BRISBANE CITY PLAN 2000

WATER SUPPLY INFRASTRUCTURE CONTRIBUTIONS PLANNING SCHEME POLICY

July 2009

BRISBANE CITY

Dedicated to a better Brisbane

TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS

BCC	Brisbane City Council
BW	Brisbane Water
BIPA	Building and Integrated Planning Amendment Act 1998
CA	Cost Apportionment
CBD	Central Business District
DLGP	Department of Local Government and Planning
DSS	Desired Standard of Service
EP	Equivalent Person
ET	Equivalent Tenement
GFA	Gross Floor Area
ICU	Infrastructure Contribution Unit
IPA	Integrated Planning Act 1997
IPOLAA	Integrated Planning and Other Legislation Amendment Bill 2003
LP	Local Plan
NPV	Net Present Value
PSP	Planning Scheme Policy
PV	Present Value
QSAM	Queensland Small Area Projection Model
SLA	Statistical Local Area
WI	Water Infrastructure
WTP	Water Treatment Plant

1 INTRODUCTION

The purpose of this Water Supply Infrastructure Contributions Planning Scheme Policy (PSP) is to provide background and contributions information on infrastructure for the water supply network of Brisbane. This PSP is to be read in conjunction with:

(a) IPA Section 6.1.20 (Planning Scheme Policies for Infrastructure).
(b) IPA Section 6.1.31 (Conditions about Infrastructure for Applications).
(c) Brisbane City Plan 2000.
(d) All adopted Infill and High Growth PSPs.
(e) Water Supply Executive Master Planning Studies.

1.1 PURPOSE

The *Integrated Planning Act 1997* requires integration of land use and infrastructure planning that allows infrastructure to be supplied in a coordinated, efficient and orderly manner. Infrastructure coordination encourages development in areas where infrastructure already exists or can be efficiently provided and has a major influence on achieving sustainable development.

Infrastructure contributions in general urban areas of the City will usually be addressed by way of the low growth PSPs which are also referred to as Infill PSPs. Development in these areas is, by its nature, fragmented. In consequence, the definition of the networks, and forecasting of variations in network capacity and usage will necessarily be less accurate than would be the case in more consolidated growth locations.

1.2 AUTHORISING LEGISLATION

This PSP is made pursuant to IPA Section 6.1.20.

IPA allows for the imposition of conditions on development approvals requiring contribution of land, works or money towards the cost of supplying infrastructure in accordance with planning scheme policies, until 30 June 2009 or if the Minister, by gazette notice, nominates a later day for the planning scheme—the later day. Infill and High Growth Infrastructure Contributions Planning Scheme Policies 1 to 14 identify the infrastructure contribution mechanisms for transport, community purposes, water supply, sewerage and waterways for High Growth and Infill Areas throughout the City.

Pursuant to Section 6.1.20 (2) this policy states each of the following –

Table 1.1 - Compliance to Section 6.1.20 of the Integrated Planning Act

Requirement	Reference
A contribution for each development infrastructure network identified in the policy	Section 2
The estimated proportion of the establishment cost of each network to be funded by the contribution	Section 7
When it is estimated the infrastructure forming part of the network will be provided	Appendix A
The estimated establishment cost of the infrastructure	Appendix A Section 7
Each area in which the contribution applies	Section 2 Map 1
Each type of lot or use for which the contribution applies	Section 2
How the contribution must be calculated for each area in which the contribution applies and each type of lot or use for which the contribution applies	Section 2

1.3 DEFINITION OF TRUNK INFRASTRUCTURE

IPA differentiates between trunk and non trunk infrastructure. Trunk infrastructure is the infrastructure for which Council will levy infrastructure contributions under this PSP.

1.3.1 The Definition of Non Trunk Infrastructure

Non trunk infrastructure is development infrastructure that is not trunk infrastructure.

1.3.2 The Definition of Trunk Infrastructure

Trunk infrastructure is higher order development infrastructure supplied by the local government or State infrastructure provider and primarily intended to provide network distribution and collection functions or provide services shared by a number of developments.

The Water Supply PSP sets contributions for the trunk water supply network that services the future population including:

- Bulk supply and treatment, reservoirs, pump stations, booster stations, and pipes.
- Augmentation or replacement of the existing network (where capacity has been exceeded as a result of ultimate flows).

The water supply network is essentially a pressurised reticulated network of pipes that provides a water service to individual properties. Within the water supply network each element within the network is shared and can be identified in relation to the network hierarchy. The shared system for water supply corridors is for regional and reticulation mains down to (and including) 200mm diameter. It should also be noted that the reticulation network contains a planned component and may contain a component that cannot be planned. For example it may depend upon the form and timing of development in the area.

The hierarchy in the water supply network chosen for the Water Supply Infrastructure Contributions PSP is shown in the following figure.

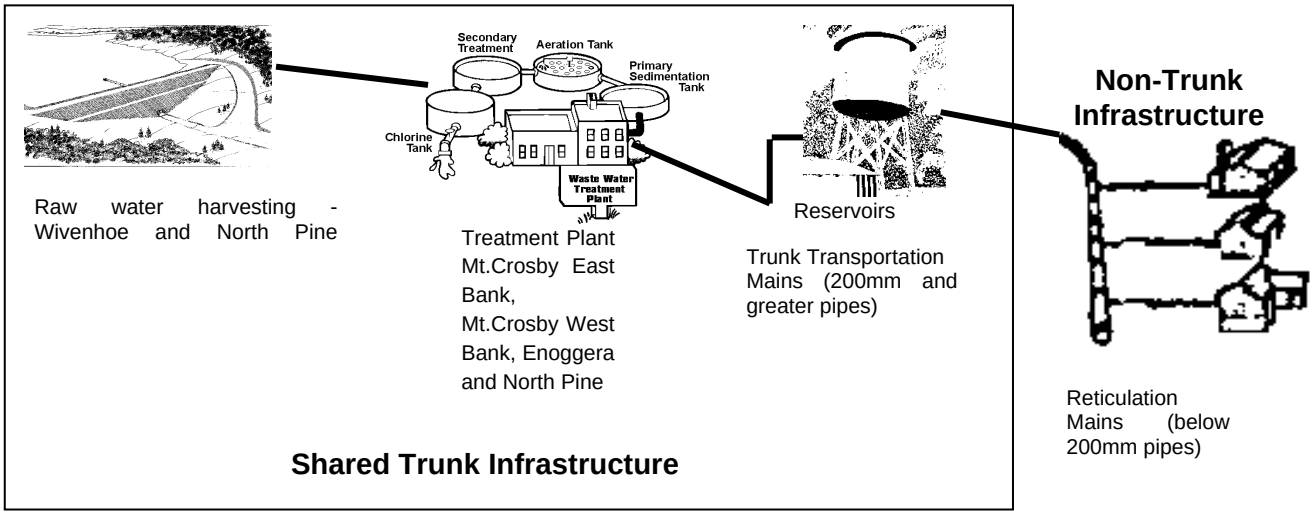


Figure 1.1: Elements generally considered to be shared infrastructure and included in the Infrastructure Planning Scheme Policy.

1.3.3 Items Excluded from Infrastructure Planning Scheme Policies

In addition to paying an infrastructure contribution, developers must also demonstrate that all infrastructure requirements have been satisfied.

In general, there will be elements of local infrastructure required to connect a site or development area to the trunk infrastructure networks. This work is attributable to the development and is over and above the infrastructure contribution defined through a PSP. It is also the responsibility of the developer to provide services to the property boundary of land for community purposes near any planned buildings or facilities.

In certain circumstances, a development may need special types of infrastructure, which were not considered in the PSP. For example, industrial development may require grease traps to prevent pollutants from escaping into local waterways.

A development may also require temporary work if the regional infrastructure has not yet been constructed. This is most likely to occur when the proposed development is outside the assumed sequence of development. Many of these items can be removed once the regional infrastructure has been provided. For example, a local detention pond may be required where a regional corridor has not yet been acquired. The site of the local detention basin could be developed for other purposes once the corridor has been acquired and associated work undertaken.

The cost of these types of infrastructure will not be offset against the contributions set in the PSP.

1.4 OVERVIEW OF WATER INFRASTRUCTURE IN BRISBANE

The water supply assets of Brisbane City Council comprise:

- Four (4) small dams - Enoggera, Lake Manchester, Mt. Crosby Weir and Gold Creek
- Four (4) Water Treatment Plants - Mt. Crosby East Bank, Mt. Crosby West Bank, Enoggera and North Pine
- Seven (7) bulk water reservoirs
- Six (6) major pump stations
- Trunk mains - 537km
- Water boosters and distribution system.

The South East Queensland Water Corporation manages the major raw water supplies in the region and it allocates water from Wivenhoe and North Pine Dams to meet the competing demands.

Brisbane City Council (BCC) and Brisbane Water (BW) provide raw water treatment and bulk treated water transportation to its Brisbane customers and the adjoining local authorities of Logan, Pine Rivers, Ipswich and Redcliffe. Total design capacity of the existing water treatment plants (WTP) is 1,260ML/d. The two water treatment plants at Mt. Crosby are the key facilities, with North Pine Water Treatment Plant (WTP) operated during the warmer months of the year.

There are seven bulk water service reservoirs with a combined capacity of 637ML that supply water to the bulk water customers, and the retail water customers in Brisbane City. Six bulk water pumping stations supply bulk water customers and fill service water reservoirs for the retail water customers.

The trunk mains supply water to all the bulk treated water customers at defined connection points to their distribution systems, as well as into service reservoirs for the Brisbane City

residents. The trunk mains and reticulation system within Brisbane City distribute the water to residents, industry and commercial users.

Council has established Customer Standards of Service requirements for quality, pressure and volume of flow. The water supply treatment and distribution system is assessed against these standards. As the City grows and further demands are placed on the water supply network, augmentation works, for example additional trunk mains, are constructed to ensure that the water supply network continues to perform satisfactorily.

The ongoing assessment and forward planning process for the distribution system is undertaken by the development of Water Supply Network Master Plans. Currently there are twenty-four master plans covering the Brisbane area.

Map 1 shows the overall study area for the Water Supply Infrastructure Contributions PSP, along with a breakdown of catchments that formed the basis of separate master planning studies. The master planning studies are aimed at determining the optimum solution and timing for efficiently and effectively augmenting the water supply transportation system and accordingly form the basis of the infrastructure contribution areas. The study area excludes all non-serviced areas.

1.5 FORECASTS OF DEVELOPMENT & COST IMPACT ASSESSMENT

The time horizon for the PSPs extend to 2016. Infrastructure required beyond this horizon may also be included in the plans for infrastructure, particularly for major infrastructure items if development occurring now will use, or benefit, from such infrastructure, in the future. The forecasts of development are detailed in Section 4.

Assumptions have been made about the likely sequence of development and the staging of infrastructure. Contributions are based upon these assumptions. Development that is inconsistent with the type, scale, location and timing of development as set out in the City Plan is considered to be inconsistent with the planning assumptions underlying the infrastructure contributions and will be subject to cost impact assessments. If development does not achieve the planned densities as set out in the City Plan, the infrastructure contributions will still be assessed in accordance with planned densities.

Some sites are not included in network contribution areas. These sites will be subject to cost impact assessments.

1.6 DESIRED STANDARDS OF SERVICE

The desired standard of service (DSS) is detailed within Section 5. The DSS sets a benchmark for the standard of performance or service to be provided. The DSS are characterised by two types of criteria:

- Planning criteria which define the form or shape of the network; and
- Design criteria which define the nature, scale or size of items in the network.

Planning criteria determine the preferred form and function of the network in question. Design criteria are used to define the detailed specification of individual items in a network. They are usually drawn from State or Commonwealth legislation, technical guidelines/standards and Council policy.

Important considerations to note in the development of DSS for each individual infrastructure network include:

- A network designed to the DSS may not necessarily be the lowest cost solution;
- The DSS might not be attained throughout the development period. In most cases they represent the long-term, rather than minimum, design requirement; and

- Current standards are greater than when many existing urban areas were established. In these circumstances, it should not be implied that Council will seek to achieve the DSS for each network.

The DSS for the Infill Area of Brisbane additionally provides the minimum standards for the high growth areas of the City. In some high growth areas the DSS is further detailed in the PSP as these areas have been subjected to more detailed planning and would normally have infrastructure items planned that contribute to the DSS. Some high growth areas located in historically older suburbs are unable to achieve the DSS due to factors such as the constraints of topography or a lack of space. In this case an alternative standard will be developed.

1.7 INFRASTRUCTURE CONTRIBUTION TRIGGERS

Infrastructure contributions for trunk infrastructure arising from:

- Reconfiguring a Lot,
- A Material Change of Use,
- A combined reconfiguring and material change of use,
- A building application,
- Any other assessable development that increases the demand for trunk infrastructure.
- Preliminary approval to which IPA Section 3.1.6 (Preliminary Approval may Override Local Planning Instrument) applies; where the development which is the subject of the preliminary approval is stated to be self assessable development.

1.8 OVERVIEW OF CALCULATING CONTRIBUTIONS

The total infrastructure contribution for the water supply infrastructure network is expressed in infrastructure contribution units (ICUs). Summary contribution tables and calculation formulae are contained in Section 2.

1.8.1 Measures of Development and Demand for Network Capacity

Land use is defined in terms of development units. In established areas, these units are dwellings in the case of residential development and gross floor area in the case of non-residential development. In greenfield areas development units are developable hectares for both residential and non-residential development. Development units are converted into units of demand for specific infrastructure networks by using a land use and network specific conversion rate.

By expressing demand in relative terms across land uses, a range of different uses can have their demand defined through a single index, the Unit of Demand. In established areas, this relative unit of demand is the Equivalent Tenement or ET, and is the consumption of capacity of a network by one low-density dwelling. In greenfield areas Equivalent Hectare or EH, and is the consumption of the capacity of a network by one developable hectare of low-density residential development. The relationship is expressed in the following equation:

Units of Demand (ETs or EHs) = (conversion rate) x No. of Development Units.

The demand measure relevant for this PSP is stipulated in relevant parts of the document.

1.8.2 Infrastructure Credits

An infrastructure credit represents the value of infrastructure contributions or payments imputed to have previously been made over the site by:

- Any existing lawful use(s) that exists or existed on the land which is the subject of an infrastructure contribution assessment, at the time the assessment (or the application being lodged with Council) is made, where a contribution has been made which accords with the requirement for the relevant network.

- A self assessable residential use on that land permitted at the time of the assessment.

Existing lawful development will be credited at infrastructure credit rates specified and expressed as ICUs.

1.8.3 Infrastructure Offsets

An offset may be allowed where a developer will undertake trunk infrastructure works that are part of the PSP. The amount of this offset is to be determined by Council, deducted from the calculated infrastructure contributions and expressed as ICUs.

A development may be conditioned or agreement reached (via an Infrastructure Agreement) to supply certain items of trunk infrastructure as part of a development. In such instances, the value of that infrastructure identified in the relevant PSP will be offset against the contribution for the relevant network. For example, where Council has approved the construction of works or dedication of land in fee simple, the value of these works or land will be offset against the assessed infrastructure contribution where an agreement is reached with Council to do this.

1.9 CONDITIONING OF INFRASTRUCTURE CONTRIBUTIONS

IPA allows for the imposition of conditions on development approvals requiring contribution of land, works or money towards the cost of supplying infrastructure in accordance with IPA Section 6.1.31(c).

1.10 PAYMENT OF INFRASTRUCTURE CONTRIBUTIONS

1.10.1 Timing of Payment

The infrastructure contributions must be paid as follows:

a. Reconfiguration of a lot – before Council approves the plan of subdivision.
b. Building application – before the certification of classification for the building work is issued.
c. Material change of use – before the change happens.

If a), b) and c) do not apply – as stated in the development approval.

1.10.2 Methods of Payment

Monetary payment can by paid by cash, credit card, EFTPOS or cheque at Council Customer Service Centres.

1.10.3 Infrastructure Agreements

Infrastructure Agreements (IAs) is an agreement about payment for, or supply of, infrastructure. Council may consider entering into an IA in certain situations, for example to:

a) Vary the amount, the timing or the form of payment of an infrastructure contribution (e.g. to allow the applicant to supply works or land in lieu of part or all of the contribution).
b) Provide the terms on which a refund would be provided.

IAs may be used in High Growth or Infill Areas when future growth is associated with a single or limited number of developers and the planning for infrastructure, costing and cost apportionment can be clearly associated with the development in question.

1.11 FINANCIAL IMPACT OF INFRASTRUCTURE CONTRIBUTIONS

Council is currently largely supplying the type of infrastructure identified in the PSPs across the city. At the present time developer contributions may not reflect the true cost of this infrastructure and in some cases contributions are limited only to water, sewer and parkland. The introduction of a city wide charging scheme will apply contributions for the five infrastructure networks to all development across the city ensuring that appropriate contributions are made toward trunk infrastructure provision. Adoption of infrastructure contributions for infill areas will help to alleviate Council's financial burden of providing service infrastructure.

1.12 IMPLEMENTATION

Prior to the introduction of the Water Supply PSP, water supply headworks charges under *Brisbane CityPlan 2000 Infrastructure Contributions Planning Scheme Policy 2* (PSP2) governed the determination of charges with respect to water supply infrastructure.

Applications lodged prior to the effective date of implementation of the Water Supply PSP will continue to be governed by the provisions of PSP2. Such applications will however be subject to changes in rates associated with ICUs. Assessment managers are also authorised under IPA Section 3.5.6 to give weight to the provisions of the Water Supply PSP in assessing applications that were lodged but had not entered the decision stage before the date of the Water Supply PSP's introduction.

Applications lodged after the effective date of implementation of the Water Supply PSP will be governed by the Water Supply PSP contribution rates. These contribution rates allow for full cost recovery of water supply infrastructure.

2 SUMMARY OF INFRASTRUCTURE CONTRIBUTIONS

Calculation of water supply infrastructure contributions with applicable credits and offsets are to be calculated in accordance with Section 2.1 – Section 2.5 inclusive.

The cost of providing water infrastructure to support new development demands has been apportioned on a catchment basis to ensure a fair and equitable user pays system. As such, contributions have been developed on a catchment basis. These catchments are mapped in Map 1. Existing and future infrastructure is mapped in Map 2 Series.

Those catchments identified as full cost impact areas on the Full Cost Impact Areas Map (Map 2 Series) are areas where the cost of supplying supporting water infrastructure will be entirely at the cost of the developer. For these areas of Brisbane, developer's will be required to supply supporting water infrastructure at their own cost for development deemed appropriate on an infrastructure and town planning basis.

2.1 THE VALUE OF AN INFRASTRUCTURE CONTRIBUTION UNIT

The value of an ICU will be indexed on an annual basis applying increases for the prior calendar year to the Australian Bureau of Statistics 6427.0 Producer Price Indexes, Australia, Index Number 4121, Road & Bridge Construction Queensland. The value of an ICU for the 2009/2010 financial year is $1.84.

2.2 THE VALUE OF AN INFRASTRUCTURE CONTRIBUTION UNIT

Planned minimum density will be used to calculate the minimum charges payable in certain circumstance. The charge is based on the proposed development density or planned minimum density, which ever is the greater. The relevant circumstances are outlined in Table 2.1 below.

Table 2.1: Planned Minimum Density Application Matrix

	ROL	MCU
Residential Development	Yes	Yes
Non-Residential Development	Yes	Yes
Non-Residential Development - Extension to an Existing Building	N/A	No

2.3 CALCULATION OF CHARGES

2.3.1 Reconfiguration of a Lot

Council's master planning for water supply is based on achieving a planned level of development intensity in certain areas of the city. The integrity of Council's infrastructure planning and contributions relies on achieving these planned densities. Council adopts a minimum density of development for a site, regardless of the number of allotments, or development density being proposed. In areas where the proposed number of allotments or developed density does not achieve Council's planned minimum densities, the greater of the number of ETs determined from Table 2.4 will be used for assessing the infrastructure contribution.

The infrastructure contribution can be calculated as follows:

1. Identify the catchment within which the site falls (Maps 1 and 2).
2. Identify the corresponding infrastructure contribution rate for the catchment (ICUs/ET) (Table 2.2).
3. Identify the proposed number of lots.
4. Identify the density by City Plan Area Classification (ET/Ha) (Table 2.4).
5. Using the greater number from steps 3 and 4, calculate the infrastructure contribution using the formula below.
6. Deduct any applicable credits or offsets (Section 2.5)

Infrastructure Contribution ($)	**=**	***No of ETs****	***X***	***Infrastructure Contribution rate per Water Catchment (Table 2.2)***	***X***	***Value of an ICU ($)***

**** No. of ETs = No. of Lots x Corresponding Area Classification ET per Lot Rate (Table 2.4)***

OR

No. of ETs = No. of Hectares x Corresponding Area Classification ET per Hectare Rate (Table 2.4)

Whichever is the greater.

2.3.2 Material Change of Use

A development is assessed according to its demand for water supply infrastructure in terms of equivalent tenements (ETs). An ET is the demand for infrastructure generated by one detached dwelling. The ET conversion rates for different development types to be used in calculating the contribution are identified in Table 2.3. For all development except a detached dwelling, the number of ETs payable will be the planned minimum densities per hectare identified in Table 2.4.

The infrastructure contribution can be calculated as follows:

1. Identify the catchment within which the site falls (Maps 1 and 2)
2. Identify the corresponding infrastructure contribution rate for the catchment (ICUs/ET) (Table 2.2).
3. Identify the number of development units (no. of dwellings or m^2 GFA) and the ET conversion rate (Table 2.3).
4. Identify the number of hectares and minimum ET Density by City Plan Area Classification (Table 2.4)
5. Identify the value of an ICU
6. Calculate the infrastructure contribution using both formulas below.
7. Adopt the greater of the two answers.
8. Deduct any applicable credits or offsets (Section 2.5)

Infrastructure Contribution ($)	**=**	***No of development units***	***X***	***Infrastructure Contribution rate for Water sub-catchment (Table 2.2)***	***X***	***ET conversion rate for type of development (Table 2.3)***	***X***	***Value of an ICU ($)***
				OR				
Infrastructure Contribution ($)	**=**	***No of hectares***	***X***	***Infrastructure Contribution rate per Water sub-catchment (Table 2.2)***	***X***	***Minimum ET Density by City Plan Area Classification (Table 2.4)***	***X***	***Value of an ICU***
Whichever is the greater.								

2.4 CALCULATION TABLES

Table 2.2 - Infrastructure Contributions Per Contribution Area

Contribution Area		Infrastructure Contributions (ICUs/ET)					
		Local Distribution	Shared Distribution	Bulk Transport	Bulk Supply & Treatment	Preparation Charge	Total Contribution
1	Acacia Ridge	1815	598	1342	867	5	4627
2	Aspley	2080	598	1342	867	5	4892
3	Australia TradeCoast	4506	383	860	556	5	6310
4	Bartleys Hill	3873	598	1342	867	5	6685
5	Bracken Ridge	2045	598	1342	867	5	4857
6	Eildon Hill	2258	598	1342	867	5	5070
7	Ferny Grove	4308	598	1342	867	5	7120
8	Forest Lake	2853	598	1342	867	5	5665
9	Green Hill	1373	598	1342	867	5	4185
10	Inala	2079	598	1342	867	5	4891
11	Karana Downs	3409	598	1342	867	5	6221
12	Kuraby North/Karawatha	1466	598	1342	867	5	4278
13	Manly Roles Hill	2732	598	1342	867	5	5544
14	Milne Hill/Stafford	2504	598	1342	867	5	5316
15	Mt Crosby North	1948	598	1342	867	5	4760
16	Mt Crosby South	1716	598	1342	867	5	4528
17	Mt Gravatt / Holland / Toohey	2166	598	1342	867	5	4978
18	Mt Ommaney	2556	598	1342	867	5	5368
19	North Pine Aspley	1097	598	1342	867	5	3909
20	Richlands	1571	598	1342	867	5	4383
21	Rochedale	2753	598	1342	867	5	5656
22	Sparkes Hill	2611	598	1342	867	5	5423
23	Stretton	2015	598	1342	867	5	4827
24	Tarragindi	3670	598	1342	867	5	6482
25	The Gap	3118	598	1342	867	5	5930
26	Wellers Hill	1353	598	1342	867	5	4165

Table 2.3 - Conversion Rates for Material Change of Use

TYPE OF DEVELOPMENT (from BCC City Plan 2000)	DEVELOPMENT UNIT OF MEASURE	ET CONVERSION RATE*
Detached dwelling	Dwelling	1.0
Single Unit Dwelling	Dwelling	0.8
Multi-unit dwelling In CR, LR or EC area In LMR area In MR area In HR	Self contained dwelling or shared facility (1-3 beds equals 1 measurement unit)	 0.8 0.7 0.5 0.4
Commercial/Education	m² of gfa	0.006
Light Industry	m² of gfa	0.0019
General Industry	m² of gfa	0.0024
Heavy Industry	m² of gfa	0.0048

**Unless Council determines otherwise, based on a higher or lower estimated demand for water supply infrastructure, by the particular development.*

Table 2.4 - Minimum Densities (Demand) by City Plan Classification

CITY PLAN AREA CLASSIFICATION	ASSUMED DENSITIES (DEMAND)
Residential	
Character Residential	1 ET per Lot or 14ET/Ha, whichever is greater
Low Density Residential	1 ET per Lot or 14ET/Ha, whichever is greater
Low-Medium Density Residential	1 ET per Lot or 25 ET/Ha, whichever is greater
Medium Density Residential	1 ET per Lot or 29 ET/Ha, whichever is greater
High Density Residential	1 ET per Lot or 30 ET/Ha, whichever is greater
Emerging Community	1 ET per Lot or 15 ET/Ha, whichever is greater
Multi-Purpose Centres	
City Centre MP1	40 ET/Ha
Major Centre MP2	32 ET/Ha,
Suburban Centre MP3	24 ET/Ha
Convenience Centre MP4	8 ET/Ha
Industry	
Light Industry	10 ET/Ha (18 ET/ha if in Australia TradeCoast area)
General Industry	12 ET/Ha(18 ET/ha if in Australia TradeCoast area)
Heavy Industry	12 ET/Ha(18 ET/ha if in Australia TradeCoast area)
Future Industry	12 ET/Ha(18 ET/ha if in Australia TradeCoast area)
Extractive Industry	1 ET Per Person engaged in the activity*
Community Use	
Community Facilities	7 ET/Ha
Education Purposes	7 ET/Ha
Emergency Purposes	7 ET/Ha
Health Care Purposes	24 ET/Ha
Utility Services	2 ET/Ha
Special Purpose Centre	
Major Hospital & Medical Facility	24 ET/Ha
Major Educational & Research Facility	7 ET/Ha
Major Defence & Communications Facility	1 ET Per Person engaged in the activity*
Major Sporting Stadium	12 ET/Ha
Entertainment Centre	12 ET/Ha
Airport	1 ET Per Person engaged in the activity*
Port	10 ET/Ha
Major Institution	14 ET/Ha
Correctional Facility	1 ET Per Person engaged in the activity*
The Brisbane Market	1 ET Per Person engaged in the activity*
Vehicle Sales & Service	7 ET/Ha
Mixed Industry & Business	24 ET/Ha
Office Park	24 ET/Ha
Cottage Industry / Retail	1 ET per Lot or 14 ET/Ha, whichever is greater
Marina	1 ET Per Person engaged in the activity*
South Bank	1 ET per Lot or 7 ET/Ha, whichever is greater

**Unless Council determines otherwise, based on a higher or lower estimated demand for water supply infrastructure by the particular development. Development that exceeds assumptions will be contributed accordingly on infrastructure demand and may be required to construct supporting infrastructure*

2.5 CREDITS AND OFFSETS

2.5.1 Credits

Infrastructure credits apply where:

- there is an existing lawful use;
- a previous payment was made under the planning scheme policy; and/or
- an applicant can prove previous contributions have been paid.

The amount of the credit will not exceed the amount of contribution payable. The value of the equivalent tenements is to be credited for each water supply catchment. Infrastructure credits are calculated as follows:

1. Identify the number of existing ETs;
2. Identify the credit rate for the relevant catchment;
3. Identify the value of an ICU;
4. Calculate the credit using the following formula.

Credit($)	***=***	***No of ETs****	***X***	***Credit per Water sub-catchment (Table 2.5)***	***X***	***Value of an ICU***

Number of ETs are to be determined as follows:

- *Where documentary evidence is provided, the number of ETs that a have previously been paid for.*
- *For a vacant lots, in the absence of documentary evidence of any previous contribution, 1 ET per lot.*
- *For other circumstances, in the absence of documentary evidence of any previous contribution, the number of ETs attributable to the **existing use** on site calculated in accordance with the following formula:*

No of ETs	***=***	***No of existing development units***	***x***	***ET conversion rate for type of development (Table 2.3)***

Table 2.5 - Infrastructure Credits Per Catchment Area

	PSP Catchment	Credits (ICUs per ET)
1	Acacia Ridge	4622
2	Aspley	4887
3	Australia TradeCoast	6305
4	Bartleys Hill	6680
5	Bracken Ridge	4852
6	Eildon Hill	5065
7	Ferny Grove	7115
8	Forest Lake	5660
9	Green Hill	4180
10	Inala	4886
11	Karana Downs	6216
12	Kuraby North/Karawatha	4273
13	Manly Roles Hill	5539
14	Milne Hill/Stafford	5311
15	Mt Crosby North	4755
16	Mt Crosby South	4523
17	Mt Gravatt / Holland / Toohey	4973
18	Mt Ommaney	5363
19	North Pine Aspley	3904
20	Richlands	4378
21	Rochedale	5560
22	Sparkes Hill	5418
23	Stretton	4822
24	Tarragindi	6477
25	The Gap	5925
26	Wellers Hill	4160

** Excludes subsidies*

2.5.2 Offsets

An offset may be allowed where an applicant will undertake trunk infrastructure works that are identified in this PSP. The amount of this offset is to be determined by Council, deducted from the calculated infrastructure contributions and expressed in ICUs.

3 METHODOLOGY

This section outlines the methodology used to prepare the Water Supply Infrastructure Contributions PSP and associated Water Supply Master Planning Studies.

3.1 MASTER PLANNING STUDIES

The water supply catchments formed the basis of separate master planning studies and infrastructure contribution areas. Each study aimed to determine the optimum solution and timing for efficiently and effectively augmenting the water supply transportation system of the catchment(s) to enable the network to achieve the desired standard of service. Below is a general overview of the steps undertaken in order to determine existing and future infrastructure requirements. Specific details of the modelling techniques used are contained in each of the Water Supply Master Planning Studies.

1. Identification of existing water supply infrastructure within the catchment and where necessary, infrastructure outside the catchment which impacts on or supports water supply transportation to the catchment. The age and condition of mains, where known, were also determined for consideration in developing augmentation/replacement strategies.

2. Establishment of potential development profiles for each catchment area, and growth patterns and trends, which will impact on the water demand for the catchment area into the future. Perform a sensitivity analysis on the forecast development of water demands and review the implications for augmentation.

3. Building and calibration (based on historical data from pressure gauges and flow meters) of a detailed (all mains) model for each catchment using the MikeNet software package. Infrastructure capital works and augmentation were focused on 200mm diameter mains and greater.

4. Hydraulic analysis of the network using a computer (MikeNet) model. Models were required for the existing conditions and for each forecast and augmentation scenario considered.

5. Review and address the implications on the network to meet fireflow requirements.

6. Determination of existing network performance and comparison with the desired standards of service for water delivery to customers.

7. Examination and analysis of the augmentation options that are available, to meet the forecast scenarios and the desired standards of service.

8. Analysis, including computer modelling, of the water supply network in the relevant catchment. This determines the capability of projected infrastructure works to meet forecast scenarios. Where required alternative plans of integrated infrastructure capital works were developed.

9. Assessment of the estimated capital expenditure and a net present value economic analysis of options, where applicable, were undertaken in order to define the optimal solution.

10. Recommendation of the preferred option and development of a capital works program and cash flow. The costs and timing of the recommended augmentations were used in the cost apportionment process, as discussed in Section 7.

4 FORECAST DEVELOPMENT

4.1 INTRODUCTION

4.1.1 Context

Relationship to SEQ Regional Plan and Local Growth Management Strategy

The projections put forward in this document do not accord with the SEQ Regional Plan (SEQRP) which has set higher growth targets than previously envisaged by Brisbane City Council.

The projections in this document were prepared prior to the SEQRP being completed and were subsequently used to undertake detailed infrastructure planning which was largely completed prior to the SEQRP being finalised. Because of the detailed technical analysis and processes required to develop infrastructure plans the timeframes for the completion of projections through to finalisation of infrastructure contributions has taken a number of years.

In response to the SEQRP Council has been required to prepare a Local Growth Management Strategy which addresses the requirements of the regional plan including accommodation of additional growth. Because the LGMS will require the accommodation of additional growth, both population and employment, the demands on infrastructure will be increased.

Following the approval of the LGMS by Council and State Government a revised set of development projections will be able to be prepared and revised infrastructure planning undertaken. At that time this policy will be revised to reflect the revised figures.

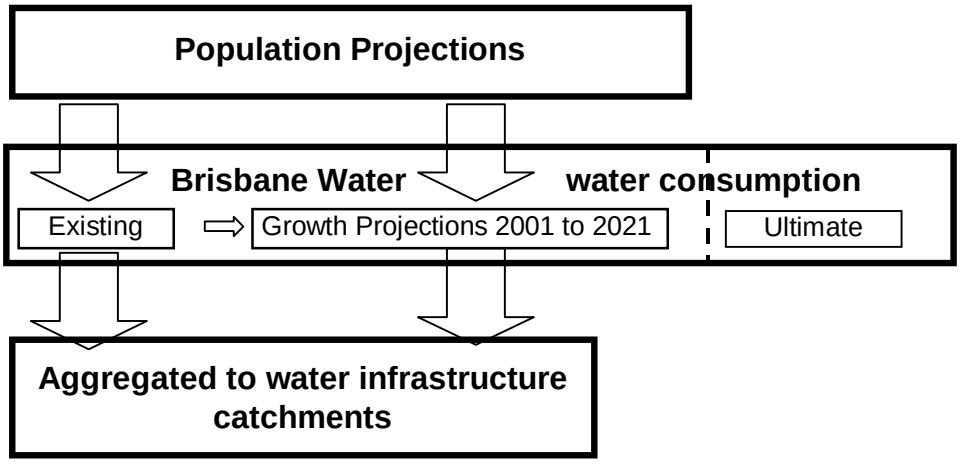
4.1.2 Purpose

This section explains the forecasts of future population and non-residential floor space used in the preparation of the Infill PSPs. To ensure consistency and compatibility between all Infill PSPs a single set of development forecasts has been used. The forecasts have supported the planning and design of infrastructure networks and the calculation of infrastructure contributions. Council does not support use of the forecasts for any other purpose.

4.1.3 Relationship to Water Supply Catchments

The forecasts have been completed for the whole of Brisbane City Local Government Area (LGA) except for the Statistical Local Area (SLA) of Karana Downs-Lake Manchester (see Figure 4.4). For the purposes of preparing the Water Supply PSP the forecast development data set has been further aggregated to align with the relevant water supply catchments. The information outlined below provides an overview of the allocation method used to determine forecast development for each water supply catchment.

Figure 4.1 Structure of Population Forecasts Methods



In order to validate and align forecast development to the water catchments three sources of information were utilised, being:

- Sewerage Catchment Areas Estimation Program or Sewerage Network Population Program (SNPOP) - this is a population estimation program that assesses existing equivalent persons (EPs) based on metered customer usage, including assessment of trade-waste, for each property in Brisbane.
- QSAM – the Queensland Small Area Projection Model forecasts future population rates based on dwelling counts, land availability, development trends and intercensal information.
- Observed ultimate development yields based on City Plan 2000 area classifications and Local Area Plan.

From the above data sources, the existing population for each water catchment, at a property parcel, was calculated by calibrating the SNPOP data with the base population defined in the QSAM model.

Growth projections to the year 2031 were based on the trend outputs of the QSAM model, with the data being converted to EPs at a property parcel level. An ultimate EP rate for each water supply catchment was calculated by applying an assumed EP density for each area classification in City Plan 2000. The results of the ultimate EP rates when modified to take into account, Local Area Plan densities, QSAM projections and known existing and future major uses.

All projections were produced for equivalent population (EP). For water planning, this was then converted to equivalent tenements (ET) at the following rates (Table 4.0).

Table 4.0 - Economic Analysis Summary

Code	Classification	EP/ET	Water ET/Person
LR	Low Density Residential	2.50	0.40
LMR	Low-Medium Density Residential	2.88	0.35
MR	Medium Density Residential	3.78	0.26
HR	High Density Residential	5.00	0.20
CR	Character Residential	2.50	0.40
EC	Emerging Communities	2.40	0.42
RU	Rural	1.24	0.81

4.1.4 Overview of Forecasts

Providing the foundation for all forecasts were the equivalent person (EP) estimates and forecasts. These are explained in Section 4.2. Created initially by Brisbane Water for the purpose of water supply and sewerage master planning, the EP forecasts provided a consistent basis for planning all infrastructure networks. The base spatial unit used for the EP forecasts was City Plan polygons, which are generally a single City block, i.e. an area of developed or developable land bounded by streets. This base unit enabled aggregation of the forecasts as required to suit the various catchments of the different infrastructure networks.

The EP forecasts were calibrated against population projections by SLA prepared by the Department of Local Government and Planning (DLGP). Those projections are explained in Section 4.3.

The EP forecasts also provided the starting point for estimates of non-residential gross floor area (GFA) and associated employment, which are calibrated against other GFA and employment estimates. The methods used to generate the estimates of GFA and associated employment are explained in Section 4.4.

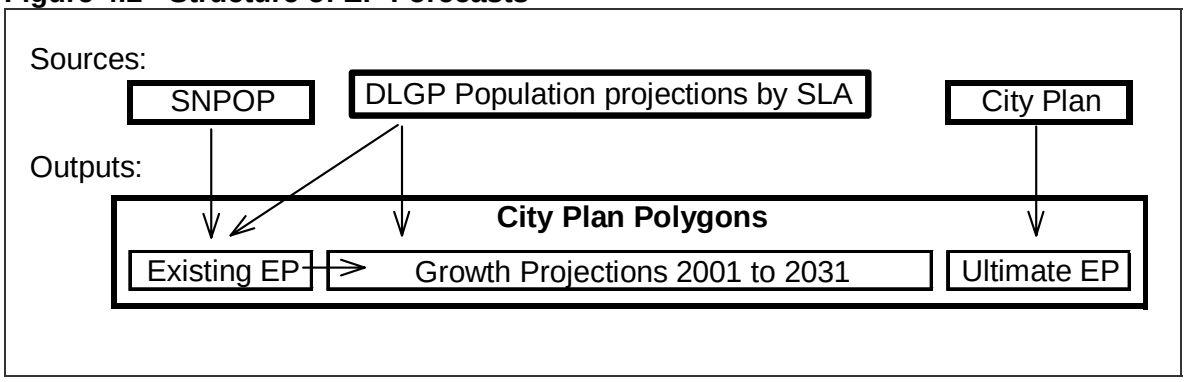
Section 4.5 includes a summary of the forecasts and projections by SLA. Individual Infill PSPs related to each infrastructure network explain how the forecasts have subsequently been used in that context.

4.2 EQUIVALENT PERSON FORECASTS

4.2.1 Overview of Method

Figure 4.2 provides a graphical overview of the derivation of the equivalent person (EP) forecasts.

Figure 4.2 - Structure of EP Forecasts



The following broad steps were taken in deriving the EP forecasts, which relate to the City Plan polygons as they existed in 2001:

- Brisbane Water's SNPOP was used to estimate the existing (2001) EP, split into residential and non-residential.
- The assumed ultimate EPs by polygon were estimated having regard to the relevant provisions of the City Plan as at 2001 and emerging policy changes at that time.
- The existing and ultimate residential EPs by polygon were calibrated against the DLGP population estimates and projections by SLA (see Section 4.5) and adjustments made to bring the EPs and DLGP estimates/projections into alignment.
- The growth pattern from the existing EPs to 2031 was determined, based primarily on the DLGP projections.

These broad steps are explained in more detail in the following respective Sections. A summary by SLA of the resulting EP forecasts is included in Table 4.1.

4.2.2 Estimates of Existing EPs using SNPOP

SNPOP extracted data from various BCC databases and manipulated it to calculate EPs for each property in Brisbane at the time the program was run. This data was aggregated to the City Plan polygon level and classified into residential and non-residential according to land use and City Plan area classification.

The residential EPs were derived using average occupancy rates in the relevant Collection District (CD) as at the 1996 Census. Separate rates were used for detached and attached dwellings.

The non-residential EPs were calculated as a fraction of average water usage, depending on land use, with the domestic or pedestal allowance assigned separately to the trade waste EPs.

4.2.3 Estimates of Ultimate EPs based on City Plan

The estimates of ultimate EPs had regard to the theoretical development potential under the City Plan, [including area classifications and Local Plans (LPs)], and policy changes emerging in 2001. However, the ultimate EPs did not generally assume the maximum

theoretical potential density. They took account of the prospects of reaching that density across all properties given the density of existing uses and historical patterns of development. This was supported by an analysis of achieved densities by City Plan area classification. For some polygons the existing EPs were assumed to be carried forward as the ultimate EPs, because they exceeded expected future densities based on this analysis.

4.2.4 Calibration of Estimates using DLGP Projections

The existing residential EPs, aggregated to the SLA level, were calibrated against the DLGP estimates, by SLA, of the existing (2001) population. The existing residential EPs at the polygon level were adjusted to match the DLGP population estimates in the following ways:

- Where the total EP by SLA was less than the DLGP estimate, the difference was assumed to be existing rural residential uses, i.e. areas without sewerage. The difference was therefore apportioned by land area to all City Plan polygons, within the SLA, with the following area classifications: Rural, Emerging Communities or Environmental Protection
- Where the total EP by SLA was greater than the DLGP estimate, for all polygons in the SLA the EPs were reduced proportionally to match the DLGP totals by SLA.

Where the ultimate residential EPs, aggregated to the SLA level, were lower than the DLGP projections to 2031, the ultimate EPs and DLGP projections were generally brought into alignment. However, in most SLAs the ultimate EPs exceeded the projections.

4.2.5 Determination of Growth Pattern 2001-2031

The growth pattern over time of the residential EPs, by polygon, was derived from the DLGP projections for the relevant SLA. The EP growth from 2001 to 2031 was allocated evenly until the ultimate EP of each polygon was reached.

For the non-residential EPs, a growth pattern similar to nearby residential was assumed. Overall there is projected to be a declining growth rate over time.

4.3 POPULATION PROJECTIONS

In July 2001 DLGP prepared population estimates for 2001 and projections to 2031, at five-yearly intervals, by SLA in Brisbane City.

The projections to 2021 were undertaken using the Queensland Small Area Projection Model (QSAM). This is the standard method used in Queensland for the preparation of projections for components of LGAs. In broad terms, QSAM allocates LGA-wide projections to SLAs based on past trends, land availability and identified major redevelopment projects. QSAM projects the number of dwellings, split into detached and attached, and converts those to population using assumed occupancy rates.

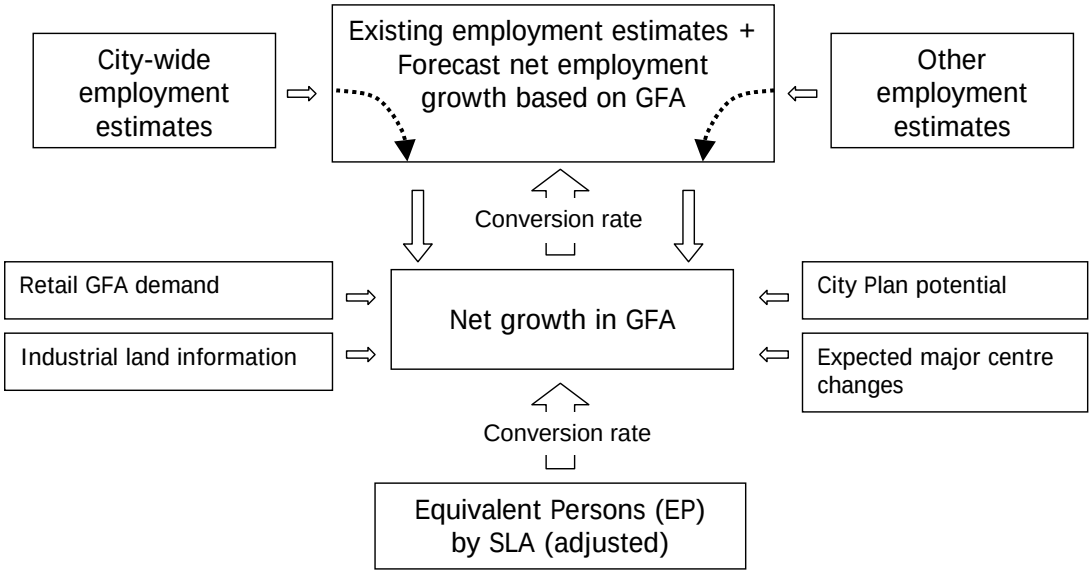
The projections for 2026 and 2031 were largely trend projections based on the rate of growth up to 2021.

4.4 NON-RESIDENTIAL FORECASTS

4.4.1 Overview of Method

Figure 4.3 illustrates the method used to derive and calibrate the projections of GFA and associated employment that were prepared to support infrastructure planning and contributions associated with the Infill PSPs.

Figure 4.3 - Summary of Determination of Non-Residential GFA and Employment



The following broad steps were taken in deriving the GFA and employment estimates and forecasts, from the EP forecasts, and calibrating them against other available estimates and projections:

- The non-residential EP forecasts were adjusted by removing large trade waste components and to reflect actual development patterns rather than estimates based on high sewerage generating activities.
- The non-residential EP forecasts were allocated to different development categories, i.e. industrial, retail, commercial and miscellaneous, and converted to GFA based on determined conversion rates.
- The GFA estimates derived from the EP forecasts were compared to other estimates of potential future GFA and some adjustments made.
- An estimate was made of existing (2001) employment by SLA based on a combination of sources, including conversion of existing GFA estimates to employment, the Workplace Health and Safety Register, the 1996 and 2001 Censuses and BCC's transport model (1999).
- Net employment growth was calculated from the GFA estimates, using the determined conversion rates, and then added to the estimate of existing (2001) employment to generate forecasts for employment by SLA to 2021.
- The employment forecasts by SLA were compared to an alternative estimate of potential employment City-wide to 2021, and other available projections by SLA, and also considered in the context of broader employment projections and trends and investment targets, resulting in some adjustments to the forecasts by SLA.

These steps are explained in more detail in the following respective Sections. A summary by SLA of the resulting GFA and employment forecasts is included in Table 4.2. Limitations of the forecasts include:

- They assume constant rates over time for GFA per employee and vacancy.
- They do not recognise the effect of any home business growth.

4.4.2 Adjustment of Non-Residential EP Forecasts

The non-residential EP forecasts were reduced by removing large trade waste components not reflected in existing GFA. Otherwise the GFA estimates (see Section 4.4.3) would have been distorted.

The EP forecasts for industrial areas were also reduced to better reflect actual development patterns rather than service standards that assumed high sewerage generating activities. This adjustment was informed by the rate used for conversion of EPs to GFA (see Section 4.4.3) versus the EP generation rate assumed by Brisbane Water.

4.4.3 Conversion of EP forecasts to GFA by SLA

To enable conversion of the EP forecasts to GFA the non-residential EPs were first allocated to different development categories, i.e. industrial, retail, commercial and miscellaneous. This allocation was based on City Plan area classifications.

The conversion rates from EPs to GFA were determined based on analyses of the infrastructure demand generated from different land uses, having regard to the EP forecasts, SNPOP and other sources (including Queensland Department of Business, Industry and Regional Development, 1992; Property Council of Australia, 2000a; Street Ryan, 1999). Each City Plan polygon was allocated a conversion category, but the conversions to GFA used a single conversion category for each development category in each SLA, based on the categories of all component polygons. The conversion category for each polygon was based on the City Plan area classification, the proportion of industrial land identified as available, whether located in the Australia Trade Coast and the existing (2001) EP density.

The conversion rates from EPs to GFA were only finalised after completion of the employment estimates explained in Sections 4.4.5 and 4.4.6 and adjustments to the GFA and employment estimates arising from the calibrations explained in Sections 4.4.4 and 4.4.7.

4.4.4 Calibration of GFA Estimates

The GFA estimates based on conversion of EPs were compared to other estimates of GFA, for particular development categories, and some adjustments made. Those other estimates of GFA included the following:

- Potential industrial GFA growth based on an assessment of the potential under City Plan given assumptions about the existing scale of development derived primarily from BCC's industrial land survey database (BCC, 2001).
- Retail GFA growth estimated based on the expected growth in household expenditure, as informed by various consultant's reports (Winter Consulting, 2001; Core Economics, 2001; John Larcombe and Associates, 2000). This was calculated using the DLGP dwelling projections by SLA (see Section 4.3) and identified retail expenditure per household. That expenditure was converted into an increase in GFA that was assumed required to service the increased expenditure. The estimated GFA increases were allocated to relevant centres at each level in the hierarchy.
- Future growth of commercial and retail GFA within the City Centre and major centres determined based on the advice of local planning officers with specific knowledge of individual centres and additional site specific information sourced from various reports (including CB Richard Ellis, 2002a, 2002b; PRD Nationwide Research 2002a, 2002b; Property Council of Australia, 2000b, 2001; Jone Lang LeSalle, 2002).

Revisions of the GFA estimates for the miscellaneous development category were informed by the employment forecasts and adjustments made to those forecasts (see Section 4.4.7).

4.4.5 Estimate of Existing Employment by SLA

Two initial estimates were made of existing (2001) employment by SLA, as follows:

- Estimates of existing (2001) GFA, as derived from the EP forecasts, were converted to employees based on assumed conversion rates of GFA per employee, those rates being different for different floor space types.
- Existing employment was derived through adjustment of the Department of Employment, Workplace Relations and Small Business' Workplace Health and Safety

Register (March 2001). Adjustments were made based on the Working Population data from the 1996 Census and employment inputs to BCC's transport model (1999).

The final estimates of existing employment by SLA were determined from the above two estimates, and preliminary working population estimates from the 2001 Census, in the following way:

- If the two estimates yielded similar figures the higher figure was used.
- Where the two methods yielded significantly different figures the 2001 Census figures were used to select the most appropriate figure.
- Where the two estimates could not be reconciled with the 2001 Census estimate the Census estimate itself was used.

4.4.6 Calculation of Employment by SLA

Net employment growth by SLA was calculated by converting the GFA estimates (see Section 4.4.3) using assumed conversion rates of GFA per employee, as for the existing employment (see Section 4.4.5). This net employment growth was then added to the existing employment to create employment forecasts by SLA to 2021 (at five-yearly intervals).

4.4.7 Calibration of Employment Forecasts

The employment forecasts by SLA were calibrated and reviewed in the following ways:

- An estimate was made of City-wide employment to 2021 (at five-yearly intervals) based on the DLGP population forecasts and ABS labour market statistics and unemployment rates. The working age population (15-65) was determined at each forecast date and that population multiplied by a participation rate to determine the number of people in the workforce. From this workforce the assumed unemployed population was removed, leaving the number of persons employed. Constant rates were assumed over the projection period for the rate of import/export of workers to and from Brisbane City and the Brisbane Statistical Division. The resulting estimates consistently exceeded, by about 5% or less, the City-wide totals reported in Table 4.2.

- The forecasts were compared to the following alternative projections by SLA:
  ~ Projections completed as part of the Brisbane 2011 plan (BCC, 1996).
  ~ Inputs to the Brisbane transport model (1999).
  Comparisons were made in terms of the projected employment as well as the employment growth and proportion of growth. These projections were used as a guide to highlight possible errors. They were particularly useful to check the employment growth related to the miscellaneous development category (see Section 4.4.3).

- Forecasts of employment growth across the south-east Queensland region have been prepared by DLGP as part of regional planning work. At the time of preparation of the employment forecasts those regional forecasts were not available by SLA, but by industrial classification across the region. BCC worked closely with DLGP to align the employment forecasts with those regional forecasts. As a result, the estimated employment growth relating to industrial areas in the outer sector was reduced.

- A review was made of recent employment trends using Census information, to ensure general economic changes were reflected in the employment forecasts.

- The forecasts were guided by and reviewed against the Investment Targets of the Economic Development Strategy (BCC, 1999).

4.5 SUMMARY OF TABLES OF FORECASTS

Tables 4.1 and 4.2, respectively, include:

- Summaries by SLA of the residential and non-residential EP forecasts - 2001, 2006, 2011, 2016, 2021, 2026, 2031 and ultimate EPs.
- Summaries by SLA of non-residential GFA and associated employment forecasts - 2001, 2006, 2011, 2016 and 2021.

Table 4.1 Summary of EP forecasts by SLA, 2001-2031 and Ultimate

			Residential EPs								Non-residential EPs							
SLA Name	SLA Code	2000 ERP	2001	2006	2011	2016	2021	2026	2031	Ultimate	2001	2006	2011	2016	2021	2026	2031	Ultimate
Acacia Ridge	1001	6674	6,832	7,091	7,352	7,585	7,584	7,632	7,659	7,704	4,573	6,782	8,563	9,721	10,416	10,833	11,093	11,811
Albion	1004	2337	2,378	2,382	2,394	2,393	2,412	2,491	2,537	2,619	1,479	1,566	1,626	1,660	1,682	1,697	1,709	1,756
Alderley	1007	4921	4,949	5,024	5,112	5,190	5,275	5,275	5,275	5,287	319	402	451	477	492	500	505	518
Algester	1012	7412	7,486	8,143	8,487	8,991	10,125	10,125	10,125	11,135	265	284	302	312	321	330	340	407
Annerley	1015	8859	8,906	9,008	9,102	9,175	9,259	9,831	10,173	10,252	659	710	742	763	776	784	791	816
Anstead	1018	1080	1,093	1,171	1,244	1,302	1,348	1,385	1,406	1,406	0	2	3	6	9	12	14	26
Archerfield	1023	609	612	623	626	635	649	649	649	732	2,962	3,722	4,323	4,761	5,063	5,263	5,393	5,740
Ascot	1026	4885	4,909	4,925	4,937	4,931	4,950	4,950	4,950	5,065	756	815	866	884	892	897	899	904
Ashgrove	1031	11466	11,507	11,559	11,558	11,472	11,401	11,401	11,401	11,930	1,128	1,170	1,195	1,215	1,232	1,249	1,264	1,344
Aspley	1034	11386	11,455	11,776	12,020	12,186	12,506	13,025	13,329	14,140	1,648	1,873	2,019	2,118	2,190	2,248	2,297	2,722
Bald Hills	1037	6124	6,204	7,067	7,876	8,627	9,158	9,766	10,131	10,639	476	572	688	836	1,001	1,163	1,308	2,002
Balmoral	1042	3577	3,610	3,645	3,706	3,784	3,906	3,963	3,996	4,080	91	93	94	95	95	95	95	95
Banyo	1045	4935	4,941	4,929	4,913	4,882	4,868	4,884	4,893	5,178	1,477	2,179	2,856	3,293	3,500	3,626	3,707	4,985
Bardon	1048	8749	8,819	8,886	8,892	8,858	8,913	9,158	9,300	9,300	592	654	693	729	767	807	846	1,053
Bellbowrie	1053	4418	4,639	5,884	6,626	7,341	7,674	8,141	8,420	8,579	90	133	185	234	270	294	309	353
Belmont-Mackenzie	1057	4120	4,211	4,562	5,066	5,557	6,073	6,073	6,073	6,073	0	49	61	71	85	103	122	270
Boondall	1064	7821	7,948	8,331	8,812	9,163	9,209	9,927	10,363	10,363	544	667	793	965	1,176	1,398	1,604	2,528
Bowen Hills	1067	958	1,146	1,302	1,753	1,753	1,753	1,759	1,766	1,970	3,400	3,522	3,673	3,770	3,828	3,862	3,882	3,930
Bracken Ridge	1072	14149	14,368	15,217	15,964	16,599	17,850	17,850	17,850	18,909	968	1,182	1,340	1,456	1,539	1,595	1,632	1,722
Bridgeman Downs	1075	5674	5,954	6,848	7,477	8,095	8,404	10,533	12,054	11,945	24	47	52	58	65	72	78	104
Brighton	1078	8816	8,849	8,958	8,925	8,852	8,833	8,895	8,930	9,122	739	885	969	1,020	1,050	1,068	1,078	1,102
Brookfield (incl. Mnt Ctha)	1083	3497	3,587	3,659	3,712	3,724	3,735	3,815	3,861	3,861	86	105	124	154	194	239	284	530
Bulimba	1086	4063	4,107	4,533	4,771	4,751	4,745	4,745	4,745	5,275	1,307	598	607	612	614	615	615	617
Burbank	1091	1189	1,188	1,181	1,170	1,147	1,127	1,127	1,127	1,127	18	203	391	662	997	1,350	1,674	3,093
Calamvale	1094	8747	8,869	10,425	13,338	16,296	16,927	16,927	16,927	19,200	317	395	491	580	649	697	731	860
Camp Hill	1097	9270	9,316	9,334	9,311	9,228	9,163	9,689	10,002	10,232	407	473	495	510	523	535	546	600
Cannon Hill	1102	3949	4,021	4,245	4,347	4,415	4,497	4,582	4,630	4,629	894	1,206	1,413	1,554	1,668	1,769	1,859	2,306
Capalaba West	1105	374	374	381	376	368	365	365	365	365	18	38	83	126	181	244	310	756
Carina	1113	9169	9,268	10,384	10,317	10,163	10,037	10,100	10,135	10,750	397	450	480	511	546	584	622	846
Carina Heights	1116	5846	5,885	6,076	6,140	6,175	6,217	6,217	6,217	6,601	219	307	365	396	412	420	425	434
Carindale	1108	12676	12,975	13,785	14,683	15,258	15,265	15,265	15,265	16,924	2,127	2,165	2,153	2,134	2,113	2,090	2,066	2,212
Carseldine	1121	6316	6,348	6,942	8,246	9,545	10,143	10,538	10,769	11,356	828	985	1,109	1,209	1,282	1,337	1,379	1,552
Chandler	1124	973	982	1,021	1,056	1,079	1,098	1,098	1,098	1,098	124	147	173	211	262	318	372	747
Chapel Hill	1127	10400	10,533	10,971	11,082	11,283	11,852	11,852	11,852	12,614	325	394	421	433	439	441	442	445
Chelmer	1132	2663	2,686	2,692	2,687	2,657	2,653	2,683	2,700	2,700	261	272	284	292	298	301	303	307
Chermside	1135	6156	6,188	6,228	6,254	6,242	6,244	7,041	7,549	7,584	4,777	5,051	5,253	5,392	5,480	5,533	5,565	5,637
Chermside West	1138	5985	6,016	6,067	6,138	6,191	6,204	6,204	6,204	6,727	281	303	315	324	332	340	346	379
City-Inner	1143	633	1,000	2,738	3,913	5,020	6,101	6,685	7,047	7,047	29,500	29,524	29,540	29,554	29,568	29,583	29,597	29,666
City-Remainder	1146	1549	1,653	1,914	2,192	2,460	2,730	2,878	2,966	3,087	10,243	10,307	10,351	10,382	10,405	10,425	10,441	10,528
Clayfield	1151	9472	9,525	9,640	9,713	9,755	9,810	10,066	10,213	10,545	784	815	825	829	831	832	833	834
Coopers Plains	1154	4371	4,416	4,656	4,726	4,821	4,934	4,934	4,934	4,934	2,400	3,272	3,913	4,345	4,632	4,830	4,973	5,497
Coorparoo	1157	13292	13,427	13,782	13,948	13,978	14,048	14,048	14,048	14,447	2,061	2,183	2,260	2,306	2,333	2,350	2,361	2,403
Corinda	1162	4304	4,334	4,425	4,521	4,611	4,703	4,884	4,989	4,989	608	743	853	928	972	997	1,011	1,049
Darra-Sumner	1167	3803	3,860	4,317	4,615	4,728	4,864	5,095	5,231	5,806	2,683	3,750	4,597	5,245	5,775	6,239	6,648	8,797
Deagon	1173	3263	3,274	3,276	3,254	3,210	3,178	3,319	3,401	3,481	355	439	487	511	524	531	534	544
Doolandella-Forest Lake	1176	13231	13,887	15,927	18,001	18,959	21,019	23,223	24,598	24,598	174	261	356	475	603	719	812	1,118
Durack	1184	6143	6,177	6,364	6,918	7,462	7,729	7,729	7,729	7,729	345	402	458	514	570	628	684	1,020
Dutton Park	1187	1279	1,282	1,486	1,551	1,637	1,678	1,678	1,678	1,735	144	149	153	160	169	180	192	263
East Brisbane	1195	4941	4,962	5,010	5,086	5,182	5,323	5,379	5,411	5,470	1,055	1,025	998	973	950	928	906	1,014
Eight Mile Plains	1198	10791	10,935	11,665	13,451	15,310	15,758	15,758	15,758	15,757	432	559	658	716	759	795	828	1,049
Ellen Grove	1203	3161	3,453	5,313	6,298	7,945	11,193	11,335	11,416	13,366	2	5	8	12	16	20	25	53
Enoggera	1206	6723	6,339	6,543	6,478	6,357	6,940	6,969	6,986	6,437	1,054	1,162	1,234	1,278	1,305	1,322	1,334	1,453
Everton Park	1211	8076	8,097	8,199	8,336	8,509	8,940	9,152	9,273	10,049	532	668	762	818	852	876	893	958
Fairfield	1214	2221	2,227	2,223	2,227	2,216	2,214	2,344	2,422	2,422	130	224	278	308	323	331	335	347

Ferny Grove	1217	5665	5,728	5,910	6,146	6,607	7,599	7,599	7,599	7,975	641	716	749	769	783	793	801	830
Fig Tree Pocket	1222	2856	2,920	3,272	3,709	4,490	6,026	6,250	6,381	6,992	362	412	426	435	441	446	451	488
Fortitude Valley-Inner	1228	1466	1,427	1,729	2,111	2,155	2,333	2,884	3,236	3,236	3,310	3,332	3,349	3,363	3,375	3,386	3,395	3,444
Fortitude Valley-Remainder	1233	1851	1,939	2,005	2,188	2,407	2,722	3,078	3,321	3,399	1,590	1,805	1,957	2,057	2,118	2,154	2,176	2,229
Geebung	1236	4221	4,231	4,248	4,253	4,242	4,272	4,272	4,272	4,380	2,980	3,576	4,016	4,296	4,471	4,580	4,651	4,841
Graceville	1241	3946	3,974	3,993	4,014	4,020	4,025	4,025	4,025	4,025	480	516	535	544	548	551	552	559
Grange	1244	3815	3,825	3,832	3,834	3,828	3,826	3,826	3,826	3,826	257	279	288	293	295	296	297	298
Greenslopes	1247	7439	7,464	7,502	7,509	7,465	7,447	7,898	8,167	8,434	2,155	2,236	2,272	2,291	2,301	2,307	2,311	2,321
Gumdale	1252	1004	1,024	1,139	1,236	1,340	1,480	1,480	1,480	1,480	0	6	12	22	34	48	63	139
Hamilton	1255	4069	4,120	4,127	4,117	4,072	4,040	4,215	4,317	5,099	717	770	806	824	833	838	841	887
Hawthorne	1258	4021	4,051	4,084	4,099	4,113	4,127	4,267	4,348	4,348	136	144	145	145	145	145	145	145
Hemmant-Lytton	1265	2141	2,212	2,362	2,535	2,555	2,597	2,627	2,643	2,643	3,055	4,249	5,600	12,633	15,279	18,165	21,019	45,403
Hendra	1271	3600	3,634	3,706	3,828	3,968	4,162	4,162	4,162	4,162	778	1,039	1,232	1,370	1,475	1,556	1,616	1,800
Herston	1274	1782	1,810	1,919	2,103	2,333	2,558	2,558	2,558	2,558	601	659	710	779	865	964	1,064	1,722
Highgate Hill	1277	5316	5,346	5,433	5,515	5,630	5,754	5,754	5,754	5,830	33	37	39	43	47	53	59	99
Holland Park	1282	7383	7,401	7,427	7,419	7,374	7,377	7,424	7,450	7,698	400	464	499	518	529	537	542	563
Holland Park West	1285	5441	5,474	5,560	5,572	5,547	5,558	5,691	5,768	6,097	354	372	388	403	418	434	450	543
Inala	1288	13683	13,810	13,796	13,772	13,746	13,741	13,741	13,741	14,386	766	1,011	1,222	1,377	1,502	1,604	1,689	2,139
Indooroopilly	1293	10597	10,683	10,880	10,960	11,020	11,235	11,882	12,268	12,268	3,862	3,960	4,047	4,095	4,104	4,086	4,052	4,108
Jamboree Heights	1296	3345	3,348	3,400	3,541	3,678	3,735	3,735	3,735	3,904	246	260	272	288	308	332	356	502
Jindalee	1301	5373	5,377	5,374	5,352	5,310	5,311	5,311	5,311	5,563	427	454	475	489	499	504	507	515
Kangaroo Point	1304	5141	5,364	5,413	5,517	5,574	5,603	6,228	6,620	6,921	1,658	1,924	2,154	2,326	2,447	2,532	2,592	2,810
Kedron	1312	11313	11,352	11,445	11,471	11,405	11,354	12,373	12,999	13,036	976	1,101	1,218	1,298	1,346	1,373	1,388	1,461
Kelvin Grove	1315	4107	4,117	4,324	5,748	5,787	5,851	5,851	5,851	5,965	1,066	1,092	1,108	1,137	1,176	1,218	1,255	1,522
Kenmore	1318	8469	8,520	8,854	9,497	10,150	10,456	10,616	10,707	11,148	793	864	908	931	943	949	952	959
Kenmore Hills	1323	2571	2,610	2,734	2,711	2,663	2,619	2,679	2,713	2,713	543	748	864	923	956	977	992	1,045
Keperra	1326	7566	7,594	7,566	7,539	7,477	7,434	7,434	7,434	7,946	440	528	588	640	688	736	781	1,042
Kuraby	1331	3770	4,226	5,918	7,173	8,404	8,636	9,016	9,239	10,672	45	93	131	174	213	242	262	310
Lota	1337	2647	2,657	2,657	2,696	2,764	2,949	2,949	2,949	3,423	64	112	182	262	337	396	438	562
Lutwyche	1345	2587	2,596	2,632	2,645	2,663	2,705	2,785	2,831	3,116	334	363	385	400	412	420	427	459
MacGregor	1356	5631	5,644	5,659	5,630	5,621	5,635	5,680	5,705	5,706	1,306	1,605	1,809	1,939	2,014	2,056	2,079	2,124
Manly	1364	3676	3,711	3,734	3,713	3,683	3,697	3,697	3,697	3,767	594	612	620	625	628	630	632	642
Manly West	1367	9392	9,450	9,897	10,279	10,907	12,294	12,294	12,294	13,140	477	520	561	591	612	628	639	694
Mansfield	1372	9387	9,513	9,773	9,998	10,078	9,970	9,970	9,970	11,614	1,082	1,325	1,468	1,554	1,613	1,656	1,690	1,833
McDowall	1353	6515	6,653	6,970	7,414	8,031	9,311	9,311	9,311	9,951	296	307	318	335	356	379	403	530
Middle Park	1375	4470	4,478	4,474	4,447	4,388	4,346	4,346	4,346	4,416	312	348	373	387	395	399	401	406
Milton	1378	1682	1,846	2,557	3,175	3,453	3,628	3,628	3,628	3,843	9,427	9,421	9,321	9,213	9,100	8,984	8,868	8,872
Mitchelton	1383	6072	6,125	6,741	6,919	7,024	7,035	7,693	8,098	8,600	1,649	1,861	1,975	2,032	2,060	2,075	2,084	2,104
Moggill	1386	975	1,030	1,518	2,470	4,150	7,381	8,127	8,591	10,208	95	106	110	111	112	112	112	113
Moorooka	1391	8582	8,607	8,641	8,624	8,550	8,517	8,938	9,186	9,696	1,054	1,231	1,341	1,399	1,428	1,444	1,453	1,474
Moreton Island	1394	181	190	224	232	248	282	327	357	2,424	0	57	116	207	323	451	573	1,177
Morningside	1397	7802	7,844	7,969	8,017	8,028	8,032	8,629	8,991	8,986	3,055	3,816	4,196	4,386	4,495	4,568	4,623	4,882
Mount Gravatt	1402	3193	3,194	3,193	3,191	3,186	3,184	3,402	3,532	3,915	866	1,210	1,515	1,718	1,835	1,901	1,938	2,016
Mount Gravatt East	1405	9507	9,568	9,883	10,036	10,105	10,108	10,413	10,590	11,110	940	1,129	1,261	1,346	1,399	1,431	1,450	1,494
Mount Ommaney	1408	2287	2,365	2,620	2,611	2,598	2,609	2,866	3,025	3,025	750	1,022	1,168	1,236	1,268	1,284	1,293	1,314
Murarrie	1413	2499	2,972	5,459	5,978	5,878	5,809	5,809	5,809	5,851	22,130	23,148	24,171	25,099	25,877	26,519	27,045	29,377
Nathan	1416	1590	1,590	1,590	1,590	1,590	1,589	1,589	1,589	1,661	2,477	2,512	2,553	2,591	2,618	2,637	2,650	2,679
New Farm	1421	10136	11,095	11,491	12,135	12,635	12,696	12,882	13,182	13,182	320	321	320	319	318	317	316	316
Newmarket	1424	3837	3,890	4,019	4,165	4,349	4,531	5,405	5,997	5,997	188	236	273	301	320	333	340	363
Newstead	1427	2214	3,395	4,844	6,615	6,729	6,743	6,727	6,711	7,060	839	183	269	360	438	496	535	634
Norman Park	1432	6341	6,386	6,450	6,448	6,421	6,409	6,598	6,708	6,864	87	91	96	101	107	114	121	167
Northgate	1435	3817	3,849	3,957	3,945	3,915	3,898	4,017	4,087	4,084	12,229	12,634	12,969	13,204	13,351	13,440	13,497	13,639
Nudgee	1438	1934	1,947	2,533	2,694	2,767	2,974	2,974	2,974	3,527	10	102	158	235	324	414	496	838
Nudgee Beach	1443	335	340	376	405	465	574	601	617	637	96	259	477	738	998	1,232	1,428	2,277
Nundah	1446	8097	8,118	8,171	8,204	8,213	8,288	9,049	9,517	9,775	1,493	1,665	1,775	1,848	1,897	1,931	1,956	2,072
Oxley	1451	5913	6,067	6,811	7,338	7,843	8,163	8,385	8,513	9,116	794	1,249	1,648	1,954	2,194	2,395	2,567	3,464
Paddington	1454	7395	7,435	7,473	7,535	7,591	7,658	7,658	7,658	7,799	1,313	1,425	1,508	1,556	1,582	1,596	1,604	1,620
Pallara-Heathwood-Larapinta	1456	758	758	1,336	2,978	4,707	5,062	5,418	5,633	5,633	142	607	1,265	2,145	3,190	4,270	5,277	10,504

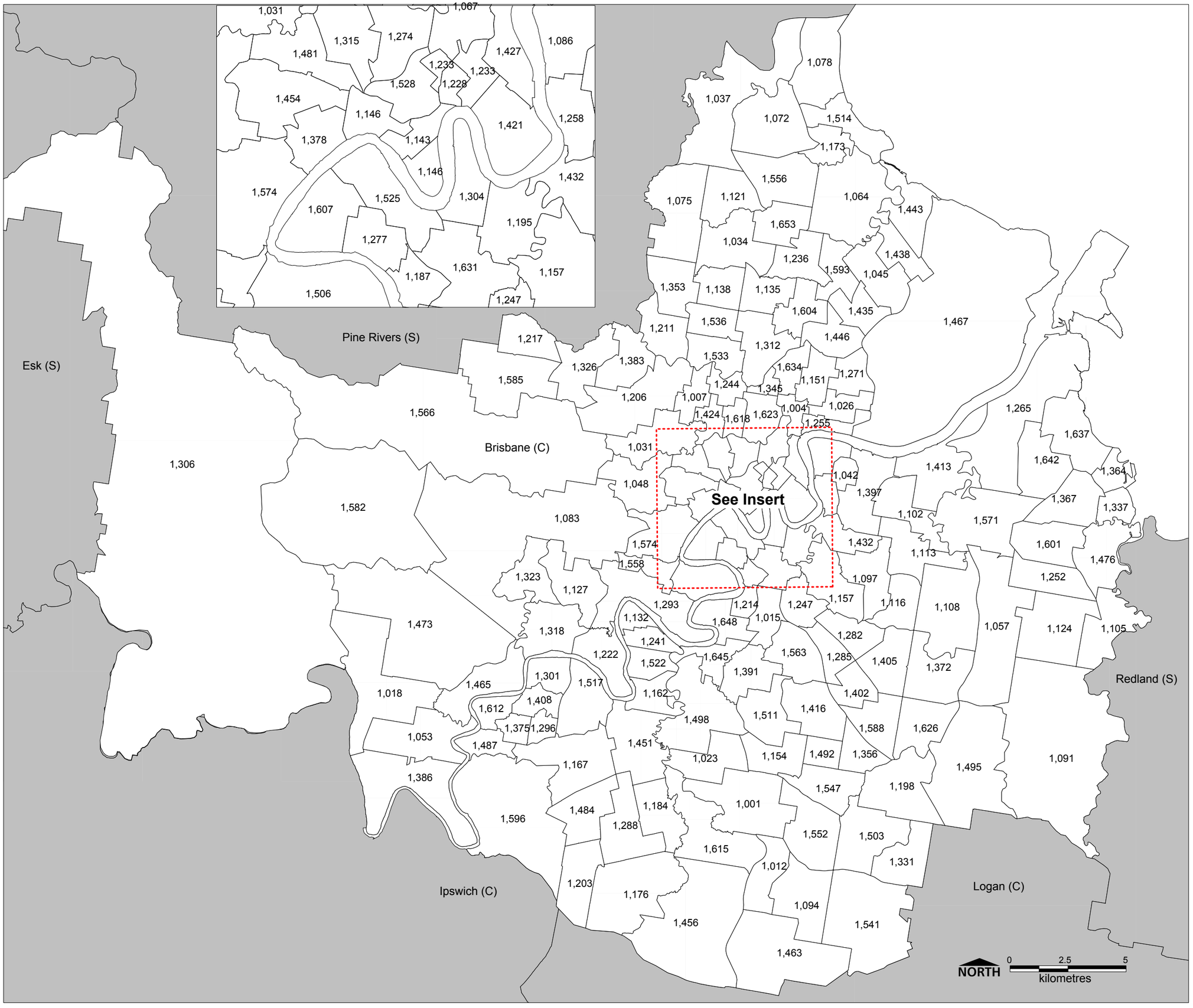
Parkinson-Drewvale	1463	5210	5,940	10,347	14,617	18,629	19,323	19,323	19,323	22,447	0	117	244	448	728	1,064	1,420	3,901
Pinjarra Hills	1465	481	484	495	505	510	515	781	1,013	1,013	581	1,240	2,138	3,043	3,757	4,241	4,548	5,227
Pinkenba-Eagle Farm	1467	501	482	494	509	551	625	749	833	833	14,669	17,112	20,062	22,627	25,376	28,163	30,788	61,521
Pullenvale	1473	2091	2,120	2,282	2,417	2,529	2,619	3,053	3,340	3,340	30	61	130	231	361	505	642	1,325
Ransome	1476	456	456	452	447	438	430	430	430	430	0	0	0	0	0	0	0	0
Red Hill	1481	5016	5,042	5,090	5,145	5,220	5,309	5,309	5,309	5,309	533	478	495	508	519	529	538	580
Richlands	1484	907	913	1,120	1,701	2,710	4,627	4,680	4,709	5,557	3,346	3,899	4,378	4,861	5,350	5,822	6,248	8,357
Riverhills	1487	3756	3,825	4,048	4,104	4,078	4,057	4,057	4,057	4,837	19	21	24	26	29	31	33	41
Robertson	1492	4403	4,469	4,684	4,857	5,021	5,106	5,106	5,106	5,333	935	970	996	1,010	1,018	1,022	1,024	1,028
Rochedale	1495	1351	1,354	1,362	1,395	1,436	1,505	1,751	1,913	1,913	65	136	228	326	418	496	558	777
Rocklea	1498	1484	1,522	1,592	1,610	1,639	1,687	1,781	1,836	1,836	6,554	8,209	9,581	10,577	11,265	11,756	12,118	13,523
Runcorn	1503	11667	11,853	12,505	13,525	14,552	14,794	14,794	14,794	15,079	552	727	869	978	1,052	1,098	1,128	1,206
Salisbury	1511	5405	5,431	5,468	5,484	5,467	5,468	5,584	5,651	5,712	2,966	3,496	3,864	4,097	4,237	4,323	4,376	4,509
Sandgate	1514	6325	6,337	6,332	6,303	6,237	6,186	6,186	6,186	6,209	488	656	761	842	909	968	1,019	1,250
Seventeen Mile Rocks	1517	6394	6,979	9,867	12,086	11,902	11,709	11,709	11,709	11,707	1,616	1,325	1,510	1,609	1,663	1,695	1,716	1,774
Sherwood	1522	4611	4,640	4,691	4,712	4,710	4,710	4,710	4,710	4,946	420	541	628	679	706	720	728	745
South Brisbane	1525	2748	2,760	3,259	5,083	6,388	6,379	6,379	6,379	6,379	11,291	11,163	11,226	11,156	11,028	10,874	10,708	10,786
Spring Hill	1528	3226	3,238	3,272	3,320	3,389	3,454	3,716	3,876	4,448	10,893	11,002	11,076	11,095	11,093	11,080	11,061	11,115
St. Lucia	1506	10633	10,710	10,805	10,877	10,880	10,900	10,900	10,900	11,037	4,684	4,711	4,733	4,755	4,780	4,808	4,838	5,041
Stafford	1533	5558	5,573	5,571	5,576	5,555	5,567	5,693	5,766	6,091	1,543	1,696	1,778	1,830	1,867	1,898	1,925	2,065
Stafford Heights	1536	7324	7,345	7,392	7,335	7,258	7,191	7,191	7,191	7,673	135	235	328	418	509	599	682	1,081
Stretton-Karawatha	1541	3238	3,317	3,721	4,487	5,278	5,763	6,014	6,161	7,613	0	11	23	41	64	89	114	247
Sunnybank	1547	7904	7,951	8,142	8,169	8,119	8,120	8,182	8,217	8,266	1,941	1,980	1,998	2,007	2,012	2,014	2,016	2,020
Sunnybank Hills	1552	16189	16,417	17,323	17,729	18,000	18,127	18,127	18,127	18,797	464	521	557	585	613	642	671	848
Taigum-Fitzgibbon	1556	6324	6,564	8,366	10,450	12,482	13,408	14,337	14,896	16,801	444	826	1,160	1,396	1,536	1,615	1,660	1,761
Taringa	1558	6636	6,677	6,858	6,889	6,872	6,870	6,870	6,870	7,785	755	773	786	798	810	822	833	893
Tarragindi	1563	9285	9,313	9,337	9,367	9,336	9,304	9,304	9,304	9,751	127	148	167	181	196	211	225	327
The Gap	1566	16045	16,195	16,468	16,605	16,824	17,541	17,541	17,541	18,684	479	580	661	720	761	791	814	916
Tingalpa	1571	9054	9,224	9,341	9,731	10,112	10,761	10,761	10,761	11,086	3,440	3,638	3,762	3,896	4,022	4,131	4,221	4,685
Toowong	1574	13354	13,714	14,086	14,274	14,337	14,436	14,436	14,436	15,167	5,802	5,837	5,871	5,901	5,924	5,939	5,947	6,138
Upper Brookfield	1582	546	546	541	536	526	536	571	591	591	0	1	2	3	5	7	9	22
Upper Kedron	1585	1186	1,306	2,429	4,278	5,973	6,444	6,792	6,999	7,946	0	7	15	27	42	58	74	151
Upper Mount Gravatt	1588	7488	7,513	7,609	7,760	7,873	7,933	8,749	9,258	9,840	1,855	2,431	2,866	3,125	3,267	3,347	3,393	3,532
Virginia	1593	1845	1,852	1,855	1,854	1,846	1,845	1,845	1,845	1,874	2,405	2,995	3,417	3,689	3,870	3,999	4,099	4,522
Wacol	1596	5636	6,401	6,529	6,794	7,067	7,402	7,402	7,402	7,909	5,960	7,390	8,928	10,339	11,550	12,554	13,367	16,778
Wakerley	1601	1188	1,743	3,343	5,168	7,489	8,728	8,794	8,547	11,582	64	134	251	399	560	716	854	1,464
Wavell Heights	1604	8516	8,536	8,526	8,477	8,369	8,282	8,317	8,336	9,069	169	233	280	308	322	330	334	342
West End	1607	5875	6,212	10,551	10,718	10,653	10,574	10,574	10,574	10,595	1,385	1,532	1,614	1,657	1,679	1,691	1,697	1,711
Westlake	1612	4077	4,236	4,608	4,682	4,740	4,688	4,688	4,688	4,775	17	20	23	27	33	39	45	74
Willawong	1615	245	245	387	792	1,223	1,308	1,656	1,907	1,907	0	65	115	190	287	393	494	991
Wilston	1618	3375	3,397	3,422	3,451	3,473	3,530	3,530	3,530	3,671	180	134	134	134	134	134	134	134
Windsor	1623	5812	5,836	5,902	5,902	5,867	5,858	6,013	6,103	6,612	689	828	907	956	987	1,009	1,026	1,102
Wishart	1626	9488	9,606	9,975	10,433	10,852	10,902	10,902	10,902	11,723	344	414	463	493	510	520	526	539
Woolloongabba	1631	3857	3,872	4,108	5,972	6,849	6,810	6,810	6,810	6,887	5,988	6,342	6,203	6,043	5,864	5,671	5,470	5,502
Wooloowin	1634	5494	5,534	5,619	5,598	5,545	5,515	5,515	5,515	5,806	815	822	826	828	829	829	829	830
Wynnum	1637	11194	11,286	11,436	11,408	11,303	11,231	11,491	11,640	12,175	1,243	1,460	1,610	1,707	1,771	1,816	1,849	1,966
Wynnum West	1642	9938	10,183	10,360	10,701	11,249	12,439	12,573	12,649	12,649	1,374	1,580	1,673	1,715	1,736	1,747	1,753	1,767
Yeerongpilly	1645	2246	2,272	2,313	2,315	2,313	2,330	2,495	2,595	2,616	2,260	2,543	2,725	2,844	2,930	3,000	3,058	3,348
Yeronga	1648	4954	4,995	5,082	5,100	5,097	5,141	5,603	5,887	6,190	507	665	775	858	916	955	980	1,048
Zillmere	1653	7681	7,721	7,690	7,676	7,619	7,641	8,004	8,217	8,265	613	938	1,254	1,483	1,621	1,699	1,744	1,830
Total Brisbane City (excl. Karana Downs - Lake Manchester)		**877,116**	**893,038**	**951,389**	**1,006,216**	**1,050,375**	**1,087,168**	**1,116,258**	**1,134,190**	**1,192,959**	**280,809**	**310,658**	**337,709**	**365,017**	**384,278**	**401,072**	**415,445**	**514,815**

Table 4-2 Non-residential GFA and employment forecasts by SLA, 2001-2021

SLA Name	SLA Code	Total Jobs					Industrial Development (GFA sq m)					Retail Services (GFA sq m)					Commercial (GFA sq m)					Miscellaneous Development (GFA sq m)				
		2001	2006	2011	2016	2021	2001	2006	2011	2016	2021	2001	2006	2011	2016	2021	2001	2006	2011	2016	2021	2001	2006	2011	2016	2021
Acacia Ridge	1001	10,440	11,409	12,151	12,575	12,689	669,823	761,875	831,866	869,457	874,321	16,843	19,773	22,623	25,043	26,943	-	-	-	-	-	16,417	20,897	23,717	25,237	26,067
Albion	1004	3,766	3,888	3,924	3,927	3,908	123,876	130,877	132,039	131,188	128,725	10,207	10,837	11,227	11,447	11,597	-	-	-	-	-	50,358	51,338	51,778	51,988	52,088
Alderley	1007	956	1,046	1,095	1,119	1,131	16,968	18,754	19,908	20,605	21,019	13,588	16,218	17,608	18,258	18,568	-	-	-	-	-	-	-	-	-	-
Algester	1012	788	822	850	878	907	-	-	-	-	-	2,510	3,730	4,480	5,270	6,010	-	-	-	-	-	11,738	11,738	12,048	12,308	12,678
Annerley	1015	2,097	2,199	2,264	2,304	2,331	-	-	-	-	-	32,386	35,066	36,886	37,966	38,606	-	-	-	-	-	17,637	18,547	19,007	19,347	19,657
Anstead	1018	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Archerfield	1023	4,412	4,716	4,960	5,150	5,294	251,365	285,126	311,836	331,290	344,702	612	622	632	652	682	-	-	-	-	-	81,017	81,717	82,437	83,507	84,837
Ascot	1026	1,412	1,502	1,549	1,572	1,584	-	-	-	-	-	16,671	19,741	21,301	22,031	22,381	-	-	-	-	-	7,213	7,343	7,493	7,633	7,733
Ashgrove	1031	2,619	2,687	2,727	2,756	2,784	-	-	-	-	-	14,442	15,800	16,520	16,902	17,195	5,899	6,351	6,591	6,719	6,816	43,761	44,511	45,091	45,761	46,531
Aspley	1034	3,984	4,467	4,803	5,001	5,114	-	-	-	-	-	43,980	57,453	66,633	71,043	72,285	12,405	13,902	14,922	15,412	15,550	11,768	14,288	16,308	18,918	22,238
Bald Hills	1037	774	887	1,035	1,215	1,398	-	-	-	-	-	5,260	8,400	12,810	17,950	22,860	-	-	-	-	-	11,853	13,253	14,593	16,593	19,213
Balmoral	1042	325	330	333	335	336	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,402	11,592	11,722	11,792	11,832
Banyo	1045	2,725	3,015	3,291	3,521	3,705	174,721	198,945	219,644	233,151	241,075	5,901	6,251	6,381	6,451	6,511	-	-	-	-	-	7,723	12,123	17,893	24,673	31,553
Bardon	1048	1,225	1,307	1,359	1,408	1,461	-	-	-	-	-	3,418	3,488	3,548	3,638	3,768	-	-	-	-	-	29,985	33,625	35,915	38,015	40,265
Bellbowrie	1053	492	566	658	741	801	-	-	-	-	-	2,448	5,048	8,268	11,178	13,258	-	-	-	-	-	-	30	60	110	180
Belmont-Mackenzie	1057	551	551	566	579	597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	690	1,280	2,110
Boondall	1064	1,716	1,748	1,833	1,898	2,013	-	-	-	-	-	5,506	5,686	5,916	6,136	6,196	-	-	-	-	-	15,415	17,065	21,785	25,365	32,195
Bowen Hills	1067	6,965	7,409	8,316	9,422	9,577	133,786	123,417	124,958	125,658	126,015	14,472	22,148	34,620	51,249	52,873	75,762	82,805	89,771	96,253	98,387	24,879	26,390	27,582	28,381	28,883
Bracken Ridge	1072	1,826	2,143	2,369	2,530	2,656	-	-	-	-	-	13,556	18,416	21,106	22,376	23,466	-	-	-	-	-	42,467	50,487	57,237	62,857	67,147
Bridgeman Downs	1075	497	505	511	518	526	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	377	747	1,057	1,407	1,807
Brighton	1078	848	1,040	1,150	1,217	1,257	-	-	-	-	-	3,146	3,216	3,246	3,296	3,346	-	-	-	-	-	34,131	42,701	47,651	50,621	52,391
Brookfield (incl. Mnt Ctha)	1083	1,306	1,370	1,438	1,545	1,686	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,801	13,071	15,481	19,231	24,191
Bulimba	1086	2,134	1,861	1,544	1,551	1,559	73,626	38,566	-	-	-	14,303	15,003	15,373	15,593	15,883	-	-	-	-	-	8,457	8,807	8,937	8,987	9,007
Burbank	1091	232	232	232	232	232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	542	542	542	542	542
Calamvale	1094	836	984	1,057	1,123	1,169	-	-	-	-	-	19,808	21,887	24,461	26,774	28,416	-	-	-	-	-	-	3,110	3,110	3,110	3,110
Camp Hill	1097	1,237	1,285	1,313	1,334	1,353	833	1,304	1,758	2,074	2,258	5,554	5,774	5,884	5,994	6,094	-	-	-	-	-	18,406	20,076	21,016	21,696	22,336
Cannon Hill	1102	2,213	2,804	3,210	3,520	3,798	833	1,280	1,690	1,962	2,115	38,745	55,315	65,565	70,675	73,125	-	-	-	-	-	35,268	41,938	48,398	57,938	70,138
Capalaba West	1105	235	260	287	311	338	-	327	673	1,211	1,921	1,110	1,880	2,710	3,370	4,060	-	-	-	-	-	-	-	-	-	-
Carina	1113	2,189	2,321	2,418	2,525	2,651	-	-	-	-	-	5,294	6,264	6,684	7,104	7,384	-	-	-	-	-	24,206	27,886	30,866	34,196	38,336
Carina Heights	1116	636	755	835	884	911	-	-	-	-	-	4,753	5,313	5,683	6,083	6,373	-	-	-	-	-	8,410	13,060	16,230	17,940	18,800
Carindale	1108	3,816	3,949	4,098	4,278	4,481	-	-	-	-	-	61,664	63,161	65,107	67,539	70,267	59,246	59,719	60,333	61,101	61,963	11,600	13,170	14,150	15,090	16,150
Carseldine	1121	1,109	1,177	1,256	1,324	1,370	-	-	-	-	-	6,688	6,958	7,538	8,168	8,498	-	-	-	-	-	20,309	23,979	27,729	30,759	32,969
Chandler	1124	511	511	511	511	511	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chapel Hill	1127	763	856	897	923	952	-	-	-	-	-	15,852	17,892	18,652	19,262	20,132	-	-	-	-	-	4,083	5,673	6,553	6,963	7,153
Chelmer	1132	333	339	345	350	354	-	-	-	-	-	415	445	475	525	595	-	-	-	-	-	6,680	7,010	7,350	7,610	7,770
Chermside	1135	8,046	9,072	9,914	10,512	10,891	-	-	-	-	-	55,413	67,057	77,113	84,373	88,992	27,293	34,429	40,593	45,043	47,874	176,019	179,959	181,369	181,969	182,289
Chermside West	1138	664	693	709	723	736	-	-	-	-	-	1,822	1,872	1,952	2,062	2,142	-	-	-	-	-	14,813	16,083	16,723	17,243	17,733
City-Inner	1143	63,997	71,357	75,942	81,004	84,821	-	-	-	-	-	425,426	448,978	463,650	479,850	492,064	1,701,703	1,825,351	1,902,379	1,987,429	2,051,555	-	-	-	-	-
City-Remainder	1146	33,333	36,841	41,775	46,399	51,238	-	-	-	-	-	109,791	123,074	141,801	159,353	177,716	637,722	694,617	774,583	849,533	927,965	19,031	19,333	19,482	19,619	19,784
Clayfield	1151	2,132	2,165	2,181	2,192	2,201	-	-	-	-	-	26,938	27,138	27,298	27,518	27,788	-	-	-	-	-	19,977	21,217	21,747	21,967	22,067
Coopers Plains	1154	5,844	6,437	6,717	6,981	7,054	251,496	277,751	287,583	307,653	310,858	4,752	4,892	4,982	5,122	5,282	-	-	-	-	-	47,847	64,277	73,017	77,037	78,917
Coorparoo	1157	4,002	4,235	4,378	4,460	4,507	126,896	133,450	136,599	138,040	138,760	27,244	29,504	31,394	32,724	33,534	-	-	-	-	-	48,304	50,934	52,554	53,464	54,024
Corinda	1162	1,594	1,745	1,891	2,000	2,072	16,660	20,177	23,342	25,413	26,570	12,373	13,183	13,763	14,083	14,333	-	-	-	-	-	38,433	41,873	45,463	48,373	50,323
Darra-Sumner	1167	6,120	6,540	6,873	7,132	7,347	406,815	453,221	490,392	518,739	541,781	12,928	13,448	13,848	14,348	14,938	-	-	-	-	-	1,357	1,787	2,007	2,137	2,237
Deagon	1173	790	909	984	1,023	1,043	995	1,057	1,079	1,087	1,090	9,037	11,287	13,037	14,067	14,617	-	-	-	-	-	9,175	11,615	12,735	13,205	13,415
Doolandella-Forest Lake	1176	1,701	1,852	2,023	2,230	2,449	-	925	1,874	3,284	5,032	4,933	8,703	13,913	20,483	27,433	-	-	-	-	-	11,662	12,852	13,282	13,442	13,512
Durack	1184	403	431	459	487	515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,506	11,206	12,906	14,586	16,306
Dutton Park	1187	972	983	994	1,011	1,034	2,015	2,297	2,536	2,874	3,311	-	-	-	-	-	-	-	-	-	-	16,461	16,741	17,041	17,521	18,191
East Brisbane	1195	2,922	2,824	2,730	2,638	2,549	57,870	51,041	44,212	37,383	30,554	17,451	17,821	18,231	18,601	18,921	-	-	-	-	-	23,208	23,508	23,918	24,488	25,248
Eight Mile Plains	1198	2,847	3,311	3,682	3,913	4,072	-	-	-	-	-	2,053	2,353	3,053	3,853	4,153	-	-	-	-	-	49,313	65,283	77,573	84,893	90,183
Ellen Grove	1203	253	257	260	264	269	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	134	314	484	684	914
Enoggera	1206	4,294	4,533	4,728	4,890	5,038	43,153	51,508	57,770	61,710	63,941	7,906	7,986	8,026	8,036	8,056	-	-	-	-	-	15,430	19,750	23,740	28,060	33,030
Everton Park	1211	1,566	1,781	1,921	2,010	2,082	16,430	19,412	21,753	23,124	23,840	19,172	20,482	21,332	21,792	22,312	-	-	-	-	-	13,502	18,852	22,212	24,462	26,272
Fairfield	1214	668	796	889	940	965	2,645	3,326	3,693	3,861	3,938	6,786	11,036	14,156	15,886	16,766	-	-	-	-	-	-	-	-	-	-
Ferny Grove	1217	862	904	934	955	977	-	-	-	-	-	18,585	19,215	19,895	20,435	21,065	-	-	-	-	-	10,171	11,611	12,271	12,621	12,871
Fig Tree Pocket	1222	465	476	483	487	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,959	11,639	12,069	12,329	12,509
Fortitude Valley-Inner	1228	9,124	9,222	9,677	10,626	12,020	-	-	-	-	-	60,220	60,811	63,544	69,238	77,602	122,265	123,644	130,021	143,307	162,823	-	-	-	-	-
Fortitude Valley-Remainder	1233	7,737	7,996	8,802	10,033	10,924	18,418	18,779	18,914	18,966	18,988	65,006	66,558	72,504	82,000	88,920	67,660	69,988	78,907	93,151	103,531	2,488	4,658	6,828	8,378	9,298
Geebung	1236	3,691	4,414	4,947	5,288	5,500	383,855	446,709	492,971	522,062	539,688	10,140	10,270	10,350	10,440	10,550	-	-	-	-	-	4,600	6,260	7,540	8,570	9,380
Graceville	1241	545	567	579	587	593	-	-	-	-	-	6,680	6,910	7,050	7,210	7,380	-	-	-	-	-	9,943	10,913	11,403	11,613	11,703
Grange	1244	448	504	536	554	564	-	-	-	-	-	2,339	2,429	2,499	2,609	2,719	-	-	-	-	-	13,370	15,250	16,320	16,860	17,120
Greenslopes	1247	4,613	4,724	4,781	4,810	4,825	4,973	5,069	5,124	5,150	5,162	29,180	31,064	31,939	32,380	32,626	18,656	19,762	20,277	20,536	20,680	75,618	76,768	77,548	77,968	78,178
Gumdale	1252	236	256	278	312	356	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	720	1,490	2,680	4,250
Hamilton	1255	2,089	2,237	2,326	2,371	2,393	66,810	71,942	74,879	76,299	76,969	15,476	16,706	17,496	17,946	18,186	-	-	-	-	-	7,252	8,192	8,792	9,102	9,272
Hawthorne	1258	607	609	611	614	617	-	-	-	-	-	452	542	612	722	832	-	-	-	-	-	7,530	7,530	7,530	7,530	7,530
Hemmant-Lytton	1265	5,321	6,917	8,609	10,842	13,741	402,373	523,708	651,928	814,711	1,023,629	-	-	-	-	-	-	-	-	-	-	1,513	18,203	36,143	63,993	101,733
Hendra	1271	2,074	2,232	2,392	2,549	2,690	110,635	121,473	128,861	133,604	136,925	2,926	2,996	3,096	3,236	3,406	-	-	-	-	-	1,723	3,943	7,263	11,223	15,003
Herston	1274	7,267	7,497	7,732	8,072	8,508	16,736	17,954	18,863	19,437	19,764	-	-	-	-	-	-	-	-	-	-	250,130	257,750	265,640	277,340	292,480
Highgate Hill	1277	455	457	460	465	471	-	-	-	-	-	2,055	2,155	2,275	2,475	2,695	-	-	-	-	-	-	-	-	-	-
Holland Park	1282	1,701	1,896	2,002	2,058	2,091	4,430	4,430	4,430	4,430	4,430	2,835	3,905	4,605	4,985	5,185	-	-	-	-	-	40,148	45,918	48,948	50,548	51,508
Holland Park West	1285	305	328	346	360	371	-	-	-	-	-	7,488	8,188	8,728	9,048	9,218	-	-	-	-	-	5,492	5,692	5,902	6,202	6,582
Inala	1288	1,982	2,274	2,489	2,624	2,730	12,500	17,094	23,095	27,175	31,443	23,477	29,300	32,224	33,541	34,204	8,249	9,276	9,792	10,025	10,142	5,307	8,117	11,227	14,047	16,297
Indooroopilly	1293	6,759	7,099	7,440	7,760	8,059	6,140	6,140	6,140	6,140	6,140	70,800	73,038	75,438	78,158	81,198	27,534	28,586	29,716	30,996	32,426	96,574	104,474	111,884	117,304	120,744
Jamboree Heights	1296	332	339	347	357	368	-	-	-	-	-	625	655	735	825	875	-	-	-	-	-	7,158	7,558	7,928	8,408	9,018
Jindalee	1301	1,032	1,066	1,092	1,111	1,123	-	-	-	-	-	6,249	6,269	6,289	6,319	6,359	-	-	-	-	-	16,604	18,114	19,304	20,134	20,664
Kangaroo Point	1304	2,084	2,100	2,111	2,123	2,137	7,871	8,105	8,293	8,405	8,464	6,483	6,703	6,823	6,963	7,133	-	-	-	-	-	50,595	50,935	51,215	51,545	51,935
Kedron	1312	3,392	3,529	3,660	3,752	3,812	56,131	58,657	62,620	65,332	66,846	5,706	6,369	7,064	7,586	7,914	1,610	1,797	1,992	2,140	2,232	53,350	55,810	57,170	58,120	58,930
Kelvin Grove	1315	3,905	3,570	3,663	3,782	3,940	53,493	51,878	49,190	46,095	42,850	2,566	2,716	3,566	3,716	3,896	-	-	-	-	-	19,897	8,971	13,001	18,861	26,161
Kenmore	1318	2,406	2,502	2,572	2,621	2,653	-	-	-	-	-	24,446	24,856	25,426	26,166	26,806	-	-	-	-	-	23,612	27,442	29,882	31,172	31,822
Kenmore Hills	1323	489	679	785	836	863	-	-	-	-	-	10,530	14,780	17,120	18,200	18,740	-	-	-	-	-	11,343	15,503	17,883	19,133	19,873
Keperra	1326	1,205	1,264	1,317	1,377	1,447	-	-	-	-	-	3,831	4,931	5,951	7,461	9,481	-	-	-	-	-	11,079	12,779	14,219	15,259	16,019

Kuraby	1331	187	222	272	328	378	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,555	4,165	6,415	8,945	11,205
Lota	1337	321	345	380	420	457	290	363	402	420	428	-	-	-	-	-	-	-	-	-	-	1,700	3,150	5,230	7,660	9,930
Lutwyche	1345	1,172	1,223	1,261	1,287	1,306	-	-	-	-	-	13,946	15,132	16,003	16,613	17,055	6,869	7,453	7,882	8,182	8,400	39	79	129	169	209
MacGregor	1356	1,580	2,061	2,418	2,648	2,780	-	-	-	-	-	60,603	77,193	89,613	97,653	102,283	-	-	-	-	-	10,144	10,564	10,714	10,764	10,784
Manly	1364	842	868	882	889	894	-	48	99	180	291	9,040	9,890	10,330	10,530	10,680	-	-	-	-	-	26,285	26,375	26,425	26,455	26,475
Manly West	1367	1,326	1,387	1,444	1,493	1,539	-	-	-	-	-	1,735	1,935	2,125	2,465	3,095	-	-	-	-	-	21,452	23,982	26,342	28,112	29,372
Mansfield	1372	2,869	3,169	3,346	3,453	3,526	109,070	126,326	137,394	144,197	148,725	1,649	1,799	1,949	2,059	2,119	-	-	-	-	-	22,278	27,178	29,548	30,898	31,898
McDowall	1353	619	636	654	682	719	-	-	-	-	-	5,898	6,498	7,128	8,108	9,408	-	-	-	-	-	6,118	6,158	6,178	6,188	6,188
Middle Park	1375	451	511	553	576	587	-	-	-	-	-	3,523	5,603	7,063	7,853	8,243	-	-	-	-	-	7,733	7,813	7,853	7,893	7,923
Milton	1378	10,791	11,137	11,140	11,277	11,689	186,796	178,829	138,208	111,724	112,805	16,984	17,766	18,208	18,487	18,766	108,696	116,753	125,150	133,230	140,830	21,575	21,895	22,237	22,568	22,879
Mitchelton	1383	2,861	3,406	3,718	3,878	3,957	11,020	14,128	15,885	16,713	17,098	94,374	103,804	109,304	112,164	113,584	-	-	-	-	-	16,070	18,500	19,630	20,160	20,440
Moggill	1386	124	138	143	144	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,585	6,215	6,445	6,525	6,555
Moorooka	1391	3,171	3,439	3,599	3,683	3,730	78,315	94,286	104,445	109,821	112,514	17,619	18,379	18,899	19,209	19,529	-	-	-	-	-	31,766	34,326	35,546	36,136	36,456
Moreton Island	1394	172	172	172	172	172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Morningside	1397	4,459	5,536	6,057	6,300	6,429	287,766	361,354	395,910	411,305	418,795	19,226	21,706	23,006	23,626	24,036	-	-	-	-	-	4,378	5,898	7,348	8,608	9,698
Mount Gravatt	1402	5,806	5,937	6,101	6,195	6,307	1,823	1,896	1,988	2,081	2,156	11,208	13,158	14,548	15,498	16,088	-	-	-	-	-	39,727	43,107	48,667	51,677	55,967
Mount Gravatt East	1405	1,001	1,285	1,498	1,641	1,730	-	-	-	-	-	25,706	34,946	42,146	47,036	50,116	-	-	-	-	-	16,013	17,263	17,753	17,953	18,053
Mount Ommaney	1408	1,263	1,738	1,992	2,108	2,162	-	-	-	-	-	42,048	57,708	65,988	69,748	71,468	-	-	-	-	-	2,790	4,070	4,890	5,320	5,560
Murarrie	1413	6,873	8,371	9,874	11,230	12,368	514,783	623,824	735,237	836,173	920,824	-	1,270	1,560	1,600	1,660	-	-	-	-	-	587	1,097	1,687	2,257	2,737
Nathan	1416	2,166	2,510	2,732	2,929	3,049	5,006	6,312	7,786	8,983	9,764	6,143	6,143	6,143	6,143	6,153	-	-	-	-	-	89,092	104,112	113,552	121,972	127,092
New Farm	1421	3,291	3,471	3,555	3,619	3,624	-	-	-	-	-	19,449	21,868	23,000	23,865	23,932	9,153	10,344	10,902	11,327	11,360	294	294	294	294	294
Newmarket	1424	1,205	1,284	1,344	1,387	1,424	-	-	-	-	-	8,453	10,753	12,253	13,163	13,993	-	-	-	-	-	2,772	3,392	4,172	4,942	5,552
Newstead	1427	3,770	3,215	4,729	6,243	6,596	120,142	-	-	-	-	7,032	30,724	54,948	79,172	84,820	2,735	8,658	14,714	20,770	22,182	-	-	-	-	-
Norman Park	1432	782	789	795	804	815	60	100	147	186	212	2,486	2,556	2,616	2,726	2,836	-	-	-	-	-	1,315	1,565	1,775	2,055	2,405
Northgate	1435	4,206	4,421	4,612	4,745	4,828	442,748	458,406	472,398	482,262	488,410	199	259	289	329	379	-	-	-	-	-	16,345	19,145	21,625	23,295	24,315
Nudgee	1438	676	701	727	764	808	1,680	2,120	2,619	3,026	3,293	-	-	-	-	-	-	-	-	-	-	-	1,330	2,690	4,720	7,230
Nudgee Beach	1443	48	130	239	370	501	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,900	7,850	14,440	22,330	30,230
Nundah	1446	2,930	3,517	3,915	4,169	4,330	11,220	13,195	15,314	17,209	18,728	86,162	94,524	100,082	103,547	105,692	21,540	24,328	26,180	27,335	28,050	5,980	6,470	6,740	6,900	7,010
Oxley	1451	1,018	1,582	2,010	2,436	2,690	50,995	66,293	72,806	87,559	92,781	6,568	7,878	8,758	9,418	9,958	-	-	-	-	-	20,736	36,986	51,966	63,086	71,276
Paddington	1454	1,868	1,935	1,982	2,018	2,046	1,933	1,933	1,933	1,933	1,933	58,577	59,187	59,537	60,037	60,597	-	-	-	-	-	10,842	13,832	16,092	17,442	18,172
Pallara-Heathwood-Larapinta	1456	134	1,302	2,867	4,985	6,619	23,678	160,195	343,087	590,559	781,279	-	-	-	-	-	-	-	-	-	-	-	90	180	330	530
Parkinson-Drewvale	1463	122	625	1,521	2,232	2,504	-	52,809	151,679	228,889	259,572	-	1,820	3,620	5,430	5,790	-	-	-	-	-	-	-	-	-	-
Pinjarra Hills	1465	293	293	319	326	342	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,604	17,604	19,204	19,624	20,624
Pinkenba-Eagle Farm	1467	18,522	20,436	21,977	24,357	26,842	804,125	909,505	984,508	1,101,190	1,207,919	-	-	-	-	-	-	-	-	-	-	267,742	285,562	304,522	333,392	370,592
Pullenvale	1473	39	79	168	300	321	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,764	3,604	7,624	13,574	14,543
Ransome	1476	48	50	52	56	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140	290	530	850
Red Hill	1481	1,494	1,338	1,389	1,432	1,473	14,103	-	-	-	-	10,006	10,816	11,126	11,296	11,486	-	-	-	-	-	33,951	36,041	37,541	38,891	40,161
Richlands	1484	3,152	3,701	4,191	4,679	5,172	251,925	308,795	360,568	412,921	466,005	-	-	-	-	-	-	-	-	-	-	3,120	5,350	7,020	8,470	9,870
Riverhills	1487	235	243	248	251	254	-	-	-	-	-	1,044	1,234	1,304	1,334	1,364	-	-	-	-	-	116	266	406	546	686
Robertson	1492	1,626	1,661	1,685	1,698	1,706	-	-	-	-	-	40,001	40,818	41,369	41,654	41,853	16,338	16,381	16,410	16,425	16,436	1,014	1,664	2,154	2,434	2,584
Rochedale	1495	1,443	1,512	1,601	1,697	1,787	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,844	7,994	13,374	19,134	24,554
Rocklea	1498	4,393	5,801	6,651	7,148	7,432	497,763	578,003	624,443	649,528	661,984	-	60	130	240	380	-	-	-	-	-	54,964	57,794	61,454	65,624	69,774
Runcorn	1503	1,122	1,252	1,356	1,432	1,477	3,555	7,231	11,665	15,534	18,213	9,483	9,783	10,243	10,793	11,043	-	-	-	-	-	17,781	21,871	24,291	25,551	26,261
Salisbury	1511	5,546	5,925	6,404	6,705	6,889	303,625	329,327	368,529	393,452	408,510	1,171	1,251	1,311	1,391	1,481	-	-	-	-	-	25,861	29,291	31,101	32,081	32,731
Sandgate	1514	2,277	2,519	2,698	2,828	2,929	10,604	15,352	18,242	19,682	20,372	13,330	17,930	21,390	23,660	25,040	-	-	-	-	-	8,669	10,049	11,459	13,319	15,609
Seventeen Mile Rocks	1517	1,790	1,881	2,125	2,259	2,330	88,586	88,586	93,275	95,939	97,521	14,770	22,910	28,840	32,120	33,780	-	-	-	-	-	24,362	15,912	17,342	18,032	18,432
Sherwood	1522	1,317	1,418	1,482	1,516	1,533	5,802	9,432	12,285	14,025	14,971	9,032	11,462	12,842	13,502	13,812	-	-	-	-	-	8,526	8,566	8,586	8,606	8,636
South Brisbane	1525	13,644	14,112	14,717	14,716	14,892	11,345	11,345	11,345	-	-	40,512	41,292	42,672	43,752	44,362	53,753	55,684	58,100	58,404	59,061	543,506	560,885	582,629	585,366	591,277
Spring Hill	1528	13,018	14,329	15,573	16,431	17,839	-	-	-	-	-	255,848	262,124	268,091	272,212	278,970	417,437	437,311	456,204	469,254	490,655	19,158	19,318	19,368	19,378	19,378
St. Lucia	1506	6,577	6,842	6,997	7,177	7,534	-	-	-	-	-	7,095	7,195	7,305	7,435	7,615	-	-	-	-	-	268,412	277,592	282,942	289,122	301,462
Stafford	1533	3,651	3,792	3,954	4,050	4,116	147,550	150,045	153,435	155,290	156,521	38,998	41,758	44,838	46,458	47,328	-	-	-	-	-	1,645	2,555	3,305	4,145	5,095
Stafford Heights	1536	346	488	617	738	858	-	-	-	-	-	3,072	4,642	5,642	6,142	6,382	-	-	-	-	-	5,028	9,428	13,988	18,808	23,928
Stretton-Karawatha	1541	205	210	215	224	235	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	340	690	1,230	1,920
Sunnybank	1547	3,647	3,695	3,720	3,734	3,743	-	-	-	-	-	41,218	41,380	41,485	41,615	41,752	16,835	16,873	16,898	16,928	16,961	57,849	59,789	60,749	61,189	61,399
Sunnybank Hills	1552	2,622	2,739	2,812	2,868	2,922	1,281	1,657	1,836	1,913	1,948	14,397	17,147	18,947	20,407	21,917	-	-	-	-	-	27,757	28,977	29,667	30,157	30,557
Taigum-Fitzgibbon	1556	707	997	1,294	1,517	1,655	-	-	-	-	-	5,683	11,243	17,533	22,643	25,973	-	-	-	-	-	10,690	18,620	25,680	30,340	32,970
Taringa	1558	2,242	2,281	2,312	2,338	2,360	-	-	-	-	-	24,101	24,491	24,683	24,857	25,049	12,978	13,238	13,366	13,482	13,610	20,226	20,966	21,746	22,396	22,866
Tarragindi	1563	876	904	930	950	970	-	-	-	-	-	1,791	1,841	1,911	2,011	2,101	-	-	-	-	-	4,357	5,597	6,697	7,497	8,307
The Gap	1566	2,190	2,334	2,451	2,536	2,598	-	-	-	-	-	13,845	15,665	17,255	18,435	19,275	-	-	-	-	-	12,362	16,532	19,762	22,112	23,842
Tingalpa	1571	2,886	3,018	3,173	3,344	3,509	261,103	272,393	285,749	300,197	313,549	6,567	6,737	6,927	7,157	7,487	-	-	-	-	-	8,320	8,480	8,660	8,940	9,310
Toowong	1574	10,464	10,964	11,558	11,783	12,041	30,103	30,406	30,509	30,547	30,563	69,160	71,740	74,920	76,000	77,380	71,982	78,033	85,481	88,022	91,254	197,368	200,368	203,179	205,199	206,466
Upper Brookfield	1582	64	64	64	65	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	80	150	250
Upper Kedron	1585	83	83	83	83	83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Mount Gravatt	1588	7,955	10,280	12,075	13,229	13,858	-	-	-	-	-	80,776	102,961	120,021	130,940	136,764	63,467	84,782	101,172	111,663	117,259	26,023	31,273	35,583	38,533	40,573
Virginia	1593	5,167	5,405	5,578	5,689	5,762	352,505	377,125	395,202	406,901	414,649	-	-	-	-	-	-	-	-	-	-	16,534	17,794	18,664	19,184	19,524
Wacol	1596	8,650	9,497	10,395	11,238	11,987	323,715	380,530	442,338	499,249	547,929	690	750	870	1,000	1,150	-	-	-	-	-	82,881	93,151	103,201	113,151	122,861
Wakerley	1601	453	732	866	1,035	1,216	10,666	17,732	29,858	45,082	61,358	-	7,000	7,000	7,000	7,000	-	-	-	-	-	-	110	220	390	610
Wavell Heights	1604	685	769	831	868	888	-	-	-	-	-	3,866	3,906	3,946	4,006	4,066	-	-	-	-	-	6,314	10,064	12,844	14,454	15,304
West End	1607	6,811	7,334	7,625	7,776	7,853	49,953	29,953	6,953	-	-	50,233	54,226	55,940	56,653	56,973	23,960	29,927	33,714	35,837	36,968	30,636	35,335	38,484	40,298	41,277
Westlake	1612	183	191	196	203	210	-	-	-	-	-	1,075	1,245	1,295	1,365	1,375	-	-	-	-	-	-	160	330	590	920
Willawong	1615	106	188	273	403	569	-	7,568	15,455	27,440	42,775	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wilston	1618	512	513	514	516	519	7,720	7,720	7,720	7,720	7,720	7,409	7,459	7,519	7,619	7,749	-	-	-	-	-	7,637	7,637	7,637	7,637	7,637
Windsor	1623	2,302	2,421	2,499	2,549	2,587	49,161	53,519	56,217	57,825	58,804	5,146	5,766	6,156	6,356	6,476	-	-	-	-	-	34,605	36,855	38,415	39,515	40,455
Wishart	1626	502	601	669	717	743	13,111	13,111	13,111	13,111	13,111	7,928	9,048	9,578	10,078	10,288	-	-	-	-	-	8,157	11,177	13,577	15,117	16,037
Woolloongabba	1631	10,345	10,764	11,157	11,546	11,942	66,545	73,195	76,429	77,938	78,650	82,462	84,996	88,114	91,721	95,652	45,154	46,316	47,693	49,249	50,927	131,016	136,720	142,045	146,982	151,832
Wooloowin	1634	1,065	1,074	1,078	1,080	1,080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47,936	48,376	48,596	48,696	48,736
Wynnum	1637	4,007	4,340	4,573	4,721	4,817	21,146	26,086	29,742	32,261	33,920	28,361	34,569	38,954	41,591	43,145	8,472	9,654	10,489	10,992	11,288	23,995	27,085	29,085	30,485	31,625
Wynnum West	1642	1,432	1,751	1,905	1,975	2,049	-	-	-	-	-	31,948	40,928	45,358	47,318	49,618	-	-	-	-	-	23,408	26,238	27,518	28,158	28,538
Yeerongpilly	1645	1,708	2,043	2,258	2,420	2,567	137,178	145,634	151,678	155,339	157,563	-	-	-	-	-	-	-	-	-	-	22,538	31,768	37,498	42,088	46,578
Yeronga	1648	1,092	1,292	1,498	1,677	1,809	20,088	23,248	25,580	27,045	27,988	9,266	10,116	10,746	11,166	11,476	-	-	-	-	-	27,366	32,586	38,496	43,906	47,966
Zillmere	1653	2,005	2,271	2,491	2,632	2,712	48,011	59,697	71,883	81,018	86,630	4,788	6,688	7,938	8,588	8,898	-	-	-	-	-	22,462	26,382	29,192	30,762	31,582
Brisbane City Total (excl. Karana Downs - Lake Manchester)		508,942	556,948	601,132	641,926	676,523	8,893,765	10,016,186	11,136,405	12,261,937	13,191,905	2,954,955	3,317,641	3,608,028	3,842,777	4,002,150	3,645,371	3,925,963	4,184,233	4,432,743	4,657,185	4,362,105	4,767,855	5,133,537	5,455,382	5,778,656

Figure 4.4
Statistical Local Areas



Statistical Local Area boundaries

Surrounding LGA areas

Considerable care has been taken to avoid errors and omissions. The latest information has been sought out and included. The Brisbane City Council does not accept any responsibility for any errors, omissions or inaccuracies for information in the map.

Printed on: 21/03/2003

Source: ABS, (2001) Australian Standard Geographical Classification (ASGC) 2001, Catalogue No. 1216.0

BRISBANE CITY

5 DESIRED STANDARDS OF SERVICE

5.1 WATER SUPPLY

This section identifies defines the desired standards of service (DSS) for water supply within Brisbane City. The DSS is characterised by two types of criteria:

- Planning criteria which define the form or shape of the network
- Design criteria which define the scale or size of items in the network

Planning criteria outline the general intent for the form of the network in question. Design criteria are used to define the detailed specification of individual items in a network. They are usually drawn from State or Commonwealth legislation, technical guidelines and Council policy.

The following criteria are used for expressing the DSS for each network. It is important to note that:

- A network designed to these DSS may not be the least cost solution.
- Current standards are more demanding than when many existing urban areas were established. In these areas, the DSS may not be achieved.

In most cases standards set represent the long term, rather than minimum, design standard. The water supply network is intended to achieve the planning criteria and design criteria that are outlined below.

Planning Criteria	User Benefit	Environmental Effect
• Provide a service of potable water that meets the desired public and environmental health requirements for the community • Ensure that the service minimises whole of life cost to the community • Make effective use of available water supplies, including on-site storage where appropriate	• Provides a reliable supply of water at each property to undertake a given range of activities. • Manages the collection and use of water on-site • Allows for the efficient development of land through innovative use of onsite storage • Provides the service in an affordable manner	• Improves community health by reducing the risk of disease • Provides a uniform quality of water that is scientifically monitored

Design Criteria	User Benefit	Environmental Effect
• Design of the water supply network will comply with established codes and standards including: - Water Services Australia Code for Water Supply - Local Government Design Standards (refer to Design Guidelines for Water Supply) - Standard Water Supply Law - NHMRC Guidelines for water quality • Whole of life costs should be optimised • Community expectations should be reflected where codes or standards can be interpreted to the contrary	• Ensures that the service performs as required to: - Deliver water to a desirable pressure and flow - Ensure fire fighting can be undertaken with the supply - Optimise the operating conditions to provide the service efficiently	• Maintains the health of the community • Minimises water loss and wastage • Foster sustainable water consumption

• Design of non-conventional systems will reflect the precepts of the draft Queensland Water Recycling Strategy and best appropriate practices that achieve the desired outcomes for the potable water supply	• Ensures that potable water supply methods are applied in the context of Water Sensitive Urban Design • Reduces whole of life costs	• Maintains the health of the community • Minimises water wastage • Fosters sustainable water consumption

Design Guidelines for Water Supply
The pressure shall be above 21 metres head minimum and below 100 metres head at any time.
Any private booster connection pressure shall be above 10 metres head minimum during normal system operation.
All hydrants on reticulation mains shall deliver a minimum flow of 15 litres per second.
Any adjacent hydrants on reticulation mains shall deliver a combined flow of 25 litres per second. A minimum connection pressure of 10 metres head is required.
Ultimate Demand all residential, commercial and industrial areas at 0.06 litres per second per equivalent tenement.
Ultimate Demand in environmental protection and rural areas at 0.15 litres per second connection.
The criteria applied to intermediate demand 5, 10 and 20 year planning horizons. • Existing lots at peak hour demand +25% or 0.06 litres per second whichever is greater. • New development at peak hour demand +50% or 0.08 litres per second per equivalent tenement. Peak hour demand typically occurs at 6:30pm Sunday and maximum day demands typically occur on Sunday (normally different for non-residential areas). Sensitivity checks have been carried out. Calibration based on pressure gauges, flow meters and reservoir levels on previous max day.
Ground level reservoir storage provides one maximum day of demand. Minimum operating storage equivalent to four hours of current system demand without inflow to the reservoir (will vary diurnally and seasonally).
Elevated reservoir storage provides six times maximum hour demand minus supply plus fire flow storage. Minimum fire flow storage of 150 kL.
Pumping stations deliver maximum day demand in 20 hours. The flow rate may be reduced if there is sufficient excess storage capacity available in the catchment to satisfy demand.
Booster stations shall be capable of delivering the design flow while maintaining standards of service pressure requirements: • Peak hour flow, typically supplied by a single pump unit. • Fire flow and background demand during a fire event. The use of boosters is not a preferred option as they have inherent operational costs. However, a booster station can have a lower whole-of-life cost compared to constructing an elevated storage reservoir or augmentation works involved with rezoning an area.
A gravity main feeding a ground level reservoir shall be capable of delivering maximum day flow. In some cases, a main may also be required to provide peak hour flow to a supply catchment.
Trunk mains shall deliver a pumped supply to a ground level or elevated reservoir shall be capable of delivering maximum day flow in 20 hours. A higher flow may be required for some elevated reservoirs where there is insufficient storage compared to peak hour demands in the system being serviced. Trunk mains delivering flow directly into the reticulation system shall be capable of delivering peak hour flow. For all classifications of water mains, the velocities in the mains should be maintained below 2.5 m/s.
Trunk mains have a diameter of 200mm or greater. Trunk mains are shared infrastructure included within the Infrastructure Planning Scheme Policy.
Localised reticulation mains have a diameter of less than 200 mm. Local reticulation mains do not include shared infrastructure and are not included within the Infrastructure Planning Scheme Policy.

6 EXISTING AND FUTURE INFRASTRUCTURE

6.1 W1 ACACIA RIDGE WATER SUPPLY CATCHMENT

6.1.1 Existing System

Acacia Ridge Water Supply Catchment covers an area of 6,040ha to the south of Brisbane. It serves all or parts of the suburbs of Rocklea, Nathan, Salisbury, Archerfield, Acacia Ridge, Coopers Plains, Moorooka, Willawong, Algester, Sunnybank, Sunnybank Hills, Pallara, Parkinson and Larapinta.

The catchment is supplied by multiple trunk mains originating from the Mt Crosby/Camerons Hill Reservoir, with offtakes from the mains into the local reticulation. The supply trunk mains continue towards the eastern and south-eastern areas of the city and supply major service reservoirs at Tarragindi, Wellers Hill and Kuraby. These mains supply Logan City in its entirety, which in turn also supplies a small amount of water to northern Gold Coast City.

The Acacia Ridge Water Supply Catchment is currently divided into three separate pressure zones.

- Mt Crosby Pressure Zone.
- Acacia Ridge Low Level Zone.
- Mayfield Rd Booster Zone.

No reservoirs form part of the Water Supply Catchment.

6.1.2 Future Demand

There are 1,870 industrial users in the catchment, including nine users who are in the Top 200 Water Consumers in Brisbane City Council, including Griffith University, George Weston Foods Ltd, Containers Ltd, QEII Hospital Health Services, Scientific Support Services, and BOC Gases Australia Ltd.

Non residential and residential demand is expected to grow approximately 100% and 30% respectively in the 2002-2031 period.

6.1.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Modify the boundaries of the Acacia Ridge Low Level Pressure Zone and form seven new low level pressure zones.
- Install pressure reducing valves for new zones.
- Upgrade cross connections to improve distribution of water within the system.
- Provide trunk main augmentations in Evans Rd and Orange Grove Rd.
- Provide trunk mains and a booster pump to service future industrial areas north and south of Logan Motorway.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.2 W2 ASPLEY WATER SUPPLY CATCHMENT

6.2.1 Existing System

The Aspley Water Supply Catchment is located approximately 11 km north from Brisbane's Central Business District and is approximately 9 km by 9 km in area. It includes the suburbs of Northgate, Banyo, Nudgee, Nudgee Beach, Virginia, Boondall, Taigum, Geebung, Zillmere and parts of Nundah, Wavell Heights, Chermside, Aspley, Fitzgibbon and Carseldine.

Sandgate Road divides the Aspley study area in a north to south direction and provides access to a number of major facilities in the catchment, including Arnott's Biscuits, Toombul Westfield Shopping Centre and the Golden Circle Cannery.

The Aspley Reservoir essentially provides a gravity supply to the Aspley Water Supply Catchment. There are no booster pumps in the Aspley Catchment. It also provides supply to the Milne Hill Catchment through the Aspley Pump Station and the Milne Hill Reservoir, the Bracken Ridge Reservoir, Brisbane City Council areas to the north and the Northern Customer Councils.

6.2.2 Future Demand

The Aspley area displays a wide diversity of land use within the catchment including residential, light and general industry and multi-purpose centres (e.g. Golden Circle Cannery, Brisbane Entertainment Centre), through to green space. The dominant development type is residential, accounting for approximately 94%.

Most of the catchment is developed. Future development is dispersed throughout the catchment, with Taigum and Nudgee having the majority of Emerging Community growth. Infill development and intensification provide the source of growth in the established areas.

In the Aspley Catchment, the residential demand is estimated to increase by 23% and non-residential by 63% in the 2001-2031 period.

6.2.3 Future Strategy

Augmentation requirements addressed for this Master Plan are limited to pipe infrastructure in the local gravity system. The Aspley Pump Station and Aspley Reservoir upgrading relates to the bulk water supply and is subject to separate assessment.

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries at the edge of the catchment to incorporate properties into an adjacent high level catchment.
- Upgrade reticulation and trunk mains to improve distribution of water and maintain acceptable pressure within the system. These include Murphy Road, Seeney Street, Jennings Street and Zillmere Road; Handford Road, Bilsen Road and Zillmere Road; and St Vincents Road.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.3 W3 AUSTRALIA TRADECOAST WATER SUPPLY CATCHMENT

6.3.1 Existing System

Australia TradeCoast Water Supply Catchment encompasses the Brisbane Airport and industrial areas around the mouth of the Brisbane River. It comprises the suburbs of Eagle Farm, Pinkenba, Port of Brisbane, Lytton, and portions of Hemmant, Murarrie and Morningside.

There are a number of major water users in this catchment. They include G James Holdings, Alsco Linen Service, Queensland Cement, P&O Lines, BP Oil Refinery, Shell Company and Federal Airports Corporation on the northern side of the river, and Port of Brisbane, Caltex, Visy, Q Meat, Incitec, Elite Chemicals, Berri and Mrs Crocketts Kitchen on the southern side of the river.

The northern side of the river is supplied from the Bartleys Hill Reservoir and the southern side of the river is supplied from the Wellers Hill Reservoir. In addition, there is a reverse osmosis treatment plant at the Luggage Point Water Reclamation Plant that supplies recycled water to the BP refinery, and a treatment plant at the Gibson Island Water Reclamation Plant that supplies Class B recycled water to the Royal Queensland Golf Club.

The Bartleys Hill Reservoir, which also supplies the Bartleys Hill Water Supply Catchment, does not have sufficient capacity to cater for ultimate demands under the existing supply arrangements.

6.3.2 Future Demand

The Australia TradeCoast area offers significant potential for growth in industrial and commercial development and high water using industries that are able to use recycled water are being encouraged to locate in the area. Water demands are expected to double by 2031.

6.3.3 Future Strategy

Water Distribution's (WD) preferred strategy to address future demands is to increase the supply and use of recycled water within the catchment and rezone the northern side of the river onto the Wellers Hill Reservoir zone to reduce demands on the Bartleys Hill Reservoir. In addition to the existing treatment plants, recycled water will be supplied from a new reverse osmosis treatment plant at the Wynnum Water Reclamation Plant and from the Western Corridor Recycled Water Scheme being constructed by the Queensland Government. Future infrastructure includes:

- Reverse Osmosis recycled water plant at the Wynnum Water Reclamation Plant.
- Upgrade of the Gibson Island recycled water plant to produce Class A recycled water and increase capacity.
- Non-drinking water trunk main network.
- Drinking water trunk main under the Brisbane River to connect Australia TradeCoast North to the Wellers Hill Reservoir supply zone.
- Augmentation of drinking water mains servicing the Myrtletown locality.
- Augmentation of drinking water mains servicing Fisherman Islands.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.4 W4 BARTLEYS HILL WATER SUPPLY CATCHMENT

6.4.1 Existing System

Bartleys Hill Water Supply Catchment is bounded to the south by the Brisbane River and Kingsford Smith Drive, to the west by the Bowen Hills to Toombul railway line, to the north by Schultz's Canal and to the east by the Gateway Motorway. The area comprises the residential suburbs of Albion, Ascot, Clayfield, Hamilton, Hendra, and a portion of Wooloowin.

Major water users in this catchment include Brisbane Amateur Turf Club and Racing Development Corporation.

The two reservoirs located on Bartleys Hill have a total storage capacity of 19.8 ML. The first (8.2 ML) was built in 1907 and the second (11.6 ML) was built in 1920. The reservoirs are normally supplied from Green Hill reservoir, boosted through Lloyd St Pump Station as required. There is also an alternative supply route from Green Hill Reservoir through the CBD.

The Bartleys Hill Reservoirs provide supply to the northern Australia TradeCoast water supply catchment in addition to the Bartleys Hill water supply catchment. The Bartleys Hill Reservoirs do not have sufficient capacity to cater for ultimate demands under the existing supply arrangements.

6.4.2 Future Demand

The residential population is estimated to grow by 13% from 2001 to 2031. The highest growth suburb is expected to be Hamilton at 23%.

6.4.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Ensuring the bulk supply to/from Bartleys Hill water supply catchment meets bulk water transport system and storage requirements.
- Rezoning the northern Australia TradeCoast water supply catchment onto the Wellers Hill Reservoir supply zone to reduce load on the Bartleys Hill Reservoirs.
- Upgrading trunk main in Sandgate Road to maintain acceptable pressure within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.5 W5 BRACKEN RIDGE WATER SUPPLY CATCHMENT

6.5.1 Existing System

The Bracken Ridge Water Supply Catchment covers an area of approximately 32 square kilometres and has a terrain comprising a series of undulating hills. The land is higher in the southwest around Bracken Ridge Reservoir and generally falls to the east towards a coastal plain abutting Moreton Bay. To the north is Pine River and Pine Rivers Shire. Development is primarily residential extending across the suburbs of Brighton, Bald Hills, Fitzgibbon and Shorncliffe.

The supply system receives water from the North Pine-Aspley trunk main via a 600mm-diameter branch line along Barbour Rd. The Bracken Ridge Reservoir provides a buffering/standby facility. This reservoir has a capacity of 9.2ML.

This system operates differently to most others in Brisbane in that supply to the reticulation system occurs via Bracken Ridge Reservoir and two pressure reducing valves. These valves are situated towards the east side of the reticulation system. This effectively provides the system with supply from the equivalent of three similarly elevated reservoirs.

There are two booster zones situated on elevated areas of the reticulation system. One is located adjacent to Bracken Ridge reservoir and one is centred on Nash St, on the east side of the supply system.

Bulk water is delivered to Redcliffe City Council at the northeast corner of the reticulation system. During summer water is supplied via the North Pine-Aspley trunk main from North Pine WTP. During winter this changes to a southern supply from the Mt.Crosby WTP.

6.5.2 Future Demand

Most land within this catchment is zoned for residential development. Approximately 90% of this has been taken up and is classified as Low Density Residential. The remainder is classified as Emerging Community and is likely to be developed over the next twenty years.

Additionally, there are a number of schools, a major shopping centre situated in Brighton Road, Sandgate, and some small areas zoned as Low Medium Density Residential. Wetland areas and some land classified as Rural on the Pine River floodplain are in the north.

Residential and non-residential growth is estimated to be 26% and 88% (from a low base figure) respectively over the 2001-2031 period.

6.5.3 Future Strategy

The most effective means of augmenting the peak hour capacity of this supply system to meet future demands is to provide additional trunk mains. The use of booster pumps or rezoning is not considered economically viable. Future infrastructure required includes:

- Augmentation of the trunk main between the intersection of Denning and Barbour Roads and the Bracken Ridge Reservoir.
- Augmentation of the trunk main between Bracken Ridge Reservoir and Deagon Deviation.
- Trunk main augmentations in Lascelles Street, North Road, Greenwood street and Hornibrook Highway.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.6 W6 EILDON HILL WATER SUPPLY CATCHMENT

6.6.1 Existing System

The Eildon Hill Water Supply Catchment covers an area of land to the north of the city approximately 9.1 square kilometres in area. The area primarily consists of land designated residential with small areas of multipurpose centres and green spaces. Most of the non-residential development is concentrated on Lutwyche Road. The catchment takes in part of the suburbs of Windsor, Wilston, Grange, Lutwyche and Wooloowin. Currently the majority of the area is classified residential with the industrial areas being located in the southern part of the catchment.

The zone is supplied by a single 22.7ML reservoir, Eildon Hill Reservoir, and has no booster pump stations.

The Eildon Hill Catchment is primarily supplied from the Green Hill Supply Catchment to the south with the option of some supply from the Sparkes Hill Catchment via the Lloyd Street Booster Pump Station.

6.6.2 Future Demand

The demand is estimated to increase by 3% residential and 48% non-residential (including the major user Sisters of Mercy Commercial Laundry located on the corner of Kedron Park Road and Chalk Street).

6.6.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries. An area of the Eildon Hill catchment is to be isolated and connected to the Green Hill catchment to improve fire fighting capacities.
- Install new valves for rezoning.
- Change reservoir top inlet to a bottom inlet.
- Upgrade reticulation system and cross connections to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.7 W7 FERNY GROVE WATER SUPPLY CATCHMENT

6.7.1 Existing System

The Ferny Grove Water Supply Catchment covers approximately 17 km² and extends from the suburb of Mitchelton in the east, to Enoggera and The Gap in the south east and to the Pine Rivers Shire in the north. It includes the suburbs of Ferny Grove, Upper Kedron, Keperra and some of Mitchelton. The area is primarily residential together with eight schools, a hospital, golf course and several small businesses.

Water is presently supplied via the Hay St. Pump Station, on the eastern extremity of the catchment, from a trunk main from the Green Hill Reservoir in the south. The Hay Street pump station supplies water to this area as follows:

- Part of the flow from Hay St Pump Station is directed to Mitchelton Reservoir by a pump station at Frasers Rd. The Mitchelton Reservoir services approximately one third of the Ferny Grove Catchment.
- Hay St Pump Station directs flow to the Grovely Reservoirs, which service the remainder of the Ferny Grove Catchment.
- The Grovely Reservoirs supply water to booster pumps at Callan St, which in turn, transfer water to the Archdale Rd, Upper Kedron Rd and Monash Place boosters. This boosted area is the Callan St Boosted Zone.

6.7.2 Future Demand

The Ferny Grove Water Supply Catchment is projected to grow by 58% to 2031, with most of the increase occurring to the west of the Callan St boosted area in the suburbs of Ferny Grove and Upper Kedron. This overall 58% rise comprises a 30% increase in the Mitchelton area and a rise of 96% in the Callan St boosted zone.

The augmentation works required are primarily directed towards the Callan St Booster Zone due to the expected high growth.

6.7.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries to remove high residual pressures in the Mitchelton supply catchment.
- Install new valves for rezoning.
- Booster upgrades at Callan St and Upper Kedron Rd.
- New "Ferny Grove Reservoir" in Upper Kedron to provide supply reliability and security.
- Augmentation and extension of mains in Upper Kedron to cater for new development.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.8 W8 FOREST LAKE WATER SUPPLY CATCHMENT

6.8.1 Existing System

The Forest Lake Water Supply Catchment is situated at the southern boundary of Brisbane City. It covers approximately 15 square kilometres and comprises undulating terrain.

The area is primarily residential and incorporates the suburb of Forest Lake and parts of Heathwood, Ellen Grove, Richlands, Inala and Doolandella. Near the southern boundary is approximately 45 ha of General Industry land. This is principally being used for warehousing and therefore is not a significant water user.

Water is supplied to Forest Lake from the Mt.Crosby supply system via a 600 mm diameter main along Archerfield Rd. This 600 mm diameter main supplies water to the Darra PRV supply catchment, to the Inala and Richlands supply systems, and ultimately to Forest Lake at its southern end.

6.8.2 Future Demand

The majority of land in the Inala, Richlands and Forest Lake Supply Catchments is classified as residential. Around 40% of this land is yet to be developed.

The majority of future development will occur in areas classified as Emerging Community and Low Density Residential. These are primarily located in the east and southeast.

Most growth will occur in Forest Lake and to a lesser degree in the Darra PRV and Richlands Supply Catchments. The Inala Supply Catchment is nearly fully developed.

In the Forest Lake Supply Catchment, the majority of new development will occur in the south and east, in the suburbs of Doolandella and Heathwood. There is also an area in the northeast, in Richlands suburb, which will experience significant growth.

It is estimated that there will be a 65% increase in population in this area over the next 30 years.

6.8.3 Future Strategy

The reliability of supply for the Inala, Richlands and Forest Lake systems requires upgrading. WD's preferred strategy to address future demands includes:

- Upgrade Government Rd Pump Station.
- Augment Archerfield Rd trunk main.
- Augment Forest Lake Reservoir system.
- Mains augmentations.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.9 W9 GREEN HILL WATER SUPPLY CATCHMENT

6.9.1 Existing System

The Green Hill Water Supply Catchment covers an area of approximately 4,530 ha and extends from Mitchelton in the north to Indooroopilly in the south, and includes the CBD and surrounds.

The Camerons Hill Reservoir supplies water to the Mt.Crosby supply system, which delivers water to the Green Hill reservoirs. The catchment is serviced from these two bulk reservoirs, Green Hill 1 & 2 with capacities of 77.3ML and 79.5ML respectively.

Reservoirs at Bardon (4.4ML) and Chapel Hill (10.1ML) supply some of the more elevated areas of the catchment, whilst pressure reducing valves (PRV) in the Paddington area reduce maximum pressures to an acceptable level in the lower areas.

There are four bulk supply locations to adjacent systems that are relevant to this Master Plan. These are the Hay Street Pumping Station (supply to Grovely Reservoir), Eildon Hill Reservoir, Bartleys Hill Reservoir, and Bennett Road Pumping Station (supply to The Gap).

The system also includes three major pumping stations:

- Lloyd Street Pumping Station was primarily designed to supply the system north of the catchment boundary during periods when the North Pine WTP is not operational, although it can also supply the Green Hill catchment.
- Leworthy Street Pumping Station supplies Bardon Reservoir and the higher lying areas of the Bardon Reservoir catchment.
- Russell Terrace Pumping Station supplies water from Green Hill Reservoir 2 to Chapel Hill Reservoir.

6.9.2 Future Demand

This catchment consists of eighty four percent residential with a small percentage of land classified as Rural and Emerging Community. Industrial parcels contribute to two percent of the total number of parcels and are predominantly located in the suburbs of Milton, Bowen Hills and Newstead. There is an estimated increase of 13% in residential and 4% in non-residential demand from 2001 to 2031.

6.9.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Augmentation of trunk mains between Toowong and the CBD.
- Augmentation of trunk main between the Valley and Herston.
- Augmentation of trunk main between Green Hill reservoirs and Lloyd Street Pump Station.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.10 W10 INALA & W20 RICHLANDS WATER SUPPLY CATCHMENT

6.10.1 Existing System

Inala
Inala Reservoir has a capacity of 9.2 ML. The system's reticulation pressures are dependent on the HGL provided by the reservoir's water level. The Inala system supplies about 400 ha and is supplied from Inala Reservoir via a single 300 mm diameter main running along Poinsettia St.

Richlands
Richlands Reservoir has a volume of 7 ML. Richlands water supply catchment comprises two separate areas of around 100 ha each. Both rely on Richlands Reservoir to provide back up storage. Unlike the Inala system, mains pressures are dependent on other factors besides the water level in the reservoir. The eastern area receives gravity supply from the Mt Crosby zone which is boosted when Government Road Pump Station is operating. The western area receives gravity supply from Richlands Reservoir but the hydraulic grade line in the outlet main is impacted by the operation of Boss Road Pump Station.

6.10.2 Future Demand

The Inala and Richlands area is largely classified as residential. This comprises Low Density Residential, Low-Medium Density Residential and Emerging Community classifications. It is estimated there will be significant growth in both Inala and Richlands supply catchments over future years. The majority of this will come from the take up of 250 hectares of Emerging Community classified land. Of this, 180 hectares is situated in the western area of Richlands Catchment.

It is estimated that the Inala and Richlands areas will grow by 13% and 160% over the 2001-2031 period respectively.

6.10.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries around Lowry St in the eastern Richlands area.
- Expansion of the western Richlands area to the north and reduction to the south (areas transferred from/to the Forest Lake Water Supply Catchment).
- Upgrade trunk main and reticulation to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.11 W11 KARANA DOWNS AND MOUNT CROSBY WATER SUPPLY CATCHMENT

6.11.1 Existing System

The water supply catchments are located on the southwest extremity of Brisbane City and were transferred from Ipswich City Council (ICC) to Brisbane City Council (BCC) in early 2000. There are three reservoirs with a combined capacity of 2.32 ML and three water booster pump stations.

The Mount Crosby Water Supply Catchment is fed via an off-take from the arterial trunk water mains supplying Brisbane City, which derive their water in turn from the Cameron's Hill Reservoirs.

The Karana Downs Water Supply Catchment is serviced via an off-take from a distribution main from the arterial trunk water mains supplying Brisbane City.

A new reservoir and pump station were recently completed for the Manchester Forest Estate development. This area is to the northwest of the Mount Crosby Water Supply Catchment. It is included in the Master Plan area and is referred to as the "Manchester Forest Water Supply Catchment". The Manchester Forest Water Supply Catchment is fed from an off-take from Mount Crosby Water Supply Catchment, at the intersection of Swensons Road and Lake Manchester Road. A reservoir level controlled pump station supplies a reservoir supplying the Manchester Forest Estate.

6.11.2 Future Demand

The ultimate area served is approximately 2,000 ha and the predominant area classification is Low Density Residential. This is not planned to change in the future. The adopted growth rates for the years 2000-2010 and 2010-2015 are 1.0% and 0.1% respectively. The populations and demands in the Manchester Forest Water Catchment do not significantly impact on the water catchment.

6.11.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries by supplying the Emungerie Drive residences from the Mount Crosby Water Catchment.
- Upgrade booster pumps.
- Reticulation augmentation with mains and pressure reducing valves.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.12 W12 KURABY NORTH AND KARAWATHA WATER SUPPLY CATCHMENT

6.12.1 Existing System

The Kuraby North and Karawatha Water Supply Catchments service the suburbs of Acacia Ridge, Calamvale, Eight Mile Plains, Kuraby, Runcorn, Sunnybank, Sunnybank Hills and Karawatha.

The Camerons Hill reservoirs supply water to the Mt.Crosby supply system, which delivers water to the Kuraby North and adjacent systems such as Green Hill, Tarragindi, Wellers Hill, Forest Lake and Mt.Ommaney.

Kuraby North forms part of a trunk main system, which delivers water to Logan and Gold Coast Cities, Karawatha and Kuraby South and is supplied from Kuraby Reservoir (70 ML) and the pumping stations at Learoyd Rd and Stones Road. These pumping stations also feed the Kuraby Reservoir from where the water gravitates to the Kuraby South system and to Karawatha PS. The Karawatha PS feeds the Karawatha Reservoir (5.1 ML) and supplies the Karawatha distribution catchment.

There are three bulk supply locations to Logan City that are relevant to this Master Plan and they are located at Compton Road in Kuraby North, Trinder Park and Illaweena Street in Kuraby South.

The only booster pump in the system maintained by Brisbane Water is at the corner of Stiller Street and Beenleigh Road to boost supply to new developments in the vicinity of Orchard Heights Estate. There are a number of private booster pumps in Kuraby North around Chesterfield Crescent and King Street.

6.12.2 Future Demand

Ninety one percent of the parcels are used for residential purposes; one percent contributes towards industrial purposes with the remaining land being rural and emerging community.

There is an increase of 94% in non-residential demand from 2001 to 2031. Most increase is in the General and Light Industry categories.

6.12.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Karawatha: Augmentation of pipelines in Gowan Road, Beaudesert Road and Compton Road.
- Kuraby North: Creation of Stiller Drive Booster Zone and new pipeline in Allbutt Street.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.13 W13 MANLY AND ROLES HILL WATER SUPPLY CATCHMENT

6.13.1 Existing System

The water supply catchment consists of the suburbs of Wynnum, Manly, Manly West and Lota and is bordered by Moreton Bay to the east, Wondall Road to the west, Catherines Terrace to the north and Lota Creek to the south. This equates to a gross area of land of approximately 1100 ha.

The water supply area comprises the three pressure zones of Manly, Roles Hill and Manly Road Water Booster.

Two elevated storages supply the Manly Zone, while two ground reservoirs supply the Roles Hill Zone. All of these storages are located on the corner of Manly Road and Preston Road. The Manly Road Booster's suction is connected into the reticulation of the Manly Catchment.

The Roles Hill Zone is divided into two sub-zones, Roles Hill North and Roles Hill South. Roles Hill North encompasses the suburb of Wynnum, while Roles Hill South encompasses the area in the southern part of Lota. The Manly Zone splits these two sub-zones.

6.13.2 Future Demand

The major land use in the area is for residential purposes, together with a number of light industries and commercial businesses. The commercial and light industrial development is centralised in the Wynnum and Manly suburbs, while the main areas of residential development occur in Manly, Manly West, the south eastern part of Wynnum and the north eastern part of Lota.

Residential and non-residential demand is expected to grow by 11% and 58% respectively by 2031. The highest residential growth is anticipated in the Manly Road Water Booster Zone and non-residential in the Roles Hill Zone.

6.13.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Augmentation of existing Manly Road booster pump station
- Undertake augmentation of various trunk mains and reticulation, including Ernest St, Daisy St, Blackwood Rd, Coswell st, Manly Rd, Whites Rd, Nevis St, Kelston St, Tralee St and Radford Rd.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.14 W14 MILNE HILL/STAFFORD WATER SUPPLY CATCHMENT

6.14.1 Existing System

The Milne Hill/Stafford Water Supply Catchment is located in the north of Brisbane City and incorporates the suburbs of Bridgeman Downs, Carseldine, Aspley, McDowall, Chermside West, Everton Park, Stafford Heights, Kedron, and Stafford.

The catchment consists predominantly of residential allotments, with no industrial development. Commercial development is limited to two local shopping centres. The catchment also contains a cemetery, crematorium, hospital, two retirement villages, and several schools.

The two reservoir complexes that service the catchment are Milne Hill and Stafford. The Milne Hill complex is the larger of the two and has a single reservoir with a capacity of 13.6 ML. The two reservoirs at the Stafford Site are a 1.3 ML reservoir and a larger 9.1 ML storage. The Milne Hill reservoir is generally fed from the Aspley Reservoir and associated pump station, whilst the Stafford reservoirs are fed from the Sparkes Hill Reservoirs using pumps located in Cockle St.

The area contains two booster zones required to supply high elevation areas. Eldershaw St/Flockton St booster zone is a large combined booster zone servicing an area of 169 ha, whilst the Hamilton Road booster zone covers 16 ha.

6.14.2 Future Demand

Generally the suburbs of Stafford Heights, Kedron and areas near Aspley are at full development. However there is a substantial amount of land in the suburbs of Bridgeman Downs, McDowall, Everton Park and Chermside West for future residential development.

Population growth in the Emerging Community Area will be significant and will place considerable demands on the water supply infrastructure.

6.14.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Trunk main and reticulation augmentation.
  - Duplication of the outlet main from Milne Hill Reservoir
  - Trouts Rd, Aspley between Horn Rd & Albany Ck Rd.
  - Trouts Rd, McDowall between Flockton St & Hamilton Rd
  - Trouts Rd, Aspley near Albany Ck Rd
  - Flockton St, Everton Park between Old Northern Rd & Palmer St
  - Trouts Rd, Stafford Heights between Flockton St & Redwood St
  - Beckett Rd, Bridgeman Downs between Darien St & Albany Ck Rd
  - Flockton St, Everton Park between Old Northern Rd & Cayley St
- Augmentations at the Milne Hill Reservoir complex.
- Flockton St Booster Pumps upgrade.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.15 W15 MT CROSBY NORTH WATER SUPPLY CATCHMENT

6.15.1 Existing System

The Mt Crosby North Water Supply Catchment covers a large area north of the Brisbane River, which is supplied by gravity from Camerons Hill reservoirs at Mt Crosby. Significant variations in elevation throughout the catchment require booster pumps in some locations, and in some instances a series of booster pumps, in order to meet Standards of Service.

Existing infrastructure lying within Mt Crosby North water supply catchment comprises:

- Major trunk mains designed for the bulk transfer of water from Camerons Hill reservoirs to storage facilities within the overall Brisbane City water supply system.
- Distribution and reticulation mains for distribution within Mt Crosby North Catchment.
- Eight booster zones.

The trunk mains primarily transfer water from Camerons Hill reservoirs to Green Hill reservoirs. Branch mains supply other storages to the south of the Brisbane River. The catchment includes eight booster catchments. The pumps supplying these catchments are:

- Grandview Road
- Gold Creek Road
- Boscombe Avenue
- Allspice Street
- Pullenvale Road
- Nioka Street
- Gap Creed Road
- Herron/Pullenvale Road

6.15.2 Future Demand

The catchment primarily consists of land designated for residential or future residential development. Existing residential development is concentrated in the suburbs of Indooroopilly, St Lucia, Taringa, Chapel Hill and Kenmore. There are also small residential pockets in Fig Tree Pocket and Bellbowrie with significant land stocks in these areas available for future development. Further to the west, land is reserved for rural use, which primarily consists of large home sites, hobby farms, etc. Commercial and industrial development within the master plan area is very limited. The majority of residential growth in the supply catchment is planned to occur in the suburbs of Bellbowrie, Fig Tree Pocket, Moggill, Chapel Hill and Kenmore. Other suburbs are near fully developed and only infill development growth is expected. Some growth may be attributable to multiple dwelling construction in areas currently classified as low medium density residential. The major non-residential component of water demand is related to the existing University of Queensland campus at St Lucia and to the development of what is now the University farm at Pinjarra Hills.

6.15.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Augment Grandview Rd Booster Pump Station.
- Undertake trunk main augmentation, including Hawkesbury Rd, Church Rd and Grandview Rd.
- Upgrade reticulation.

Augmentation works are required to ensure that Standards of Service are met in the Bellbowrie/Moggill area as development occurs. Development should be the driver for expansion of the distribution system into this area. The proposed augmentations are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.16 W16 MT CROSBY SOUTH WATER SUPPLY CATCHMENT

6.16.1 Existing System

The Mt Crosby South Water Supply Catchment covers an extensive area in the south-western corner of Brisbane, incorporating the suburbs of Mt Ommaney, Jindalee, Seventeen Mile Rocks, Chelmer, Sherwood, Graceville, Corinda, Oxley, Darra, Richlands, Wacol, Ellen Grove, Inala, Durack, Yeerongpilly and Yeronga.

The Water Supply Catchment is fed by gravity from the Cameron's Hill Reservoirs (165 ML) at Mt Crosby. The supply catchment is subdivided into eight separate sub-systems including Mt Crosby Clear Water Storage, Sherwood PRV, Yeronga PRV, Yeerongpilly PRV, Mt Ommaney Reservoir Booster, Darra PRV, Seventeen Mile Rocks Road Booster and Boundary Road Booster.

Pumped booster catchments have been created to improve supply in elevated areas of Mt Ommaney, Seventeen Mile Rocks and Carole Park. By contrast, the majority of the supply catchment is at a low elevation and there are four reduced pressure catchments fed from the trunk mains. These are Yeerongpilly, Yeronga, Sherwood and Darra. Each is served by a number of pressure reducing valves located between trunk main and reticulation.

6.16.2 Future Demand

The Master Plan area consists of a large range of land uses, with distinct regions of industrial and residential use. Principal residential areas within the supply catchment are the suburbs of Sherwood, Jindalee, Yeronga and Yeerongpilly in the north, and Inala/Durack in the south. There is potential for future residential development in Darra and Yeerongpilly. Industrial and commercial development is mainly concentrated in a belt following Ipswich Rd in the Darra PRV Catchment. This includes light, heavy and extractive industries. Several of Brisbane Water's major customers, such as the Coca-Cola Amatil plant on Orchard Rd, Richlands, are located in the Master Plan area.

There is an expected increase of total Residential demand in the Mt Crosby South Supply Catchment by 2031 of 34%. There is large predicted residential growth in the Mt Crosby Clear Water Storage Catchment (increase of 54%) and the Darra PRV Catchment (increase of 49%). The non-residential growth to 2031 is 136%. It is predicted that there will be a significant growth in non-residential activities in the Darra PRV Catchment, with a growth of up to an additional 158% by the year 2031.

6.16.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Staged augmentations required for maintaining standards of supply for 2003 to 2031 is to be provided for the sub-systems of:
  - Mt Crosby Clear Water (that is applicable to the area defined as Mt Crosby South)
  - Sherwood PRV
  - Darra PRV
  - Seventeen Mile Rocks Road Booster
  - Boundary Road Booster
- Install new PRVs and modify/reinstate existing PRVs.
- Adjustment of catchment isolation valves.
- Install new valves for rezoning.
- Trunk main and reticulation augmentation to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.17 W17 MT GRAVATT/HOLLAND PARK/TOOHEY/NATHAN WATER SUPPLY CATCHMENT

6.17.1 Existing System

The Mt Gravatt Water Supply Catchments study area is located approximately 10 km south-west from Brisbane's Central Business District and is approximately 12 km by 8 km in area. It broadly covers the existing reticulated areas of: Tarragindi, Holland Park, Mount Gravatt, Nathan, Macgregor, Robertson and Eight Mile Plains. The existing water supply infrastructure in the Mt Gravatt Water Supply Catchments is relatively complex. There are seven pressure catchments in the study area. The catchments receive bulk water from Tarragindi and Wellers Hill reservoirs. The following reservoirs form part of the existing Mt Gravatt system:

- Mt Gravatt (22.7 ML)
- Holland Park 1 and 2 (1.1 ML and 4.5 ML)
- Nathan (22.7 ML)
- Toohey Mountain 1 and 2 (4.5 ML and 7.3 ML)
- Outlook Drive (1.0 ML)

Nathan Reservoir forms part of the Holland Park Reservoirs supply zone.

There are two major pump stations in the Mt Gravatt existing system, pumping to ground level reservoirs. These are: Tarragindi Road WP12 (to Toohey Mountain Reservoirs) and Shire Road WP10 (to Holland Park and Mt Gravatt Reservoirs). In addition, the Azanian Street Booster Pump Station pumps to the Outlook Drive Reservoir.

Booster pump stations in Mt Gravatt's existing water supply infrastructure supply elevated service areas. These boosters include:

- Bakewell/Panorama Drive WB124
- Padstow Road
- Cleary Street

The Mt Gravatt supply zone also feeds the Miles Platting Road Booster Pump Station, which currently services most of the proposed Rochedale Urban Community area. This area is covered by the Rochedale high growth PSP.

6.17.2 Future Demand

The Mt Gravatt catchment is characterised by primarily residential development together with an amount of commercial and industrial development (e.g. Logan and Kessels Road commercial precincts). Approximately 90% of existing demands in the area are due to residential development. The Pacific Motorway divides the Mt Gravatt area in a north-west to south-easterly direction and provides access to a number of major facilities in the catchment including ANZ Stadium, Garden City Shopping Centre and the Nathan and Mt Gravatt campuses of Griffith University.

Future development is predicted to occur in 'Emerging Communities' classified areas in Eight Mile Plains. The remainder of the study area is well developed, with mainly infill development and intensification providing the source of growth in these established areas. Residential and non-residential demands are estimated to increase by 13% and 67% respectively between 2001 and 2031.

6.17.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Adjustment of catchment boundaries, including valving.
- Upgrading of booster pumps at Padstow Road.

- Upgrade trunk mains, reticulation and cross connections to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.18 W18 MT OMMANEY WATER SUPPLY CATCHMENT

6.18.1 Existing System

The Mt Ommaney Water Supply Catchment is located on the south western side of Brisbane. It includes the suburbs of Westlake, Sumner, Middle Park, River Hills, Jamboree Heights and a portion of the suburbs of Mt Ommaney, Wacol and Sinnamon Park.

The water supply catchment is approximately 24 km^2 and is bounded to the west by the Brisbane River, to the south by Ipswich, and to the north and east by the Mount Crosby South and Darra PRV water supply catchments respectively.

The Mt Ommaney Catchment is supplied via the Mt Ommaney Reservoir (32.7 ML), which is located at the northern end of the catchment. The Mt Ommaney Reservoir is supplied via gravity from Mt Crosby. The catchment is serviced by one booster pump that is located in the Leopard Tree Crescent Booster zone.

6.18.2 Future Demand

The Mt Ommaney Catchment is divided into two distinct sections. The northern section is typically residential, with parks, schools, a golf course and some general to light industry on the south eastern side. The southern section of the catchment is generally special purpose land owned by the State and Commonwealth governments, and uses include correctional centres and hospitals.

It is predicted that the area's residential population will increase by about 17% over the next 30 years. This will primarily occur as infill in existing residential areas and as new development in the areas classified as Emerging Community. Non-Residential Demands are expected to increase by 45% over the next 30 years, and 66% ultimately.

The Master Plan contains recommendations for a case-by-case assessment of infrastructure contributions in the southern area, as no growth has been allowed for due to the uncertainty around future development that might occur.

6.18.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Upgrade Leopard Tree crescent Booster Pump Station
- Provide adequate fire fighting flow to the Jason Street Area.
- Connect the McPherson St area to the Leopard Tree Crescent Booster Zone.
- Connect the Endeavour Street Area to the Mt Crosby Catchment if practical.
- Upgrade reticulation cross connections to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.19 W19 NORTH PINE WATER SUPPLY CATCHMENT

6.19.1 Existing System

The North Pine Water Supply Catchment is 11 km north of the city and is broadly concentrated on the suburbs of Aspley, Bridgeman Downs, Carseldine, Bald Hills and Bracken Ridge. The study area covers approximately 12 square kilometres. The composition of the area is predominantly residential with a concentration of commercial development along Gympie Road in Aspley.

The system is connected to two supply sources, North Pine Treatment Plant and the Aspley Reservoir (91 ML). The North Pine Aspley system has two further sub systems, a pump booster catchment at Graham Road and a pressure reduced (PRV) catchment at Lacey Road, Bald Hills.

6.19.2 Future Demand

A significant proportion of the area is residential with non-residential areas concentrated along Gympie Road. Development potential in the northwest of the area from the Emerging Communities and Rural lands is identified by BCC's City Plan.

It is predicted that the area's residential population will increase by approximately 15% to 2031. This will primarily occur in the Lacey Road PRV Catchment (24%) and the North Pine/Aspley Catchment (20%).

No non-residential development is identified to change within the North Pine Aspley Master Plan area.

6.19.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Upgrading Graham Rd Booster Pump.
- Modify Graham Rd booster zone.
- Upgrade reticulation to improve distribution of water within the system.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.20 W21 ROCHEDALE WATER SUPPLY CATCHMENT

6.20.1 Existing System

The Rochedale Water Supply Catchment covers an area of approximately 10 square kilometres and is located about 14 km south east of the Brisbane CBD. It comprises parts of the suburbs of Rochedale, Mackenzie and Burbank.

The Rochedale Water Supply Catchment area is defined by the area that will be serviced by the future Rochedale Reservoir and is outside of the Rochedale Urban Community area. The Rochedale Urban Community Area will be mostly serviced by the Rochedale Reservoir but is covered by a separate high growth PSP.

The area is primarily rural with a pocket of urban residential land in Mackenzie. It lies to the north of the Rochedale Urban Community area.

The area is currently supplied by the Mt Gravatt-Capalaba Road Booster Pump Station which is fed from the Wellers Hill supply zone. The lower lying land in the area is in turn supplied via a pressure reducing valve (PRV) located at the corner of Mt Gravatt-Capalaba Road and Gardner Road.

6.20.2 Future Demand

There is limited growth expected within the Rochedale Water Supply Catchment, with only a small area of emerging community land in Mackenzie available for urban development. Some subdivision of rural lots may occur but growth from this is expected to be minimal. It should be noted, however, that redevelopment of rural land in Rochedale to the south as the Rochedale Urban Community with an ultimate population of about 20,000 EP will have a major influence on the water supply arrangements in the area.

6.20.3 Future Strategy

WD's preferred strategy for future servicing of the area includes:

- New reservoir in Rochedale Road near Miles Platting Road
- Conversion of Mt Gravatt-Capalaba Rd Booster Pump Station to reservoir supply pump station pumping to the new Rochedale Reservoir.
- Augmentation of trunk mains between the pump station and the reservoir.
- Relocation of the PRV in Mt Gravatt-Capalaba Rd from the Gardner Rd intersection to the Grieve Rd intersection.

6.21 W22 SPARKES HILL WATER SUPPLY CATCHMENT

6.21.1 Existing System

The Sparkes Hill Water Supply catchment is located in the central north of Brisbane City. The water supply catchment services parts of the suburbs of Aspley, Chermside West, Wavell Heights, Nundah, Grange, Enoggera, Alderley, Newmarket and Everton Park, and the entire suburbs of Gordon Park, Kedron and Stafford. The overall system receives treated water from Mount Crosby and North Pine Water Treatment Plants.

Sparkes Hill reservoirs are a significant component of the overall Brisbane City bulk water transportation system and are currently operated in a number of modes, depending on the overall demand within Brisbane City, and the availability of water from North Pine Water Treatment Plant. These operational modes include:

a) Low Demand (winter) - Supply from Mt Crosby

During low demand periods Sparkes Hill reservoirs provide supply to, and storage for:

- Sparkes Hill supply catchment.
- Aspley reservoir, which in turn supplies the system to the north including the Northern Customer Councils.
- Milne Hill and Stafford catchment with Milne Hill reservoir supplied through the Aspley pump station and Stafford reservoirs through the Cockle St pump station.

b) High Demand (summer) - Supply from North Pine WTP

In this mode Sparkes Hill reservoirs provide supply to, and storage for:

- Sparkes Hill supply catchment
- Stafford reservoirs through the Cockle Street pump station.

The water supply catchment is separated into seven pressure zones, one gravity feed from the Sparkes Hill reservoir system and six booster zones. The boosted zones are Huddart Street, Ellison Road, Bilsen Road/Pfingst Road, Musgrave Terrace, Appleby Road/Minimime Street and Rode Road. The Sparkes Hill Water Supply Catchment is serviced by two reservoirs with a combined capacity of 118 ML. The booster pumping stations include Appleby Road, Pfingst Road, Huddart St No 1, Rode Road, Minimime Street, Ellison Road, Huddart Street Number 2, Bilsen Street, Musgrave Terrace and Huddart Street No 3.

6.21.2 Future Demand

The catchment primarily consists of existing residential properties, with non-residential development confined to light industrial and commercial activities, and includes four of Brisbane Water's top 200 customers.

In general terms, the water supply catchment is close to full development. By the year 2031, demand is increased by 30% for residential and 37% for non-residential respectively.

6.21.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Upgrade existing booster pump stations, including modifications to the Ellison and Rode Road booster pumps and minor adjustment to booster catchment boundaries and pump operation.
- Undertake trunk main/reticulation main augmentations to meet growth in demands and facilitate pressure and leakage management strategies.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.22 W23 STRETTON WATER SUPPLY CATCHMENT

6.22.1 Existing System

The Stretton water supply catchment comprises an area of 2,200 ha and incorporates the suburbs of Stretton, Calamvale, Drewvale, and Karawatha, some of which are undeveloped.

The area is supplied from Kuraby Reservoir, and has off-takes to the Karawatha Elevated supply catchment, as well as to Logan City supply catchments, via the Trinder Park pumping station and Illaweena Street Reservoirs.

6.22.2 Future Demand

The Stretton Catchment is approximately 26% developed, based on the City Plan. The anticipated sequencing of development to the ultimate development is assumed to progress as follows:

- Industrial area north of Johnson Road, Hillcrest, is expected to have a linear growth from 2000 to 2010.
- Staged development is expected in each residential area to the end of the sequencing period (i.e. 2005, 2010 & 2015).
- Residential areas in central Calamvale will be developed first (i.e. 2005) through natural infill and by virtue of proximity to existing services and facilities.
- Residential areas south of Illaweena Street, and in the high level areas south of Logan Motorway, will be last to develop (i.e. 2015) due to difficulties associated with servicing.
- Remaining residential areas to north/west and west of Beaudesert Road and north of Illaweena Street will be developed in the medium term of 10 years (i.e. 2010).

6.22.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Provision of temporary in-line boosting to high level areas in Muscari Crescent, to delay trunk main augmentations.
- 1200/900mm diameter trunk main augmentations to Kuraby Reservoir outlet.
- Mains upgrading in Illaweena Street, Honeysuckle Way and Beaudesert Road.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.23 W24 TARRAGINDI WATER SUPPLY CATCHMENT

6.23.1 Existing System

The Tarragindi Catchment services the inner southern suburbs of Brisbane. It extends from Hawthorne in the north to Tarragindi in the south, and east to Camp Hill. The western boundary of the catchment is the Brisbane River.

The area contains a mixture of land uses. A large proportion of the land is residential, with a mixture of detached and attached housing. As an inner city area, there are significant numbers of flats and units, with the proportion expected to increase in the near future. Significant numbers of "Character Residential" dwellings are located in the older suburbs of East Brisbane, Woolloongabba, Dutton Park, Highgate Hill and Coorparoo.

Commercial and Industrial development is concentrated along Ipswich Rd, Logan Rd, Annerley Rd, and Old Cleveland Rd. There are also pockets of industrial development along the railway line, and the river at West End. The South Bank and Cultural Centre precincts are located within the catchment. Major customers in the catchment include PA Hospital, Pauls Ice Cream & Milk, Mater Hospital, South Bank Corporation, Qld Cultural Centre, Greenslopes Hospital, Gabba Cricket Ground, ACI Operations, Coorparoo School and Telstra.

The catchment is serviced from three reservoirs, Tarragindi (60.8 ML), Highgate Hill No. 1 (4.7 ML) and Highgate Hill No. 2 Reservoir (4.6 ML). Booster pumps located at Highgate Hill Reservoir and Curd Street provide additional pressures to elevated areas within the catchment. Tarragindi Road Pump Station delivers water to the Toohey Mountain reservoirs.

6.23.2 Future Demand

Substantial infill development is anticipated in the area, resulting in an expected 25% increase in total population over the next 30 years.

The majority of growth is anticipated in the suburbs of West End, South Brisbane and Woolloongabba. Growth in these areas is likely to be achieved through redevelopment of industrial land along Montague Rd, as well as further intensification of housing within current residential areas. A large proportion of residential development is likely to be attached housing varying in density.

Growth in the commercial/industrial sectors is anticipated to be approximately 20% over the next 30 years. However, demand is anticipated to shift away from heavy industries to a light industrial and commercial focus that complements the residential area.

Generally, water demand rates follow a similar pattern to residential growth, with the majority of growth anticipated to occur in the 10-15 year horizon.

6.23.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Install pressure gauges and flow meters to better estimate customer demands and system performance.
- Further investigation into the two Pressure Reduction Zones at Fairfield and Coorparoo North is required.
- Highgate Hill Booster Upgrade, Riding Rd Booster and Vulture St PRV.
- Mains augmentation including Boundary St, Hardgrave Rd, Wynnum Rd.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.24 W25 THE GAP SUPPLY CATCHMENT

6.24.1 Existing System

The Gap Water Supply Catchment covers an area of approximately 1,600 ha to the west of Brisbane adjacent to the Enoggera Reservoir. The catchment is supplied from the Green Hill catchment by the Bennett Road Pump Station.

The Gap Water Supply Catchment is divided into three separate pressure zones: Gap Reservoir (9.1 ML), Gap Booster and Bennett Road Booster zone.

The Gap Reservoir zone is fed by either The Gap Reservoir, or the transfer pumps on the eastern boundary of the water supply catchment (Bennet Road Pump Station).

The Bennett Road Booster zone is a small pressure zone fed from a booster pump, situated on the eastern boundary of the water supply catchment, which pumps from the Green Hill Reservoir Catchment.

6.24.2 Future Demand

The Master Plan area consists of predominantly low-density residential allotments and green space. There are some medium commercial demands from local shopping centres, but no other major users. Based on City Plan 2000, there are limited opportunities for future development in the area.

Overall, growth is projected to be relatively slow, at approximately 0.3% per annum from 2002 – 2021. Projected growth is broadly spread out across the water supply catchment. In the period 2002 – 2031 the demand is estimated to grow approximately 9%, for combined Residential and Non-Residential users.

6.24.3 Future Strategy

WD's preferred strategy to address future demands includes:

- Form two new pressure zones: a) fed from a PRV in Pammay Street; b) by installation of a booster pump station in Kilcolman Street.
- Install new valves and adjust valve operation for rezoning.
- Telemetry and controls for pumps.
- The Gap Reservoir upgrade.
- Upgrade reticulation cross connections to improve distribution of water within the system.

The proposed augmentations are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

6.25 W26 WELLERS HILL WATER SUPPLY CATCHMENT

6.25.1 Existing System

The Wellers Hill Water Supply Catchment covers approximately 115 km^2. It extends from Wynnum, Hemmant and Bulimba in the north to Wishart and Mackenzie in the south. The western boundary extends to Morningside, Camp Hill and Holland Park West. The eastern boundary borders Redland Shire.

The Wellers Hill Supply System is served by two reservoirs with a combined capacity of 152 ML. These are filled under gravity, or booster pumped if necessary, from a trunk main system extending from Mt Crosby, which also supplies Kuraby Reservoir, Tarragindi Reservoir and Green Hill Reservoir.

The majority of the catchment is supplied by gravity from the Wellers Hill Reservoirs, however, elevated areas are supplied by booster pumps forming the following five boosted zones: Bacton Road, D'Arcy Road, Jones Road, Cavendish Hill (Thomas St and Eva St Boosters), and Greendale way.

The Wellers Hill Catchment also supplies water to the Manly & Roles Hill Catchment, the Australia TradeCoast Catchment, the Rochedale Catchment and the Mt Gravatt/Holland Park Catchment.

6.25.2 Future Demand

Existing development is primarily low density residential with pockets of low medium density in Carina, Camp Hill, Murarrie, Morningside, Balmoral, Bulimba and Holland Park. Small pockets of industry exist in Hemmant, Tingalpa, Wakerley, Bulimba and Mansfield. In the east, in the vicinity of Gumdale, Chandler and Burbank, development consists of semi-rural blocks and bushland. Large areas of vacant residential land are present in Wakerley and Manly West. Major commercial development occurs in Carindale, Cannon Hill and Wynnum West.

The majority of the urban growth is expected in the suburbs of Mackenzie, Wakerley and Wynnum West. Residential and non-residential growth of approximately 19% and 40% respectively are anticipated by 2031.

6.25.3 Future Strategy

WD's preferred strategy to address future demands includes:

- New reservoirs at Belmont.
- Trunk main augmentations in Gumdale, Tingalpa, Morningside, Wynnum, Wynnum West, Balmoral and Camp Hill.
- Upgrade reticulation cross connections to improve distribution of water within the system.
- Installation of pressure reducing valves, flow meters and pressure gauges for pressure and leakage management.

These works are detailed in the Appendices, where estimated costs and timing have been assigned to the recommended augmentation works.

7 WATER SUPPLY COST APPORTIONMENT

This section explains the basis of cost apportionment, including the scope and valuation of items, the way in which demand from different types of development has been assessed and the methods used for cost apportionment.

7.1 PLANS FOR INFRASTRUCTURE

Plans for infrastructure are an essential element of identifying future infrastructure needs, timing, and costs. Trunk infrastructure items that service the future population and are recoverable through the Water Supply PSP are detailed in Appendix A. The direct costs of preparing and reviewing the PSP and financing the provision of infrastructure are also recoverable through the contributions.

7.2 TIMING OF INFRASTRUCTURE

The timing of infrastructure is identified within the PFIs and in Appendix A, taking into account the development forecasts as outlined in Section 4. The PSP identifies the year in which an item is anticipated to be provided. These times may vary depending upon development, infrastructure items are planned to service the future population for the planning horizon.

All water supply master planning within Brisbane is designed to ultimate 2031. Ultimate is considered the planned infrastructure to service maximum population scenario. The PSPs have been based on a planning horizon to 2016 and as such, infrastructure contributions have been based on this shorter horizon. The provision and timing of infrastructure has been based on applying the most cost efficient and economical approach.

7.3 COST OF INFRASTRUCTURE

Planned and existing infrastructure has been valued as follows:

- Planned infrastructure is costed on the basis of preliminary designs and standard construction rates. Standard construction rates have been inflated for indirect costs, including contingencies and the cost of project and construction management. The net present value of future assets has been applied.
- Infrastructure that was provided with the expectation that part of the funding would be sourced from infrastructure contributions has been valued at the actual cost. To maintain contributions at the same rate over the life of the plan, the present value of infrastructure is used.

The costs of infrastructure stated in this document are real values. Real discount rates and contingencies are also used, where required, in the cost apportionment.

Table 7.1 Cost and Valuation of Water Supply Infrastructure

The present value of current Water Supply Infrastructure	1,748,595,694 ICUs
The present value of proposed Water Supply Infrastructure	326,966,936 ICUs
Existing ETs used for calculating Water Supply Infrastructure Contributions	471,352 ETs
Ultimate ETs used for calculating Water Supply Infrastructure Contributions	651,794 ETs

7.4 MEASURES OF DEVELOPMENT AND DEMAND FOR NETWORK CAPACITY

7.4.1 General Provisions

Development creates a demand for infrastructure capacity that differs by land use type and infrastructure network. Therefore, it is important to describe how land use generates these different demands and to express this demand in generally understood and accepted units. Infrastructure contributions will also generally be expressed in terms of these same units.

Land use is defined in terms of development units. In established areas, these units are dwellings for residential development and gross floor area (GFA) in the case of non-residential development. In greenfield areas, development units are generally 'developable hectares' for both residential and non-residential development. The developable hectare excludes land in public ownership or required in a PSP or a Plan for Infrastructure, or areas of land removed through the development assessment process.

Development units are converted into units of demand for specific infrastructure networks by using a land use and network specific conversion rate. For water supply infrastructure the measure of demand is calculated using 'litres per second in peak periods'. The conversion rate defines the use made of a network by different types of development.

By expressing demand in relative terms across land uses, a range of different uses can have their demand defined through a single index, the unit of demand. In established areas, this relative unit of demand is the Equivalent Tenement or ET, and is the consumption of capacity of a network by one detached dwelling. The relationship is expressed in the following equation:

Units of Demand (ETs) = (conversion rate) x No. of Development Units

It is important to note that all projections were produced for equivalent persons (EP). For water planning, this was then converted to equivalent tenements (ET) at the rates shown in Table 4.0.

7.4.2 Specific Provisions of this PSP

For the purpose of this PSP, the development unit is taken to be equivalent tenements (ET). When discounting is used, the discount period is the difference between the proposed timing and the base year. For this PSP the base year is 2001.

7.5 METHODS OF COST APPORTIONMENT

PSPs have been developed based on infrastructure required for existing development and that required by new development. Fair apportionment of costs therefore means that existing development as well as new development must fund an equitable proportion based on infrastructure usage. PSPs have determined the component of infrastructure required by anticipated development and calculating the fair share on infrastructure. Cost apportionment is undertaken in a three-step process:

- Determination of the proportion of the cost of an infrastructure item that should be paid for by future development within the water catchment area;
- Calculation of the contribution, based on the Present Value of the cost of the item and the Present Value of future development; and
- Calculation of infrastructure contribution units.

7.5.1 Stage 1 – Assessment of Apportioned Costs

A variety of methods are available to proportion the cost of an item that should be paid for by future development within the plan area. The approach used for the Water Supply PSP was:

Average cost apportionment - where the total cost of existing and planned infrastructure is apportioned across the combined amount of existing and forecast development. This approach is generally used in circumstances where the planned infrastructure will increase the existing standard of service, or where patterns of use change as development or investment occurs;

The cost of preparing the PSP has been apportioned across the amount of existing and new development. Infrastructure planning is based on the foreseeable population projections. The water master planning is based on full cost recovery of infrastructure over the ultimate population 2031. Contributions are based on the existing and future population contributing to its fair share of infrastructure. Contributions have been split proportionally between the existing and future population.

7.5.2 Stage 2 – Assessment of Infrastructure Contribution

$$\text{Contribution (\$/ET)} = \frac{\sum (\text{Present \$ Value of Total Assets}) \text{ X } (\text{Proportion of Total Asset Usage})}{\sum \text{Net Present Value of Future ET}}$$

∑ Present $ Value of Total Assets =
Current $ Value of Existing Assets + Net Present Value of Future Assets

Proportion of Total Asset Usage (%) = Additional ET Served (2001 to 2031) x 100
Ultimate ET Served (2031 indexed 2001)

The following example is only hypothetical and for the purposes of explaining how to apply the Water Supply Infrastructure Contributions PSP methodology.

INPUTS

- PSP contribution area has a value of total assets of $1,000,000.00
- The planned future NPV of the future assets is $200,000.00
- In the same catchment the total number of ET at ultimate is 1000
- The current ET within the catchment is 800
- The additional or future ET within the catchment is 200
- NPV of future ET within the catchment is 186

EXAMPLE:

STEP 1:

∑ Present $ Value of Total Assets =		Current $ Value of Existing Assets + Net Present Value of Future Assets
$1,000,000.00	=	800,000.00 + 200,000.00

STEP 2:

Proportion of Total Asset Usage (%) =		Additional ET Served (2001 to 2031) x 100 Ultimate ET Served (2031 indexed 2001)
20%	=	200 ET x 100 1000 ET

STEP 3:

$$\text{Contribution (\$/ET)} = \frac{\sum (\text{Present \$ Value of Total Assets}) \text{ X } (\text{Proportion of Total Asset Usage})}{\sum \text{Net Present Value of Future ET}}$$

$$\$1075.20/\text{ET} = \frac{1{,}000{,}000 \text{ X } 20\%}{186}$$

Use of this formula effectively ensures that existing and future population is contributing to its fair share of infrastructure. The funding of infrastructure has been split proportionally between the existing and future population. The capacity of assets is also split proportionally between the existing and future population. This formula is in accordance with the State Government requirements and legislation. A 6% real discount rate has been used for this calculation. Factors that were taken into account include risk and the weighted average cost of capital.

The total infrastructure contribution for a development unit for a network is the sum of contributions for items of that type e.g. detached dwelling. The contribution rate for each of the specified types of development is then calculated by multiplying the contribution rate for a development unit by the relevant conversion rate.

7.5.3 Stage 3 – Calculation of Infrastructure Contribution Units

The purpose behind relating an infrastructure contribution (as expressed in current dollars) to an Infrastructure Contribution Unit (ICU) is to enable dollar values of future contributions to take account of inflationary factors affecting the cost of trunk infrastructure. These calculations are contained in Section 2.

7.6 CONTRIBUTION AREAS

As a consequence of the infrastructure requirements, together with the apportionment of costs, 24 contribution areas are proposed to cover the Water Supply Infrastructure Contributions PSP (refer to **Map 1**). The water contribution areas essentially align with the water master plans.

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GLOSSARY

Cost Apportionment (CA) – Cost apportionment is the process by which contributions are determined. It is based on ensuring that all new users of an item of infrastructure pay for the infrastructure they use – a user pays system.

Desired Standard of Service (DSS) – Networks of infrastructure that have been developed to achieve a certain level of service, such as quantity or quality of water supply etc.

Equivalent Persons (EP) – is a unit of measure that imposes a peak hour demand on the water supply network (design load on the water supply network) equivalent to the peak hour demand (design load) imposed by a person resident in a detached house.

Equivalent Tenement (ET) – the consumption capacity of a network by one low density detached dwelling. Units of demand are standardised through this single index.
Infrastructure Contribution Unit (ICU) – The base measure for recovering contributions.

IPA – Integrated Planning Act 1997 – Queensland State legislative document that achieves ecological sustainability by coordinating and integrating at the local, regional and State levels while managing process and effects of development on the environment.

IPOLAA – Integrated Planning And Other Legislation Amendment Act 2003 – As an amendment to the IPA to delivery a planning and infrastructure delivery network to Queensland.

NPV - Net Present Value – Compares the dollar value of today verses the value of that same dollar in the future after considering inflation and other returns into account.

PSP – Planning Scheme Policy – Defined infrastructure contributions for development, based on the cost of planned infrastructure and expected development for the area – replaces traditional “headworks” contributions.

PV – Present Value – Dollar value of today.

QSAM – Queensland Small Area Model – Model used by both Brisbane City Council and DLGP to complete population projections for Brisbane.

Sewerage Catchment Areas Estimation Program - a Brisbane Water population estimation program that extracts data from the customer databases and manipulates it to calculate EP’s for each property in Brisbane. Census based average occupancy rates (persons per dwelling) are generally used for residential properties and a sewerage fraction of water usage for non-residential properties.

SLA – Statistical Local Area – an area encompassing several suburbs used by the Australian Bureau of Statistics and local governments for population forecasting purposes.

SNPOP – Equivalent Populations in Sewerage Catchment Areas Estimation Program – A Brisbane Water population estimation program which extracts data from the customer databases and manipulates it to calculate EP’s for each property in Brisbane – generally uses census average occupancy rates (persons per dwelling) for residential properties and usage rates for non-residential properties.

Water Infrastructure – the water supply network that provides water to a property including bulk supply and treatment, reservoirs, pump stations, booster stations, and pipes. City Plan Polygons - individual regions of the same Brisbane City Plan Area Classification that are often but not necessarily bounded on all sides by roads.