Moreton Bay Regional Council – Redcliffe City

Planning Scheme Policy

PSP4 Part 8.4.8 Development Contributions for Trunk Infrastructure – Stormwater

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ADOPTION
Moreton Bay Regional Council adopted this planning scheme policy on 8 September 2009.

COMMENCEMENT
This planning scheme policy took effect from 29 October 2009.

I, Daryl Hitzman, A/Chief Executive Officer, of the Moreton Bay Regional Council, hereby certify that this document is a true copy of the original.

Daryl Hitzman
A/Chief Executive Officer

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PSP4 Part 8.4.8 – DEVELOPMENT CONTRIBUTIONS FOR TRUNK INFRASTRUCTURE – STORMWATER

Head Of Power

This document is a Planning Scheme Policy for the purposes of the *Integrated Planning Act 1997* (the Act) and is made in compliance with the process prescribed in Schedule 3 of the Act.

Objective

The objective of this policy is to apportion the cost of Stormwater Trunk Infrastructure over all benefiting development (existing and future) commensurate with the demand or load that existing and future development will place on existing and planned future infrastructure, while ensuring a reasonable and equitable distribution of the costs of Stormwater Trunk Infrastructure works between Council and developers of land in the former Redcliffe City.

Definitions / Application

Application

This policy applies to all applications for development which has been made assessable against the *Redcliffe City Planning Scheme* and which will utilise any part of the Stormwater Trunk Infrastructure Network. For the purposes of this policy, the extent of the Stormwater Trunk Infrastructure Network within the former Redcliffe City is shown in Schedule C.

The policy outlines the basis of Council's Infrastructure Contributions Regime for Stormwater Trunk Infrastructure (Water Quality and Stormwater Discharge Quantity) in the former Redcliffe City. It is to be read in conjunction with Planning Scheme Policy PSP4 Part 8.4.1 Development Contributions for Trunk Infrastructure – Administration Policy.

Payment of the monetary contribution under this policy will in no way relieve the development proponent from any requirement under a condition of development approval to undertake non-trunk works or to connect the development to trunk infrastructure. Nothing contained in this policy precludes Council and the development proponent from entering into an infrastructure agreement in regard to the matters dealt with by this policy.

Definitions

The definitions of applicable terms are contained in PSP4 Part 8.4.1 Development Contributions for Trunk Infrastructure – Administration Policy. Where a term used in this policy is not defined in PSP4 Part 8.4.1, that term shall, unless the context indicates or requires otherwise, have the meaning assigned to it in the *Redcliffe City Planning Scheme* or in the *Integrated Planning Act 1997*.

Policy Statement

1 Scope

This policy sets out the basis for determining the amount of Development Contributions for Stormwater Trunk Infrastructure which Council will impose as conditions of development approval. The provisions of this policy shall apply to applications for development within the former Redcliffe City which, in the opinion of Council, may impact on its Stormwater Trunk Infrastructure either immediately or at some time in the future. This policy:

- is to be read in conjunction with Planning Scheme Policy PSP4 PART 8.4.1 Development Contributions for Trunk Infrastructure – Administration Policy;
- specifies the assumptions made in determining the rate of the contribution payable towards the cost of Stormwater trunk infrastructure within Council's Local Government Area;
- specifies the works, structures and/ or equipment, which the Council determines to be Stormwater Trunk Infrastructure;
- establishes the estimated cost of construction and any required augmentation of the Stormwater Network where contributions are to be made in terms of Stormwater Quality and Stormwater Drainage (Quantity) costs; and
- lists the applicable Demand Factors and Schedules of Infrastructure Contribution Rates.

2 Background Information

With the formation of Moreton Bay Regional Council incorporating the former Redcliffe City, Pine Rivers and Caboolture Shire Councils, there has been an effort to align the approaches to determining development contributions. As such, the methodology used in establishing the amount of required Trunk Infrastructure Contributions under this policy is generally based on the methodology identified in the report by John Wilson and Partners (JWP), "Priority Infrastructure Plan Stormwater" (the Study Report) for the former Pine Rivers Shire. This Study Report comprises:-

(1) Part 1 – Executive Summary (June 2008);

(2) Part 2 – Main Report (June 2008);

(3) Part 3 – Detailed Maps (June 2008); and

(4) Part 4 – Calculations and Supporting Data (June 2008).

The following additional studies/catchment management plans (CMPs) identifying required Trunk Infrastructure for the former Redcliffe City, were also used in the preparation of this policy:

(1) Saltwater Creek Catchment Management Plan, Geo-Eng Australia Pty. Ltd., June 2000;

(2) Bells Creek Rehabilitation Options, Natural Solutions, February 2009;

(3) Humpybong Creek Catchment Management Plan, Place Environmental, February 2007; and

(4) Catchment D37 Stormwater Management Study, Willing & Partners, September 1996.

3 Stormwater Methodology

3.1 Methodology

Determination of infrastructure for stormwater quantity and quality management has been undertaken for catchments throughout the Redcliffe City area. Assessment of this infrastructure has been based generally on assessments of existing land use and impervious cover, projected land use information derived from the *Redcliffe City Planning Scheme* and engineering investigations, modelling, as well as the forecasting and design aspects outlined in the studies and reports referred to in section 2 of this policy. Those studies are available as supporting and reference documents to this policy.

The abovementioned studies have focussed on catchment issues for creek systems and major drainage areas. The adopted infrastructure items are required to service or mitigate impacts from a large number of allotments or significant land areas having potential for subdivision. Accordingly, that infrastructure identified in these studies and reports has been adopted as trunk infrastructure for the purpose of this policy.

The provision and timing of trunk infrastructure has been based on the ultimate development of the particular catchment envisaged in the *Redcliffe City Planning Scheme* and the anticipated population growth over time respectively.

Investigation of stormwater management requirements has been performed for a large area of the waterway network within the former Redcliffe City. Table 3.1B details the extent of studies undertaken and applicable service catchments. The studies identify the infrastructure required to service both existing and future residents and non-residential activities as well as a methodology for the appropriate apportionment of cost based on the relative utilisation of the network and existing and future users. The requirements for land acquisition, revegetation and riparian protection have also been considered.

The procedures that have been applied to determine infrastructures contribution rates for this policy are detailed in Table 3.1A:

Table 3.1A – Infrastructure Contributions Methodology

Step	Tasks	Section
(1) Establish Service Catchments.	(a) Determine Service Catchments.	3.2 Stormwater Service Catchments.
(2) Assess change in land use based on growth projections.	(a) Evaluate the change to future land use based on the planning assumptions.	
(3) Assess the land use components within the river, creek and local catchments throughout the Shire as applicable to each service catchment.	(a) Determine the existing land use within each catchment in hectares; (b) Determine the future land use within each catchment in hectares based on strategic planning of future urbanisation and other land uses in hectares; and (c) Calculate the equivalent contributing area (demand units) for each catchment.	3.3 Basis for Demand Assessment. 3.4 Stormwater Demand in Catchments. Demand units for allocating charge.
(4) Identify Future Assets.	(a) From Catchment Management, Local Area Drainage and Detail Hydrological studies determine which future assets form part of the ultimate infrastructure network for waterway management of river, creek and local catchments. Refer Table 3.1B for a listing of those studies; and (b) Determine the Trunk Infrastructure cost and allocate to the service catchment hierarchy. Revalue cost to 01 January 2009;	4.3 Stormwater Trunk Infrastructure Determination. 4.4 Stormwater Trunk Infrastructure Valuations. 4.5 Existing Stormwater Trunk Infrastructure. 4.6 Future

Step	Tasks	Section
		Stormwater Plan for Infrastructure.
(5) Assess timing of works	(a) Evaluate infrastructure timing based on projected future development needs; and (b) Based on future development timing and availability of funding, determine the timing of works.	4.6 Future Stormwater Plan for Infrastructure.
(6) Assess the cost of infrastructure to be funded by future development	(a) Calculate the net present value for each future infrastructure item by escalating the cost by an anticipated inflation index and discount back by the relevant discount rate for the network; (b) Calculate the infrastructure contribution rates by dividing the costs of future infrastructure in net present value by the equivalent contributing area (demand units) in the catchment. To satisfy the discounted cash flow methodology requirements of calculating the infrastructure contribution rates, existing demand is added to the value of future demand which has been indexed for anticipated fluctuations in construction costs (generally increases) and discounted for cost of capital; and (c) The cost of infrastructure is allocated to existing and/or future equivalent contributable areas as appropriate.	4.7 Stormwater Infrastructure Costs by Catchment Table 4.7A.
(7) Apportion the Trunk Infrastructure costs attributable to each land use within the river, creek and local catchments throughout the Shire as applicable to each service catchment	(a) Apportion the cost and unit rate applicable for quantity infrastructure to existing and future land use based on impact of change in land use; and (b) Apportion the cost and unit rate applicable for quality infrastructure to existing and future land use based on impact of change in land use.	Schedule B Infrastructure Contribution Rates.

