UTILITIES PLANNING SERVICES

JOHNSTONS CREEK SWC 55

CAPACITY ASSESSMENT

December 1995

Sydney
WATER

JOHNSTONS CREEK SWC 55 CAPACITY ASSESSMENT

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SECTION 1

OVERVIEW

PURPOSE

This report assesses the current quantitative performance of Sydney Water's Johnstons Creek SWC 55 and gives an estimate of the impact of simulated urban consolidation on that performance.

SYSTEM DESCRIPTION

Location

The Johnstons Creek Stormwater Drainage System and Area is located to the west of the City of Sydney. Its catchment is one of five declared Sydney Water Drainage Areas within the Johnstons Bay Stormwater Group (SWG) 7 as shown in **Figures 1-1** and **1-2**.

The system serves a resident population of about ..... people in the Sydney suburbs of Annadale, Camperdown, Enmore, Glebe, Newtown and Stanmore as shown in **Figure 1-3**. The Johnstons Creek Drainage Area falls in three local government areas: Leichhardt, Marrickville and South Sydney; a breakdown is shown in **Table 1-1** below. Johnstons Creek flows into Rozelle Bay, an arm off Johnstons Bay. It is tidal for about 0.5 km upstream of its outlet.

TABLE 1-1 LOCAL GOVERNMENT AREAS IN JOHNSTONS CREEK DRAINAGE AREA 55

Municipality	Area (ha)	Proportion %
Leichhardt	168.0	36.5
Marrickville	183.5	39.9
South Sydney	108.5	23.6
TOTAL	**460.0**	**100.0**

Land Zoning and Use

The drainage area is fully urbanised. Local government land zoning detail captured by the Utilities Planning Services (UPS) geographic information system (GIS) reveals the breakdown shown in **Table 1-2**.

TABLE 1-2 LAND ZONING IN JOHNSTONS CREEK DRAINAGE AREA 55

Zoning	Area (ha)	Proportion %
Residential	221.9	48.2
Special Use	135.9	29.5
Industrial	44.0	9.6
Open Space	39.1	8.5
Commercial/Business	19.0	4.1
TOTALS	**460.0**	**100.0**

The housing density is generally medium with some pockets of multi-storey units. The peak equivalent dwelling density in any Australian Bureau of Statistics (ABS) *collector district* in the drainage area is about 54 equivalent dwelling units per hectare (edu/ha). The number of equivalent dwelling units represents the number of ground floor units in high rise areas, that is, their *footprint*, and has been estimated from information provided in the 1991 Census. The lowest dwelling density is about 22 edu/ha, typically ranges between 24 and 40, whilst the average for the drainage area is about 32 edu/ha.

The special use areas include Sydney University and three major Sydney hospitals. Sydney Uni has at least five ovals and other areas of open space. Some of these fields may have the potential to retard flows to the system and perhaps already do so with the more significant storm events. In addition to a railway corridor, some 29 ha is reserved for a major urban motorway. It is assumed that not all the reserved area will be road surface; a proportion impervious of 75 percent has been adopted. Probable RTA on-site controls have been ignored.

The main open space areas have little impervious areas excepting Harold Park Paceway which is assumed to be 30 percent impervious. The other areas of note include Bicentennial Park along the foreshores of Rozelle Bay, Jubilee Park, Federal Park, Camperdown Park, Camperdown Memorial Rest Park and O'Dea Reserve. The AR&R coefficients of runoff for such areas are considered to be very conservative and are believed to over-estimate the peak. However, their adoption may overcome the need for partial area considerations.

The industrial area is centred on Parramatta Road at Camperdown and a small pocket on the southern side of the railway near Newtown. The average percent impervious is assumed to be 85 percent. Commercial/business areas at Annandale, Camperdown, Newtown and Stanmore are assumed to be 90 percent impervious.

The average equivalent percent impervious at the system's outlet for the existing drainage area, with the freeway in place, weighs in at 63 percent.

Dimensional Detail/ Summary

Sydney Water owns and operates nearly 10.7 km of the drainage system in this catchment. This includes about 1.0 km of main channel relief now generally known as the Cardigan Street Branch which operates independently off the main channel. As a result of amplifications in 1928 and 1965, the overall length of stormwater conduit owned by Sydney Water is nearly 11.8 km. A breakdown by type and size is shown in **Table 1-3**.

TABLE 1-3 SUMMARY OF SYDNEY WATER'S ASSETS IN JOHNSTONS CREEK DRAINAGE SYSTEM

Type of Conduit	Typical Size Range mm	Length km	Percent
Open Channel	15545 x 1625 to 5270 x 2970	1.64	14
Covered Channel	2820 x 1370 to 1040 x 865	4.47	38
Boxed	1830 x 1370 to 915 x 915	0.67	6
Pipe	1500 to 750	3.84	33
Pipe	675 to 300	1.18	10
Total		**11.79**	

Operational Aspects

The assessment of the performance of the system includes a number of operational assumptions.

- The Gladstone St Branch is blocked off at node VB1 to divert all upstream flows to the Cardigan St Branch.
- The two parallel conduits of the amplified section of the Stanmore Branch

handle the total flow from the sub-catchment in the ratio of their capacities irrespective of physical connections.

- The balance lines allow the two conduits of the Fowlers Creek Branch to handle the total flow from the sub-catchment in the ratio of their capacities.

- The flow from the Kingston Rd Branch sub-catchment is similarly proportioned on the basis of its capacity to that of a [presumed] council owned relief pipe to another point on the Cardigan St Branch.

METHODOLOGY

Aim of the Assessment

The aim of the analysis is to asses the performance of the various elements of the drainage system in terms of the average recurring design storm required for the corresponding peak flow to exceed the hydraulic capacity of the drainage path, ie channel plus any overbank capacity. Upstream attenuation is ignored unless integral to operation of the system. This capability is referred to as the Storm Event Capacity (SEC) afforded by the reach and represents the threshold of possible undesirable overland flows and/or flooding beyond the recognised drainage path.

The SEC is compared to design standards typically adopted in the past for the use of the land through which the channel passes. This benchmark may be different from the original design and should not be confused with the higher demand for flood damage prevention with 100 year ARI (average recurring interval) storms.

Methodology

A separate report ***Stormwater Capacity Assessment - Methodology*** will provide full documentation of the approaches, methodology and assumptions used for the analyses. The following points provide an outline to the report.

- A spreadsheet approach founded on updated Regional databases and applicable data from previous evaluations.

- Flow rates are estimated by the Rational Method as outlined in Australian Rainfall and Runoff (AR&R), 1987, in particular:

  - Intensity-Frequency-Duration Design Rainfall, with the aid of Glenn McDermott's *Rainman*, to derive easy to use relationships appropriate for each drainage area; and

•Coefficients of Runoff based on percent impervious.

- The percent impervious in residential areas is based on the equivalent dwelling density estimated from data in the 1991 Census, for example, 40 percent impervious (including share of public roads) for 10 edu/ha, 72 percent impervious for 30 edu/ha and up to 90 percent impervious for densities of and exceeding 50 edu/ha. Where the 1991 density is less than 9, this minimum value is adopted.

- Hydraulic capacity using the Manning Formula and AR&R methods for composite roughness and compound sections. Manning roughness parameters generally ranges from 0.013 for concrete pipe and brick oviform to 0.014 for other concrete sections and brick walls.

- Circular sections and pipes are assumed to be flowing full. Culverts and the shorter reaches of covered channel are treated as open to establish the upper bound capacity prior to the impact of soffit friction losses. For the longer covered and boxed reaches, hydraulic capacities are based on flowlines below the soffit (generally 98 percent of the height unless the cover is clear above the original coping) whereas previous evaluations may be based on closed sections. Overbank capacity within the drainage easement is included where available and is given as a multiple of the formal constructed drain.

- The SEC is determined by looking up the storm event that causes a peak flow equal to the hydraulic capacity. Such events are provided as a range, viz: below 6 months, 6 months to a year, 1-2, 2-3 and so on to 9-10, 10-12, 12-15, 15-20, 20-25, 25-50, 50-100, and greater than 100 year. The results are grouped into one of six SEC Rating Groups which are featurised on GIS based figures. Details are summarised in a series of charts and tables with supporting calculations.

- The spreadsheet can easily include the impacts of increased dwelling density.

SECTION 2

PERFORMANCE RESULTS

Desirable Design Standard

To assess the performance only, each reach of the system has been assigned one of three design ARI according to the zoning/use of the surrounding land, typically:

- 5 year ARI for low density residential and open space areas;
- 10 year ARI for business, commercial and industrial areas, intensely developed residential areas, and local access road culverts; and
- 20 year ARI for intensely developed business, commercial and industrial areas, major road and railway culverts, and the wider service corridors where the channel is obviously a trunk drain as defined by AR&R, though the 100 year ARI may be more appropriate for highways, railways and floodways.

RESULTS

Summary for System

Table 2-1 lists dimensional detail, hydraulic capacity, peak flow corresponding to 5 year ARI rainfall intensity-duration, the consequent storm event capacity (SEC) and the assigned design ARI for each reach. For the Johnstons Creek drainage system, the SEC ranges from frequent events (twice per year) to rare events (once in 100 years).

Figure 2-1 features the SEC Group Rating for each reach against a backdrop of the land zoning and use. The figure highlights the poor rating for the open main channel reaches downstream of the Orphan School Creek Branch, the many reaches of the this Branch and its Hockey Field Sub-branch, and for the Stanmore Branch in particular.

Table 2-2 provides a dissection of the proportion having a certain event capacity, ie, the proportion satisfying certain events. This is given for the system as a whole, and by each one of the three design ARI.

This performance is shown graphically in **Figure 2-2**. The line graph shows the proportion able to satisfy or transport storm events up to 20 year ARI. In particular, the graph demonstrates that only about half of the system copes with the 5 year ARI storm, about a quarter cannot handle a two year storm though a third of the system copes with a 10 year ARI event and nearly 20 percent copes with a 20 year ARI storm.

However, the bar chart of **Figure 2-2(b)** reveals that much of these meagre capabilities are not in areas where they are required. For example, of the 18 percent good for a 20 year storm, none occurs where this is desirable. Similarly, of the 31 percent that can handle a 10 year design storm, only about two thirds or 20 percent of the system is located where desirable. And yet again, in only 22 percent of the system out of 54 percent of the system where a 5 year ARI is desirable, is this minimal demand satisfied.

Tables 2-3A, 2-3B, 2-4 and **2-5** provide the assumptions and supporting calculations to estimate the hydraulic capacity, overbank capacity, 5-year peak flow and the look-up table for this drainage system. Overbank capacity is based on visual observations of site dimensions and shape. [Table sheet numbers correspond with **Table 2-1**.]

Component Summaries

In the following paragraphs, reference to numbers of years refers to the ARI in years of a design rainfall event.

Main Channel - Open Portion. There is little consistent overbank capacity that can be relied on currently. However some potential exists to improve this relatively inexpensively for the first 1.1 km stretch of the system up to the Orphan School Creek. In this stretch, the SEC is relatively poor, ranging from the 6 month to the 3 year ARI. At the upstream end of this section there is a pocket of town houses with floor levels little higher than the coping of the adjacent channel.

