

DURBAN
NORTH COAST
BEACH
SHACK



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PROJECT DETAILS

PROJECT NAME:	BEACH SHACK
PROJECT LOCATION:	DURBAN NORTH COAST
BUILDING TYPE:	PRIVATE RESIDENCE
BUILDING SIZE:	360 m ²
PROJECT DATES:	FINISHED FEBRUARY 2022
START & COMPLETION:	FEBRUARY 2021 TO FEBRUARY 2022 (3 MONTHS LOST TO COVID SHUTDOWNS)
PROJECT SECTOR/S:	RESIDENTIAL

PROFESSIONAL TEAM

DEVELOPER:	PRIVATE OWNER
ARCHITECT:	DESIGN/CONCEPT: WIHL+CO LOCAL IMPLEMENTATION: BOAST ARCHITECTS
CONTRACTOR:	EARTHWORKS/MAIN CONTRACT: JEMSTRUCT CONTRACTORS DRYWALLING & CEILINGS: MATTHEW BANEY KINGDOM DRYWALL CO.
ENGINEERS:	MARTIN & ASSOCIATES CONSULTING ENGINEERS
PROJECT MANAGER:	JEMSTRUCT
ENVIRONMENTAL CONSULTANT:	TRIPLO 04 - EIA AND SITE MONITORING



PROJECT OVERVIEW

This 3 bedroom residential house is located in the North Coast of KwaZulu-Natal and is a new build. The remarkable beach house project is a real life demonstration of the Saint-Gobain building better approach, in which comfort and wellbeing of the occupants are at the heart of the design and its execution. This home demonstrates that certain simple adaptations and material choices are required at the design stage to deliver against the homeowners requirements for comfort and wellbeing in an energy efficient home.

PROJECT BACKGROUND AND CLIENT BRIEF

The property is lapped by the Indian Ocean, on the coastline of KwaZulu-Natal South Africa that is a paradise of warm waters and sun drenched beaches. The ground is situated in a coastal forest, which required an Environmental Impact Assessment (EIA) with strict assessments of how the property design and the building impacts the land for minimal disruption. The climate is subtropical – hot humid conditions requiring purposeful design.

The owner wholeheartedly embraced the principles of Saint-Gobain, a lightweight construction materials supplier. Saint-Gobain believes that feeling good in a building is about having the perfect amount of light, the appropriate level of sound and the ideal indoor temperature. The approach is about designing homes that deliver comfort and wellbeing utilising lightweight building technology, beauty and safety, efficiency and sustainability. A good living place is adaptable to us, rather than the other way around.

“We designed and built our own home using lightweight solutions from Saint-Gobain that enable us to enjoy the benefits of comfort and support our wellbeing. The property is built in a coastal forest with Milkwood trees which required an EIA with strict assessments of how the building was designed and how it impacted the land with minimal disruption between the trees. It had to be a property that would make us feel happier and enable us to live, work and play in a healthier internal environment’ – The Owner.

An experienced and specialised contractor in the Durban area, Kingdom Drywall Co. was appointed to implement the internal fit-out for all the interior walls, ceilings and bulkheads. In addition to these practical installations, the company also provided bespoke solutions to various challenges via system and product applications through the Saint-Gobain technical teams.



KEY CHALLENGES

TEAM DELIVERED VALUE

The site is located within a highly environmentally sensitive zone and is just 30 m from the beach. There were overarching environmental considerations during the planning and construction phases, in addition to the design, building typography and system/materials selection being of prime importance to a humid subtropical climate.