Table 3.1B – Stormwater Management Planning Documentation

Catchment Management Document	Service Catchment
Bells Creek Rehabilitation Options	Bells Creek
Humpybong Creek CMP	Humpybong Creek
Catchment D37 Stormwater Management Study	Margate Balance
Saltwater Creek CMP	Saltwater Creek

Outline Planning

Where catchment management or other drainage planning does not exist for a particular service catchment, future infrastructure requirements have been determined through an Outline Planning process.

Table 3.1C details catchments where infrastructure allocation has been determined through "in-house" Outline Planning by Council. As part of Council's ongoing review process, appropriate studies will be undertaken over time to progressively encompass those service catchments and the stormwater management planning for those areas will be updated accordingly.

Council acknowledges that the infrastructure adopted for these interim schemes is based on a minimalist approach which will need to be supplemented in the future to meet the same desired standards of service on which the detailed studies listed in table 3.1B were based.

Table 3.1C – Infrastructure Cost Allocation to Areas with Outline Planning

Infrastructure Subject to Outline Planning	Service Catchment Area
Outline Planning for GPTs	Redcliffe Proper
Outline Planning for GPTs	Rothwell Balance
Outline Planning for GPTs	Scarborough Coastal
Outline Planning for GPTs	Woody Point Coastal

3.2 Stormwater Service Catchments

The concept of Service Catchments allows for the cost of works within each service catchment and the corresponding infrastructure contribution rates to accurately reflect the actual impacts of development and the mitigation required. The service catchment concept is a convenient and logical vehicle for relating the infrastructure items being charged for and the development changes that they address to topographically derived boundaries.

The former Redcliffe City has been divided into the stormwater service catchments shown in Table 3.2A.

Table 3.2A – Stormwater Service Catchments

Service Catchment
Bells Creek
Humpybong Creek
Margate Balance
Saltwater Creek
Redcliffe Proper
Rothwell Balance
Scarborough Coastal
Woody Point Coastal

The extent of each of these "Stormwater Service Catchments" is shown on the map contained in Schedule C of this Policy.

3.3 Basis for Demand Assessment

Both the quantity and quality of stormwater discharged from a property as a result of a rainfall event are directly related to variables such as the extent of impervious area and the nature of the activity being conducted on the land. Since the type, nature and intensity of development is governed by the zone of the land, it is reasonable to adopt land zone under the planning scheme as a reliable technique for the determination of stormwater flows (quantity assessment) and pollutant discharges (quality assessment) from and within catchments. Such an approach has been used for establishing demand under this policy.

3.3.1 Stormwater Quantity Assessment

Assessment of rainfall runoff and stream flow flood level has been performed by software modelling of the various processes using industry accepted engineering design practice and, where possible, calibration to measured or known conditions. The assessments have been undertaken using procedures that have regard to the nature and extent of land zones and the hydrologic impact of these uses which are consistent with the intent of each of those zones under the *Redcliffe City Planning Scheme*. Table 3.3A details the various runoff coefficients and contribution factors for the applicable land zones.

The runoff coefficients used reflect the impervious area generally associated with that specific zone. The contribution factors for the calculation of the infrastructure contribution rate for Stormwater Quantity infrastructure have been based upon the ratio between the C100 Runoff Coefficient assigned to each zone or land use and that assigned to undeveloped land.

The various runoff coefficients and contribution factors for the applicable land zones have been adapted from the runoff coefficients for land zones in the *PineRiversPlan*. Table 3.3A lists the equivalent zones under *PineRiversPlan* to those listed in *Redcliffe City Planning Scheme* and the applicable runoff coefficients.

Table 3.3A – Runoff Coefficient Assumptions and Contribution Factors

Redcliffe City Planning Scheme Zone	Equivalent PineRiversPlan Zone	Runoff Coefficient (C100)	Contribution Factor (CF_{QTY}) /hectare
Community Purpose	Home Industry	1	0.19
Frame Business	Local Business, Commercial	1	0.19
Health Services	Local Business, Commercial	1	0.19
Industry	General Industry, Service Industry	1	0.19
Low Density Residential	Residential A (lots > 600m^2)	0.95	0.13
Medium Density Residential	Residential B	1	0.19
Mixed Residential	Residential A (lots < 600m^2)	0.97	0.15
Natural Values	Rural	0.84	0.00
Open Space and Recreation	Park and Open Space	0.84	0.00
Retail Core	Local Business, Central Business	1	0.19

Stormwater Quantity infrastructure elements have been assessed on the basis of requirements to mitigate the impact of development to achieve Council's adopted desired standard of service.

3.3.2 Stormwater Quality Assessment

Stormwater Quality infrastructure elements have been evaluated on the basis of necessary works required to mitigate the impact of development to achieve Council's adopted desired standard of service in relation to water quality issues. Stormwater Quality Infrastructure includes Riparian Corridor Management Area and Rehabilitation / Revegetation Areas, as well as other Stormwater Treatment Measures. The costs for this infrastructure have been allocated across all existing and future demand in the former Caboolture Shire to ensure fair cost allocation.

The pollutant export loading rates have been determined utilising the former Pine Rivers Shire's adopted design standards in regard to the relative increase in the specific pollutant elements of Total Nitrogen (TN), Total Phosphorous (TP) and Suspended Solids (SS). The contribution factors for the calculation of the infrastructure contribution rate for Stormwater Quality management infrastructure have been based on the ratio between the average of the pollutant export loading rates assigned to each zone or land use and that assigned to undeveloped land.

Table 3.3B lists the equivalent zones under *PineRiversPlan* to those listed in *Caboolture ShirePlan* and the applicable annual pollutant export loads and contribution factors upon which the cost allocation method is based.

Table 3.3B – Pollutant Impact Assumptions and Contribution Factors

Redcliffe City Planning Scheme Zone	Equivalent PineRiversPlan Zone	Annual Pollutant Export (Load – kg/ha)			Contribution Factor (CF_{QAL})/hectare
		TP	TN	SS	
Community Purpose	Home Industry	1.6	10.3	950	1.32
Frame Business	Local Business, Commercial	2.1	10.6	1100	1.74
Health Services	Local Business, Commercial	2.1	10.6	1100	1.74
Industry	General Industry, Service Industry	2.3	10.7	1150	1.90
Low Density Residential	Residential A (lots > 600m^2)	1.6	10.3	950	1.32
Medium Density Residential	Residential B	2.0	10.5	1050	1.63
Mixed Residential	Residential A (lots < 600m^2)	1.9	10.4	1000	1.52
Natural Values	Rural	0.7	7.4	290	0.00
Open Space and Recreation	Park and Open Space	0.8	7.8	380	0.17
Retail Core	Local Business, Central Business	2.1	10.6	1100	1.74

3.4 Stormwater Demand in Catchments (Demand Units)

Stormwater infrastructure requirements have been determined for 'ultimate' development of the City under the current Planning Scheme. Table 3.4A shows the Equivalent Contributing Areas (ECA), or Demand Units - ECAqty and ECAqal - for existing and anticipated future activity within the Stormwater Service Catchments. The Equivalent Contributing Areas are calculated by multiplying the area of all land of a given Planning Scheme Zone in a catchment by the contribution factor for the zone, and then aggregating the results for the catchment.

