REPORT

GLADSTONE REGION PLANNING SCHEME – STRATEGIC FRAMEWORK

– *Residential land mapping and analysis*

March 2013

DISCLAIMER

The Residential Land Mapping and Analysis Report has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Information within this report has been verified through a Quality Assurance process, however cannot be guaranteed as 100% correct. Data is subject to logical assumptions.

SNAPSHOT		
Key Projection Statistics:	- Medium series population projection: 111,000 in 2031 - 52,000 population increase from 2011 - 2,500 population growth annually (growth in 2006 – 2011 was about 1,000 people annually) - Apply 2.4 persons per dwelling - **Demand is 22,000 dwellings over next 20 years or 1,100 dwellings annually**	
Greenfield Development Capacity : URBAN AREAS Scenario Range 1-3	*Gladstone urban area*	6,700 to 5,800 dwellings
	Calliope and surrounding area	5,000 to 3,100 dwellings
	Boyne Island & Tannum Sands	8,100 to 7,300 dwellings
	Agnes Water	2,000 to 1,100 dwellings
	Total Gladstone Region	22,200 to 17,600 dwellings
Greenfield Scenarios:	*Scenario 1 (high)*	- **Greater Housing choices/mix** - Detached & attached housing - Lots 200-600m2 - Density: 20dph net, 15dph gross
	Scenario 2 (medium)	- **Some housing choices** - Detached houses only - Lots 300-700m2 (average 450m2) - Density: 15dph net, 10dph gross
	Scenario 3 (low)	- **Limited housing choice (reflects now)** - Detached houses only - Average lot size 700m2 - Density: 10dph net, 8dph gross
Infill Development Capacity:	- Infill within Urban Revitalisation Precincts - 100% take up could yield 20,000 dwellings - Realistic 20% of infill over 20 years, equivalent to 4,000 dwellings	
Key Findings:	- Sufficient land exists in Gladstone Region to satisfy projected housing demand for about 20 to 30 years - No additional greenfield land required over next 20 years to accommodate projected population growth - Large amount of greenfield approvals in place - Infill component required to accommodate growth is conservative but necessary to achieve housing diversity - Cost implications for servicing new areas is significant (refer to Toowoomba example)	
Key Strategies:	- No new greenfield areas - consolidate existing / identified growth areas/urban expansion - Densities support housing mix, choice and good neighbourhood design (balanced outcomes) - No new rural residential areas (consolidate existing areas) 20% target for infill development with supportive policies to achieve housing mix/density and a longer lasting housing supply. An infill strategy will also support many other emerging policies of the strategic framework focusing on a 'smart growth' approach to urban management. - Structure Planning work for Calliope and Agnes Waters	

1. INTRODUCTION

Buckley Vann Town Planning Consultants were asked to further inform the emerging strategic framework of the Gladstone Region planning scheme by mapping options for land supply for housing supply in the short-long term.

The primary purpose of this exercise was to ensure that sufficient land has been identified for housing supply for the future. Related aims include: giving council information to help with sequencing of greenfield residential development; and an examination of infill development capacity and expected infill development yields. Nominal date of mapping is 30 June 2013 and anything previous to this date is assumed as existing development.

This work will directly inform several themes of the strategic framework, most notably *Theme – Community Living*, and *Theme – Building it better: our urban areas,* and associated strategic framework mapping.

2. METHODOLOGY

The study was designed around five phases including: (refer to **Appendix 1** for a detailed methodology)

A – Create GIS Dataset and Schema - collate and input background information, land parcel identification and zoning into a GIS dataset.

B – Define criteria for yield analysis – define criteria for greenfield and infill calculations, define parameters for infill development locations, net and site residential density, likelihood of development occurring, and timeframes;

C - Housing supply scenarios – conduct three (3) scenarios for greenfield and infill development based on a variation of parameters (e.g. greenfield/infill split);

D –Methodology – document the methodology of the analysis process; and

E – Findings – present findings of the analysis process in the formation of a brief statistical report, mapping, and final dataset. Present and discuss with council and agree preferred option (as part of the strategic framework project).

Note: A reduced emphasis was placed on timeframes, as insufficient data existed to distinguish between projects expected to be development in 0-10 years, versus 10-20 years.

TERMS

Definitions for the purpose of this study including:

Greenfield Lots– Land previously undeveloped for urban purpose including development applications, Broad hectare sites and other residential zoned land. Greenfield sites are related to the 'Next Generation Suburban Neighbourhoods' in the Strategic Framework.

Infill Lots– Lots identified in the 2012 Urban Design Vision or have development applications, excluding sites recently developed or are developed to the full density potential, as well as excluding 50% of the heritage/character sites. Infill sites are related to the 'Urban Revitalisation Neighbourhoods' or 'Mixed Use Centres in the Strategic Framework.

Rural Residential Lots– Lots that area zoned rural residential with a land area greater than 5 hectares.

Constrained Land – Land that is constrained by steep land, power easements, engineering problems, recently been developed or are development to the full density potential or are heritage/character site.

3. RESULTS

MAPPING

Identified land for housing supply (greenfield, infill and rural residential) was mapped for the following areas:

- Gladstone region overview (1);
- Gladstone and surrounding areas (2);
- Calliope and surrounding areas (3);
- Boyne Island and Tannum Sands (4);
- Agnes Water (5); and
- Other areas (Mount Larcom and Miriam Vale) (6).

Refer to **Appendix 3** for maps.

PROJECTION SCENARIOES

The following Greenfield statistics have been derived across three development scenarios. The scenarios range from housing choice to limited housing choices. Development scenarios are as follows:

Scenario 1

Housing choices

Detached & attached housing
Lots 200-600m2

Density: 20dph net, 15dph gross

Scenario 2

Some housing choices

Detached houses only
Lots 300-700m2

Average lot size 450m2

Density: 15dph net, 10dph gross

Scenario 3

Limited choice

Detached houses only

Average lot size 700m2

(what we see today)

Density: 10dph net, 8dph gross

Infill projections have been calculated on a series of potential building types which range from mixed use building from 4 to 6 storeys to small lot dwellings, all which yield a range of densities. Refer to **Appendix 1** for more information.

STATISTICS

Greenfield Statistics

Land for housing supply estimates are summarised on the following tables. (Refer to **Appendix 2** for detailed tables)

GREENFIELD Identified Land for Housing Supply

			Scenario 1*	**Scenario 2***	**Scenario 3***
	Land Area (ha)	No. Parcels	Total Dwellings	No. Dwellings	No. Dwellings
Gladstone City	866.6	91	6,736	6,137	5,807
Calliope	375.7	40	5,014	3,680	3,146
Boyne Island	252.7	38	3,227	3,099	3,047
Tannum Sands	514.8	13	4,929	4,498	4,260
Sub-Total	2009.8	182	19,906	17,414	1,6260
Agnes Water	186.2	33	1,988	1,361	1,110
Other Areas	64.9	9	380	328	308
Total	2260.9	224	22,274	19,103	17,678

Refer to Appendix 1 for detailed methodology. Summary:

*Scenarios 1, 2 and 3 = dwelling yield from planned and DA approved/applied sites PLUS balance land yield estimate by density as follows:

Scenario 1: 15dph gross (10dph constrained land), Scenario 2: 10dph gross (7dph const.), Scenario 3: 8dph gross (5dph const.)

The table above indicates that:

- **Gladstone region** has a total of **2260 hectares** of **greenfield land** available for housing supply;
- Depending on the development density adopted (Scenarios 1-3) the total **Gladstone region** could be expected to yield from **17,678 to 22,274 new dwellings in Greenfield areas**; and
- In the **main urban area** of Gladstone, Calliope, Boyne Island and Tannum Sands a yield of between **16,260 to 19,906 new dwellings** could be expected.

