BUILD BETTER NOW: **FORTIS HOUSE**

FORTIS HOUSE WAS DEVELOPED IN RESPONSE TO COMMUNITY REQUESTS FOR HELP TO BUILD BETTER. EVERY YEAR, THE BUSHFIRE BUILDING COUNCIL OF AUSTRALIA (BBCA) IS CONTACTED BY THOUSANDS OF PEOPLE ASKING FOR HELP TO MAKE THEIR HOMES MORE RESILIENT TO BUSHFIRE AND OTHER DISASTERS. THE NUMBER OF PEOPLE ASKING FOR HELP IS RAPIDLY INCREASING AS DISASTERS BECOME MORE FREQUENT, INTENSE AND WIDESPREAD. SPONSORED BY NRMA INSURANCE, THE PROJECT HAS DELIVERED HOUSE DESIGNS AND A SET OF BUILDING PRINCIPLES FOR EXTREME WEATHER AND DISASTER RESILIENCE, SUSTAINABILITY, SELF-SUFFICIENCY AND QUALITY.

BBCA created FORTIS House in response to the 2019-2020 Black Summer bushfires and subsequent floods to help recovering communities re-build.

According to Kate Cotter (CEO, BBCA), "FORTIS House came about because we were receiving lots of enquiries from people in the wake of the Black Summer bushfires. People really wanted to know how to build better, what materials to use, and how to build to best practice. The sheer scale of that disaster meant it was almost impossible for us to help people on an individual level. So, we thought the best way to help was to work with a recovering community to design a home that local people wanted to live in. Importantly, we wanted to ensure that the outcome of the project was something that everyone could use," said Cotter.

COMMUNITY-LED DESIGN

FORTIS is a world first community-led resilient house design project. The overarching aim was a design project 'for the community, by the community'.

The Shoalhaven community in New South Wales helped design FORTIS House, empowering a disaster-affected community to lead their own recovery and re-building.

"BBCA approached the Shoalhaven community, which was heavily impacted by the Black Summer bushfires. Together with the Shoalhaven City Council, we put out an Expression of Interest, to which a lot of people replied," said Cotter.

The Shoalhaven participants developed a community design brief, exploring experiences of living in the Shoalhaven, what 'home' means and design styles and living preferences. Community design workshops ran from May 2021 to February 2022.

"We kicked off a year-long consultation process. We had our engineers, architects and builders facilitate a co-design process. This all happened during the COVID-19 pandemic, so it involved a lot of online webinars. We asked general questions about what they loved about Shoalhaven, how they wanted to connect with the community, the look and feel they wanted in a house, what functionality was needed and what wasn't. The same process you would go through with an architect as an individual, we did as a group," said Cotter.

"While we couldn't design something to suit everyone, we were able to pick up on the common threads. The real challenge for us was how to provide technical resources, and clear instructions for homeowners, designers and building trades. We had to create a design that would suit individual sites and preferences, and exceed the building regulations."

Despite these challenges, the team released the free FORTIS Resources

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less than a year after commencing the design brief—in April 2022.

THE FORTIS PRINCIPLES

FORTIS applies research and engineering principles to provide households and the building industry with best-practice, practical solutions to achieve greater disaster resilience.

"The FORTIS Principles are how we demonstrate best practice – they are about going beyond building regulations and adapting buildings to climate change over their lifecycle," said Cotter.
"A key focus is the ability to shut down the home in the event of a disaster or extreme weather—homes that are self-defending. We want people to be able to evacuate the area when there is a disaster, without having to activate systems to protect their home. There should be no need for experienced people to protect property—it is too dangerous. The FORTIS Principles put people first. Let's get people safe, and ensure there is a built environment for them to come back to."

"We also wanted to address materials and trade shortages. These are issues that are exacerbated after a disaster—let alone at the moment with ongoing shortages. With people having to draw on their savings or insurance to live out of home, speed of construction was important. Prefabrication and the use of steel enables people to get back onsite quickly, speeding up the construction process, without cutting back the resilience of the building. The FORTIS design can be built or prefabricated entirely offsite, a hybrid approach can be used, or it can be built entirely onsite," said Cotter.