Table 3.4A – Equivalent Contributing Existing and Future Land Use Areas

Catchment	ECAqal Existing	ECAqal Future	ECAqal Total	Change in demand ECAqAL	ECAqty Existing	ECAqty Future	ECAqty Total	Change in demand ECAqty
Bells Creek	341.88	2.96	344.84	0.9%	34.79	0.29	35.08	0.8%
Humpybong Creek	219.50	7.10	226.61	3.2%	23.35	0.78	24.13	3.3%
Margate Balance	151.57	4.10	155.67	2.7%	15.56	0.41	15.97	2.7%
Redcliffe	487.70	6.34	494.04	1.3%	50.12	0.62	50.74	1.2%
Rothwell Balance	397.91	117.02	514.93	29.4%	42.29	11.61	53.89	27.4%
Saltwater Creek	826.41	91.67	918.08	11.1%	85.88	9.31	95.19	10.8%
Scarborough Coastal	361.05	7.08	368.12	2.0%	36.93	0.70	37.63	1.9%
Woody Point Coastal	226.23	5.32	231.55	2.4%	22.90	0.55	23.45	2.4%

The existing land areas used were derived from an assessment of land use as it existed in June 2006. This included the use of GIS, current aerial photography and the determination of impervious area. The future land areas were derived by subtracting existing land area from total area at "ultimate" development of the City.

4 Stormwater Plan for Trunk Infrastructure

4.1 Stormwater Trunk Infrastructure Network

For the purposes of this policy, stormwater infrastructure items have been considered in terms of stormwater quantity and quality subnetworks. Only those infrastructure items indicated on the map in Schedule C are deemed to be Trunk Infrastructure for the purpose of planning and funding of the Trunk Stormwater Network.

Infrastructure components include the following mapped items:

(1) Stormwater Quality Infrastructure:

- (a) waterway corridor revegetation and restoration of the creek systems, together with any ancillary infrastructure;
- (b) works for stormwater treatment in the form of gross pollutant traps, bioretention systems, wetlands and swales;

(2) Stormwater Quantity Infrastructure:

- (a) works for conveyance and detention of peak flows;
- (b) underground piped drainage and overland flow paths.

4.2 Stormwater Trunk Infrastructure Items

The terms/titles listed in table 4.2A are used to describe specific components and actions comprising stormwater trunk infrastructure management. A complete definition for each of those terms appears in PSP 8.4.1 – Administration Policy. These Trunk Infrastructure Items would ordinarily be constructed by Council using Infrastructure Contributions or by a developer where an agreed amount would be credited as ‘works in lieu’ of contributions payment. In order to qualify for an infrastructure credit the developer would be required to install or construct an agreed infrastructure item that conforms with the performance criteria detailed in the respective Catchment Management Plan (CMP) or relevant study, this policy and/or Planning Scheme Policy 10 – Works (Development Standards Manual). Within the various infrastructure listings, shortened titles are used for some of the infrastructure items as indicated in the Table 4.2A:

Table 4.2A – Stormwater Drainage Infrastructure Descriptions

Infrastructure Title	Short Title
Bioswale	Swale
Bioretention Basin	
Gross Pollutant Traps	GPT
Constructed Wetland	Wetland
Revegetation	
Pipe Drainage System	Pipe Drainage

4.3 Stormwater Trunk Infrastructure Determination

Trunk Infrastructure provision has been informed by the various waterway planning studies carried out by, or on behalf of, Council as well as the “in-house” assessments mentioned in section 3.1 of this policy. These studies have identified the location and nature of the stormwater Trunk Infrastructure networks for their respective service catchments.

In regard to the timing of the provision of the infrastructure, it should be noted that the infrastructure listed provides for ultimate development in accordance with the planning assumptions inherent in the *Redcliffe City Planning Scheme*.

While a particular development may have an obvious immediate impact on adjacent local drainage infrastructure, the impact of development on other Stormwater Trunk Infrastructure is generally more gradual, thereby allowing Council greater flexibility in staging the delivery of the trunk stormwater network. It is therefore not considered imperative that Council deliver any identified infrastructure in the precise year nominated in tables 4.6A and 4.6B. Nor is it necessary for Council to complete all of one project in the same financial year. However, the delivery of the infrastructure is related to maintaining Council’s desired standard of service. This is a function of the anticipated impact of development on stormwater quantity and quality in the various service catchments.

Trunk Infrastructure provision identified in this policy has therefore been based on an assessment of the change in land use consistent with the planning assumptions within each service catchment. Stormwater infrastructure requirements are aligned with land use and land use change, and the resultant change in runoff and pollutant export.

4.4 Stormwater Trunk Infrastructure Valuations

Future Stormwater Management Infrastructure requirements and associated costs have been based on the recommendations of existing stormwater management studies or have been identified through an "in-house" Outline Planning Process. An infrastructure costing review was undertaken by Council in 2009. All items were reassessed and, where possible, the costs of all items of infrastructure recalculated from first principles current to 01 January 2009.

4.5 Existing Stormwater Trunk Infrastructure

Only existing pipe drainage 450mm diameter and larger, box culverts and GPTs have been valued and included in the infrastructure contributions regime. The Trunk Infrastructure requirements determined for this policy are to address the anticipated impacts of future development and augmentations in the existing network to meet the DSS. Note that trunk infrastructure items required for both purposes have been apportioned to both existing and future development in order to ensure equitable cost allocation with no allocation of network deficiencies to future development.

Current asset valuations of the existing Stormwater Trunk Network owned by Council and located in the former Redcliffe City are provided in Table 4.5A. They have been determined by using the item unit rates in Council's Asset Register. Using in-house engineering cost estimate valuations, construction oncosts for the Pipe Drainage System and the GPTs were calculated at double the unit rate, and for Box Culverts, oncosts were calculated at triple the unit rate, to arrive at a realistic current replacement value.

Table 4.5A – Existing Stormwater Drainage Infrastructure and GPTs Replacement Cost at 01 January 2009

Asset Prefix	Description	Replacement Cost
DGERCBC	Box Culverts	$4,106,368
DGEGPT	Gross Pollutant Traps	$1,666,470
RCP	Pipes	$131,787,236
	Total	**$137,560,074**

4.6 Future Stormwater Plan for Trunk Infrastructure

The map in Schedule C shows the extent of the existing and future stormwater trunk infrastructure on which this policy and its infrastructure contributions regime is based, while tables 4.6A and 4.6B provide a detailed listing of each of the various components of future infrastructure, its projected construction date, and its net present value at 1 January 2009.