Probable/ possible attenuation/ retardation within the grounds of Sydney University may improve these performances marginally.

Upstream of Orphan School Creek, the SEC improves, though only half of this 0.5 km section approaches a rating of 10 year ARI.

Main Channel - Covered Portion. Downstream of the Cardigan St Branch (Main Channel Relief), the covered main channel is rated at 5 years. Upstream of this Branch, the channel performs generally as desired with the exception of an 140 m reach.

Federal Park Branch. The 80 m amplified section performs as desired at around the 10 year ARI. However, the upper 100 m reach is rated at only 1-2 years, though improvements may be part of major future RTA roadwork.

Lillie Street Branch. The performance of this 1 km branch is generally very poor to poor, with event capacity ranging from less than 1 year ARI to 3-4 years.

Piper Street Branch. This short 70 m branch performs very poorly and has a SEC of 6 months to 1 year. However, it is located in the corridor reserved for major roadwork which, if it proceeds, is likely to result in this 600 mm pipe being replaced by something a little larger.

Taylor Street Branch. This is another short branch (100 m) in the roadway corridor which currently performs very poorly at 1-2 year ARI.

Orphan School Creek Branch. This branch (1.6 km) and its sub-branches (totalling a further 1.7 km) represent a significant proportion of the system. The main branch is generally rated very poorly from its outlet into Johnstons Creek up to the Medical School within Sydney Uni. This event capacity for this section is 1 to 3 years ARI. Elsewhere, the event capacity generally exceeds 25 years.

Its sub-branches, all within the grounds of Sydney Uni, perform variously. The **Hockey Field Sub-branch** is rated very poorly at 1-2 years, though this must encourage some retardation from the No 2 Oval. The generally parallel **Physics School Relief Sub-branch** copes well. A further **sub-branch off the Physics School Relief**, rated at under 1 year, presumably behaves as an outlet control to retard flows from St Paul's Oval.

The **St Andrews College Sub-branch** is rated progressively from 1-2 to 20-25 years ARI over its short length of 160 m from Orphan School Creek.

Gehrigs Creek Branch. This short 140 m branch easily copes with an 100 year storm from its industrial catchment.

Cardigan Street Branch. This main channel relief system which also intercepts the Fowlers Creek and Kingston Rd Branches and most of the Gladstone St Branch, generally performs well with SEC ranging from 10 to 50 year ARI. However, the SRA owned portion under the rail, linking the Gladstone St Branch, performs a little below desired levels at 3-4 years.

The **Gladstone Street Branch**, is also rated well, except for an 8 m section, rated at 2-3 years, that links most of the sub-catchment to the Cardigan St Branch.

Fowlers Creek Branch. This amplified sub-branch off the Cardigan St Branch has event capacity ranging from 10 to 15 years ARI, appropriate for the industrial zoning through which the conduit passes.

Kingston Road Branch. This short 40 m sub-branch intercepted by the Cardigan St Branch, with an ARI event capacity of 3-4 years in conjunction with a council owned relief drain, performs a little poorer than desirable. However, it is also located in the RTA corridor reserved for roadway.

Stanmore Branch. Despite a 1928 amplification for most of its length, this 1.0 km branch performs poorly with SEC ranging from 2 to 4 years.

Impact of Urban Consolidation

In comparison to many other Sydney suburbs, the average dwelling density, at 32 equivalent dwelling units per hectare, is already significant. It is unlikely that the character of the residential areas will be allowed to change significantly in the future.

Whilst, in theory, it is possible to stack more people into the area, it is unlikely to lead to measurable practicable difference in storm runoff. Consequently, simulated scenarios have not been examined in detail. A minimum 40 edu/ha across all residential areas has the following impact on the overall performance in terms of the proportion of the system handling a:

- 2 year ARI design storm - no change on existing situation;
- 5 " " " " - down 1 percent; and
- 10 " " " " - no change.

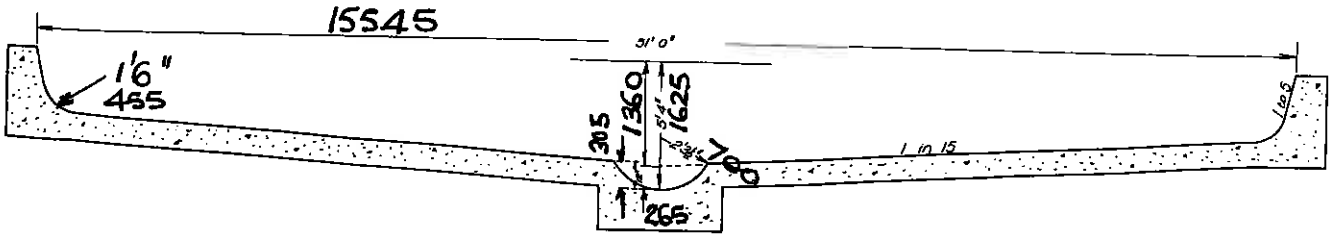
APPENDIX

CHANNEL CROSS-SECTIONS

APPENDIX

CHANNEL CROSS-SECTIONS

JOHNSTONS CREEK MAIN CHANNEL



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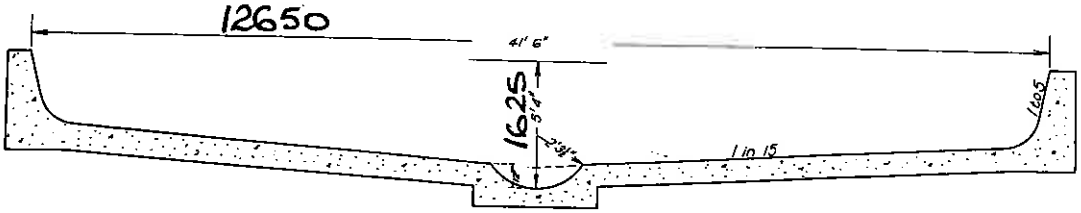

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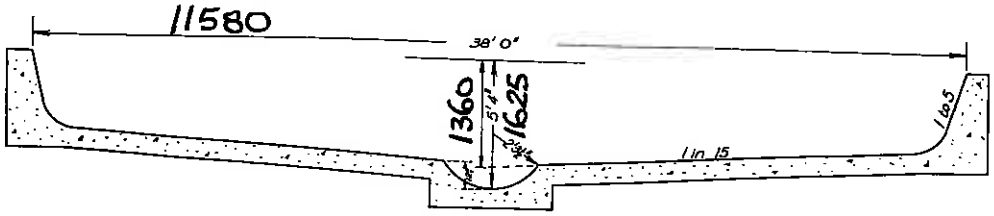

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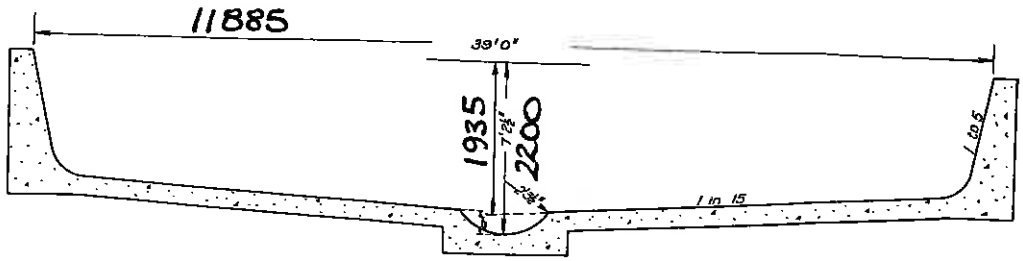
JOHNSTONS CREEK MAIN CHANNEL



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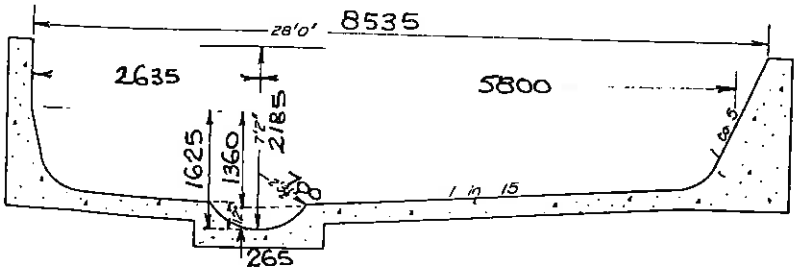

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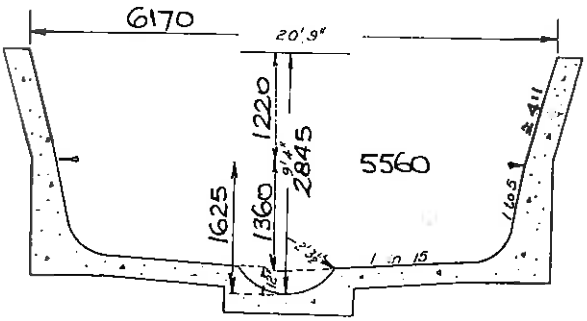

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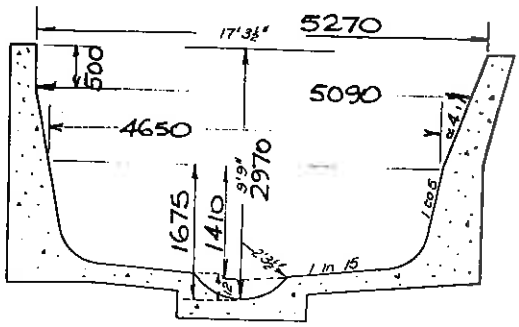
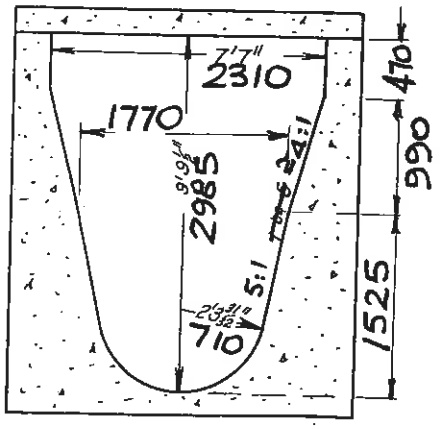


L-M

JOHNSTONS CREEK MAIN CHANNEL



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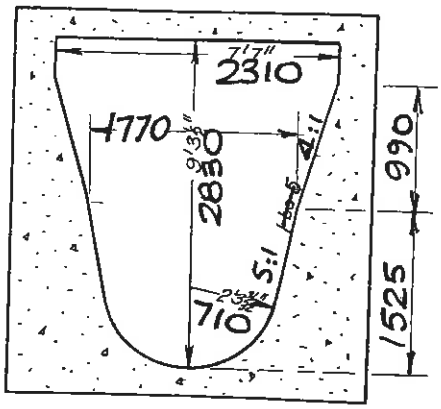

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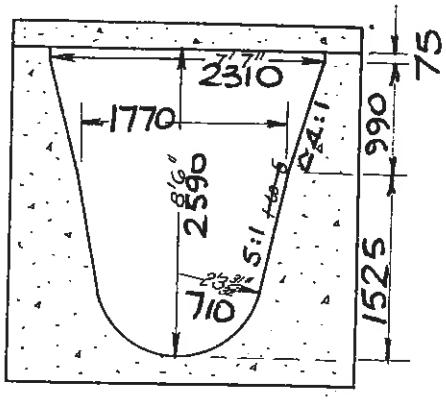

