

Building  
Momentum

# Transforming construction through innovation

OUR OFFSITE MANUFACTURING PLAN



# 01 | Delivering the most new homes in a generation



Three-level, walk-up apartments, Grey Lynn, Auckland Hybrid

CREDIT: Miles Construction

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Front cover image:  
Three-level walk-up apartments,  
Blockhouse Bay, Auckland  
Hybrid  
CREDIT: Miles Construction

## IMPROVING ALL RESIDENTIAL CONSTRUCTION IN NEW ZEALAND

New Zealand urgently needs more homes. An ever-increasing number of people and whānau need and want to buy warm, dry, safe and healthy houses in thriving communities. To meet this challenge Kāinga Ora is delivering the most newly built homes in a generation – more than 11,000 homes between 2021 and 2024.

Delivering well-designed and built homes at a faster rate with better outcomes for customers and communities, as well as helping to solve some of the challenges facing the construction industry, requires us to think differently.

Kāinga Ora is the largest client of residential construction services in the country and is responsible for large-scale and complex urban developments. It is vital that we are at the forefront of innovation and progressive action to increase housing supply. We have an unparalleled opportunity right now to lead sector change and build homes more effectively, affordably and sustainably.

We are committed to improving all residential construction in New Zealand – beginning with our own performance – by increasing our use of offsite manufacturing.

This document sets out our vision and the action we are taking to realise the benefits of offsite manufacturing and take a leadership role in helping to solve New Zealand’s housing issues.

As the largest provider of residential homes in the country, we are charged with annual delivery of thousands of new public, affordable, transitional, and market homes, as well as renewing our existing portfolio to meet modern standards for warm, dry and healthy housing.

### Building Momentum

[Building Momentum](#) – our construction plan for future homes, released in 2020, outlines the key changes we are making in delivery and upgrade of public housing in New Zealand across five priority focus areas.

Increasing our use of offsite manufacturing improves the rate at which we supply homes and contributes to each focus area:

-  **Partnering**
-  **Innovation**
-  **Design quality**
-  **Delivery**
-  **Sustainability**

## OUR VISION FOR THE FUTURE

Between 2019 and 2021, Kāinga Ora doubled the number of homes delivered using offsite manufacturing solutions. By the last quarter of 2021 our market and affordable housing activity included approximately 200 units under contract, and at the time of writing, Kāinga Ora is on track to complete 500 units using offsite manufacturing by the end of the 2022 financial year.

We have set a target to increase the number of offsite manufacturing solutions we use by a minimum of 20 percent year on year for the duration of the public housing plan.

Our vision is to be one of the sparks that ignites modernisation of the housing sector for the benefit of everyone. We will do this through partnership with OffsiteNZ and key government agencies including the Ministry of Business, Innovation and Employment, Ministry of Social Development, Ministry of Education, Callaghan Innovation and others.

We will review our targets annually against supply and demand, and maintain 'Whanake - be bold' as a key value that guides us to make decisions that will have real impact.

We have also set an objective to drive behaviour change and make offsite manufacturing 'business as usual'. As we embark on this journey, we are developing new partnership frameworks with suppliers to increase efficiency and the productivity that will drive long-term transformation.



Our vision is to be one of the sparks that ignites modernisation of the housing sector for the benefit of everyone.

## 02 | Definitions and benefits of offsite manufacturing

### WHAT IS OFFSITE MANUFACTURING?

Offsite manufacturing (OSM) is the manufacture of components and buildings offsite in a factory, which are then transported to the site where they are needed. OSM has the ability to unlock a step-change in housing supply and tackle some of the problems that have beset the residential construction sector.

OSM enables Kāinga Ora to have completed homes on site up to 40 percent faster than traditional builds.



### Benefits

- OSM homes can be built faster than traditional builds, with 24/7 production possible in a factory setting. Construction takes place in the factory at the same time as site works, reducing construction time
- There is less disruption to neighbours and communities (including noise, dust, traffic) than traditional builds and health and safety improves as hazards are easier to manage
- Quality and sustainability improves as best-practice design and manufacturing techniques are adopted, leading to homes that are drier, healthier and have a longer life
- The benefits of digitisation are achieved as the supply chain collaborates in real-time and the same information is available simultaneously to everyone including up-to-date costs and material availability
- OSM homes can be relocated, which allows for different land options including short-term land leases, or installation on Kāinga Ora land awaiting development
- Weather dependency diminishes, as well as the risk of materials exposure
- Waste reduces as components are produced from standardised digital designs which optimise material use
- Costs go down as economies of scale are achieved from standardised parts, bulk consenting and faster production
- Multi-year contracts give the sector confidence to invest in technology and skills
- Skill shortages are easier to manage in factory environments. Different employment possibilities open up to different groups than traditional construction alone.