Infill Statistics

INFILL - Ultimate Development Scenario			
	100% Capacity		
	Land Area (ha)	No. Parcels	No. Dwellings
URBAN REVITALISATION NEIGHBOURHOODS			
Gladstone CBD	31.92	458	4,801.39
Valley	17.59	249	2,012.02
Gladstone South	52.91	663	2,376.39
Gladstone West	64.92	735	7,193.42
Gladstone Surroundings	1.97	4	62
Sub-Total	169.31	2,109	16,445.22
MIXED USE CENTRES AND SURROUNDINGS			
Kin Kora	15.19	154	1,909.41
Boyne Island Town Centre	6.67	25	687.29
Tannum Sands Town Centre	8.82	107	858.68
Calliope Town Centre	3.99	6	114.56
Sub-Total	34.67	292	3,569.94
Total	203.98	2401	20,015

Refer to Appendix 1 for detailed methodology. Summary:

This estimate is an ultimate development scenario based on 2012 Urban Design Vision.

Its implementation, if at all, will be many decades in the making, particularly in the Mixed Use Centres.

Infill Opportunity Sites generally within Urban Revitalisation Neighbourhoods OR Mixed Use Centres.

Excludes land already developed to potential AND allowance for heritage.

No minimum lot size was used in the calculations to allow for amalgamation of lots.

The table above indicates that:

- This 'ultimate' development capacity analysis indicates that **up to 20,015 new dwellings** being feasible, albeit over the very long term;
- In the **priority urban revitalisation** areas of Gladstone CBD, Valley, Gladstone South and West a possible **dwelling yield of 16,445** has been calculated;
- This estimate was made of the potential urban infill dwelling yield that could be generated through urban redevelopment as outlined in the Gladstone Urban Design Study & Strategy (2012);
- There is an assumed infill of existing suburban areas of **50-100 additional dwellings p.a**; and
- The infill capacity statistics are a 100% development scenario and is not a realistic outcome. The maximum potential allows for further calculations of expected development rates.

The proposed strategic framework for the new planning scheme suggests a policy whereby a low degree of change is pursued in existing suburban areas. Low change does not however mean no change. Modest developments (e.g. 1 into 2 subdivisions, 'granny flats') will occur. Trend data for 'infill' development in existing suburban areas of Gladstone was gathered from the 2001, 2006 and 2011 census. Regional growth and population growth was considered. An assumption of 50 to 100 p.a new dwellings in existing suburban areas was adopted. The documented methodology in Appendix 1 provides further commentary.

Rural Residential Statistics

RURAL RESIDENTIAL Identified Housing Supply			
	Land Area (ha)	No. Parcels	Total Dwellings
Total	1078	145	1,223

Refer to Appendix 1 for detailed methodology. Summary:

Scenario - rural res approved/zoned, 2dph, 50% no development (constraints assumption).

There are a number of rural residential lots that have existing development applications. The calculations used the predefined dwelling allocation of the DA sites, opposed to the above scenario dph.

The table above indicates:

- There is **1078 hectares of recognised rural residential zoned and undeveloped land** for housing supply. Nevertheless, rural residential development is not prioritised in the new strategic framework.
- It was assumed that **50% of this land will be undevelopable due to constraints**. However up to **1223 new dwellings are possible** from this land.

It is recognised that the rural residential land would require connection to town water and sewer and is therefore an option in the residential land mapping and analysis exercise. It is also recognised that there could be potential for residential possibilities beyond the identified rural residential lots.

HOUSING DEMAND TABLES

The following table highlights the data sources that were reviewed as part of this study.

Annual Housing Demand Estimated 2011-2031 - Population Projections – Gladstone Region			
	High	**Medium**	**Low**
Queensland Government Projections			
Population change 2011-2031	59,910	48,708	30,978
Averaged annual growth	2996	2435	1549
100% (Census 2011)			
Average household size - persons/household	2.7	2.7	2.7
New housing demand 2011-2031 household size 2.7)	**22189**	**18040**	**11473**
Averaged annual housing demand household size 2.7)	**1109**	**902**	**574**
80%			
Household size detached	2.8	2.8	2.8
Housing size attached	1.8	1.8	1.8
Average household size if 80% detached 20% attached	2.6	2.6	2.6
New housing demand 2011-2031 (household size, 2.6)	**23042**	**18734**	**11915**
Averaged annual dwelling demand if 20% attached	**1152**	**937**	**596**

The data indicates that:

- The **Queensland Government population projections** range across three scenarios including low, medium and high, resulting in a range of **30,978 – 59,910 new people**;
- This translates into a **new housing demand of 11,473 - 22,189 over 20 years**, using Census Statistics. If 20% of new dwellings are attached (lowering the average household size slightly to 2.6), new housing demand is projected to be 11,915, 18,734 or 23,042.

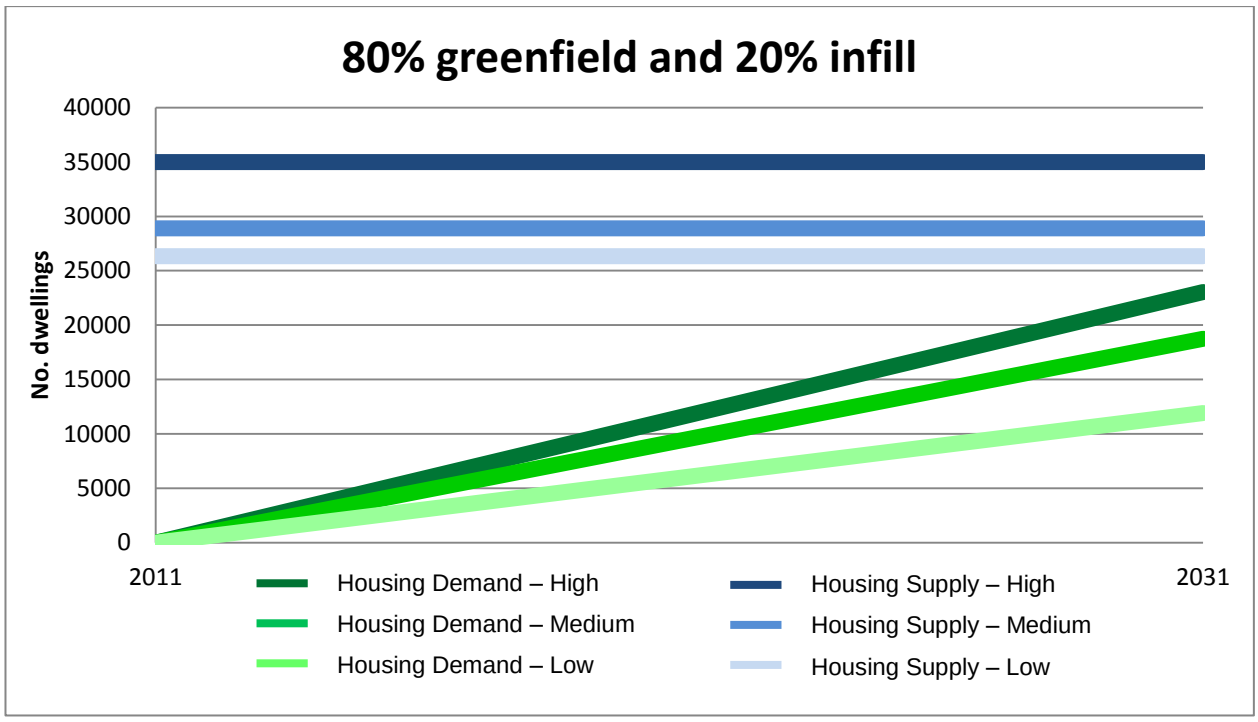
Typically the medium series projection is adopted for planning projects, although actual population change is likely to be less than or greater than this projection. An **average housing demand** p.a is expected to be in the range of **902 to 937 dwellings each year**¸ using a medium scenario. Housing demand fluctuates from year to year based on many factors, and sometimes by a large variation. For example, from 2006-11, 3375 new private dwellings were built in the Gladstone Regional Council area. This equals 675 new dwellings per annum, substantially less than the anticipated average demand from the 2011-2031 medium series population projections (Source: census 2006, 2011). Average housing demand per annum is then only intended as a 'rule of thumb', and actual demand can be expected to be less or more than this figure in any individual year.

To comfortably achieve projected housing demand it is suggested than a target of 1000-1200 dwellings per annum be adopted. Note this target includes greenfield, infill and rural residential dwellings. A supply target of 10-25% greater than averaged annual demand is suggested to allow for fluctuation, competition, housing choices, and the inevitability of delayed or cancelled projects or infrastructure.

Over the 20 year period 2013-2033 this equates to 20,000-24,000 new dwellings, almost all of which is expected to be needed in urban areas of Gladstone, Calliope, Boyne Island and Tannum Sands.

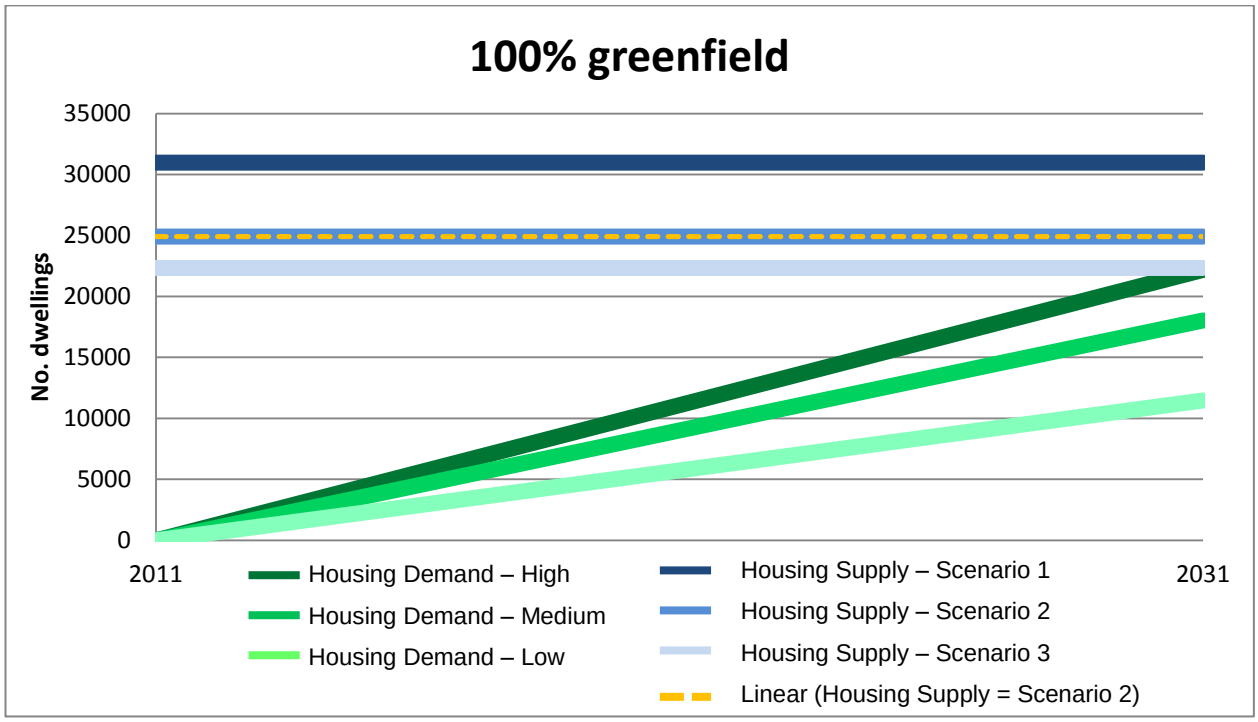
COMPARING HOUSING SUPPLY AND HOUSING DEMAND

The following graphs illustrate the relationship between identified housing supply, and anticipated demand for housing, in the Gladstone Region.



- The above graph illustrates the recommended strategy of 80% of new dwellings being built in a greenfield setting and 20% as infill across 20 years
- Housing demand at 2031 (green shading) is estimated to be:
    - 11,915 new dwellings (low series);
    - 18,734 new dwellings (medium series); and
    - 23,042 new dwellings (high series).
- Housing supply at 2031 is estimated to be:
    - 34,976 new dwellings (density scenario 1);
    - 28,900 new dwellings (density scenario 2); and
    - 26,341 new dwellings (density scenario 3).

    ** Note the graphed housing supply is greenfield and infill only, with an assumed total infill yield of 200p.a. for 20 years, total 4,000. New rural residential dwellings add further to the housing supply available.*
- In all scenarios**, identified land for housing supply exceeds demand**.



- The above graph illustrates a strategy include no infill development, resulting in new housing being built solely on greenfield land;
- This removes about 4,000 potential dwellings that have been assumed in the 80/20 example as the infill development target. Housing demand remains the same; and
- The graph identifies that supply meets the 20 year demand with the exception of the high series growth – density scenario 1 example. In this case 23,042 new dwellings are needed, with only 22,341 greenfield new dwellings available (only 19,315 in the Gladstone/Boyne Island/Tannum Sands/Calliope greater urban area).

A NOTE ON INFRASTRUCTURE COSTS

Work in other regions of Queensland (for Priority Infrastructure Plans and other infrastructure planning exercises) highlights differences in costs for trunk infrastructure when comparing greenfield and infill development areas. In some cases greenfield trunk infrastructure costs have been found to be double the maximum allowable trunk infrastructure charges under the present charging system. Conversely, infill development areas are often cheaper to service because they contain substantial existing infrastructure assets.

Council should investigate this issue in relation to infill development opportunities in Gladstone. An infill development strategy may result in substantial cost benefits to council with respect to a 100% greenfield housing strategy.

4. CONCLUSION

AREA CONSIDERATIONS

The following considerations have been noted throughout this study:

Gladstone urban areas:

- Gladstone has a high number of existing development application, for example Kirkwood Road Structure Plan;
- There are a number of lots south of Kirkwood Road that are classified as constrained land;
- Kin Kora has been identified as a potential area for mixed use and housing in the future; and
- Gladstone CBD is the major area for infill development, corresponding with the Urban Revitalisation Precincts;

Calliope and surrounding areas:

- Please note, numbers for Calliope have undergone refinement through a Structure Planning process.
- Calliope is a potential land bank area, particularly within the PIA;
- There is not a lot of development applications within Calliope;
- Areas east of Calliope PIA could be an opportunity in the long term strategy (30 years plus) through urban expansion and providing town services. This area however is not required in the short term; and
- There is potential for some (more) town centre mixed use and residential development.

Boyne Island and Tannum Sands:

- Boyne Island and Tannum Sands both have some residual greenfield sites within the town; and
- The area is dominated by large scale master planned community style projects, for example Riverstone Rise

Agnes Water:

- Please note, numbers for Agnes Water have undergone refinement through a Structure Planning process.
- Agnes has a substantial land bank of approved and zoned residential land, however the demand is expected to be much more modest.

GENERAL CONSIDERATIONS

- This analysis has identified that sufficient land exists in Gladstone Region and its urban area to satisfy projected housing demand for about 20 to 30 years.
- There is the potential for some sites and projects to be delayed and problematic, as well as preferred or not preferred due to constraints and costs.
- Further, Gladstone Region's housing supply will last longer by adopting an infill development strategy targeting 20% of new dwellings in each year. An infill strategy will also support many other emerging policies of the strategic framework focusing on a 'smart growth' approach to urban management.
- By adopting this strategy it is expected that existing housing supply may last for 30 years, and indeed this 30 year timeframe is the suggested target, given that Gladstone Region is and has been periodically subject to housing shortages.
- The mapping undertaken for this study should prove useful in further refining and sequencing urban development in the planning scheme, probably time periods of: 0-10 years, 10-20 years, and 20+ years.

- The investigation has not undertaken analysis of very long term (beyond 30 years) housing and urban development locations. However ideas for consideration may include: new urban revitalisation areas around Kin Kora or other urban areas, O'connel, Mt Larcombe, Agnes Water, Benaraby or even one or more new towns.

APPENDIX 1 – DOCUMENTED METHODOLOGY

Data available for the study comprised:

Housing supply background study	Includes	Gaps?
2011 and 2012 Broadhectare studies (Queensland Government)	Calculates 'greenfield' and 'low density' (rural residential) land supply based on zones and approvals	Indicates 10 years of greenfield supply (need 20+). Does not address infill supply. Minimal growth at Calliope
Housing Needs Assessment 2010 and Planning Scheme Analysis 2012 (SGS)	Assessment of future housing needs including land and housing mix Dwelling needs forecast by town	Top down analysis of population and dwelling yield, rather than bottom up analysis based on land use opportunities Does not anticipate a substantial infill housing strategy. Limited mapping
Urban Design Study 2012	Urban intensification possibilities for Gladstone CBD, inner urban areas and centres	Does not identify dwelling yield from proposed redevelopment, or likely uptake of redevelopment
GRC Major Development Snapshot (September and December 2012 editions)	Records of approved, underconstruction and pending residential development projects	Not mapped (Further development assessment data and maps was provided in March 2013. This was used to verify data collected form the DA Snapshots.)
Census 2001, 2006, 2011	Data on infill housing development rates in Gladstone and in other Queensland cities	

The study was conducted as follows:

	DOCUMENTED METHODOLOGY
A	**Create GIS Dataset and Schema**
A1	Mapped broadhectare land data from Broadhectare Study 2012 as 'greenfield' or 'rural residential' housing supply land. 'Workers camps' parcels were excluded. Manual data input.
A2	Mapped approved and unapproved development applications from GRC Major Development Snapshot September quarter 2012 and December quarter 2012. (Obtained some location data separately from GRC.) Data comprised a mixture of greenfield, 'infill' and rural residential parcels. Manual data input. Dwelling yield attributed for each lot where yield data exists (most DA summaries included a lot or dwelling yield).
A3	Mapped 'Urban Design Vision' from 2012 Gladstone Urban Design Study and Strategy. Identified parcels as infill. Excluded Barney Point and eastern side of Gladstone West, as these areas are not proposed for urban revitalisation in draft strategic framework. Manual data input.
A4	Mapped Urban Development Areas (now called Priority Development Areas) at Clinton, Toolooa, Tannum Sands. Dwelling yields derived from development schemes and published (website) information.
A5	Mapped Priority Infrastructure Areas. Included additional land parcels zoned residential in current planning schemes and/or inside council's Priority Infrastructure Areas. Mostly these additional parcels are 'greenfield'.
A6	Cross referenced and checked each parcel to verify data. Assigned development timeframe for each parcel (not used in final analysis). Already subdivided residential lots marked as 'existing' (to exclude from future supply calculations). Nominal date of mapping is 30 June 2013. Confirmed known yields for parcels in Major Development Snapshot. Allocates yield across larger developments based on Major Development Snapshot and site plans. Used aerial photo to identify undevelopable parcels (mostly already developed, or developed as caravan parks or other uses proposed to be protected in draft strategic framework).
A7	Identified constrained land including steep land, power easements, engineering problems, recently been developed or are development to the for density potential or are heritage/character site.
B	**Define criteria for yield analysis for greenfield and infill development**
B1	Defined density assumption to use for estimating residential yield for greenfield housing supply land. (Estimates only apply to land parcels that do not have yield data from detailed planning/development approval.) • Sampled gross and net density values for four Gladstone projects (Clinton UDA, Vantage Estate, Toolooa UDA, Riverstone Rise). Used Major Development Snapshot, development schemes, developer websites for data. • Compared with known best practice development in SEQ i.e. Fitzgibbon, Springfield • Assessed likely housing mix from draft strategic framework (and housing needs studies) • Defined two greenfield density scenarios. Scenario 1 with strategic framework *recommended housing choices* – 20 dwellings per hectare (dph) net, 15dph gross (10 dph constrained land). Scenario 2 – *some housing choices* - 15dph net, 10dph gross (7dph constrained land).

- Added Scenario 3 ('conventional suburban development') after team meeting on 28 February 2013, for comparison purposes – *detached housing only* - 10dph net, 8dph gross (5dph constrained land).

Note: Gross density = dwellings per hectare of land (including all lots, parks, minor and major roads, shops, schools, open spaces). Useful measure for larger projects and neighbourhoods.

Net density = dwellings per hectare of land (only including lots, local parks, local streets and half of the major roads if bordering the site). Useful for stages of developments.

B2 Defined yield calculation method for greenfield supply land:

- Greenfield area dwelling yield = (dwellings from DA approved parcels) + (non-DA approved parcel area x gross density/constrained density (for each of three scenarios))

B3 Defined density assumptions to use for estimating ultimate dwelling yield/capacity for infill development areas. (Again, estimates were only used where no DA data existed for a parcel, although in the case of infill there were relatively few dwelling yields gathered from DA data.)

- Assumed use of five apartment/mixed use building typologies, and two 'small lot' typologies, from 2012 Gladstone Urban Design Study & Strategy.
- Calculated site density for each typology, based on 'Development Standards' (code-like criteria) of 2012 Gladstone Urban Design Study & Strategy.
    - Developed 8-9 sketch development examples for each typology, of various lot sizes and apartment sizes. Calculated site density for each example. Noted median and average site densities across all examples.
    - Cross referenced with known SEQ examples from BCC/QG 'Residential Form Handbook' (2011), and one example per typology from Deicke Richards background notes to 2012 Gladstone Urban Design Study & Strategy.
    - Assumed site densities based on examples and references, as follows:

Building type	***place type***	***description***	***assumed site density (dph)***
1	*city centre*	*Goondoon St mixed use bldg 8 storeys*	*200*
2	*city centre, urban renewal, mixed use centres*	*6 storey mixed use bldg*	*150*
3	*city centre, urban renewal, mixed use centres*	*6 storey apartments no podium*	*170*
4	*city centre, urban renewal, mixed use centres*	*4 storey mixed use bldg*	*80*
5	*city centre, urban renewal, mixed use centres*	*4 storey apartments*	*120*
6	*urban renewal, mixed use centres, existing suburban, next gen suburban*	*small lot detached*	*22*
7	*urban renewal, mixed use centres, existing suburban, next gen suburban*	*attached/terrace houses*	*42*

	Note: Site density – number of dwellings in a development, divided by the site area. Excludes roads, parks etc. Best comparative measure for apartment projects.
B4	Define yield calculation method for infill supply land • Referred other studies e.g. Fraser Coast Dwelling Capacity Analysis, Rockhampton Planning Assumptions Report for method comparisons. • Identified *known parameters* (i.e. lot size, proposed height, proposed active/non-active streets, lots with DA, existing use and building type (from Google Maps/Streetview), recently developed or developed to full density potential, heritage/character streetscapes) • Identified infill parcels with DA yield • Identified and excluded infill parcels already developed to maximum potential (from *known parameters*) • Assumed and excluded 50% parcels on heritage/character streetscapes to account for reduced development potential. • Identify building typology and therefore site density for each infill parcel (from *known parameters*) • Infill area dwelling yield = (dwellings from DA approved parcels) + (*underdeveloped infill parcel area x site density)
B5	Defined yield calculated method for Rural Residential land supply • Assumed development density of 2dph gross • Assumed 50% undevelopable due to constraints • Rural residential dwelling yield = (dwellings from DA approved parcels) + ((non-DA approved parcel area x 3dph x 50%)

B6	Researched dwelling yield expectations for infill development in Existing Suburban Areas:
	• Examined census data from 2001, 2006 and 2011 for Gladstone (city) suburban areas
	• Gladstone (city) suburban semi-attached/attached new dwellings
	  ○ 2001-06: 22
	  ○ 2006-11: 68 (14 p.a.)
	• Noted Gladstone (city) about half of region total dwellings. Noted growing population.
	• Noted some or many infill developments in existing suburban areas will be detached (e.g. 1into2 subdivision) and are not distinguishable in this census data.
	• For 'low change in existing suburban areas' scenario, assume 50-100 additional dwellings p.a.

B7	Researched infill development target (for urban revitalisation areas and mixed use centres) • Examined existing plans and strategies e.g. Wide Bay Burnett Regional Plan (20% 'infill' target for urban areas) • Spoke with local government colleagues in south east Queensland • Examined census data from 2001, 2006 and 2011 for Infill area take up – historical examples *Gladstone CBD, south, west new dwellings as % of Gladstone city new dwellings:* • *2001-06: 16%* • *2006-11: 28%* *Gladstone CBD, south, west new dwellings as % of Gladstone (region) new dwellings:* • *2006-11: 12%* *Gladstone semi-attached/attached as % of Gladstone city new dwellings:*

	• *2001-06: 19%* • *2006-11: 21%* *Gladstone (city) suburban semi-attached/attached as % of Gladstone city new dwellings:* • *2001-06: 3%* • *2006-11: 7%* *Hervey Bay semi-attached/attached as % of Hervey Bay city new dwellings:* • *2001-06: 14%* • *2006-11: 22%* *Townsville semi-attached/attached as % of Townsville city new dwellings:* • *2001-06: 11%* • *2006-11: 35%* *Rockhampton semi-attached/attached as % of Rockhampton city new dwellings:* • *2001-06: 19%* • *2006-11: 44%* *Mackay semi-attached/attached as % of Mackay city new dwellings:* • *2001-06: 34%* • *2006-11: 11%* **Assumed recommended infill (CBD, URAs, MUCs only) target of 20% of all new dwellings in all years.** Achievable based on: • past 10 years performance of inner city Gladstone • Achievements in comparable cities e.g. Mackay, Townsville, Rockhampton, Hervey Bay
C	**Conduct minimum three (3) housing supply scenarios**
C1	Calculated greenfield parcel area, no. of parcels and identified dwelling yield from greenfield parcels for scenarios 1 and 2 and 3. Calculated by 'town' and presented on table *GREENFIELD identified housing supply*.
C2	Calculated infill ultimate development scenario (100% maximum theoretical dwelling yield based on 2012 Urban Design Study & Strategy). Calculated infill land area, no. of parcels and dwelling yield and presented by area in a table *INFILL- Ultimate Development Scenario*.
C3	Calculated Rural Residential parcel area, no. of parcels and identified dwelling yield. Presented on table *RURAL RESIDENTIAL identified housing supply*.
C4	Noted assumed infill dwelling yield from Existing Suburban Areas as 50-100 additional dwellings p.a.
C5	Noted recommended infill dwelling target from CBD, urban, centres as 20% of all new dwellings.
	Reviewed population projections from 2011 Queensland Government projections, and household size data from Broadhectare Study.

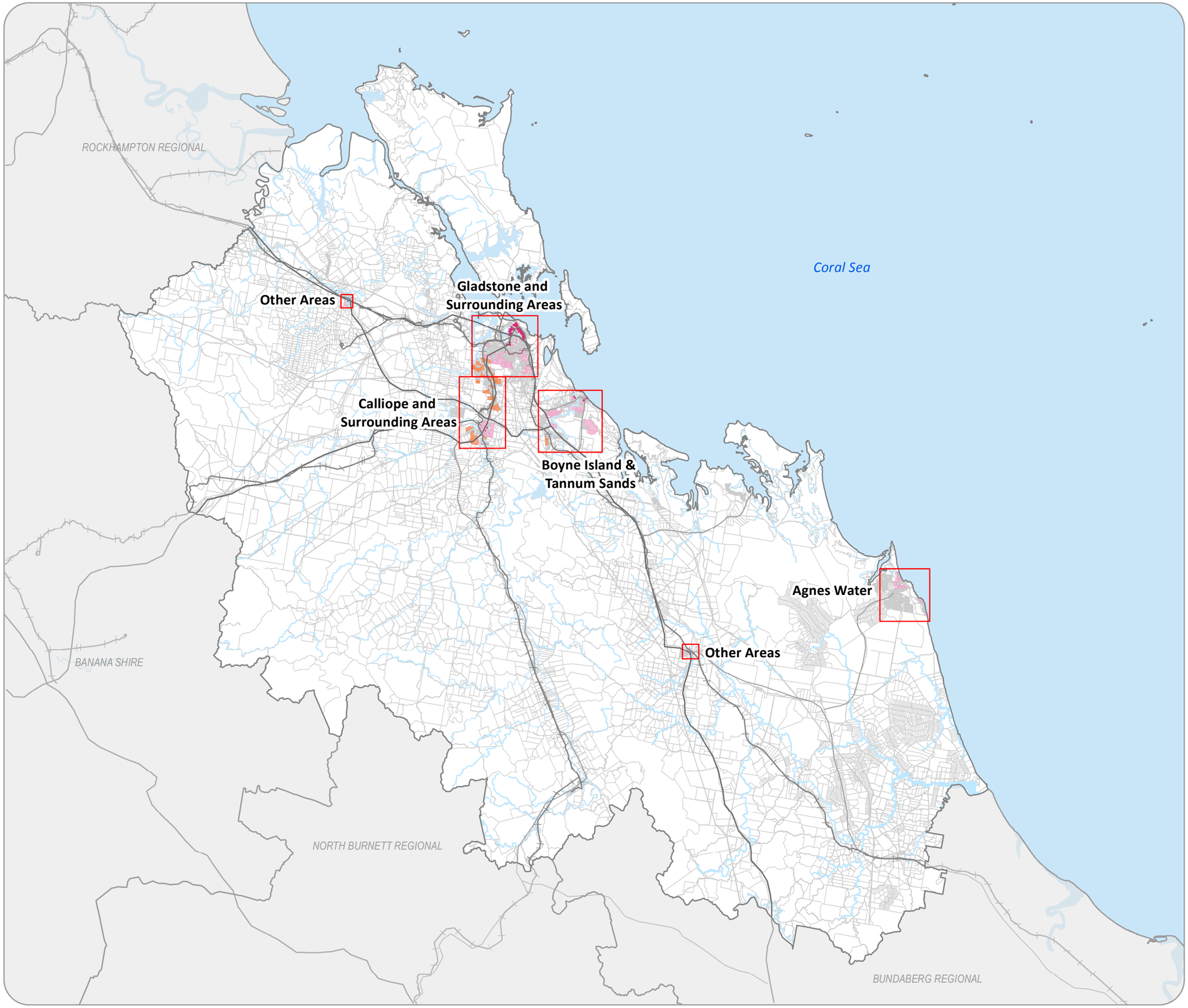
C6	Calculated housing demand for low, medium and high population projections and presented in table.
C7	Compared supply and demand and graphed.
C8	Analysed results and prepared commentary.
D /E	**Document the methodology / Present findings**
D1	Prepared council presentation and draft report.
D2	Peer review of draft report by BV Principal Planner.
D3	Council presentation and feedback.
D4	Finalised report.

APPENDIX 2 – DETAILED GREENFIELD TABLES

SCENARIO 1 (15 dph/constr.10 dph)	Gladstone City	Calliope	Boyne Island	Tannum Sands	Agnes Water	Other Areas
Overview all Parcels						
Total No. of Parcels	224	91	40	38	13	33	9
Total Area (ha)	2,261	866.6	375.7	252.7	514.8	186.2	64.9
Constrained Parcels	25	24	0	0	0	0	1
Overview of density allocated Parcels (non-constrained)						
No. of Parcels	96	42	11	30	6	7	
No. of Lots (1 lot = 1 dwell)	9,051	3,050	1,001	2,836	2,063	101	
No. of Dwellings (units)	2,300	788	9	6	1,491	6	
Total No. of Dwellings	11,351	3,838	*1,010*	*2,842*	*3,554*	*107*	
Overview of density allocated Parcels (constrained)						
No. of Parcels	4	3					1
No. of Lots (post dev.)	1,061	836					225
No. of Dwellings (units)	150	150					
Total No. of Dwellings	1,214	989					*225*
Overview of non-density allocated Parcels (non-constrained)						
No. of Parcels	101	25	29	7	6	26	8
Total Area (ha)	516	52.0	267.0	25.2	36.2	125.4	10.3
Total No. of Dwellings	7,740	*780*	*4,004*	*378*	*542*	*1,881*	*155*
Overview of non-density allocated Parcels (constrained)						
No. of Parcels	23	21		1	1		
Total Area (ha)	197	112.9		0.7	83.3		
Total No. of Dwellings	1,969	*1,129*		*7*	*833*		
Total Future Lots for Greenfield Development						
No. Future Dwellings for Greenfield Dev.	22,274	*6,736*	*5,014*	*3,227*	*4,929*	*1,988*	*380*

SCENARIO 2 (10 dph/constr.7 dph)	Gladstone City	Calliope	Boyne Island	Tannum Sands	Agnes Water	Other Areas
Overview all Parcels						
Total No. of Parcels	224	91	40	38	13	33	9
Total Area (ha)	2,261	866.6	375.7	252.7	514.8	186.2	64.9
Constrained Parcels	25	24	0	0	0	0	1
Overview of density allocated Parcels (non-constrained)						
No. of Parcels	96	42	11	30	6	7	
No. of Lots (1 lot = 1 dwell)	9,051	3,050	1,001	2,836	2,063	101	
No. of Dwellings (units)	2,300	788	9	6	1,491	6	
Total No. of Dwellings	11,351	3,838	*1,010*	*2,842*	*3,554*	*107*	
Overview of density allocated Parcels (constrained)						
No. of Parcels	4	3					1
No. of Lots (post dev.)	1,061	836					225
No. of Dwellings (units)	150	150					
Total No. of Dwellings	1,214	989					*225*
Overview of non-density allocated Parcels (non-constrained)						
No. of Parcels	101	25	29	7	6	26	8
Total Area (ha)	516	52.0	267.0	25.2	36.2	125.4	10.3
Total No. of Dwellings	5,160	*520*	*2,670*	*252*	*362*	*1,254*	*103*
Overview of non-density allocated Parcels (constrained)						
No. of Parcels	23	21		1	1		
Total Area (ha)	197	112.9		0.7	83.3		
Total No. of Dwellings	1,378	*790*		*5*	*583*		
Total Future Lots for Greenfield Development						
No. Future Dwellings for Greenfield Dev.	19,103	*6,137*	*3,680*	*3,099*	*4,498*	*1,361*	*328*

SCENARIO 3 (8 dph/constr.5 dph)		Gladstone City	Calliope	Boyne Island	Tannum Sands	Agnes Water	Other Areas
Overview all Parcels							
Total No. of Parcels	224	91	40	38	13	33	9
Total Area (ha)	2,261	866.6	375.7	252.7	514.8	186.2	64.9
Constrained Parcels	25	24	0	0	0	0	1
Overview of density allocated Parcels (non-constrained)							
No. of Parcels	96	42	11	30	6	7	
No. of Lots (1 lot = 1 dwell)	9,051	3,050	1,001	2,836	2,063	101	
No. of Dwellings (units)	2,300	788	9	6	1,491	6	
Total No. of Dwellings	11,351	3,838	*1,010*	*2,842*	*3,554*	*107*	
Overview of density allocated Parcels (constrained)							
No. of Parcels	4	3					1
No. of Lots (post dev.)	1,061	836					225
No. of Dwellings (units)	150	150					
Total No. of Dwellings	1,214	989					*225*
Overview of non-density allocated Parcels (non-constrained)							
No. of Parcels	101	25	29	7	6	26	8
Total Area (ha)	516	52.0	267.0	25.2	36.2	125.4	10.3
Total No. of Dwellings	4,128	*416*	*2,136*	*202*	*289*	*1,003*	*83*
Overview of non-density allocated Parcels (constrained)							
No. of Parcels	23	21		1	1		
Total Area (ha)	197	112.9		0.7	83.3		
Total No. of Dwellings	984	*565*		*3*	*416*		
Total Future Lots for Greenfield Development							
No. Future Dwellings for Greenfield Dev.	17,677	*5,807*	*3,146*	*3,047*	*4,260*	*1,110*	*308*



L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

GLADSTONE REGION

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Cadastral Bounadry
- Local Government Areas
- Ocean
- *Refer to Map Series*

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

Projection: GDA 94 Zone 56

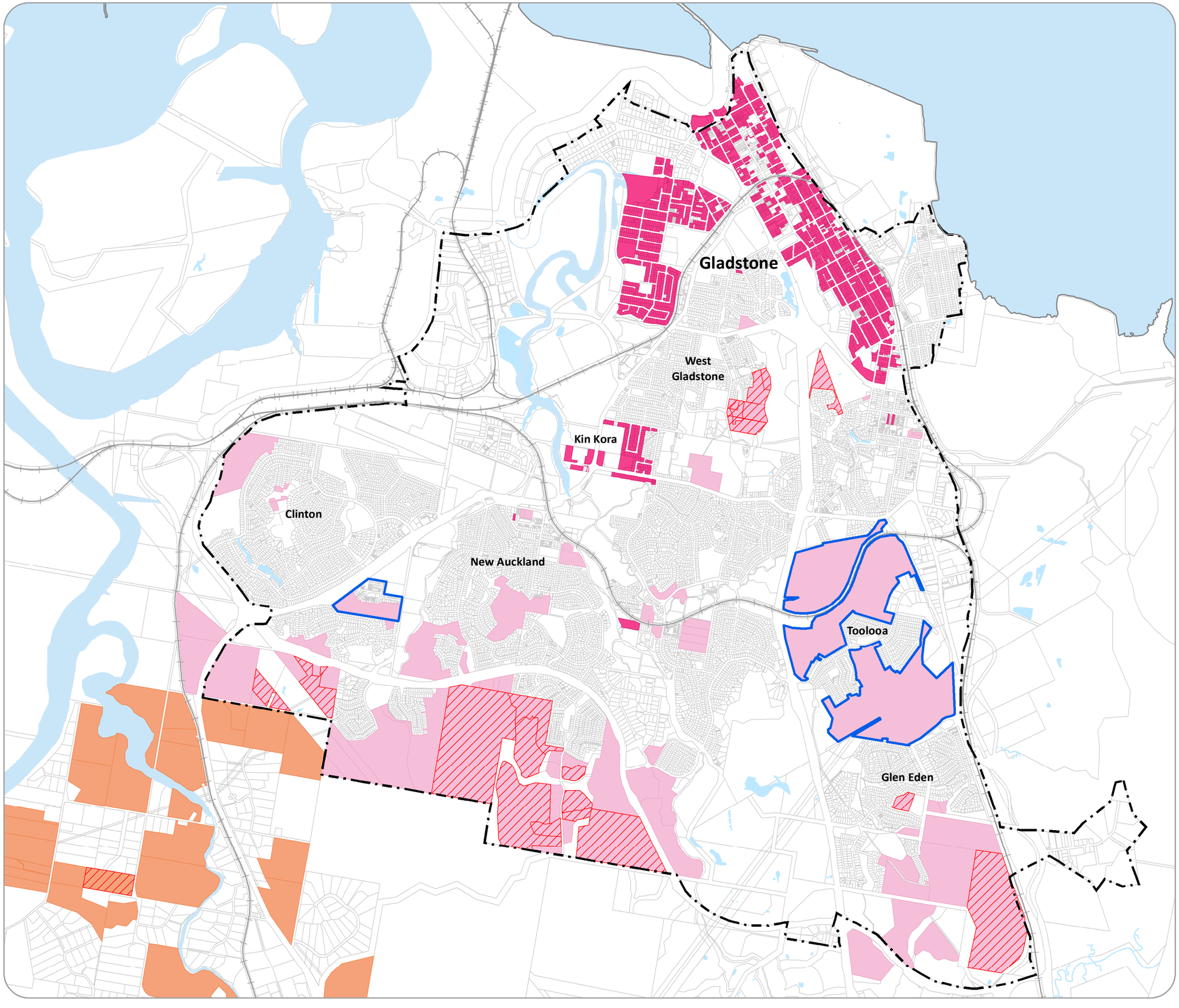
0 5 10 20 km

1:600,000

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 01



L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

GLADSTONE AND SURROUNDING AREAS

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Priority Infrastructure Area
- Priority Development Areas (previously Urban Development Areas)
- Constrained Land
- Cadastral Bounadry
- Local Government Areas
- Ocean

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

Projection: GDA 94 Zone 56

0 0.25 0.5 1 1.5 km **1:35,000**

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 02

Burua

Calliope

L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

CALLIOPE AND SURROUNDING AREAS

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Priority Infrastructure Area
- Priority Development Areas (previously Urban Development Areas)
- Constrained Land
- Cadastral Bounadry
- Local Government Areas
- Ocean

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

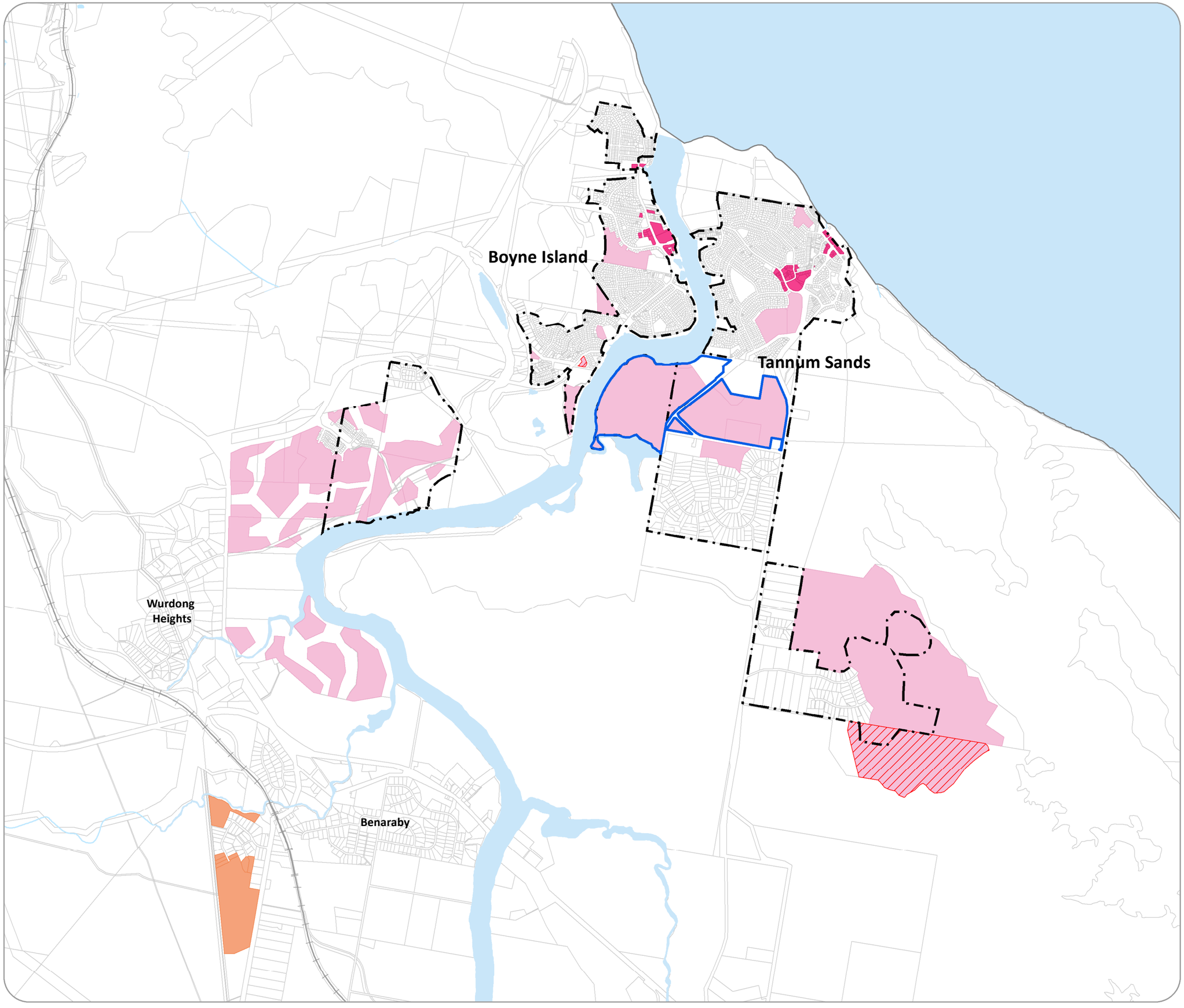
Projection: GDA 94 Zone 56

0 1 2 km 1:50,000

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 03



L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

BOYNE ISLAND AND TANNUM SANDS

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Priority Infrastructure Area
- Priority Development Areas (previously Urban Development Areas)
- Constrained Land
- Cadastral Bounadry
- Local Government Areas
- Ocean

