions

In general, the construction approach to the design of the façades and its thermal envelope will seek to avoid thermal breaks and bridging which normally tend to appear in the openings, overhangs, edges of slabs and thus eliminate possible condensation and other pathologies.

With the aim of ensuring a low energy demand on this development and thus keep heating and cooling costs to a minimum, a set of measures will be implemented during the design and construction:

- Façades insulated using an External Thermal Insulation System (SATE)
- Party Walls built with 2 ribbed concrete walls and expanded polystyrene, separated by an air chamber with a 1.2m extruded polystyrene insulation as skirting and with all the joints taped.
- The ground floor concrete slab in contact with the car park will have additional thermal insulation.
- The roof, as one of the most vulnerable elements, will be insulated with an additional thickness.

## INTERNAL PARTITIONS & LININGS

### Internal linings to façades

All linings to façades will consist of a 48mm metal profiled structure infilled with 30kg/m<sup>3</sup> and 0,037w/mK rockwool panels and finished with 15mm fireproof plasterboard.

### Internal linings to party walls

Ribbed concrete Party Walls will be finished with a factory surface treatment.

### Internal partitions

All internal partitions will employ dry wall construction solutions using self-supporting metal profiles.

Partitions will be erected on acoustic bands to prevent the transmission of noise. Partitions will consist of a 70mm metal profiled structure infilled with 40kg/m<sup>3</sup> and 0,035w/mK rockwool panels and finished with 15mm plasterboard on both sides.

In wet areas, moisture resistant plasterboard will be employed.

## FLOORING & WALL FINISHES

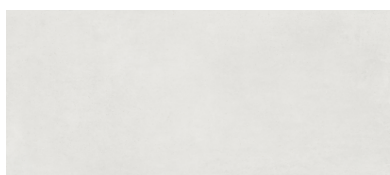
### Finishes

The flooring finish throughout the entire home with the exception of the flooring in the wet areas will be in exposed concrete, factory finished with a surface treatment.

Timber skirtings will consist of pine sections, painted and finished in gloss. The colour of the skirtings will match those of the vertical surfaces.

### Flooring finishes in wet areas

Bathrooms, utility rooms and cleaner's stores will be finished in Porcelain Stoneware rectified flooring with an anti-slip finish, class II UNE 4190EX and absorption class Bla in 30cm x 60cm format.



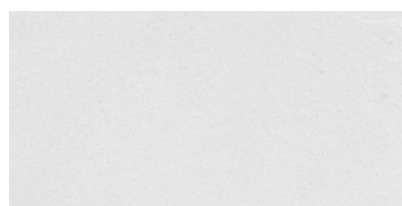
Gravel White



Gravel Grey

### Wall finishes in wet areas

Wall finishes to wet areas will be executed with tiling, either in the same ceramic piece as the flooring finish or in a lighter tone, for example a combination of Gravel Grey flooring and Gravel White tiling. Plain wall tiling will be combined with embossed ceramic tiling.



Plain ceramic tile



Embossed ceramic tile



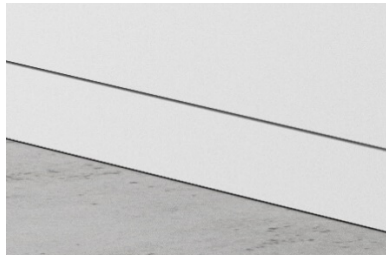
## WALL & CEILING FINISHES

### Vertical surfaces

The vertical surfaces will be discreet in appearance in search of the quality and sustainability of the materials. In general, all internal partitions and linings will be carried out in laminated plasterboard painted with low emission of volatile particles with a smooth plastic white paint, with two coats of primer and one coat of finish. Porcelain tiles will be fixed on all vertical surfaces to wet areas, coordinated with the flooring finish.

### Skirtings

The skirtings will form a conceptual part of the vertical surfaces, matching the colour of these elements. Skirting in general will consist of recessed pine sections painted in a gloss finish.



### Ceilings

Continuous plasterboard ceilings will be fixed in areas where services need to be concealed. In wet areas, these surfaces will be fitted with moisture resistant plasterboard.

## DOORS

### Main entrance door

The main entrance door to the dwelling will be 80cm wide x 209cm high and consists of a security door finished in timber with a 3-pin lock and a wide angled peephole.



Internal view of the main entrance door.

## KITCHEN

### Minimalist kitchen

The kitchen will be minimalist in style with clean and elegant lines, and at the same time, will create a functional environment.



The fixed furniture will consist of kitchen units with doors and drawers with brakes, fitted below the worktop together with an integrated space for the dishwasher. There will be a floor to ceiling column integrating a fridge and freezer, a built-in oven and microwave in addition to kitchen units with push-open doors.

All kitchen unit fronts, exposed sides and skirtings will be of recycled MDF board employing recycled timber fibres, finished in polyethylene terephthalate (a material known to effectively block moisture) in a light /white colour and matt finish.

The kitchen unit fronts will incorporate a concealed finger pull handle recessed along the entire length's edge.