Table 4.6A – Stormwater Quality Works

Project ID	SERVICE CATCHMENT	TYPE OF WORK	NPV (as at 1 January 2009)	TIMING OF WORKS (YEAR)
BEL_BIO_1	Bells Creek	Bioretention Basin	$ 617,556	2010
BEL_GPT_1	Bells Creek	GPT	$ 52,613	2017
BEL_GPT_2	Bells Creek	GPT	$ 38,716	2012
BEL_GPT_3	Bells Creek	GPT	$ 156,161	2012
BEL_GPT_4	Bells Creek	GPT	$ 51,297	2018
BEL_GPT_5	Bells Creek	GPT	$ 28,993	2019
BEL_GPT_6	Bells Creek	GPT	$ 68,191	2020
BEL_REV_1	Bells Creek	Revegetation	$ 61,930	2011
BEL_REV_2	Bells Creek	Revegetation	$ 61,930	2011
BEL_SW_1	Bells Creek	Bioswale	$ 132,840	2011
BEL_WET_1	Bells Creek	Wetland	$ 200,332	2010
HUM_BIO_1	Humpybong Creek	Bioretention Basin	$ 1,082,408	2011
HUM_BIO_2	Humpybong Creek	Bioretention Basin	$ 196,064	2012
HUM_BIO_3	Humpybong Creek	Bioretention Basin	$ 232,461	2014
HUM_BIO_4	Humpybong Creek	Bioretention Basin	$ 126,710	2015
HUM_BIO_5	Humpybong Creek	Bioretention Basin	$ 607,157	2013
HUM_BIO_6	Humpybong Creek	Bioretention Basin	$ 184,102	2016
HUM_GPT_1	Humpybong Creek	GPT	$ 67,988	2019
HUM_GPT_2	Humpybong Creek	GPT	$ 36,572	2020
HUM_GPT_3	Humpybong Creek	GPT	$ 34,870	2021
HUM_GPT_4	Humpybong Creek	GPT	$ 527,631	2010
HUM_GPT_5	Humpybong Creek	GPT	$ 519,005	2012
HUM_GPT_6	Humpybong Creek	GPT	$ 368,497	2013
HUM_GPT_7	Humpybong Creek	GPT	$ 76,021	2017
HUM_GPT_8	Humpybong Creek	GPT	$ 493,964	2018
HUM_GPT_9	Humpybong Creek	GPT	$ 489,909	2019
MGT_GPT_1	Margate Balance	GPT	$ 506,330	2015
MGT_GPT_2	Margate Balance	GPT	$ 514,745	2013
MGT_GPT_3	Margate Balance	GPT	$ 514,745	2013
MGT_GPT_4	Margate Balance	GPT	$ 359,498	2016
MGT_GPT_5	Margate Balance	GPT	$ 498,052	2017
MGT_GPT_6	Margate Balance	GPT	$ 35,743	2018
MGT_GPT_7	Margate Balance	GPT	$ 150,146	2019
MGT_GPT_8	Margate Balance	GPT	$ 152,175	2020
RED_GPT_1	Redcliffe	GPT	$ 57,407	2011
RED_GPT_10	Redcliffe	GPT	$ 92,482	2018
RED_GPT_11	Redcliffe	GPT	$ 92,482	2018
RED_GPT_12	Redcliffe	GPT	$ 38,326	2018
RED_GPT_13	Redcliffe	GPT	$ 71,254	2018
RED_GPT_14	Redcliffe	GPT	$ 81,714	2018
RED_GPT_15	Redcliffe	GPT	$ 82,390	2017
RED_GPT_2	Redcliffe	GPT	$ 57,407	2011
RED_GPT_3	Redcliffe	GPT	$ 56,936	2012
RED_GPT_4	Redcliffe	GPT	$ 74,866	2012
RED_GPT_5	Redcliffe	GPT	$ 39,939	2013
RED_GPT_6	Redcliffe	GPT	$ 85,151	2013
RED_GPT_7	Redcliffe	GPT	$ 85,151	2013
RED_GPT_8	Redcliffe	GPT	$ 83,072	2016
RED_GPT_9	Redcliffe	GPT	$ 94,019	2016
RED_TR_1	Redcliffe	Trash Rack	$ 759	2013
RED_TR_2	Redcliffe	Trash Rack	$ 717	2020
RED_TR_3	Redcliffe	Trash Rack	$ 717	2020
RED_TR_4	Redcliffe	Trash Rack	$ 711	2021
ROT_GPT_1	Rothwell Balance	GPT	$ 51,363	2016
ROT_GPT_2	Rothwell Balance	GPT	$ 69,634	2016
ROT_GPT_3	Rothwell Balance	GPT	$ 115,259	2017
ROT_GPT_4	Rothwell Balance	GPT	$ 36,318	2017
ROT_GPT_5	Rothwell Balance	GPT	$ 49,695	2018
ROT_GPT_6	Rothwell Balance	GPT	$ 49,154	2020
ROT_GPT_7	Rothwell Balance	GPT	$ 48,751	2021

Project ID	SERVICE CATCHMENT	TYPE OF WORK	NPV (as at 1 January 2009)	TIMING OF WORKS (YEAR)
ROT_GPT_8	Rothwell Balance	GPT	$ 49,290	2021
SAL_GPT_24	Saltwater Creek	GPT	$ 514,745	2013
SAL_GPT_25	Saltwater Creek	GPT	$ 143,631	2018
SAL_GPT_26	Saltwater Creek	GPT	$ 502,174	2016
SAL_GPT_27	Saltwater Creek	GPT	$ 519,005	2012
SAL_GPT_28	Saltwater Creek	GPT	$ 493,964	2018
SAL_GPT_29	Saltwater Creek	GPT	$ 106,719	2017
SAL_GPT_30	Saltwater Creek	GPT	$ 527,631	2010
SAL_GPT_31	Saltwater Creek	GPT	$ 139,020	2011
SAL_GPT_32	Saltwater Creek	GPT	$ 519,005	2012
SAL_GPT_33	Saltwater Creek	GPT	$ 143,631	2018
SAL_GPT_34	Saltwater Creek	GPT	$ 489,909	2019
SAL_GPT_35	Saltwater Creek	GPT	$ 111,209	2012
SAL_GPT_36	Saltwater Creek	GPT	$ 66,017	2020
SAL_GPT_37	Saltwater Creek	GPT	$ 50,024	2020
SAL_GPT_38	Saltwater Creek	GPT	$ 112,276	2021
SAL_GPT_39	Saltwater Creek	GPT	$ 112,815	2021
SAL_GPT_40	Saltwater Creek	GPT	$ 139,020	2011
SCA_GPT_1	Scarborough Coastal	GPT	$ 120,108	2012
SCA_GPT_10	Scarborough Coastal	GPT	$ 38,368	2012
SCA_GPT_11	Scarborough Coastal	GPT	$ 42,780	2012
SCA_GPT_12	Scarborough Coastal	GPT	$ 43,651	2012
SCA_GPT_13	Scarborough Coastal	GPT	$ 76,612	2012
SCA_GPT_14	Scarborough Coastal	GPT	$ 71,665	2013
SCA_GPT_15	Scarborough Coastal	GPT	$ 153,727	2013
SCA_GPT_2	Scarborough Coastal	GPT	$ 117,913	2013
SCA_GPT_3	Scarborough Coastal	GPT	$ 51,785	2013
SCA_GPT_4	Scarborough Coastal	GPT	$ 51,785	2013
SCA_GPT_5	Scarborough Coastal	GPT	$ 49,013	2019
SCA_GPT_6	Scarborough Coastal	GPT	$ 49,013	2019
SCA_GPT_7	Scarborough Coastal	GPT	$ 128,226	2019
SCA_GPT_8	Scarborough Coastal	GPT	$ 111,950	2019
SCA_GPT_9	Scarborough Coastal	GPT	$ 82,455	2019
WPT_GPT_1	Woody Point	GPT	$ 113,748	2020
WPT_GPT_2	Woody Point	GPT	$ 49,697	2020
WPT_GPT_3	Woody Point	GPT	$ 35,920	2020
WPT_GPT_4	Woody Point	GPT	$ 34,615	2020
WPT_GPT_5	Woody Point	GPT	$ 109,581	2021
WPT_GPT_6	Woody Point	GPT	$ 34,870	2021
WPT_GPT_7	Woody Point	GPT	$ 49,829	2021
SAL_WET_19	Saltwater Creek	Wetland	$ 683,735	2013
SAL_WET_20	Saltwater Creek	Wetland	$ 612,390	2018
SAL_WET_21	Saltwater Creek	Wetland	$ 1,200,667	2016
SAL_WET_22	Saltwater Creek	Wetland	$ 568,648	2018
SAL_WET_23	Saltwater Creek	Wetland	$ 1,940,582	2017
SAL_WET_24	Saltwater Creek	Wetland	$ 607,405	2010
SAL_WET_25	Saltwater Creek	Wetland	$ 2,270,657	2011
SAL_WET_26	Saltwater Creek	Wetland	$ 1,111,729	2016
SAL_WET_27	Saltwater Creek	Wetland	$ 131,226	2018
SAL_WET_28	Saltwater Creek	Wetland	$ 650,747	2019
SAL_WET_29	Saltwater Creek	Wetland	$ 573,354	2017
		TOTAL	**$ 27,469,558**	

Table 4.6B– Stormwater Quantity Works

Project ID	SERVICE CATCHMENT	TYPE OF WORK	NPV (as at 1 January 2009)	TIMING OF WORKS (YEAR)
MAR_PD_1	Margate Balance	Pipe Drainage	$17,197,703	2014
MAR_PD_2	Margate Balance	Pipe Drainage	$9,697,512	2015
		TOTAL	**$26,895,214**	

4.7 Stormwater Infrastructure Costs by Catchment

The distribution of the costs of existing and future planned infrastructure works apportioned between existing and future development is demonstrated in Table 4.7A. The level of future development contribution towards the total cost of the stormwater infrastructure network per catchment is highlighted in the table.