- ▶ An EIA was performed by independent consultants. It included strict assessments of how the property design and building could impact the land and cause minimal disruption. Once implemented, ongoing site inspections were carried out and reported on during the build phase.
- ▶ The house sits on concrete stilts on a floating slab, located 1.8 m above ground level. This facilitates airflow for mass cooling in summer.
- ▶ The building footprint was minimised to have the least impact on the site. The second floor cantilevers the smaller first floor which is raised off the ground
- ▶ Water usage during the build was kept to a minimum due to the shuttering of the concrete with no mixing required on site and the usage of lightweight dry construction materials from Saint-Gobain.
- ▶ The nature of the environment – temperature range from 10° C in winter to a high of 32° C in summer, plus the humidity necessitated the incorporation of lightweight building methods and elements.
- ▶ Due to its location, just 30 m from the beach, the selection of corrosion resistant materials was paramount. Hence the roofing material used is aluminium. High grade stainless steel and glass was specified wherever possible, complemented by ongoing cleaning of all metal objects.
- ▶ The proximity to the beach creates a noisy environment. Appropriate acoustic measures were specified and facilitated by a combination of Gyptone®, RhinoBoard® & RhinoLite® used on the ceilings with Isover® Cavitybatt™/Cavitylite® insulation and RhinoBoard® plasterboards used for all the walls. In addition, Cool-Lite® high performance Low-E glass used in the windows and doors also reduces the noise when shut, but allows for a gentle version of the surf to be heard.
- ▶ The home is orientated towards the south-east, and is therefore mainly exposed to the early morning sunlight. Interventions to manage solar energy penetration include Low-E treated fenestrations which reduces solar heat gain, glare and UV radiation that causes furniture to fade. Solar absorption is decreased by a minimum of 37% which reduces the re-radiation of heat into the internal space. In addition, the roof has a 1.5 m overhang around the envelope which serves as an additional shading element.
- ▶ Rain water is harvested into two tanks under the house, further supporting low water consumption.
- ▶ Challenging aspects of the project requiring bespoke solutions by the drywalling contractor supported by the Saint-Gobain Construction Products technical team, included thermal comfort, acoustic comfort, load bearing capacity of walls, shower cubicle, kitchen applications and tiling. Another aspect was providing the necessary load bearing support inside the drywall cavity for fixings on the drywall.
- ▶ These helped to ensure that the structural integrity of the drywall and ceiling systems would be upheld for the lifetime of the building. In order to do this, it was necessary to understand what the owner's plans were for the interior layout, including aspects such as the sighting of the LED screens that would be installed, wine racks, floating shelves, cupboards, fireplace positioning, what tiles would be used in the shower and other crucial aspects such the

designs for wall mounted WCs.

- ▶ Matthew Baney, the owner of Kingdom Drywall Co. explains: "Two unique challenges stood out for us. However, drywall systems are so versatile that these challenges were rather simple to overcome."
- ▶ "Challenge 1 was the wall hung toilet pans, which could not be fixed to the external cladding blocks. We installed 90 mm steel tubing within the drywall cavity mechanically fixed to the concrete slab and soffit. The pan was then fixed through the tiles and plasterboard and bolted into the steel tubing."

- ▶ "Challenge 2 was the wall tiles: they exceeded the maximum weight limitations of the drywall system of 20 kg/m². We overcame this challenge by a mechanical fix of aluminium angles fixed through the plasterboard and into the 102 mm Gypframe® UltraSTEEL® Studs. This transfers the weight of the tiles onto the steel structure and not solely on the RhinoBoard® MoistureResistant plasterboard."
- ▶ All system assembly was done on-site, hence minimising transport and handling logistics.



General building systems and applications:

Building element	Design & systems used
Foundations	<ul style="list-style-type: none"> ● Concrete stilts on a 1.8 m high floating slab facilitates airflow for summer cooling the thermal mass. Anchoring of lightweight concrete blocks off the slab and columns is by Weber Tylon® Multi Fix tile adhesive.
Roofing	<ul style="list-style-type: none"> ● Aluminium ribbed locking roof. ● The roof has a 1.5 m overhang to manage the sun shining directly into the house. In line with SANS 10400-XA, an internal reflective foil is also fitted under-roof.
Ceilings	<ul style="list-style-type: none"> ● Gyptone® Bigline 6 was combined with RhinoBoard® 9 mm when a smooth ceiling or bulkhead was required. ● Ceiling products supported by Aerolite® which has exceptional acoustic insulation properties; it enhances your indoor environment by absorbing noise from the inside and outside. ● The upper level veranda has RhinoBoard® MoistureResistant plasterboard skimmed with RhinoLite®, as it is a covered space.
Insulation (thermal)	<ul style="list-style-type: none"> ● 135 mm Aerolite® glasswool with up to 85% recycled glass above the ceiling boards which exceeds SANS 10400-XA requirements for the region as well as a 200 mm air gap under roof. ● The wall cavities contain Isover® Cavitybatt™/Cavitylite® insulation to an R value of 2.68 m²k/w.
Walling	<ul style="list-style-type: none"> ● The exterior walls of the building consist of Green Crete lightweight 110 mm concrete/EPS blocks. These were plastered with an external coloured acrylic render. ● The interior walls and interior drywalls – 12.5 mm RhinoBoard®, RhinoLite® supported by a 102 mm Gypframe® UltraSTEEL® Stud and track system insulated with 102 mm Isover Cavitylite. ● Surfaces – interior and exterior – skimmed and painted. Large format tiles installed on the walls of the open en-suite bathroom and wet areas. ● Weber Tylon® Plaskey and Key It were used to benefit long term health through superior waterproofing properties for the bathrooms and showers also ensuring resistance to mould growth.
Windows	<ul style="list-style-type: none"> ● Windows and sliding doors from Saint-Gobain Cool-Lite® 150 with a solar factor – solar absorption of 37%. These are openable to facilitate airflow and cooling.
Floors	<ul style="list-style-type: none"> ● Solid wooden floors, providing natural thermal comfort in the living areas, with tiles in the wet areas. ● Tiles: Weber Tylon® Porcelain S was used to fix the floor tiles with Weber Tylon® Bonding-It, providing a stronger bond for the large format tiles. Grouting was done using Weber Tylon® All Purpose Grout.

