

Thuringowa **Sustainable** Village Project

Breakthrough Ideas for Sustainable Urban Development in North Queensland

A product of an extensive industry consultation program



Full Version

October 2007



Supporting a vision for

A CENTRE FOR EXCELLENCE
IN TROPICAL DESIGN
Sustainability & Innovation

ec|SAVVY

Introduction

Breakthrough Ideas – the product of an extensive industry consultation program

Breakthrough Ideas for Sustainable Urban Development in North Queensland is a product of the Thuringowa Sustainable Village Project, an innovative project of Thuringowa City Council.

Adopting a completely new model for accelerating sustainable housing and urban development outcomes, the first part of the Thuringowa Sustainable Village Project involved an extensive industry consultation and capacity building program.

Capturing the collective ideas and knowledge of over 100 industry representatives who were involved in 55 coordinated focus group discussions, *Breakthrough Ideas for Sustainable Urban Development in North Queensland* documents a wealth of intellectual property that has been contributed with the common desire that sustainability principles be increasingly incorporated into housing and urban development in the region.

A catalyst

The *Breakthrough Ideas for Sustainable Urban Development in North Queensland* Report identifies key objectives, suggested solutions, practicalities and tips for planning, designing, constructing and marketing housing and urban development product in North Queensland. The Breakthrough Ideas Resource supports our housing and development industry to deliver substantial triple bottom line benefits (i.e. balancing social, environmental and economic outcomes) to our communities in a way that is commercially viable, market friendly and cost competitive with mainstream housing.

It is anticipated that the Breakthrough Ideas resources will be useful to, and widely referenced by a range of disciplines and stakeholders associated with the housing and urban development industries both in North Queensland and beyond.

Key Findings

Breakthrough findings were identified in the following areas: improving housing affordability; cost effective tropical housing; development application/approvals processes to support ESD (ecologically sustainable development); the need for tenure and building forms to influence subdivision layouts; marketing tools to reduce the commercial risk of 'designing' and 'selling' sustainable development product; the importance of landscape analysis informing development design; water sensitive urban design in tropical climates; educational priorities for the NQ urban development industry to accelerate sustainable practices; guidance for cost effective energy, water and waste efficiency; the need for community involvement in community creation; universal accessibility (at the level of the precinct) and 'visitability' (at the level of the house), and more...

With its focus on affordability, marketability and commercial realities, Breakthrough Ideas represents a new and unique industry resource that seeks to complement rather than duplicate other key sustainability resources available, including the UDIA's Enviro Development Standards, the Queensland Government's Smart and Sustainable Homes Design Objectives and the HIA's Greensmart criteria.

Findings in the Breakthrough Ideas Report are sorted into six main sections and 35 sub-sections. The six main sections are: Marketing, Sales and Mainstream Pricing; Land Development and Urban Design; Dwelling Design and Construction; Resource Efficiency; Natural Resource Management; and Infrastructure.



Two Versions – Summary and Full Report

Breakthrough Ideas for Sustainable Urban Development is presented in two versions, a Summary Version (16 pages) and a Full Report Version (88 pages). The Summary Version is simple checklist of the 206 'key objectives' that were identified by the ten Thuringowa Sustainable Village Project Focus Groups as being those objectives that if addressed will assist in the achievement of commercially viable, mainstream acceptable and cost competitive sustainable housing and urban development in North Queensland. The Full Report Version, contains additional information for each key objective in the form of 'suggested solutions' and 'explanatory notes' - to assist with the successful implementation of each objective.

Two marketing tools generated during the focus group program are provided as appendices. Supplementary Resources utilised during the consultation program are also provided on the CD.

Sustainable Village at Kelso

In addition to general industry use, the Full Report Version has been designed to be used as the basis of the tender that will be offered to a private development consortium to undertake the second part of the Thuringowa Sustainable Village Project – the unsubsidised, free market development of a 1.1 hectare Sustainable Village at Kelso.

The development of the Kelso site will provide a real market test of the concepts, approaches and recommendations identified in the Breakthrough Ideas Report.

Further information on the Thuringowa Sustainable Village Project is available from:

<http://www.townsville.qld.gov.au/services/departments/planning/thesustainablevillage>



Acknowledgements

Thuringowa City Council gratefully acknowledges and celebrates everyone who has supported and participated in the Thuringowa Sustainable Village Project to date and particularly recognises the over one hundred focus group participants and the ten focus group chairs who gave so generously of their time and knowledge to contribute to the industry consultation program and focus group findings. You were, and are, inspiring and we encourage you to recognise yourself as someone who is championing sustainable development in the region.

The focus group chairs were:

Focus Group 1 – Sustainable Housing at Mainstream Pricing: Justin Stainton (Stainton Master Builders)

Focus Group 2 – Urban Design: Neil Bennett (Urbex)

Focus Group 3 – Tropical Design: David Stefanovic (Architects North)

Focus Group 4 – Sustainability Education and Innovation: Prof Chris Berndt (James Cook University)

Focus Group 5 – Economic and Legal Tools and Incentives: Bob Bartlett (Thuringowa City Council, Economic & Commercial Development)

Focus Group 6 – Marketing and Valuing: Dean Dederer (PRDnationwide)

Focus Group 7 – Infrastructure: Derek Saw (Northern Consulting Engineers)

Focus Group 8 – Natural Resource Management: Lucilla Marshall (Thuringowa City Council, Parks Services)

Focus Group 9 – Energy and Water: Just Berkhout (Energy Consultant – Independent)

Focus Group 10 – Community Wellbeing: Alison Abbott (Department of Health)



A meeting of the Energy & Water Focus Group

The Thuringowa Sustainable Village Project is an initiative of the Thuringowa City Council that has enjoyed the enthusiastic support of elected Council members and Council executives.

The project has been managed by the Planning Services Department under the direction of Paula Grant, Director Planning Services and Graeme Kenna, Manager Planning Services and has been advised by a cross-departmental Project Management Control Group.

Sustainability consultant, Sandy McCathie of ecoSAVVY coordinated the planning and delivery of the industry consultation process and the documentation of the focus group findings into the *Breakthrough Ideas for Sustainable Urban Development in North Queensland* resources.

The Thuringowa Sustainable Village Project is recognised by the Queensland Government's Sustainable Homes Program as one of 30 projects across the state supporting the adoption of the Queensland Government's Smart and Sustainable Design Objectives.

The project supports a vision for a Centre of Excellence in Tropical Design.



Focus Group Participants (Townsville and Thuringowa based unless otherwise mentioned)

- Margaret Ward - Accessible Design Expert (Brisbane)
 David Stefanovic - Architects North
 Keith Rogers - Aussie Foil
 Stephen Winter - Bonlec
 Graham Ward, Stephen Motti - Brazier Motti
 Greg Whebell - Building Designer (Independent)
 Anthony Buckle - BWD Enterprises
 Brad Skinner - Connelly Suthers
 Greg Sexton - Conrad Gargett Architects
 Daniel Di Mascio - Del Mondo Property Group
 Martin Wiltshire - Delfin Lend Lease
 Dr Richard Aynsley - Delta T Corporation (USA) [Past-Professor of Tropical Architecture, James Cook University, Townsville]
 Karen Taylor - Department of Emergency Services
 Alison Abbott, Renae Gordon, Asha Kiran, Jane Keast - Department of Health
 Renee Chilton - Department of State Development
 Damian Dryden - Developer (Independent)
 Sandy McCathie - ecoSAVVY
 Just Berkhout - Energy Consultant (Independent)
 Glen Robinson - Ergon Energy
 Darren Finlay - Finlay Homes
 Don Boynton - GHD
 Ashley Nuttall - Go Green Technologies/Solahart
 Hugh Yorkston - Great Barrier Reef Marine Park Authority
 Bob Osborne, Alan Smith (Brisbane)- Greening Australia
 Greg van Dinter - GVD Design
 Darren Robins - Herron Todd White
 John Futer, Mike Roberts (Brisbane) - Housing Industry Association
 Prof Chris Berndt, Dr Douglas Goudie, Rod Smith, Lisha Kayrooz, Dr Peter Jones - James Cook University
 Mary-Lynne Howard - John Egan Realty
 Peter Elliss - LCJ Engineers
 Rebecca Reid, Brad Cornwell - NAB
 Pauline Woodbridge - North Queensland Domestic Violence Resource Service
 Derek Saw, Charles Taylor, Andrew Wallace - Northern Consulting Engineers
 John Chalmers - Origin Energy
 Kevin Macks - PDT Architects
 Sophie Thompson - Permaculture Townsville
 Peter Mullins - Peter Mullins Landscape Design Consultant Services
 Sue King - Place Psychology
 Stewart Pentland, John Harker - PMM
 Dean Dederer, Shane Russell - PRDnationwide
 Snr Sgt Greg Croft, Snr Sgt Glenn Doyle, Kel Clark - Queensland Police
 Greg Goodwin - Ross River Real Estate
 Karen Hauser - Smith + Elliott Real Estate
 Ross Coventry - Soil Horizons
 Robyn Reid, John Mayo, Jordan Lefmann - Spinal Injuries Association
 Terry Ayling - Spirited Communities (Hamilton Island)
 Justin Stainton - Stainton Master Builders
 Phil Moss - Stockland
 Lucilla Marshall, Bob Bartlett, Alan Walker, Martin Clark, Paula Grant, Graham Anderson, Ian Savage, John Waetford, Michael Browne, Shaun Warner, Graeme Kenna, Amber Webster, Terry Seymour, Terry Healy, Natalie Melville, Anne Cowdy, Meredith Anderson, Jeremy Jenkins, Katie Glasgow, Adam Fryer, Paul Johnston, Howard Nuttall - Thuringowa City Council
 Andrew Froggatt - Townsville City Council
 Marie-Claude Brown - Townsville Thuringowa Safe Communities
 Frank Dallmeyer - Tropical Energy Solutions
 Neil Carter - Troppo Architects
 Jenny Tyler - Tyler Carpentry
 Neil Bennett, Vi Miller, Rosie Lo Giudice - Urbex
 Renee Jezard - VIVO Design

The Table of Contents is a list of the 206 key objectives identified by the focus groups for achieving commercially viable, mainstream market acceptable and cost competitive sustainable housing and urban development in North Queensland. The Table of Contents can be used as a reference in its own right without or with only occasional reference to the additional information provided in the Report.

Marketing, Sales and Mainstream Pricing	1
Maintaining affordability and mainstream pricing	1
In recognition that the upfront cost of housing is a key limiting parameter for the mainstream market, take specific measures to ensure the creation and delivery of sustainable housing product that is cost competitive with 'traditional' mainstream housing prices, i.e. in the price range of \$300 - \$450K (2007 prices)	1
Be cautious in assuming that buyers will pay more for sustainable homes	1
Recognise that consumers may not be able to pay more up front for a more sustainable home	1
Consider developing a sustainable housing product that is very affordable, not only undercutting typical prices in the traditional housing market but also providing a better product	2
Maximising market valuations	2
During the design of dwellings, be aware of, and seek to include features of sustainable homes that will achieve favourable market (lender) valuations	2
Develop product that meets future rather than past market expectations	3
Evaluate an acceptable price point for infill development	3
Design for market acceptance	3
Recognise that the market for sustainable dwellings is the entire market	3
Ensure that sustainability features incorporated in both the precinct and housing are highly marketable	3
In recognition that many new home buyers are not willing to accept compromises, ensure that homes designed for sustainability do provide consumers with the 'benefits' they value and do not inadvertently incorporate compromises	3
Be aware of the underlying 'benefits' that home buyers are looking for their home/investment property	4
Ensure that dwelling and precinct design is influenced from early in the design process to include the 'benefits' that consumers want and need	4
Utilise Marketing Tool #1 – 'A tool for DESIGNING highly marketable sustainable product' extensively during the design process	4
Keep in mind a consideration of which housing/land product generically does or does not sell well	4
Recognise what sells well in North Queensland and seek to ensure that there are no compromises in the benefits provided by a more sustainable home	5
Safeguard successful sales by ensuring that key 'market friendly' attributes are not overlooked in the design of 'more sustainable dwellings'	5
Create a marketing edge by overcoming issues typical of traditional detached homes/lots, e.g. noise, privacy	6
Provide housing of increased density, but ensure it is done really well	6
Capture a new market by providing medium density dwellings that can accommodate pets	6
Promote operational cost savings	6
Optimise tax depreciation incentives	6
Include features that will reduce running and maintenance costs	6
Estimate the operational savings likely to be achieved as a result of considered housing design	7
Promote to home buyers the investment benefits of choosing a more sustainable home	7
Disclose operational cost savings at point of sale	7
Improve consumer returns on investment	7
Support home buyers in reaping the significant financial rewards of reinvesting operational savings in advance mortgage repayments	7
Support home buyers in achieving reduced lending rates for green housing product	7
Support occupants in adopting efficient lifestyle practices	8
Promote water saver tariffs to households who use less water	8
Marketing and sales	8
Ensure that the purchase of a more sustainable home is no more complex than that of buying a 'traditional' mainstream home.	8
Test the proposed product with potential buyers	8

Ensure effective marketing of the precinct/project	8
Develop a marketing strategy and marketing/sales materials that focuses on selling the ‘benefits’ (rather than the features) of (a) the precinct and (b) the dwellings to potential home buyers	9
Promote the growth of an informed buying market by communicating the benefits (including the cost benefits) provided by sustainable dwellings and urban development	9
Utilise the ‘Thuringowa Sustainable Village Project - Marketing Tool - #2 - A tool for MARKETING sustainable product’ to guide the development of the marketing strategy and sales materials	10
Be smart in the use of words and terminologies used around the project	10
Land Development and Urban Design	10
Planning, urban design and development approval	10
Adopt best practice (sustainable) urban development processes	10
Adopt development application and assessment processes to best handle assessment of sustainability performance, in particular alternative and/or innovative solutions	11
Support council in providing incentives for sustainable developments	12
Promote the capturing and dissemination of sustainable development learnings by undertaking post development reviews	12
Community creation	13
Support community creation and social sustainability	13
Involve the people who are likely to live in and/or interact with the precinct in the planning of the precinct	13
Define the community’s ‘values’ and develop a community ‘vision’ to shape the ‘culture’ that this community will embody	14
Ensure that the marketing strategy for the precinct is informed by the identified community ‘values’ and ‘vision’	14
Actively facilitate community creation throughout all stages of precinct development e.g. design, construction, marketing, establishment	14
Ensure that residents (both existing and future), both in and around the development are supported both initially and on an ongoing basis in community creation	15
Land tenure and legal frameworks for sustainable urban development	15
Consider group title/community title with community management statements as a form of title	15
Consider registrable covenants to control land and buildings	15
Choose land tenures that best support sustainable urban development outcomes	16
Ensure that the built form informs the subdivision design and land tenure	16
Land affordability	16
Be aware of, and seek to minimise, factors that increase the land cost component of new housing	16
Reduce costs associated with the provision of the land	16
Seek to reduce the cost impost of infrastructure charges	17
Implement practices to minimise costs incurred through regulatory compliance and approvals processes	17
Reduce the land area utilised per dwelling	17
Economic mechanisms supporting sustainable development	18
Look for opportunities to share infrastructure and/or facilities to defray costs	18
Look for opportunities for capital intensive facilities to be provided by a service provider, thereby reducing up-front capital costs	18
Provide common infrastructure in development design, to enable community title land to be allocated in the subdivision	18
Apply for reduced headworks charge on basis of reduced use of council infrastructure	18
Support supply chain access to innovative or more sustainable products	19
Encourage Council to provide a rates incentive for sustainable dwelling performance using a differential rating mechanism	19
Carbon footprint	19
Reduce the community’s carbon footprint through urban design	19
Density	19
Improve urban efficiency, increase urban densities	19

Diversity .....	.20
Provide a diversity of dwelling product to cater for diverse household sizes and types .....	.20
Provide mixed use development .....	.20
Community health, wellbeing and interconnectedness .....	.20
Develop the site as an integrated part of the wider regional community .....	.20
Consider the physical and mental health of residents in the design of public and private spaces .....	.21
Create active, vibrant and identifiable urban spaces .....	.21
Encourage interactions with nature .....	.21
Encourage social interaction and promote active living through the provision of high quality communal spaces .....	.21
Promote sun safety .....	.21
Facilitate communication between residents .....	.22
Design the precinct to provide privacy for residents .....	.22
Promote the development of dwellings with natural daylighting .....	.22
Design the precinct to minimise sources of, and impacts of dust .....	.23
Design the precinct to minimise sources of, and impacts of noise .....	.23
Tropical urban design principles .....	.23
Embrace priority tropical urban design principles .....	.23
Urban design to encourage air movement .....	.24
Urban spaces and buildings orientated for avoidance of sun .....	.25
Prevent heat island effects .....	.25
Subdivision design to prioritise achieving best practice climate responsive urban design outcomes .....	.25
Design subdivision layout to enable passively designed dwelling configurations suited to a tropical climate .....	.25
Crime prevention .....	.26
Design the development (i.e. at level of precinct) to feel safe and reduce crime .....	.26
Accessibility and universal design .....	.27
Create a community environment that is accessible and safe for use by people of all ages and abilities .....	.27
Employment .....	.28
Maximise employment opportunities in the precinct .....	.28
Transportation .....	.29
Encourage reduced vehicle speeds .....	.29
Avoid single function land uses which segregate urban activities and perpetuate traffic .....	.29
Facilitate use of public transport and alternatives to private car transportation .....	.29
Consider vehicle parking/storage alternatives .....	.30
Dwelling Design and Construction .....	.30
Cost competitive dwelling types for tropical climates .....	.30
Provide dwelling types/sizes which can provide superior passive design performance in the tropics at pricepoints competitive with mainstream housing .....	.30
Dwelling design principles for tropical climates .....	.31
Encourage air-movement .....	.31
Minimise heat gain .....	.32
Utilise landscaping to provide shading to dwellings and outdoor spaces .....	.33
Promote outdoor living and optimise transitions between indoor and outdoor spaces .....	.33
Optimise passive design of living areas .....	.33
Install well ventilated garages or carports .....	.34
Minimise noise .....	.34
Cost competitive construction practices .....	.34
Be aware of, and seek to minimise, factors that increase the cost of the building component of new housing .....	.34
Provide dwellings sized to achieve affordable price points .....	.34
Reduce the size (square meterage) of dwellings through compact, flexible housing designs .....	.35
Prioritise inclusion of sustainability features that do not add additional upfront cost .....	.35

Maximise use of prefabricated, off site construction and modular componentry	.35
Minimise construction costs associated with flooring structures	.36
Choose cost effective floor coverings	.36
Reduce costs associated with providing walls	.36
Reduce construction costs associated with providing external openings (i.e. windows and doors)	.37
Minimise costs associated with providing internal openings	.37
Minimise costs associated with providing air-conditioning	.37
Reduce construction costs associated with ceilings	.38
Minimise costs associated with providing roof insulation	.38
Reduce construction costs associated with roofing	.38
Minimise construction costs associated with providing external shading	.39
Use construction methods where availability of trade skills is not a constraint	.39
Encourage retrofit programs for energy and water efficiency/sustainability performance of existing housing stock	.39
Dwelling design principles - other	.39
Encourage community interaction through considered dwelling design	.39
Encourage dwellings that are designed to feel safe and reduce crime	.40
Provide dwellings that are accessible, safe and easy to use by people of all ages and abilities	.41
Design to minimise injury in the home	.44
Design dwellings to maximise the physical and mental health of occupants	.45
Ensure provision of adequate storage areas	.46
Resource efficiency	.46
Waste	.46
Design for adjustability and retrofitting	.46
Support occupants in recycling and composting	.46
Take measures to minimise and manage waste in construction	.46
Energy	.47
Include smart meters including in-home energy use displays in all dwellings	.47
Provide for automatic/remote switching of electricity using devices	.47
Design housing to minimise electricity use by air-conditioning	.47
Choose high-efficiency air-conditioners and install for maximum energy efficiency	.48
Choose energy efficient hot water heating	.48
Locate refrigerators for energy efficient operation	.48
Supply or facilitate installation of energy efficient appliances	.48
Provide external clothes lines to all dwellings	.48
Install infrastructure to enable utilisation of LPG (gas)	.48
Provide gas reticulation to outdoor living spaces	.48
Provide a shared swimming pool	.49
Provide areas of north facing roof for present or future installation of photo-voltaic (PV) panels for solar electricity generation	.49
Explore the opportunity to utilise and/or demonstrate wind or solar power generation within the development	.49
Seek carbon credits or have a goal of creating a carbon neutral development	.49
Review material selection and choose materials for reduced embodied energy and lifecycle impacts	.50
Water	.50
Use demand management approaches to reduce water consumption across the project as a whole and of individual dwellings	.50
Supply or facilitate installation of water efficient landscaping and irrigation	.50
Provide for reuse (or future reuse) of greywater	.51
Consider the use of non-potable water for irrigation purposes.	.51
Ensure water recycling efforts are justifiable considering embodied energy	.51
Consider rainwater reuse but ensure benefits justify the cost	.51

Natural Resource Management	52
Landscape analysis	52
Recognise and elevate the value of biodiversity, habitat, trees, landscaping and natural processes in urban environments	52
Provide adequate budget to achieve effective landscape outcomes	52
Seek to minimise the impact of population increases on natural environments	52
Undertake landscape analysis early in the planning process	52
Ensure that landscape analysis informs the development design	53
Habitat	53
Conserve, create and protect habitat corridors	53
Sediment and erosion control	54
Prevent sedimentation of water courses	54
Control dust	54
Developers to be accountable for upholding Sediment and Erosion Control related to their development site	54
Builders to be responsible for managing sediment and erosion control related to their building site	54
Local Government/Regulators to support builders, developers and homeowners in adopting good erosion and sediment control practices	54
Appropriately manage contaminated and/or acid sulphate soils	55
Adopt good soil retention, storage and improvement practices	55
Minimise or avoid cut and fill practices	55
Landscape design	55
Utilise landscape design to improve the relationships between public and private spaces	55
Utilise nature to provide a feel good environment throughout the development	56
Include art in public landscape design	56
Prioritise creating a cool micro-climate in all areas of the precinct	56
Utilise landscape design to create a cool microclimate and to promote indoor/outdoor living	56
Maximise provision of shade trees in streetscaping and public spaces	57
Utilise best practice research to promote healthy growth and establishment of shade trees with minimal disturbance to nearby infrastructure	58
Ensure landscape design supports transportation alternatives	58
Reduce the risk of damage from cyclones, strong winds and fire	58
Use a mix of indigenous, native and introduced, primarily low water use plant species and a variety of landscaping styles to create highly attractive, consumer friendly landscaping	58
Landscaping design to be water efficient	59
Use landscaping to highlight views, natural features and cultural heritage of the site	59
Support iconic and indigenous flora and fauna in landscaping	59
Elevate the image of native gardens	59
Incorporate CEPTED (safety/security) and universal design (accessibility) principles in landscape design	59
Incorporate permaculture principles in landscaping practices	59
Incorporate a community garden	60
Foster and encourage successful plant selection, planting, establishment and maintenance of landscaping	60
Increase resident knowledge of how to look after their gardens	61
Infrastructure	61
Stormwater management and water sensitive urban design (WSUD)	61
Demonstrate water sensitive urban design practices	61
Seek to provide stormwater management solutions that are appropriate for the landscape (pre and post development) and that mimic natural processes	61
Work collaboratively to design swales and other WSUD structures that will satisfy desired engineering, ecological, landscaping, urban design, accessibility and other desired criteria and that are optimal for local conditions	62
Prevent litter and sediments from entering waterways	62
Consider permitting larger stormwater events to enter onto privately owned land	62
Encourage retardation of stormwater runoff from private property	62

Promote the inclusion of vegetation within water sensitive urban design structures, but ensure flow capacities are maintained	.63
Ensure drainage swales aesthetically enhance the precinct	.63
Minimise the maintenance requirements of water sensitive urban design structures	.63
Remove the need for traditional subsurface stormwater drains to free up verges and enable sufficient space for planting of street trees minimising adverse impacts on remaining subsurface services	.63
Explore opportunities to reduce stormwater infrastructure costs through alternative inlet configurations	.63
Roads and access pathways (vehicular & pedestrian)	.64
Consider the use of pervious road structures for roads and driveways	.64
Remove kerb and channel where possible	.64
Use lipless driveways for accessibility in precinct	.64
Optimise the location of pathways	.64
Design pathway widths with road profiles to match expected pedestrian usages	.65
Construct pathways to minimise trip hazards	.65
Lighting of street and public spaces	.65
Provide energy efficient street lighting	.65
Provide public lighting that can be adjusted to match community lighting needs	.65
Promote ownership of public lighting	.65
Prevent nuisance light	.65
Services provision: sewerage reticulation, water supply, energy (i.e. electricity, gas, other) and telecommunications	.65
Consider common services corridor easements at the rear of allotments to optimise infrastructure efficiency and overcome access issues	.65
Provide universal service connection point at common boundaries	.66
Install smart service indicators to facilitate rapid identification of key service points in emergency situations	.66
Install third pipe system for non potable/greywater within the house design	.66
Install exposed service pipework to the outside of houses to facilitate better access	.66
Where topography permits vacuum sewerage system may be appropriate	.66
Consider providing garbage collection from centralised locations	.66
Appendix 1	Thuringowa Sustainable Village Project - Marketing Tool #1: "A tool for DESIGNING highly marketable sustainable product" .68
Appendix 2	Thuringowa Sustainable Village Project - Marketing Tool #2: "A tool for MARKETING sustainable product" .74

Marketing, Sales and Mainstream Pricing

Maintaining affordability and mainstream pricing

Key Objective	In recognition that the upfront cost of housing is a key limiting parameter for the mainstream market, take specific measures to ensure the creation and delivery of sustainable housing product that is cost competitive with 'traditional' mainstream housing prices, i.e. in the price range of \$300 - \$450K (2007 prices)	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide sustainable house/land product for the mainstream market at appropriate prices i.e. in the range \$300,000 to \$450,000 (2007 prices). ▶ Provide housing at a range of price points, ideally in a bell curve distribution in the price range \$300 to \$420K. Note: The prices indicated here are current as at April 2007 and adjustment to reflect inflation etc would be appropriate. 	Comments:
Supporting Information	<p><i>In March 2007, a survey of new housing prices identified that most new homes in the Thuringowa area were being purchased in the price range of \$350 - \$450K. Providing housing at even lower price points is believed achievable with medium density development and offers an opportunity to undercut the current housing market and also provide North Queenslanders with new housing at a more affordable price point.</i></p> <p><i>A summary of the house/land prices being achieved in residential estates in the Thuringowa area in April 2007 is available on the Breakthrough Ideas CD and from the Thuringowa Sustainable Village Project website.</i></p>	
Key Objective	Be cautious in assuming that buyers will pay more for sustainable homes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that housing product seeking to attract any level of premium through the inclusion of green/sustainable features provide 'benefits' that home buyers will 'value'. 	Comments:
Supporting Information	<p><i>There are a number of studies suggesting that consumers will pay 5-15% more for a 'green' or 'more sustainable' home.</i></p> <p><i>It is considered that, some people may be prepared to pay a little more for green/sustainable home (and possibly only a couple of % more) but only if the product is providing them with a 'BENEFIT' that they value. For example, Brisbane developers are getting a premium for housing product with high quality onsite water recycling and reuse because it means that residents in those dwellings are unconstrained by water restrictions and can continue to have green gardens/lawns. In other words buyers won't pay more for just any 'green features'.</i></p> <p><i>Refer to Marketing Tools #1 and #2 available on the Breakthrough Ideas CD and the Thuringowa Sustainable Village Project website for guidance as to the benefits that home buyers will value.</i></p>	
Key Objective	Recognise that consumers may not be able to pay more up front for a more sustainable home	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide potential buyers with information on the benefits provided by specific sustainability features including estimates of cost savings to encourage the North Queensland market to appreciate and pay for the longer term benefits provided by sustainable housing product. 	Comments:
Supporting Information	<p><i>The finance available to home buyers in the mainstream market is a limiting factor on a buyers ability to pay more.</i></p> <p><i>The amount of money that home buyers can borrow from a financier is determined by a valuer's market evaluation. A word from a valuer: "Valuers only try and interpret the market. If the product is different in some way then it's a guessing game until there is sales data to set a benchmark."</i></p> <p><i>Valuers are unable to value expensive items that are put into a house – if the buying market will not pay extra for them. In other words, valuers are unable to add the value of expensive inclusions unless there is sales evidence that the market will pay more for them.</i></p>	

Key Objective	Develop a sustainable housing product that is very affordable, not only undercutting typical prices in the traditional housing market but also providing a better product	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Gain cost efficiencies through reducing the land area per dwelling, reducing the internal floor area per dwelling, prioritising the use of low cost construction techniques and moving from a detached housing form to housing forms that more cost effectively achieve tropical design principles (e.g. design housing forms that use share walls in E-W orientations to minimise heat gain from the east and west, facilitate provision of cost effective shading, and through a N-S orientation enhance breeze access and outlooks). ▶ For marketability, ensure that the dwellings provide the benefits that people are really looking for. 	Comments:
Supporting Information	<p><i>Typically sustainable homes are not directed to 1st home buyers due to the perception that the cost of homes that are more sustainable must be higher. The Thuringowa Sustainable Village Project has found however that by moving to attached housing styles that a housing product that is actually cheaper than the current mainstream housing product could be cost effectively designed/constructed and successfully marketed.</i></p> <p><i>To ensure that designs meet market desires, refer to the 'Thuringowa Sustainable Village Project, Marketing Tool #1 – A tool for DESIGNING highly marketable sustainable product.'</i></p>	

Maximising market valuations

Key Objective	During the design of dwellings, be aware of, and seek to include features of sustainable homes that will achieve favourable market (lender) valuations	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Design housing to achieve favourable market valuations and to provide assurance to home buyers and investors that their investment in a home designed with sustainability in mind will also achieve a strong return on resale. ▶ Utilise housing configurations that will be favourably valued by lenders/valuers. Some favourable options identified were: <ul style="list-style-type: none"> ▷ A home designed for flexibility i.e. the one house could be variously used in different configurations e.g. interchangeably as a 2 bed + media, 2 bed + granny-flat, 2 bed + office, or 3 bed home; ▷ Houses that can be 'divided' to enable occupation by separate households e.g. a 4 bedroom dwelling that is constructed as two separate pods e.g. 2+2 bed or 3+1 bed arrangement. This could enable the future rental or sale of the property as two separate dwellings or an upgrade for a larger family; and ▷ Housing designed for sharing between independent adults e.g. 3 bed/3 bathroom house. Note: Independent adults would typically prefer their own bathroom. ▶ Include outdoor living area. Note: This is highly likely to increase the valuation of the dwelling. ▶ Incorporate tropical design styles. Note: Can increase the valuation of the dwelling. 	Comments:
Supporting Information	<p><i>Favourable market valuations benefit home buyers by increasing the likelihood that lenders will lend on full construction cost of dwelling.</i></p> <p><i>Be aware that the upfront bank valuation and the long term resale value of a home are very important buying considerations for many home buyers.</i></p> <p><i>Staged construction of housing i.e. where plans are prepared for a 4 bedroom house, but only a portion e.g. a 2 bedroom house is initially built, are currently not valued favourably because the land is not being used to full potential and makes a disproportionate component of the total price.</i></p> <p><i>Similarly, lenders do not favour two-bed houses on standard lot sizes as the land is not being used to full potential and makes a disproportionate component of the total price. Note: This does however depend on where the property is. A two bedroom cottage is readily accepted in the inner city and fringe city areas.</i></p> <p><i>Recognise that improving ambience whilst likely to speed the sale of a house, is unlikely to increase the \$ valuation of the house (other factors have a greater valuation).</i></p> <p><i>Operational costs (i.e. reduced running costs) are not currently recognised by financiers or valuers in the current market. As a result, lenders do not consider in \$ terms the value that would be returned over time as a result of the inclusion of sustainable features in housing, nor will they provide homebuyers with additional finance.</i></p>	

	<i>In other words extended borrowing is not available to homebuyers whose homes are capable of delivering even substantial operational cost savings. Investigations into whether homes whose designs are capable of delivering saving of even \$3000 per annum revealed that at present (2007) that institutional lenders were not able to provide any additional access to finance.</i>	
Key Objective	Develop product that meets future rather than past market expectations	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider the changing wants and needs of 'future' generations and develop product to meet future rather than past market expectations. ▶ Consider the impact of changing demographics e.g. an aging population; more single person households, smaller households. ▶ Consider the implications of changing economic influences e.g. high oil prices; low communications cost; increase in telecommunication use. ▶ Consider changing community attitudes i.e. sustainability likely to be more valued, increased demand for eco-features. ▶ Consider what particular benefits that people living in North Queensland (both present population and future population makeups) are likely to want in their homes. ▶ Pick up on trends emerging in Brisbane and South East Queensland. 	Comments:
Key Objective	Evaluate an acceptable price point for infill development	Yes / No
Suggested Solutions	▶ Provide an infill product that whilst better is only slightly higher in price than existing housing stock.	Comments:
Supporting Information	<i>In the case of infill development, because the new product is likely to be substantially different to the form/type of housing already existing the suburb (and possibly contributing to the revitalisation of the suburb), it is plausible that new, better forms of housing, potentially targeting a different market to that already within the suburb will be market desirable even with a (slightly) higher pricepoint than the pricing currently being achieved in that suburb.</i>	
Design for market acceptance		
Key Objective	Recognise that the market for sustainable dwellings is the entire market	Yes / No
Suggested Solutions	▶ Recognise that by incorporating sustainability into housing at price points that are cost comparative with 'traditional' housing that the market for sustainable homes expands to include ALL markets segments.	Comments:
Supporting Information	<i>Sustainable homes are typically marketed at 3rd+ home buyers. The ability to provide dwellings that are cost comparative (or even potentially cheaper) than 'traditional' new homes opens up the market for sustainable homes to also include 1st or 2nd home buyers. The current market desire for greener, more sustainable homes is predominantly met in North Queensland by people who buy Queenslanders. Consider however, that ALL people would like to be able to live in a more sustainable home if given the choice.</i>	
Key Objective	Ensure that sustainability features incorporated in both the precinct and housing are highly marketable	Yes / No
Suggested Solutions	▶ Refer to and use 'Thuringowa Sustainable Village Project Marketing Tool #1 – A tool for DESIGNING highly marketable sustainable product'.	Comments:
Key Objective	In recognition that many new home buyers are not willing to accept compromises, ensure that homes designed for sustainability do provide consumers with the 'benefits' they value and do not inadvertently incorporate compromises	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that the benefits provided by more sustainable housing exceed those typically provided by mainstream new housing product, especially where dwellings have a smaller (internal) floor area. ▶ Consider the conditions required for buyers to move from buying a detached dwelling to buying a unit, terrace or townhouse. ▶ Address and seek to minimise and overcome early in the design stage any compromises incurred in moving from a detached to attached housing form. 	Comments:
Supporting Information	<i>Courtyard blocks e.g. in Riverside Gardens were/are accepted by the Townsville market because they were more affordable and because the people who bought them considered them a grander version of an apartment (despite the small 300sqm lot size) plus there were good parks nearby so large areas of private 'grassed' areas weren't important to buyers.</i>	

Key Objective	Be aware of the underlying 'benefits' that home buyers are looking for in their home/investment property	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Take steps to overcome the tendency for consumers (and others) to compare dwellings based on the number of rooms, floor area and lot area. ▶ Develop dwellings that provide the BENEFITS that homebuyers are looking for. ▶ In recognition that people buying in different areas of Thuringowa or North Queensland e.g. Burdell, Kalynda, Bushland Beach, Kelso, Willowbank, etc are likely to have some differences in their priorities/wants/needs, seek to prioritise the 'benefits' that would be most important to people buying in a particular location. 	Comments:
Supporting Information	<i>Refer to 'What consumers REALLY want/need list' available on the Breakthrough Ideas CD and from the Thuringowa Sustainable Village Project website.</i>	
Key Objective	Ensure that the dwelling and precinct design is influenced from early in the design process to include the 'benefits' that consumers want and need	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Rather than focusing on the 'features' that typically frame the design of dwellings e.g. floor area, lot area - design homes from first principles to ensure that the 'benefits' that consumers want/need are provided for in the designs. ▶ Refer to and use: 'Thuringowa Sustainable Village Project Marketing Tool #1 – A tool for DESIGNING highly marketable sustainable product'. 	Comments:
Key Objective	Utilise Marketing Tool #1 – 'A tool for DESIGNING highly marketable sustainable product' extensively during the design process	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise Marketing Tool #1 to identify the underlying 'benefits' that home buyer/home occupants and investors look for in a home as opposed to the 'features' they may say they want. 	Comments:
Supporting Information	<p><i>Marketing Tool #1 has been developed for use at the DESIGN and PRODUCT DEVELOPMENT stage of new dwellings and subdivisions.</i></p> <p><i>The tool serves to provide assurance to builders and developers that they can develop differentiated housing and development product with improved sustainability performance that will also be highly market acceptable.</i></p> <p><i>The tool seeks to identify for designers/builders the attributes (benefits) that people/home buyers are looking for in a home/investment property, providing builders and designers who use the tool with the added confidence and assurance that their new product will be desired by the buying public. For example in general consumers aren't looking for a fully airconditioned home, what they really want is a home that is (thermally) comfortable to live in.</i></p>	
Key Objective	Keep in mind a consideration of which housing/land product generically does or does not sell well	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that housing or developments designed with sustainability in mind consider the basic requirements for a product to be successfully sold. 	Comments:
Supporting Information	<p><i>An answer to the question, "Generically, what sells?" is "A product that works (for them – the buyer), that is at the right price (for them) i.e. within their budget or ability to pay, and that meets the buyers intangible wants/needs."</i></p> <p><i>An answer to the question, "Generically, what doesn't sell?" is "A product that doesn't meet their specific needs, that's ugly, that has poor amenity (i.e. no facilities in location), is poorly presented, that just doesn't feel right e.g. pokey, or that doesn't function 'right'."</i></p> <p><i>"Home buyers look for a housing 'package' that represents 'value' within their 'budget' and provides a satisfactory 'lifestyle' at their particular stage of the 'lifecycle.'" (Source: Tigani, J. 2003, "Marketing Residential Projects, A Strategic Guide to Marketing Success," JLT & Associates, Brisbane).</i></p> <p><i>In general consumers/builders and people don't like being the one who has to pioneer an idea. They want to know that they (as a consumer) will like it, that others (their peers) will like it, and for builders that consumers will like it enough to buy it.</i></p>	

Key Objective	Recognise what sells well in North Queensland and seek to ensure that there are no compromises in the benefits provided by a more sustainable home	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Strong land sales are typically achieved (in North Queensland) when there is: <ul style="list-style-type: none"> ▷ Perceived affordability (i.e. comparative value for money); ▷ A sense of spaciousness/openness (e.g. consider maintaining wider frontages and blocks with less depth, to avoid a cluttered streetscape); ▷ For developments that have higher than traditional densities - public open spaces must be (a) provided (b) well designed (c) interesting and (d) active; ideally with very good relationships to dwellings; ▷ A sense of safety; ▷ Good access to amenity including recreational areas/opportunities in immediate area; close proximity i.e. a couple of kms to shopping, key services, restaurants, entertainment, schools; and a reasonable proximity to work; and ▷ Include in the precinct design features that will create a sense of community and neighbourliness but recognise that focusing marketing a precinct as having 'a (strong) sense of community' may result in omission of attributes of higher priority to consumers from the marketing message. Note: It was initially thought that a sense of community and neighbourliness would be something that home buyers would place a very high priority on and be specifically seeking but after discussion we don't think this is the case. 	Comments:
Supporting Information	<p><i>The typical new home purchased by 80% of the North Queensland market is a 4 bedroom, double lockup garage with ensuite + variations for their personal taste + sometimes additional rooms for study and theatre room.</i></p> <p><i>4 bedroom homes are strongly preferred by home buyers as this allows for a spare room, however 3 bedroom homes are rising in demand because they're more affordable.</i></p> <p><i>2 living areas are very popular. Typically they are separate areas (as recently, there has been a backlash to open plan living). One living area typically rotates around an outdoor living area. The other is often called a media room. The home will often have both a rear and a side patio.</i></p> <p><i>Current housing trends include having a pool, home theatre and air-conditioning to the entire house. Note: Concrete masonry detached homes essentially mandate a need for full air-conditioning to be provided as most concrete masonry homes are uncomfortably warm without air-conditioning – especially at night.</i></p> <p><i>Tropical design is not currently prevalent as a trend for mainstream housing. Neither is sustainability. Perhaps one or both could or will become predominant trends for mainstream housing in North Queensland.</i></p> <p><i>There are not presently many 1st home buyers buying new homes at the moment – they simply can't afford it.</i></p>	
Key Objective	Safeguard successful sales by ensuring that key 'market friendly' attributes are not overlooked in the design of 'more sustainable dwellings'	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In designing homes, consider the 'benefits' being provided by the traditional new housing in North Queensland and seek to provide those 'benefits' by alternate means in an alternative dwelling type/design. ▶ It is considered important to address the following points that are particularly relevant to creating market friendly sustainable homes. The dwelling: <ul style="list-style-type: none"> ▷ Has an upfront cost that is perceived as being 'affordable' – this can mean different things for different people, but essentially means value for money and within financial reach of the buyer; ▷ Will achieve a good resale value (see Maximising Market Valuations sub-section); ▷ Does not present any particular maintenance issues e.g. cyclones, termites ; ▷ Provides comfort; ▷ Provides privacy; and ▷ Is at least equivalent to a traditional dwelling in terms of the benefits it provides i.e. there must be no trade offs 	Comments:

Key Objective	Create a marketing edge by overcoming issues typical of traditional detached homes/lots, e.g. noise, privacy	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Increase dwelling densities and overcome issues with privacy and noise by moving from detached housing forms to dwellings with shared walls (ensure walls have good acoustic properties). ▶ For duplex style housing 'give back' the additional width achieved by building to boundary on one side by providing an increased setback from neighbours on the non-shared wall boundary. 	Comments:
Supporting Information	<i>Noise and privacy from neighbours is an issue in most new housing product as the distance separating dwellings has decreased. The distance between dwellings walls/window openings is now often 3 metre or less.</i>	
Key Objective	Provide housing of increased density, but ensure it is done really well	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide medium density development even in locations where detached housing would typically be the default, but justify through enhancement of the precinct with strong relationships to well designed open spaces, improved amenity and enhanced proximity to services. 	Comments:
Supporting Information	<p><i>Medium density development is typically associated with the city fringes and in suburbia is often seen as a cheaper form of accommodation.</i></p> <p><i>Success and desirability of medium density dwellings is typically related to proximity to desired services e.g. well maintained public spaces, shops, entertainment. Providing a medium density product could be regarded as an issue in areas which lack immediate proximity to services/amenity.</i></p> <p><i>Overcome lack of proximity to services/amenity by ensuring that all dwellings have excellent relationships to well designed, active and interesting open space – as this has been identified as a critical desirable attribute for highly marketable medium density dwellings. If such an area is not already existing, ensure that adequate land is allocated to this purpose.</i></p>	
Key Objective	Capture a new market by providing medium density dwellings that can accommodate pets	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Expand the market of medium or high density homes by designing in provisions to enable the keeping of pets (especially dogs and cats). Note: Fencing is a key consideration to enable accommodation of pets. 	Comments:
Supporting Information	<i>Many households have pets and as such dwellings that cater for accommodating pets are very marketable at sale/resale.</i>	
Promote operational cost savings		
Key Objective	Optimise tax depreciation incentives	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Select building fabric, carpets, floating floors, air-conditioners etc to optimise tax depreciation incentives. 	Comments:
Supporting Information	<i>Tax depreciation is particularly important for investment/rental properties.</i>	
Key Objective	Include features that will reduce running and maintenance costs	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide home buyers with designs that deliver operational cost savings. Particularly significant cost savings can be returned through considered design in the areas of energy consumption, maintenance, housing flexibility (universal design) and through minimising the occurrence of accidents and injuries in and around the home. 	Comments:
Supporting Information	<p><i>Although, operational savings in homes are not currently recognised by financiers or valuers in today's market, it is anticipated that justification for and acknowledgment of the value of investing in and having homes that have reduced running and maintenance costs will increase.</i></p> <p><i>Drivers for this include (1) increased community awareness of our collective need to conserve energy and water, resulting in increased demand for housing that is more water and energy efficient, and (2) the likely growth in the capital value of homes that would eventuate from disclosure of the environmental /sustainability performance of homes.</i></p> <p><i>The benefit of considering sustainability in housing design is that well designed dwellings can provide substantial operational savings to both home owners and occupiers, which ultimately adds to the economic prosperity of both.</i></p>	

Key Objective	Estimate the operational savings likely to be achieved as a result of considered housing design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Calculate the savings in electricity and water bills and avoided or reduced long term maintenance costs resulting from the inclusion of the sustainability features in the home 	Comments:
Key Objective	Promote to home buyers the investment benefits of choosing a more sustainable home	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Choose a way to demonstrate to potential buyers: <ul style="list-style-type: none"> ▷ That the whole of life costs of a particular dwelling or suite of dwellings is significantly less than a traditionally designed dwelling due to the direct savings arising from reduced maintenance and running costs. ▷ The probable increase in the capital value of a home built with sustainability in mind that will arise after disclosure of eco/sustainability performance (probable within 5 years). 	Comments:
Supporting Information	<i>Increasingly buying a home is seen as an investment, with making money off the property a prime motivator of purchasing.</i>	
Key Objective	Disclose operational cost savings at point of sale	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Expand the market of medium or high density homes by designing in provisions to enable the keeping of pets (especially dogs and cats). Note: Fencing is a key consideration to enable accommodation of pets. ▶ Trial the use of a mechanism/checklist for disclosing the operational running costs of your homes to potential home buyers. This would likely incorporate an indication of the energy efficiency performance of the home. Consider using a disclosure criteria in a similar format to that of the ACT, whereby all houses advertised for sale are compelled to disclose the energy rating of the dwelling as a star-rating out of 5 or alternately the poster/checklist developed by the HIA GreenSmart Program to promote GreenSmart Accredited Homes in Brisbane. 	Comments:
Supporting Information	<i>Probable benefits of disclosure include a significant shift in market awareness for the ongoing running/operational costs of homes and also the financial savings available to them in purchasing a home where sustainability performance has been considered as a key part of the design.</i>	
Improve consumer returns on investment		
Key Objective	Support home buyers in reaping the significant financial rewards of reinvesting operational savings in advance mortgage repayments	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Promote to potential home buyers (e.g. via sales/marketing materials) the considerable \$\$ savings that they could achieve by buying a housing product with low operational costs and reinvesting the operational savings back into their mortgage effectively shortening the duration of their mortgage. 	Comments:
Supporting Information	<i>Householders that reinvest operational savings back into their loan can significantly shorten their loan and save themselves considerable \$\$ in avoided interest over the life of the loan.</i>	
Key Objective	Support home buyers in achieving reduced lending rates for green housing product	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Explore the availability and attractiveness of green loans e.g. Bendigo Bank currently offers a 'Generation Green™ Home Loan'. 	Comments:
Supporting Information	<p><i>Green loans tend to offer a reduced lending rates (typically 0.5% on their current variable rate) in return for proof of enhanced 'environmental or sustainability' performance.</i></p> <p><i>A 0.5% reduction in the variable rate can result in a saving of more than \$48,000 in avoided interest rates over the life of a loan is estimated.</i></p>	

Key Objective	Support occupants in adopting efficient lifestyle practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Support home owners and occupants in adopting efficient lifestyle and home management practices. ▶ Provide homebuyers/occupants with information on how to efficiently live in and maintain their new home. ▶ Include design features e.g. in-house energy/water meters to provide occupants with instantaneous feedback on the impact of their lifestyle practices on their efficient use of resources. 	Comments:
Supporting Information	<i>As the efficiency of features incorporated in housing design improves, the way we live in a house (occupant behaviour) plays an increasingly large role of the overall efficiency achieved by the dwelling.</i>	
Key Objective	Promote water saver tariffs to households who use less water	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage homeowners to apply to participate in optional user pays water charging plans that reduce the costs for households who use less than about 500 kls per year, e.g. the Thuringowa Council Water Watcher Plan. 	Comments:
Marketing and sales		
Key Objective	Ensure that the purchase of a more sustainable home is no more complex than that of buying a 'traditional' mainstream home.	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use sale processes that are similar to methods typical of mainstream housing sales e.g. sold as house/land package, land + covenant etc. ▶ Be able to explicitly state the point of difference – the WOW factor - of the (sustainable) precinct/home product. ▶ Define the unique selling proposition of the precinct/housing product. ▶ Define the wow factor of the precinct. 	Comments:
Key Objective	Test the proposed product with potential buyers	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Seek feedback from potential buyers as to whether the proposed product is attractive to them. Specifically test whether they appreciate the 'benefits' the product seeks to provide. ▶ Undertake a market research exercise with potential buyers in the precinct. ▶ Incorporate feedback from potential buyers in the refinement of the product. 	Comments:
Key Objective	Ensure effective marketing of the precinct/project	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider the following marketing tips to ensure effective marketing of the precinct/homes: <ul style="list-style-type: none"> ▷ Start with a low price to create momentum. ▷ Raise prices strategically i.e. at certain milestones or on market signals. ▷ Build up PR in advance of product release. Note: This is critical. ▷ Develop a brand recognition from early in the planning process. Note: For a sustainable development, ensure that the development name/branding is compatible and supportive of the theme(s)/key desired attributes (i.e. 'values' and 'vision') envisaged for the development. 	Comments:

<p>Key Objective</p>	<p>Develop a marketing strategy and marketing/sales materials that focuses on selling the 'benefits' (rather than the features) of (a) the precinct and (b) the dwellings to potential home buyers</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Adopt the Golden Rule of marketing – Sell the benefits not the specific features (of sustainable precincts/housing). ▶ Develop a marketing strategy that focuses on selling the 'benefits' (rather than the features) of (a) the precinct and (b) the dwellings to potential home buyers. ▶ Utilise the 'Thuringowa Sustainable Village Project - Marketing Tool - No 2 - A tool for MARKETING sustainable product' to help identify BENEFITS that are priorities for homebuyers. Note: The 'Thuringowa Sustainable Village Project, Marketing Tool #1 – A tool for DESIGNING highly marketable sustainable product' may also be a useful reference. ▶ Develop for each dwelling a simple list of 'benefits' embodied in the design of the precinct/home(s) for use in sales materials. ▶ Use this list of benefits to inform advertising, marketing and sales people associated with selling the land/home(s). ▶ Develop a consumer handout (e.g. brochure, flyer or checklist) to succinctly and quickly communicate to potential home buyers the 'benefits' of (a) the precinct; (b) each dwelling. ▶ In marketing materials, consider the following tips: <ul style="list-style-type: none"> ▷ Avoid comparing product on floor/lot area; ▷ Do promote that sustainable houses are actually BETTER in many ways than traditional new homes providing a raft of BENEFITS; ▷ Provide reassurance that sustainable dwellings don't entail compromises; ▷ Take care not to fall into the trap of reverting to focus on 'sustainability features' e.g. low VOC/low odour/non-toxic paints. The 'benefit' is a 'healthier home especially for children and people with asthma; ▷ Consider highlighting the particular benefits that might be attractive to different audiences i.e. owner-occupiers, investor-owners, and renters and ensure that benefits attractive to each sector are addressed in marketing materials; and ▷ Encourage sales staff, builders, consumers and others to communicate and focus on the 'benefits' provided by a particular dwelling/development rather than the 'physical features' present in that dwelling/development. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Promote the growth of an informed buying market by communicating the benefits (including the cost benefits) provided by sustainable dwellings and urban development</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Ensure that consumers are told why the precinct/the homes are special and the benefits that they will enjoy as a result of the homes/precinct being designed and built with sustainability in mind. ▶ Seek to overcome complacency in market demand for sustainable product by using marketing materials to promote, educate and the raise awareness of consumers of the 'benefits' available to them from choosing dwellings and urban development product designed and planned with sustainability in mind. ▶ At the most mainstream level, consider presenting to potential home buyers a side-by-side comparison of two houses (one built to prior and one built after the current BCA Standards which require water saving devices such as water efficient tapware and toilets, energy efficient lighting, energy efficient hot water system). ▶ In recognising that the act of forming an opinion on a home is often a very fast process, develop and/or utilise a format that will enable rapid communication of a homes sustainability benefits to potential purchasers. ▶ In all communications, focus on the BENEFITS rather than the 'features' provided by more sustainable product. ▶ Include in marketing materials specific encouragement to home buyers to move beyond comparing houses on 'features' e.g. floor area, to thinking of the benefits that they would like their new home to deliver, i.e. to think of thermal comfort rather than air-conditioning as being the requirement they want their new home to deliver. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Market awareness of the benefits provided by sustainable features in housing is currently low.</i></p> <p><i>Consumer education is key to having an informed market that will value and pay for sustainable features of housing product.</i></p>	

Key Objective	Utilise the 'Thuringowa Sustainable Village Project - Marketing Tool #2 - A tool for MARKETING sustainable product' to guide the development of the marketing strategy and sales materials	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise 'Marketing Tool #2: A tool for MARKETING sustainable product' when developing marketing strategies and sales materials. 	Comments:
Supporting Information	<p><i>Marketing Tool #2 has been developed as a guide to MARKETERS of more sustainable dwellings and subdivisions to support them in focusing marketing efforts on communicating the BENEFITS that home buyers will appreciate (rather than on specific sustainability features).</i></p> <p><i>The tool outlines important concepts for marketing sustainable homes, suggested language and suggested process.</i></p>	
Key Objective	Be smart in the use of words and terminologies used around the project	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In marketing sustainable product – undertake research or get specialist input to identify those words that are more or less effective to use in the marketing of sustainable product. ▶ Consider the impact of using different words, particularly to avoid negative connotations. Some examples are: using the word 'apartments' rather than 'units'; 'composite style construction' rather than 'light weight construction'; 'courtyard lots' rather than '15m frontage lots'; 'medium density' rather than 'high density', etc. ▶ Use persuasive words in marketing materials like: easy, results, save, discover, guarantee, safety, health, love, money, need, proven, you. Note: These words according to Yale University, are the twelve most persuasive words in the English language. ▶ Use layman's language rather than techno-garble, e.g. Houses that work in the tropics (instead of climate responsive design or passively designed home), water saving taps and shower heads (instead of 3-star fittings), windows that open all the way (instead of the names of various window types), houses that let the breeze in (instead of oriented to capture breezes etc). 	Comments:

Land Development and Urban Design

Planning, urban design and development approval

Key Objective	Adopt best practice (sustainable) urban development processes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise market research reports to encourage innovation and incorporation of sustainable urban design principles. ▶ Refer to the publication 'Australian New Urbanism – A guide to Projects' as a resource for identifying best practice urban planning and design principles (www.acnu.org). ▶ Recognise that sustainable urban development is a specialised area and that the use of sustainability specialists to coordinate implementation of triple bottom line sustainability principles can achieve superior development and commercial outcomes. 	Comments:

Key Objective	Adopt development application and assessment processes to best handle assessment of sustainability performance, in particular alternative and/or innovative solutions	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Adopt development application processes that seek to minimise costs and time associated with the development assessment process. ▶ Support local government to assess development applications within tight time frames. ▶ Ensure that applications properly consider and address local government concerns. ▶ Use pre-lodgement meetings EARLY in the design process. ▶ Use pre-lodgement meetings to: identify local government concerns upfront, and achieve in-principle agreement for the proposed development with the goal of enabling further development approval processes to be 'code' assessable. ▶ Seek to identify approval pathways that will minimise the complexity and administration heavy focus of IDAS which can lead to delays. ▶ Be proactive in relation to State Agency referrals with a view to clarifying their requirements, increasing certainty and improving response timeframes. ▶ Use non-statutory partnering agreements to encourage best practice approach and outcomes. ▶ Consider the benefits of seeking a preliminary approval. Note: It is recognised that preliminary approval may not be a viable approach for some (smaller) developments. ▶ Adopt a development application/approval process that involves: <ul style="list-style-type: none"> ▷ Pre-lodgement meetings; ▷ Pre-approval; ▷ Creation of a shared vision (developer/council); ▷ Development of a non-statutory Partnering Agreement that identifies overall outcomes (with the intention of facilitating the achievement of best practice approaches and outcomes); and ▷ Development of a list of mutually agreed ESD initiatives. ▶ Approach the development assessment process with the intention of finding mutually agreeable outcomes. ▶ Nip in the bud any adversarial mentality between local government and developer. ▶ Encourage openness in communication from both sides (developer (applicant) and government (development assessor)). ▶ Develop an understanding of the other's potential concerns/preferences/wants/needs – as a foundation for finding mutually agreeable outcomes. ▶ Problem solve to achieve the best development outcome for both parties. ▶ Improve development outcomes by using performance based sustainability checklists. ▶ Consider the merits of incorporating a scoring mechanism into the checklist. ▶ Utilise existing sustainability checklists to guide the development of a list of mutually agreed sustainability initiatives. ▶ Encourage Councils to support developers through the provision of a sustainability checklist (like the Thuringowa City Council Sustainability Checklist). ▶ Explore opportunities for relevant industry organisations to endorse practices particularly alternative or innovative solutions. ▶ Consider the use of third party accreditation programs to support/endorse alternative solutions, e.g. UDIA EnviroDevelopment, HIA GreenSmart. Note: Benefits for the developer include marketing leverage, third party endorsement of the sustainability credentials of the development, additional credibility for the precinct. ▶ Use documentation developed for justification of third party accreditation/endorsement to support alternative solutions in development assessment applications. ▶ Encourage Council(s) to establish a pool of specialist consultants and a committee review process which can be utilised by developers who would like to speed up the assessment of proposed innovative or alternative solutions. 	Comments:

Key Objective	Support council in providing incentives for sustainable developments	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Work with Council to identify incentives that would encourage developers to provide sustainability benefits in their development. ▶ Trial the application of Council incentives encouraging sustainable urban development and test their application to determine whether they really do present an incentive and to set a precedent for the industry. ▶ In developing incentive mechanisms ensure that the specific outcomes that must be achieved to receive the benefit are identified. ▶ Involve mechanisms for peer (industry) review in the development of incentives. ▶ Optimise the peer review process via the appointment of a review panel of select industry representatives and remunerate them for their time. ▶ Consider incentives like: <ul style="list-style-type: none"> ▷ Density credits; ▷ Mechanisms that enable transitions from impact assessable to code assessable and ideally to self assessable processing; ▷ Time incentives that enable developers to more time effectively progress ESD initiatives; and ▷ Rewards for developers seeking self-assessable development assessment. ▶ Encourage the incorporation of incentive mechanisms into the planning scheme. ▶ Encourage a review of elements of Council Policies not promoting sustainability e.g. road standards. ▶ Utilise the findings of Thuringowa Sustainable Village Project (i.e. as presented in this document) to identify priority areas where sustainability could be better supported via the planning scheme and Council policies. ▶ Encourage Council to support higher minimum standards for developments. ▶ Advocate the use of pre-lodgment meetings to support Council in communicating desired development standards even in absence of the inclusion of acceptable solutions in the planning scheme. ▶ Encourage Council to maintain momentum in the process of amending the planning scheme on a bi-annual basis, particularly to promote sustainable urban development, even recognising that the process to amend the planning scheme can take a number of months (particularly when the change is major and a state interest check is required). 	Comments:
Supporting Information	<p><i>The appointment of a peer review panel recognises that standard industry consultation processes (i.e. voluntarily involvement by industry representatives) is being constrained by the time availability of those representatives, resulting in overlooking of some aspects and lost opportunity for incentive optimisation.</i></p> <p><i>When a Planning Scheme is quite broad, acceptable solutions are often not provided. This is both positive and negative. The opportunity for a comprehensive review of the planning scheme occurs on a 6 year timeframe. The impact of not adopting amendments over time is that it is difficult for the Council to require higher standards especially of poor developments.</i></p>	
Key Objective	Promote the capturing and dissemination of sustainable development learnings by undertaking post development reviews	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Undertake post development reviews to capture experiences and learnings of both the government and developer. ▶ Document post development reviews in a written format to achieve a clear factual sharing of ESD approval/experiences/learnings to a broader industry base than presently achieved through word of mouth. ▶ Support and/or encourage Council to lead an initiative to promote the sharing of sustainable development learnings in the Townsville/North Queensland region through capturing and disseminating post development learnings (of both the Council and the developer) in a simple casestudy format. ▶ Consider undertaking post development reviews in two stages – (1) at commencement of ON maintenance to capture as early as possible assessment and application learnings and (2) at OFF maintenance to capture learnings from built form outcomes and ON maintenance period. 	Comments:
Supporting Information	<p><i>Post development reviews should seek to identify both positive and negatives experiences from both Council and developer perspectives in relation to approval processes and sustainable development outcomes with the overall intent of documenting findings for the benefit of both the government and the developer and enabling the learnings to be shared with the industry more widely.</i></p> <p><i>Ensure the format of post development reviews is a simple casestudy format to enable rapid documentation and reading by industry peers. Post development reviews could summarise key points in relation to what the developer did, what with hindsight they would have done differently, how it was assessed and any outcomes that the council would have liked to see achieved that weren't.</i></p>	

Community creation

Introductory Note:

Social Sustainability and Community Creation are ABOUT PEOPLE.

Social Sustainability embodies cultural, emotional and spiritual sustainability.

Community creation requires the creation of a strong sense of attachment to the community and to the people who live in the community.

Community creation is about connectivity, its about the depth of knowing each other. Simply knowing peoples names is better than in 90% of neighbourhoods, however it is ideal if we can take it to another level.

A strong sense of community would likely be expressed by a sense of neighbourliness, connectivity with others, relationships with others in the community that are deeper than typical and feelings of belonging. One outcome of an effective community is when people overcome their fear of ASKING for help.

Community creation occurs at different scales, e.g. the scale of the street, estate, suburb or regional community. Note: The difference between a 'street' and a 'village'. In essence, a street belongs to all, people pass through it. A village is about inclusiveness. There is more involved in creating a 'sustainable village' as opposed to creating a 'sustainable street'.

In reflecting on where a sense of community has emerged in our existing communities, factors identified included: when dogs and kids happened to be out the front and so people congregated there; where there was no front fence; where the street was quiet and safe enough for kids to play on - often a culdesac; where older people, especially a number of older people lived in the street; in communities where residents were invited to a community event in the park e.g. movie night or BBQ.

Having said this in seeking to create community, look forward to the future as well as learning from the past.

Consider the differences in creating community when residents are renters rather than owner occupiers. Obviously there is less ownership. It is important that owned or rented that a strong sense of ownership is created.

A justification for creating a sense of community is that the market has a growing desire for 'community'. Evidence for this includes that people are starting to 'verbalise' their desire for something different and the emergence of a growing recognition that our current way of living is socially isolating. People who live alone (a growing segment of the market) are most aware when community is not present.

A village/community life may be more attractive to investors as likely to be more easily rentable to pensioners/others.

Note: The creation of social sustainability ISN'T expensive.

Key Objective	Support community creation and social sustainability	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that PEOPLE who are likely to live in and/or interact with the precinct are involved in the planning of the development (and in identifying key 'values'). ▶ Define the 'values' and 'vision' of the community (for and with the people living in/around the community) in the knowledge that the 'values' and 'vision' identified will ultimately shape the 'culture' embodied by the community. ▶ Ensure that actions are undertaken to support 'community creation' at a deeper level. Specifically, ensure (1) provision of physical facilities in which people can gather and (2) ensure that someone facilitates community interaction. ▶ Be active in community creation throughout the design, construction, marketing and establishment of the precinct. ▶ Ensure that residents (both existing and future), both in and around the development are supported both initially and ongoingly in community creation. 	Comments:
Key Objective	Involve the people who are likely to live in and/or interact with the precinct in the planning of the precinct	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that the precinct and the community created is developed for and with the 'people' who are likely to live in/interact with the precinct. Community creation is all about people. ▶ Seek to create a local hub of support for and of the new community. ▶ Involve the people who are likely to live in the precinct in the planning of the dwellings. ▶ Define the precinct's target market from initial community creation activities. ▶ Consider NOT creating a product/precinct that will seek to be all things to all people. ▶ Let the development be a new, unique choice. Note: The product might target people who live alone (i.e. single person dwellings); a product for a category of the market who's needs aren't presently being met e.g. single parents; or a product for people who want to connect more with their community. 	Comments:
Supporting Information	<i>Rather than creating homes and then populating them with people, its much better if the people who will live in them have a say about the creation of the homes. This also creates a deeper ownership of the homes.</i>	

Key Objective	Define the community's 'values' and develop a community 'vision' to shape the 'culture' that this community will embody	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Clearly identify 'values' that will link the community. ▶ Ensure that the people who are likely to live in and/or interact with the development are involved in identifying the community's 'values'. ▶ Define and establish a community 'vision' (using the identified 'values'). ▶ Ensure that the 'values' and the 'vision' chosen for the community are very sharply defined. For keynote projects ensure that they are also identifiably different. ▶ Create a 'vision' that is a clear statement: e.g. "People who live here are a connected community etc". ▶ Ensure that the 'values' and 'vision' identified for the community, also influence the physical built form. ▶ The 'values' and 'vision' will ultimately determine the 'culture' created in the precinct. When well executed the people will talk, live and move the community vision. The community's actions will be aligned with the identified 'values' and 'vision'. ▶ If the vision is passive and/or not identifiably different, no one will talk about it, want it, desire it. A precinct that seeks to be all things to all people will also probably be dull and not meet anyone's needs. 	Comments:
Supporting Information	<p><i>In shaping the 'vision', consider that a 'vision' is an aspiration that lives over time. It is about creating a future.</i></p> <p><i>The vision may promote safety, social, physical or psychological wellbeing, a NQ lifestyle, a 'spirit of hospitality'.</i></p> <p><i>The purpose of the 'vision' is establish a clear 'culture' for the precinct/development. In seeking to identify the future community's 'values', there is a need to know who the precinct is being designed for. What is/are the value(s) that are held dear to the people who will choose to live in or interact with this precinct over the next one? This recognises that you don't get 'community' from a set of random people. Community is created through linkages, typically in 'values'. The 'values' chosen may be ones that the mainstream aspires to, so consider what values we all aspire to? Do however seek to avoid stereotyping.</i></p>	
Key Objective	Ensure that the marketing strategy for the precinct is informed by the identified community 'values' and 'vision'	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that the 'values' and 'vision' identified for and by the community are clearly, creatively and emotionally communicated by the marketing strategy. 	Comments:
Supporting Information	<p><i>Ensure that the primary reason for the identification of the 'values' and 'vision' is for the purpose of community creation. Their use in the commercial marketing strategy is secondary. Developed for the purpose of community creation, the values and vision will shape the 'culture' and provide more than solely a commercial benefit at point of sale.</i></p>	
Key Objective	Actively facilitate community creation throughout all stages of precinct development e.g. design, construction, marketing, establishment	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Undertake community creation activities, involving people who are likely to live in/interact with the precinct, as an integral part of project planning/design/marketing processes. ▶ Involve your target market/existing community in identifying 'values' and ultimately a 'vision' for the community. ▶ Seek to establish ownership of the new development by existing residents in the surrounding area (who may initially have concerns about the impact of the development on them). ▶ Ensure that effort is taken to understand and consider the wishes of the local community including traditional owners. ▶ Support the involvement of new residents being active in ongoing community creation. ▶ Provide new residents with a welcome/information pack of services available locally to them e.g. bus timetables, vouchers with local businesses etc. ▶ Facilitate the staging of community nights e.g. BBQs, movie nights. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ Support the establishment of local groups e.g. playgroups, physical activities and social clubs. ▶ Establish community structures e.g. body corporates, community title schemes, clubs, organisations, committees etc to coordinate ongoing management of community facilities and assets. Note: Place emphasis on ensuring the sustainability of any community bodies established. ▶ Provide residents with ideas for actions that they can take on an ongoing basis to create community. ▶ At the completion of sales, undertake a post development evaluation to ascertain the extent of 'community' that has been created and to identify if there's anything more that the community would want in the area of community creation. Go in with a commitment to seek avenues to provide/deliver outstanding aspects. 	Comments:
Supporting Information	<p><i>Beginning community creation activities during the planning process, recognises that community creation commences prior to the sale of the lots/dwellings.</i></p> <p><i>Contact with the indigenous owners can be commenced via contact with the local Council.</i></p>	
Key Objective	Ensure that residents (both existing and future), both in and around the development are supported both initially and on an ongoing basis in community creation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that provision is made for a person to facilitate community creation. Note: The role of the facilitator is to connect people and create real links between people living both in and around the development. ▶ Place an emphasis on building a culture that welcomes change (as is inevitable over time) and that welcomes new residents as past ones leave. ▶ In recognising that community creation occurs at different scales, accordingly facilitate community creation at different scales e.g. the scale of the street, estate, suburb, regional community. ▶ Provide financial support to either the Council (to partially fund a community development officer) or a third party to undertake community building activities for residents post-establishment. This could be a levee paid to council, possibly as part of the DA process. 	Comments:
Supporting Information	<p><i>Typically, facilitation will require a minimum of two stages, (i) initial activity and (ii) a revisit to see how community connectedness is going.</i></p> <p><i>Ideally ongoing facilitation support for community creation is also provided after establishment (i.e. post development). Note: It is important that efforts for encouraging community creation/interaction last longer than the marketing stamina for the precinct.</i></p> <p><i>Facilitation would typically involve the development of a community engagement strategy and may include processes typically used for community renewal.</i></p>	

Land tenure and legal frameworks for sustainable urban development

Key Objective	Consider group title/community title with community management statements as a form of title	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use a community management statement to place conditions on landholders that are legally binding. ▶ Apply a community management statement model with tri-partite responsibilities assigned i.e. the homeowner, Council and body corporate entity each have legally enforceable responsibilities to uphold. ▶ Include a design review panel as part of the community management statement. ▶ Use of community management statements (CMS) but only over specific areas of the development. For example some dwellings or alternately roads and swales could be excluded, with control of these areas remaining with the local Council as is typical in a standard subdivision. 	Comments:
Supporting Information	<p><i>Group title, while not mainstream, is considered increasingly market acceptable, and enables easier sharing of infrastructure as well as the ability to have some control over occupant behaviour e.g. to uphold sustainable design principles on private property over time.</i></p>	
Key Objective	Consider registrable covenants to control land and buildings	Yes / No
	<ul style="list-style-type: none"> ▶ Use registerable covenants to enforce architectural codes or to apply an environmentally sustainable covenant. 	
Supporting Information	<p><i>It is possible to refer to architectural code/drawings under registerable covenant.</i></p>	

Key Objective	Choose land tenures that best support sustainable urban development outcomes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use registerable covenants to enforce architectural codes or to apply an environmentally sustainable covenant. ▶ Consider the use of different types of title within a subdivision for different dwelling forms. 	Comments:
Key Objective	Ensure that the built form informs the subdivision design and land tenure	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Allow the desired built form to determine the tenure of the land. ▶ Ensure that subdivision designs prioritise the provision of built forms most suited to our tropical climate and so as to achieve superior passive design and hence energy efficient outcomes. ▶ Prevent parceling of neighbourhoods into small blocks. Note: Smaller plots use land inefficiently, whilst amalgamation of land frees up green space that can be used to create continuous pedestrian networks. ▶ Implement a planning, development and project management approach that allows the desired built form/designs to be determined prior to, and to inform subdivision design (not the other way around). Note: It is not known whether this will increase the cost of the planning process but there was a strong feeling that a superior development outcome would be achieved. ▶ For large scale developments (where community title may not be preferred), use building envelopes based on desired housing forms to inform subdivision design and achieve certain outcomes. 	Comments:
Supporting Information	<p><i>A minimum standard for the building design of dwellings to suit the climate and in particular the energy use estimated to be used by air-conditioning in providing thermal comfort is presently regulated by the Building Code of Australia's Energy Efficiency Provisions. There is presently little enforced regulation that requires that subdivision design facilitate the development of climatically appropriate dwelling types, forms or orientations.</i></p>	
Land affordability		
Key Objective	Be aware of, and seek to minimise, factors that increase the land cost component of new housing	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Take steps to identify opportunities and implement measures to minimise costs that contribute to the land cost component of new housing. 	Comments:
Supporting Information	<p><i>In 2007, the rising cost of new housing/land in Townsville/Thuringowa has impacted on the affordability of new housing in the region. Recognising that a significant contribution to this rising cost is due to the increasing cost of the land component of the home helps to identify opportunities for improving the affordability of new house/land product in the region. Note: In 2007, the ratio of the value of the land compared to the cost of constructing the dwelling increased to approximately 50% land : 50% dwelling construction. In 2000, the ratio was 30% land : 70% house.</i></p> <p><i>Typical land prices in relatively close proximity to Thuringowa Central (as at April 2007) were: \$143K (520 sqm lot) and \$159K (650 sqm lot) at Kalynda Chase and \$102K to \$295K at Willowbank. Premium blocks at Riverside Gardens were in the high \$300's.</i></p> <p><i>Land in the Northern Beaches areas (at April 2007) was in the range of \$115 - \$140K (650 to 800 sqm) at Bushland Beach (flat land) and Forrest Lakes.</i></p> <p><i>Increases in the land component of new housing costs can be attributed to increases in development costs, infrastructure charges, taxes, regulation and delays for approvals.</i></p>	
Key Objective	Reduce costs associated with the provision of the land	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Reduce lot sizes and encourage the construction of dwelling types on smaller lot sizes to reduce the proportion of new housing costs resulting from the provision of land. ▶ Explore opportunities in the following areas to minimise costs associated with the provision of the land component of new housing. In particular, consider: <ul style="list-style-type: none"> ▷ the impact of higher raw land acquisition costs; ▷ costs associated with developing and managing covenants; ▷ the cost impact of master planning processes; ▷ the cost impact associated with providing a more advanced product. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▷ the costs associated with image creation including the provision of streetscaping, park facilities, trees, lakes; ▷ the development costs carried by the developer and which subsequently are passed on to home buyers; ▷ the impact on home buyers of staged release of lots which maintains high land costs; ▷ the impact on home buyers of multiple taxes and the compounding effect of these taxes including the stamp duty paid by the developer on raw land purchase, GST on all transactions, stamp duty paid by builder and stamp duty paid by again by home buyer; ▷ the effect of the timing of change of ownership on duty payable by home buyer. Suggestion: consider optioning the purchase of land with the land held by the developer and sold directly to home buyer (rather than intermediary); ▷ costs incurred from delays resulting from labour and skills shortages; and ▷ marketing costs (an increasing proportion of the end cost). <p>▶ Consider separating the purchase of land from house and land packages to minimise duty payable by the home buyer.</p>	Comments:
Key Objective	Seek to reduce the cost impost of infrastructure charges	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Reduce the impact of rising infrastructure charges by increasing densities to reduce the rateable area and the associated infrastructure charge per dwelling. ▶ Consider methods for reducing infrastructure use in the precinct and seek to negotiate proportionally reduced infrastructure charges. 	
Supporting Information	<i>The transition to a user pays system has seen infrastructure costs rise considerably ie headworks charges have doubled/quadrupled in recent years and developers of new land are now paying for infrastructure development beyond their boundaries (some of which is catchup, some future planning).</i>	
Key Objective	Implement practices to minimise costs incurred through regulatory compliance and approvals processes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Explore opportunities available to minimise costs incurred through regulatory compliance and approvals processes. ▶ With regards to costs incurred through regulations, particularly look at: Workplace Health and Safety (significant), regulation generally affecting administration costs i.e. paperwork (significant), Insurance, Licensing, Covenants, Energy Efficiency Provisions. Costs are also incurred in association with IPA/IDAS approval processes. ▶ With regards to approval processes, explore opportunities to reduce costs incurred in the following areas: <ul style="list-style-type: none"> ▷ the time taken by Council to process your applications; ▷ delays in approval processes; ▷ development approval fees; ▷ requests for unreasonable condition requests; ▷ fees associated with the use of specialist consultants; and ▷ responses to information requests. 	Comments:
Supporting Information	<i>For additional tips in relation to reducing the cost of approvals processing, see the Planning, Urban Design and Development Approval section.</i>	
Key Objective	Reduce the land area utilised per dwelling	Yes / No
	<ul style="list-style-type: none"> ▶ Provide housing on smaller lots. ▶ Consider dwelling types that go up rather than out. ▶ Introduce a dwelling product mix that includes dwelling types that reduce the land cost per dwelling. 	Comments:
	<i>Given the improved affordability of medium density dwelling types, and a climate of reduced housing affordability, demand for housing on smaller land parcels is anticipated to continue to grow.</i>	

Economic mechanisms supporting sustainable development		
Key Objective	Look for opportunities to share infrastructure and/or facilities to defray costs	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide shared infrastructure or services in place of privately owned infrastructure (especially) for facilities that (i) normally have low utilisation, or (ii) benefit from economies of scale. ▶ Considered the provision of shared: <ul style="list-style-type: none"> ▷ swimming pool(s); ▷ centralised air-conditioner plant; ▷ storage facilities (garden shed); ▷ satellite antenna; ▷ garaging and carparking; ▷ lawn mower; ▷ gas infrastructure; ▷ solar hot water system; ▷ garbage bins and/or compactor; ▷ recreation infrastructure e.g. basketball hoop, tennis court; ▷ cold room; ▷ cleaning/ironing service; ▷ child minding; ▷ green waste composting; ▷ vegetable garden; ▷ landscaping and lawns; ▷ internet and telephony; ▷ home office equipment; ▷ wireless data network; ▷ fishing boat; or ▷ vehicle e.g. 4WD. 	Comments:
Supporting Information	<i>There are many examples of infrastructure and facilities that normally have low utilisation that could be shared through a community title/body corporate arrangement. This would reduce costs per homeowner, and provide an increased level of amenity through improved quality of infrastructure.</i>	
Key Objective	Look for opportunities for capital intensive facilities to be provided by a service provider, thereby reducing up-front capital costs	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Identify new service providers for sustainable solutions, to avoid placing the capital burden of sustainability infrastructure on the home owner. 	Comments:
Supporting Information	<p><i>Some sustainability solutions have a high upfront capital component compared with traditional solutions which typically accrue higher costs during the service provision stage.</i></p> <p><i>For example a solar power station, with its high up front costs, competes with the electricity grid, where the service provider (Ergon) provides the capital and recovers its cost of capital through its user pays pricing of electricity provision.</i></p>	
Key Objective	Provide common infrastructure in development design, to enable community title land to be allocated in the subdivision	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Allocate land for common/shared infrastructure provision at the time of subdivision design. ▶ Plan for and facilitate delivery of common infrastructure on 'shared' land through classification of land under a community or group title arrangement over that shared land e.g. for provision of a community swimming pool, a community solar hot water system or for the provision of higher quality landscaping in parks/open space or management of natural resources e.g. a habitat corridor. 	Comments:
Key Objective	Apply for reduced headworks charges on the basis of reduced use of Council infrastructure	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Approach Council with a case for reduced headworks in return for and on the basis of being able to prove a reduced use of Council infrastructure. 	Comments:

Key Objective	Support supply chain access to innovative or more sustainable products	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Support innovative product providers in marketing their product to builders in your development e.g. products with recycled content. ▶ Facilitate the availability of commercial quantities of innovative products e.g. local native plant species. ▶ Facilitate the availability of innovative product at cost competitive pricing, e.g. bulk purchase or facilitate emergence of a local supplier for example of 'wider' doors for accessibility. 	Comments:
Key Objective	Encourage Council to provide a rates incentive for sustainable dwelling performance using a differential rating mechanism	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Lobby Council to provide a rates incentive for sustainable dwelling performance using a differential rating mechanism. 	Comments:
Supporting Information	<i>Council has the power to reduce rates for certain classes of ratepayer - in this case those who can demonstrate sustainable performance.</i>	

Carbon footprint

Key Objective	Reduce the community's carbon footprint through Urban Design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Prioritise during urban design, the basic principles of carbon conscious urban design. Specifically, to achieve (a) higher densities (b) pedestrianisation. ▶ In particular, address issues caused by population and urban growth – notably, consumption of energy resulting from transportation, home appliances and air-conditioning. ▶ Undertake urban development as part of an integrated strategy for development of the city. 	Comments:
Supporting Information	<i>In recognition of the urgent need to reduce carbon emissions in the face of climate change, there is a need for developers and urban designers to ensure that our future communities have significantly reduced carbon footprints.</i>	

Density

Key Objective	Improve urban efficiency, increase urban densities	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In all areas, improve the efficiency of urban activities e.g. by increasing the number of people served per unit area, in another words by increasing the density. Note: Where possible to avoid state referrals i.e. don't do as a masterplan it will trigger. Take a preliminary approval approach. ▶ Especially ensure that higher density development is provided in areas identified by the Planning Scheme commercial centres hierarchy. ▶ Achieve higher densities by: <ul style="list-style-type: none"> ▷ reorganising street patterns; ▷ rethinking the importance of the car to urban life; ▷ providing dwellings in excess of single storey; ▷ reducing dwelling footprints; ▷ providing smaller lots, ideally with zero lot lines to neighbouring properties (at least on one side); and ▷ providing integrated housing solutions i.e. so that the provision of housing occurs at a scale higher than provision of individual dwellings. ▶ Seek to increase the built density up to 50 persons per ha. ▶ Provide building heights to maximum 3 levels. ▶ Adopt minimum lot sizes aligned with per capita usage. For example by allocating 150m² land per occupant, gain permission for smaller blocks for single/two bedroom dwellings with the added advantage of encouraging a diversity of use. ▶ For detached dwelling sites, provide lots with wider rather than narrow frontages to facilitate construction of fragmented (i.e. pod style dwellings with separate driveways) capable of occupancy by two separate households. For example where one pod is a family room and bathroom developed around central back yard and capable of being rented separately. ▶ Provide narrow allotments when the long side of the dwelling is in north/south direction. Note: Pod style homes capable of being separately rented would still be possible. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ Construct the community on a centralised framework to aid pedestrianisation and improve connectivity and accessibility to services. ▶ Encourage the Council or other to develop a series of suggested dwelling proto-types with tips on how to achieve good and higher density outcomes for various development scenarios 	Comments:
Supporting Information	<p><i>Increasing densities in most areas can in general almost always be supported on sustainability grounds (if done well).</i></p> <p><i>Benefits of higher densities include:</i></p> <ul style="list-style-type: none"> • <i>land costs reduced by 50 – 60 % and infrastructure costs reduced by 50 - 60% both resulting in increased affordability</i> • <i>possibility of walking, cycling, public transport (higher densities enable mass transportation) - reducing transportation costs, travel distances, travel speeds (due to less separation of urban spaces), time spent traveling, and need for fossil-fuel powered transportation. Currently transportation uses 1/5th of all energy consumption.</i> • <i>opportunity to create 'common' gathering spaces, generating a sense of community and increasing social interaction and safety</i> 	

Diversity

Key Objective	Provide a diversity of dwelling product to cater for diverse household sizes and types	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide a range of housing types e.g. terraces, individual (detached) dwellings, duplex housing, garden courtyards, townhouses, apartments. ▶ Seek to attract a diversity of households to the precinct e.g. owner-occupiers as well as investors/renters, households of differing sizes/configurations e.g. single person households, families with children and shared housing configurations, and households of differing demographics e.g. age, culture, socio-economic status. ▶ Provide dwellings to suit a range of household sizes e.g. 2 to 5 bedrooms. ▶ Provide a product mix where: <ul style="list-style-type: none"> ▷ 20% of dwellings are met by traditional lots, i.e. approx 20x30m² = 600m²; ▷ 30% of dwellings are met by courtyard lots, i.e. approx 15x30m² = 450m²; ▷ 10% of dwellings by duplexes; and ▷ 40% of dwellings by terrace homes/townhouses. 	Comments:
Supporting Information	<i>Providing a broad product mix responds to the diverse housing needs of different household types and sizes and also the desire to develop diverse, interesting communities (i.e. not monocultures).</i>	
Key Objective	Provide mixed use development	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Integrate mixed uses e.g. a commercial or community facilities into 'residential development'. 	Comments:

Community health, wellbeing and interconnectedness

Key Objective	Develop the site as an integrated part of the wider regional community	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Understand the context of the site in order to maximise the opportunity for development of the site as an integrated part of the wider regional community. ▶ Recognise the development context as being a community within a community, and as such design the development to complement and build upon the larger and more immediate surroundings. ▶ Incorporate mixed use development areas into the new development. ▶ Investigate opportunities to integrate existing local facilities in the project. ▶ Seek to build on and enhance the functionality of existing community facilities and surrounding residential and commercial areas. ▶ Ensure that the (new or infill) development complements its surrounds, e.g. provide seamless landscape connections between existing and new development areas. Note: The key to integration with existing development in the area are the 'connections'. ▶ With infill development in particular where the surrounding development may be dramatically different in looks and or functionality to modern development, focus on sympathetic interfaces, setbacks and heights. Note: Do not be constrained by seeking to replicate what's already there, as that lead to really poor design outcomes. 	Comments:

Key Objective	Consider the physical and mental health of residents in the design of public and private spaces	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise the Queensland Department of Health to undertake a Health Impact Assessment (at least the screening tool) during the detailed planning stage of the development. 	Comments:
Supporting Information	<p><i>The Queensland Government's Health Impact Assessment can be found at: www.health.qld.gov.au/phs/Documents/sphun/20364.pdf</i></p> <p><i>The health effects of social connectedness are powerful with studies showing the more connected people are to their community, the less likely they are to suffer depression and other chronic diseases such as heart disease and cancer. Mental health is affected by social, structural, economic and environmental factors. Factors such as a sense of belonging, feeling valued and having strong social networks in the community help protect and maintain positive mental health and well-being by acting as a 'buffer' to life's stressors.</i></p> <p><i>Undertaking the Health Impact Assessment will support good community outcomes e.g. active living, safety, mental health.</i></p>	
Key Objective	Create active, vibrant and identifiable urban spaces	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure the precinct design prioritises the creation of an active and vibrant urban place, and a strong sense of place and identity. ▶ Physically represent the 'values' and 'vision' of the community in public art/structures, e.g. celebratory 'cairn', posterboard, symbols, pavement art, bollards, street names, icons. ▶ Consider the importance of preserving and celebrating indigenous and post-European cultural heritage. ▶ Incorporate distinctive built features into the precinct and to each dwelling e.g. characteristic letterbox or other design features that link dwellings within the precinct encouraging a feeling of belonging. 	Comments:
Supporting Information	<i>The heritage officer at the local council is a good source of information on sites of heritage significance.</i>	
Key Objective	Encourage interactions with nature	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage and support the integration of nature into the built environment. 	Comments:
Key Objective	Encourage social interaction and promote active living through the provision of high quality communal spaces	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Identify the 'best' part of the site and locate shared (communal) areas there. ▶ Locate common/community areas and facilities towards the centre of the precinct to maximise the use of open spaces and facilities and encourage community interaction. ▶ Ensure a sense of openness in the precinct and that the vast majority of dwellings and in particular medium density dwellings have views of parks and open space. ▶ Design communal open spaces within the new development site to include opportunities for interaction with residents from surrounding areas. ▶ Ensure the subdivision/masterplan design and community structure encourages positive interactions between residents and other people using the precinct. ▶ Provide design features that encourage passive, active and casual interactions. ▶ Provide reasons for people to walk around. Consider the inclusion of elements that facilitate both planned and unplanned visitations e.g. include elements that create a need to leave the dwelling and venture down the street and include elements that elicit a creative response. Examples include community noticeboards, letterbox, public art, recreation areas, shops, community services e.g. childcare centre. ▶ Specifically set out to create communal spaces with activities/movement to watch e.g. bird life in native habitat, bird aviary or feeding area, butterflies, flags, moving water, children playing, active adult activities, or more passively e.g. perfumed flowering gardens. 	Comments:

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide common areas to promote community interaction through activities e.g. recreation, playing, relaxation, hobbies and maintenance (e.g. shared dedicated car/boat washing area), civic/community gatherings, and where possible shopping and/or working. ▶ Provide amenities to promote an active lifestyle e.g. provide parks, open spaces, playgrounds, gazebos, recreational facilities, bicycle paths and parking. ▶ Incorporate shaded pathways exclusively for use by pedestrians/cyclists between interconnecting communal/open spaces. ▶ Provide a roofed common multi-functional space for use by and benefit of all residents e.g. for meetings, recreation, gym, BBQ etc. Note: Ensure roof is insulated. ▶ Ensure common areas are well designed, well defined, have multiple uses and have strong ownership relationships to neighbouring properties. ▶ Ensure pathways and commons are safe, accessible and shaded. ▶ Encourage ownership of commons/shared spaces. Consider provision of facilities/mechanisms that enable of community members to have responsibility for looking after a common area e.g. a community garden. ▶ Promote casual surveillance/interaction with common areas from private dwellings. ▶ Require recessing of carports/garages behind front of house, to avoid blocking casual surveillance of the street/commons from inside the dwelling or the front patio. ▶ Discourage the placement of garages at the front of the property on narrow frontages. ▶ Encourage activity at front of dwellings including visibility of residents between parking car and entering the house. Consider alternative garaging/carparking that may facilitate this. ▶ Encourage dwelling designs that enable and encourage front living. Ideally both internal and external front living is provided by dwelling designs. ▶ Keep fences low or transparent. Encourage the use of intermittent vegetation or sections of trellis to provide soft screening above the height of low fences for privacy. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>There are significant marketing benefits for sale of dwellings with strong relationships to open spaces. This is particularly true of dwellings on smaller lots/medium density developments.</i></p> <p><i>The availability of recreational facilities such as bike paths, walking trails, parks, children's play areas, swimming pools etc., have been reported as influencing the community's participation in recreational physical activity. These amenities can also help create safer places with more people out and about. They also encourage community connectedness, draw tourism, become a means of transport and can create employment.</i></p>	
<p>Key Objective</p>	<p>Promote sun safety</p>	<p>Yes / No</p>
	<ul style="list-style-type: none"> ▶ Incorporate natural or constructed sun shade features in community design. ▶ Prioritise provision of shading in communal areas. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Facilitate communication between residents</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide and support the development of a community communication system e.g. intranet, newsletter, community noticeboard. Ensure a strong ownership structure is established to support ongoing upkeep/use. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Design the precinct to provide privacy for residents</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Support the provision of buildings/dwellings with shared walls to enhance privacy (acoustic and visual) compared to detached dwellings in close proximity. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Promote the development of dwellings with natural daylighting</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Encourage the design of buildings that achieve good levels of natural daylighting to internal spaces. ▶ Minimise depth of dwellings especially built to boundary dwellings. 	<p>Comments:</p>

Key Objective	Design the precinct to minimise sources of, and impacts of dust	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Minimise dust in the precinct by eliminating at source. ▶ Consider irrigation of swales to prevent dust mobilisation. 	Comments:
Supporting Information	<p><i>Especially for naturally ventilated dwellings, dust can become a significant negative impact. The prevalence of dust and the potential issues it brings is a deterrent to people choosing a naturally ventilated home in the first place, may discourage the use of the home in naturally ventilated mode and will increase the time/money spent cleaning the dwelling.</i></p> <p><i>If utilising drainage swales, if the grass dies off (as it will during winter), dust will be created. Grass blocks may alleviate but will not prevent dust issues.</i></p>	
Key Objective	Design the precinct to minimise sources of, and impacts of noise	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Minimise sources of unwanted noise throughout the development at source. ▶ In mixed use developments, plan compatible land uses especially in relation to time considerations and resultant noise impacts on dwellings. ▶ Achieve compatible landuses both horizontally as well as vertically, e.g. residential above commercial/office spaces is compatible. ▶ If mixed landuses have unwanted impacts e.g. residential above restaurants below, place limits on trading hours. ▶ Favour dwellings/buildings with shared walls in preference to detached dwellings to overcome acoustic issues that can arise from having small distances separating openings along side boundaries. ▶ Utilise building volumes as a noise buffer to noise sources e.g. main roads. Note: Buffering the noise from the main road is a pre-condition to naturally ventilated design. 	Comments:

Tropical urban design principles

Key Objective	Embrace priority tropical urban design principles	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that tropical urban design priorities are incorporated in urban design, specifically: <ul style="list-style-type: none"> ▷ reduce radiation during the day (preventing heat build-up); and ▷ maximise ventilative and convective cooling both during the day and at night. ▶ Prioritise 'passive' urban design responses e.g. design for appropriate orientations to maximise shading and access to cooling breezes. ▶ Ensure that critical urban design principles for a tropical climate are adopted: <ul style="list-style-type: none"> ▷ Orientation and shading of site, buildings and open spaces to minimise solar exposure; and ▷ Orientation of site and buildings to encourage air movement. Including orientation of dwelling layouts so that living room and main outdoor areas within north, north-east or east orientation. 	Comments:
Supporting Information	<p><i>In the tropics, the issue is heat. There is rarely a problem of cold. Heat, combined with humidity, and (in the 'Dry Tropics') an absence of alleviating rainstorms each day, makes for uncomfortable conditions during the summer months.</i></p>	

Key Objective	Urban design to encourage air movement	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In streetscapes: <ul style="list-style-type: none"> ▷ Align street layouts parallel to major wind directions (buildings orientated within 30 – 60 degrees of prevailing wind direction); ▷ Incorporate variable building heights; ▷ Avoid long walls which prevent deep wind penetration; and ▷ Ensure breeze access to both buildings and open spaces. 	Comments:
Supporting Information	<p><i>Ensure that 'local' wind directions as well as prevailing breezes for the region are considered.</i></p> <p><i>Cooling breezes may come from any direction, but the "target winds/prevailing breeze" in the Townsville/Thuringowa region are the north-easterlies, which occur during summer afternoons, with a probability of around 60%.</i></p>	
Key Objective	Urban spaces and buildings orientated for avoidance of sun	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Design built form to provide shade to common/external areas. ▶ Reduce urban density and building heights towards northeast (smaller buildings in north-east, taller towards west) e.g. consider locating taller i.e. 2 to 3 storey dwellings so as to provide shading of common areas, particularly from western sun. ▶ Within overall urban massing determine optimum locations for natural elements (e.g. parks, water features) to enhance thermal comfort. ▶ Make north-south streets narrow (so self shading) to encourage pedestrian use. ▶ Ensure that the precinct design supports the construction of dwelling types that can be passively cooled. ▶ Favour the provision of passive cool buildings/dwellings that have shared walls in preference to detached building types to achieve cost effective passive design in a tropical climate. ▶ Preferred orientation of buildings is 0 - 80 degrees (i.e. north-eastern quadrant). ▶ Ensure building openings are able to be cost effectively shaded between 8am and 5pm. 	Comments:
Key Objective	Prevent heat island effects	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Minimise heat gain, heat storage and the creation of a 'heat island' effect throughout the precinct. ▶ Provide shade, use light coloured finishes, and limit the use of, or otherwise shade high thermal mass materials which have the ability to store and increase the temperature in built up areas. ▶ Use of water, vegetation and awnings to create a cool and comfortable microclimate throughout the precinct, particularly communal areas. 	Comments:
Key Objective	Subdivision design to prioritise achieving best practice climate responsive urban design outcomes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider alternatives to detached dwellings if desiring smaller lot sizes. ▶ Utilise available resources to achieve better subdivision design outcomes for tropical climates. 	Comments:
Supporting Information	<p><i>The potential to provide 'detached' dwellings with good climate responsive design on smaller lots in particular is limited due to less access to breezes and provision of shading of walls and openings being a higher proportion of the total building cost.</i></p>	

<p>Supporting Information</p>	<p>The potential to provide 'detached' dwellings with good climate responsive design on smaller lots in particular is limited due to less access to breezes and provision of shading of walls and openings being a higher proportion of the total building cost.</p> <p>Sources of guidance on best practice subdivision and urban design for tropical climates include:</p> <ul style="list-style-type: none"> • The resources on Tropical Design available from the Thuringowa Sustainable Village Project Website, in particular the "Guidelines for Housing in the Humid Tropics" – see http://www.thuringowa.qld.gov.au/council/departments/planning/sustainable_village/opportunities/industryfocusgroups/group3. • Thuringowa City Council's Planning Scheme Requirements for Climate Responsive Design (CRD)" notably the requirements to address climate in the Residential Planning Area – see http://www.thuringowa.qld.gov.au/council/departments/planning/planning_scheme and the two "Thuringowa City Council Planning Scheme Policies for Climate Responsive Design" – see http://www.thuringowa.qld.gov.au/council/departments/planning/planning_schem e#policies Items 2 and 3. • Martin Clark's (Thuringowa City Council Planning and Urban Design Officer's) paper "Designing for Climate Research Paper" available from http://people.aapt.net.au/jclark19/. 	
<p>Key Objective</p>	<p>Design subdivision layout to enable passively designed dwelling configurations suited to a tropical climate</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<p>Design subdivision layouts to accommodate the following housing configurations/sizes which have been identified as those that can achieve superior passive design performance in our tropical climate, can be cost effectively built and which are generally aligned with general market expectations. Specifically:</p> <p>Terrace Housing Types: 125–135m² (2 or 3 bedroom) – comparatively low, medium or equivalent price point</p> <p>Dual occupancy (i.e. duplex dwellings): 125 – 135m² (2 or 3 bedrooms each) – comparatively medium to high price point</p> <p>Individual Dwellings (modular design): 200 – 220m² (3 – 4 bedrooms) – comparatively medium to high price point.</p> <p>For examples of dwelling configurations, see Cost competitive, passive designed dwelling types for tropical climates sub-section.</p>	<p>Comments:</p>
<p>Supporting Information</p>	<p>The dwelling types above can be produced at prices in range similar to or less than traditional mainstream housing i.e. where typical new house/land product falls in a range between \$350,000 and \$450,000 (2007 prices).</p>	

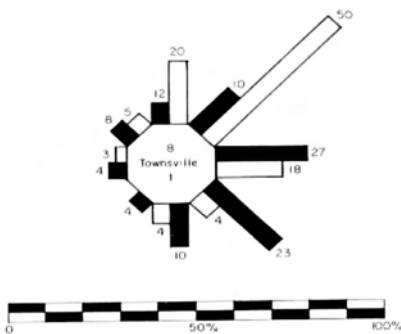


Illustration 1 – Prevailing breeze, Townsville (Note: North is up the page)

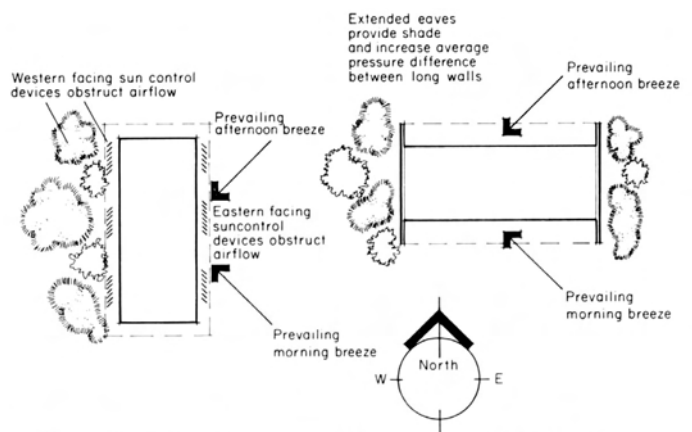


Illustration 2 – Orientation of living areas to be within north-eastern quadrant

Crime prevention		
Key Objective	Design the development (at level of precinct) to feel safe and reduce crime	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Incorporate crime prevention through environmental design (CPTED) urban design principles in the design of the precinct. ▶ Identify the types of crimes that will most likely occur in the specific locality and specifically address these through design. ▶ Be aware that properties in proximity to public transport or on highly used thoroughfares are at a higher crime risk. ▶ Provide adequate and even night-time lighting. Minimise shadows. Note: This will increase the perception of safety and deter crime. ▶ Promote and ensure casual surveillance throughout the precinct, particularly to manage risks in the street, common areas and places children might play e.g. out front, out the back, on the road. ▶ Particularly focus CPTED design principles on higher risk areas i.e. public pathways (pedestrian and cyclist), public spaces/parks, communal carparks, around home entrance/exit points, and to rear of properties. ▶ Design roads and pathways with gentle curves rather than sharp corners (to maximise visibility). ▶ Choose vegetation type/locations for visibility, particularly around houses, parks, pathways. ▶ Choose bushes and trees without low limbs so can see under/through them. ▶ Encourage demographic diversity amongst residents to ensure that there are always people around e.g. older people, people who work from home to increase eyes on the street including in the middle of the day. ▶ Provide a mix of dwelling sizes so as to attract a diversity of residents to provide a daytime presence. ▶ Limit/avoid the design of houses with frontages that have double garages because of the limited surveillance of the street that results. ▶ On narrow frontages, avoid or minimise garages at front of the dwelling at all to enable good casual surveillance of the street/front of the house. ▶ Promote alternatives to and avoid non-transparent 6ft fences. ▶ Provide a sense of openness and maintain clear lines of sight throughout the precinct. ▶ Provide safe access routes. ▶ Ensure public pathways are safe for use by pedestrians and cyclists at night times. ▶ Eliminate opportunities for entrapment and places for people to hide. ▶ Promote respect and caring of individual and community properties. ▶ Eliminate or otherwise implement measures to mitigate crime risks associated with spaces that belong to everyone yet no one "owns" e.g. carparking areas in public spaces/common areas. ▶ Promote ownership of commons/shared landscaping e.g. by ensuring strong relationships to adjacent properties and designs that are conducive to ownership by all. ▶ Clearly delineate boundaries of public/private space e.g. define with plants, paving, screens, other. ▶ Provide on-street parking, in preference to allocated common parking area. ▶ Ensure that the intended use(s) of all public spaces are clearly defined. ▶ Provide signage in relation to the use of public spaces. ▶ Ensure that commons are well designed to ensure good utilisation. 	Comments:
Supporting Information	<p>Refer to "Designing out Crime: Crime Prevention through Environmental Design" by Susan Geason and Paul R Wilson, Australian Institute of Criminology (1999) (http://www.aic.gov.au/publications/crimprev/cpted/).</p> <p>Refer to "Brisbane City Council Crime Prevention Through Environmental Design (CPTED) Planning Scheme Policy." (http://www.brisbane.qld.gov.au/bccwr/plans_and_strategies/documents/crime_prevention_whole_policy.pdf).</p>	

Accessibility and universal design

Introductory Note

The principle reasons for universal design and specifically universal accessibility are:

- (1) for an improved EXPERIENCE (by ALL)
- (2) to enable visitability by ALL people.

Designing the precinct such that it enables use by the most vulnerable (e.g. people in wheelchairs, the aged, parent with both a pram and young child walking with them, vision impaired) also improves the safety and ease of use of the precinct by all people, including the most able.

Universal design/accessibility can be thought of as user-friendliness and means that services provided are easy to access and that the use of design elements is easily understood – by all.

20% of the Australian population live with a permanent disability (Australian Bureau of Statistics) or put another way, 1 in 5 families have a person in their family that has some form of disability. Additionally 17% of the Australian population is aged 60+ and 6% of households are parents using a pram (i.e. have children aged 1 to 4).

With both increasing aging and disabled populations and a high percentage of the population with accessibility needs, the importance of accessibility is growing.

Because accessible spaces are clearly understood by people, a further benefit is that there is less damage from accidents and misuse, resulting in precincts/homes that last longer, undamaged.

Marketing of accessible precincts/dwellings should focus on the openness, clear lines of sight, safer feeling of the precinct and the sustainable features that will allow people with a diverse range of needs to comfortably live in and visit the house throughout its lifetime. Avoid the angle that it is accessible and easily useable by the aged/disabled. No one with accessibility needs want to be labelled as that.

At the level of the precinct, providing accessibility is critical. There is little point in having accessible dwellings if the precinct itself is inaccessible or lacking in user-friendliness.

Refer Smart Housing Design Objectives, Queensland Government Department of Housing - <http://www.housing.qld.gov.au/design/smarthousing/index.htm>

Key Objective	Create a community environment that is accessible and safe for use by people of all ages and abilities	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that public areas of the precinct (up to the threshold of each home) are accessible and safe (i.e. minimise risk of injury) for ALL people (i.e. people of ALL ages and abilities) ▶ Ensure that connections throughout the precinct and boundaries with neighbouring precincts are seamless (i.e. no barriers). ▶ In particular, ensure seamless connections for transitions between the footpath, road and streetscape and at transportation pickup points including bus stops, taxi points, private vehicles and links to access footpaths within and beyond precinct. ▶ In streets with kerbs, provide kerb gradients of minimum 1:10. Note: The current minimum kerb gradient standard is 1.8. ▶ In streets with kerbs, specify lipless driveways. ▶ Where ramps are provided for accessibility (includes driveways), ensure maximum gradient 1:15.5. ▶ Provide safe and accessible non-slip pathways. ▶ Provide public pathways with a minimum width of 1800mm (current legislation). In some cases, pathway widths up to 2.5 metres may be justified. ▶ Ensure pathways are level, non-slip, have a sense of openness, are visible, have clear lines of sight, and that they are attractive. ▶ Use appropriate vegetation and tree types around paths. ▶ Use root barriers around trees to reduce lifting of paths. ▶ To facilitate safe night time use, provide adequate and even lighting. ▶ To facilitate daytime use, provide adequate shade. ▶ Provide shared road/footpaths in low speed environments. ▶ Provide dual purpose pathways e.g. pedestrian/bicycle. ▶ In ensuring the creation of an accessible precinct, check that all parts of the precinct are accessible, that all services work and are where you need them, and that all services serve ALL people, not just some. 	Comments:

<p>Supporting Information</p>	<p><i>The benefits of reducing the kerb gradient to 1:10 include that they are much more user friendly to all (some people can't use a 1:8 gradient but virtually all can safely use 1:10 and injuries will be reduced.</i></p> <p><i>Currently, driveways tend to have a 50mm lip that denies their use to wheelchair users and those who cannot climb steps. The Spinal Injuries Association recommends Local Government's statewide follow Redland Shire Council's lead in creating inclusive communities by improving access throughout the community by adopting a policy to build lipless driveways.</i></p> <p><i>Benefits of lipless driveways include no extra cost and the ability to actually save money by not having to install kerb ramps other than at intersections; traversable by people of all ages and abilities; safer/smooth transition between road and footpath for wheelchairs, prams, walking frames, walkers; less bicycle accidents.</i></p> <p><i>Refer to "Lipless Driveway Design Guidelines" from Redland Shire Council, available from the Thuringowa Sustainable Village Project Website and the Breakthrough Ideas CD.</i></p> <p><i>Current regulations for ramps specify a minimum gradient of 1:14 but a 1.15.5 gradient is more accessible.</i></p> <p><i>1800mm wide public pathways will sufficiently accommodate two-way traffic and use by the most vulnerable people in society including those that need assistance.</i></p> <p><i>The Accessible Public Transport Standard 2002 specifies 1800mm minimum width for pathways connecting to public transport infrastructure e.g. bus stops. Australian Standard 1428 part 2 states that the width required for corridors in new or refurbished buildings be 1800mm i.e. so that 2 wheelchair users can cross. The commercial construction minimum for pathways is 850mm.</i></p> <p><i>The people with the widest path requirements are not a wheelchair or other mobility vehicle as is commonly thought. Users requiring the greatest width of passage on a path of travel are: (1) A person who requires to be accompanied. These include: a parent with a child; an adult with another adult/carer; a person required to use an assistance animal; (2) Parent with a twin side by side pusher (3) Adult using crutches because these are thrown outward then forward as part of the one motion and therefore the user's width requirement is based on the measure of the outward swing. The above exceed the width of any mobility device currently in Australia.</i></p> <p><i>As a standard, human movement studies show that 1000mm is the preferred per person path width for one way traffic and 900mm the minimum. For two-way traffic, times by 2, so 2000mm is preferred path width and 1800mm the minimum.</i></p>	
--------------------------------------	---	--

Employment

<p>Key Objective</p>	<p>Maximise employment opportunities in the precinct</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Seek to provide for residents from as many dwellings as practicable to work within the precinct or at home on a part-time, full-time, home based business or in an employee home working environment. ▶ Provide facilities in the precinct and encourage dwelling designs to facilitate working from home. ▶ Incorporate mixed uses in the development to both improve availability of employment opportunities and to provide proximity to complementary services needed by people working in the precinct. Useful inclusions could include integration of service based businesses like childcare facilities, co-location of residential dwellings over commercial/retail premises. Light commercial activities, offices and service functions are also compatible with residential use and create jobs. ▶ Encourage floor plates and building design that facilitate home based businesses and working from a home office, studio and/or workshop. Favourable features include a separate entrance, a view of visitors arriving, adequate technology/wiring to provide high speed internet, and advanced communication technologies and a pleasant working environment and outlook. ▶ Consider improving the design of the garage in dwellings to include good daylighting, natural ventilation, and enhanced openability e.g. openings at front and rear, could be roller doors to enable potential dual use for business purposes. 	<p>Comments:</p>

Suggested Solutions	<ul style="list-style-type: none"> ▶ Integrate into the community structure the provision of small business support environments, for example a business/communications/meeting space or facility for use by businesses or residents working from home in the precinct. ▶ Provide facilities useful to small businesses within the precinct e.g. postal points/centres, meeting rooms, workshop spaces, tele-conference facilities. These could be co-located with other services. ▶ Enhance existing or incorporate new community facilities to accommodate dual/multiple uses including business support uses. ▶ Cater for a balanced lifestyle: provide for an integration of work, play, community, education and living environments close to home. 	Comments:
Supporting Information	<i>A benefit of working at home or in close proximity to home is minimised transportation requirements.</i>	
Transportation		
Key Objective	Encourage reduced vehicle speeds	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Include measures to promote reduced speed limits both in and in advance of the precinct (e.g. considered road/streetscape design measures, signage preferably encouraging peer pressure from residents rather than specifying a speed limit). ▶ Avoid big road loops that become hoon thoroughfares. ▶ Design streets to facilitate in-out traffic movement rather than large loops. 	Comments:
Key Objective	Avoid single function land uses which segregate urban activities and perpetuate traffic	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Incorporate mixed use development to reduce the need to leave the precinct to access (essential) services. 	Comments:
Key Objective	Facilitate use of public transport and alternatives to private car transportation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Complete an analysis of transport movement and housing as part of the initial scope of the project. ▶ Provide infrastructure that supports alternatives to private car transportation e.g. walking, cycling, motorcycling, taxis, carpooling, public buses, community buses, trains and trams if relevant. ▶ In larger developments, incorporate a public transport hub. ▶ Provide high quality pedestrian connections to public transport setdown points. ▶ Ensure connections between public transport collection points and the front door of dwellings are seamless and accessible for people of all ages and abilities, (kerb gradients minimum 1:10 (improves usability and reduces injury, compared to current regulatory minimum of 1:8). If ramps used ensure maximum gradient 1:15.5 for ease of use by all. ▶ If providing impervious paving for water sensitive urban design, provide hardstand areas for bus setdowns. ▶ Ensure access ways to public transport pickup points are shaded, pleasant and feel safe i.e. have good visibility. ▶ Ensure that public transport pickup points are conveniently located, comfortable, pleasant and designed for use by people of all ages and abilities (i.e. accessibly designed) and seamless. ▶ Provide shelters that are suited to the tropics i.e. provide adequate sun protection and breeze access. Also ensure that 'shelters' provide a place to sit, allow visibility of approaching 'public transport vehicle', are shaded and pleasant. ▶ Consider the merits of setting an urban growth boundary and increasing densities including in existing suburbs to improve the viability of public transport provision in North Queensland. 	Comments:
Supporting Information	<i>Benefits to the city from being able to provide an efficient public transport system include economic efficiencies, increased competitiveness and improved community access to services.</i>	

Key Objective	Consider vehicle parking/storage alternatives	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ As a priority, seek to minimise or avoid the dominance of car garages, cars and driveways on street frontages, particularly narrow frontages. Note: A major benefit is improved visibility of street from dwellings. ▶ Incorporate alternative parking arrangements. Consider: <ul style="list-style-type: none"> ▷ Provision of a recessed single carport/garage to the front of the property instead of a double or triple garage; ▷ Storage of cars in carports rather than garages or in garage/carport combinations; ▷ Permission to meet carparking requirements on the driveway (covered or uncovered); ▷ Provision of on-street parking in road/road reserve; ▷ Provision of common parking area ideally with a line of site relationship to the property (for crime prevention, ownership of the common space); ▷ Carparking in a rear access garage/carport; ▷ Provision of a drop off point if parking is not provided immediately adjacent the dwelling; and ▷ Parking for one car from each residence and/or visitor parking separately from the dwelling. ▶ For multiple dwellings, provide easy access to bicycle storage areas for both residents and visitors, perhaps accommodated near to entrance. ▶ Include in all dwellings, garage/carport designs that enable easy parking/storing of bicycles. 	Comments:
Supporting Information	<p><i>Current carparking/storage practice in Australia involves provision of 'housing' for one, commonly two cars (and occasionally an extra space for other vehicles e.g. motorbike/boat) in an enclosed garage that is constructed as part of the dwelling and which is accessed from a driveway from the front of the property. Visitor parking is commonly in the driveway or on the street.</i></p> <p><i>Provision of carparking separate from dwellings is common in many parts of the world. In Australia, it is not common, but it is considered that the provision of one carparking space in the immediate location of the dwelling with a second carparking space (if required) removed from the dwelling would be acceptable to consumers.</i></p> <p><i>If providing rear access garage/carports, ensure that the rear laneway is generally discrete and becomes a positive asset. Consider treating the rear laneway as a common area of the residents (e.g. under body corporate) and incorporate design solutions to avoid starkness. Consider incorporating multiple uses in the laneway space. Examples are available from Landcom and Mirvac (Promontory Project in Victoria). The Radburn Scheme may also be a useful reference.</i></p>	

Dwelling Design and Construction

Cost competitive dwelling types for tropical climates

Key Objective	Provide dwelling types/sizes which can provide superior passive design performance in the tropics at pricepoints competitive with mainstream housing	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Design and construct dwelling types that can cost effectively achieve superior passive design performance in our tropical climate. ▶ Specifically design and construct the following housing configurations/ sizes which have been identified as those that can achieve superior passive design performance in our tropical climate, can be cost effectively built and which are generally aligned with general market expectations, i.e.: <ul style="list-style-type: none"> ▷ Terrace Housing Types: 125–135m² (2 or 3 bedroom) – comparatively low, medium or equivalent price point ▷ Dual occupancy (i.e. duplex dwellings): 125 – 135m² (2 or 3 bedrooms each) – comparatively medium to high price point ▷ Individual Dwellings (modular design): 200 – 220m² (3 – 4 bedrooms) – comparatively medium to high price point. 	Comments:

<p>Supporting Information</p>	<p>The dwellings types/sizes identified above can be produced at prices in range similar to or less than traditional mainstream housing i.e. considering that typical new house/land product in Thuringowa falls in a range between \$350,000 and \$450,000 (2007 prices).</p> <p>The typically imagined modern tropical home would generally exceed the mainstream price range. Typical features of a detached tropical home would include 'U', linear or pod shaped configuration, raised floor, spacious design, extensive openings for ventilation, extensive shading of walls and windows to minimise heat gain, integrated with landscaping, use of alternative textures and material composition for overall form.</p> <p>Some examples of dwelling/types sizes which can achieve superior passive design in the tropics within a mainstream market price range are:</p> <ul style="list-style-type: none"> • Example A - low cost option - Terrace House: single level, 3 bedroom + media – End value: \$300,000 - \$ 330,000. Internal Areas: 8 metre wide module, 125m²; Central Courtyard = 25m²; Single Garage: 25m²; Total dwelling area: 175m². Required land size 36 x 8 = 290m². • Example B - low cost option - Terrace House: two storey, 2 bedroom + study area, living at upper level - End Value \$300,000 - \$ 330,000. Internal Areas: 10.8m long x 4.7m wide module = 50m² x 2 levels = 100m²; External Areas: 2.7m x 3.0m = 8 m² courtyard + 8m² patio + 1.5m² service balcony = 17.5m²; Single carport (could be located separately): 25m². Total dwelling area: 142m². Required land size = 20 x 4.7 = 95m². Market acceptance achieved by providing: affordability, typology appropriate to locality/urban setting; open plan/flexibility, good ventilation and shading, solar water heating. • Example C - medium cost option - Terrace House: two storey, 2 bedroom + study area, living at lower level - End Value: \$330,000 - \$ 375,000. Internal Areas: 10m long x 5.2m wide module = 52m² x 2 levels = 104m²; External Areas: car port 6 x 5.2m = 30m², upper deck 5m x 3m = 15m²; additional single carport (could be located separately): 25m². Total dwelling area: 149m². Required land size = 20 x 5 = 100m². Market acceptance achieved by providing dwelling that is: cool to live in (low air-conditioning requirement, secure, large outdoor area, spacious deck, open plan/flexibility, sense of community, attractive vernacular outcome. • Example D - high cost option - Terrace House: two storey, 2 bedroom + study area, living at upper level - End Value: \$360,000 - \$ 395,000. Internal Areas: 13m long x 5.2m wide module = 48m² x 2 levels = 96m²; External Areas: single carport 6 x 5.2m = 30m², or double garage 6m x 6m = 36m², upper deck 6m x 6m = 36m²; Total dwelling area: 160m² or 130m². Required land size = 20 x 10.4 = 208m² (if double garage), 20 x 9.2 = 185m² (if single garage). • Example E – medium cost option – Detached Dwelling: single level, 3 bedroom + study area - End Value: \$330,000 - \$350,000. Total dwelling area: approximately 160m² or 200m². Affordability achieved through modular construction, tropical design achieved through segregation of volumes and provision of large open areas. • Example F – medium to high cost option – Duplex Dwelling: two storey, 3 bedroom + study area, living at upper level - End Value: \$375,000 - \$425,000. Internal Areas: 78m² x 2 levels plus external Area: Breezeway 36m² = 156m²; Garage additional 24m²; Total dwelling area: 180m². Required land size = 26m x 30m = 780m². 	
--------------------------------------	--	--

Dwelling design principles for tropical climates

<p>Key Objective</p>	<p>Encourage air-movement</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide ventilation paths/breezeways to all internal and external areas and maximise openings to allow for good air flow. ▶ Aim to achieve a maximum of 40% site coverage for individual (detached) dwellings. Note: This area can exclude external roofed patios and open entry porches. ▶ Reduce density of built form towards north-east corner to improve access to prevailing (north-easterly) breezes. ▶ Provide side/back fencing with minimum 50% perforations and maximum height of 1.5 metres to allow for ventilation flow. ▶ Due to strong consumer demand for the provision of air-conditioning, provide housing that is zoned to enable air-conditioning of discrete areas, e.g. particularly bedrooms. Air-conditioning for indoor living areas will also typically need to be provided (for market acceptance). 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Ensure excellent passive design performance for internal living areas in particular and excellent transitions to pleasant outdoor living areas to significantly reduce dependence on air-conditioner use in living areas. ▶ Provide a minimum of two external openings on separate walls of all rooms to provide sufficient cross ventilation and air circulation to achieve thermal comfort. Orientate one of the openings to the prevailing breeze direction and where possible place the second external opening diagonally on the opposite side of room. The openings can be above door height. ▶ Use casement windows (highly effective on prevailing wind side) and louvre openings (for prevailing breeze and leeward sides) in locations where they will provide maximum ventilation benefits. Don't just place for aesthetics. ▶ Project external end walls to breeze directions as 'wind walls' and provide adjacent ventilation openings to maximise air flow. Note: There may be a cost associated with inclusion of this design feature, it will depend upon the configuration of external walls. ▶ Use screens and wall openings in lieu of solid walls between internal living areas to encourage good ventilation flow. ▶ Provide louvered (timber) panels (ideally 500mm wide, but narrower may be adequate) beside doors of habitable rooms to encourage air flow. ▶ Position openings to provide fresh air intake at lower levels and air discharge at high levels. ▶ Use internal partitions that stop (wherever possible) at 2.1 metres to maximise cross ventilation. ▶ Provide laundry walls to only 1.2 metres high i.e. sufficient to hide facilities in open plan designs. ▶ Use screened hi-lights above internal doors. ▶ Provide ventilated cupboards, robes and storage areas. ▶ Provide ceiling fans fitted to all habitable rooms to maintain airflow of 1 metre per second. Note: Spacing of fans to be 1.5 times the height of the fan blades above floor level (i.e. 2 fans in room 7.2 x 3.6m). ▶ Provide natural ventilation for all truss roofs and other roof cavities by use of energy efficient ventilators e.g. wind, solar or provision of sufficient eaves/gable ventilation openings. ▶ Consider 'cool pool principle'. The system uses a low mounted air-conditioner to create a pool of cold air at low level of room. The system is complemented by low level window louvers that can be easily shut once air-conditioner is on. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>In the tropics, airflow equals comfort. In recognition that casement and louvre window types do maximise air flow but also carry additional costs compared to sliding sash windows use louvres and casements judiciously.</i></p>	
<p>Key Objective</p>	<p>Minimise heat gain</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Design dwellings with shared walls to enable cost effective reduction of heat gain to dwellings. ▶ Provide insulation to roof and/or ceilings of internal and external spaces. Ideally insulate to 3.5 R-value or better. ▶ For non air-conditioned living spaces and outdoor areas use reflective roof insulation with a low thermal resistance to upward heat flow to promote rapid cooling of the house after sundown. ▶ Locate utility spaces e.g. laundries, store rooms, garages, carports, covered outdoor areas along western façade. ▶ Design dwellings with wider eaves projections to east and west elevations. Consider justifying wider eaves e.g. between 900mm and 1.5m (or even wider) by incorporating useable outdoor space under eaves i.e. verandahs and patios thereby providing a multiple benefit (i.e. shading of walls/windows and provision of (additional) usable space) in return for the additional expense. Where eaves are 1.0 metre wider or more, seek permission to reduce the allowable distance from the fascia to the boundary to 0.5 metres. ▶ Ensure western walls are insulated and/or fully shaded. For concrete masonry construction, alternative walling materials may be more appropriate for western walls. 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Where walls receive direct sun, insulate these walls to minimum R1.9. ▶ Keep wall areas without a roof overhang to a minimum. ▶ Minimise west and south-west facing openings. Where possible, minimise west-facing windows to 2% of room area. If provided, e.g. for ventilation purposes (and this is important), minimise size of openings and include sun shading screens on the outside of the openings to provide shading from low, hot afternoon sun. ▶ Ensure glazed openings in all orientations (even north-facing) are shaded between 8am and 5pm. ▶ Utilise shading options suited to purpose and choose type to minimise cost. Alternatives include window hoods; recessed windows; verandahs and other undercover areas such as patios and carports; roof overhangs; fixed shades; movable shades e.g. sliding slatted screens, roller shutters or trellises (either attached or offset from the building, can become a structure for vines). Note: Roller shutters have limitations such as excluding light when fully down, however, benefits when cyclones are threatening the region. ▶ For fragmented (e.g. pod style buildings) consider providing a roof to cover outdoor spaces between buildings thereby shading inward facing walls of these buildings. This could be a single truss roof over an entire building. ▶ Provide a light coloured roof and light coloured wall finishes. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Consider at the design stage requirements for fire walls between adjoining properties when adopting zero lot lines on side boundaries.</i></p>	
<p>Key Objective</p>	<p>Utilise landscaping to provide shading to dwellings and outdoor spaces</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Develop the landscaping design to maximum shading to the dwelling, as well as open spaces (both common and private). Where space permits, consider the use of trees, shrubs and trellises. ▶ Provide sufficient depth on private property to allow for planting of one major shade tree. Locate trees not less than 4m from the building roof and 2m from any boundary. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Promote outdoor living and optimise transitions between indoor and outdoor spaces</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Maximise the provision of outdoor living areas. Note: 24m² to 36m² would not be considered unreasonable. ▶ Include kitchen utilities in outdoor living areas. ▶ Ensure roofs to external areas are insulated. ▶ Provide insect screening of outdoor living spaces. ▶ Ensure at least one outdoor living area is of sufficient size and finish to be utilisable as a dining area for most of the year. ▶ Provide level thresholds between internal and external living areas. ▶ Maximise glazing and the size of openings between internal and external living areas. ▶ Provide transitions between indoor and outdoor spaces can be easily insect screened e.g. sliding doors as opposed to bi-folds. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Optimise passive design of living areas</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Ensure that dining and living areas whether inside or outside have excellent natural ventilation. ▶ Provide an area of internal living room as a non air-conditioned space with minimum 2.7m ceiling height and extensive ventilation. ▶ Provide openings to living rooms of minimum 35% of floor area. ▶ Provide room air changes of above 100 per hour. ▶ Use larger 'xxo' and 'oxxo' sliding doors for interfaces with outdoor living areas to effectively achieve cost effective openability with the added advantage that sliding doors can be easily insect screened. ▶ Provide raked ceiling to full or part of living room with high level ventilation openings. Note: There is a significant additional cost associated with this option. ▶ Consider exposed truss roofs over living areas (no ceiling). Note: There is a significant additional cost associated with this option. 	<p>Comments:</p>

Key Objective	Install well ventilated garages or carports	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure carport/garage roofs are insulated. ▶ Design garages and carports to ensure cross-ventilation. ▶ Promote stacking carports, along the western boundary especially of individual dwellings. ▶ Seek permission for minimised or zero setbacks to side boundary as concession for providing carports that both reduce heat loads on the home and through excellent ventilation lend themselves to flexible, multiple uses. 	Comments:
Supporting Information	<i>Benefits of well designed garages/carports include reduced heat gain of dwelling and provision of a car storage area that is also suitable for other uses e.g. entertaining, hobbies, business operation.</i>	
Key Objective	Minimise noise	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise building volumes to buffer noise from main roads. Note: Buffering the noise from busy roads is a pre-condition to market acceptable naturally ventilated home designs 	
Cost competitive dwelling types for tropical climates		
Key Objective	Be aware of, and seek to minimise, factors that increase the cost of the building component of new housing	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Explore and adopt opportunities to reduce the cost of constructing new housing. Consider opportunities in the following areas: <ul style="list-style-type: none"> ▷ Construction of dwelling types suited to smaller lot sizes; ▷ Reduced size (square meterage) of dwellings; ▷ Use of construction methods that keep building costs down; ▷ Production and cost efficiencies available from use of componentry that is prefabricated, constructed off-site construction or modular in design; ▷ Use of designs, materials and construction techniques that reduce the cost of various housing components e.g. provision of flooring structures, floor coverings, walls, external openings, internal doors, air-conditioning, ceilings, roof insulation, roofing, external shading. Suggested solutions provided in detail below; ▷ Cost effective incorporation of sustainable housing design criteria; ▷ Priority inclusion of sustainable design features that do not add additional upfront costs when considered early in the design stage; ▷ The use of construction methods where availability of trade skills is not a constraint; or ▷ For developers, avoid applying covenants that stipulate minimum dwelling sizes. 	Comments:
Supporting Information	<p><i>Despite a significant component of the rising cost of new housing being attributed to the rising cost of the provision of land, building costs are also increasing (in 2007 at a rate marginally above CPI) which is also impacting on the affordability of new housing.</i></p> <p><i>Recent increases in construction costs can be attributed to: labour shortages; skills shortages; increases in material prices; greater regulation of housing design and construction; housing sizes trending bigger whereas size of households trending smaller; greater and more expensive inclusions - due to higher expectations of both the buying public and regulatory requirements. Mitigating effects include improved efficiencies in construction practices and declining builder profits.</i></p>	
Key Objective	Provide dwellings sized to achieve affordable price points	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Reduce dwelling sizes and/or spend per gross floor area to ensure that the final house/land cost remains within the standard price range of the mainstream market i.e. total house/land cost between \$300,000 and \$450,000 per dwelling. ▶ The following table demonstrates a possible indicative cost breakdown for the construction of dwellings of different sizes in three different price points, considering land costs of approximately \$100,000 (inclusive of infrastructure costs) and profit margins etc. Note: Undertake your own calculations given your particular construction/land/other costs. 	Comments:

Suggested Solutions	Total house/land price	\$330,000	375,000	450,000	Comments:
	Real GST costs (4%)	13,000	15,000	18,000	
	Land/Infrastructure	80,000	90,000	100,000	
	Other costs	20,000	20,000	20,000	
	Profit	66,000	75,000	90,000	
	Construction Costs	150,000	175,000	200,000	
	m² of GFA @ price/m²	125m² @ \$1200/m²	137m² @ \$1200/m²	210m² @ \$1,000/m²	
Key Objective	Reduce the size (square meterage) of dwellings through compact, flexible housing designs			Yes / No	
Suggested Solutions	<ul style="list-style-type: none"> ▶ Reduce dwelling sizes so as not to exceed 200m² gross floor area. ▶ Providing dwellings in a range of sizes, i.e. reducing the dominance of the 4 bedroom house and increasing the proportion of 1, 2 or 3 bedroom dwellings to better meets the needs of smaller households. ▶ Offset reduced indoor floor areas for larger external living areas. ▶ Improve the usability of the space provided by designing for improved flexibility. ▶ Reduce the total number of rooms required by having multipurpose 'spaces'. That is spaces that can be readily converted from one purpose to another. ▶ Incorporate flexible designs to enable smaller dwellings to provide comparable utility to less flexible but larger 'traditional mainstream housing forms'. Note: Flexible design also enables a dwelling to better meet variable households requirements (i.e. various stages of life/family or household makeup). ▶ Promote outdoor dining and outdoor living through provision of 'active decks' that incorporate kitchen, dining and other uses and are well integrated with building interiors. ▶ Incorporate movable partitions i.e. double doors, sliding doors, bi-folding doors, screen panels to enable the use of spaces as either one larger space or two smaller ones. ▶ Provide study nooks adjacent other areas e.g. in entry/living/bedroom areas. ▶ Provide family/living rooms with ability to be partitioned e.g. to provide a guest bedroom. ▶ Provide naturally ventilated carports with insulated roofs, in lieu of enclosed garages. ▶ In multi-storey terrace designs replace carport roofs above ground level car ports with large raised decks. ▶ Design compact laundries, e.g. in a cupboard (either internally or externally). 			Comments:	
Supporting Information	<p><i>Current dwelling size are typically 200-250m², including the garage.</i></p> <p><i>Two bedroom new housing product built out of town for affordability has historically not sold well in North Queensland. Acceptance however does depend on where the property is. A two bedroom cottage is for example readily accepted in the inner city and fringe city areas.</i></p>				
Key Objective	Prioritise inclusion of sustainability features that do not add additional upfront cost			Yes / No	
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that the dwelling is orientated optimally in relation to the sun and breezes. ▶ Design for natural day-lighting throughout. 			Comments:	
Key Objective	Maximise use of prefabricated, off site construction and modular componentry			Yes / No	
Suggested Solutions	<ul style="list-style-type: none"> ▶ Utilise roof trusses. ▶ Use prefabricated wall framing (external and/or internal). ▶ Use pre-cast concrete panels. ▶ Use house modules that are prefabricated or constructed off-site in entirety, in part as a one-off or that are modular in design. 			Comments:	
Supporting Information	<p><i>The benefits of offsite construction include reduced construction times, reduced supervision and administration costs, and improved material/waste efficiencies.</i></p>				

Key Objective	Minimise construction costs associated with flooring structures	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use slab on ground construction in recognition that raised floors have higher construction costs. ▶ Use waffle-pod (preferred) or raft concrete slab forms due to lower construction costs in preference to strip footings. Note: Waffle-pod concrete slabs reduce the volume of concrete and/or fill required. ▶ On sloping sites, achieve cost efficiencies by using cut and fill practices to allow slab on ground construction. Note: This choice conflicts with desire to minimise sediment erosion from sloping sites. ▶ Use timber joists with a steel sub-frame (posts and bearers) to achieve a cost-effective raised floor. ▶ Alternately, achieve a cost effective raised floor using an elevated concrete slab (i.e. over fill) for raised floors up to a maximum height of 800mm. ▶ A timber sub-floor is a cost effective option for two-storey dwellings with lightweight construction to the upper-storey. ▶ Preferentially provide external living areas at ground level e.g. external paved areas as this is cheaper than providing a raised deck. ▶ Design decks less than 1m above the ground to avoid incurring increased costs due to requirement for handrails, balustrade etc. 	Comments:
Key Objective	Choose cost effective floor coverings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Choose cost efficient floor finishes. 	Comments:
Supporting Information	<p><i>Linoleum or carpet are the cheapest floor coverings. The next cost effective floor covering is ceramic tiles. Polished concrete is most expensive.</i></p> <p><i>For raised flooring, structa flooring followed by structural ply are the cheapest flooring finishes either left at a polished finish or covered with linoleum or carpet. Covering with tiles adds additional cost (floor substrate may change to compressed fibre cement sheeting). Polished floors are more expensive and bamboo substantially more expensive again (both in purchase and installation costs).</i></p>	
Key Objective	Reduce costs associated with providing walls	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Construct internal partitions from steel e.g. stud'n'track in preference to timber to reduce trade/labour costs. ▶ Use concrete block walling systems but ensure that designs incorporate self shading walls (i.e. shared walls) or other design features to ensure that the concrete can be cost efficiently shaded to avoid unwanted heat gain, storage and release. ▶ Provide a better quality and higher cost wall finish to facades (e.g. painted, rendered finish or painted accent cladding materials to highly visible areas). For sides and rear of dwelling to minimise costs use of painted fibre cement (most affordable) then rendered blueboard. ▶ For composite wall systems, design stud intervals to match sheet sizes. ▶ To achieve the most cost effective external wall framing, use prefabricated plantation timber framing (cheapest option in volume) then plantation timber frame using traditional construction techniques, then steel framing. Note: The use of plantation timbers is standard industry practice for timber framing. ▶ For affordability, reduce the ratio of wall length to floor areas, i.e. prefer square floor plates over rectangular or shapes which increase wall lengths. ▶ Consider the cost efficiencies provided by single storey over double storey housing designs. Note: Higher costs associated with double storey buildings can be minimised by reduced land area and/or utilising shared walls. 	Comments:
Supporting Information	<p><i>Concrete block i.e. masonry walls (including rendered masonry) are generally the cheapest form of wall construction in North Queensland due to relative skill availability of trade labour. It is worth noting however that in homes which desire to perform well in a tropical climate the use of masonry block due to its high thermal mass necessitates the provision of extensive wall shading (e.g. eaves/other) this is a particularly significant cost for detached concrete masonry homes.</i></p> <p><i>For composite and light weight wall systems, the type of finish has a big impact on the cost.</i></p>	

Key Objective	Reduce construction costs associated with providing external openings (i.e. windows and doors)	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In general, choose (significantly cheaper) sliding windows over louvre and casements window types. However, as price permits install more and bigger sliding windows to increase the area of openability. ▶ Position sliding windows to benefit from attenuations in external wall alignment that concentrate breezes, but avoid designing in wing walls with no other purpose than to specifically to channel breezes due to the considerable cost incurred in doing so. ▶ If additional airflow is required replace sliding windows with casement windows or louvres but ensure that they are used in strategic locations (i.e. not positioned for aesthetics as is common practice) but where they will provide enhanced performance i.e. in prevailing breeze directions to improve breezeways. ▶ For all windows, clever placement is critical. Specifically locate window and doors to optimise breeze paths. ▶ Use louvre windows preferentially in locations where they would avoid expenditure on security screens and balustrading (i.e. in locations where floor height is in excess of 1m) ▶ In choosing blades for louvres, the cost of aluminium blades and timber blades are comparable. Glass louvers are cheapest. The higher cost of opaque or solid blades may be justified where savings are made on window dressings and window shadings. Note: Aluminium blades have significantly lower maintenance requirements compared to timber blades. ▶ Locate windows/doors with consideration of use of room (avoid locating where the usability of the room is restricted). ▶ Use performance glazing where appropriate. Note: The cost is declining as use becomes more widespread. ▶ For non-air-conditioned spaces, to promote breeze paths, consider replacing windows and external walls with openings without glazing e.g. slats, mesh, fixed louvres etc. 	Comments:
Supporting Information	<i>Louvre windows are approximately three times the price of sliding windows.</i>	
Key Objective	Minimise costs associated with providing internal openings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Choose doors of standard sizes e.g. maximum width 870mm. 920mm is a non-standard size in North Queensland and will increase costs (due to product not being stocked), this may change with increased demand. Note: 870mm wide door leaf is the minimum acceptable doorleaf for universal accessibility. ▶ Provide openings above internal doors to assist with ventilation. Note: There is a slight but minimal additional cost involved, but this may be a cheaper option overall for improving ventilation compared to the inclusion of an extra window. ▶ Consider and justify the additional costs associated with providing cavity sliding doors i.e. unit cost and maintenance. ▶ Justify the additional costs incurred in using louvered internal doors. 	Comments:
Key Objective	Minimise costs associated with providing air-conditioning	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Minimise the total capacity of air-conditioning installed in dwellings. ▶ Avoid installing oversized air-conditioning systems. ▶ Design homes with smaller internal floor areas offset by larger areas of usable outdoor living spaces thereby reducing the internal floor areas required to be air-conditioned. ▶ Investigate the feasibility of providing air-conditioning to only some parts of the house, rather than the full house (i.e. design some internal space as a non-air-conditioned zone). ▶ Implement offsets, to justify the additional expense of providing inverter air-conditioners. 	Comments:

Supporting Information	<p><i>In providing non-airconditioned spaces, be sure to avoid creating compromises for buyers – See Marketing section. Note 2: Consider also the limitations of the BCA requirements which assumes houses are air-conditioned.</i></p> <p><i>Inverter airconditioners have higher upfront cost compared to standard air-conditioners, but due to the significant greenhouse and energy savings that they provide, efforts should be taken to accommodate and offset their additional cost. Justification for choosing inverter airconditioners is supported by the increased consumer awareness of the greenhouse and ongoing operational energy savings they provide, increasing use of inverters as the industry standard, and regulatory pressure to phase out standard, non-inverter air-conditioners from the market.</i></p>	Comments:
Key Objective	Reduce construction costs associated with ceilings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ To maintain housing affordability, keep ceilings flat. ▶ Avoid skillion roofs with raked ceilings despite both design (ventilation, natural light) and market advantages (i.e. higher ceilings sought after) due to the significant addition to the cost of housing construction. ▶ Avoid ceiling/wall heights exceeding 2.7m as this increases costs. 	Comments:
Supporting Information	<p><i>For higher priced housing, the ability to achieve a different look and include clerestory lighting may justify the use of non-flat ceilings. In these cases, the use of polycarbonate (laserlite) sheeting over windows or fixed lites can help to reduce costs.</i></p>	
Key Objective	Minimise costs associated with providing roof insulation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Preferentially choose, batts, cool'n'cosy and polywool type insulations (laid on the ceiling) as these are an effective form of insulation for tropical homes when the ceiling space is well ventilated and are cheaper than "bubble wrap" insulation types (which are typically lain under the roof sheeting). ▶ When using insulation on the ceiling, use higher insulation ratings and ensure better than average ventilation of the roof cavity. ▶ Use whirlybirds, deco vents and roof vents etc to cost effectively improve ventilation of the roof cavity. ▶ Justify the provision of sisalation/sarking (in addition to batts). Inclusion is not common industry practice and increases costs. Note: There are however benefits for use of sisalation/sarking acts as a vapour barrier and improves insulative performance. 	Comments:
Key Objective	Reduce construction costs associated with roofing	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use prefabricated timber trusses in preference to hand pitched rafters. ▶ Design dwellings with shared walls to minimise the need for roof overhangs on these walls. ▶ Design flat soffits in preference to raked soffits. ▶ Retain standard eave lining (i.e sheeted with, fascia and gutter) to avoid additional labour and material costs associated with removal of eaves lining, soffits, fascias and gutters. ▶ Choose roof frames made of plantation timber in preference to steel roof frames. ▶ To minimise costs, choose metal roof sheeting over roofing tiles . ▶ Choose light coloured roofing materials. Better performance is achieved at no additional cost. ▶ Use zincalume roof sheeting over colourbond as material price is cheaper. ▶ Developers to permit zincalume roofs in building covenants as an acceptable alternative to light-coloured steel sheeting. ▶ Use skylights to cost effectively and conveniently providing natural light. 	Comments:
Supporting Information	<p><i>Prefabricated trusses are widely used and are considerably more cost effective as a result of time/labour savings.</i></p> <p><i>Roof overhangs that are sufficiently wide enough to shade walls well tend to exceed 600mm which carries with it increased construction costs.</i></p> <p><i>Raked soffits require additional render/paint to raking section making them more expensive in terms of labour to construct.</i></p>	

<p>Supporting Information</p>	<p><i>Additional costs associated with removal of eaves lining, soffits, fascias and gutters may include painting the revealed rafters, bird-proofing or blocking in of rafters at wall line and ongoing maintenance issues as a result of exposure to external elements. Additionally, maintenance issues may arise from: water ingress, timber maintenance, cobwebs, vermin, and the need to stabilize the ground under the drip line of gutterless rooflines.</i></p> <p><i>Plantation timber roof framing is not only eco preferred but the cost of timber framing is similar to or less than steel roof framing.</i></p> <p><i>In metal roofs, trusses are spaced at 900 centres, whilst tiled roofs require trusses to be spaced at 600 centres and incur additional framing and labour costs.</i></p> <p><i>Tiled roofs are also a poor choice in tropical climates due to their high thermal mass ie heat storage capacity.</i></p> <p><i>Light coloured roof materials advantageously reduce heat transfer into the home compared to medium or dark coloured roofs finishes.</i></p> <p><i>Skillion roof styles with raked ceilings have wide appeal and provide improved day-lighting and ventilation but due to cost this is only an option in dwellings priced over \$450K.</i></p>	<p>Comments:</p>
<p>Key Objective</p>	<p>Minimise construction costs associated with providing external shading</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Seek to incorporate soft landscaping (lower cost) where possible to reduce spend on provision of hard shading. ▶ Locate existing housing inclusions e.g. soft landscaping e.g. trellises, carports, utility spaces, and breezeways wisely e.g. along west facing walls to achieve more cost effective external shading of walls and windows. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Use construction methods where availability of trade skills is not a constraint</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Use mainstream trade skills to minimise incurrance elevated labour costs. 	<p>Comments:</p>
<p>Key Objective</p>	<p>Encourage retrofit programs for energy and water efficiency/sustainability performance of existing housing stock</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Due to the improved cost efficiency and potential for significant water savings arising from retrofitting of existing homes, support regulation requiring a retrofit of existing housing stock for energy/water efficiency (e.g. at point of sale). 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Savings of household energy and water use in existing housing stock are likely to be able to be achieved more cost effectively than additional mandatory measures on new housing.</i></p> <p><i>In the case of water efficiency, a retrofit program for conversion of single flush to dual flush toilets and traditional to water saving showerheads is considered to deliver more water savings and be substantially less costly than a mandatory requirement for installation of rainwater tanks on new dwellings. (Source: QMBA, 2007)</i></p> <p><i>Increased emphasis on the performance of all homes will also contribute to public awareness and increased 'valuation' by the market of water and energy efficiency in new homes.</i></p>	<p>Comments:</p>

Dwelling design principles - other

<p>Key Objective</p>	<p>Encourage community interaction through considered dwelling design</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide dwelling designs that enable and encourage front living. ▶ Provide dwelling design with both internal and external front living. ▶ Provide insulated fully roofed entry patios (not less than 4m² in area) at the front of dwellings ▶ Include in entry patios, a bench or permanent seating and partial screening for privacy. ▶ Eliminate front fencing to enhance visual interaction between neighbours. ▶ Stop and return side fencing to the building face at the building line behind the line of the entry patio/deck. 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Place fencing for containment of dogs to the street frontage at the building line and not on the site front boundary. ▶ For containment of animals but to maintain lines of sight and breezes, provide fencing that is 'solid' up to 1.0m high and perforated above that to 1.5m or max 1.8m. ▶ Recess carports/garages behind front of house, to avoid blocking casual surveillance of the street/commons from inside the dwelling or the front patio. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Benefits of eliminating front fencing include enabling the front entry/patio to present to the street and improved air movement across the site.</i></p>	
<p>Key Objective</p>	<p>Encourage dwellings that are designed to feel safe and reduce crime</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Ensure that Crime Prevention Through Environmental Design Principles are incorporated in dwelling designs. ▶ Identify the types of crimes that will most likely occur in the specific locality and address these through design. For example, in low socio-economic areas crimes are likely to include vandalism, graffiti and break and enters and for infill development amongst traditional residential properties, the rear of the properties may be high risk as access can be achieved through back fences of low density home backing onto the site. ▶ Target harden properties. ▶ Limit ease of access to dwellings to reduce opportunistic crime. ▶ Use solid back doors. ▶ Install security screens to all windows and doors. ▶ Ensure all entries have a keyed lock and are keyed alike. ▶ Use designs that promote passive surveillance, particularly of the streetm, areas where children play and external areas of the dwelling. ▶ Limit/avoid the provision of houses with frontages that have double garages because of the limited surveillance of the street that results. ▶ Ensure that all people using the home can see out of windows including people sitting/in bed. ▶ Ensure visibility of entries from the street and from neighbouring properties, i.e. ensure entries are easy to see and well lit. ▶ Provide sensor lighting to main entry/exits points of home. ▶ Keep the rear of houses off the back fence to provide some visibility of both your and neighbouring properties. Balance providing casual surveillance and privacy. ▶ Choose appropriate fencing. Considerations will include target hardening, visibility, breeze access and containment of pets. Note: High fences can help prevent access, but high fences can also attract graffiti and provide cover for trespassers. If security can be provided with lower and more transparent fencing/walls to back and sides of property, then that is preferred as barriers to breezes and visibility are reduced. ▶ Choose fencing with shaped tops and battens on inside to make climbing over fences more difficult. ▶ Use of vegetation or trellis intermittently along side and rear of property to provide privacy whilst enabling some visibility. ▶ Reduce the risk to residents from domestic violence related crime and stalking through considered housing design. A key consideration in these crimes is the ability to escape or get out. It is also worth noting that this type of crime typically occurs at night. ▶ The following points particularly minimise risks of domestic violence and stalking crimes but provide security benefits for all households: <ul style="list-style-type: none"> ▷ Provide sufficient entry and exit doors and the opportunity to escape through windows; ▷ Provide one room in the house that can be used as a panic room i.e. lockable from the inside (generally this should not be a bathroom) and ideally though not essentially the room should also have a phone; ▷ Ensure visibility to see out of the home to check but privacy once inside the home.; ▷ Use audible beds outside windows e.g. gravel; ▷ Provide a space to securely park car(s) i.e. off the street (primarily to avoid vandalism of the car); ▷ Use non-flammable materials around the front door; 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▷ Ensure that the home is easily locatable and accessible by emergency vehicles, i.e. clear numbering on letterbox that can be spotted from a distance ▷ Dwelling/community design encourages casual interactions with neighbours. Note: Neighbours can play an important support/deterrent role to victims of crime/domestic violence; ▷ Have the entrance of the home enter into a communal living area to encourage communication between residents and a 'happy home'; and ▷ Provide separated spaces in/around the home to chill out, particularly important in overcrowded homes. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>For further guidance refer to 'Designing out Crime: Crime Prevention through Environmental Design' by Susan Geason and Paul R Wilson, Australian Institute of Criminology.</i></p> <p><i>Typically there are three levels of security screening. The cheapest option is windows/doors with security grills fixed with rivets, the medium option is security grills that are welded, the third and most expensive option is crimsafe. At a minimum adopt the middle standard. For high risk access points e.g. back doors in high crime areas, install crimsafe security screens.</i></p> <p><i>To minimise unwanted light disturbance from sensor lights on adjacent rooms (especially bedrooms) and neighbouring properties provide hoods or shields to external lighting.</i></p>	
<p>Key Objective</p>	<p>Provide dwellings that are accessible, safe and easy to use by people of all ages and abilities</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide some dwellings (a minimum of 1 in 15) that are fully accessible/universally designed, i.e. that are designed for full time occupancy by people with limited ability. ▶ Maximise the number of dwellings that are 'visitable' by people of all ages and abilities. ▶ 'Visitable' dwellings include all of the following: <ul style="list-style-type: none"> ▷ an accessible space available where the person could sleep (ideally with privacy). This is not essentially though preferably a room that could be used as a bedroom; ▷ an accessible bathroom, shower and toilet (can be separate rooms); ▷ a place to be with others and share a meal; ▷ a step-free threshold; and ▷ step-free pathways connecting the accessible spaces. ▶ Provide 'visitable' spaces on the ground floor for best cost effectiveness. Note: Un-'visitable' areas e.g. upstairs can be used to provide kids bedrooms, additional bathroom(s), further living space etc ▶ Be consistent in the specification, ordering and installation of accessible design features throughout the dwelling even to inaccessible spaces like upstairs. Consistency can reduce complexity and potentially labour costs. Low cost options include specifying wider door dimensions, design an accessible bathroom, and using the same door and cabinet hardware and light/power switches throughout the home. ▶ Ensure priority accessible design features are incorporated in dwellings: ▶ A step-free threshold at the main entry/exit point of the dwelling. ▶ Step-free thresholds throughout, i.e. eliminate steps and use ramps (or lifts) if necessary. ▶ If using ramps, ensure gradients do not exceed 1:15.5. ▶ Design dwelling to enable cars to be able to be drive immediately adjacent the dwelling (either to a carport or garage or a set down point) so as to enable a wheelchair to be able to be driven into the dwelling. ▶ Limit/avoid need for hallways through considered house design. ▶ Specify wider doorways, wider hallways and internal pathways. ▶ Ensure hallways and internal pathways have minimum 1200-1300mm width and are preferably 1800mm wide. ▶ In general, choose doors to have a 850mm clearance/opening (i.e. a 870mm doorleaf). ▶ Provide 900mm wide door openings off hallways where hallways are less than 1800mm wide to ensure accessibility to rooms coming off narrower corridors by having an extra wide i.e. 900mm doorleaf (to accommodates a larger turning circle to get into the room). 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Provide private (external) pathways that are 1200mm or wider. ▶ Have a bumper rail or lip on at least on one side of external pathways to prevent wheelchairs running off the path. ▶ Provide adequate circulation space. Note: For circulation – width of paths and turning points are the most important. For wheel chair accessibility, provide spaces that enable 1.5m turning circles. ▶ Specify lever door handles in preference to doorknobs. ▶ Provide an accessible room/bedroom. ▶ Provide an accessible bathroom. ▶ Select large format light and powerpoint switches. ▶ Position light switches and power points for ease of use by all. ▶ Position light switches at a height ideally 1000mm but in the range of 1000-1200mm above floor level. ▶ For fully accessible homes: provide side opening ovens; consider the provision of a carers's suite/quarters in the dwelling. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Design that is accessible, safe and easy to use by people of all ages and abilities is often termed 'universal design'.</i></p> <p><i>Universal design aims to meet everyone's needs and to avoid discriminating against any users. Universal design aims for minimal adaptation over time to meet changing needs.</i></p> <p><i>There are seven principles of universal design: 'Equitable use' - the design is useful for people with diverse abilities and avoids stigmatising users; 'Flexibility in use' - the design accommodates a wide range of individual preferences and abilities; 'Simple and intuitive use' - the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level; 'Perceptible information' - the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities; 'Tolerance for error' - the design minimises hazards and the adverse consequences of accidental or unintended actions; 'Low physical effort' - the design can be used efficiently and comfortably, and with a minimum of fatigue; 'Size and space for approach and use' - the design provides appropriate size and space for approach, manipulation and use regardless of the user's body size, posture or mobility.</i></p> <p><i>In considering accessible, and safe and ease of use (i.e. universal design), as a general rule, avoid thinking 'disability' but instead think 'ease of use' and 'usability' over the life of the house.</i></p> <p><i>A visitable dwelling is one that enables persons of ALL ages and abilities to enter and leave with dignity, share a meal with the family, use the toilet, have a shower and stay the night. It is COMMON to have a vulnerable visitor or someone who for a period of time can't get upstairs. It is RARE to have a manager of the house who is vulnerable and who has to cook, clean, wash clothes and needs a fully accessible home.</i></p> <p><i>In general, there are only a few small changes that will result in homes becoming 'visitable'. The barriers that do still commonly exist are: the 100mm step at the front door; doors that are too narrow, pathways or corridors that are too narrow, the use of door knobs instead of lever handles, and the installation of shower hobs.</i></p> <p><i>It is not a requirement of a visitable dwelling that visitors of all ages and abilities be able to cook, do laundry or go into the garden. Consequently universal accessibility/design is NOT required for the kitchen, laundry or garden. Similarly the powerbox, BBQ area and study do not need to be accessible.</i></p> <p>Achieving accessible dwellings</p> <p><i>The key to getting new homes to actually be accessible is consideration at the design stage by home designers in the nuances that make dwellings accessible. The cost is now almost cost neutral, with the main cost incurred being initially in changing practices.</i></p> <p><i>In terms of being able to be accessible, most new houses are 90% there. This is partially because houses are currently much bigger than in the past. Also current trends towards less cleaning, simplified, less technical homes and open plan living are all compatible with accessible homes. Also, garages typically have direct access to the house.</i></p>	

Supporting Information

The 2-3 bedroom market is the easiest bracket in which to achieve cost neutral universal design. Two-storey dwellings are cost effective too, noting that accessibility to upstairs areas is generally not necessary.

Typical household sizes (2-3 people households) generally 'need' 2-3 bedrooms, although they may often 'want' 4-5 bedrooms. Increasing the number of bedrooms makes accessible design more difficult to achieve cost effectively.

The most difficult house sizes to make accessible are very tiny one bedroom apartments i.e. 50m² of floor space and also dwellings of around the 170m² size which have a large number of (e.g. 5) bedrooms.

If dwelling is <1m off ground, ramps can be relatively cost effective and only a marginally higher cost than concrete steps. Aluminium or timber ramps are more cost effective than concrete ramps.

Accessibility to highset houses and dwellings beginning above the ground floor will require more expensive ramps/lifts. Lifts may be viable for a block of apartments. A lift costs of the order of \$75-\$100K.

Benefits of wider doorways include a feeling of spaciousness, less architrave and wall damage, reduced cleaning/maintenance time/costs, and enables wheelchairs to turn into a doorway from a hallway.

An accessible bedroom is generally readily achievable in most new homes, as existing room sizes would typically already accommodate an accessible room layout e.g. single bed against wall, and cupboard well placed to enable sufficient space for turning circle. Ensure that the swing of doors does not jeopardise the accessibility of the room. For dimensions/layout, refer: Smart Housing Factsheet for Bedrooms (http://www.build.qld.gov.au/smart_housing/factsheets/index.asp).

In capital cities there is now no cost differential in choosing a slightly wider i.e. 870mm doorleaf.

The achievement of an accessible bathroom can be no more expensive if considered at the design stage. An accessible bathroom is most easily accommodated in modern homes in the ensuite as the ensuite is typically larger than the bathroom and typically already of sufficient size to make them wheelchair accessible. In general, it is just the detailed design that makes them inaccessible.

Parameters of an accessible bathroom include an even, step free, non-slip floor surface; all fittings (e.g. towel rails) capable of supporting a person's body weight (minimum 112kg); a seamless transition to the shower, i.e. shower is not over a bath, is stepfree and hobless (maximum 20mm lip); ability to fit toes under joinery; walls reinforced near the bath, shower and toilet for later installation of grab rails if required and an appropriate room layout. Note: For dimensions/layout, refer to Smart Housing Factsheet for Bathrooms (http://www.build.qld.gov.au/smart_housing/factsheets/index.asp).

Marketability of accessible dwellings

The marketability of accessible homes is rapidly improving.

As the percentage of older people in society, the workforce and as the holders of wealth increases – older markets will increase their influence on the market.

Remaining independent, being connected to the community and not being socially isolated are important factors to the quality of life of older people.

In South East Queensland (SEQ), a big shift is occurring. Mainstream builders there are now recognising the older person as a massive, profitable and growing market and see accessibility and universal design as a marketing opportunity.

If young people are buying the properties, then the experience of older people visiting their homes becomes important, so that they: (a) can come and visit (b) look favourably upon the young person's choice of property.

It is true that households typically don't foresee the future and don't plan on becoming vulnerable. Also most people with accessibility needs don't want to be labelled as that. Imagery is critical. Accessibility is very marketable IF you can't see it. Well applied however, the changes are very subtle.

It is therefore no longer a matter of whether universal design is acceptable to the market. A home that works well through better design in fact has a wider market appeal and sale potential (including resale potential). This is especially important given that over the life of a house 10 families will live in that house.

<p>Supporting Information</p>	<p>Further useful references for universal design, accessibility and safety are:</p> <ul style="list-style-type: none"> • Smart Housing Website especially the Smart Housing Design Guidelines and Smart Housing Factsheets (http://www.build.qld.gov.au/smart_housing/); • The UDIA EnviroDevelopment Safe and Accessible Checklist (comparable to the social section of the BCC Sustainable Home Checklist Part 3, 4, 5); • Smart Housing Safety and Security Booklet, in particular the section: Taking a tour of a safe and secure home (pages 12 – 22) for specific design features that will reduce the risk of injuries (and crime) at home; • Smart Housing Universal Design Booklet, in particular the section: Taking a tour of a universally designed home (pages 11 – 17); • Welcome - Design ideas for accessible homes. ISBN 0957763883 By Building Commission Victoria 2002; • Adaptable Housing Standard AS4299 Class A (3 versions); • The Australian Code for Accessibility; • The UNESCO Code for Accessibility; and • Townsville accessible design specialist – Max Murray, Access Designs Ph 4728 9831. 	
<p>Key Objective</p>	<p>Design to minimise injury in the home</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Design to minimise risk of falls. Note: Designing for accessibility minimises the risk of falls. ▶ Provide a step-less entry and avoid steps throughout. Where steps are used ensure they are wide enough. ▶ Choose flooring to avoid slips and trips. ▶ Provide non slip and non-glare flooring throughout and particularly in kitchens and bathrooms. Note: If using carpets, choose low pile carpets in accessible spaces for ease of manouverability for wheelchair users, people with disabilities and the elderly. ▶ Be aware that changes in surfaces can be cause for trips, be especially aware of creating ledges. ▶ Provide lighting that is ambient, even (i.e. not shadowy) and non-blinding. ▶ Ensure showers are hobless and step free (maximum 20mm step). ▶ Do not provide showers over baths (high risk of falls in getting in/out). ▶ Provide baths separately to (i.e. not under) a shower. Note: Baths are highly marketable so do include one, just not under a shower. ▶ Strengthen bathroom walls for later fitting of grab rails etc. ▶ Prevent scalds. ▶ Install end of line shut-off valves, tempering valves or thermostatic mixing valve to ensure hot water tap temperature is set at no more than 50 degrees Celsius. ▶ Position shower taps away from the water source (to reduce the risk of scalding). ▶ Provide tap fittings that are curved rather that pointy (to avoid knocks/bumps). Levers are preferred. ▶ Choose window styles/frames/locations for safety, in particular seek to prevent falls out of windows, particularly of children, especially at height. ▶ Ensure sufficient entry/exit points for escape in the event of an emergency. ▶ Select rounded corners for furniture and fittings. ▶ Provide lockable, childproof cupboards in kitchen, laundry, bathroom and garage for safe storage of dangerous substances and medicines. Preferably position these cupboards up high. ▶ Provide barriers between children and fans, especially in children's bedrooms. Consider the use of caged wall fans instead of ceiling fans – especially an issue when bunk beds used in small rooms. ▶ Choose a stove with knobs beside not on the front of the stove. ▶ Install upright stoves with anti-tilt brackets or bolted to the floor and wall. ▶ Ensure safe installation of appliances. ▶ Provide a barrier between the driveway and front garden/entrance of the home (front door) and have a straight rather than curved driveway. Note: Minimises risk of low speed runovers of small children. ▶ For road safety, avoid vegetation that blocks views e.g. keep vegetation low. 	<p>Comments:</p>

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Avoid placing climbable structures adjacent driveways/concrete paving, this includes letterboxes. Note: Minimises risk of injury from falls of children onto hard surfaces. ▶ Avoid climbable trees to minimise injuries to children. Note: Counter argument is that kids have to have some adventure. ▶ Avoid risk of drowning. Ensure water features are a maximum 5cm depth or are fitted with a grill 30mm-50mm below the water surface. ▶ Provide consistency in location/type of house numbers between dwellings and ensure they are visible day and night. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Falls are the number one cause of injury for children and older people. 75% of falls occur in the home environment.</i></p> <p><i>A third degree burn occurs in less than 1 second at temperatures 65-70 degrees. At 60°C a serious burn can happen in 1 second, at 55°C a serious burn would take 10 seconds, at 50°C a serious burn would happen after 5 minutes.</i></p> <p><i>A child falling from a window sustains serious injury (i.e. fractures or head injuries) at a rate of one a week across Australia.</i></p> <p><i>Refer to Townsville Thuringowa Safe Communities Program for references and design guidelines for safety in the home, especially risks to children/aged, e.g. the Townsville Thuringowa Safe Communities Guide on Home Safety.</i></p>	
<p>Key Objective</p>	<p>Design dwellings to maximise the physical and mental health of occupants</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Design dwellings that minimise heat stress through passive design i.e. a high level of comfort is achievable without reliance on air-conditioning, i.e. via design of dwellings with adequate shading, appropriate orientation and access to breezes. ▶ Minimise the impact of noise on dwelling occupants. ▶ For attached dwellings, ensure excellent acoustic attenuation between neighbouring properties – address walls and floors. ▶ Locate and shield air conditioning (if provided) to prevent noise nuisance to occupiers of same or neighbouring properties and to minimise internal transmission of noise from external sources (e.g. traffic noise). Refer: AS2107-2000: Acoustics – Recommended design sound levels and reverberation times for building interiors. ▶ Be respectful in positioning pool pumps, air-conditioners, and window openings in relationship to neighbours. ▶ Position garages (and roller-doors) an appropriate distance from bedrooms to reduce noise during night hours. ▶ Incorporate design features to reduce/avoid unwanted lighting from street lighting and headlights (especially on curved roads) especially to front facing bedrooms. ▶ Promote a relaxing home environment. ▶ Incorporate feng shui and other wholistic design principles in housing design. ▶ Promote interactions with nature e.g. views, sounds, smells, physical interactions e.g. bird/butterflies, etc. ▶ Prevent water pooling in landscaping to reduce risk of mosquito borne diseases. ▶ Minimise exposure to toxins, irritants and allergy triggers in both indoor and outdoor environments. ▶ Ensure that vegetation used in landscaping in non-toxic and non-allergenic, especially in places accessible to children. ▶ Preferentially select non-toxic building materials to create a healthy indoor environment, i.e. choose materials with low off-gassing of volatile organic compounds (VOCs) during application or use e.g. low emission paints, carpets, carpet underlays, glues, lacquers, protective coatings, oils. ▶ Ensure kitchen range hoods are flued to the outside of the building from all gas stoves/ovens and/or ensure kitchens have effective natural or mechanical ventilation to expel combustion exhausts to the outside of the building (i.e. not just into the roof space). ▶ Choose non toxic, non irritant, non allergenic forms of insulation. 	<p>Comments:</p>

Suggested Solutions	<ul style="list-style-type: none"> ▶ Use or encourage the use of permaculture practices and native plants in landscaping to minimise exposure to pesticides and herbicides. ▶ Choose materials that are non-hazardous to touch, notably for floors and children's playground equipment e.g. avoid CCA treated timbers, etc. ▶ Avoid the use of chemical termite treatments. ▶ Ensure soils used for food production are non-toxic. 	Comments:
Supporting Information	<p><i>For guidance in reducing allergy triggers in and around dwellings, see http://www.asthmawa.org.au/files/factsheets/Towards%20the%20Low%20Allergen%20Home.pdf.</i></p>	
Key Objective	Ensure provision of adequate storage areas	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide a minimum 6m² of storage space with external access in each dwelling. ▶ Incorporate secure store room areas adjacent to car ports. ▶ Provide in a location nearby but not necessarily with the dwelling shared storage facilities (with individual secure compartments) sufficient to provide additional storage for 50% of dwellings. Note: This is especially important for smaller dwellings, terrace or duplex dwellings. ▶ Use truss roof cavities for storage. Provide a minimum roof/storage platform of 6m² and fitted ladder/removable steps for access. Note: Cost justification would depend on design and alternative spaces available. 	Comments:
Resource efficiency		
Waste		
Key Objective	Design for adjustability and retrofitting	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Design for adjustability and future retrofitting. Especially consider bathroom design, kitchen design, technology, ageing and disabilities. Note: This recognises that there will be changes in fashion and trends, and in occupancy over time 	Comments:
Key Objective	Support occupants in recycling and composting	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Incorporate design features to make recycling easy, e.g. provide built in recycling/composting facilities to enable separation of waste types at source. ▶ Provide an area for composting in a common area. Co-locate compost area with a horticultural area to enable easy reuse of compost. ▶ If providing on-site grey/black water treatment, use systems that have capability to also handle compost waste. 	Comments:
Key Objective	Take measures to minimise and manage waste in construction	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage regulatory incentives to improve the viability of waste management and recycling practices in the North Queensland region. ▶ Adopt waste minimisation practices which are currently considered viable, including: <ul style="list-style-type: none"> ▶ Increase use of prefabricated and modular designs. Note: Production efficiencies minimise the creation of waste and generation of waste in a workshop environment making reuse and recycling easier. ▶ Consider waste minimisation at the design stage; ▶ Design to suit standard material sizes e.g. wall sheeting; ▶ Choose construction methods that minimise the quantity of material used in housing construction and/or result in reduced volumes of waste being generated; 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▷ Specify products to eliminate the creation of toxic wastes on site e.g. choose physical termite barriers as opposed to chemical termite control treatments; ▷ Explore opportunities to reuse left over materials e.g. plasterboard may be recyclable on site i.e. as a soil conditioner; ▷ Choose materials which have recycled content to support demand for recycling and recycled product; ▷ Include in sediment and erosion control plans, waste management stockpile locations; ▷ Maintain a clean site. Note: A tidy, safe site is indicative of efficient, well managed construction practices; and ▷ Provide a skip or caged area in preference to unfenced piles for storage of waste on site. 	Comments:
Supporting Information	<p><i>Waste management is a difficult area to make inroads into in North Queensland at present.</i></p> <p><i>Improvements in waste management will require incentives including contractual, regulatory and regional coordination. All of which are either not in the direct control of the builders/developers or in the case of introducing contractual requirements – not easy to introduce or enforce on a contract workforce in times of labour shortage.</i></p> <p><i>In regards to waste prevention/minimisation, the practices of trades and contractors have a big impact on the amount of waste generated. Typically labour costs are higher than material costs which is a disincentive for practices that increase labour time in avoiding material waste.</i></p> <p><i>There is also a limited availability in North Queensland of recycling services for different categories of waste e.g. masonry, plastics, wood, steel.</i></p> <p><i>Economies of scale are often absent.</i></p>	
<h2 style="margin: 0;">Energy</h2>		
Key Objective	Include smart meters including in-home energy use displays in all dwellings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▷ Install in-home electricity use displays in all dwellings to facilitate energy efficient behaviour by residents. ▷ Consult the energy retailer (presently Ergon) to ensure selection of a future proof smart metering solution. 	Comments:
Key Objective	Provide for automatic/remote switching off of electricity using devices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▷ Install automatic switching to turn off or reduce electricity used by appliances e.g. light sensors, movement sensors, timers. Note: Cost may be a limiting factor in adopting this. ▷ Install home automation combined with metering and irrigation. For higher-end housing home automation will quite likely provide for synergies in the fields of security, energy services control, irrigation control and data communications capability. Note: Cost is likely a limiting factor for mainstream housing at present. 	Comments:
Key Objective	Design housing to minimise electricity use by air-conditioning	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▷ Prioritise passive design of dwellings to suit our tropical climate with the goal of substantially reducing the need for extensive air-conditioner use for thermal comfort. ▷ Ensure that living spaces in particular are well designed for the climate, and ideally provide at least one living space that is exceptionally well designed for the tropics and to which air-conditioning is not provided. ▷ Design dwellings in 'zones' to enable efficient air-conditioning of some areas at exclusion of others. ▷ Ensure that all air-conditioned zones are well insulated. 	Comments:

Key Objective	Choose high-efficiency air-conditioners and install for maximum energy efficiency	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Choose or strongly encourage the choice of air-conditioning systems with minimum 4.5 star energy efficiency. ▶ Position air-conditioning systems to achieve maximise running efficiency. Specifically, ensure air-conditioning system compressor(s) are not exposed to direct sun and that hot exhaust air is vented away from this or another air-conditioners air intake. ▶ Provide central air-conditioning facilities that are shared between two or more dwellings especially for duplexes and multiple dwellings or otherwise where density allows. ▶ Use third-party service models, a body corporate or shared ownership model for provision of central/shared air-conditioning. Note: For an explanation see Economic Mechanisms Supporting Sustainable Development section of this document. 	Comments:
Key Objective	Choose energy efficient hot water heating	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Install energy efficient hot water heating systems. Note: Solar water heating is considered the most preferable, although heat pump systems and instantaneous gas also significantly reduce greenhouse emissions compared to electric storage hot water systems. ▶ In choosing the type of hot water system, consider synergies e.g. availability of gas infrastructure, cooling effect of heat pumps, etc. ▶ Install shared water heating facilities, especially for higher dwelling densities which make the sharing of facilities more attractive. ▶ Use a third-party service model as opposed to body-corporate/shared ownership model for provision of shared/central hot water heating. 	Comments:
Key Objective	Locate refrigerators for energy efficient operation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Locate refrigerators in well-ventilated locations. ▶ Install vents above and below refrigerators (as practicable); and provide ample space on all sides if built into kitchen cabinetry. 	Comments:
Key Objective	Supply or facilitate installation of energy efficient appliances	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that all appliances pre-installed or otherwise supplied as part of the development achieve an energy efficiency rating of minimum 4-stars. 	Comments:
Key Objective	Provide external clothes lines to all dwellings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure all dwellings have an area of under cover external clothes line to completely eliminate the need for mechanical clothes dryers in tropical climates. 	Comments:
Key Objective	Install infrastructure to enable utilisation of LPG (gas)	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide shared LPG infrastructure to dwellings (as practicable) e.g. from a shared storage tank. This becomes increasingly attractive with higher dwelling densities. ▶ Use a third-party service model (as opposed to body-corporate/shared ownership model) for provision of the LPG (gas) and possibly also the infrastructure linking. ▶ Consider synergies e.g. shared solar-gas hybrid water heating will possibly make gas infrastructure more viable. 	Comments:
Key Objective	Provide gas reticulation to outdoor living spaces	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide reticulation of gas to an outdoor location for BBQ use (i.e. verandah, patio). 	Comments:
Supporting Information	<i>Benefits of external cooking facilities include promotion of outdoor living, and a reduction of indoor heat load.</i>	

Key Objective	Provide a shared swimming pool	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide residents with access to a shared swimming pool. 	Comments:
Supporting Information	<i>Aside from the increased pool-amenity from a larger and better pool, there are considerable efficiency savings in reduced resource and energy use, reduced operational expense etc when compared to individually owned pools.</i>	
Key Objective	Provide areas of north facing roof for present or future installation of photo-voltaic (PV) panels for solar electricity generation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Include in building designs, north-facing roof space tilted at latitude angle (19° in Townsville/Thuringowa) to allow (future) installation of solar equipment (e.g. photo-voltaic (PV) energy generation system or solar hot water systems). ▶ Alternatively, provide other accessible (i.e. flat) roof space for future installation of solar energy systems. ▶ Ensure that roof structures suitable for future installation of PV are sufficiently strong for installation of Photovoltaic Power (PV) Systems and solar hot water systems without further re-enforcement or structural changes. ▶ Encourage householders to access grants for inclusion of photovoltaic power (PV) systems in new homes. ▶ Lobby for grants for installation of photovoltaic power (PV) systems to be made accessible to developers. ▶ Use a third-party service model for installation of PV (photovoltaics). Note: This may also make a significant difference (i.e. improvement) to the cost viability of PV installation. 	Comments:
Supporting Information	<p><i>Inclusion of PV (photovoltaic) systems is presently (2007) considered too large an expense to include as a standard option in cost competitive mainstream housing (even with an \$8000 rebate on a 1kW system (sufficient to service 1/3rd of the energy of a standard home in a grid connect configuration).</i></p> <p><i>The high upfront cost outlay is especially difficult to justify given the exceptionally long payback period to the homeowner, currently of the order of 20+ years.</i></p> <p><i>The cost scenario for home PV installation may however change rapidly in only a short time (due to regulation, economies of scale, carbon trading, pricing incentives for resale of electricity to the grid) so a reinvestigation into the viability for installation of a percentage of domestic electricity supply from solar at the time of development design/construction is suggested.</i></p>	
Key Objective	Explore the opportunity to utilise and/or demonstrate wind or solar power generation within the development	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Include a community or local government owned/maintained micro wind/solar power generation as a demonstration and community reminder of the importance of utilising renewable energy. Note: Cost will be a limiting factor, but low cost opportunities may exist. ▶ Demonstrate the use of solar power within the development as viable, e.g. solar powered public lighting, access path/house number lighting, solar powered pump for water feature, photo-voltaic (PV) pool chlorination system. ▶ Provide (some) solar lighting for landscaping and/or public lighting (as a demonstration, if not viable for all). 	Comments:
Key Objective	Seek carbon credits or have a goal of creating a carbon neutral development	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Explore opportunities to receive carbon credits in return for above average energy/greenhouse efficiency within the development. ▶ Seek recognition for the carbon offsetting properties of vegetation corridors included or developed in association with the precinct. 	Comments:

Key Objective	Review material selection and choose materials for reduced embodied energy and lifecycle impacts	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Explore and implement feasible opportunities to reduce the use of energy embodied in materials utilised in the development. ▶ Review proposed designs/materials choices and identify and implement at least some practices that will reduce the embodied energy and lifecycle impacts of the development. Consider: <ul style="list-style-type: none"> ▷ transportation/sourcing locations; ▷ potential for modularisation; ▷ use of prefabricated materials; ▷ designing for compactness; ▷ measures taken to reduce material consumption; ▷ sourcing of materials that are recycled or have recycled content; and ▷ ongoing maintenance requirements, re-use/disposal at end use. 	Comments:
Water		
Key Objective	Use demand management approaches to reduce water consumption across the project as a whole and of individual dwellings	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ As a priority, design and provide incentives for water efficient landscaping and irrigation systems to minimise water used externally – both within the precinct and on private property. ▶ Facilitate the installation of water efficient appliances (minimum 4-star) e.g. washing machines and dishwashers e.g. negotiate special bulk deals for builders and/or homeowners with local suppliers. ▶ Choose, as practicable, plumbing fittings (e.g. tap ware, showerheads, toilets) that have water efficiency standards that exceed minimum regulated standards. Note: Building regulations currently require 3-star water efficient (showerheads) and dual flush toilets. ▶ Install water efficient taps. ▶ Install 4-star toilets (i.e. 3L half flush/4.5L full flush). ▶ Choose ceramic in preference to washer tap fittings to minimise leaks. ▶ Use third party service models to provide and maintain water efficient, well maintained plumbing services. ▶ Encourage water efficient household practices including for example, sound irrigation practices, sweeping rather than hosing driveways and paths, and the use of a bucket or waterless methods for carwashing. 	Comments:
Supporting Information	<p><i>Typical domestic water use is found to be 500-600L/day/person or around 500kL/year/household.</i></p> <p><i>Approximately half of domestic water use is used for garden watering.</i></p> <p><i>Highest internal uses of water include clothes washing, showering and bathing, toilet flushing (if not dual flush), leaking taps, cisterns and dishwashing.</i></p>	
Key Objective	Supply or facilitate installation of water efficient landscaping and irrigation	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure that landscaping and irrigation systems provided in both public, shared and private areas are water efficient. ▶ Implement measures to reduce water used for both private and public landscaping by at least 50%. ▶ Whilst recognising the aesthetic and other benefits of lawn, prioritise minimising areas of lawn. ▶ Ensure that covenants do not mandate water intensive landscaping practices e.g. extensive areas of lawn. ▶ In all landscaping, do not use lawn as the 'default' feature for the landscaping. ▶ Install rain-sensors and soil-moisture sensors to improve efficiency of irrigation systems. Note: Cost may be a factor. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide incentives for the installation of water efficient private landscaping. Specifically provide financial incentive to decrease areas of lawn, increase areas of mulched garden beds and shade and information to facilitate choice of water efficient lawn and plant species. 	Comments:
Supporting Information	<p><i>Water efficient landscaping and irrigation provides a significant opportunity to drastically reduce water consumption at both a household and whole of development level.</i></p> <p><i>Water use for private landscaping typically constitutes 50-60% of the average North Queensland household's annual water consumption. Water use in public landscaping is often also significant.</i></p>	
Key Objective	Provide for reuse (or future reuse) of greywater	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Install plumbing to enable diversion of untreated greywater from dwellings for use in landscape irrigation. ▶ Consider the immediate reuse of greywater (untreated) from the shower and laundry as an existing viable option in North Queensland. ▶ Install plumbing installations that allow conversion for future permitted treated or untreated greywater reuse scenarios, e.g. flushing toilets. 	Comments:
Key Objective	Consider the use of non-potable water for irrigation purposes.	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider the use of non-potable water (including borewater or recycled effluent) for irrigation purposes. 	Comments:
Key Objective	Ensure water recycling efforts are justifiable considering embodied energy	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider and justify, the embodied energy, and hence greenhouse gas emissions resulting, from the treatment, pumping and provision of infrastructure required to enable the use of rainwater or reuse of greywater or blackwater. 	Comments:
Key Objective	Consider rainwater reuse but ensure benefits justify the cost	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ If exploring scenarios for under which rainwater collection and use could be justified for dwellings or development precincts in North Queensland, ensure that the design and installation of rainwater collection infrastructure includes inherent hydrological head (e.g. elevated storage) to minimise/eliminate a need for pumping. 	Comments:
Supporting Information	<p><i>For a number of reasons including inconsistency of rainfall in North Queensland (leaving the rainwater tank, empty for significant periods of time) and also the excessive cost associated with achieving sufficient storage capacity for tropical North Queensland rainfall patterns - rainwater collection is generally not considered a cost effective nor efficient strategy for conserving water in North Queensland.</i></p> <p><i>It is probable that potential water savings resulting from rainwater capture and reuse in North Queensland are not justified on account of the greenhouse impact in cases where electric pumping of the water is required to enable reuse.</i></p>	

Natural Resource Management		
Landscape analysis		
Key Objective	Recognise and elevate the value of biodiversity, habitat, trees, landscaping and natural processes in urban environments	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Identify, recognise and promote the benefits that biodiversity, habitat, trees, landscaping and natural processes provide. ▶ Undertake measures to elevate the importance of natural resource management criteria in urban design processes. ▶ Ensure engineers and urban designers work in close collaboration with natural resource managers to enable utilisation of natural processes to benefit infrastructure and achieve optimum ecological outcomes. 	Comments:
Key Objective	Provide adequate budget to achieve effective landscape outcomes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In recognising the value of landscaping in its fundamental role in providing both environmental services (soil, water, plants, animals), aesthetic benefits and a supportive environment in which to live, increase the budget allocated to landscaping. ▶ Allocate either a % of total spend, a \$/m² or allocation per lot to soft landscaping for both public and private areas. At a minimum allocate at least \$7000 for design and soft landscaping per lot. ▶ Provide assurance and ensure that the landscaping budget will be preserved (i.e. not undermined by over expenditure in other areas). 	Comments:
Supporting Information	<i>The industry standard soft/hard landscaping budget for a standard lot is typically \$5000-\$7000. Ideally for a \$400K house, 5% or \$20K is desired for soft landscaping alone.</i>	
Key Objective	Seek to minimise the impact of population increases on natural environments	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Design consolidated and compact built areas. ▶ Minimise segmentation of areas designated to accommodate nature and natural processes 	Comments:
Key Objective	Undertake landscape analysis early in the planning process	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Elevate the importance and early undertaking of landscape analysis so as to enable findings to be incorporated into and guide early subdivision and infrastructure layout concept designs. ▶ Include in the landscape analysis: topography, water courses and drainage lines, flooding potential, view-lines, climate analysis (including wind, solar projections, rainfall, likelihood of extreme climatic events), soil analysis, existing vegetation (including locations of strategic habitat corridors, existing or potential fauna use, past or present anthropogenic uses), including indigenous or post 'European' settlement. ▶ In undertaking the landscape analysis consider the site not only at a local level but in the context of the larger catchment and its natural functions. ▶ For indigenous heritage, align actions in relation to risk/opportunities, e.g. cultural heritage significance is more likely in the vicinity of rivers, creeks, beaches, ridgelines, and hill tops. In areas of high risk/opportunity, consult with specialists in cultural heritage. 	Comments:
Supporting Information	<p><i>Early Landscape Analysis enables the landscape to inform the overall design which in turn maximises possibilities for good outcomes for natural systems e.g. habitat, natural drainage lines, soil erosion and tree protection.</i></p> <p><i>Relevant information to support landscape analysis investigations may be available from: Ecosystems Regional Maps (DNR); Vegetation Maps (DNR); Queensland Vegetation Act; sections of the local area IPA Planning Scheme including: Natural Areas Maps (shows identified habitat corridors), local laws on vegetation protection, City Landscape Strategy, City Landscape Policy, Visual Amenity Maps (shows view lines), Acid Sulphate Soil Maps, and references within the Planning Scheme referring to other guidelines and regulations; Regional Soil Maps (DNR); climate data and analysis (Bureau of Meteorology); local fauna & flora studies (local Council); lists of recommended, inappropriate and declared weeds in the locality (local Council); sites of cultural significance (local Council - Local Heritage Officer); Indigenous bodies (local Council).</i></p>	

Key Objective	Ensure that landscape analysis informs the development design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Undertake a comprehensive landscape analysis in advance of (initial) design. ▶ Adopt a collaborative, multi-disciplinary approach to the design development process. ▶ Ensure that landscape analysis informs the development design. ▶ Ensure that the proposed methods of development are suitable for the site. ▶ Consider water sensitive urban design, sediment and erosion control, habitat corridors, view lines, and appropriate infrastructure and building forms as responses to the landscapes present. ▶ Ensure that the landscape analysis informs the landscape plan. ▶ Ensure that flora and fauna present on the site guides the location of habitat corridors and connections. ▶ Undertake a vegetation survey prior to design development. ▶ Ensure that space is provided (either existing or new) for native species/vegetation retention e.g. designate building envelopes, provide wider road reserves and/or open spaces (e.g. parks, drainage reserves, waterways, foreshores, pedestrian links). ▶ Provide areas of habitat, ideally with a relationship to identified regional habitat corridors that are useful (i.e. provide food/shelter) to local fauna. Consider endemic species, species reintroduction and also species whose presence contributes to human enjoyment e.g. birds, butterflies, lizards. ▶ Consider providing signed crossing points and/or tunnels to provide fauna corridors across roads. ▶ Ensure particularities of the site related to soil and erosion potential are incorporated into the design of the development. ▶ Encourage Council to require vegetation surveys and landscape plans for Material Change of Use applications (e.g. via Planning Scheme amendment) to indicate protection areas and links to other corridors in the early stages of design development. 	Comments:
Supporting Information	<p><i>Refer to the Planning Scheme for major identified habitat corridors. Investigate the availability of other habitat studies in the region.</i></p>	

Habitat

Key Objective	Conserve, create and protect habitat corridors	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide space for habitat retention – minimise the built form footprint, incorporate (wider) road reserves, and utilise habitat and drainage corridors, recreational and other open space for habitat provision. ▶ Create vegetation and wildlife corridors in association with water courses, drainage corridors. ▶ Provide corridors at an appropriate scale to provide a habitat benefit. ▶ Minimise interference with the course of creeks and natural drainage courses. ▶ Balance the needs of infrastructure service corridors with habitat corridors and facilitate dual use corridors through considered block placement. Note: Engineers and urban designers to collaborate with natural resource and landscape specialists to achieve optimum design outcomes (for both). Consider upfront and long term practicalities and implications (for both). ▶ Enhance biodiversity through revegetating open-space corridors i.e. habitat corridors, drainage swales, creek lines, rivers, watercourses, play spaces, with appropriate indigenous species. ▶ Create corridor connections that utilise private as well as public spaces e.g. establish corridors that abut fences of private properties. Encourage continued use of appropriate plant species in private landscaping. ▶ Retain significant trees e.g. >15m i.e. raintrees, river gums, and other eucalypts. Note: In North Queensland, it is more important to retain vegetation stands and corridors than individual trees. ▶ Encourage local government to consider introduction of regulatory measures to strengthen ability to retain existing vegetation corridors. 	Comments:

Sediment and erosion control		
Key Objective	Prevent sedimentation of water courses	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Minimise and selectively time periods of soil/ground disturbance i.e. avoid soil disturbance immediately prior to the wet season. ▶ Delay site clearing for as long as possible to minimise long periods of unstable soil exposure, e.g. undertake staged and delayed clearing practices. ▶ Retain existing vegetation (i.e. minimise or delay clearing) to improve stability and minimise need for artificial sediment control measures. ▶ Use stabilisation methods that are more extensive than a small strip of turf to prevent sediment losses to roads. ▶ Take appropriate and adequate measures to ensure sediment from development disturbance and building sites is prevented from entering water courses. 	Comments:
Key Objective	Control dust	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Delay site clearing for as long as possible to minimise long periods of unstable soil exposure, e.g. undertake staged and delayed clearing practices. 	Comments:
Key Objective	Developers to be accountable for upholding Sediment and Erosion Control related to their development site	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Develop and submit a sediment and erosion control plan/strategy at the approval stage of the subdivision. ▶ Developer to take responsibility for ensuring that the 'development scale' sediment control plan/strategy is ongoingly implemented and managed so as to ensure 'no sediment leaves the site'. ▶ Developers to take responsibility for ensuring that good sediment control is upheld by all third parties operating with the development including in relation to individual building sites. ▶ Developer to promote clean site/safe site principles to be practices to be adopted for all work undertaken on the development site. ▶ Develop to inform home buyers of their rights and responsibilities in relation to the sediment and erosion performance standards that are required to be achieved on development/building sites, including their home site after they take possession of it. 	Comments:
Key Objective	Builders to be responsible for managing sediment and erosion control related to their building site	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure an adequate sediment control plan, specific to the individual lot (if necessary), is developed and submitted as part of the building approval process. ▶ Builder to ensure that the sediment and erosion control plan is implemented and upheld by all sub-contractors working on the building site so as to ensure 'no sediment leaves the site. Site supervisor to enforce. ▶ Install downpipes connected to the street stormwater system or alternative temporary measures immediately following installation of the roof to prevent scouring. ▶ Utilise existing vegetation (i.e. minimise or delay clearing) to improve stability and minimise need for artificial sediment control measures. ▶ Ensure stabilisation of blocks at handover to homeowner. ▶ Ensure that homeowner is aware of their ongoing responsibility in relation to soil and erosion control. 	Comments:
Key Objective	Local Government/Regulators to support builders, developers and homeowners in adopting good erosion and sediment control practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Call for clear lines of responsibility in relation to the provision of consistent advice. ▶ Call for sediment and erosion control guidelines and training information to be made easily obtainable, ideally from a single location. ▶ Call for clarity and consistency in relation to the regulatory enforcement of breaches. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage local government to consider providing educational audits of development/building sites as a preventative enforcement practice. Seek to create a cooperative approach between the enforcement officer and developer/builder including agreement for practical, site specific sediment and control practices. Note: Consider use of an Environmental Health Officer as enforcement/education officer. Ensure enforcement officer is appropriately trained e.g. has undertaken 5-day sediment and erosion course. ▶ Call for the introduction of a planning scheme condition/policy that makes developers accountable for all sediment and erosion occurring on their development site. 	Comments:
Key Objective	Appropriately manage contaminated and/or acid sulphate soils	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ For contaminated soils refer to the Land Protection Act. ▶ Identify areas associated with Acid Sulphate Soils. 	Comments:
Supporting Information	<p><i>Refer to Acid Sulphate Soil Maps in planning scheme for likely locations.</i></p> <p><i>Refer to technical standards for management of acid sulphate and contaminated soils.</i></p>	
Key Objective	Adopt good soil retention, storage and improvement practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Employ good soil retention and storage practices including appropriate stockpiling methods, native seed preservation, weed control, microbial enhancement. ▶ Consult a soil scientist with the objective of adopting practices that will enable reuse and improvement of soil on the site. Process will involve basic soil test to ascertain soils on the site and then removal of soil as required for stockpiling in a location where it can be left until use. Note: Everytime you move soil the soil structure is damaged, adopt appropriate practices for stockpile height, adding organics, and microbes. ▶ For importation of fill, use certified fill suppliers. ▶ In particular take care to avoid importation of soils contaminated by declared weeds. 	Comments:
Supporting Information	<p><i>Contact Greening Australia North Queensland for guidance on good soil stockpiling procedures.</i></p> <p><i>Certified suppliers of fill should be able to provide certification certificates for the fill.</i></p>	
Key Objective	Minimise or avoid cut and fill practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Call for the introduction of planning scheme policies that discourage cut and fill practices. ▶ On sloping sites explore housing types/designs to reduce/avoid the requirement to cut and fill. 	Comments:
Supporting Information	<p><i>In majority of cases, slab on ground construction will be the cheaper construction option. A benefit to the home owner of raised construction however is enhanced ventilation to the house.</i></p>	
Landscape design		
Key Objective	Utilise landscape design to improve the relationships between public and private spaces	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use landscaping to improve views and vistas from both public and private spaces. ▶ Utilise CEPTED (crime prevention through environmental design) landscape design principles to provide an overall sense of safety and security in the precinct and to individual dwellings, e.g. maintain clear sight lines. ▶ Use landscaping to create a distinction between private and public spaces e.g. separation. ▶ For boundaries between public and private spaces, use vegetation e.g. garden bed/row of plants/hedge instead of fencing. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ If pets are permitted, use 900mm high enviromesh fences concealed by vegetation on public side. ▶ Seek to integrate public and private landscaping – both in appearance and functionality. ▶ Use attractive and effective landscape design to create active, visible and accessible public spaces and encourage the transition of activities that typically occur in private spaces into the public realm. ▶ Landscape public and private landscaping to accommodate multiple uses (including active uses). ▶ Provide clear lines of sight and strong relationships from dwellings to both private and public outdoor spaces to maximise use of outdoor spaces. 	Comments:
Key Objective	Utilise nature to provide a feel good environment throughout the development	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Prioritise in urban design the inclusion of landscaping features that facilitate incidental (daily) interactions with nature e.g. provide for views/sounds/smells of nature (both distant and in close proximity) - both throughout the precinct and from internal and external spaces around dwellings. 	Comments:
Key Objective	Include art in public landscape design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Enhance public spaces through the inclusion of public art. ▶ Allocate a budget for public art in the overall development budget. ▶ Encourage local participation in the creation of the art. ▶ Position art to maximise ongoing community interaction. 	Comments:
Key Objective	Prioritise creating a cool micro-climate in all areas of the precinct	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Take a collaborative, multi-disciplinary approach to landscape, housing and infrastructure design to prioritise creating a cool micro-climate throughout the development, including around roads, footpaths, public open spaces, and in and around private dwellings. ▶ Adopt practices which seek to minimise heat gain i.e. reducing use of thermal mass materials in unshaded locations and also measures which promote cooling e.g. water and transpiration from plants. ▶ Utilise shade, evapo-transpiration, light-coloured materials, low thermal mass materials to reduce glare, heat gain and heat storage. ▶ Aim to provide a high degree of shade throughout i.e. maximise shading of road ways, pathways, driveways, buildings and soft/hard landscaped areas. ▶ Position and align stands of trees to maximise provision of shade. ▶ Where surfaces are not shaded, avoid or minimise the use of building and construction materials that have high thermal mass (i.e. capable of storing heat). ▶ Use lower thermal mass alternatives (to traditional concrete based products) for paving, driveways, roads and walls in areas which are not shaded to avoid heat retention and re-radiation. ▶ Reduce heat gain by choosing light coloured finishes e.g. for road surfaces, paving, built structures, etc. ▶ Choose materials and colours to minimise glare. 	Comments:
Supporting Information	<i>Creating a cool microclimate can provide a benefit of up to 3 degrees celcius reduction in temperature – which provides a significant improvement in human comfort in the tropics. The benefits would be experienced in both internal and external environments.</i>	
Key Objective	Utilise landscape design to create a cool microclimate and to promote indoor/outdoor living	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ As a first principle, address shading of buildings through appropriate design and orientation of the built form as this is a highly effective way to achieve shade of dwellings e.g. N-S facing terrace rows (self shading), appropriate positioning of utility spaces (e.g. bathrooms, carports, garages, storage areas to the west), eaves and verandahs and vertical screening. ▶ Provide temporary shade structures whilst trees become established e.g. shade sails. ▶ Design landscaping to augment hardstand infrastructure in shading dwellings and landscaped areas. Note: Pay particular attention to providing shade from western sun. 	Comments:

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Design landscaping to deliver microclimate benefits i.e. cooling via evapotranspiration from leaves. Note: Substantial improvements in thermal comfort can be achieved. ▶ Plan lot layouts and building envelopes to enable planting of appropriate trees within private property boundaries. ▶ Encourage positioning of dwellings on lots to allow space for planting of trees and provide guidance in appropriate locations for trees. ▶ Implement measures to ensure that trees on private property are best able to become established and that measures are taken to prevent/minimise damage from roots or other. ▶ Utilise root barriers 600mm - 1m deep to allow placement of trees in closer proximity to buildings and infrastructure. ▶ Implement measures to provide consistent moisture levels to tree to help prevent invasive roots. ▶ Use trellises – freestanding or other to provide both shade and microclimate benefits. Note: Design trellises to enable air-circulation flow through or behind the trellis. ▶ Utilise water features and lush plantings adjacent high use areas. ▶ Use plantings adjacent openings from indoor spaces to minimise glare (e.g. adjacent patios, outside windows). ▶ Utilise a range of plants (high, medium, and low) and shade structures to create low glare outdoor spaces. ▶ Design external landscaping to relate to both internal and external living spaces and to encourage occupants to utilise external living spaces. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Seeking to shade dwellings with vegetation can be problematic because of issues with building approvals at time of time of construction, required distances of trees from slab on ground dwellings (root invasion, cyclone damage), time taken for trees to grow to provide shade, sufficient space on lots to allow placement of larger trees, maintenance issues associated with leaves in gutters.</i></p> <p><i>Enhancing outdoor living spaces with landscaping capitalises on North Queensland's lifestyle/climate.</i></p> <p><i>Consider wind directions in locating trees - in relation to stability.</i></p> <p><i>One of the reasons we have grass is glare. By eliminating glare, other landscape finishes become more desirable e.g. paving, gravels, mulches.</i></p>	
<p>Key Objective</p>	<p>Maximise provision of shade trees in streetscaping and public spaces</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Maximise provision of shade trees in streetscaping. ▶ Utilise design tools e.g. software programs to achieve best shading outcomes with regards to tree spacing, shadow lines and lines of sight. ▶ Review service locations in relation to tree placement and consider alternative solutions to achieve best all round outcomes. ▶ Select powerline friendly street trees. Note: Overhead powerlines are not generally present in new developments. ▶ Develop swale designs that enable planting of shade trees and other landscape features immediately adjacent and within the swale. ▶ Work together with stormwater engineers to overcome conflicts with planting trees in swales and achieve optimal cross-disciplinary outcomes. ▶ Provide root barriers as necessary to trees planted near to/in swales. ▶ Utilise the opportunity provided by large public spaces to introduce larger shade trees into the precinct. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Provision of shade trees to streetscapes has multiple benefits including views of trees from the properties, treelined streets raise property values, shading to road reduces heat radiation, shading to footpaths improves walkability and a comfortable space for casual community interactions, evapo-transpiration from trees cools the microclimate along the street directly benefiting neighbouring properties.</i></p> <p><i>There is typically 3.6m of verge of which 0.9m closes to property is services, 1.5m is footpath and remainder closest to the road is tree space. There are however different schools of thought on placement of service trench i.e. closest to boundary or closest to house.</i></p> <p><i>Refer to Ergon Energy Smart Plant Street Trees lists for appropriate trees to plant under powerlines.</i></p> <p><i>Tree roots are considered to jeopardise long term maintenance and performance of swales.</i></p>	

Key Objective	Utilise best practice research to promote healthy growth and establishment of shade trees with minimal disturbance to nearby infrastructure	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Apply best practice soil improvement and planting practices to promote healthy growth and establishment of street/shade trees in North Queensland conditions. ▶ Ensure adequate shade is provided at public transport collection points and along public transport and other pathways. ▶ Provide built or natural shade to public transport collection points and pathways. 	Comments:
Supporting Information	<p><i>Refer specifically to shade/street tree planting practices developed by Julie Roach, Parks Services, Townsville City Council.</i></p> <p><i>There is a cost associated with this kind of plant preparation but the benefit is a healthy full canopy shade tree once established. The method is applicable for both private and public space (shade) trees.</i></p> <p><i>In overview, the planting preparation involves improvement of 4 cubic metres of soil, the installation of a substantial root barrier and the application of a permeable surface treatment/pavement to allow water infiltration.</i></p> <p><i>Soil enhancement involves e.g. porous fill, gravel, special soil mix.</i></p> <p><i>The shape of this 4 cubic metres need not be square, elongate is fine however need to consider effect of wind directions on tree stability.</i></p>	
Key Objective	Ensure landscape design supports transportation alternatives	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Ensure landscape design incorporates adequate access for pedestrians, bicycles, motorised bikes and cars. ▶ Provide signage for pedestrian and cycleways. ▶ Provide bike parking as an integral part of the landscaping design. 	Comments:
Key Objective	Reduce the risk of damage from cyclones, strong winds and fire	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Choose appropriate plant species and adopt planting measures e.g. stabilisation and alignment to reduce damage from trees in cyclones and high winds. ▶ Incorporate measures to reduce the risk of fire hazard at the scale of the subdivision rather than at the scale of individual lots (which can result in requirement for excessive buffers and habitat segmentation and removal). ▶ In areas of high fire risk (as identified in the Planning Scheme), choose fire retardant species for plantings around dwellings. ▶ Ensure access for emergency services and water is considered and provided. 	Comments:
Supporting Information	<i>Refer to Queensland Fire & Rescue Service Road Access Guidelines.</i>	
Key Objective	Use a mix of indigenous, native and introduced, primarily low water use plant species and a variety of landscaping styles to create highly attractive, consumer friendly landscaping	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Develop a species mix that has an increased proportion of attractive indigenous, non-local native and exotics which are primarily low water use species for use in public and private landscaping. ▶ Ensure that landscaping is attractive and consumer acceptable. This is critical. ▶ In recognising that the North Queensland area has a limited number of attractive indigenous native plant specimens commercially available, the use of local natives is encouraged but not prescribed. ▶ For consumer acceptance, consider replacing traditional garden species with similar looking native or low water use species and use in a similar fashion. ▶ Utilise various landscape styles and structures to provide variety in the use of the preferred species and meet a diverse range of consumer landscaping preferences. ▶ Utilise the most attractive, iconic plants in high visibility areas. 	Comments:

Key Objective	Landscaping design to be water efficient	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide water efficient landscaping. ▶ Seek to ensure that both public and private landscaping utilises half the water application rates of 'traditional' North Queensland landscaping. ▶ Key water efficient landscaping measures include: <ul style="list-style-type: none"> ▷ limiting areas of lawn; ▷ choosing water efficient lawn and plant species; ▷ grouping or zoning in specific areas plant species with similar water requirements; ▷ using high water use plants only in strategic locations; ▷ mulching; using soil wetting agents; ▷ shading; ▷ using water efficient irrigation systems and watering regimes; and ▷ considering measures to reduce or offset use of mains water for irrigation. 	Comments:
Supporting Information	<i>Irrigation of landscaping on private properties typically accounts for 50-60% of each household's total annual water consumption. Water efficient landscaping therefore provides an opportunity to significantly reduce residential water consumption.</i>	
Key Objective	Use landscaping to highlight views, natural features and cultural heritage of the site	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Identify and optimise view lines and natural assets of the site. ▶ Consider the history of the site and incorporate heritage elements into the overall landscape design. 	Comments:
Key Objective	Support iconic and indigenous flora and fauna in landscaping	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Create an (unique) identity for the precinct through the choice of a landscaping style that highlights species endemic/iconic to the area. ▶ Identify and use iconic flora species in landscaping. ▶ Identify iconic fauna species and seek to provide suitable habitat areas within the precinct. ▶ Showcase landscaping (in both public and private spaces) that includes varying percentages of indigenous, native and introduced plants and grasses. ▶ Include food producing plants in landscaping – both introduced and indigenous bush foods. 	Comments:
Key Objective	Elevate the image of native gardens	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Showcase attractive garden styles that utilise native and low water use plants. Ideally include landscaping examples with varying percentages of local native, non-local native, and exotic species. ▶ Incorporate habitat supporting and food plants in the plant species mix. ▶ Use signage or other to draw attention to and raise awareness of special landscape features e.g. presence of edible plants. ▶ Inform homeowners/residents of the plants utilised in the precinct/their landscaping to promote ownership and encourage appropriate care. 	Comments:
Key Objective	Incorporate CEPTED (safety/security) and universal design (accessibility) principles in landscape design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider the implications of pervious paving particularly of pathways on accessibility within the precinct. 	Comments:
Key Objective	Incorporate permaculture principles in landscaping practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Adopt permaculture principles in landscaping practices i.e. minimise the use of chemicals in the landscape; take a preventative approach to weed management; use resources efficiently, maximise re-use and recycling of materials and minimise waste. ▶ Minimise introduction of toxic chemicals into the natural environment. 	Comments:

<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Maximise reuse of materials already present on the site. ▶ Preferentially choose landscaping materials with recycled content. ▶ Consider the quantity of imported materials utilised for landscaping. ▶ Utilise vegetation cleared from the site for mulching (if practicable). ▶ Minimise exportation and importation of fill through appropriate stockpiling of soil recovered from the site for later reuse. ▶ Explore the potential for reuse of any interesting materials present on the site. ▶ Use recycled materials or materials with recycled content in landscaping ▶ Specify gravels made from recycled concrete rather than newly quarried gravel (tumbled recycled gravels available from Mark Wells). Note: It is possible to specify the gravel size and is commonly cheaper than quarried gravels. ▶ Utilise recycled plastic products e.g. bollards, seats, garden edging as practicable. Note: For seats consider composites e.g. steel frame with plastic slats or work with different moulds to achieve attractive seating styles. ▶ Design landscaping for low maintenance and in particular to minimise the requirement for trimming and therefore the creation of greenwaste, e.g. avoid the use of plant species that require regular pruning e.g. hedges and minimise the use of plant species that drop leaves extensively unless there are suitable surfaces underneath to avoid need for removal of shed leaves. ▶ Provide areas under and around trees that are compatible with leaving leaf litter insitu (thereby avoiding raking/removal). ▶ For common areas, specify use of a mulching mower to minimise lawn clipping waste. ▶ Recycle greenwaste if possible. Note: Generally greenwaste recycling is more easily achieved via a regional recycling facility rather than onsite. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>The upfront price of choice of using recycled product likely to be an issue e.g. edging is \$38 per metre compared to \$15 per metre, however there are savings in that typically timber bollards/edging require replacement after 7 years.</i></p>	
<p>Key Objective</p>	<p>Incorporate a community garden</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Set aside an area for horticultural purposes i.e. for growing food/flowers. 	<p>Comments:</p>
<p>Supporting Information</p>	<p><i>Providing residents with a shared/community garden area for produce production meets a potentially unmet need of people living in medium density developments.</i></p> <p><i>Issues in the success of community gardens include time availability and knowledge of residents to operate and maintain the garden</i></p> <p><i>It is possible that wider community involvement in the garden could also be fostered.</i></p>	
<p>Key Objective</p>	<p>Foster and encourage successful plant selection, planting, establishment and maintenance of landscaping</p>	<p>Yes / No</p>
<p>Suggested Solutions</p>	<ul style="list-style-type: none"> ▶ Design landscaping to minimise the ongoing cost of maintaining public, shared or private landscaping. ▶ Use preferred plant species lists to guide plant selection in public and private landscaping. ▶ Utilise guidelines for sustainable landscape design (including species selection, how to create different looks i.e. structured and non structured gardens, and successful planting, establishment and maintenance methods). ▶ If guidelines for best practice landscape practices are not available for local conditions, encourage Council/others to create some. ▶ Utilise raised beds to ensure plant success. A minimum of 300mm is required. Note: Raised beds elevate plant roots above waterlogged soils during the wet season. 	<p>Comments:</p>

Key Objective	Increase resident knowledge of how to look after their gardens	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Promote preferred plant lists and sustainable landscape design guidelines to (new) residents to raise consumer awareness and market acceptance for preferred local landscaping practices. ▶ Provide a welcome booklet to support homeowners/residents understand what plants have been used, how to maintain the plants/landscaping, which species attract birds and butterflies, what benefits have been sought to be delivered in the garden design and also the desired watering regime. ▶ Coordinate workshops where residents can learn more about both the public and private landscaping provided and to support residents in looking after their landscaping/gardens. Note: Increasingly people lack an understanding of how their gardens work/thrive and consequently many people don't know how to look after their gardens and are 'scared' of mucking up their garden. ▶ In establishment of gardens (low water use gardens, in particular) provide assistance in getting the garden established. Note: Many people over-water drought tolerant gardens. Better results are achieved if the plants are initially stressed to make them hardy. ▶ Install water sensors e.g. in public areas to show and educate residents of the different water use needs in different garden zones. 	Comments:

Infrastructure

Stormwater management and water sensitive urban design (WSUD)

Key Objective	Demonstrate water sensitive urban design practices	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Undertake water sensitive urban design with the goal of working with nature and natural systems. ▶ Provide assurance that engineers and natural resource managers will work collaboratively to achieve cooperative outcomes. ▶ Maintain natural drainage corridors (including vegetation buffers) in water sensitive urban designs. ▶ Prioritise treating the first flush, e.g. through diversion measures e.g. to an offline bio retention swale or similar to capture and treat the first flush. 	Comments:
Key Objective	Seek to provide stormwater management solutions that are appropriate for the landscape (pre and post development) and that mimic natural processes	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In the design of stormwater management solutions, ensure that existing catchment characteristics (i.e. slopes, catchment size, runoff co-efficients) and soil structures (i.e. erodability, presence of dispersive soils, acid sulphate soil potential, potential to sustain vegetation coverage) are considered. ▶ Ensure WSUD solutions are aesthetically appropriate to adjacent post-development landuses. ▶ Incorporate bio retention systems in stormwater management designs to remove nutrients from stormwater. ▶ Bio-retention techniques could include: open swale drains, permeable drain inverts, permeable road, driveway and pathway pavements, wetlands. ▶ Promote sedimentation and water polishing prior to discharge of stormwater into conventional drainage infrastructure, creeks, rivers or the reef. ▶ Maximise use of soft solutions i.e. unlined drains for stormwater runoff corridors to assist with infiltration and polishing of stormwater runoff. ▶ Soft solutions could include: existing creek profiles, open parklands, table drains, swale drains, wetlands, sedimentation basins. ▶ Improve infiltration through the installation of soakage trenches filled with a permeable material e.g. sand/gravel at low points in the drain. ▶ Provide sedimentation settling ponds if site permits. ▶ Enhance nutrient removal through use of harvestable vegetation. ▶ Where sedimentation settling ponds are impractical, slow flow velocities through inclusion of meandering low flow invert alignments as opposed to straight drains to promote deposition of suspended solids. ▶ In cases where, above ground stormwater flow is unachievable, use of perforated subsoil pipe systems within soakage trenches to enable onsite stormwater infiltration to minimise overall stormwater runoff volumes discharged from the site, e.g. slotted PVC, slotted RCP. 	Comments:

Supporting Information	<i>For specific guidance refer to the Water Sensitive Urban Design Guidelines for South East Queensland Version 1 - June 2006, produced by Healthy Waterways</i>	
Key Objective	Work collaboratively to design swales and other WSUD structures that will satisfy desired engineering, ecological, landscaping, urban design, accessibility and other desired criteria and that are optimal for local conditions	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Given the tropical rainfall patterns of North Queensland, design water sensitive urban design structures to treat minor rainfall events (i.e. enable treatment of the first flush) and safely convey major events. ▶ Ensure that the design of water sensitive urban design structures e.g. swales and bio-retention basins can be justified on ecological grounds. In particular, consider whether swales are being over engineered and whether they are really achieving their purpose of providing an enhanced environmental outcome, particularly if the result is an unshaded grass swale devoid of trees and other vegetation. ▶ Trial new water sensitive urban design solutions in an arrangement with the Council. ▶ In designing swales consider: hydraulic capacity, water sensitive urban design purpose, potential for utilisation of swale for parking, vehicle access to properties, location for wheelie bin collection, pedestrian accessibility, provision of habitat and support for biodiversity, shade of public space, efficient utilisation of space, aesthetic appearance at different times of year and other desired attributes. Note: Some potentially conflicting criteria include: For pedestrian (universal) accessibility through swale drain cross-fall required to be maximum 1 in 14, whilst for hydraulic capacity and maintenance, swale drain cross-fall to be maximum, 1 in 6. ▶ Consider benefits of providing all weather access to allotments at driveway points e.g. elevated swale crossings incorporating culverts/pipes. Note: Benefits include meeting current community expectations with regard to traversing swales on foot during minor rain events, providing flatter driveway/pedestrian crossing (useful for universal design) and improved retardation of water flows. ▶ Alternately, profile design of driveway points to enable efficient stormwater removal during peak storm flows, thereby minimizing duration of driveway inundation. ▶ If providing WSUD, consider implications of providing parking on the street. 	Comments:
Key Objective	Prevent litter and sediments from entering waterways	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Take measures to prevent solid waste e.g. litter and sediment entering waterways, ideally at source. 	Comments:
Key Objective	Consider permitting larger stormwater events to enter onto privately owned land	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider encroachment of stormwater onto private land within prescribed building setback zones to achieve more efficient use of open space between buildings. ▶ From urban planning perspective for both community interaction and compactness, consider zero or reduced setbacks on swales to reduce the width of the road corridor. Note: In a standard subdivision, from an urban planning perspective a zero setback is undesirable. Articulation is desirable. ▶ Consider easements for drainage on front of properties, would be more palatable to developers and consumers if done with the statement 'in favour of Council'. Note: A problem is that having an easement on a property does not raise the value of the property but perhaps this could be overcome with education. 	Comments:
Key Objective	Encourage retardation of stormwater runoff from private property	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage landscaping of house blocks to reduce stormwater runoff. ▶ The more cost effective measures include minimising areas of impervious paving, maximising mulch (for water storage and soil protection) and maximising tree cover (for interception). 	Comments:
Supporting Information	<p><i>Given the intensity and volume of tropical rain events, significant reductions in stormwater runoff from houseblocks is very difficult/expensive to achieve.</i></p> <p><i>The use of tanks or other vessels to retain water from houseblocks is expensive and difficult to justify for stormwater management in tropical climates (due to the intensity and volume of rainfall events).</i></p>	

Key Objective	Promote the inclusion of vegetation within water sensitive urban design structures, but ensure flow capacities are maintained	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Encourage planting of vegetation within drains but select with a view to minimising impacts on flow capacity of the drain, including low flow scenarios. Preferentially select single, vertical trunked trees with no low foliage. ▶ Take an integrated approach to the design of stormwater drainage corridors to ensure that impacts from the inclusion of landscaping are considered (i.e. that sufficient capacity is provided, debris management). 	Comments:
Key Objective	Ensure drainage swales aesthetically enhance the precinct	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Incorporate multiple uses in areas designated as swales e.g. footpaths, seating, habitat functions. ▶ Consider whether swales can achieve recognition as creditable open space, especially if designed to deliver multiple objectives. ▶ Work collaboratively to overcome the principle of vegetation exclusion zones in swales and prioritise the inclusion of rocks, rubble bars, trees and plantings that will slow the water down and provide enhanced habitat and aesthetic properties. ▶ Landscape swales so that they become an attractive addition to the streetscape e.g. give appearance of dry creek beds, encourage meandering in alignment i.e. minimise use of straight lines. ▶ Specifically address aesthetic issues associated with water sensitive urban design structures in dry tropical zones i.e. extended dry periods. ▶ Select lawn species for swale drains to minimise mowing requirements and provide aesthetic appeal during dry periods i.e. some species require mowing only once every 6 weeks, e.g. zoisier. Refer to COT, Infrastructure Policy on appropriate grass species selection. ▶ Call for the development of a more substantial list of suitable grass species for swales in dry tropics. ▶ Consider merit of irrigating swales during extended dry periods (ideally with non-mains water), particularly for dust suppression and aesthetic benefits. 	Comments:
Key Objective	Minimise the maintenance requirements of water sensitive urban design structures	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Identify measures at the design stage to minimise the ongoing maintenance of water sensitive urban design structures. ▶ Identify who/how these will be maintained in both the short and long-term. ▶ Establish structures for ongoing maintenance. ▶ Consider the use of temporary protection measures (including vegetation) in advance of construction of final water sensitive urban design structures to minimise negative impacts on the ongoing performance of the swale resulting from sediment collection during the construction of housing in the precinct. ▶ Consider extending maintenance period of swales until development is built out. 	Comments:
Key Objective	Remove the need for traditional subsurface stormwater drains to free up verges and enable sufficient space for planting of street trees minimising adverse impacts on remaining subsurface services	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Incorporate WSUD structures to eliminate the need for traditional subsurface stormwater drainage. 	Comments:
Key Objective	Explore opportunities to reduce stormwater infrastructure costs through alternative inlet configurations	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider inflow nodes that allow water ingress to stormwater drains without traditional pit structures to eliminate entry losses and/or headlosses caused by turbulence at pit locations. 	Comments:
Supporting Information	<i>Benefits include smaller pipe systems and resultant lower initial and ongoing costs, more efficient flow characteristics, fewer blockage points. Concessions will include fewer manual entry points to stormwater pipe systems.</i>	

Roads and access pathways (vehicular & pedestrian)		
Key Objective	Consider the use of pervious road structures for roads and driveways	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ If providing permeable paving, especially in areas with clay soils, ensure that the design seeks to achieve the following goals: (1) maintenance of consistent moisture content in clays to minimise soil movement and (2) temporary retention, store and delayed release of stormwater. ▶ Ensure that subgrade under the permeable paving is able to drain. Note: Particular attention should be paid to areas where cars turn/reverse out as displacement issues can occur here which will require maintenance. ▶ Ensure gradients of structures for temporary containment/storage and release of stormwater have site levels that enable drainage. Note: This is critical. Ideally in larger events, provide for discharge of water from the bottom rather than the top of the retention vessel. ▶ Adopt practices in dealing with stormwater that combine engineering and landscape design approaches to achieve optimal environmental outcomes. ▶ For roads, use a pervious wearing course as an alternative to dense graded asphalt. Consider open graded asphaltic concrete, interlocking pavers, grass pavers, etc. ▶ Use a sub-surface pavement structure to promote infiltration and water polishing, e.g. type 1 gravel, lean mix concrete (no fines), etc. ▶ If using grass pavers, take measures to eliminate dust. 	Comments:
Supporting Information	<i>Clay soils are reactive and an issue for permeable paving in NQ. The only place permeable paving is really suited is on sand.</i>	
Key Objective	Remove kerb and channel where possible	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Install alternatives to tradition sub-surface drainage infrastructure. Priority considerations include minimising initial and ongoing costs and maximising ecological benefits. ▶ Promote the benefits of reducing costs associated with provision of stormwater infrastructure. ▶ Seek agreement for increased prevalence of nuisance flows in exchange for lower initial stormwater drainage costs. 	Comments:
Key Objective	Use lipless driveways for accessibility in precinct	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Use lipless driveway designs to provide accessibility within the precinct. 	Comments:
Supporting Information	<i>Refer to Lipless Driveway Design Guidelines from Redland Shire Council.</i>	
Key Objective	Optimise the location of pathways	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ In locating pathways consider water sensitive urban design objectives, ongoing maintenance issues and accessibility. Options include the following: <ul style="list-style-type: none"> ▷ Option 1: Dual use invert/pathway located at bottom of swale (i.e. invert) Note: The benefit is cost sharing between provision of a concrete lined invert with lower maintenance costs and the provision a pathway that can be used during the dry season, but will be inaccessible following rain; ▷ Option 2: Pathway located on side or outside of swale or meandering within/across swale. Note: The benefit is that pathway is able to be used under a greater number of circumstances, but there is increased difficulty in maintaining a unlined, grass swale; and ▷ Option 3: No pathway provided. Note: This is not a preferred option. The benefit is cost saving but creates pedestrian vehicular conflicts in pedestrian movements through precinct. 	Comments:

Key Objective	Design pathway widths with road profiles to match expected pedestrian usages	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide 1.5m width footpaths to an 'Access Place' i.e. to roads servicing up to 40 lots, and to an 'Access Street' i.e. to roads servicing up to 80 lots. Note: Minimum 1.8m public pathways are preferred for accessibility. ▶ Provide 2.0m width footpaths to a 'Collector Road' i.e. to roads servicing up to 500 lots, and to a 'Trunk Collector' i.e. to roads servicing up to 833 lots. ▶ Provide 2.5m width footpaths to a 'Sub Arterial Road' i.e. to roads servicing up to 1660 lots and 'Arterial Roads' i.e. to roads servicing in excess of 1660 lots. ▶ Provide wider roads with pedestrians and cyclists on edge for small low speed environments. Potentially utilising grass pavements for footpaths. 	Comments:
Key Objective	Construct pathways to minimise trip hazards	Yes / No
Suggested Solutions	▶ Choose pathway materials to minimise trip hazards. Consider use of concrete (preferred); asphalt; soft fall rubber; CTB (cement treated base); bitumen stabilised gravel. Note: Avoid using pavers which are prone to lifting.	Comments:
Lighting of street and public spaces		
Key Objective	Provide energy efficient street lighting	Yes / No
Suggested Solutions	▶ Ensure street lighting utilises cost competitive, energy efficient technologies.	Comments:
Key Objective	Provide public lighting that can be adjusted to match community lighting needs	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide street and/or park lighting with lighting levels that can be reduced when not required i.e. late at night e.g. timers to turn off nominated lighting nodes. ▶ Provide a high level of lighting to parklands and pathways between 6pm and 10pm. ▶ Provide a mix of low level bollard lighting and standard high level street lighting to minimise light spilling onto neighbouring properties and natural habitat. 	Comments:
Key Objective	Promote ownership of public lighting	Yes / No
Suggested Solutions	▶ Provide letterboxes and display of street numbers on lit bollards. Note: Benefits include delineation of public/private property, reduced vandalism, easy property location and perceived ownership of public lighting.	Comments:
Key Objective	Prevent nuisance light	Yes / No
Suggested Solutions	▶ Ensure public and private lighting is directional and minimises impacts on night skies, habitat routes and neighbouring properties.	Comments:
Services provision: sewerage reticulation, water supply, energy (i.e. electricity, gas, other) and telecommunications		
Key Objective	Consider common services corridor easements at the rear of allotments to optimise infrastructure efficiency and overcome access issues	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide 'maintenance vehicle only' service corridors at the rear of allotments to enable use by abutting properties, thereby reducing the physical quantity, ongoing maintenance costs and access issues associated with the provision of essential services to private properties. ▶ If public vehicle access to rear service corridors is permitted i.e. enabling the dual use of the land as a public laneway, consider limiting permitted vehicles to less than 1 tonne capacity to minimise costs associated with meeting required road performance standards. 	Comments:

Suggested Solutions	<ul style="list-style-type: none"> ▶ Eliminate all fencing adjacent or within easement corridors (front or rear) to promote ownership of easements, enable unrestricted access and increase social interaction and community use along easement corridors. ▶ Address access to hydrants by fire fighting vehicles, if water mains are located in rear service corridors. Negotiate reduced setback requirement to property frontages to negate impacts of service corridor easement at rear of properties 	Comments:
Supporting Information	<p><i>Desirable characteristics of a 'maintenance vehicle only' service corridor include: no fencing, provision of a vegetation corridor or shade trees, drainage swales, development of shared public use facilities e.g. parkland, bbqs, children's play areas, meandering shared (i.e. pedestrian/bicycle) pathways.</i></p> <p><i>A benefit of 'maintenance vehicle only' service corridors is the potential for construction cost savings due to reduction in material classes and cover requirements for underground services.</i></p> <p><i>A side benefit of providing rear access to properties is option to park at rear of properties.</i></p>	
Key Objective	Provide universal service connection point at common boundaries	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ For service easements, provide a common service connections/meters location for water, gas, telecommunications, and electrical services. ▶ If service easements are also the main vehicular access corridors to properties, consider inclusion of letterboxes, street numbers, public lighting and rubbish/recycling storage facilities on common service connection points. 	Comments:
Key Objective	Install smart service indicators to facilitate rapid identification of key service points in emergency situations	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Install smart service indicators such as blue markers for fire hydrants. ▶ Provide highly visible street numbering e.g. reflective, or illuminated. 	Comments:
Key Objective	Install third pipe system for non potable/greywater within the house design	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide provision for future connection to community scale third pipe system in locations that would be expensive to retrofit later e.g. within the house slab and walls. 	Comments:
Key Objective	Install exposed service pipework to the outside of houses to facilitate better access	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide external access points for maintenance of services e.g. water main, sewerage, electrical, and telecommunication services. ▶ Design concealed external service conduits into housing designs. 	Comments:
Key Objective	Where topography permits vacuum sewerage system may be appropriate	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Consider alternatives to traditional gravity sewerage reticulation systems. 	Comments:
Supporting Information	<p><i>The advantages of vacuum sewerage systems include increased flexibility in sewerage reticulation layout, minimised trench depths compared to traditional gravity sewerage systems (providing cost savings both initially and for maintenance access) and temporary onsite storage capacity (useful in the event of power outages). Disadvantages are higher running costs and a potential for odour issues.</i></p>	
Key Objective	Consider providing garbage collection from centralised locations	Yes / No
Suggested Solutions	<ul style="list-style-type: none"> ▶ Provide for collection of garbage from centralised collection points in beneficial circumstances particularly to avoid need for wider road widths or provision of garbage truck turning circle locations purely for rubbish collection requirements. 	Comments:

Appendix I

Thuringowa Sustainable Village Project - Marketing Tool #1: “A tool for DESIGNING highly marketable sustainable product”

Marketing Tool #1 has been developed by the Marketing Focus Group in 2007 as part of the Thuringowa Sustainable Village Project for use at the design/product development stage of new dwellings and subdivisions.

Marketing Tool #1 – is a DESIGN guide developed to provide assurance to builders and developers that they can design and produce housing and development product that has both improved sustainability performance and that is different from what is typically available in the mainstream market but with the reassurance that their new product will also be highly market acceptable.

Marketing Tool #2 is targeted at MARKETING and SALES personnel and outlines important concepts, suggested language and other tips for marketing and selling more sustainable homes.

The tools recognise the golden rule of marketing - "to market the benefits, not the specific features. Accordingly the creation of the tools started with a consideration of what BENEFITS people/consumers want/need/look for in a home (see first column of Marketing Tool #1)."

Whilst designed for industry use, Marketing Tool #1 may also be useful for individuals who are considering the design of a sustainable dwelling.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
COST		
Affordability	Buyer settles for less. Buy in less preferred area. Buy less preferred housing layout/style. Optional extras omitted. Purchase based on lower up front purchase cost with little regard for ongoing running and long term maintenance costs.	Provide a design that maintains a housing price point in the range of \$300,000-\$450,000 or priced up to the third quartile of the market operating within. Predominant yet appropriate use of masonry block to keep costs down (e.g. dividing walls between attached townhouses). Dwelling types suited to small lot sizes. Refer to Breakthrough Ideas Report sections on construction cost savings, tropical housing styles particularly terrace dwelling types.
Good capital growth	Buy in desirable location and incorporate features that the current market demands (e.g. 4 bedrooms, double car lockup garage, 2 bathrooms etc.) Buy as cheaply as possible.	Incorporation of design features to 'better' meet the needs wider market i.e. for people of all ages and abilities and the changing needs of households over time, notably flexible, accessible design. Provide dwellings in close proximity and with good access to essential services, public parks (especially for higher density dwellings); low maintenance/lifestyle oriented properties; dwellings with lower running/maintenance costs; dwellings/communities that are unique in the market place; that work in the tropics; and that feel good to live in.
Good value for money	Biggest home possible at the lowest price (typically achieved through lower quality finishes/construction	Incorporation of low cost design elements that enhance sustainability performance of the dwelling/precinct e.g. orientation for reduced heat gain, maximised breeze access and openings aligned for good internal cross ventilation through the dwelling, natural daylighting, smaller interior floor area offset by larger outdoor living areas, compact but more flexible and function design. Limit sustainability inclusions that add additional upfront costs e.g. grid connected solar cells, expensive computer-driven drip irrigation systems, etc.
LOCATION - SUBURB, NEIGHBOURHOOD, STREET		
Access to employment, education facilities & community services including recreation	New low density residential estates on urban perimeters resulting in lack of proximity to services. Expanding urban area and requirements for expansion of civic infrastructure e.g. new roads, sewers, schools, shopping precincts etc.	Infill development. Mixed use development. Urban renewal projects. Medium to high density development (regardless of location). New development occurs close to existing infrastructure and services, i.e. not on urban fringe. The development contributes to improved viability of public transport availability in the location.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
Self-esteem and impress friends and peers	Buy in prestigious suburb. Impressive façade to house. Families typically buy a large detached (separate) home on a large block.	Ensure precinct and homes are impressive-looking. Ensure impressive entrance statement to precinct/facade of the home and high quality estate presentation. Retain familiar aesthetics. Highlight innovative features of the development. Product well branded and positioned as desirable in the market. Promote as a good place to live.
Neighbourliness/Community (A sense of)	Buy in an existing suburb. Buy in an estate that provides support for community development e.g. community activities, community group formation. Buy in a cul-de-sacs. Buy in an estate with lots of other new family homes all together (Note: The dominance of dwellings by garages at the front of the home in most new estates significantly limits the degree of 'community' that actually develops in the street).	Design for 'front living' i.e. both internal and external areas at the front of the home relate to and have good visibility of the street. Active front yards. Carparking on street. Front entry to home not via garage.
Place for children to play	Large private backyard (typically predominantly lawn and minimal trees). Quiet suburban street. Proximity to parks.	Communal play area/playground/recreational facilities - ideally visible from dwelling. Plentiful "pocket parks". Active front yards. Play areas inside/outside or in community areas are visible from living and kitchen areas of the home.
DESIGN OF DWELLING & YARD		
Self esteem/impress friends and peers	Large house with most luxurious appointments affordable, e.g. granite benchtops and spa bath in ensuite. Inclusion of latest trends such as home theatre room with expensive equipment.	Impressive looking building. Impressive entry/streetfront view. Unique tropical design and a home designed to be naturally cool. Upmarket features. Design trends as seen in magazines. Well planned landscaping. Flexible, functional home design suitable for use by people of all ages and abilities including to households changing needs over time e.g. smart/accessible/universal housing design.
Privacy - internally	6 foot fence. Curtains/blinds. Home set back from street/footpath. Choice of a larger block with goal of achieving better separation from neighbours. Separation of living spaces into rooms with solid walls.	External screening (including vegetation) that can see out through but not in so much. Pod style buildings, elongate or two storey floor layout for separation of sleeping from living spaces. Separation of living spaces by open (ventilating) partitions.
Privacy - externally	6 foot fencing. Outdoor living at rear of property. Choice of a larger block with goal of achieving better separation from neighbours.	Partial battening/screening (including by vegetation) to front deck/patio. Light trees for semi concealment from public spaces. Shady trees/shrubs. Tinted windows and window coverings. Considered location/orientation of windows/outdoor areas. Intermittent fencing. Sharing walls with neighbouring properties (ensure good acoustic properties).
Safety - from intruders		Crime Prevention Through Environmental Design (CEPTED) principles incorporated in house/garden design. Elevated house. Line of sight of entries from street. Doors/windows lockable and keyed alike. Ability to see visitors before opening front door. Secure louvres (bars). Traditional security i.e. security doors/window screens. Sensor lighting of all entries. Audible gravel paths. Design that encourages community interaction/knowning neighbours - so can look out for each other. For more see Breakthrough Ideas Report.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
Safety - from injury (residents, guests including children, aged)	Non-slip tiles. Australian safety standards for steps etc.	Step free showers. Minimise steps throughout. Lockable, childproof cupboards for chemical storage e.g. in garage, laundry, bathroom (medicines), other. Tempering valve on hot water system. No toxic plants used in landscaping. Wider corridors. No blind corners. Adequate lighting. Kitchen cupboards with handles that accommodate child locks. Rounded corners on benchtops/furniture. Non-slip floor finishes. Floorplan that allows adults to supervise children while engaging in other activities (e.g. good lines of sight from kitchen to pool or play yard).
Sense of Space/Openess - internally	Open plan design. Large home. Multiple living areas (typically mostly internal).	Open plan living. Rooms that breathe/that are breezy. Rooms that have good relationships (to other rooms indoors and to the outdoors) and hence feel bigger. Light coloured finishes. Natural daylight. Partitions instead of walls. Minimal corridors. Louvre walls/doors internally. Strong connection to outdoors i.e. merging inside and out even if just via view through window. Excellent interfaces between indoor and outdoor living spaces e.g. oversized sliding doors.
Sense of Space/Openess - externally	Larger sized block (800 - 1200m ²).	Eliminate, reduce height or increase transparency of fences. Blur boundaries with neighbours and between public/private space e.g. define boundaries but maintain a consistent landscaping style across boundaries to allow the eye to travel beyond. Utilise built to boundary and reduced setback designs to realise useable outdoor spaces rather than unusable narrow setbacks.
Recreation - Internally (e.g. theatre room, pool room etc)	Dedicated closed in theatre room to provide wall space and minimise light. Dedicated pool room/computer room etc.	Multiple decks/patios for each house (provide at least two alternate outdoor living spaces). Semi outdoor spaces i.e. covered decks used for recreation e.g. pool room/entertaining. Flexible, multi use rooms, e.g. garage doubles as hobby area, bedroom doubles as computer room; communal use games/theatre room, living area can be partitioned off as guest bedroom.
Recreation - Externally(e.g. pool, patio, yard for sports etc).	Lawn area, pool, patio/deck, shed, use of garage as hobby space.	High quality, well designed/integrated shared recreational areas (i.e. managed under a body corporate arrangement) e.g. landscaped communal garden, community/body corporate pool. Community parks, playgrounds, picnic areas etc.
Flexibility in usage - internal	Homes built typically to have minimum four bedrooms with view to having sufficient space to accommodate family/guest needs.	Multi use rooms e.g. bedroom converts to office, garage more a carport and designed for use as recreation/hobby/entertainment space, retractable doors/walls to merge indoor with outdoor spaces, 4th bed/study, two detached living areas not defined as lounge or living, study nooks (either open or able to be closed off) built into other rooms or hallways. Multi use houses e.g. home can be occupied easily but independent adults in a share housing arrangement.
Flexibility in usage - external	Lawn predominantly.	Garden spaces designed for multiple uses e.g. shade to the home and quiet shady space for relaxation. Patios designed for use as primary dining area. External 'rooms' e.g. lounge under covered deck, external cooking station/cupboards.
Integration with nature (positive experiences) (e.g. native gardens, natural lighting, breezeways etc)	Separation from nature - indoor environment distinctly different from external environment.	Garden spaces designed for multiple uses e.g. shade to the home and quiet shady space for relaxation. Patios designed for use as primary dining area. External 'rooms' e.g. lounge under covered deck, external cooking station/cupboards.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
Integration with nature (lack of negative experiences) (e.g. insects, wildlife inside house)	Design separates internal occupants from nature. Insect screening. Lack of vegetation/ecosystem around home.	Screening to exclude bugs. Zoning of gardens to separate native wildlife corridors (snakes especially) from priority use areas. Incorporation of plants that naturally repel insects. Avoid open eaves - potential for animal ingress.
Home a sanctuary or place to escape the outside world	Private, internalised, inward looking design.	Design for quietness and some space for privacy. Private courtyard or sitting areas (indoor outdoor), water features, gardens, attraction of wildlife to watch e.g. birds, butterflies.
Place for pets	Detached (separate/stand alone) family home on suburban block	In medium-density community, establish body corporate regulations that do permit certain type and size pets.
Ambience (i.e. feels good)	Familiarity. Very similar designs for all houses. Non-drafty, carpeted floors. Design sympathetic to cooler (non-tropical) climates i.e. southern designs.	Considered design. Airy. Higher ceilings. Sense of Space. Natural Light. Pleasant views. Pleasant textures e.g. timber floors, feng shui principles, soothing colours. Relationships with plants/landscaping.
Clean Air	Indoor air quality of many new homes is actually typically quite poor due to lack of natural ventilation and build up of toxins released from materials used in the construction, finishing, furnishing and cleaning of the home.	Separation of dwellings from high traffic corridors. Tree canopy intercepting air pollution. Dense leafy gardens promote positive ions in air. Natural ventilation rather than air-conditioned air. Material selection for construction, finishing, furnishing, cleaning to minimise toxic offgassing. Exhaust of cooking fumes (if gas) outside of room and roofspace.
Quietness (via lack of or protection from noise pollution)	Solid home, with interior closed off from outdoors. Windows in close proximity to neighbours particularly on side boundaries frequently an issue.	Acoustic barriers with or without vegetation. Tiered urban planning to shelter residential spaces from noise sources e.g. higher use roads. Dense leafy gardens for visual separation. Building materials that break up noise. Fencing. Water features/gardens to provide other noises to cover up 'disturbing' noises.
Storage facilities - internal and external (e.g. appliances/cars/sports equip/boats, clutter, general stuff etc)	Cupboards (kitchen, laundry, bedrooms). Shed, garage often used as storeroom.	Adequate storage provided e.g. minimum 6 cubic metres. For medium and high density dwellings, provision of additional storage for hobbies, boats, sports equipment etc in close proximity but not necessarily on the immediate property. Designated storage areas incorporated in design e.g. bin nook, storage cupboard in garage/carport, under-house storage (if raised home), storage in roof space.
Functionality and practicality (i.e. good design)	Consistent finishes throughout.	Use of the home and features/fittings in the home are intuitively and simply operated. Floorplan has good "flow". Outdoor living spaces take advantage of our tropical climate. Outdoor cooking area (bbq) minimising cooking heat in internal kitchen. Direct relationship between kitchen and dining area (including external dining area). Good lines of sight and hearing allow adults to supervise children at play.
Comfort - internal (e.g. climate control)	Air-conditioning of the whole home typically for 6-9 months of the year.	Design of dwellings to suit our tropical climate - maximise cross ventilation, reduce heat gain, integrated indoor/outdoor living style. See Breakthrough Ideas Report for a range of suggestions. Prioritise excellent tropical design for living areas in particular. Ensure excellent cross ventilation throughout the home e.g. by considered placement of windows and openings, including internal openings such as fan lights and 3/4 or 1/2 walls. Dwelling designs with shared walls and north-south facing to minimise heat gain especially when construction material is concrete block. Use of composite construction to reduce heat gain, especially for western (and eastern) walls. Plants around home to create a cool microclimate. Ensure interfaces between internal and external living areas can be easily screened e.g. prefer sliding doors to bifolds.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
Comfort - external (e.g. climate control, other)	Covered patios, often with a fan are provided.	Landscaping and retractable screens, blinds and shutters for shading, to reduce heat gain/storage and to create a cool microclimate around outdoor living areas. Provide covered external living spaces. Provide ceiling fans and insulation in roofs over external living spaces.
The Familiar	Project houses based on designs and by designers from non-tropical i.e. southern areas. Little differentiation of product available between builders.	Sufficient space/a feeling of sufficient space. Incorporate some aesthetic features typical of traditional homes in the vicinity/suburb. Ergonomically designed (i.e. designed for ease and comfortable use).
Lighting	Recessed downlights with high-wattage/ high-heat halogen bulbs.	Energy-efficient light bulbs and fittings (a wide range are now available) for both internal/external/private and communal applications. Lighting of public spaces on timers/sensors.
Water supply	Town water supply.	Reuse of grey water, recycling (i.e. treatment and reuse) of greywater/blackwater, use of borewater, collection and use of rainwater. Efficient use of water e.g. water efficient landscaping, water saving appliances and plumbing/tapware.
Power supply	Mains electricity (coal-fire generated).	Green power electricity (from electricity provider). Hot water heating - solar technologies e.g. panels or heatpump. Photovoltaic panels (as pricing permits). Efficient use of energy - home designed to reduce need for air-conditioning, energy efficient fittings, appliances, inhouse energy meters.
Water heating	Electric hot water system.	Heat pump, solar panel or 5-star instantaneous gas hot water system.
Sanitation services - stormwater	Concrete lined drainage systems discharging ultimately to the sea.	Water sensitive urban design e.g. swales, first flush collection, stormwater detention and polishing.
Sanitation services - sewer	Town sewerage.	In some pricebrackets and locations blackwater (i.e. sewerage treatment) at an individual or local scale may be viable (cost is currently prohibitive for application in dwellings targeting mainstream housing price-bracket).
Sanitation services - domestic rubbish	Garbage collection. Separate recycling collection.	First priority is waste minimisation i.e. of packaging, domestic waste including food, churn (general household products) and greenwaste - i.e. design landscaping to minimise creation of greenwaste. Separation of recyclable from non-recyclable waste. Separation of compostible wastes for use in vermiculture (worm farm) or compost heap. Separation of greenwaste for composting commercially or privately.
Easy maintenance/upkeep - internally	Keep windows closed to minimise dust. Take shoes off at door to minimise dirt. Sweep, vacuum, mop, dust etc. Repaint walls etc as required. Replace cupboards upon wear and tear.	Wider doorways and corridors minimise wall damage. Cupboards of waterproof materials and raised off the floor in wet areas - to minimise water damage. Clean lines and minimal ledges/exposed shelves and grooves to minimise dust/dirt collection. Rounded internal corners easier to clean. Elevated construction can reduce perceived need for security screens, which are hard to keep clean. hard floor surfaces for easier cleaning especially of dust/dustmites. Reduced grout in wet areas e.g. larger format tiles/continuous wall/floor finishes. Fewer glass walls/partitions in wet areas.

DESIRED BENEFIT (What consumers are REALLY looking for/want/need in a home - identified as a 'benefit')	Typical 'Features' of Mainstream/Conventional Homes (to provide the desired benefit)	Possible 'Features' of Sustainable Homes as identified in the Thuringowa Sustainable Village Project (to provide the desired benefit) [Note: For further ideas see Report: Breakthrough Ideas for Sustainable Urban Development in North Queensland]
Easy maintenance/upkeep - externally	Eaves lining. Rendered concrete. Gardens predominantly lawn (time consuming but simple maintenance)	Evaluate use of timber products (such as louvres, cladding accents, fencing) that require frequent staining, oiling or painting. Reduce use of painted surfaces. Ensure that composite construction materials used are no more maintenance-intensive than painted rendered masonry block construction. Minimise or eliminate lawn areas. Use mulch on garden beds to reduce weeds and plants that don't require regular pruning.
Efficient running costs (e.g. energy, water)	Often considered, commonly not achieved.	Tropical home design to reduce air-conditioning, energy efficient appliances/timers, internal energy use display meter, water efficient landscaping, fittings and appliances.
Easy to understand and use	Low technology. Similar design/inclusions for most homes. Homes with electrically controlled systems/automation can be difficult to operate optimally.	Features able to be used by people of all ages and abilities i.e. accessible/inclusive (universal) design. Low level or simply operated automation/appliances/features. Features intuitive to use. Clearly defined pathway separate to driveway. Clear street numbering. Larger format light switches. Consistent fittings throughout e.g. lever door handles.
Accommodation of specific/unique occupant requirements	Typically homes are designed for able bodied adults.	Features able to be used by people of all ages and abilities i.e. accessible/inclusive (universal) design, e.g. step-free thresholds throughout. Adjustable shelves. Multi-purpose/flexible home/room design.
Food preparation area - internally	Dedicated cooking area inside the home, commonly with relationship to dining area via open plan design.	Orientation of food preparation areas (sink and/or burners) to enable that adults working in kitchen to remain integrated with activity in rest of indoor and preferably also outdoor living areas.
Food preparation area - externally	Typically space for a BBQ is provided, generally undercover.	Provide external cooking station in near proximity to internal food preparation area. Ensure good ventilation.
Homework area	Separate study room. Kitchen table. Desk in bedroom.	Study nooks (open or closed). Multi-use rooms.
Small business office/operating area	Dedicated study/office/workshop.	Convertible spaces or alcoves/multi use rooms ideally with separate entrance to enable visitors to access the business without needing to come into the private part of the home or a relationship to street so that can see visitors arriving. Technology enabled bedrooms/living rooms.
High speed telecommunications	Broadband.	Installation of latest technology available to facilitate telecommuting and other advanced communication methods minimising need for physical travel.
Size (of house)	Bigger is better.	Good design is priority. Compact, flexible design with smaller urban and ecological footprint preferred.
Provision of shelter	Masonry block, slab on ground construction predominates largely due to cost, trade availability, familiarity and possibly because of the belief that it is strong in cyclonic areas. Tiles or colourbond roof.	Mixed materials i.e. composite construction, including extensive use of concrete blockwork when used appropriately i.e. shaded or self shading to prevent heat gain/storage. Note: concrete block construction is not the only building fabric that can achieve cyclone ratings, many walling systems/construction methods can cost effectively achieve cyclone ratings. Colourbond roofing is preferred - more stable in cyclones, less heat storage so reduces heat retention in home at night.

Appendix 2

Thuringowa Sustainable Village Project - Marketing Tool #2:

“A tool for MARKETING sustainable product”

Having designed a home for sustainability (ideally using Thuringowa Sustainable Village Project Marketing Tool #1: A tool for DESIGNING highly marketable sustainable product), this tool (Marketing Tool #2: A tool for MARKETING sustainable product” has been developed to assist MARKETERS to be more effective in their marketing of dwellings and subdivisions designed with sustainability in mind.

Both Marketing tools were produced by the Marketing Focus Group (June 2007) as part of the Thuringowa Sustainable Village Project.

Marketing Tool #1 – is a DESIGN guide developed to provide assurance to builders and developers that they can design and produce housing and development product that has both improved sustainability performance and that is different from what is typically available in the mainstream market but with the reassurance that their new product will also be highly market acceptable.

Marketing Tool #2 is targeted at MARKETING and SALES personnel and outlines important concepts, suggested language and other tips for marketing and selling more sustainable homes.

The tools recognise the golden rule of marketing - "to market the benefits, not the specific features". Accordingly the creation of the tools started with a consideration of what BENEFITS people/consumers want/need /look for in a home (see first column of Marketing Tool #1).

Rather than falling into the common trap of simply promoting the sustainable 'features' of a sustainable precinct/homes, marketers are advised to focus on communicating to potential buyers the BENEFITS that they will appreciate as a result of the home/precincts sustainability design achievements.

CONCEPTS TO PROMOTE IN MARKETING

I. PROMOTE THE 'BENEFITS' RATHER THAN 'SUSTAINABILITY FEATURES' PROVIDED BY SUSTAINABLE DESIGN

A. Promote Lifestyle Benefits

1. Promote that a sustainable home is a 'quality' home
 - New home with latest features and aesthetics
 - Low maintenance
 - Greater comfort
 - Safe for children & others
 - Accessible for all ages & abilities
2. Promote that a sustainable home has a 'good location and community'
 - Close to schools, work, facilities (esp. recreation and shopping)
 - Good for families; place for children to play
 - Open outdoor green spaces (esp. in the context of a planned medium density development)
 - Suburb has character
3. Promote that a sustainable home is a 'healthy' home
 - Tranquil
 - Less refrigerated a/c = better air quality
 - Less environmental toxicity
4. Promote that a sustainable home is a 'secure and safe' home
 - Designed for optimal safety and personal security
5. Promote that sustainable homes are 'suitable for pets' (Note: IF particular design accommodates this)
 - Pet ownership encouraged and supported

B. Promote Status of owning/living in the dwelling (both self-perception and peer-perception)

- Prestige of brand new construction
- Prestige of location
- Involvement in a housing revolution

C. Promote Economic Advantages

- Affordable (upfront and ongoingly)
- Superior capital growth potential (a good investment)
- Good value for money (better design/finish)
- Lower household running costs over time:
 - Electricity
 - Water
 - Maintenance/repairs

D. Promote environmental benefits

- Energy savings
- Lower greenhouse emissions
- Water savings
- More trees and open spaces provided

II. PROVIDE REASSURANCE THAT SUSTAINABLE DWELLINGS DON'T ENTAIL COMPROMISES, AND ARE COMPARABLE (OR BETTER) THAN CONVENTIONAL DWELLINGS IN THE FOLLOWING AREAS:

- Upfront cost to purchase is comparable, or likely cheaper in the case of terrace style dwellings
- Climatic comfort is provided (passively cool through good design, with air-conditioning provided but required to be used much less often)
- Cyclone resistance/structural integrity (it is a myth that composite construction is less strong, both concrete block and composite construction are both fully able to meet cyclone standards)
- Ongoing maintenance requirements, especially external is reduced (i.e. typically through considered building and interior design, material choices. Landscape design also seeks to minimise time/cost spent maintain, opening up additional leisure time)
- Pest (esp. white ant) management not an issue (resistance guaranteed without the use of chemicals)

SUGGESTED LANGUAGE

A. In Marketing, AVOID using the following words and phrases:

- Lightweight construction (instead consider using the words 'composite construction')
- Low thermal mass (instead use: 'materials that don't retain heat' or similar)
- Climatic responsive housing (instead use: 'tropical design')
- Universal design (instead use 'accessible' or 'inclusive' design)
- Avoid overuse of the word "sustainable"

B. Words and phrases to use:

- Use "layman's" language rather than technical terms or industry jargon as much as possible.

Suggested phrases:

- Housing for the tropics
- Houses that work in the tropics
- Water-saving taps & showerheads
- Windows that open all the way
- Stay cool without the need for air-conditioning 24/7
- Houses that are cheaper to run
- You'll be laughing when electricity prices skyrocket
- Houses that are fun to live in
- The end of surviving, the beginning of living
- The modern Queenslander
- Back to basics
- Tropical living in its purest form
- Homes that suit our modern tropical lifestyle
- Discover how a home designed for the tropics really feels
- Your friends will be GREEN with envy with your new modern Queenslander

Additional tips to support effective sales of sustainable product

- Educating buyers as part of the marketing process is essential.
- Use local marketers and consultants that understand life in the tropics and the Townsville/Far North Queensland culture rather than using companies from southern states or regions that don't fully understand local issues (unless a proven track record or expertise can be demonstrated).
- Conduct primary market research. Consult potential buyers perhaps in a focus group format to get feedback on and test the local markets reaction to the ideas and recommendations within this guideline to optimise alignment of your product design and marketing angles with the wants and desires of the target market.