### Worktops

The kitchen worktop and splashback, together with the sides and top of the kitchen island will be clad in 12mm compact laminate, in white to give it a minimalist touch.



### Sink

A stainless steel undermounted sink will be fitted within a 80cm wide kitchen module. Model Fuji 5040 or similar



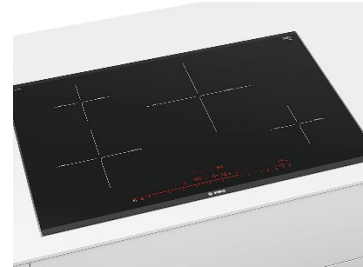
### Taps

The faucet will be a single level type, with an L-shaped spout, finished in chrome. Model Urban CR 93658 or similar



### Cooking hob

The cooking hob will be a 60cm induction plate with 4 cooking zones and touch control. Model Bosch Serie 4 PUJ631BB5E



### Extractor fan

The extractor fan with a white surface wide will be integrated into the ceiling. MODEL BOSCH DRC065AQ5 90X50 cms.





## KITCHEN

### Oven

Built-in multi-function, self-cleaning oven 60cm x 60cm in stainless steel.

Model Bosch HBA512ES0



### Microwave

Built-in 60cm x 38cm stainless steel self-cleaning microwave. All kitchens will integrate a “column” with oven and microwave. Model Bosch BFL520MSO.

## BATHROOMS

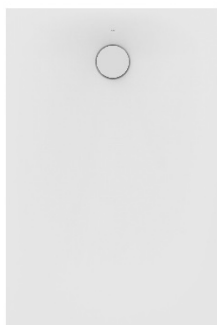
### Vanity unit

Hand wash basin integrated in vanity unit with concealed chrome waste trap.



### Shower trays

Rectangular shower tray with custom dimensions, finished with non-slip treatment.



### Basin taps

Single lever hand wash basin mixer with spout and plain body set in chrome.



### Shower taps

Thermostatic shower taps for en-suite bathroom in master bedroom.



### WC

Complete close coupled compact toilet (includes pan, cistern and lid)



## SERVICES

### Electrical

An electrical board with a simple network and different circuits: one for lighting, one for general sockets, one for a washing machine one for cooking equipment, one for the dishwasher will be installed in order to protect the home.

Internal electrical lines consisting of insulated copper wire in flexible corrugated PVC conduits will be installed within internal partitions/linings and a rigid PVC conduit when exposed (or a self-shielded cabling).

All mechanisms (sockets, switches, light points) will be executed as per design drawings and according to Building Regulations with high quality mechanisms, minimalist in appearance.

LED recessed ceiling lighting will be installed in bathrooms, corridors and halls and LED downlights in kitchens.



### Telecommunications

Fibre optic will be employed leading to the User Access Point (PAU) inside the home.

Coaxial cable will be employed for cable/broadband telecommunications service leading to the PAU. Available Public Telephone Services will be provided (STDP) leading to the PAU.

Broadcasting and TV sockets (RTV) will be provided in the living room, kitchen and all rooms, employing coaxial cable leading to these points from the User Access Point (PAU), located at the entrance to the home. Broadband and telephone sockets will be provided in the living room, kitchen and all rooms via a category 6 UTP cable from the PAU.

### Electrical / Plumbing

Electronic video intercom for access to the home will be installed.

Internal water network carried out in protected polyethylene ducting.

Shut off valves in each wet area together and connection to hot water production. Shut off valves will be placed next to each connecting item: sanitaryware, sinks, appliances and taps.

Plumbing will comply with Building Regulations and will be dimensioned by and an approved installer.

## SERVICES

### Heating & hot water supply

The heating installation includes:

- AEROTHERMAL. LG MULTI V S heat pump (outdoor equipment), or similar and direct expansion units (indoor equipment).
- The heat pump serves the thermal needs of the home, both DHW Domestic Hot Water and air conditioning (heating and cooling).
- Air conditioning will be supplied via direct expansion ducts and DHW production with medium temperature hydrokit, with the interiors and the hydrokit connected to the same outdoor unit with heat recovery.
- A "data logger" calorie counter will be installed in the home to monitor the system and be able to control the COP of the system both in heating and in DHW generation.

### HVAC

Bedrooms, living rooms, dining rooms and kitchens have all been placed along a façade so that they can enjoy natural ventilation and natural lighting.

Bathrooms have mechanical air ventilation, meeting the ventilation and air renewal requirements established by the Building Regulations. Forced ventilation by mechanical means guarantees a minimum extraction flow of 30 m<sup>3</sup>/hour, as indicated in article 66.

Exhaust air outlets will be executed employing 130mm diameter individual galvanized sheet ducts. All ducts will be hidden inside built-in boxing or within false ceilings.

Smoke extraction to the kitchen will ventilate at roof level.

### Vertical waste

Rainwater will be collected into roof gutters and water collecting drains and channels. All bathrooms, wet areas and kitchen appliances will be connected to 110mm diameter vertical PVC downpipes. All the downpipes will be concealed with boxing.