Systems supporting Comfort:

System Performance	System Products
Thermal Windows	Saint-Gobain Cool-Lite® 150. Cool-Lite® 150 Low-E glass absorbs 37% of inbound solar.
Roof & cavity insulation	Aerolite® 135 mm
Cavity insulation (walls)	Isover Cavitybatt™/Cavitylite® 102 mm
Floor	Thermal comfort is also facilitated by the wooden floors.
Acoustic Ceilings	<ul style="list-style-type: none"> ● Aerolite® 135 mm in the roof. ● Combination of RhinoBoard® 9 mm and Gyptone® Bigline 6 reduces reverberation.
Walls	<ul style="list-style-type: none"> ● Isover® Cavitybatt™/Cavitylite® 102 mm supports improved acoustics. ● RhinoBoard® 12.5 mm helps support privacy between spaces.
Windows	<ul style="list-style-type: none"> ● Cool-Lite® 150 Low-E glass reduces transmission of inbound noise.
Visual	<ul style="list-style-type: none"> ● Environmental sensitive design, meaning an elevated view above the protected trees. ● The nature of the design, when viewed from outside, also gives the house a beautiful aesthetic. ● Natural light is maximised inside the house.
Indoor air quality (IAC)	<ul style="list-style-type: none"> ● Gyptone® Big Line 6 – helps improve indoor air quality by absorbing formaldehydes due to ActivAir technology.



KEY FEATURE ELEMENTS OR UNIQUE SPECIFICATIONS

- The applications of lightweight products and systems from the Saint-Gobain group expertly support comfort in the home through; thermal comfort, acoustic comfort, visual comfort and indoor air quality.
- What is exceptional is the achievement of these goals within an environmentally sensitive coastline inside a protected area. The house's impact is testimony to this.

KEY ACHIEVEMENTS USING SAINT-GOBAIN SOLUTIONS

- Indoor environments perform better for acoustic and thermal comfort while promoting required passive fire safety.
- Aesthetically pleasing spaces.
- Wall mounted fixtures properly fixed to the walls: "We absolutely do believe that the right choices were made as we considered every detail of the interior layout of wall fixtures and applications".
"In SA, drywall systems are used predominantly in commercial spaces such as offices and hotels and not so often in residential applications. This project was unique in that there was so much more to consider other than what is typically found in office environments - that is because this is a living space designed around the client's personal interior design preferences, while blending with the environment".

- **Matthew Baney, Kingdom Drywall Co.**



COMFORT

OWNER OBSERVATIONS

Acoustics

The house is quiet and has a calming effect as there are no echoes or sound transmittance as the sound in a room is reduced through the walls and ceiling rather than transferring to the rest of the house. The ceilings are designed to provide acoustic performance with Gyptone® used in all the living areas

Visual

The ceilings and bulkheads with LED lighting were designed for visual aesthetics as well as thermal performance. The raised nature of the house on two levels meant that a stunning sea view could be achieved without damaging the protected Milkwood trees growing on the site.

Thermal comfort

Careful design using the high performance lightweight systems rather than traditional bricks on the external structure ensure improved thermal performance.

Indoor air quality

This is facilitated by sliding doors and windows that allow for cross breezes and natural ventilation. However, a central air conditioning system was installed upstairs to assist over the very humid days. Formaldehyde levels are controlled by the use of Gyptone® board in all the living areas which also improves indoor air quality as it absorbs formaldehydes.

Energy Efficiency

The ceiling and walls perform to levels above the requirements in SANS 10400-XA which delivers cost savings as less cooling or heating is required to keep the house comfortable. Hot water is supplied by a heat pump system. The smart light switches and LED lights are all controlled via an app on cell phones.





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