The proportion of future infrastructure expenditure anticipated to be collected from future development after 01 January 2009 is equivalent to 20% without giving regard to the capping regime. The remaining 80% of future infrastructure costs will be funded directly by Council so that costs associated with augmentations within the existing network to address the DSS are not passed to proponents of development approved after 1 January 2009.

Table 4.7A – Future Stormwater Infrastructure Costs by Catchment allocated between existing and future demand in NPV as at 01 January 2009

CATCHMENT	$ Qty Existing	$ Qty Future	$ Qty Total	$ Qal Existing	$ Qal Future	$ Qal Total	Est funding rate
Bells Creek	$14,230,728	$119,216	$14,349,944	$1,457,942	$12,617	$1,470,558	0.8%
Humpybong Creek	$7,317,448	$243,630	$7,561,078	$4,992,855	$161,603	$5,154,458	3.2%
Margate Balance	$31,437,382	$836,058	$32,273,440	$2,659,553	$71,880	$2,731,433	2.6%
Redcliffe Proper	$27,157,203	$338,490	$27,495,693	$1,081,442	$16,315	$1,097,757	1.2%
Rothwell Balance	$10,010,238	$2,747,436	$12,757,674	$877,881	$258,169	$1,136,051	21.6%
Saltwater Creek	$38,550,655	$4,177,155	$42,727,810	$13,939,982	$1,546,342	$15,486,324	9.8%
Scarborough Coastal	$13,625,939	$259,070	$13,885,009	$1,493,086	$29,260	$1,522,346	1.9%
Woody Point Coastal	$11,465,286	$272,884	$11,738,170	$526,961	$12,397	$539,359	2.3%
TOTAL	$153,794,879	$8,993,940	$162,788,819	$27,029,702	$2,108,584	$29,138,287	5.8%

Table 4.7B – Future Stormwater Infrastructure cost allocation between current and future demand in NPV as at 01 January 2009

Allocation of Development	Quantity	Quality	Total
Existing Development	$153,794,879	$27,029,702	$180,824,582
Future Development	$8,993,940	$2,108,584	$11,102,524
TOTAL	$162,788,819	$29,138,287	$191,927,106

Schedule A: Demand Factors

Table A – Demand Factors for Stormwater Infrastructure Contributions

Redcliffe City Planning Scheme Zone	Contribution Factor (CF_{QAL}/Ha)	Contribution Factor (CF_{QTY}/Ha)
Community Purpose	1.32	0.19
Frame Business	1.74	0.19
Health Services	1.74	0.19
Industry	1.90	0.19
Low Density Residential	1.32	0.13
Medium Density Residential	1.63	0.19
Mixed Residential	1.52	0.15
Natural Values	0.00	0.00
Open Space and Recreation	*	*
Retail Core	1.74	0.19

NOTE:

The demand factors/contribution factors listed in Table A above apply to all development applications for reconfiguring a lot (RAL) or a material change of use (MCU) corresponding to the actual zone of the land.

If the development proposal incorporates a land use which is specifically listed as "inconsistent" for the zone of the land in chapter 4 of *Redcliffe City Planning Scheme,* the demand factor for that component of the development will be based on the demand factor for any zone in which that land use and the majority of the other uses comprising the development are listed as "consistent".

* The Demand Factor for the zone which allows the consistent land use most closely aligning to the proposal will be applied.

Schedule B: Infrastructure Contribution Rates

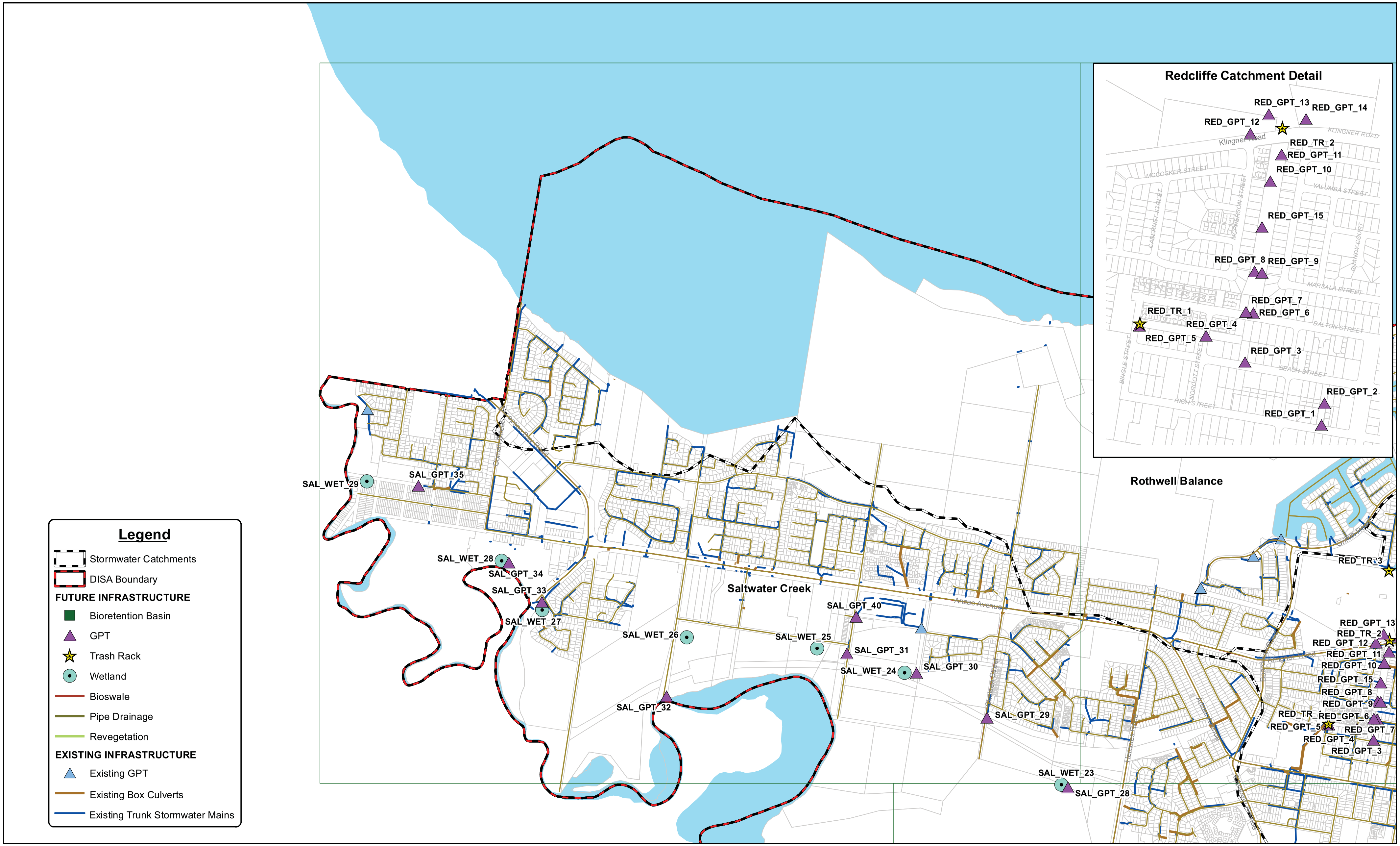
Table B shows the Infrastructure Contribution Rates for the network.

