MDH/2

Medium Density Housing Assessment Tools: Framework Development Working Paper

Final

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About This Report

Title

Medium Density Housing Assessment Tools: Framework Development Working Paper

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Abstract

This working paper reports on progress during the *framework development* and *best tool evaluation* phases of Beacon's Medium Density Housing (MDH) research. The project is addressing the question "How is success of MDH measured at the individual development and neighbourhood level?" This report sets out the foundations of a suitable New Zealand assessment framework for medium density developments. This framework highlights the key aspects that will be assessed and provides criteria and sub criteria for assessment. The evolving framework forms the basis for the development of the prototype tool which will be tested in the coming phases of the project. Key issues to be resolved and the next steps for the project are also identified.

Reference

Ryan, V. and Smith, B. (2017). Medium Density Housing Assessment Tools: Framework Development Working Paper. Report MDH/2 by Beacon Pathway.

Contents

Tables

Figures

1 Executive summary

This working paper provides a summary of progress to date on Beacon's Medium Density Housing (MDH) research funded by the Building Levy and MBIE.

The project addresses the following questions:

1. *How is success of MDH measured at the individual development and neighbourhood level?*
2. *What evaluation method is best suited for New Zealand to assess, measure, and target best practice in medium density communities?*
3. *What overseas tools are relevant to New Zealand, and what should be developed or adapted here that would provide a means to measure progress on key outcomes sought by government and industry in medium density communities?*

This working paper summarises progress and learning during the Framework Development and Tool Evaluation Phases and sets out the foundations of a suitable New Zealand assessment framework for medium density developments.

The report outlines the process of determining approaches to assessment and provides a discussion of the proposed target audiences, the scoring approach, the language and use of surveying techniques.

The Framework Development and Tool Evaluation phases have included a detailed review of nine existing approaches to the guidance and assessment of medium density and built form. These are presented in Section 4 together with key concepts taken from each for consideration in developing a New Zealand- and medium density-specific framework. This process helped the project team to refine the framework.

Throughout the course of the project, the research has been informed by input from a group of medium density housing experts and stakeholders (the TARGET Group[1]). A summary of the TARGET Group's review of the proposed approach is presented.

The draft assessment framework was presented to the TARGET Group who helped to further evolve the core outcome principles into the five following key areas:

[1] ***TARGET is an acronym for Technical Advisory Reference Group (External Team). This project advisory group includes a range people with housing, urban planning, development and architectural expertise and a particular interest in MDH. This group has reviewed the findings of the discovery phase and also the framework development phase, offering theoretical and practical direction as the project develops***

Core principle	Aim
Character, Context and Identity	To develop a site and buildings that integrate with or relate to existing building form and style in the surrounding neighbourhood
Choice	The development provides for and enables occupancy by a diverse range of residents that can benefit from and support a thriving local economy with the understanding that high levels of diversity and optimum residential density make the development viable in terms of marketability and cost per unit
Connectivity	Connecting infrastructure enables safe, universal access using active, mobility, shared and private modes of transport within and through the site to identified key destinations
Liveability	Providing quality facilities and facilitating positive interactions between residents and the wider community
Sustainability	Efficient and cost effective resource use through design, behaviour and technological advancement

The review and refinement of core outcome principles enabled the drafting of a Medium Density Assessment Framework which has been essential in determining how these outcomes directly relate to the development (in terms of the site and building design), the residents, and the wider community. The framework also enabled consideration of how such outcomes could be directly assessed, both by residents, and by developers and methodologies that could combine their scores to provide specific guidance for improved MDH design.

The prototype framework presented in Section 7 of this report highlights the key aspects that will be assessed and provides criteria and sub criteria for assessment. Each core outcome principle is divided into areas, each of which has its own outcome-focused principle. The areas under each core outcome are listed below. See Section 7 for the full framework.

Character, context and identity	Choice	Connectivity	Liveability	Sustainability
Physical landscape	Residential dwelling typology	Key destinations	Building quality	Climate adaptability
Environmental landscape	Building adaptability	Accessibility	Technological integration	Building materials
Heritage and culture	Tenure	Transport choice	Personalised dwellings	Solar gain
Sense of place	Affordability	Permeability	Storage	Warmth and dryness
Building character	Opportunity	Safety from vehicles	Noise control	Energy efficiency

Street scape	Population density	Parking provision and management	Privacy	Water supply and heating
Identity		Access for services	Interactive space	Storm water management
		Wayfinding	Outdoor space	Recycling
			Security	Native ecology
			Emergency preparedness	Gardening and food production
			Engagement	Home user guide
			Satisfaction	

The report concludes with a summary and an outline of the next steps for the research. These focus on the development of the assessment methodology and associated assessment processes ahead of testing in case studies; applying the framework to the development of the main tools for assessment – a set of observational assessment questions for developers and a set of post-occupancy evaluation questions for residents.

2 Introduction and background

This report summarises the outcomes from the phases two and three of Beacon's Medium Density Housing (MDH) research:

PHASE	Status & Time frame
1 – Discovery: Setting the foundations for the project including desktop review and setting up advisory group	Complete
2 - Framework Development: Evolving an evaluative framework to assess medium density and community aspects of developments in NZ	**Complete**
3 – Tool Synthesis and Best Tool Evaluation: A range of tools (identified in phase one) have been evaluated against a set of agreed criteria developed in consultation with the advisory group.	**Complete**
4 – Prototype Tool(s) Development: A prototype tool (or tools) is currently in development based on the foundations of the framework and the tool synthesis phase.	Underway
5 – Pilot Tool Case Studies: The prototype tool will be applied and tested against two medium density case study sites.	August – Oct 2017
6 – Reporting Results / Outputs: The results of the previous five phases will be collated and analysed to highlight lessons learned, recommendations for improvement, and recommendations for further development.	Oct- Dec 2017

The project addresses the question highlighted under the Levy Prospectus *Programme 1: Giving industry the tools to deliver medium density housing that meets the needs of New Zealanders*, which asks **"How is success of MDH measured at the individual development and neighbourhood level?"** Further to that question, two further sub-questions arise:

1. What evaluation method is best suited for New Zealand to assess, measure and target best practice in medium density communities?
2. What overseas tools are relevant to New Zealand, and what should be developed or adapted here that would provide a means to measure progress on key outcomes sought by government and industry in medium density communities?

The research addresses a gap in present knowledge and practices relating to the assessment of medium density housing and the tools that might best help deliver outcomes for medium density housing developments. Whilst previous work has been done in New Zealand and internationally to deliver design guidance of best practice, this will be the first time that a framework has been delivered to specifically assess *community* and *neighbourhood* aspects in medium density settings.

The first Discovery Phase of this project led to the following outcomes:

1. A review of relevant national and international literature and assessment tools dealing with medium density housing revealed three broad themes:
   a) Building form and urban design - Technical in nature, with a design focus targeting building specifics (e.g. building materials and design characteristics), landscaping, and urban form
   b) Residential dwelling specifications - Both technical and non-technical specifications relating to dwelling design, e.g. acoustic control, lighting, delineation of public and private space, position of on-site parking, and design and use of amenities
   c) Community development - Qualitative appraisals relating to neighbourhood interaction, accessibility to key destinations, sense of place and community resilience

2. The review highlighted a gap (see Figure 1 below) in current understanding of medium density housing relating to the needs and wants of residents and community members. This can be addressed by an approach to assessment that addresses not just the quality of design but also its outcomes in terms of functionality, sustainability, liveability, as well as opportunities to contribute to wider community development.

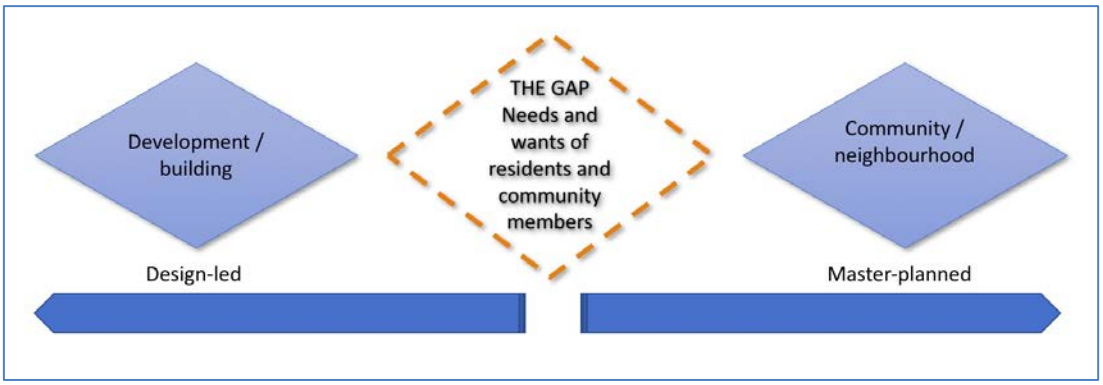

Figure 1: The gap in current housing assessment

3. The identification of key audiences for a MDH assessment tool including residents (homeowners and tenants), designers and developers (particularly inexperienced developers), and communities.

4. The drafting of outcome-focused principles to ensure any resulting assessment tool maintains a resident focus. These core principles include:

   - Character, context and identity
   - Resilience, adaptability, flexibility, robustness
   - Connectivity
   - Community interaction
   - Quality design / liveability
   - Environmental
   - Healthy, safe and secure
   - Housing choices

The Discovery Phase of this project included a literature review to identify key issues relating to MDH and categorise existing approaches to assessments. The review confirmed that significant attention is placed on the technical aspects of building MDH with somewhat less emphasis on the factors that make MDH more *acceptable* to potential residents and the neighbourhoods where they are situated. This suggests that assessment processes could be developed to include residential and community outcomes (in terms of functionality, sustainability, liveability and so forth) while also identifying opportunities to contribute to wider community development.

By taking a more people-centred approach and focusing on outcomes, the design of MDH can better understand and more directly align with residents' and community needs, and also incorporate best practice in sustainable and efficient design.

The literature review drafted a range of core principles which were initially reviewed by the TARGET Group and form the basis of the Framework Development Phase. These are detailed in the *Medium Density Housing Assessment Tools: Discovery Phase Working Paper, Dec 2016* and are summarised in Table 1 below:

Table 1: *Summary of Core Principles*

Core Outcome Principles	Description / keywords
Character, context and identity,	Sense of place, placemaking, defining boundaries, culture, legibility, heritage, artworks, landscaping, materials, vernacular (drawing on local character), Māori urban design principles (potential to include)
Resilience, Adaptability, flexibility, robustness	Physical adaptability and life-stage / demographic change (lifetime design). Responsive to social, technological and environmental change at individual and the building level, climate change adaptability, flexibility of use / space
Connectivity,	Walkability, cycling / active travel, access to local amenities and other key destinations, public transport, permeability, way finding, integration into existing neighbourhood. Determining where people want to go and how to get there
Community interaction	Daily social interaction, bumping places, communal spaces, public - private realm, engaging the community in civic life, governance / maintenance of shared/public spaces and common areas, clubs and social networks.
Quality design / liveability	Layout, internal layout, orientation, sunlight / daylight, ventilation and moisture control, thermal performance, functional design of living and public spaces, privacy, noise (external / internal), private space usability, Kiwi lifestyle, storage (internal - external [bins recycling] - hobby), parking, aesthetics, building form and appearance, open space. Accommodating life stages and mobility needs
Environmental	Sustainability, energy, water, resource use, waste, low carbon, technological advancement/innovation, shared resource use (car sharing schemes etc.), building materials and life cycle design, building reuse, durability and maintenance, wildlife habitats, biodiversity, green and blue infrastructure
Healthy, safe and secure	Safe travel between destinations and safety in your own home, CPTED, IPTED, passive surveillance, lighting, encouraging healthy lifestyles by design (e.g. secure cycle storage, bike repair etc.)
Housing choices	Tenure, affordability, typology, dwelling mix, demographics, financing (buy to let / starter homes), services/facilities for target users (e.g. teens, children, elderly)

In addition, the Advisory Group agreed that any resulting guidance and assessment tool should be accessible for a wide audience including residents (homeowners and tenants), designers and developers (particularly inexperienced developers), as well as the wider community. As a result, such 'good' guidance should have the following eight characteristics:

- Simple and easy to implement
- Measurable and objective
- Straightforward (and inexpensive) to use
- Robust and reliable
- Simple and accessible language
- Not overly prescriptive
- Marketable with simple accreditation
- Involve a feedback loop and a mechanism for continual evolution

The Discovery Phase concluded with the identification of next steps that were to direct Phase Two: Framework Development. These included specific steps that would assist in generating a more refined and detailed assessment framework for medium density housing. The steps include a further examination of some existing assessment methodologies and guidance (which were identified during the initial review) and which exhibit features that align either with the core outcome principles as shown in Table 1 or the characteristics identified above.

The remainder of this report describes this process over the following sections:

- Section Three: Framework Development Phase – Introduction to the methodology
- Section Four: A review of existing tools which sets out the key national and international tools/approaches that were explored in the development of the key criteria for a relevant New Zealand assessment tool
- Section Five: Determining approaches to assessment including a discussion of the proposed target audiences, the scoring approach, the language and use of surveying techniques.
- Section Six: A summary of the TARGET Group's review of the proposed approach and highlights from their feedback on the evolving framework
- Section Seven: An introduction and synopsis of the MDH assessment framework and core principles
- Section Eight: Conclusions and next steps for the research.

3 Framework Development Phase

3.1 Methodology

The Framework Development Phase included a detailed review of nine existing approaches to guidance and assessment in order to determine:

- Alignment with the draft core outcome principles
- Identification of any additional outcomes, principles or associated components
- Approaches that exemplify any of the identified characteristics for 'good' guidance
- Approaches to assessing, scoring or ranking outcomes that meet these characteristics and are effective in engaging both residents, and developers

As a result of examining the nine highlighted tools, the Framework Development Phase was expanded by the project team to encompass Phase 3: Tool Synthesis and Best Tool Evaluation. This parallel approach allowed the team to explore each principle whilst simultaneously researching an associated set of assessment questions that might be useful in a final tool. The benefit of this combined activity is that the outcomes-focused principles are also being developed with a view to the creation of a pragmatic framework that will be more user-friendly and accessible to end users.

The guidance and assessment tools that were reviewed included:

- MfE's 'Medium-density Housing Case Study Assessment Methodology' (2012)
- The UK's Building for Life Programme and Built for Life tool (2012)
- The MfE's Urban Design Protocol '7 C's':
- Te Aranga Māori Urban Design Principles
- Beacon Pathway's Neighbourhood Sustainability Framework (2008–2016)
- Housing New Zealand Corporation's 'Simple guide to urban design & development' (2015)
- 'Medium Density Housing Guide', Kapiti Coast District Council
- 'Good Solutions Guide for Medium Density Housing', North Shore City (2001)
- Homestar (Version 3)

The subsequent review and refinement of core outcome principles enabled the drafting of an assessment framework which has been essential in determining how these outcomes directly relate to the development (in terms of the site and building design), the residents, and the wider community. The framework also enabled consideration of how such outcomes could be directly assessed, both by residents, and by developers; and methodologies that could combine their scores to provide specific guidance for improved MDH design.

The framework development was an iterative progression, refined through a process that considered multiple elements simultaneously including:

- determining appropriate topics for assessment under each outcome principle
- thinking about how these topics may be turned into questions for residents and corresponding questions for developers (requiring a balance of technical robustness to make the assessment meaningful whilst also keeping the language and approach appropriate to enable understanding for residents and/or less experienced developers)
- exploring methods for completing the assessments (including approaches to direct surveying of residents and developers, as well as conducting desk top and site based reviews)
- drafting methods scoring responses (considering meaningful approaches to scoring or ranking answers that result in effective guidance to developers without deterring further engagement in good practice).

The developing evaluation framework was explored during a workshop session with the TARGET Group which reviewed the content and provided invaluable feedback on how the core outcome principles (and their corresponding topics for assessment) might be received by developers and residents.

The input from the TARGET Group enabled final drafting of the framework and the culmination of phases 2 and 3, thereby providing a solid foundation for the drafting of assessment questions for testing during the next phases and piloting of the tool(s) in case study applications.

4 Review of existing tools

This section outlines the results of the review of existing tools. Each of the nine approaches is summarised in turn with the identification of key issues as they relate to the amendment or refinement of the core outcome principles and their associated components. Section 5 Determining approaches to assessment then discusses how this review informs other elements of 'good' guidance and what this means in practice for a new MDH assessment approach.

4.1 MfE's Medium-density Housing Case Study Assessment Methodology (2012)

The MfE (2012) assessment methodology is principally designed with an urban design focus across a range of medium density housing typologies. The approach aims to develop a robust system for rating design elements in order to allow a range of quality outcomes to be compared and thereby identifying specific strengths and weaknesses[2]. In doing so, the assessment criteria are technical in nature often requiring a high degree of familiarity with urban design theory and language.

The methodology was derived from a literature review and stated a clear definition of medium density housing for the New Zealand context referring to:

"multi-unit developments with an average site area density of less than 350 m2 per unit. It can include detached (or stand-alone), semi-detached (or duplex), terraced or low rise apartments on either single sites or aggregated sites, or as part of larger masterplanned developments."[3]

A comprehensive ranking system identified a wide range of design oriented characteristics including in the following sections:

- Site context and layout
- Building form and appearance
- Street scene
- Internal configurations

The associated case study evaluations also utilised the seven Cs contained in the New Zealand Urban Design Protocol (see Section 4.3 below), alongside some specific questions for local authority / council representatives (involved with resource consenting and or urban design) and questions for developers.

[2] ***Boffa Miskell Ltd (2012). Medium-density housing case study assessment methodology. Page 1***

[3] ***Boffa Miskell Ltd (2012). Medium-density housing case study assessment methodology. Page 2***

Key concepts for consideration:

The review of this particular assessment methodology has raised a number of considerations for the on-going development of the core outcome principles:

- The need to integrate buildings (and residents) with the wider community
- Design criteria to encourage community interaction
- Integration with local context including heritage, vegetation and land form
- Accounting for local environmental conditions (e.g. prevailing wind and sun shine)
- Provision of quality communal facilities and service areas
- Provision, size and quality of communal, public and private space
- Ability to personalise space
- Reducing the visual dominance of car parking.

4.2 The UK's Building for Life Programme and Built for Life tool (2012)

Building for Life 12 aims to set a government-based industry standard for quality home and neighbourhood design that involves the engagement of communities, local authorities and developers in creating 'good places to live'. As the name suggests, there are 12 urban design criteria under three sections that provide a checklist for placemaking. These are listed in the table below:

Integrating into the neighbourhood	**Key features**
1. Connections	Does the scheme integrate into its surroundings by reinforcing existing connections and creating new ones, while also respecting existing buildings and land uses around the development site?
2. Facilities and services	Does the development provide (or is it close to) community facilities, such as shops, schools, workplaces, parks, play areas, pubs or cafes?
3. Public transport	Does the scheme have good access to public transport to help reduce car dependency?
4. Meeting local housing requirements	Does the development have a mix of housing types and tenures that suit local requirements?
Creating a place	
5. Character	Does the scheme create a place with a locally inspired or otherwise distinctive character?
6. Working with the site and its context	Does the scheme take advantage of existing topography, landscape features (including water courses), wildlife habitats, existing buildings, site orientation and microclimates?
7. Creating well defined streets and spaces	Are buildings designed and positioned with landscaping to define and enhance streets and spaces and are buildings designed to turn street corners well?

8. Easy to find your way	Is the scheme designed to make it easy to find your way around?
Street & home	
9. Streets for all	Are streets designed in a way that encourage low vehicle speeds and allow them to function as social spaces?
10. Car parking	Is resident and visitor parking sufficient and well integrated so that it does not dominate the street?
11. Public and private spaces	Will public and private spaces be clearly defined and designed to be attractive, well managed and safe?
12. External storage and amenity space	Is there adequate external storage space for bins and recycling as well as vehicles and cycles?

A traffic light system of assessment determines eligibility for Built for Life accreditation with 9 greens leading to qualification.

Key concepts for consideration:
A review of the Build for Life approach highlights a range of considerations relevant to MDH assessment:

- Street-scape considerations encourage urban design to consider spaces around and between homes which are vital to the quality of a place
- Development of locally inspired or distinctive character through architectural, landscape or other features
- Extent to which a development's integration with its surrounding reinforces existing connections or creates new ones
- Consideration of key destinations and the extent of services that support development while identifying gaps in provision
- Accounting for potential future changes in connective infrastructure
- Encouraging sustainable transport choices, car sharing and electric vehicles
- Provision of cycle parking and storage, particularly in urban areas
- Enabling residents to work from home
- Support for Transit Oriented Developments
- Ensuring new street layouts do not reduce existing access and permeability
- Provision of wayfinding and legibility of design
- Design to reduce conflict between cars and other users while reducing visual dominance of car parking
- Sufficient and well-integrated resident and visitor parking that does not dominate the street
- Clear delineation of public and private space
- Early development of public, bumping spaces
- Development of local streets as social spaces for safe play and neighbourhood interaction
- Management to ensure ongoing funding for provision and maintenance of public or shared open spaces
- Maximising passive surveillance through window design and placement
- Provision of external storage that meets realistic requirements of households

- Provision of a mix of homes to provide a more balanced community.

4.3 The MfE's Urban Design Protocol '7 C's'

The New Zealand Urban Design Protocol offers broad guidance for quality urban design. It offers seven core design qualities:

Context	seeing buildings, places and spaces as part of whole towns and cities
Character	reflecting and enhancing the distinctive character, heritage and identity of our urban environment
Choice	ensuring diversity and choice for people
Connections	enhancing how different networks link together for people
Creativity	encouraging innovative and imaginative solutions
Custodianship	ensuring design is environmentally sustainable, safe and healthy
Collaboration	communicating and sharing knowledge across sectors, professions and with communities

The NZ Urban Design Protocol is part of a wider Sustainable Development Plan of Action which aims to make NZ cities *"healthy, safe and attractive places where business, social and cultural life can flourish"*.[4]

Key concepts for consideration:
The document highlights a number of points that are directly relevant to the development of core principles for MDH.

- Quality urban design provides an interconnection of buildings to streets to neighbourhoods to cities and to regions
- Design reflects and enhances a distinctive character and culture that is unique and dynamic
- Importance of historic identity
- The addition of value to town and cities that increase tourism, investment and community pride
- Strong urban identities are based on memorable places that are diverse
- Recognition of the role that new technologies do and will have
- Safe connectivity supports social cohesion through all transport and communication networks, reducing travel times and lowering environmental impacts
- Wayfinding and legibility helps residents and visitors easily navigate around their neighbourhoods
- Good design relies on coordinated action amongst decision makers, infrastructure providers, developers and residents
- Improving practice is based on provision of shared examples of quality design

[4] ***Ministry for the Environment (2005). New Zealand Urban Design Protocol. Wellington: Ministry for the Environment., Page 6***

- Sustainable and responsive design recognises lifetime costs of infrastructure and buildings
- Kaitiakitanga is built on the provision of safe, enjoyable public spaces and a sense of responsibility amongst the community
- A mix of building types, densities, design, and connectivity offers choice to residents, flexible and adaptable uses and, in turn, creates robust resilient communities.

4.4 Te Aranga Māori Design Principles

The Te Aranga Māori Design Principles have been founded on Māori cultural values in order to provide an outcome-based approach to design which enhances the participation and presence of mana whenua. The principles are based on core Māori values[5]:

Rangatiratanga	The right to exercise authority and self-determination within one's own iwi / hapū realm
Kaitiakitanga	Managing and conserving the environment as part of a reciprocal relationship, based on the Māori world view that we as humans are part of the natural world
Manaakitanga	The ethic of holistic hospitality whereby mana whenua have inherited obligations to be the best hosts they can be
Wairuatanga	The immutable spiritual connection between people and their environments
Kotahitanga	Unity, cohesion and collaboration
Whanaungatanga	A relationship through shared experiences and working together which provides people with a sense of belonging
Mātauranga	Māori / mana whenua knowledge and understanding

These core values guide the practical application of seven Te Aranga Māori Design Principles summarised as follows:

- **Mana Rangatiratanga**: Authority
  The status of iwi and hapū as mana whenua is recognised and respected.

- **Whakapapa**: Names and naming
  Māori names are celebrated.

- **Taio**: The natural environment
  The natural environment is protected, restored and / or enhanced.

- **Mauri Tu**: Environmental Health
  Environmental health is protected, maintained and / or enhanced.

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[5] ***The Te Aranga Māori Design Principles exist in a number of formats and in different areas. The project team utilised the synopsis of these provided as part of the Auckland Design Manual for reference:*** ***http://www.aucklanddesignmanual.co.nz/design-thinking/maori-design/te_aranga_principles***

- **Mahi Toi**: Creative expression
  Iwi/hapū narratives are captured and expressed creatively and appropriately.

- **Tohu**: The wider cultural landscape
  Mana whenua significant sites and cultural landmarks are acknowledged.

- **Ahi Kā**: The living presence
  Iwi/hapū have a living and enduring presence and are secure and valued within their rohe.

Key concepts for consideration:

- Importance of identifying any primary mana whenua groups and interests related to any development
- The design process identifies landscape and building materials that are locally sourced and of high value to mana whenua
- Mana whenua provide input in the design process which understands and embeds cultural narratives
- A sense of place is created that reflects local iwi/hapu identity that is reflected in design and public art
- Significant sites and landmarks are acknowledged and associated narratives inform overall design responses
- Connectivity to significant sites and landmarks are promoted and enhanced visually and with identified heritage trails, signage and relevant information.
- Māori and mana whenua names are celebrated through street identification and wayfinding and to enhance connections with, and a sense of, place
- The restoration and protection of natural environments enable sustainable mana whenua harvesting where possible
- Local fauna and flora that are significant to mana whenua remain key elements in urban and modified landscapes
- Efforts to maintain and enhance biodiversity including the creation or maintenance of ecological corridors and waterways, planting of native species and the use of seasonal species markers to attract native animal and bird life
- Air, water, wand and sea quality is actively monitored
- Resources are preserved and conserved through the use of recycling or sustainable sourcing where possible.

4.5 Beacon Pathway's Neighbourhood Sustainability Framework (2008 – 2016)

Beacon's assessment tools[6] assess neighbourhood resilience, adaptability, amenity and sustainability in order to inform development planning into the future. The approach includes an observational tool which reviews the following:

- Walking access to basic every-day facilities
- Access to public transport
- Efficient use of space and viability of local centres
- Protection and enhancement of the natural environment
- Dwelling sustainability
- Quality of space
- Diversity
- Street network
- Eco-alternatives and innovation

In addition, Beacon's residential tool covers the following topics:

- Household demographics, age, gender and ethnicity
- Main modes and distance of travel
- Frequency of travel to key local destinations
- Proportion of household budget spent locally
- Perceptions of safety while walking, cycling and in the home, both during the day and after dark
- Extent of social interaction with neighbours
- Perceptions of quality of home, gardens, streets park and local retail outlets
- Extent of involvement in environmental activities
- Recognition of indicator species
- Emergency preparedness
- Intentions to continue residence at current location

Taken together, these assessment tools provide a detailed review of a particular site to inform developers of changes that will improve buildings, residents' quality of life and the overall sustainability of the neighbourhood.

[6] ***A range of Beacon's Neighbourhood Sustainability Framework (NSF) research was examined as part of the research – more information can be found at:*** ***http://www.beaconpathway.co.nz/neighbourhoods/article/the_neighbourhood_sustainability_framework***

Key concepts for consideration:

- The site's location with respect to local centres provides opportunities for employment and social interaction
- Determine the cultural significance of environmental and water features
- Walking and cycling facilities improve local resilience following crises and contribute to the ability of the neighbourhood to adapt over time
- Increased walking and cycling improves opportunities for casual interaction amongst the community
- Street network design can reduce traffic speed and improve safety
- Recognise the extent of communal activities to increase resource efficiency and resilience in terms of energy, food, water and transport
- Determine key destinations and rank their usefulness to neighbourhood residents
- Access to public transport helps communities maximise accessibility, minimise travel costs, adapt to changing conditions, become more resource efficient, and reduce environmental impact
- A variety of mode options to local centres increases the development's economic viability through improved connectivity for employment, leisure and shopping
- Provision of quality public spaces increases community interaction leading to safer, more enjoyable places to live
- Higher density developments lower the cost per capita of building and infrastructure provision while reducing environmental impact
- Clear delineation of public and private land and associated responsibilities encourages stewardship and highlights responsibilities for ongoing maintenance
- Dwelling sustainability considers the extent of energy generation, double glazing, insulation, solar hot water, orientation, moisture control and ventilation and efficient water use
- Quality design enables accessibility and safety for all residents, day and night, through appropriate lighting and passive surveillance
- Provision of appropriate space is necessary to enable recreational and healthy activity for residents of all ages and abilities
- Diversity of building typologies and affordability options encourages residency by a wide range of people which assists with the functional flexibility of a neighbourhood and associated neighbourhood satisfaction
- Diverse populations also enable contributions to effective governance.

4.6 Housing New Zealand Corporation's 'Simple guide to urban design & development' (2015)

Housing New Zealand's guide highlights key design principles which form the basis of healthy, sustainable communities. It is intended as a self-assessment tool that provides good outcomes that enables clear and useable explanations of urban design principles and approaches[7].

The guide is underpinned by 5 core principles:

Planning	Well-designed places weave buildings, networks and natural landscapes together to create seamlessly integrated, holistic environments.
Placemaking	Placemaking is a people-centred approach to planning, designing and managing an area to enhance and celebrate the special qualities of a site and its community.
Public spaces	Public spaces should contribute to the creation of a high-quality environment for people of all ages to enjoy.
Community	Successful places reflect the diversity and rich lifestyles of the population and foster a sense of pride and stewardship in the community.
Sustainability	Environmental, economic, social and cultural sustainability is integral to good design outcomes.

These provide the framework for guidance which covers the following 10 key issues and associated topics:

Form, layout and location	■ Location and context ■ Relationship between buildings ■ Building height and bulk ■ Infill developments ■ Subdivision and boundary adjustment
Access and circulation	■ Land use and transport networks ■ Parking demand and provision ■ Parking design and layout ■ Pedestrian priority ■ Access and servicing
Social and economic infrastructure	■ Land utilisation ■ Employment and mixed use environments ■ Local neighbourhood and retain centres ■ Network utilities ■ Waste management, refuse and recycling

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[7] ***Housing New Zealand Corporation (2015). The simple guide to urban design and development. New Zealand: Housing New Zealand Corporation.***

Character and identity	■ Sense of place ■ Context and character ■ Heritage areas, buildings and structures ■ Natural wayfinding ■ Gateways, landmarks and vistas
Public and private space	■ The public realm ■ Public and private spaces ■ Streetscapes ■ Landscape ■ Active lifestyles
Design quality and amenity	■ Visual amenity ■ Residential amenity ■ Private outdoor spaces ■ Boundary treatments and fences ■ Signage
Community wellbeing	■ Sustainable neighbourhoods ■ Housing quality ■ Diverse needs ■ Children and young people ■ Active lifestyles
Safety and stewardship	■ Crime prevention through environmental design ■ Care and maintenance of the public realm ■ Community stewardship ■ Safe environments ■ Lighting and night-time environments
Environmental wellbeing	■ Environmental design ■ Stormwater management ■ Existing natural environments ■ Three-waters management ■ Sustainable use of resources
Citizenship	■ Improved housing supply ■ Improved housing choice ■ Improved housing quality ■ Improved social wellbeing ■ Improved housing affordability

Key concepts for consideration:

- Optimal land use requires a balance between density, local character, amenity, and a long-term neighbourhood vision
- Successful mixed use, people-oriented developments meet societal demands and shorten journeys to key destinations
- Resilient approaches to buildings and materials lead to well-constructed homes that reduce maintenance and repair costs
- Resilience is enhanced through transport networks that integrate with the built environments, public reserves and green corridors
- Designs should prioritise pedestrians, cyclists, mobility impaired, and those with push chairs, and serve to reduce vehicle speeds in order to promote active lifestyles
- Provision of effective access and egress for visitors, emergency and delivery vehicles should not compromise the safety of active travel users
- Onsite parking provision should consider current as well as future needs alongside cycle facilities and motorcycle spaces, and take account of changes to public transport and active travel networks
- The reduction, minimisation, and recycling of waste should be promoted and enabled where ever possible
- The incorporation of energy-efficient features that maximise solar gain and minimise costs should form part of overall plans to provide people with quality, warm, dry, and ventilated homes
- Developments should manage stormwater and optimise site permeability
- Three-waters management (water supply, wastewater and stormwater) need to be integrated with wider environmental considerations
- Vulnerable residents, including children, elderly and those whose mobility is impaired, should be given special attention during the design process
- Developments are expected to promote safe environments and exhibit good CPTED (Crime Prevention Through Environmental Design)
- Lighting should provide safety and enhance function, amenity, night-time character, and the beauty of the built environment
- Successful places are reflected in the sense of pride and stewardship amongst the local community
- Design needs to accommodate people with a wide variety of physical and sensory needs particularly considering how these needs may change over time
- Developments aiming to improve the supply of quality housing need to offer a building mix providing a range of affordable options.

4.7 Medium Density Housing Guide, Kapiti Coast District Council

The Kapiti Coast MDH Guide aims to inform best practice in the planning and design with an emphasis on people and opportunities to reduce opportunities for negative conflicts that can arise as residents live closer together[8].

The guide includes the following key elements:

Site design	Site analysis Minimum site area Frontage Building fronts and backs Including the sun Open space Access, parking, cycles and pedestrians Servicing, deliveries and waste
Building components	Front doors and entrances Balconies Fences and walls Building height Diversity and choice Energy efficiency
Amenity values and character	Responding to local Kapiti Coast character Material and detail design Providing for appropriate building mass Garages Repetition with diversity Landscape design

Key concepts for consideration:

- Ensuring site design adheres to local character
- Successful MDH relies just as much on the right location as it does on the right design
- Access to open space is necessary to provide for residents' recreation and leisure needs
- Open space also allows for pursuit of outdoor hobbies, including gardening and landscaping, as well as other activities such as outdoor dining and barbeques
- Active lifestyles are enhanced through pedestrian and cycling networks to key destinations
- Mixed design and housing typologies will increase marketability to wider groups, particularly as economic conditions change
-

[8] ***Urbanism Plus Ltd (undated). Kapiti Coast District Council - medium density housing guidelines. Auckland: Urbanism Plus Ltd. Page 3***

- Design typologies should align with the needs of all age groups and also with less able-bodied where possible
- Self-determination and the ability to personalise and adapt dwelling design ensures residents are in control of how long they stay in a particular dwelling, particularly as their circumstances or mobility changes over time.

4.8 Good Solutions Guide for Medium Density Housing, North Shore City (2001)

The guide provides an approach to reviewing housing typologies, improving site design, various building elements and overall visual character[9].

Its guiding design principles include:
- Integrating with the wider community
- Protecting and enhancing the natural environment
- Promoting cleaner air through reduced car use
- Creating economically sustainable environments
- Using energy efficient design
- Establishing socially active and safe environments
- Ensuring good private amenity and design.

Specific topics for review are noted as:
- Market considerations
- Design steps for large sites
- Designing for smaller sites
- Selecting sites from existing subdivisions
- Providing clearly defined public and private space
- Refuse and recycling
- Living streets
- Communal open space
- Fronting public open space
- Access and visitor parking
- High quality storm water design.

Key concepts for consideration:

- Ensuring neighbourhood integration, quality street networks and linkages, and site permeability
- Provision of a range of housing types that meet different needs

[9] ***North Shore City Council (2007). Good solutions guide for medium density housing. North Shore City Council.***

- Provision of mixed use buildings - changing work patterns requires design that enables residents to live and work in the same building or site with separate entrances for separate functions
- Avoid commercial activities which are incompatible with residential areas
- Design buildings that can be used for different purposes over time
- Provide access to parks and open spaces where possible in areas with high passive surveillance
- Improving the environment through design that reduces the need for cars and provides for safe active transport options
- Locations closer to shops, schools and jobs encourage people to walk and cycle
- Open space with flat land, seating, shade and play areas should be accessible for all residents either on site or within easy walking distance
- Streets running in a north-south direction allows maximum sunlight to penetrate houses
- Passive solar design and attached, semidetached or apartment housing can reduce the need for heating
- Retention of natural features including bush, trees and existing landforms and waterways, the introduction of diverse native plants and the management of stormwater helps to protect the natural environment
- The provision of a range of housing types which meet varying needs helps developments integrate with the wider community
- Understanding market demands and surrounding developments in infrastructure and services will help in determining likely and suitable buyers resulting in quicker sales.

4.9 Homestar

Homestar (V3) is a rating tool that provides a robust framework for assessing specific environmental, sustainability and health features of a range of New Zealand dwellings. In recent years the tool has been extended to assessing and rating multi-unit developments including terraced houses and apartments. Homestar covers the following six core areas[10]:

Category	Descriptor
Energy, Health and Comfort	The energy, health and comfort category rewards attributes that contribute to reduced energy use within the dwelling, for example energy efficient lighting or energy rated white goods. This category also rewards dwelling attributes that contribute to occupant thermal comfort, for example insulation, or bathroom ventilation that removes dampness from the dwelling.
Water	The water category rewards dwelling attributes that contribute to reduced water consumption, e.g. low water flow taps and toilets.

[10] *NZGBC, 2015, Homestar Technical Manual Version 3.0.3*

Waste	The waste category rewards dwelling attributes that provide the ability to readily recycle waste, as well as rewarding construction practices that reduce waste going to landfill.
Home Management	The Home management category rewards dwelling attributes that contribute to making a safe, secure and adaptable dwelling.
Materials	The materials category rewards the use of responsibly sourced products and materials that have lower environmental impacts over their lifetime. As well as interior finishes that minimise the detrimental impact on occupant health from products that emit pollutants such as Volatile Organic Compounds (VOCs).
Site	The site category rewards the attributes of the site such as effective stormwater management, the contribution to local ecology, the ability to grow food on site and the location of the dwelling in relation to key amenities.

Key concepts for consideration:

- The Homestar approach encompasses a robust set of categories and sub-categories for assessment and is already achieving some uptake in the market for medium density housing.
- Significant changes have been suggested for Homestar for 2017 (launch expected in late July of Version 4 of Homestar and a revised assessment process).
- Sustainability of the built environment is a vital aspect of any new development, but the proposed medium density tool covers broader community-related and social aspects of the built environment.
- The medium density assessment framework should support and encourage the use of Homestar and not seek to replicate it, but provide the ability to assess environmental aspects without *requiring* that a developer also conducts a Homestar rating (considered too restrictive).
- A consistent approach to assess aspects of the built environment that would score well under Homestar to also score well against this medium density assessment framework helps to align the tools.
- Categories that align well include: materials, energy, health and comfort, water efficiency and harvesting, stormwater management, waste and aspects of management such as a user guide for the home.

5 Determining approaches to assessment

The above review of existing tools provided direction for the further refinement of core outcome principles and the drafting of an assessment framework to be reviewed by the Advisory Group. In addition, it has helped confirm the key characteristics of 'good' guidance (that were developed during the Discovery Phase of the project) and clarify practical approaches that any new Medium Density Housing assessment tool might take.

5.1 The target audiences

The review of existing approaches offers clear direction for identifying the target audiences of a new MDH tool and confirms the importance of providing quality assessment for a wide range of people, particularly:

- developers who are aiming to continually improve their practices
- less experienced developers that are perhaps less knowledgeable of wider urban design and placemaking concepts and practices
- residents who want to understand the principles that underpin their developments before making choices about whether a particular building or neighbourhood might be right for them
- the wider community to understand how a new development complements and enhances their neighbourhood
- local council representatives aiming to consistently improve housing quality while offering a diverse mix of affordable medium density dwellings.

The review of current tools confirms that, with such a broad audience, it is important to ensure that any assessment approach is couched in appropriate language that enables all these audiences to remain engaged. As such, a balance needs to be struck between the more technical terminology of professional urban designers and the holistic expressions utilised by some of the community and environmental-led approaches. The resulting tool must be applicable and relevant to each audience group, be engaging and simple to use, and offer an approach to assessment that is practical and, above all, helps users meet their needs.

5.2 Assessment vs guidance

Having recognised the need for any new tool to inform and perhaps to educate developers, it is important that the framing of the tool's use and associated assessment methodology balances the need for scoring outcomes with the provision of guidance when scores show there is room for improvement. More particularly, it is vital that participants are not put off by a tool that provides a 'pass' or 'fail' but, rather, provide either direct or implicit guidance towards better practice as the assessment is undertaken[11].

[11] ***This is a point that was reinforced to the project team during the TARGET Group meeting when discussing the developing framework.***

Furthermore, recognising the very wide complexity of issues associated with MDH which are compounded by issues of scale and trade-offs that invariably take place during design and building stages, it is useful to provide audiences with the ability to skip assessment components should they be non-applicable. In these cases, it will be important to expect participants to cite clear reasons why any category, sub-category or component is not completed.

5.3 Alignment with other tools

The Framework Development Phase carefully considered how best to relate any new tool to other overlapping assessment methodologies including CPTED[12], IPTED, Lifemark and Homestar. The latter of these provided the most interesting case for comparison and potential overlap. The review of Homestar (see Section 4.9 above) raised the issue as to whether prior completion of a Homestar rating for dwellings within a development would negate the need to fulfil certain sections of an MDH assessment (with the Homestar rating acting as a proxy for the score available in the sustainability section of the developing MDH tool). Such an approach raises further issues given that, while the completion of Homestar suggests proactivity in environmental design, this does not necessarily suggest that simply through having a Homestar rating (of 1 to 10 stars) that such a design has achieved 'good' outcomes.

In addition, the chosen approach to this MDH assessment tool is that, overall, it should be relatively simple to conduct an assessment without the technical expertise or length of time required to complete Homestar ratings or CPTED/IPTED[13] reviews.

The intention moving forward is that key elements aligned with tools such as Homestar and Lifemark will be included as indicators of better practice; and, furthermore, that these tools themselves would be referred to as part of any guidance should the derived scores in this MDH assessment be lower than optimal.

5.4 Assessment methodology

The core principles and component outcomes have been determined through the best tools evaluation review (Section 4). These core components have then been finalised based on further input from the TARGET Group (see Section 6 below). The final result of this process is the prototype framework which is presented below in Section 7. Taking account of the target audiences, the need to balance assessment and guidance, and to align with other tools, the next key consideration is how any new MDH assessment tool will be delivered in practice. There are three key elements to consider at this stage, which are summarised below:

[12] ***Crime Prevention Through Environmental Design***

[13] ***Injury Prevention Through Environmental Design***

1. Engaging with target audiences

As noted above, it is important to provide a tool that enables a wide target audience to understand and reflect on the key pros and cons that a new MDH development will have for the neighbourhood, community, and wider environment. That said, it is also important that any tool specifically engages residents and developers in the assessment process in order to determine if developers' aspirations or plans for a site are delivered on the ground to residents, post-occupancy. As a result, it is envisaged that this new assessment methodology will include a residents' survey which can be closely aligned with an assessment of the site itself - completed either by smaller developers (who are self-assessing in order to determine areas for improvement) or through independent observation of larger sites that may wish to gain some accreditation or recognition of good practice that a new MDH tool might provide. Given the range and type of topics covered in the core principles and outcomes, this site-based/developer approach to assessment is likely to require a mixture of desktop evaluation as well as direct observation.

2. Approaches to ranking or scoring

The approach to developing assessment scores is still under consideration at this stage; however, a few issues have been clarified from the review of other tools. Firstly it is important that any scoring or ranking methodology is well explained, simple to follow, robust, and likely to be replicable (i.e. the same score would likely be given on any specific topic, at any specific site, by different people). Secondly, it is important that any scores provided by residents can easily be compared with associated scores provided through the observation/developer's site assessment. For example, residents' questions relating to their feelings of security during the day and night can be compared with site-based scores relating to the extent of passive and active surveillance and lighting.

3. Synthesising data assessments to determine key areas for improvement

Given this parallel approach to assessment, the next consideration is how residents' and site-based rankings can most effectively be synthesised to provide meaningful guidance to developers while easily being understood by residents and other interested stakeholders. This process is likely to require some testing once the outcome principles and their components are developed into specific questions for resident and site-based instruments. Furthermore, it is again important to stress that any resulting synthesis should include clear guidance of next steps, or recommendations for improvement, without conveying a sense of failure that might otherwise reduce further engagement. Finally, it is essential that residents are provided with at least a summary of results from the assessment so they too remain engaged in any future efforts to improve their neighbourhood.

5.5 Promoting a new MDH assessment tool

At this stage, while the conceptual elements of an MDH assessment are being finalised, it is important to at least consider how a resulting tool may be promoted and, in turn, accepted by the development industry and associated stakeholder so that it is recognised as a credible, robust and worthwhile exercise. Initial efforts to engaging with stakeholders have arisen through the development of a TARGET Group who represent a diverse range of highly skilled professionals (see Section 6 below). Their insights have been invaluable in terms of shaping the core outcomes principles during the first two project stages. That said, there remains a need to consider how a new tool may be received by a wider audience. Some indication of this will be provided through the delivery of Phase Five of the project which pilots the prototype framework and tool-based assessment. The two proposed case studies provide the opportunity to test both the residents' and site-based assessment methodologies. The results from this stage will help determine further avenues for engagement with the development industry.

6 TARGET Group review

As noted in the Discovery Phase, a TARGET Group has been set up including individuals from industry, government, local government and research organisations:

- Auckland Council
- Beacon Pathway
- Boffa Miskell
- BRANZ
- Fletcher Living
- Generation Zero
- HLC (Homes, Land, Community)
- Housing New Zealand Corporation
- Jasmax
- Ministry of Business, Innovation and Employment (MBIE)
- Ockham Residential

A version of the developing medium density assessment framework was provided to the TARGET Group during a workshop meeting on 10 May 2017. TARGET Group stakeholders had the opportunity to provide feedback and comment on the evolving framework, which was subsequently revised to take account of their wide variety of opinions and ideas.

A summary of that feedback is presented here and provides context for the changes in the overall framework (captured below in the bulleted list) as well as changes and issues within categories and sub categories (appearing in Table 1 below). The evolving framework was well received, although some aspects were further refined based on feedback.

Overview notes regarding the framework and tool

- General agreement that the framework covered the key areas with no significant gaps
- The scale of development that this tool will assess was discussed and further work will be required to consider how scale might affect the assessment process and framework more generally
- General acceptance that the framework is pitched at the right philosophical level. that it uses a principle-led approach, and not overly prescriptive in terms of design or requirements etc.
- The framework approach was considered to fill a gap in current design guidance for MDH and consideration should be given about how to best raise the profile for this approach
- Upfront need in the tool to allow users to not check certain boxes or tackle items that are not applicable – encouraging use of the tool as an educational and informative methodology to promote better practice.
- Need to highlight that medium density development is sophisticated and complex and, by necessity, involves many trade-offs. Any design and build response will not be formulaic and the tool should not be prescriptive – should allow flexibility in order to encompass a wide range of potential users
- The importance for a shared language enabling and understanding amongst both residents and developers with varying technical skills was reiterated.