The following Principles must be met to achieve FORTIS resilience.

1. Protective Outer Shell
The FORTIS House protective outer layer of high performance steel mesh bi-fold screens protects glazing and decking, which are highly vulnerable to disasters. Glazing is set back from the screens to reduce radiant heat transfer, increase the likelihood that glazing survives extreme weather and disasters, providing a functioning home even if the screens are damaged.

2. Protected Sub-Floor
The sub-floor structure is built from noncombustible materials and screened with a mix of steel mesh and concrete blocks. Services connections to the sub-floor are run underground, risers are protected.

3. Separate Resilient Shed
Combustible services and stored items such as solar panels, batteries and vehicles are housed in a separate non-combustible, sealed shed/garage, away from the home.

4. Aerodynamic Roof Form
The FORTIS four-panel hip roof form minimises debris accumulation, is aerodynamic and reduces uplift forces during high winds. The separate Resilient Shed reduces the roof area of the main home, further reducing wind forces. Cyclone-rated screws and washers are used.

5. Minimal Building Penetrations
100% electric home, self-sufficient water and power. Building penetrations are minimised, must be tight fitting, screened with steel ember mesh and sealed with fire rated silicone to improve energy efficiency and prevent embers, wind and water entry.

6. Multiple Exit Points and Visibility
Non-combustible construction and managed landscaping provides safer escape pathways should the home become untenable in a disaster. Perforated mesh screens enable good visibility so occupants can observe outdoor conditions. Multiple door types provide contingency should one door system fail.

THE WEBB FAMILY STORY

Greg Webb and his wife Alex's home was the heart of their family for two generations, before it was lost during bushfires in Shoalhaven on New Year's Eve, 2019. Lake Conjola was always their happy place, and there was never any doubt that they would find a way to rebuild and bring the family back together to continue to create special memories.

"I saw a flash of flames across the lake and that's when my whole life changed. 18 minutes later I was out there trying to save this house from a bushfire," said Webb.

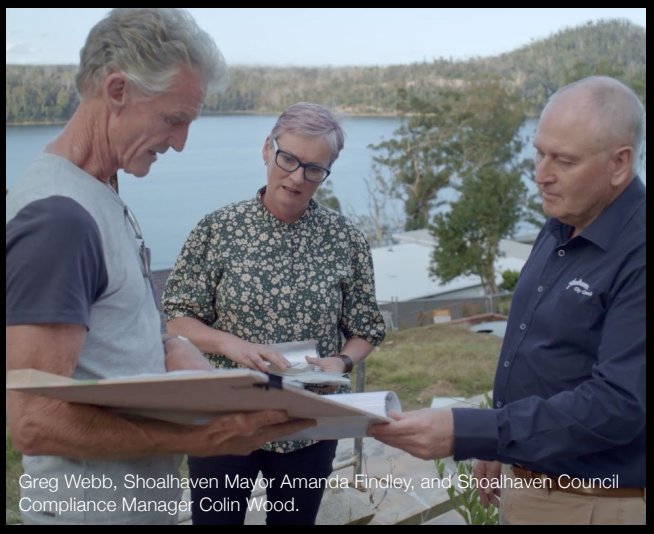
"Hollywood can't ever portray what it smells, tastes and sounds like to experience a bushfire and fight to save your home, then watch it burn down in a matter of minutes right in front of your eyes. And following that trauma, the recovery and rebuilding process is harder than anyone can possibly expect.. I felt utterly lost.. I'm 66 and I never imagined I would be building at my age."

"FORTIS House has been the first recovery project I've seen that was truly led by the community and has delivered something practical that will save homes, lives and prevent the heartache of rebuilding after the next bushfire. And we know, thanks to climate change, the next one is probably coming again in a matter of years."

"This is still my home. It's just that I'm building another house on it and I'm going to live with the bush now and I'm going to be prepared this time. That's all there's to it. I can't go through this again."

"The thing I love about FORTIS is that it's practical, and it's for anyone—you can build it in a modular concept, you can build it yourself if you're an owner-builder — all the tools are there for you to pick up and run with. It's not only resilient, but sustainable too. A house that burns down is not sustainable—our house is going to be around for at least 100 years, I'm sure of it."

"We need to be prepared, and build resilient homes with the help of experts. We just want to keep living in our happy place," said Webb.



Greg Webb, Shoalhaven Mayor Amanda Findley, and Shoalhaven Council Compliance Manager Colin Wood.

Greg Webb.

7. Non-Combustible, Robust Materials
Non-combustible structural framing, insulation, external linings, decking, gutters, gutter guard, downpipes, landscaping and storage. This robust construction method ensures FORTIS is designed to last, has redundancy and is low-maintenance.

8. Optimised Siting
Site FORTIS House with the living areas facing north. Optimal siting for resilience includes locating the house to enable emergency vehicle access and at the greatest distance from hazards such as bushland, flood prone areas of the property and neighbouring structures.

9. Building Ventilation
FORTIS protective screens and the concealed roof ventilation system provide airflow to improve energy efficiency and protect the home from embers, wind driven rain, condensation and mould.

THE ROLE OF STEEL

Steel features heavily in the FORTIS House design, from its frame, roof, gutters and balustrades, through to the steel mesh gutter guards and stainless steel mesh screened sub-floors. There are even non-combustible steel rainwater tanks, for dedicated fire fighting and domestic water supplies, that are anchored to prevent loss in storms, floods and cyclones.

"FORTIS House uses a steel frame for redundancy for bushfire. We have steel roofing, cladding and mesh to protect openings and the sub floor. In fact, FORTIS House is mostly a steel building. There are a lot of reasons for the use of steel."

"In particular, steel is the perfect material for bushfire prone areas—embers often make their way into the wall or roof cavities, and steel systems prevent these embers from igniting," said Cotter.

"Steel also offers multi-hazard resistance. We wanted to use a material that not only protects against fire, but moisture, flooding and wind impacts. Steel stands up well in the face of all these hazards."

"The other key reason for the use of steel is its longevity. We want to create buildings that last a long time. Steel enables this," said Cotter.

HOW FORTIS WORKS

FORTIS is a flexible design and set of principles that when used with the FORTIS Technical Handbook, can be applied to any house to suit individual preferences, locations, budgets and lifestyles. FORTIS can be scaled up and down to suit needs and budget. The shape of the house can be altered to suit the site, and different materials, colours and interiors can be selected.

FORTIS designs have been named after locations in the Shoalhaven, in recognition of the community contribution to this project. There are five designs in total.

The Conjola features general resilience to extreme weather and disasters including bushfire sites up to BAL 40, suiting the majority of Australian locations. The Conjola can be upgraded where additional measures are required for cyclone, flood and BAL FZ bushfire sites. Designed with flexibility in mind, the simple modular layout of FORTIS Conjola allows it to adapt to different sites and needs. Large openings to the North and East emphasise light, airflow and connection to nature.

Approved prefabrication suppliers or your own builder can adapt the FORTIS Conjola design to two storeys and steep slopes, reduce or extend the floorplan and orientate it to suit your site and local environment.

Tomerong is a long rectangular shape suited to hugging slopes. Tomerong features a skillion roof and extensive decking for indoor-outdoor living. The Budgong suits a larger sized property with its L-shaped design and courtyard. The Berrara is cabin-sized, designed to fit a single pod for speedy construction and easy relocation. The Berrara could be used for tourist accommodation, as a home studio or granny flat.

Yerriyong includes insulated shutters and setback glazing. The Yerriyong is 'see-through' with glazing on two sides to maximise light and views through the house to the surrounding landscape. This design can be built in stages, the first stage is a self-contained recovery pod with a bedroom, ensuite and kitchenette.

FORTIS House sets a new benchmark for better building to protect people, homes, communities and the environment – no matter where you live.

CLICK HERE TO LEARN MORE ABOUT FORTIS HOUSE AND DOWNLOAD YOUR FREE FORTIS RESOURCES >>>