Table B – Stormwater Infrastructure Contribution Rates

CATCHMENT	(ICR/ECA_{QAL})	(ICR/ECA_{QTY})
Bells Creek	$4,950	$474,779
Humpybong Creek	$26,401	$363,690
Margate Balance	$20,366	$2,345,673
Redcliffe Proper	$2,574	$628,942
Rothwell Coastal	$2,561	$274,750
Saltwater Creek	$19,578	$520,986
Scarborough Coastal	$4,800	$428,301
Woody Point Coastal	$2,704	$581,009

Schedule C: Service Catchments and Network Assets

Stormwater Network



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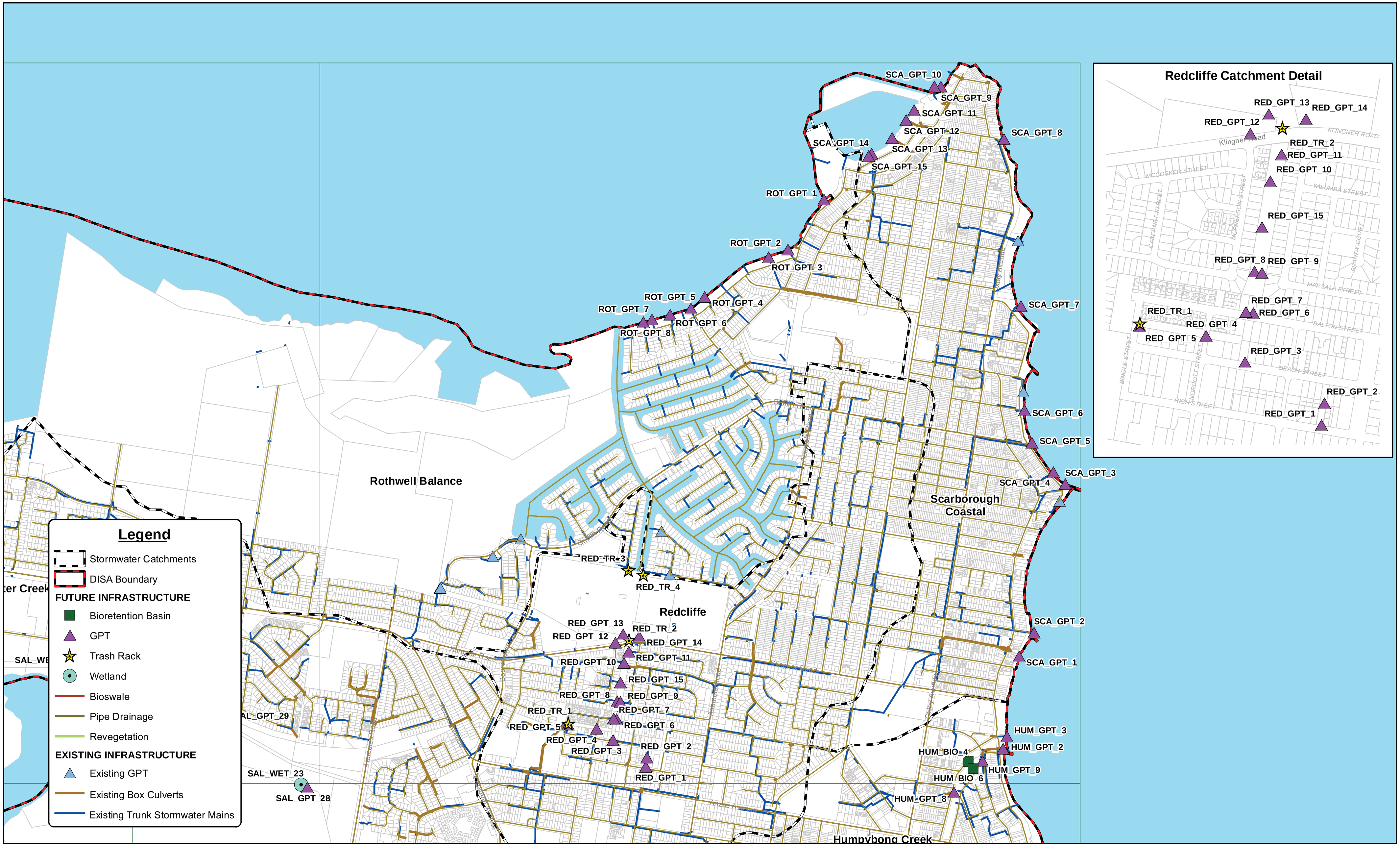
MORETON BAY REGIONAL COUNCIL
Redcliffe City

Map No: 1

EFFECTIVE FROM 29 October 2009

Stormwater Network

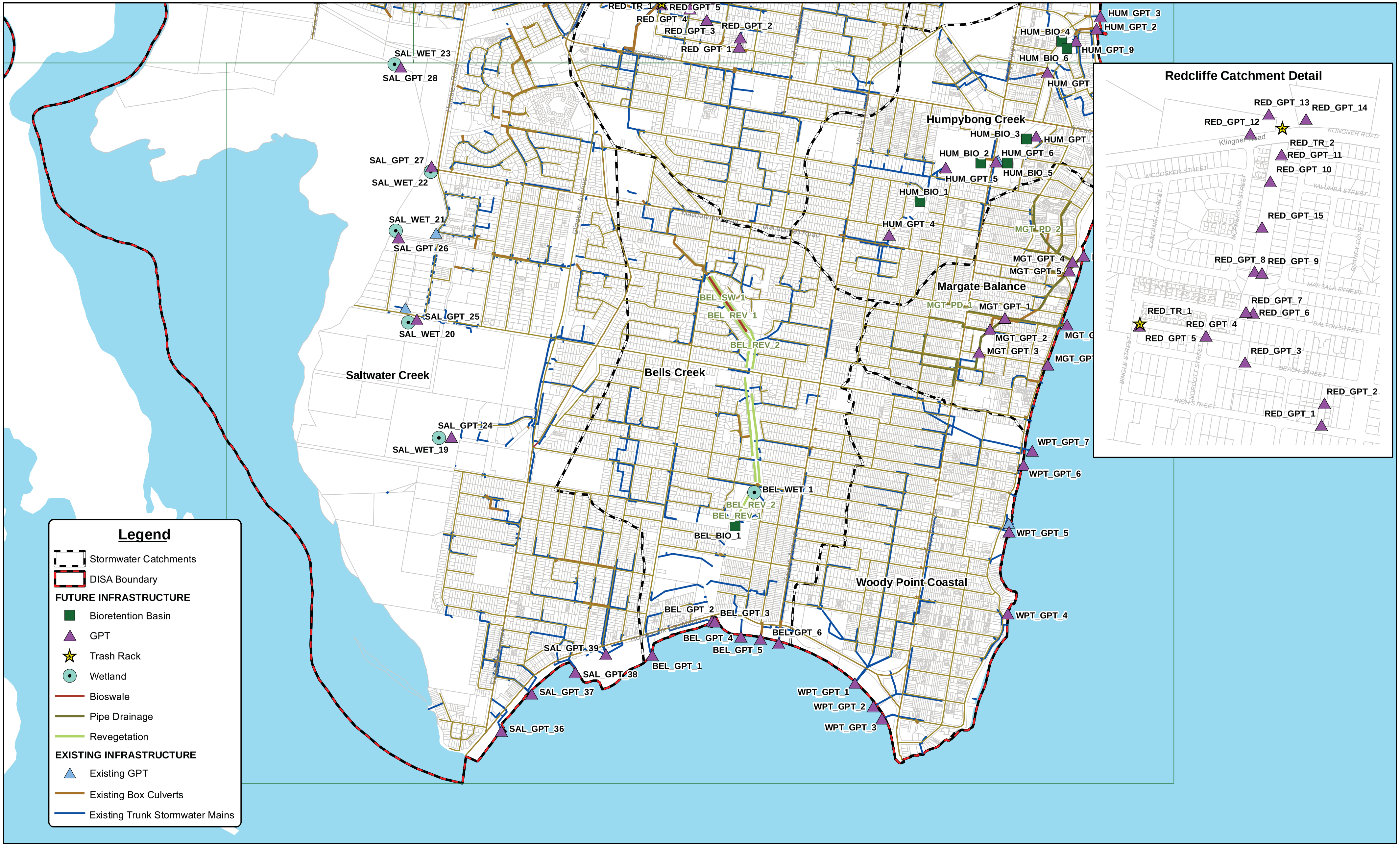


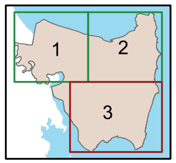
MORETON BAY REGIONAL COUNCIL
Redcliffe City

Map No: 2

EFFECTIVE FROM 29 October 2009

Stormwater Network





MORETON BAY REGIONAL COUNCIL
Redcliffe City

Map No: 3

EFFECTIVE FROM 29 October 2009

Schedule D: Desired Standards of Service

The Desired Standards of Service for the Stormwater Trunk Infrastructure network under this policy are detailed below in terms of 'Planning Requirements' and 'Design Objectives'. The 'Planning Requirements' and 'Design Objectives' were developed as a mechanism for implementing the purpose of the *Integrated Planning Act* and satisfying the relevant requirements of the *Environmental Protection Act* as well as the objectives of Council's Corporate Plan. The design objectives are the means by which the planning requirements are achieved.