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

Projection: GDA 94 Zone 56

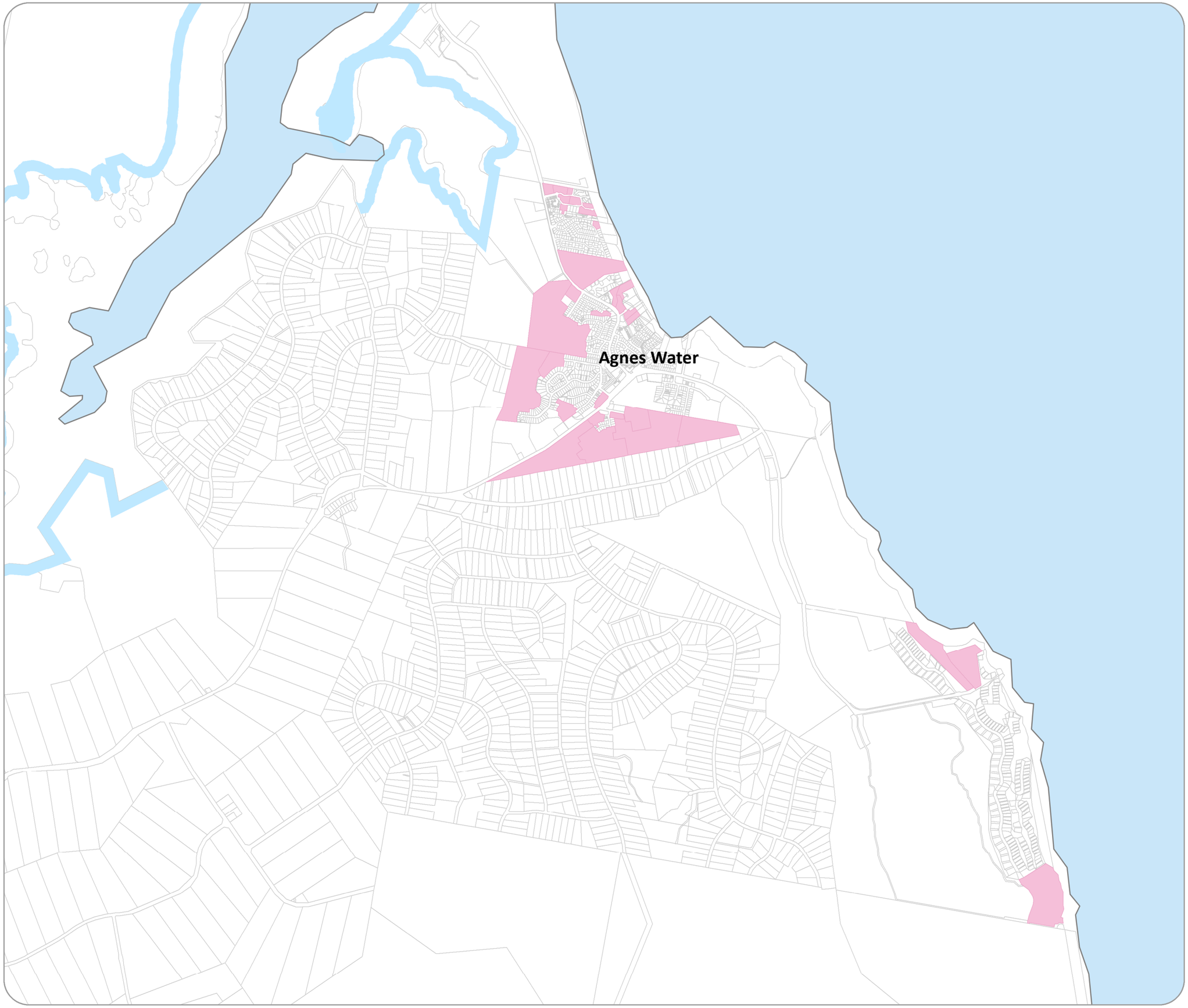
0 0.25 0.5 1 1.5 km

1:40,000

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 04



L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

AGNES WATER

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Priority Infrastructure Area
- Priority Development Areas (previously Urban Development Areas)
- Constrained Land
- Cadastral Bounadry
- Local Government Areas
- Ocean

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

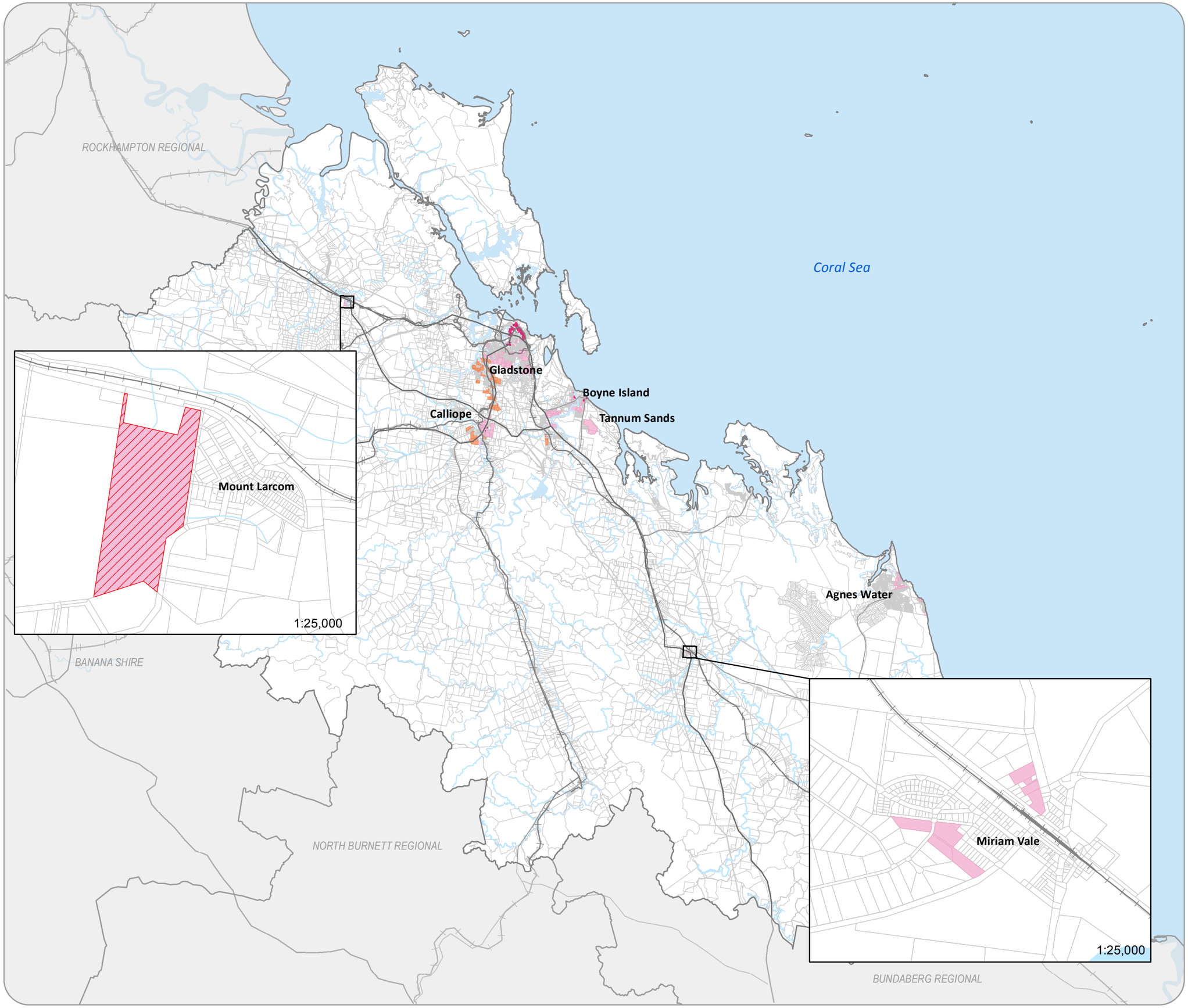
Projection: GDA 94 Zone 56

0 0.25 0.5 1 1.5 km **1:35,000**

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 05



L E G E N D

Gladstone Region - Residential Land Mapping and Analysis

OTHER AREAS

- Railway
- Waterway
- Greenfield Identified Housing Supply
- Infill Opportunity Site - Urban Revitalisation Neighbourhoods and Mixed Use Centres
- Rural Residential Identified Housing Supply
- Constrained Land
- Cadastral Bounadry
- Local Government Areas
- Ocean

GLADSTONE REGIONAL COUNCIL

Author: EM
Checked: DM & MM
Date: 7/06/2013

Data Source: QGIS 2012 & see note below

Projection: GDA 94 Zone 56

0 5 10 20 km

1:600,000

Note:

The Long Term Housing Supply Study has combined a collection of information and statistics including the Broad Hectare Study (2011and 2012), Housing Needs Assessment 2010, Planning Scheme Analysis 2012, Urban Design Study 2012 and GRC Major Development Snapshot (Dec 2012). Please refer to report for further information.

Map: 06