Table 2: *TARGET Group Review of Core Principles*

Revised Core Outcome Principles	Feedback and Issues
Character, Context and Identity (CCI)	■ Include concept of vibrancy and newness into the neighbourhood as opposed to simply integrating with neighbourhood character ■ Identity – recognising that there is evolution of identity that may mean that sense of place changes over time
Choice	■ Change heading from 'Viability' to 'Choice' and use concepts of choice and diversity within the section ■ Increase the residents voice in the viability (choice) section whilst recognizing that the ability to offer choice will vary based on the scale of the development ■ Economic viability is already a major consideration for developers and was not considered important to cover in this tool (essentially a developer will make that decision based on their own set of data – and if not considered viable will not be pursuing the development). ■ Recognition that significant developments may actually change the demographic of the area due to a new influx of residents. ■ Highlight the concept that 'medium density housing increases choice and diversity' – being explicit up front in the tool (or the section) that this is the advantage of medium density housing; that it increases the choice and diversity within our existing built fabric. ■ Tenure and affordability were seen as different and distinct issues and should therefore be split into two distinct outcome based principles within this section. ■ The concept of 'blind tenure' was seen to be important and this should be examined more closely as the tool develops (note to research team to investigate in more detail)
Connectivity	■ Important to think about existing and future connectivity (i.e. highlight infrastructure that may be planned for the area that the medium density housing is located in – e.g. a new train station coming in 2 years) ■ Useful to identify particular gaps in the infrastructure that could be invested in by the developer or as part of the development; the concept that medium density would add value to the neighbourhood. ■ Potential to identify money/resources that the developer invests to support local infrastructure and amenities (key destinations) rather than as part of the development being assessed by this tool. For instance, supporting local shops rather than creating a new one as part of the development – this is scale related and requires some further investigation. ■ Gaps in connective infrastructure should be identified and then consideration given as to the potential for advocating for improvements in items such as road safety as part of the development (to key destinations e.g. cycle lanes, road crossings etc.) ■ It was considered important that accessibility to key destinations identify distance but also included the safety and ease of travel by various modes.

Liveability	■ Overall building quality was considered especially important – so that the building doesn't degrade over time and the residents remain proud of where they live. ■ The group discussed the potential to combine internal interactive space and external green space – although there was seen to be merit in keeping them separate to enable developers to answer NA where appropriate in either category. ■ 'Satisfaction' as a concept could be broadened out so that future monitors of satisfaction reflect the dwelling, site and surrounding neighbourhood. ■ In relation to the 'engagement' outcome, it was suggested that robust, long term mechanisms for ongoing building management should be encouraged to help resolve conflict. This may be best dealt with in scoring this outcome for developers ■ The notion of 'retreat' in terms of privacy – and ability for residents to seek sanctuary away from noisy more public spaces was considered important. This will be investigated and a new principle will be devised around 'retreat'.
Sustainability	■ Important to realise that not every medium density development will meet every requirement and developers using the tool should not be put off if they cannot score in some areas – e.g. solar gain might be traded off in some developments but that could be reasonable if balanced by other gains. The tool needs to enable developers to account for these trade-offs and not be penalised. ■ 'Waste management' should be outcome principle title instead of 'recycling' ■ Food production – considered a contentious issue for any kind of rating tool regardless of how important this is. Recommendation that the research team consider this carefully. What is adequate space – and even if provided will it be used? (potential to keep this in at this stage and then test in case studies) ■ Requirement stated in the framework relating to ongoing monitoring of air and water considered a step too far (developer does not often have an ongoing role) ■ Some of the sustainability outcome principles should be measured in relation to what already exists on site or in the context of the surrounding area – especially true for storm water and native ecology.
Adaptability and Resilience (Note: no longer a stand-alone category as a result of TARGET group feedback)	■ Overall this section was seen to potentially weaken the tool and it was suggested that this was overly 'green' and not sufficiently specific to medium density. ■ Some aspects of this section could be reworked into other parts of the framework – including buildings, connectivity, emergency preparedness, climate change and community development. Some will move neatly into liveability – and should be tested in the case studies. ■ Some aspects should be removed from the framework – namely resource use, bio-diversity and carbon reduction. These are covered elsewhere sufficiently and were not considered *medium density specific* enough. ■ Collective procurement was discussed - as well as the potential benefit of medium density conglomeration of buyers. There could be scope for including this innovation but further work will be required to anchor this in a specific section. ■ Governance was raised as an issue – but it was decided that this is already incorporated throughout the tool as many of the aspects are covered and a cohesive management approach is assumed in separate credits (e.g. resident satisfaction surveys, provision and management of waste, parking). ■ The idea of adaptable buildings was considered important – ability to have flexible floor space/ layout that could be changed over time. While covered under viability (choice), wording should include long term adaptability (future flexibility).

7 MDH Assessment Framework and Core Principles

7.1 Background

The tables below summarise the latest version of the Medium Density Assessment Framework which has been reviewed by the TARGET Group during a meeting held at Beacon on 10 May 2017. This latest framework represents a number of changes and refinements to core principles and outcomes since the early draft presented in Table 1. The framework itself presents the following five core principles and associated outcomes:

Character, Context and Identity	To develop a site and buildings that integrate with or relate to existing building form and style in the surrounding neighbourhood
Choice	The development provides for and enables occupancy by a diverse range of residents that can benefit from and support a thriving local economy with the understanding that high levels of diversity and optimum residential density make the development viable in terms of marketability and cost per unit
Connectivity	Connecting infrastructure enables safe, universal access using active, mobility, shared and private modes of transport within and through the site to identified key destinations
Liveability	Providing quality facilities and facilitating positive interactions between residents and the wider community
Sustainability	Efficient and cost effective resource use through design, behaviour and technological advancement

These are presented against a checklist relating each outcome to an area and scale of influence from the site and buildings, to the people who live there and the wider neighbourhood. In this way, the framework ensures that its original aims – to determine … '*…how success of MDH is measured at the individual development and neighbourhood level'* – is fulfilled as we develop a tool that ensures quality outcomes for residents. The scale of influence affected by these outcomes are summarised below:

Site	The layout, orientation and wider geological and environmental setting of the development
Building	The design, placement, orientation, and structure of buildings
People	The residents that choose to live their
Neighbourhood	The surrounding neighbourhood, community, and environment directly affected by the development of the site, building construction and new residents

The framework showing the interaction of outcomes and related areas is shown below.

7.2 Character, Context and Identity

Scale of Influence				*Outcome Focussed Principles*	
Site	**Building**	**People**	**N'hood**	*Aims: To develop a site and buildings that integrate with or relate to existing building form and style in the surrounding neighbourhood with relation to:*	
✔	✔		✔	Physical landscape	The building design integrates with and enhances local geographic features
✔		✔	✔	Environmental landscape	Natural environmental elements are incorporated into the site which takes its cue from the local surroundings (e.g. waterways, bush etc.).
✔	✔	✔	✔	Heritage and culture	The site takes account of local history, honours heritage and culture, and seeks community direction to identify opportunities to create, exhibit or promote features that add to the neighbourhoods wider sense of place
✔	✔	✔	✔	Sense of place	Site design and layout, key features and artistic works have been developed to create a 'sense of place' recognising and aligning with the existing cultural and community context
	✔		✔	Building character	The building design and materials have been chosen to integrate with and enhance the surrounding neighbourhood character using locally sourced and culturally appropriate materials where possible
✔	✔	✔	✔	Street scape	Entranceways and frontages are welcoming and are in context with and enhance the overall character
✔	✔	✔	✔	Identity	The overall design instills a sense of pride amongst residents

7.3 Choice

Site	Building	People	N'hood	***Aims: The development provides for and enables occupancy by a diverse range of residents who can benefit from and support a thriving local economy; with the understanding that high levels of diversity and optimum residential density make the development viable in terms of marketability and cost per unit. These aims relate to:***	
	✔	✔	✔	Residential dwelling typology	The provision of dwelling typologies offer an appropriate choice with regards to existing neighbourhood demographics as well as the demographics of targeted residents (including expected age range, work status, household sizes)
	✔	✔	✔	Building adaptability	Building designs exhibit a range of adaptability and floor plan flexibility responding to changing requirements and the potential for mixing use over time
		✔	✔	Tenure	Diverse tenure arrangements provide opportunities for residents to either own or rent in quality accommodation
	✔	✔	✔	Affordability	A range of dwelling options and supporting financial instruments provide residents of varying means with the ability to live in quality accommodation (e.g. starter home / buy to let / financial assistance)
✔		✔	✔	Opportunity	Proximity to local centres provides employment opportunities and other key destinations enable the target residents to work, live and play in their surrounding neighbourhood. In addition, developments with a mix of commercial / residential premises encourage/enable employment opportunities within the site
✔	✔	✔	✔	Population density	The number of dwellings per hectare and the range of sizes on offer to residents are in line with existing and future supporting infrastructure and services.

7.4 Connectivity

Site	Building	People	N'hood	***Aims: Connecting infrastructure enables safe, universal access using active, mobility, shared and private modes of transport within and through the site to identified key destinations***	
✔		✔	✔	Key destinations	The identification of likely key destinations appropriate to the target residents determines the feasibility and potential use of various travel options
✔		✔	✔	Accessibility	Determining the extent of current and future accessibility to key destinations based on distance, infrastructure and services that enable safe travel on foot, by cycle, on public transport, by car, or with mobility aids
✔	✔	✔	✔	Transport choice	Proactive measures to encourage active and shared transport including pool vehicles, charging points for electric vehicles and options for telecommuting
✔		✔	✔	Permeability	Permeability within and through the site supports wider neighbourhood connectivity and facilitates access to surrounding destinations
✔		✔	✔	Safety from vehicles	Design considerations reduce physical conflict between cars and other users within the site and at access points
✔	✔	✔	✔	Parking provision and management	Supply of parking for cars and facilities for cycles are appropriate for residents and visitors and are managed and adapted to encourage active and shared modes over time
✔	✔	✔		Access for services	Design enables ease of access and egress for emergency, delivery and service vehicles
✔	✔	✔	✔	Wayfinding	Wayfinding and signage to and around the site facilitates visitor movement, the identification of resident dwellings while ensuring that designs and naming is appropriate to the site's overall identity

7.5 Liveability

Site	Building	People	N'hood	***Aims: Providing quality facilities and facilitating positive interactions between residents and the wider community***	
	✔	✔		Building quality	The building design and use of materials provide quality homes that are efficient to run and easy to maintain
✔	✔	✔		Technological integration	Utilities are easily accessible enabling the integration of future technologies into buildings
	✔	✔		Personalised dwellings	Dwellings and private spaces can be personalised or modified to account for changing needs over time including appropriate provision of universal designed dwellings
	✔	✔		Storage	Residents are provided with appropriate personal or shared storage space to accommodate their lifestyle requirements
	✔	✔	✔	Noise control	Design and ongoing management reduces noise to acceptable levels between dwellings as well as between dwellings and public spaces
	✔	✔		Privacy	Building design provides adequate, quiet, private space allowing residents a sense of retreat
	✔	✔		Interactive space	Provision and maintenance of high quality internal spaces where people are likely to interact (e.g. laundry, shared rooms or other communal spaces)
✔		✔	✔	Outdoor space	Residents have direct access to well-maintained public outdoor space with facilities that are appropriate to the resident demographic
✔	✔	✔		Security	Provision of security features, lighting, active and passive surveillance provides a safe environment for all residents within their homes and throughout the site at all times
✔	✔	✔		Emergency preparedness	Design considerations and a site-based emergency preparedness plan take account of residents' immediate needs while supporting wider neighbourhood resilience

✔	✔	✔	✔	Engagement	Residents are encouraged to engage with issues affecting site operation and management and maintain active interactions with each other and the surrounding community
✔	✔	✔	✔	Satisfaction	Resident satisfaction with the site, building and wider neighbourhood is regularly monitored to continually improve site management and inform future development

7.6 Sustainability

Site	Building	People	N'hood	***Aims: efficient and cost effective resource use through design, behaviour and technological advancement***	
✔	✔			Climate adaptability	Design considerations account for extreme weather variations (e.g. temperature, rainfall, wind), changing sea levels / flooding and wild fire where appropriate
	✔			Building materials	Building materials can demonstrate durability and third party eco-labelling or responsible sourcing (e.g. FSC / NZ Environmental choice) while ensuring that any waste is recycled and any contamination is remediated
✔	✔	✔		Solar gain	Building orientation takes account of seasonal variations to minimise heating, cooling and lighting requirements
	✔	✔		Warmth and dryness	Building design maximises thermal efficiency and comfort and effectively controls moisture through insulation, glazing and ventilation
✔	✔	✔		Energy efficiency	Energy management maximises the use of renewable supply, the use of efficient appliances, and reduces the need for energy use where appropriate (e.g. through the provision of outside areas for clothes drying)
✔	✔	✔		Water supply and heating	Water management reduces demand through low flow devices and efficient water heating technologies and optimises supply though rain water harvesting and grey water recycling
✔	✔		✔	Storm water management	Storm water management minimises flooding, run-off and associated pollution
✔	✔	✔		Recycling	Provision and active management of waste, recycling and composting facilities
✔		✔	✔	Native ecology	Proactive approaches monitor air and water quality and encourage residents to enhance biodiversity through the protection of local habitats and waterways
✔		✔		Gardening and food production	Space is provided for outdoor activities (e.g. gardening or growing food) where possible or appropriate
✔	✔	✔	✔	Home user guide	Information is provided to residents on the efficient use of building features, appliances and neighbourhood facilities

8 Summary and next steps

This working paper has summarised progress to date on the development of Beacon Pathway's Medium Density Assessment Framework and corresponding tools. It has specifically outlined progress during the *framework development* and *best tool evaluation* phases of this BRANZ Levy- and MBIE-funded research. The project is addressing the question *"How is success of MDH measured at the individual development and neighbourhood level?"* and this report sets out the foundations of a suitable New Zealand assessment framework for medium density developments.

The Framework Development and Tool Evaluation Phases included a detailed review of nine existing approaches to the guidance and assessment of medium density and built form (presented in Section 4). This helped the project team to refine the framework and present it to the TARGET Group; who helped to further evolve the core outcome principles into the five following key areas:

- Character, Context and Identity
- Liveability,
- Connectivity,
- Choice,
- Sustainability

The review and refinement of core outcome principles enabled the drafting of a Medium Density Assessment Framework which has been essential in determining how these outcomes directly relate to the development (in terms of the site and building design) the residents, and the wider community. The framework also enabled consideration of how such outcomes could be directly assessed, both by residents, and by developers, and methodologies that could combine their scores to provide specific guidance for improved MDH design.

The prototype framework presented in Section 7 of this report highlights the key aspects that will be assessed and provides criteria and sub criteria for assessment.

The culmination of Phases 2 and 3, which have concentrated on tool evaluation and framework development, have provided a solid foundation for the drafting of a prototype tool for assessment in New Zealand. To this end the project team are currently developing the assessment methodology and associated assessment processes; applying the framework to the development of the main tools for assessment – a set of observational assessment questions for developers and a set of post-occupancy evaluation questions for residents.

The assessment methodology and corresponding survey questions are based on the set of outcome-focused principles outlined above which provide a robust framework for our target audiences to understand what makes medium density successful. These survey techniques will be tested with the TARGET Group for feedback and further refinement before being trialed in the case studies planned for August/September/October 2017.

9 References

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