Planning Requirements

Table D1 - Planning Requirements – Catchments

DESIRED STANDARD OF SERVICE	USER / COMMUNITY BENEFIT	ENVIRONMENTAL BENEFIT
• Corporate Objectives • Legal Responsibility • Community Needs	• Community & Customer Service • Quality and Safety • Economic Activity Support	• Ecological Protection • Ecosystem Rehabilitation
Provide a system of infrastructure that caters for the adequate and safe drainage of urban lands to receiving waters in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Minimises risk of inundation of habitable areas. • Minimises the damage and risk associated with flooding. • Provides economic use of urban landscape. • Sets safe standards for the road system consistent with traffic movement and access requirements.	
Maximise the retention and enhancement of each natural waterway in a way that achieves the user/community benefit and environmental benefit listed opposite.		• Protects the environmental values of waterway systems. • Minimises the impact of development on the ecological health of waterways. • Minimises the adverse impact of development on water quality.
Optimise the use of natural waterways and overland flow paths in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Reduces the long-term costs of maintaining the waterways corridor.	• Protects areas of natural riparian vegetation in key habitat areas. • Provides for faunal movement and migration. • Reduces the risk of streambank erosion.
Optimise the provision of infrastructure in a way that achieves the user/community benefit and environmental benefit listed opposite, taking into account the use of Water Sensitive Urban Design techniques.	• Provides waterway infrastructure at least life cycle cost. • Reduces the scale of infrastructure by maintaining existing hydrological parameters, such as flows, flow velocities and patterns. • Improves water quality and waterways health.	• Improves water quality at the point of discharge. • Controls peak flows and thereby reduces the potential for erosion and sedimentation.
Retention of riparian land in rural areas for stormwater runoff and treatment in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Minimises risk of inundation to habitable areas. • Stabilise adjacent productive land.	• Minimises the adverse impact of rural activities and development on the ecological health of waterways. • Minimises the adverse impact of rural activities and development on water quality.
Provide a system of stormwater infrastructure capable of removing harmful pollutant concentrations and loads in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Minimises risk of unsafe stream, river and ocean water for human contact.	• Minimises adverse impact of development on stream and receiving environment water quality. • Optimises aquatic health and stream ecology and bio-diversity.

Table D2 - Planning Requirements – Waterways

DESIRED STANDARD OF SERVICE	USER / COMMUNITY BENEFIT	ENVIRONMENTAL BENEFIT
• Corporate Objectives • Legal Responsibility • Community Need	• Community & Customer Service • Quality and Safety • Economic Activity Support	• Ecological Protection • Ecosystem Rehabilitation
Conveyance of the design runoff in an allocated waterway corridor in a way that achieves the user/community benefit and environmental benefit listed opposite. Corridors shall preferably incorporate natural channels and floodplains.	• Minimises risk of inundation of habitable areas. • Minimises the damage and risk associated with flooding. • Reduces the cost of flood damage to the community.	• Maintains the natural functions of creeks and floodplains. • Reduces environmental damage due to flooding by maintaining the natural functions of floodplains.
Rehabilitate degraded waterway banks and floodplains through planting of native vegetation, erosion treatment measures and natural channel design features in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Ensures reasonable levels of water quality and turbidity in waterways are not exceeded.	• Protects environmentally sensitive areas from development. • Enhances nature conservation by retaining riparian areas for environmental purposes. • Minimises the adverse impact of development on waterways health.
Cater for long term morphological processes, such as erosion and sedimentation in a way that achieves the user/community benefit and environmental benefit listed opposite, by allowing sufficient width within waterway corridors.	• Minimises the impact of erosion or sedimentation on private property. • Reduces the need for costly structural treatments of waterway banks.	• Provides for natural processes of erosion and sedimentation.
Maintain, where possible, the design runoff at natural flow rates using regional detention facilities in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Controls the impact of flow rate increase on downstream landholders.	• Minimises the impact of peak flow rate increase on natural waterways.

Table D3 - Planning Requirements - Overland Flow Systems

DESIRED STANDARD OF SERVICE	USER / COMMUNITY BENEFIT	ENVIRONMENTAL BENEFIT
• Corporate Objectives • Legal Responsibility • Community Need	• Community & Customer Service • Quality and Safety • Economic Activity Support	• Ecological Protection • Ecosystem Rehabilitation
Convey floodwater from the local catchment by a network of underground pipes, natural channels and overland flow paths in a way that achieves the user/community benefit and environmental benefit listed opposite. This is to be achieved without adversely impacting on properties or compromising environmental values associated with the flow paths and at an appropriate design runoff rate.	Ensures habitable areas are protected from inundation.	Promotes the protection of environmentally sensitive areas.
Design of the overland flow system is to comply with established codes and local authority standards which achieve the user/community benefits and environmental benefits listed opposite.	Provides an optimal balance of underground pipes, natural channels and overland flow paths in order to achieve economic land use.	Promotes the retention of natural channels or rehabilitation of existing natural flow paths.
Minimise any increase in flow rate in a way that achieves the user/community benefit and environmental benefit listed opposite utilising local and on-site detention facilities where appropriate.	• Minimises adverse impacts from flooding for existing and future developments. • Optimises the size of waterway corridors and underground drainage.	• Minimises the adverse impact on the environmental values of downstream waterways by maintaining natural flows and velocities. • Minimises channel erosion by the reduction of flow velocities.

DESIRED STANDARD OF SERVICE	USER / COMMUNITY BENEFIT	ENVIRONMENTAL BENEFIT
Restrict the discharge of pollutant materials from point and non-point sources in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Minimises the risk of human, animal or ecosystem contact with unsafe or polluted water in streams, rivers or ocean waters.	• Minimises adverse impact of development on stream and receiving environment water quality. • Maintains aquatic health as well as sustainable stream ecology and bio-diversity.

Table D4 - Planning Requirements - Waterway Crossings

DESIRED STANDARD OF SERVICE	USER / COMMUNITY BENEFIT	ENVIRONMENTAL BENEFIT
• Corporate Objectives • Legal Responsibility • Community Need	• Community & Customer Service • Quality and Safety • Economic Activity Support	• Ecological Protection • Ecosystem Rehabilitation
Design culverts and bridges with appropriate flood immunity and capacity to convey floodwater in a way that achieves the user/community benefit and environmental benefit listed opposite.	• Ensures road crossings operate safely in times of inundation. • Reduces the risk of flooding for upstream properties.	
Upgrading of bridges and culverts is carried out in a manner that does not adversely impact on the natural environment, such as through the loss of vegetation or undesirable impacts on bio-diversity, and in a way that achieves the user/community benefit and environmental benefit listed opposite.		Minimises environmental impact.

Design Objectives

Design Criteria shall be as shown in the Tables D5 to D8, unless noted otherwise in Catchment Management Plans/Master Drainage Reports and/or by detailed Engineering Analysis. For additional explanation of the Design Criteria, refer to Planning Scheme Policy 10 – Works (Development Standards Manual).