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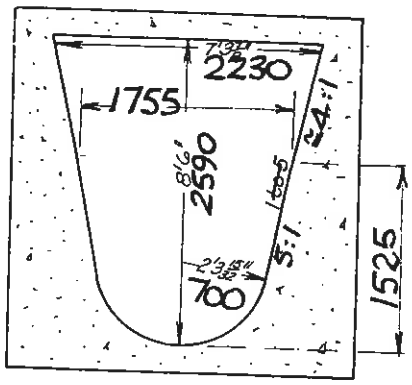

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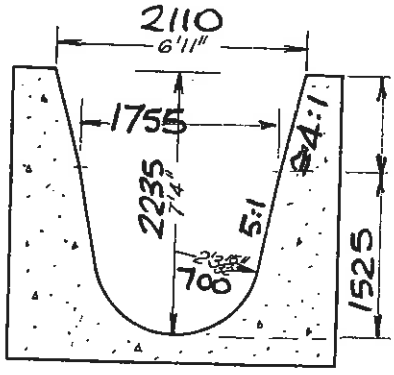

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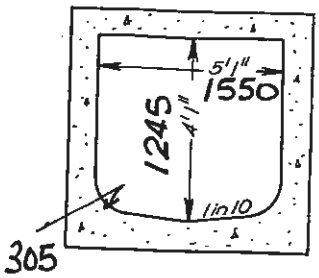

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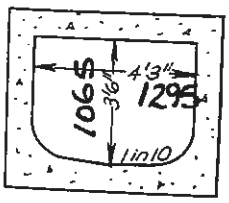

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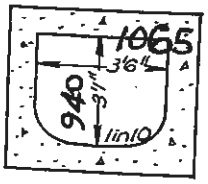

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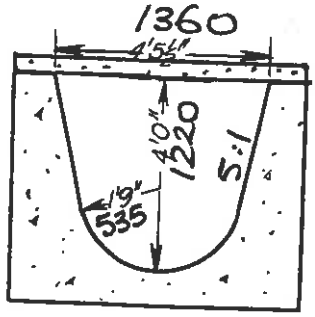
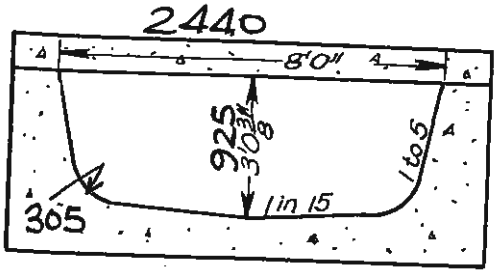
FEDERAL PARK BRANCH 55A



B1-B2

LILLIE BRIDGE BRANCH 55B



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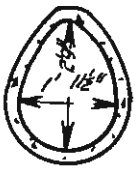

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TAYLOR STREET BRANCH 55D

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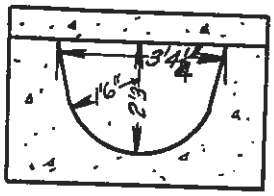

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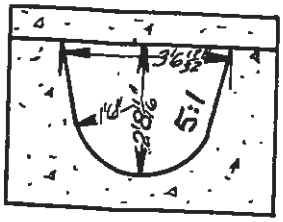

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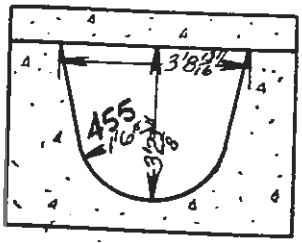

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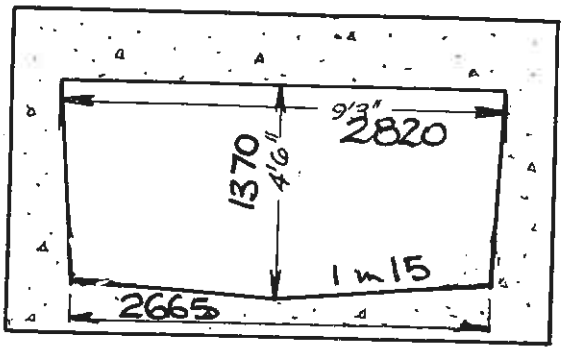
ORPHAN SCHOOL CREEK BRANCH 55E



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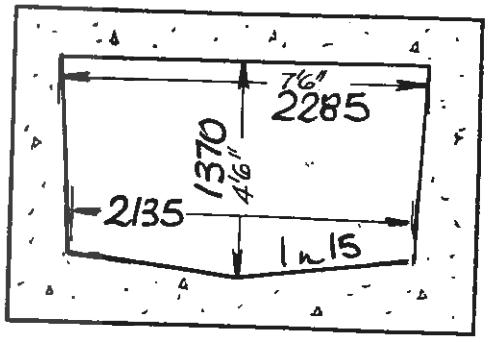

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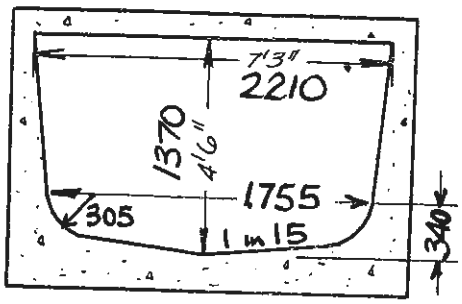

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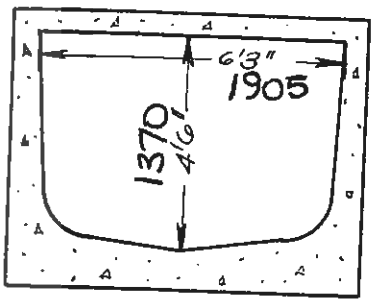

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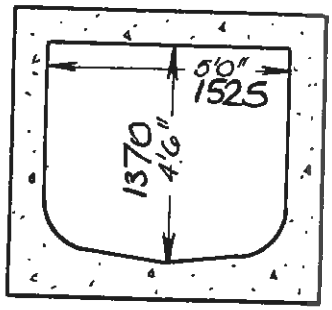

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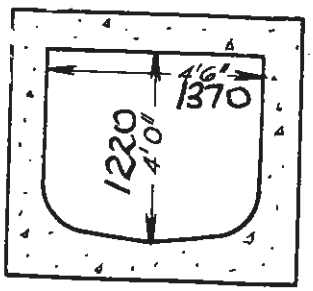

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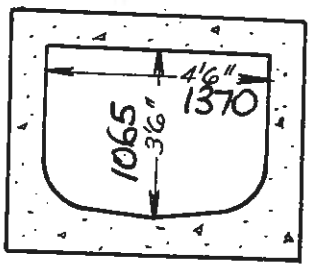

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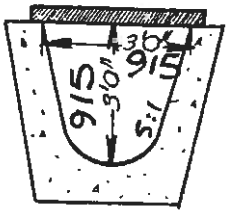
ORPHAN SCHOOL CREEK BRANCH - HOCKEY FIELD SUB-BRANCH 55G



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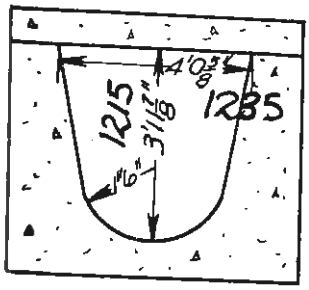
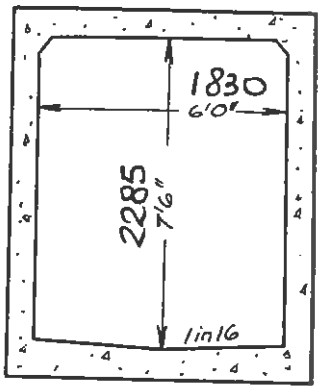
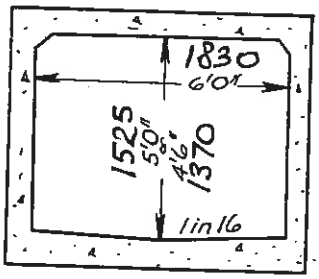


L-L56

CARDIGAN STREET BRANCH 55Q



N-N59



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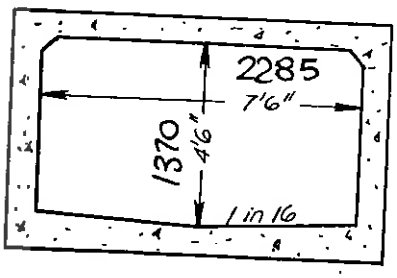

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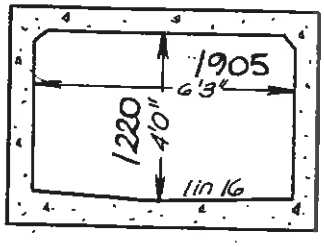

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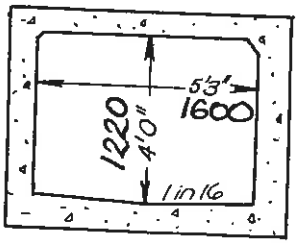

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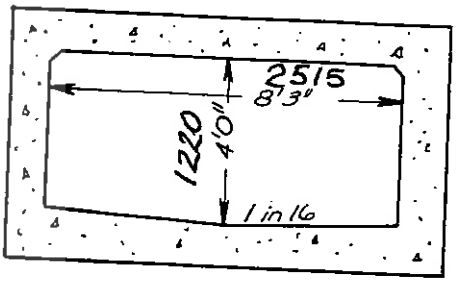
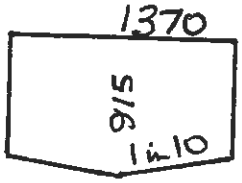


N65-N65A

GLADSTONE STREET BRANCH 55U



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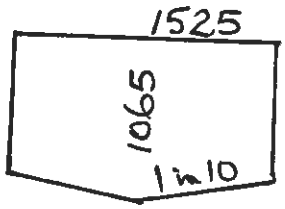

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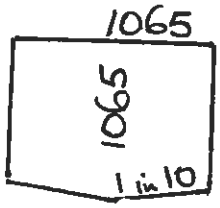
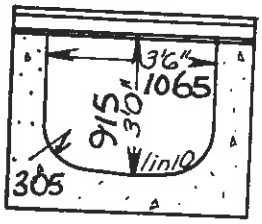


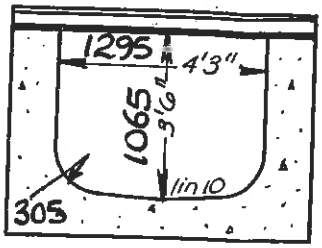
VC-VC1

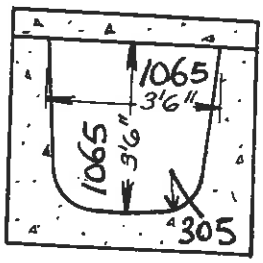
FOWLERS CREEK BRANCH 55R



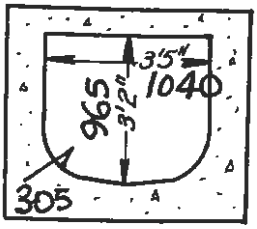
Q66-Q67

STANMORE BRANCH 55S

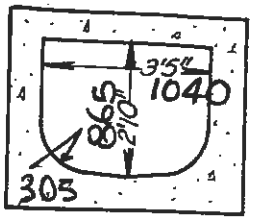




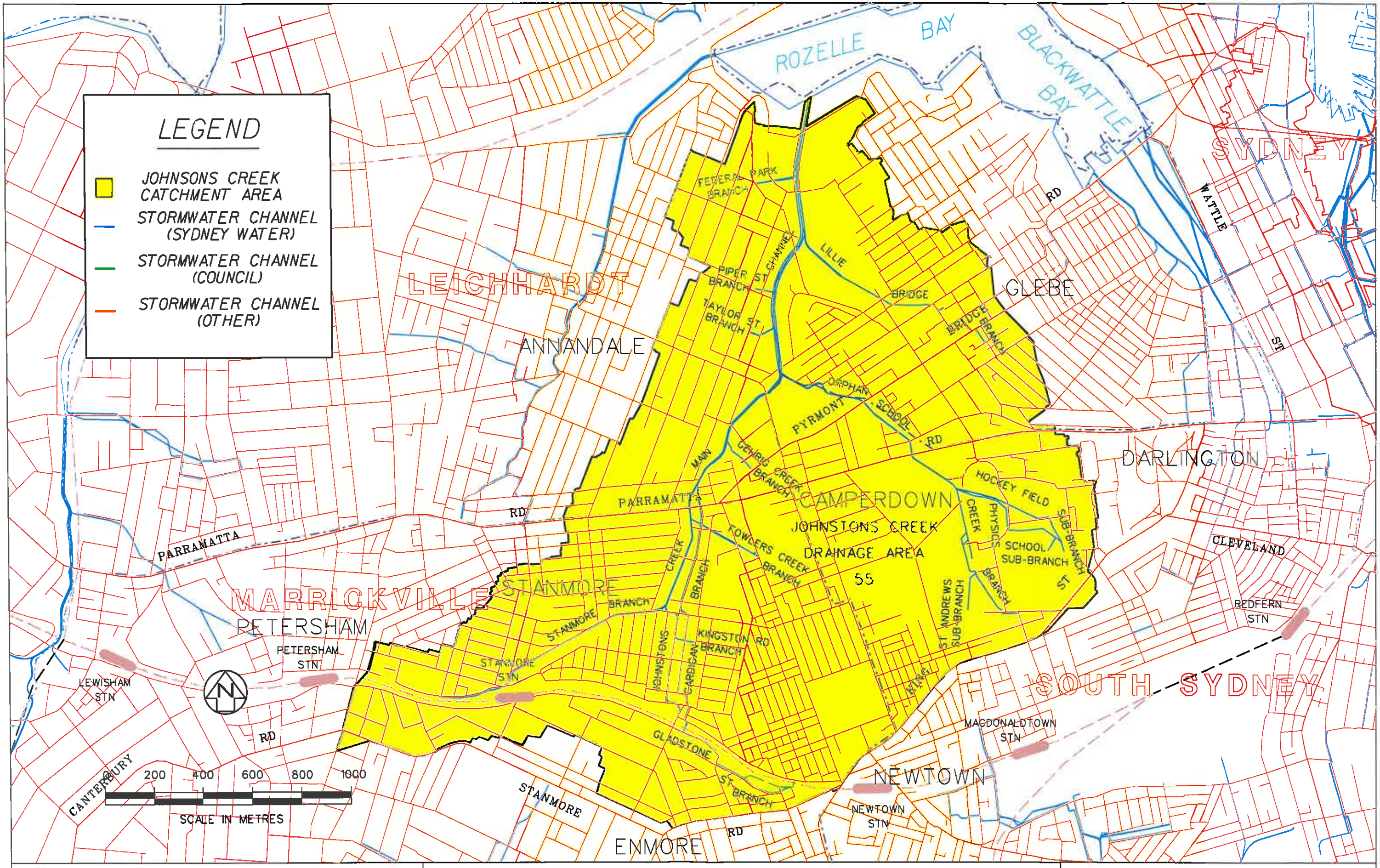
R-R71



R72-R73



R73-R78



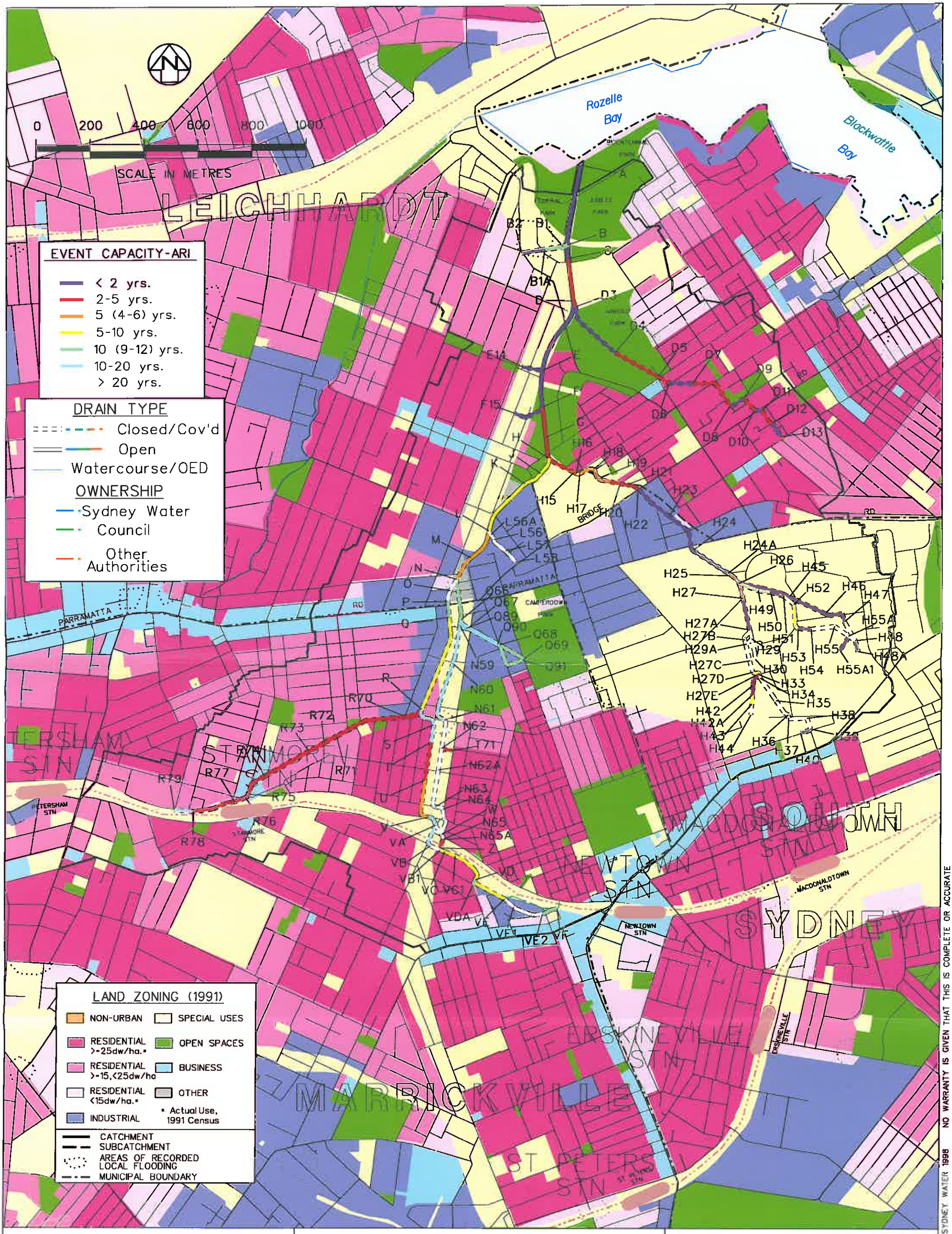
Sydney WATER

UTILITIES PLANNING SERVICES

SYDNEY WATER CORPORATION LIMITED
ACN 063 279 649

JOHNSTONS CREEK SWC 55 CAPACITY ASSESSMENT

FIGURE 1-3
DRAINAGE AREA
AND BRANCHES



Sydney WATER

SYDNEY WATER CORPORATION LIMITED
ACN 063 279 649

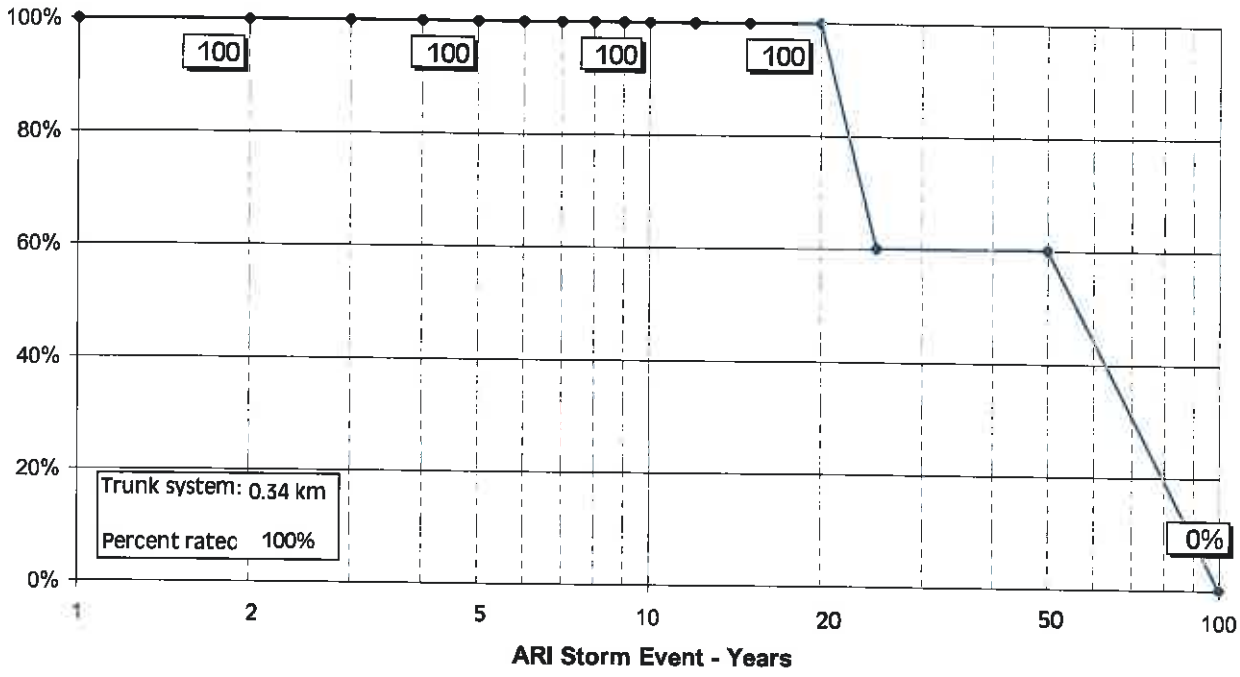
UTILITIES PLANNING SERVICES

JOHNSTONS CREEK SWC 55 CAPACITY ASSESSMENT

JAN 96

FIGURE 1-4
STORM EVENT CAPACITY

(a) PERCENT OF RATED DRAINAGE SYSTEM ABLE TO HANDLE ARI STORM EVENT



(b) DITTO, GROUPED BY CURRENT LAND ZONING/ USE & STORM EVENT CAPACITY

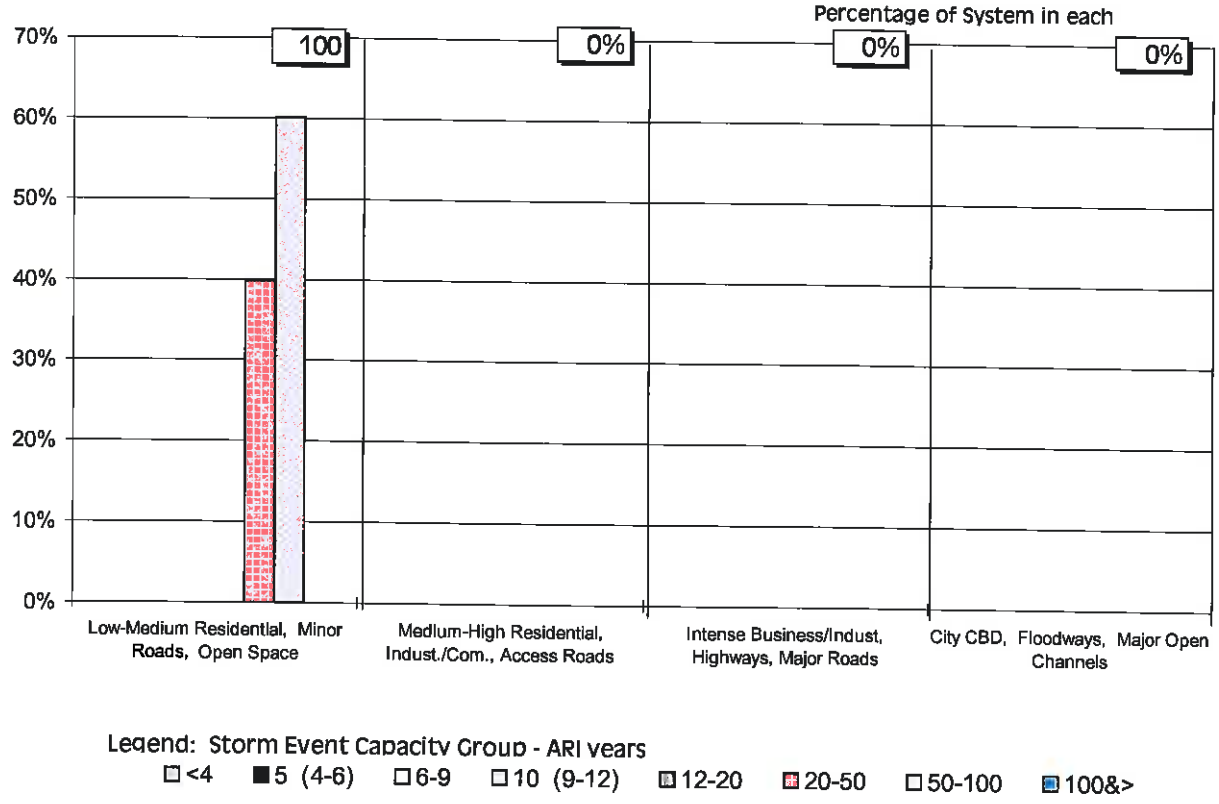


FIGURE 2-2. PERFORMANCE SUMMARY FOR KING GEORGE PARK SWC 24

TABLE 2-2. STORM EVENT CAPACITY DISSECTION - JOHNSTONS CREEK SWC 55

	Totals					Landuse Design ARI 5 year				Landuse Dsg ARI 10y				Landuse Dsgn ARI 20y			
Type 2c		vent Cat	Equivalent Leng		Cum %	Equivalent Length (m)			Cum %	Equivalent Length (m)			Cum %	Equivalent Length (m)			Cum %
type 2c	DesARI	SEC	Section	Cum	Satisfy	DesARI	Section	Cum	Satisfy	DesARI	Section	Cum	Satisfy	DesARI	Section	Cum	Satisfy
		Below.5	63,400	63,400	100%	5	21,133	21,133	100%	10	21,133	21,133	100%	20	21,133	21,133	100%
0.5		0.5-1	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
1		1-2	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
2		2-3	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
3		3-4	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
4		4-5	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
5		5-6	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
6		6-7	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
7		7-8	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
8		8-9	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
9		9-10	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
10		10-12	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
12		12-15	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
15		15-20	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
20		20-25	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
25		25-50	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
50		50-100	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%
100		100 &>	0	63,400	0%	5	0	21,133	0%	10	0	21,133	0%	20	0	21,133	0%

Summary by SEC Rating Group

	Percent Satisfying DesARI of			
SEC	5	10	20	Total
<4	33%	33%	33%	100%
5 (4-6)	0%	0%	0%	0%
6-9	0%	0%	0%	0%
10 (9-12	0%	0%	0%	0%
12-20	0%	0%	0%	0%
20&>	0%	0%	0%	0%
	33%	33%	33%	100%
	100%	67%	33%	

TABLE 2-1. SUMMARY FOR *Stormwater Capacity Assessment*

JOHNSTONS CREEK SWC 55

MAIN DRAIN or BRANCH No.	Name	INCOMING BRA SUB-BRANCH O Land Feature	Own if not Sydn	SECTION NODES according to: HSD (Vol A2)	Region	UPS	LENGTH Section (m)	RatedEq (m)	CROSS SECTION No. off	Width (mm)	Ht (mm)	Dia. (mm)	Type	Mtl	HYDRAULIC CAPACITY Capacit Mannin umecs)	CATCH-MENT AREA (ha)	RUNOFF 5 yr ARI PeakFlov umecs)	RATIO Capacit 5yr Peak	Ratio x Capacit 5yr Pea = KdY.Fc	ARI Storm Event Capacity (years)	Landuse Design ARI (years)	See Note