Three-level, walk-up apartments, Blockhouse Bay, Auckland  
Hybrid



CREDIT: Miles Construction

OSM IN ACTION

MARKET AND AFFORDABLE HOMES

In Northcote, Auckland we are building more than 1,600 new homes and two new pocket parks; upgrading streets and upgrading two of Northcote’s favourite parks. With the help of Panuku Development Auckland we’ll also be building a new greenway – a leafy pathway for locals to walk or cycle around Northcote.

As part of this large-scale urban development programme, our development partner TLC Modular will be producing more than 180 market and affordable OSM homes across two six-level apartment buildings on two Lake Road superlots. The homes will be OSM units manufactured in a factory and transported to site.



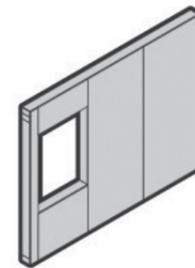
Six-level apartments, Northcote, Auckland  
Volumetric



CREDIT: Ignite Architects

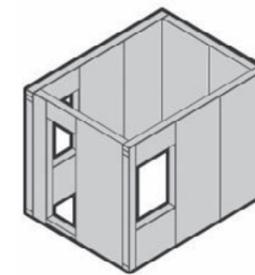
DEFINITIONS

Kāinga Ora is helping drive consistent definitions to support interoperability. Our focus is the full spectrum of OSM elements and we have been testing different OSM solutions in a range of settings and sites for several years. The results are enabling us to define and recommend the best solutions for particular situations.



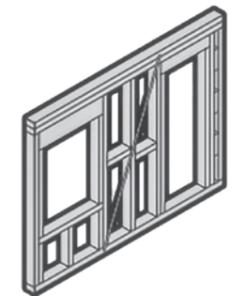
Panel

Wall and floor panels assembled on site



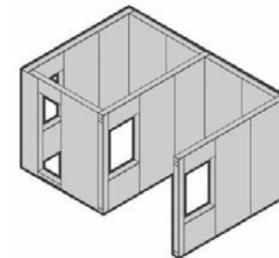
Volumetric

Modular parts (floors or rooms – for example bathroom pods) assembled to form the whole building



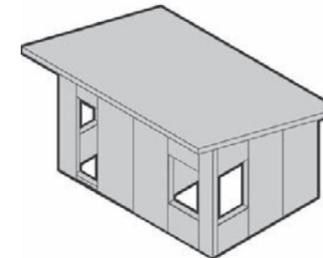
Component

Components such as windows, facades, stairs, and other fittings and joinery that is manufactured offsite for onsite assembly



Hybrid

A combination of different offsite manufacturing solutions in one building, including cross laminated timber – a strong, renewable and lightweight building product. Hybrid also refers to how offsite is combined with traditional onsite construction.



Transportable

An entire building transported to site.

OSM consenting

Consentium (the Kāinga Ora building consent authority) is developing a consenting pathway for Kāinga Ora-retained offsite manufactured homes and increasing industry knowledge of what is required to comply with the Building Act 2004 and Building Code regulations. This will enable suppliers to demonstrate compliance before applying for building consent.

consentium.co.nz

## 03 | The opportunity

### THE CHALLENGE

#### New Zealand's housing and construction sector faces sizeable challenges:

- Skills and labour shortages
- Need for health and safety improvements
- All-time high demand for materials
- Cost spikes and low margins
- Poor collaboration
- Variations between urban and rural areas
- Exposure to increased project delivery risks.

#### We need to build homes differently to:

- Build more homes, rapidly
- Innovate for high-quality builds and whole of life value
- Increase efficiency for greater volume and lower cost
- Modernise the sector to realise the benefits of digital technology
- Increase climate resilience, reduce resource consumption and minimise waste
- Enable quality, repeatable design that suits the needs of people and whānau, and can be delivered more efficiently
- Improve health and safety outcomes
- Build in ways that opens up different kinds of employment opportunities.

Kāinga Ora will be a market-maker in New Zealand's construction industry. We will provide leadership and coordination by supporting innovation, capability and scale through partnering and meaningful engagement.



Three-level, walk-up apartments, Māngere, Auckland  
**Volumetric**  
 CREDIT: Build Partners

### THE OPPORTUNITY

We have a generational opportunity to improve the way we build to create a smarter, more efficient and sustainable construction process and sector.

Kāinga Ora will lead the way by innovating to reduce costs, and improve productivity, practices, skills, and labour supply to create a more diversified, future-focused sector. Harnessing the power of OSM, first in our own business then more widely will unlock greater economic, social, environmental and cultural wellbeing for our customers, communities and the construction industry.

### ONSHORE AND OFFSHORE SUPPLY

Kāinga Ora has a large part to play in developing a sustainable, long-term approach to the New Zealand OSM sector, and we are committed to that outcome. Our domestic OSM market is relatively small and scaling it up will take time.

As part of an OSM Rapid Response Programme we are investing in both onshore and offshore OSM supply to speed up the construction time for homes and respond to growing labour and supply chain pressures that are impacting the construction sector. We are working with OSM suppliers around New Zealand to grow capacity and capability to supply this type of home at scale, and we are working with suppliers who have manufacturing capability offshore to help us meet the demand for new homes, quickly.

Faced with serious housing shortages and chronically tight budgets, governments in Australia, Singapore, and the UK are making offsite construction a strategic priority.<sup>2</sup>

### INTERNATIONAL INSIGHT

Internationally, other countries have successfully modernised their construction sector. In Sweden for example, more than 80 percent of homes are now built offsite. One factor that affects uptake in a nation is the degree of government involvement<sup>1</sup>. Experience in the UK, Sweden and elsewhere shows that governments can be key market shapers by providing:

- Stable demand and pipeline certainty so suppliers can invest
- Regulation and accreditation
- Skills acquisition and training support
- Connections between manufacturers, developers and builders
- New procurement and delivery models
- Common language and definitions for supply chain interoperability
- Confidence for the insurance and finance sectors

1, 2 Boston Consulting Group, [The Offsite Revolution in Construction](#), May 2019

# 04 | Whanake - be bold The action Kāinga Ora is taking

## WHAT WE ARE DOING TO LEAD TRANSFORMATION

To lead and support market transformation as a client of scale and an urban development authority, Kāinga Ora is:

### 01.

Increasing momentum in the use of OSM so it becomes business as usual and the benefits are experienced more widely by customers and the supply chain

### 02.

Playing a major role in growing capacity and capability in the construction sector to increase the availability of high-quality OSM solutions

### 03.

Facilitating government coordination – key to market transformation

### 04.

Contributing to broader regional economic development, social, environmental and cultural outcomes through the use of OSM.

## HOW WILL WE DO IT?

### Creating demand

- Give the market certainty to invest by defining our requirements in a clear and timely way
- Set goals for the proportion of our build pipeline to be delivered via OSM, noting our initial goal is to increase offsite manufacturing use by 20 percent year-on-year
- Set clear requirements for developers of affordable and market properties and bring OSM into the land use planning stages

### System transformation

- Be willing to be bold and future-focused in our decision making and share our learning
- Facilitate coordination of government stakeholders to harness the size and power of the public sector estate and market creating abilities including:
  - Support Ministry of Business, Innovation and Employment roll-out of new regulation for OSM facilities
  - Collaborate with Callaghan Innovation to drive innovation across the whole sector
  - Partner with Ministry of Social Development on skill development
  - Share best practice across organisations

### Processes and pilots

- Work with our design partners to increasingly standardise elements of our new homes to support OSM
- Matchmake between sector parties including manufacturers, developers, designers and builders; and partner with industry bodies to run forums, skills uplift programmes and apprenticeships
- Clear consent pathways for OSM through Consentium research to identify which OSM solutions are best suited to which building typologies.

## OSM IN ACTION

### Ngā Kāinga Anamata – Homes of the Future

Ngā Kāinga Anamata is a Kāinga Ora sustainability initiative leading the way for the New Zealand Government’s carbon mitigation programme for the building sector ‘Building for Climate Change’, and was recently one of 17 global built environment initiatives showcased at the 2021 United Nations Climate Change Conference (COP26).

The pilot will see five passive house apartment buildings on one site that are almost identical except for their different structural systems, being:

- Steel
- Concrete
- Light frame timber
- Mass/cross laminated timber
- Light/mass timber hybrid.

Each building will include solar panels and be constructed using OSM as well as other innovative construction methods to increase sustainability and reduce carbon emissions.

The programme will test the design, construction, as-built and lived-in performance of each to understand financial, health, and community benefits.

Data and insights from Ngā Kāinga Anamata will guide decision-making to resolve problems with the global housing sector including supply chain capability; construction sector productivity; energy hardship; unhealthy indoor environments; climate change mitigation and biodiversity loss.



Five near identical apartment buildings constructed with five different structural systems

# 05 | Are you ready to innovate?

## Now is the time for transformation

We are at a turning point in housing and construction history. Offsite manufacturing has the potential to transform the country’s housing supply and drive the modernisation that New Zealand and the residential construction industry desperately needs.

Turning the OSM dial to increase productivity is available for everyone in the sector. Whether it is using more OSM components or increasing the ubiquity of panels or pods, even small incremental improvements to the traditional build process will be a game changer.

Transformational change needs leadership and commitment. That means industry and Kāinga Ora working together to deliver more homes faster, and drive a thriving construction sector that is fit for the future.



**Register** to receive updates and event invitations. Please email [buildingmomentum@kaingaora.govt.nz](mailto:buildingmomentum@kaingaora.govt.nz)



**If you are a supplier with capacity,** we want to hear from you. Please email: [CCO@kaingaora.govt.nz](mailto:CCO@kaingaora.govt.nz)

The building construction industry is one of the least innovative sectors compared to other industries such as manufacturing and traditional services. Innovative approaches are required to significantly improve performance.<sup>3</sup>

CREDIT: Miles Construction



Five-level, two-bedroom apartments, Northcote, Auckland Panel

<sup>3</sup> [Transforming the Building Industry State of Nation knowledge report 2017](#)

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