Table D5 - Design Objectives - Flooding of Habitable Areas

DESIGN ISSUE	DESIGN CRITERIA		
FLOOD IMMUNITY	**MAJOR DRAINAGE SYSTEM**		
	Zone		**Design ARI (years)**
	All		100
	MINOR DRAINAGE SYSTEM		
	Zone		**Design ARI (years)**
	Central Business, Commercial, Local Business, Neighbourhood Facilities.		10
	Service Industry, General Industry, Home Industry		10
	Residential B.		10
	Residential A, Special Residential (Urban), Future Urban.		2
	Special Residential (non urban), Park Residential, Rural Residential, Rural, Future Rural Living.		2
	Park and Open Space, Sports and Recreation where length of drain is:		< 50m – adopt 5 > 50m enhance open watercourse (see Note 3)
	MAJOR DRAINAGE SYSTEM REQUIREMENTS		
		Urban, Rural Residential, Rural Area	**Park Area**
	Minimum requirements	An overland flow system for runoff in excess of the capacity of the pipe system, such that the design flow is carried through the subdivision or development clear of and with required freeboard to allotments/buildings.	Major system flows are contained within the park area.
DEVELOPMENT LEVELS	**Zone**	**Min. Area within Allotment**	**Minimum Development Levels**
	General Industry, Service Industry	4000 m^2	Q100 + freeboard
	Residential A, Residential B, Special Residential, Future Urban, Neighbourhood Facilities, Local Business, Central Business, Home Industry, Commercial.	2000 m^2	Q100 + freeboard
	Park Residential, Rural Residential, Rural, Future Rural Living.	1500 m^2	Q100 + freeboard

DESIGN ISSUE	DESIGN CRITERIA		
MINIMUM FREEBOARD	**Flooding Source**	**Minimum Freeboard**	
	Existing Natural Watercourse	Greater of 750mm; or - The highest recorded flood level + 750mm – calculated Q100 flood level	
	Engineered Channels	Greater of 500mm; or - Flood level in unmaintained channel + 250mm – flood level of maintained channel.	
	Urban Road Drainage	Greater of 250mm; or - 150mm + difference in level due to blocked catchpits or inlets.	
	Overland Flowpaths	Greater of 250mm; or - Flood level in unmaintained flow path + 150mm – flood level of maintained flow path.	
	For Major Storm (a) Where floor levels of adjacent buildings are above road level.	(i) Total flow contained within road reserve; (ii) Freeboard > 250mm to floor level of adjacent buildings, and with maximum flow depth of 200mm.	(i) Total flow contained within road reserve; (ii) Freeboard $\geq$ 250mm to floor level of adjacent buildings, and with maximum flow depth of 300mm.
	(b) Where floor levels of adjacent buildings are below or less than 300mm above road level; (i) where 100mm fall on footpath towards kerb; (ii) where less than 100mm fall on footpath towards kerb; (c) other.	50mm above top of kerb. Top of kerb. As determined by Council's Engineer.	50mm above top of kerb. Top of kerb. As determined by Council's Engineer.

Table D6 - Design Objectives – Roadways

DESIGN ISSUE	DESIGN CRITERIA		
FLOOD IMMUNITY			**Design ARI (years)**
	Major Road	Kerb and Channel Flow	50
		Cross Drainage (Culverts)	50
	Minor Road	Kerb and Channel Flow	Refer to relevant development category (satisfy highest ARI of abutting zones)
		Cross Drainage (Culverts)	10
	Bikeway	Cross Drainage	2

DESIGN ISSUE	Roadway Flow Width and Flow Velocity Limitation	
SAFETY	**Major Roads**	**Minor Roads**
	Normal situation. Flow width should be confined to parking lane width (usually 2.5m) or breakdown lane width. Where no K&C – the minor storm should be contained in table drain.	(i) for K&C – Full pavement width with zero depth at crown; where no K&C – contained within table drain; (ii) Where one way crossfall, to high side of road pavement but not above top of kerb on low side.
	Where parking lane may be replaced by a through, acceleration, deceleration or turn lane = 1.0m.	Where parking lane may be replaced by a through, acceleration, deceleration or turn lane = Not applicable.
	Where road falls towards median = 1.0m.	Where road falls towards median = Not applicable.
	Pedestrian crossing or bus stops = 0.45m.	Pedestrian crossing or bus stops = 0.45m.
	At intersection kerb returns (including entrances to shopping centres and other major developments) = 1.0m (3) (4).	At intersection kerb returns (including entrances to shopping centres and other major developments) = 1.0m (3) (4).
	Pedestrian Safety (Major and Minor Storms): (a) No obvious danger = $\leq 0.6\ m^2/s$; (b) Obvious danger = $\leq 0.4\ m^2/s$.	Pedestrian Safety (Major and Minor Storms): (a) No obvious danger = $\leq 0.6\ m^2/s$; (b) Obvious danger = $\leq 0.4\ m^2/s$.
	Vehicle Safety = $\leq 0.6\ m^2/s$.	Vehicle Safety = $\leq 0.6\ m^2/s$.

Table D7 - Design Objectives - Detention Areas

DESIGN ISSUE	DESIGN CRITERIA	
FLOOD IMMUNITY	**Design Parameter**	**Criteria**
	ARIs to be investigated for analysis	1, 5, 20 and 100 for critical durations
SAFETY	Depth / ARI	1.2m for 5 year event 1.5m for 20 year event 2.0m for 100 year event
	Structural Stability of outlet	Check under PF. conditions
	Basin Batter Slopes	1V:4H max
	Spillway Embankment Slopes	1V:6H max
	Minimum Spillway Width	3 metres
	Minimum Crossfall	1:100 - Multi Use Detention Basins (Playing Fields, Parks etc).
	Desired Crossfall	1:70 - Multi Use Detention Basins (Playing Fields, Parks etc).
	Max. Crossfall Length	70 metres - Multi Use Detention Basins (Playing Fields, Parks etc).
	Drainage Location	Sited along perimeter - Multi Use Detention Basins (with Single Playing Fields).
	Crown Location	Along longest centreline - Multi Use Detention Basins (with Single Playing Fields).

Table D8 - Design Objectives - Environmental

DESIGN ISSUE	DESIGN CRITERIA
WATERWAY BANK STABILITY	Existing watercourses or drainage features shall be re-vegetated with native species. An investigation into the stability of banks is required to ensure that no allotments will be subject to erosion or landslip. The investigation needs to cover site geology, stream hydraulics, creek morphology, remediation of buffer works.
WATERWAY HEALTH	• Receiving Water Quality standards shall be in accordance with the ANZECC standards. • Oil/Grit Separators are to be provided for carparks or hardstand areas of Commercial or Industrial developments where other catchment based water quality treatment devices are not available. • Council standard weir type sediment and trash traps are to be provided on all outlets of stormwater drainage pipes serving catchments greater than 2 hectares. • GPTs designed for the collection and easy removal of sediment and trash are to be provided on the outlets of stormwater drainage systems serving catchments greater than 5 hectares. • All detention basins are to include a low flow water quality treatment facility. The minimum storage time is 24 hours and the maximum storage time is 48 hours. • Water Quality Control Ponds, Lakes and/or Artificial Wetlands are to be incorporated in developments that are traversed by a natural drainage feature. Generally, these facilities will be applicable to subdivisional developments which are in excess of five (5) hectares or where Council's Engineer determines that the development will have a detrimental effect on the quality of the receiving waters. • Existing watercourses or drainage features shall be re-vegetated with native species in accordance with an approved landscaping plan.

REVIEW TRIGGERS

This policy is reviewed internally for applicability, continuing effect and consistency with related documents and other legislative provisions when any of the following occurs:

(1) The related documents are amended;

(2) The related documents are replaced by new documents;

(3) Amendments which affect the allowable scope and effect of a policy of this nature are made to the head of power; and

(4) Other circumstances as determined from time to time by a resolution of Council.

RESPONSIBILITY

This policy is to be:

(1) implemented by the Senior Manager Development Services; and

(2) reviewed and amended in accordance with the "Review Triggers" by the Senior Manager Strategic Direction and Sustainability, the Senior Manager Regional and the Senior Manager Infrastructure Management in consultation with the Senior Manager Development Services.

VERSION CONTROL

CEO Approval Date	**15/09/2009**

Related Links: