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*rethinking our future neighbourhoods*

# Can Form-Based Codes Be the Opportunity to Achieve a Quality Built Environment in Aotearoa New Zealand?

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**Abstract**
This article suggests that our current land-use planning is routinely failing to make good places where people want to live. The inability of land-use zoning to generate mixed-use neighbourhoods is one reason. Instead of land-use and density calculations, the use of form-based codes might be an opportunity to take a holistic approach to streets, buildings and open spaces when thinking about our future neighbourhoods.

**Keywords:** Form-based codes, urban planning, building code, land use, built environment

**Introduction**
Why are the places that we want to live and work in not the places we typically plan and build?

We know what we want, and we know what looks good. We also know that the built environments we create today are not good enough. Too often they are car dependent, have few amenities beyond retail, are not resilient and much of the social infrastructure is missing. They lack quality open spaces and coherent built form. They are bland.

Most of us live in the suburbs of our cities. There is an urgent need to address the future of our suburban neighbourhoods. The onset of rapid climate-change-related hazards, inaccessibility to quality homes, increasing urbanisation, declining mental and physical wellbeing and growing inequality are just some of the most pressing challenges our cities are facing.

We need to find new ways of creating quality neighbourhoods, and resilient, equitable, compact, lively and walkable places. In order to do this, neighbourhoods must incorporate a greater mix of uses and include more of the things that we need on a daily basis, negating the need to travel by car. When we do need to travel we should make this easier by encouraging bike use and providing frequent public-transport services.

We have plenty of evidence of what good urban environments look like. Unfortunately, what is clear is that our current zoning of land use is not creating properly conceived, well-functioning places (to use the latest government speak). The question is, how do we achieve better cities and their suburbs? How can urban planners be a force for tackling climate change, urbanisation and the creation of regenerative and attractive environments?

**Form-Based Codes**
One tool that should be applied more widely is the use of form-based codes. Simply put, these codes regulate the form of the buildings, not their use, as the current system of land-use zoning does. Land use and density controls, beloved of planners and NIMBYs (Not in My Back Yard), have become the weapon of choice for resisting change. So when, as now, we need big and rapid transformation, the system and its administrators are woefully inadequate. Form-based codes:

- De-emphasise the land use and density.
- Recognise that use must be flexible but buildings have a degree of permanence.
- Encourage mixing of uses, not only horizontally

across an area but vertically within a single building or block, achieving compatibility of uses through design.
- Understand the patterns of development and design concepts that create good environments for people.
- Give much greater attention to the relationship of the streets, the public realm and the buildings, with an emphasis on the lower levels of those buildings.
- Allow flexibility and certainty for developers and designers, making development more viable, so more likely.
- Require skilled designers to be employed because the process needs people to understand the built environment in three (or four if time is included) dimensions, which in turn is likely to lead to much-improved outcomes.
- Crucially, are based on design-focused public participation processes that increase the likelihood of more-equitable outcomes for people.

Form-based and design codes are nothing new. They are as old as cities themselves; there was some form of building code introduced in ancient towns and cities. As cities grew they responded to public-health concerns – for instance, dirty factories needed to be separated from where people lived – by segregating land uses. This became the dominant planning process and was reinforced by planning cities around people moving in cars. Zoning created a cycle of more and wider roads, more dispersal of land uses, and large land parcels in central locations utilised as car parks.

The Form-Based Codes Institute[1] in the US states:

> A form-based code is a land development regulation that fosters predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. A form-based code is a regulation, not a mere guideline, adopted into city, town, or county law.

Codes can be highly detailed with technical specifications to control all aspects of the building design. Alternatively, they can be short, a single side of A4 paper, setting out the simple rules of height, bulk, setbacks and open space.

Look at any land-use plan in Aotearoa New Zealand. While the land parcels are all allocated a use and coloured accordingly, the roads and streets are blank, as if they are all the same or don't matter. Look at a transport plan, and the roads are allocated and coloured but there is no recognition of the place or the buildings adjacent.

They should be in service to each other. A significant advantage of form-based codes is that they can consider the built environment holistically. Form-based coding examines and defines the spaces between the buildings depending on the type of road and the uses at the edges, while enhancing or creating the character of the area.

Resilience and adaptability over time have become key factors for the future of our neighbourhoods. Form-based codes provide a flexibility of use that is a basic element of urban resilience. A town centre building and street might accommodate retail, office and education as well as living, depending on the demand. While zoning might allow this to happen, it is not enough, and rarely delivers good neighbourhoods. Zone standards are rigid and prescriptive, most often resulting in decisions to lock single-use buildings that cannot quickly adapt to other uses, leading to their eventual demolition and waste.

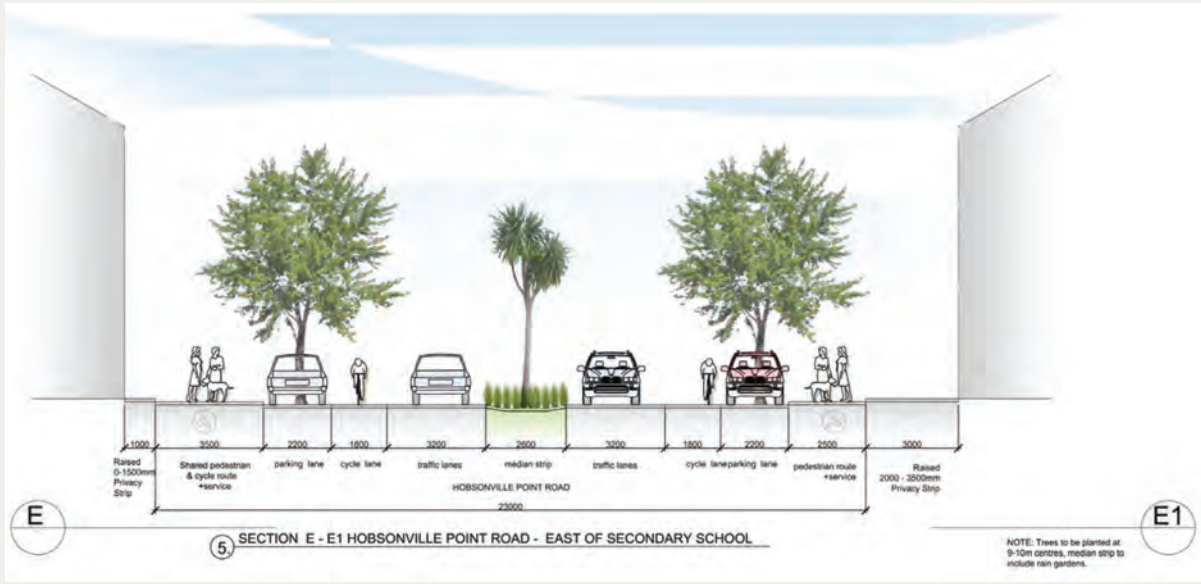


Figure 1. Example of the Hobsonville design codes, where the type of street defines the building type and their design elements, as well as the road/street design itself (how many lanes, planted median, type of street trees, etc.). Source: Buckley Hobsonville Comprehensive Development Plan (CDP) 2009, Hobsonville Land Company.

1 Form-Based Codes Institute, https://formbasedcodes.org

Mixed Use Zone District Plan private outdoor space requirements for each residential unit:

- 25m², min dimension 3.0m, ground level, accessed from living space, or
- 8m², min dimension 1.6m, balcony, accessed from living space, or
- 10m², min dimension 2.0m, roof terrace, accessed from living space

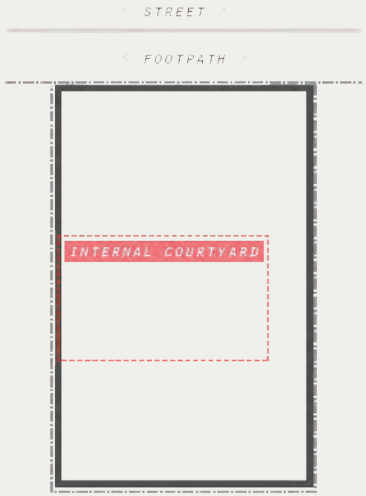


Fig 9. Internal courtyards

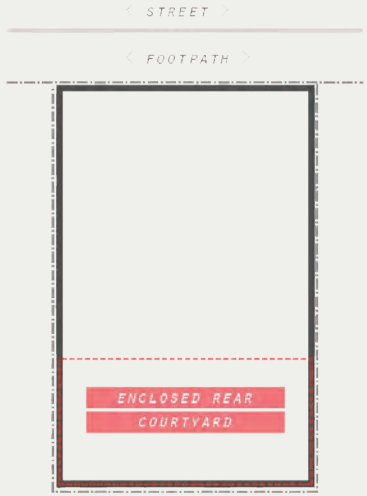


Fig 10. Enclosed rear courtyards

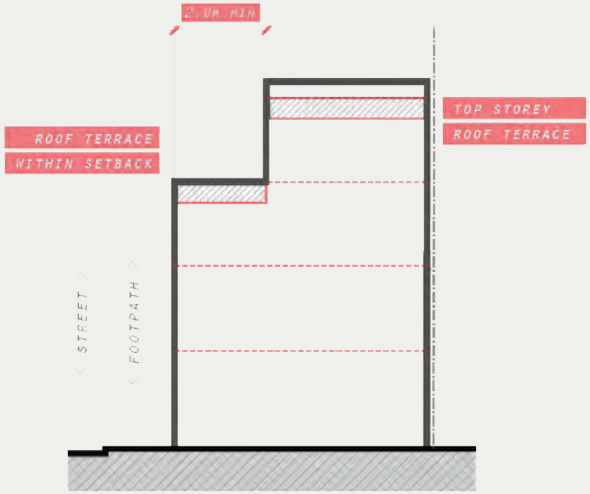


Fig 8. Roof terraces

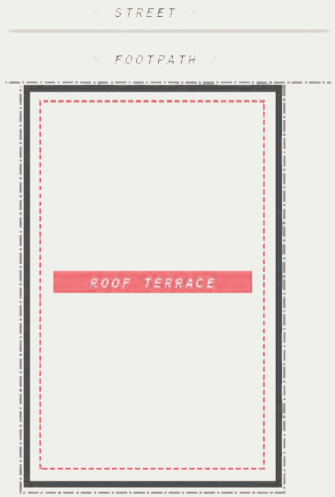


Fig 11. Roof terrace

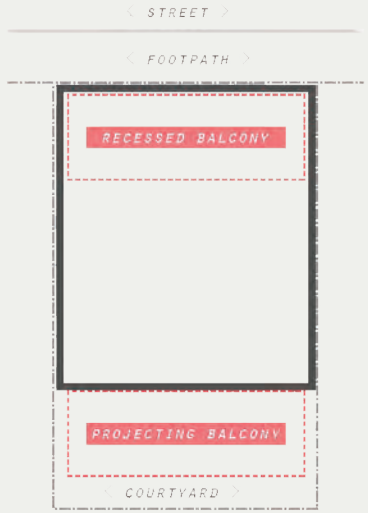


Fig 12. Balconies

Figure 2. Example of a design code that offers a range of permitted solutions for outdoor living spaces. Source: Isthmus Group, Vinegar Lane Precinct – Ponsonby, *Mixed Use Sites Design Manual*, 2013.

Encouraging compact and mixed-use areas is vital to tackling the adverse impacts of sprawl and delivering concepts such as the '15-minute city.'[2] Traditional zoning can define areas for mixed use, but it leads to each separate plot developing as a single-use building, with its own requirements for parking, etc. Form-based coding allows changes vertically within the buildings or plot, as well as horizontally across the block. The same building can contain many uses, sharing parking and refuse collection, for example, and being more compact.

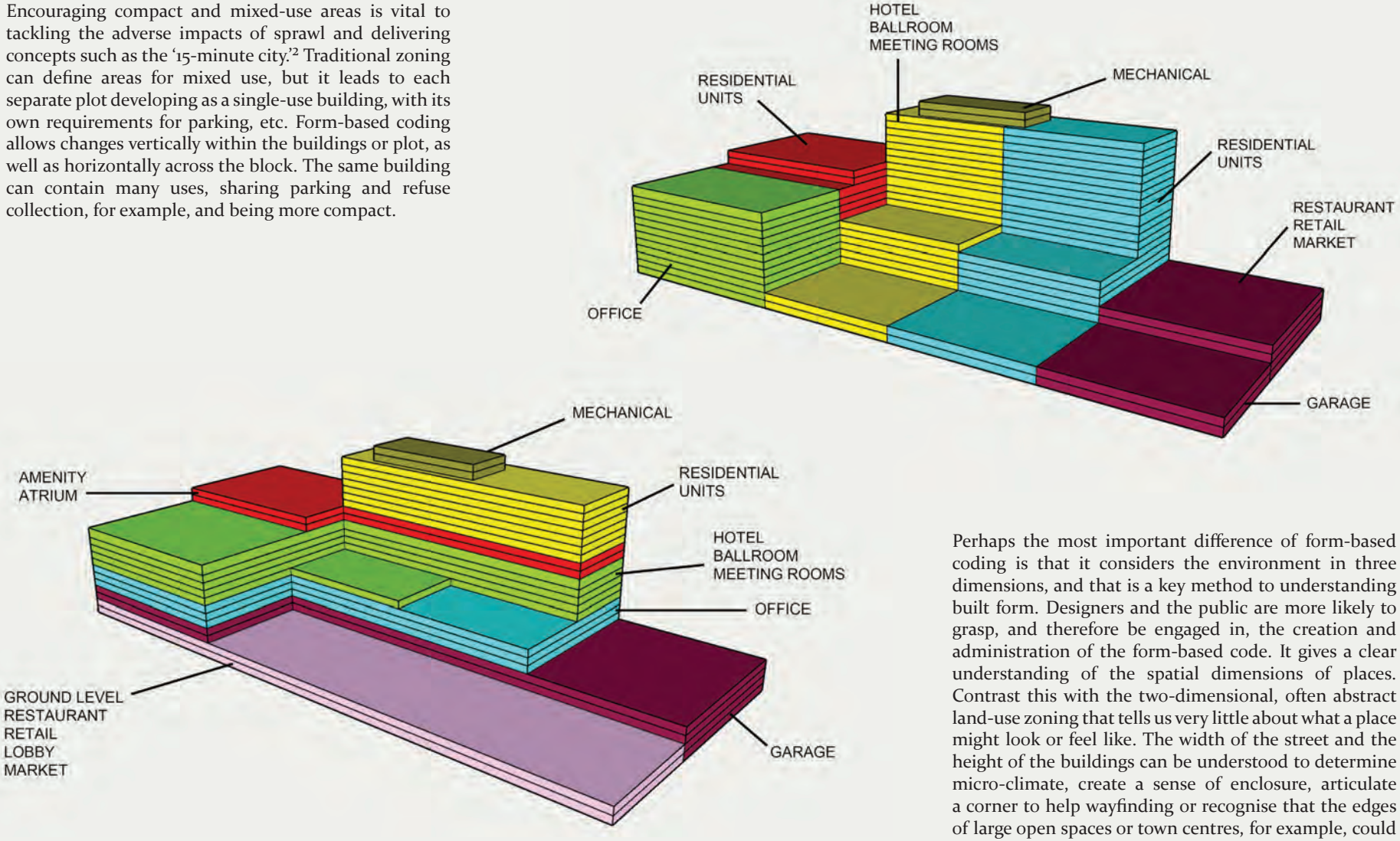


Figure 3. Vertical and horizontal mixed-use building diagram. Source: Mixed Use Transit Oriented Development, James Donovan, Archinect, https://www.pinterest.nz/pin/689895236639833714/

Perhaps the most important difference of form-based coding is that it considers the environment in three dimensions, and that is a key method to understanding built form. Designers and the public are more likely to grasp, and therefore be engaged in, the creation and administration of the form-based code. It gives a clear understanding of the spatial dimensions of places. Contrast this with the two-dimensional, often abstract land-use zoning that tells us very little about what a place might look or feel like. The width of the street and the height of the buildings can be understood to determine micro-climate, create a sense of enclosure, articulate a corner to help wayfinding or recognise that the edges of large open spaces or town centres, for example, could accommodate taller structures. Zoning alone misses these important aspects of a place.

2 The 15-minute city is a concept of an ideal city where a person's daily needs for work, healthcare, education, leisure and culture can be met within a walking journey time of 15 minutes from their doorstep.

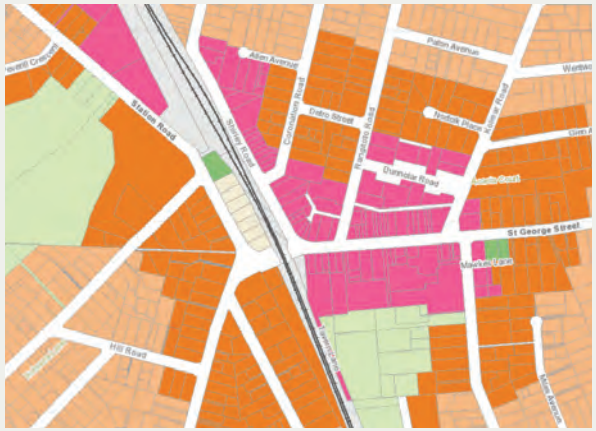


Figure 4. Typical land-use zoning map that shows the different land uses on a 2D map but not the built form. Source: Auckland Unitary Plan 2022.

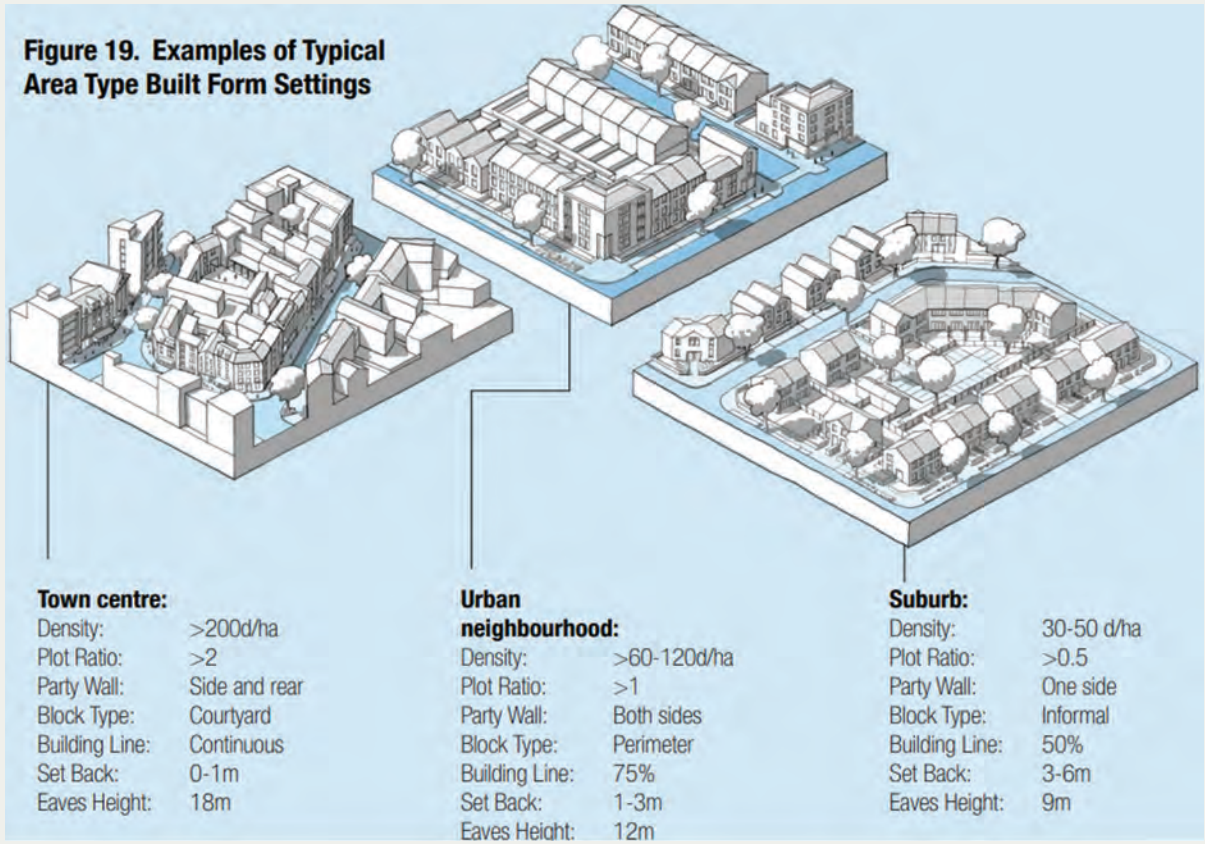


Figure 5. The proposed National Model Design Codes (UK) looks at the built environment in 3D. Source: National Model Design Codes Part 1 – The Coding Process, 2021, Ministry of Housing, Community and Local Government UK.

**An Opportunity in Aotearoa**

Form-based design coding can be a participatory, inclusive and co-operative process between the public and designers. Because the codes require an understanding of the relationship of built forms, they also require the input of skilled designers, usually urban designers. In Aotearoa New Zealand, meaningful engagement with mana whenua at this stage of the design process would form the basis of coding. Reflecting local character, identity and distinction could be examined and expressed during the early part of the process. This could also be the basis for an expression of Aotearoa vernacular.

Form-based codes can also provide certainty for developers and builders, helping to speed up delivery. Developers and their architects know what is required as a minimum, and the code can be fully costed at the early stages of design, making delays or modifications at the end of the process less likely. Coding can specify style or design, but often leaves it to the individual.

In Almere, in the Netherlands, each home is different, but the general area exhibits a great deal of cohesive character as the height, setbacks and street frontage are specified. It also means that many hands can work on one site, delivering more units, faster, with variety a likely result. The master developer of the site, working to a masterplan, can issue 'plot passports.' This allows an individual, group, builder or other developer to know what they are allowed on each plot, and each plot can be varied. Sites are built out much faster with much greater diversity. Aotearoa housing development, with its monotonous grey-roofed homes, is time consuming and bland by comparison. Form-based coding may not replace traditional zoning and may not be the only answer, but it fits well with the current system. However, the understanding of places and the level of design and planning skills required to implement such a change is limited at present in Aotearoa.

The changes could be led by local authorities to develop council-owned land, private developers seeking plan changes, or through the resource consent process. Larger


Figure 6. The Angle Mixed Use Development, Almere, the Netherlands. Photo: Studio Woodroffe Papa.

landowners such as Kāinga Ora or local authorities could become master developers, creating regulatory plans for areas and issuing plot passports to developers, builders, individuals and community groups to develop. This would speed up the completion of homes and raise standards of design and construction.

Government could promote the use of form-based codes to incrementally increase standards of construction, for example, allowing lengthy consent processes to be bypassed for energy-efficient homes. Form-based codes can be flexible and be updated as new legislation comes along without the delay usually associated with law changes. They are more likely to engage local communities, who will see the places they like reflected in the code, rather than the abstracted land-use and separate transport policy.

As the government starts to look at spatial planning, infrastructure provision and delivery of better places, form-based coding should be used to adapt our land-use plans and even replace them on specific sites. Bringing land-use planning, transport provision and built outcomes into closer alignment on a regional and local level is vital. The professions should play a prominent role in bringing the opportunities that form-based codes offer, alongside the traditional zone-based planning, to shape our neighbourhoods. Doing so will enable our neighbourhoods to better cope with the social, cultural and environmental challenges we are facing.

Figure 7. Vinegar Lane, Auckland. Photo: Author.

**Authors**
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