						TOTAL	10,723.7	10,566.6														
55	MAIN CHANNEL	BRANCH 55A		A-B	A-B	A-B	321.87	321.87	1	15545	1625	0	OC	C	0.014 35.00	457.7	72.32	0.484	312	0.5-1	5	3,6
55	MAIN CHANNEL			B-C	B-C	B-C	51.21	51.21	1	15545	1625	0	OC	C	0.014 35.00	431.2	71.52	0.489	315	0.5-1	5	
55	MAIN CHANNEL	BRANCH 55B		C-D	C-D	C-D	170.38	170.38	1	15545	1625	0	OC	C	0.014 56.00	425.7	71.17	0.787	491	2-3	5	
55	MAIN CHANNEL	BRANCH 55C		D-E	D-E	D-E	276.75	276.75	1	12650	1625	0	OC	C	0.014 29.80	376.0	64.67	0.461	296	0.5-1	5	
55	MAIN CHANNEL	BRANCH 55D		E-F	E-F	E-F	143.87	143.87	1	12650	1625	0	OC	C	0.014 29.80	365.7	65.75	0.453	290	0.5-1	5	
55	MAIN CHANNEL			F-G	F-G	F-G	110.03	110.03	1	11580	1625	0	OC	C	0.014 47.00	352.7	64.88	0.724	450	2-3	5	
55	MAIN CHANNEL	BRANCH 55E		G-H	G-H	G-H	80.16	80.16	1	11885	2200	0	OC	C	0.014 51.60	350.8	65.81	0.784	487	2-3	5	
55	MAIN CHANNEL			H-J	H-J	H-J	59.44	59.44	1	8535	2185	0	OC	C	0.014 51.70	253.8	48.98	1.056	601	6-7	10	
55	MAIN CHANNEL	Booth St		J-K	J-K	J-K	56.69	56.69	1				OT	C	0.014 51.70	252.3	49.02	1.055	600	6-7	10	4
55	MAIN CHANNEL	BRANCH 55P		K-L	K-L	K-L	246.58	246.58	1	6170	2845	0	OC	C	0.014 51.90	231.9	44.88	1.156	647	8-9	10	
55	MAIN CHANNEL			L-M	L-M	L-M	121.31	121.31	1	5270	2970	0	OC	C	0.014 44.30	222.7	44.15	1.003	577	5-6	10	
55	MAIN CHANNEL	BRANCH 55Q		M-N	M-N	M-N	99.06	99.06	1	2310	2985	0	CV	C	0.014 44.50	221.6	44.53	0.999	574	4-5	10	
55	MAIN CHANNEL			N-O	N-O	N-O	39.01	39.01	1	2310	2830	0	CV	C	0.014 40.80	110.2	22.16	1.841	951	25-50	10	
55	MAIN CHANNEL			O-P	O-P	O-P	46.63	46.63	1	2310	2590	0	CV	C	0.014 35.00	103.4	20.76	1.686	895	25-50	10	
55	MAIN CHANNEL	Parramatta Rd		P-Q	P-Q	P-Q	58.52	58.52	1	2230	2590	0	CV	C	0.014 24.00	101.0	20.30	1.182	658	9-10	20	
55	MAIN CHANNEL	BRANCH 55S		Q-R	Q-R	Q-R	377.34	377.34	1	2110	2235	0	CV	C	0.014 21.00	97.5	19.65	1.069	609	6-7	5	
55	MAIN CHANNEL	Salisbury Rd		R-S	R-S	R-S	77.42	77.42	1	1550	1245	0	CV	C	0.014 7.18	24.0	5.40	1.330	732	12-15	5	
55	MAIN CHANNEL	Cardigan St		S-T	S-T	S-T	65.84	65.84	1	1550	1245	0	CV	C	0.014 6.66	22.9	5.15	1.293	711	12-15	5	
55	MAIN CHANNEL	Cardigan St		T-U	T-U	T-U	143.87	143.87	1	1295	1065	0	CV	C	0.014 4.21	22.5	5.06	0.832	498	3-4	5	
55	MAIN CHANNEL	St/Railway Ave		U-V	U-V	U-V	181.97	181.97	1	1065	940	0	CV	C	0.014 3.80	18.1	4.07	0.934	546	4-5	5	
55	MAIN CHANNEL	BRANCH 55U		V-A	V-W	V-VA	51.95	51.95	1				Var	C	0.014 4.08	13.6	3.08	1.324	728	12-15	10	
55	MAIN CHANNEL			A-~W	V-W	VA-W	45.00	45.00	1			1150	P	C	0.013 5.43	0.1	0.02	######	119918	100 &	10	
55A	FEDERAL PARK	BRANCH		B-B1	B-B1	B-B1	17.69		1				CT	C	0.014 2.12	0.0				9-10	10	
55A	FEDERAL PARK	BRANCH			B-B1	B-B1	17.69	17.69	1			1350	P	C	0.013 2.48	17.4	3.88	1.186	661	9-10	10	
55A	FEDERAL PARK	BRANCH		B1-	B1-	B1-B1A	64.81		1	1360	1220	0	CV	C	0.014 2.12	0.0				9-10	10	
55A	FEDERAL PARK	BRANCH			B1-	B1-B1A	64.81	64.81	1			1350	P	C	0.013 2.48	17.4	3.88	1.186	661	9-10	10	
55A	FEDERAL PARK	BRANCH		-B2	-B2	B1A-B2	104.16	104.16	1	1360	1220	0	CV	C	0.014 2.12	15.5	3.44	0.616	390	1-2	10	

MAIN DRAIN or BRANCH No.	Name	INCOMING BRA SUB-BRANCH O Land Feature	Own if not Sydv	SECTION NODES according to: HSD 4FI□II (Vol A2)	Region	UPS	LENGTH Section (m)	RatedEq (m)	CROSS SECTION No. off	Width (mm)	Ht (mm)	Dia. (mm)	Typ	Mtl	HYDRAULIC CAPACITY Capacit Mannin umecs)	CATCH-MENT AREA (ha)	RUNOFF 5 yr ARI PeakFlov umecs)	RATIO Capacit 5yr Peak	Ratio x Capacit 5yr Pea = KdY.Fc	ARI Storm Event Capacity (years)	Landuse Design ARI (years)	See Note
55B	LILLIE BRIDGE BRANCH			D-D3	D-D3	D-D3	12.12	0.00	1			0	CT	C	0.014	ot App	48.2	10.36			2-3	10	
55B	LILLIE BRIDGE B	Harold Park		D3-D4	D3-D4	D3-D4	204.03	204.03	1	2440	925	0	CV	C	0.014	3.46	44.8	9.74	0.355	225	0.5-1	10	
55B	LILLIE BRIDGE B	Harold Park		D4-D5	D4-D5	D4-D5	194.73	194.73	1	0	0	1350	P	C	0.013	5.92	34.1	7.64	0.774	478	2-3	10	
55B	LILLIE BRIDGE B	Wigram Rd		D5-D6	D5-D6	D5-D6	50.49	50.49	1	0	0	1200	P	C	0.013	4.33	24.4	5.47	0.791	488	2-3	5	
55B	LILLIE BRIDGE BRANCH			D6-D7	D6-D7	D6-D7	82.84	82.84	1	0	0	1050	P	C	0.013	3.03	24.4	5.47	0.554	351	1-2	5	
55B	LILLIE BRIDGE B	Hegarty St		D7-D8	D7-D8	D7-D8	185.18	185.18	1	0	0	900	P	C	0.013	4.22	22.4	5.02	0.840	502	3-4	5	
55B	LILLIE BRIDGE B	John St		D8-D9	D8-D9	D8-D9	57.43	57.43	1	0	0	900	P	C	0.013	2.18	15.6	3.50	0.623	395	1-2	5	
55B	LILLIE BRIDGE B	Clare St		D9-D10	D9-D10	D9-D10	60.65	60.65	1	0	0	750	P	C	0.013	2.49	14.5	3.25	0.767	473	2-3	5	
55B	LILLIE BRIDGE B	ont Bridge Rd		D10-D11	D10-D11	D10-D11	27.94	27.94	1	0	0	750	P	C	0.013	2.03	14.5	3.25	0.625	396	1-2	10	
55B	LILLIE BRIDGE BRANCH			D11-D12	D11-D12	D11-D12	65.32	65.32	1	0	0	750	P	C	0.013	1.65	9.7	2.17	0.760	469	2-3	5	
55B	LILLIE BRIDGE BRANCH			D12-D13	D12-D13	D12-D13	70.27	70.27	1	595	840	0	OV	C	0.014	1.23	8.1	1.81	0.677	429	1-2	5	
55C	PIPER ST BRANCH			E-E14	E-E14	E-E14	61.99	61.99	1	0	0	600	P	C	0.013	0.45	5.2	1.17	0.388	246	0.5-1	10	
55D	TAYLOR ST BRANCH			F-F15	F-F15	F-F15	103.09	103.09	1	1080	830	0	CV	C	0.014	1.21	9.6	2.26	0.534	338	1-2	10	5
55E	ORPHAN SCHOOL CREEK BRAN			H-H15	H-H15	H-H15	106.12	106.12	1	2820	1370	0	CV	C	0.014	15.40	94.9	19.26	0.800	494	2-3	10	
55E	ORPHAN SCHOOL CREEK BRAN			H15-H16	H15-H16	H15-H16	13.36	13.36	1	2820	1370	0	CV	C	0.014	17.20	90.6	18.49	0.930	544	4-5	10	
55E	ORPHAN SCHOOL CREEK BRAN			H16-H17	H16-H17	H16-H17	12.79	12.79	1	2820	1370	0	CV	C	0.014	21.50	90.6	18.51	1.161	651	8-9	10	
55E	ORPHAN SCHOOL CREEK BRAN			H17-H18	H17-H18	H17-H18	60.35	60.35	1	2820	1370	0	CV	C	0.014	17.20	90.6	18.53	0.928	543	4-5	10	
55E	ORPHAN SCHOOL CREEK BRAN			H18-H19	H18-H19	H18-H19	44.26	44.26	1	2285	1370	0	CV	C	0.014	15.90	89.3	18.35	0.866	518	3-4	10	
55E	ORPHAN SCHOOL CREEK BRAN			H19-H20	H19-H20	H19-H20	75.32	75.32	1	2210	1370	0	CV	C	0.014	13.10	89.0	18.35	0.714	441	2-3	10	
55E	ORPHAN SCHOOL CREEK BRAN			H20-	H20-H21	H20-H21	37.29	37.29	1	1905	1370	0	CV	C	0.014	15.10	85.4	17.63	0.856	512	3-4	10	
55E	ORPHAN SCHOOL CREEK BRAN			-H22	H21-H22	H21-H22	40.18	40.18	1	1830	1370	0	B	C	0.014	15.30	85.4	17.68	0.865	517	3-4	10	
55E	ORPHAN SCHOOL CREEK BRAN			H22-H23	H22-H23	H22-H23	160.93	160.93	1	1525	1370	0	B	C	0.014	11.30	78.8	16.20	0.697	430	1-2	10	
55E	ORPHAN SCHOOL CREEK BRAN			H23-H24	H23-H24	H23-H24	170.99	170.99	1	1370	1220	0	B	C	0.014	8.30	72.9	14.92	0.556	352	1-2	10	
55E	ORPHAN SCHOO	BRANCH 55F		H24-	H24-H24A	H24-H24A	134.90	134.90	1	1370	1065	0	CV	C	0.014	6.96	50.1	10.47	0.665	421	1-2	5	
55E	ORPHAN SCHOO	Sydney Uni		-H25	H24A-H25	H24A-H25	20.34	20.34	1	1370	1065	0	CV	C	0.014	6.96	47.3	9.83	0.708	449	2-3	5	
55E	ORPHAN SCHOO	3RCH 55G & 55H		H25-H26	H25-H26	H25-H26	39.03	39.03	1	0	0	1350	P	C	0.013	7.19	47.3	9.83	0.731	451	2-3	5	
55E	ORPHAN SCHOO	Sydney Uni		H26-H27	H26-H27	H26-H27	50.49	50.49	1	0	0	1350	P	C	0.013	3.94	23.4	4.86	0.811	485	2-3	5	
55E	ORPHAN SCHOO	BRANCH		H27-H27A	H27-H27A	H27-H27A	117.48	117.48	1	0	0	1050	P	C	0.013	3.84	23.4	4.86	0.791	488	2-3	5	
55E	ORPHAN SCHOO	Sydney Uni		H27A-H27E	H27A-H27E	H27A-H27E	48.77	48.77	1	0	0	1050	P	C	0.013	5.24	12.1	2.64	1.983	1031	50-100	5	
55E	ORPHAN SCHOO	BRANCH 55L		H27B-H27C	H27B-H27C	H27B-H27C	78.64	78.64	1	0	0	1200	P	C	0.013	4.54	12.1	2.64	1.718	916	25-50	5	
55E	ORPHAN SCHOO	Sydney Uni		H27C-H27D	H27C-H27D	H27C-H27D	42.92	42.92	1	0	0	1050	P	C	0.013	3.97	11.3	2.49	1.597	852	25-50	5	
55E	ORPHAN SCHOO	Sydney Uni		H27D-H27E	H27D-H27E	H27D-H27E	24.59	24.59	1	0	0	900	P	C	0.013	2.64	11.3	2.49	1.062	605	6-7	5	
55E	ORPHAN SCHOO	BRANCH 55N		H27E-H33	H27E-H33	H27E-H33	3.11	3.11	1	0	0	900	P	C	0.013	1.47	11.3	2.49	0.591	374	1-2	5	

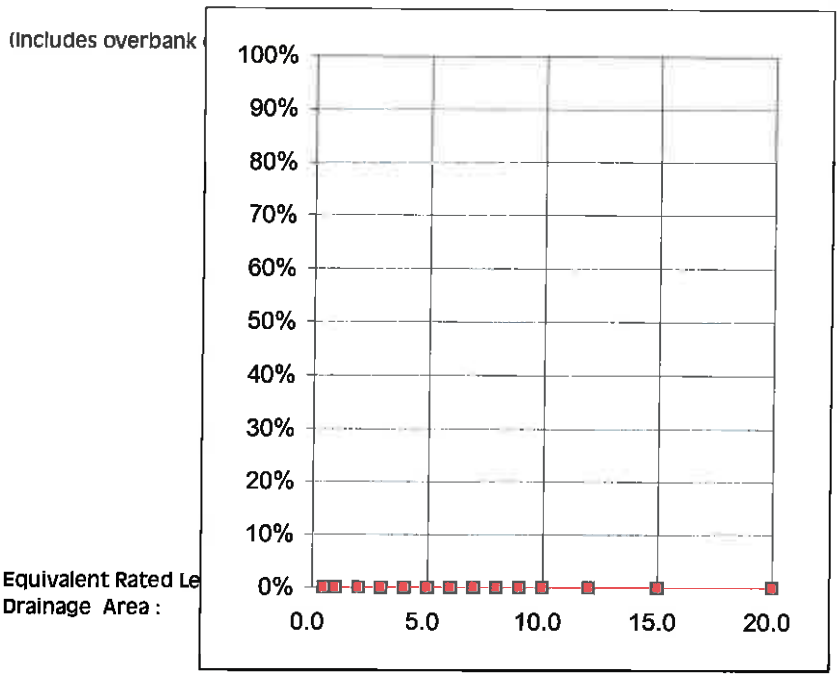
MAIN DRAIN or BRANCH		INCOMING BRA	Own	SECTION			LENGTH		CROSS SECTION							HYDRAULIC CAPACITY		CATCH-	RUNOFF	RATIO	Ratio x	ARI Storm	Landuse	
		SUB-BRANCH O	If	NODES according to:													Capacit	MENT	5 yr ARI	Capacit	Capacit	Event	Design	See
No.	Name	Land Feature	not	HSD	Region	UPS	Section (m)	RatedEq (m)	No. off	Width (mm)	Ht (mm)	Dia. (mm)	Type	Mtl		Mannin	umecs)	AREA (ha)	PeakFlov umecs)	5yr Peak	5yr Pea = KdY.Fc	Capacity (years)	ARI (years)	Note
55E	ORPHAN SCHOO	Sydney Uni		H33-H34	H33-H34	H33-H34	10.97	10.97	1	0	0	750	P	C	0.013	1.96		2.9	0.67	2.945	1496	100 &>	5	
55E	ORPHAN SCHOO	Sydney Uni		H34-H35	H34-H35	H34-H35	103.20	103.20	1	0	0	750	P	C	0.013	1.96		2.9	0.67	2.945	1496	100 &>	5	
55E	ORPHAN SCHOO	Sydney Uni		H35-H36	H35-H36	H35-H36	72.36	72.36	1	0	0	600	P	C	0.013	1.44		2.6	0.61	2.379	1209	100 &>	5	
55E	ORPHAN SCHOOL CK		C	H36-H37	H36-H37	H36-H37	12.27	12.27	1	0	0	450	P	C	0.013	0.88		2.4	0.55	1.598	852	25-50	10	
55E	ORPHAN SCHOOL CREEK BRAN			H37-H38	H37-H38	H37-H38	68.60	68.60	1	0	0	450	P	C	0.013	0.49		1.3	0.31	1.584	845	25-50	10	
55E	ORPHAN SCHOOL CREEK BRAN			H38-H39	H38-H39	H38-H39	41.84	41.84	1	0	0	450	P	C	0.013	0.61		0.8	0.19	3.174	1613	100 &>	5	
55E	ORPHAN SCHOOL CREEK BRAN			H39-H40	H39-H40	H39-H40	40.25	40.25	1	0	0	300	P	C	0.013	0.12		0.8	0.19	0.624	395	1-2	5	
55F	SCIENCE RD SUE	Sydney Uni			H24A-H24A	I24A-H24A	145.00	0.00	1	0	0	450	P	C	0.013	lot Ava		2.8	0.63				5	
55G	HOCKEY FIELD S	Sydney Uni		H26-H45	H26-H45	H26-H45	191.91	191.91	1	915	915	0	B	C	0.014	2.07		16.5	3.57	0.579	367	1-2	5	
55G	HOCKEY FIELD S	Sydney Uni		H45-H46	H45-H46	H45-H46	146.85	146.85	1	0	0	600	P	C	0.013	0.97		7.5	1.62	0.598	379	1-2	5	
55G	HOCKEY FIELD S	Sydney Uni		H46-H47	H46-H47	H46-H47	105.14	105.14	1	0	0	525	P	C	0.013	0.62		4.6	1.01	0.615	390	1-2	5	
55G	HOCKEY FIELD S	Sydney Uni		H47-H48	H47-H48	H47-H48	74.03	74.03	1	0	0	525	P	C	0.013	0.76		1.5	0.32	2.349	1193	100 &>	5	
55H	PHYSICS SCHOOI	Sydney Uni		H26-H49	H26-H49	H26-H49	76.13	76.13	1	0	0	900	P	C	0.013	1.96		7.5	1.40	1.397	761	15-20	5	
55H	PHYSICS SCHOOI	Sydney Uni		H49-H50	H49-H50	H49-H50	40.20	40.20	1	0	0	900	P	C	0.013	1.87		7.5	1.40	1.333	733	12-15	5	
55H	PHYSICS SCHOOI	Sydney Uni		H50-H51	H50-H51	H50-H51	55.08	55.08	1	0	0	900	P	C	0.013	1.74		7.5	1.40	1.240	687	10-12	5	
55H	PHYSICS SCHOOI	Sydney Uni		H51-H52	H51-H52	H51-H52	49.16	49.16	1	0	0	900	P	C	0.013	2.25		7.5	1.40	1.604	856	25-50	5	
55H	PHYSICS SCHOOI	Sydney Uni		H52-H53	H52-H53	H52-H53	95.54	95.54	1	0	0	900	P	C	0.013	1.62		7.5	1.40	1.155	648	8-9	5	
55H	PHYSICS SCHOOI	Sydney Uni		H53-H54	H53-H54	H53-H54	41.96	41.96	1	0	0	900	P	C	0.013	1.65		7.5	1.40	1.176	656	9-10	5	
55H	PHYSICS SCHOOI	Sydney Uni		H54-H55	H54-H55	H54-H55	85.22	85.22	1	0	0	900	P	C	0.013	2.13		7.5	1.40	1.518	816	20-25	5	
55H	PHYSICS SCHOOI	BRANCH 55J		H55-	H55-H55A	H55-H55A	58.96	58.96	1	0	0	900	P	C	0.013	2.13		7.5	1.40	1.518	816	20-25	5	
55H	PHYSICS SCHOOI	Sydney Uni		-H48	H55A-H48	H55A-H48	36.42	36.42	1	0	0	900	P	C	0.013	2.13		2.6	0.60	3.534	1795	100 &>	5	
55H	PHYSICS SCHOOI	Sydney Uni			H48-H48A	H48-H48A	56.30	56.30	1	0	0	375	P	C	0.013	0.32		2.1	0.49	0.640	406	1-2	5	
55J	SUB-BRANCH OFF PHYSICS SCH				H55A-H55A	I55A-H55A	36.00	36.00	1	0	0	450	P	C	0.013	0.34		4.8	0.80	0.421	267	0.5-1	5	
55E	ORPHAN SCHOOL CREEK SUB-BI			H27A-	H27A-H28	H27A-H28	15.59	15.59	1			1050	P	C	0.013	3.83		11.3	2.21	1.729	922	25-50	5	
55E	ORPHAN SCHOOL CREEK SUB-BI				H28-H29	H28-H29	18.90	18.90	1			900	P	C	0.013	3.28		5.0	0.99	3.324	1689	100 &>	5	
55E	ORPHAN SCHOOL CREEK SUB-BI				H29-H30	H29-H30	81.30	81.30	1			900	P	C	0.013	3.28		0.9	0.18	17.845	9066	100 &>	5	
55L	NEW MEDICAL SCHOOL RELIEF S				H29-H29A	H29-H29A	94.55	94.55	1	0	0	600	P	C	0.013	0.62		0.3	0.07	9.155	4651	100 &>	5	
55N	ST ANDREWS COLLEGE SUB-BRA			H33-H42	H33-H42	H33-H42	45.72	45.72	1	0	0	675	P	C	0.013	1.18		8.5	1.82	0.648	411	1-2	5	
55N	ST ANDREWS COLLEGE SUB-BRA			H42-	H42-	H42-H42A	36.58	36.58	1	0	0	675	P	C	0.013	1.27		7.5	1.63	0.778	480	2-3	5	
55N	ST ANDREWS COLLEGE SUB-BRA			-H43	-H43	H42A-H43	39.62	39.62	1	0	0	600	P	C	0.013	1.21		4.5	1.07	1.128	633	7-8	5	
55N	ST ANDREWS COLLEGE SUB-BRA			H43-H44	H43-H44	H43-H44	41.33	41.33	1	0	0	600	P	C	0.013	1.66		4.5	1.07	1.548	826	20-25	5	

MAIN DRAIN or BRANCH No.	Name	INCOMING BRA SUB-BRANCH O Land Feature	Own if not SydW	SECTION NODES according to: HSD	Region	UPS	LENGTH Section (m)	RatedEq (m)	CROSS SECTION No. off	Width (mm)	Ht (mm)	Dia. (mm)	Type	Mtl	HYDRAULIC CAPACITY Manning	Capacit umecs)	CATCH-MENT AREA (ha)	RUNOFF 5 yr ARI PeakFlov umecs)	RATIO Capacit 5yr Peak	Ratio x Capacit 5yr Pea = KdY.Fd	ARI Storm Event Capacity (years)	Landuse Design ARI (years)	See Note
55P	GEHRIGS CREEK BRANCH			L-	L-L56A	L-L56A	15.53	15.53	1	1235	1215	0	CV	C	0.014	2.90	3.1	0.74	3.919	1991	100 &>	10	
55P	GEHRIGS CREEK BRANCH			-L56	L56A-L56	L56A-L56	14.32	14.32	1			900	P	C	0.013	2.90	3.1	0.74	3.919	1991	100 &>	10	
55P	GEHRIGS CREEK BRANCH			L56-L57	L56-L57	L56-L57	70.86	70.86	1	0	0	750	P	C	0.013	2.00	2.6	0.62	3.223	1637	100 &>	10	
55P	GEHRIGS CREEK BRANCH			L57-L58	L57-L58	L57-L58	42.34	42.34	1	0	0	750	P	C	0.013	2.31	1.8	0.43	5.377	2732	100 &>	10	
55Q	CARDIGAN ST BRANCH			N-Q66	N-Q66	N-Q66	158.80	158.80	1	1830	2285	0	CV	C	0.014	25.10	97.4	20.34	1.234	683	10-12	10	
55Q	CARDIGAN ST B BRANCH 55R			Q66-Q103	Q66-N59	Q66-N59	15.00	15.00	1	1830	2285	0	CV	C	0.014	25.10	81.6	17.36	1.446	786	15-20	10	
55Q	CARDIGAN ST B BRCH 55R(AMP)			Q103-N60	N59-N60	N59-N60	145.39	145.39	1	1830	1525	0	CV	C	0.014	14.80	52.1	11.17	1.325	728	12-15	10	
55Q	CARDIGAN ST BH 55T (Portion)			N60-N61	N60-N61	N60-N61	231.73	231.73	1	1830	1370	0	CV	C	0.014	15.50	49.9	10.85	1.429	777	15-20	10	
55Q	CARDIGAN ST BH 55T (Balance)			N61-N62	N61-N62	N61-N62	109.07	109.07	1	2285	1370	0	CV	C	0.014	14.00	42.4	9.46	1.480	795	20-25	10	
55Q	CARDIGAN ST B Cardigan Ln			N62-	N62-	N62-N62A	78.86	78.86	1	1905	1220	0	CV	C	0.014	11.90	33.1	7.32	1.626	867	25-50	10	
55Q	CARDIGAN ST B Cardigan Ln			-N63	-N63	N62A-N63	126.92	126.92	1	1905	1220	0	CV	C	0.014	11.60	33.1	7.39	1.569	837	25-50	10	
55Q	CARDIGAN ST B Sanbrook Ln			N63-N64	N63-N64	N63-N64	50.90	50.90	1	1600	1220	0	CV	C	0.014	11.20	31.5	7.06	1.585	845	25-50	10	
55Q	CARDIGAN ST B)n Rd/Pierce St			N64-N65	N64-N65	N64-N65	51.55	51.55	1	1600	1220	0	CV	C	0.014	11.90	31.5	7.06	1.685	899	25-50	10	
55Q	CARDIGAN ST B Bedford St			N65-W	N65-N65A	N65-N65A	28.96	28.96	1	2515	1220	0	CV	C	0.014	7.38	30.6	6.84	1.079	615	6-7	10	
55Q	CARDIGAN ST B Railway		SRA	W-Z	N65A-Z	N65A-Z	35.97	35.97	1	1220	1590	0	B	C	0.014	5.18	26.2	5.82	0.890	532	3-4	10	
55U	GLADSTONE ST BRANCH			Z-Bu1	Z-VB1	Z-VB1	8.23	8.23	1	1370	915	0	B	C	0.014	4.49	26.2	5.82	0.771	476	2-3	10	
55U	GLADSTONE ST BRANCH			Bu1-C	VB1-VC	VB1-VC	17.56	17.56	1	1525	1065	0	B	C	0.014	6.37	25.1	5.57	1.144	642	8-9	5	
55U	GLADSTONE ST Trafalgar St			C-Cu1	VC-VC1	VC-VC1	45.35	45.35	1	1065	1065	0	B	C	0.014	5.49	23.2	5.12	1.072	611	6-7	5	
55U	GLADSTONE ST BRANCH			Cu1-D	VC1-VD	VC1-VD	132.07	132.07	1	0	0	1350	P	C	0.013	5.43	23.2	5.12	1.060	604	6-7	5	
55U	GLADSTONE ST Gladstone St			D-E	VD-VE	VD-VE	133.97	133.97	1	0	0	1200	P	C	0.013	4.16	17.2	3.72	1.117	631	7-8	10	
55U	GLADSTONE ST Gladstone St			E-Eu1	VE-VE1	VE-VE1	36.56		1	0	0	1050	P	C	0.013	3.96					25-50	10	
55U	GLADSTONE ST BRANCH		C	E-L		VE-VEL			1	0	0	525	P	C	0.013	1.11					25-50	10	
55U	GLADSTONE ST BRANCH		C	E-L		VE-VEL		36.56	1	0	0	600	P	C	0.013	0.85	17.2	3.72	1.590	848	25-50	10	
55U	GLADSTONE ST Gladstone St			Eu1-Eu2	VE1-VE2	VE1-VE2	119.74		1	0	0	1050	P	C	0.013	3.96					100 &>	10	
55U	GLADSTONE ST BRANCH		C	L-M		VEL-VEM		119.74	1	915	915	0	B	C	0.014	4.35	17.2	3.72	2.232	1134	100 &>	10	
55U	GLADSTONE ST BRANCH			Eu2-F	VE2-VF	VE2-VF	59.72		1	0	0	1050	P	C	0.013	2.85					9-10	10	
55U	GLADSTONE ST BRANCH		C	M-F		VEM-VF		59.72	1	0	0	900	P	C	0.013	1.60	17.2	3.72	1.195	666	9-10	10	
55U	SUB-BRANCH OFF GLADSTONE				VD-VDA	VD-VDA	17.19	17.19	1			900	P	C	0.013	1.44	5.1	1.19	1.206	669	10-12	5	

MAIN DRAIN or BRANCH No.	Name	INCOMING BRA SUB-BRANCH o Land Feature	Own if not SydW	SECTION NODES according to: HSD	Region	UPS	LENGTH Section (m)	RatedEq (m)	CROSS SECTION No. off	Width (mm)	Ht (mm)	Dia. (mm)	Typ	Mtl	HYDRAULIC CAPACITY Manning	Capacit umecs)	CATCH-MENT AREA (ha)	RUNOFF 5 yr ARI PeakFlov umecs)	RATIO Capacit 5yr Peak	Ratio x Capacit 5yr Pea = KdY.Fd	ARI Storm Event Capacity (years)	Landuse Design ARI (years)	See Note
55R	FOWLERS CREEK BRANCH			Q66-Q67	Q66-Q67	Q66-Q67	31.62		1	1065	915	0	B	C	0.014	4.71					15-20	10	
55W	FOWLERS CREEK BRANCH AMP			Q103-Q89	N59-Q89	N59-Q89	28.61	30.12	1	0	0	1200	P	C	0.013	8.76	45.3	9.96	1.353	737	15-20	10	
55R	FOWLERS CREEK BRANCH			Q67-Q68	Q67-Q68	Q67-Q68	132.97		1	0	0	1200	P	C	0.013	5.48					15-20	10	
55W	FOWLERS CREEK BRANCH AMP			Q89-Q90	Q89-Q90	Q89-Q90	134.39	133.68	1	0	0	1350	P	C	0.013	7.48	43.7	9.58	1.353	737	15-20	10	
55R	FOWLERS CREEK BRANCH			Q68-Q69	Q68-Q69	Q68-Q69	105.21		1	0	0	1200	P	C	0.013	5.01					10-12	10	
55W	FOWLERS CREEK BRANCH AMP			Q90-Q91	Q90-Q91	Q90-Q91	147.19	126.20	1	0	0	1500	P	C	0.013	5.48	39.2	8.53	1.230	682	10-12	10	
	KINGSTON RD RELIEF DRAIN	C				N61-T71		0.00	1			750	P	C	0.013	1.24					3-4	10	
55T	KINGSTON RD BRANCH			N62-T71	N62-T71	N62-T71	39.87	39.87	1	0	0	840	C	C	0.014	1.91	15.3	3.57	0.883	528	3-4	10	
55S	STANMORE BRANCH AMP			R-R70	R-R70	R-R70	72.83		1	1065	1065	0	CV	C	0.014	3.51					2-3	10	
55S	STANMORE BRA Salisbury Rd			R-R70	R-R70	R-R70	80.62	76.73	1	1295	1065	0	CV	C	0.014	5.68	57.0	11.50	0.799	495	2-3	10	
55S	STANMORE BRANCH AMP			R70-R71	R70-R71	R70-R71	261.52		1	1065	1065	0	CV	C	0.014	3.21					2-3	10	
55S	STANMORE BRA Salisbury Rd			R70-R71	R70-R71	R70-R71	261.52	261.52	1	1295	1065	0	CV	C	0.014	5.69	54.5	11.09	0.802	496	2-3	10	
55S	STANMORE BRANCH AMP			R71-R72	R71-R72	R71-R72	52.07		1	0	0	900	P	C	0.013	2.09					2-3	5	
55S	STANMORE BRA Salisbury Rd			R71-R72	R71-R72	R71-R72	52.07	52.07	1	1295	1065	0	CV	C	0.014	5.55	47.2	9.90	0.772	477	2-3	5	
55S	STANMORE BRANCH AMP			R72-R73	R72-R73	R72-R73	61.39		1	0	0	900	P	C	0.013	2.09					2-3	5	
55S	STANMORE BRA Salisbury Rd			R72-R73	R72-R73	R72-R73	61.39	61.39	1	1040	965	0	CV	C	0.014	4.30	37.3	7.88	0.810	485	2-3	5	
55S	STANMORE BRANCH AMP			R73-R74	R73-R74	R73-R74	188.29		1	0	0	750	P	C	0.013	1.49					2-3	5	
55S	STANMORE BRA Salisbury Rd			R73-R74	R73-R74	R73-R74	188.29	188.29	1	1040	865	0	CV	C	0.014	3.73	31.5	6.73	0.775	479	2-3	5	
55S	STANMORE BRANCH AMP			R74-R75	R74-R75	R74-R75	97.97		1	0	0	900	P	C	0.013	1.80					3-4	10	
55S	STANMORE BRA Jry/Percival Rd			R74-R75	R74-R75	R74-R75	100.45	99.21	1	1040	865	0	CV	C	0.014	3.73	30.4	6.63	0.834	499	3-4	10	
55S	STANMORE BRA Rd/Douglas St			R75-R76	R75-R76	R75-R76	14.75	14.75	1	1040	865	0	CV	C	0.014	3.73	21.7	4.69	0.795	491	2-3	10	
55S	STANMORE BRA Gordon Cres			R76-R77	R76-R77	R76-R77	51.00	51.00	1	1040	865	0	CV	C	0.014	3.73	19.1	4.13	0.903	528	3-4	10	
55S	STANMORE BRA Gordon Cres			R77-R78	R77-R78	R77-R78	159.12	159.12	1	1040	865	0	CV	C	0.014	3.46	19.1	4.13	0.838	501	3-4	5	
55S	STANMORE BRA Gordon Cres			R78-R79	R78-R79	R78-R79	69.88	69.88	1	0	0	600	P	C	0.013	1.17	3.7	0.80	1.462	786	15-20	5	
55U	GLADSTONE ST Railway			A-B	VA-VB	VA-VB	87.45	87.45	1	0	0	1050	P	C	0.013	4.03	13.5	3.06	1.317	724	12-15	10	
55U	GLADSTONE ST BRANCH (D/S P			B-Bu1	VB-VB1	VB-VB1	39.40	39.40	1	0	0	900	P	C	0.013	1.89	4.0	0.91	2.085	1084	50-100	10	

1. Section lenghts and cross-sectional dimensions from Region's Node Diagram.
2. Capacity values outlined with double lines include overbank capacity.
3. A-B has overbank capacity downstream of the footbridge which would raise its event capacity to 20-25 years ARI.
4. J-K includes an arched culvert at Booth St.
5. Taylor St Branch actually varies from 1020 x 685 to 1140 x 975. Dimensions shown are those midreach where runoff from Taylor St enters.
6. Catchment areas based on the Region's Johnston's Creek Flood Study, 1995 andHydraulic Survey Sheets. The total calculated by the UPS GIS is 460.0 ha.

(a) PERCENT OF DRAINAGE SYSTEM SATISFYING ARI STORM EVENT



(b) GROUPED BY LANDUSE BASED DESIGN ARI SPECIFICATION OF

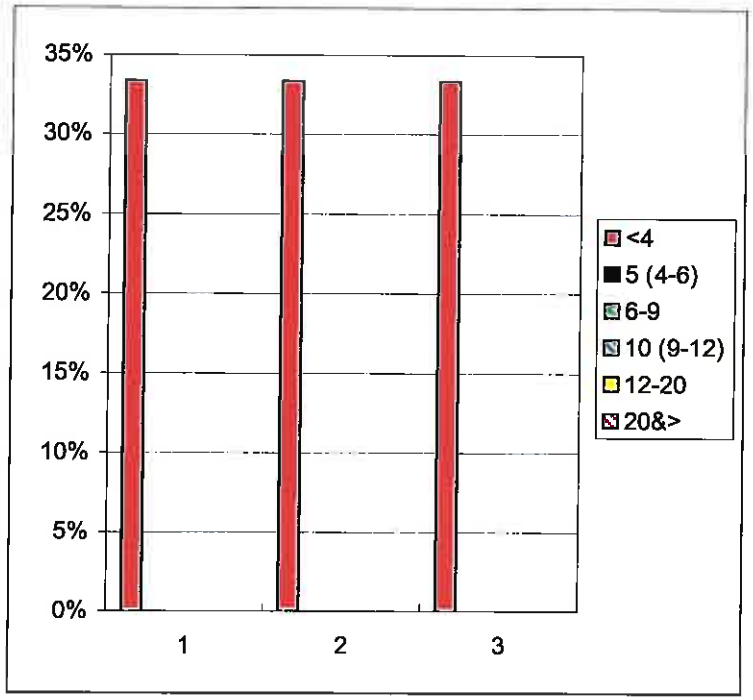


FIGURE 2-2. *PERFORMANCE SUMMARY FOR JOHNSTONS CREEK SWC 55*

TABLE 2-3A. HYDRAULIC CAPACITY CALCULATION
JOHNSTONS CREEK SWC 55

SECTION UPS	Cross Section Type	Shape	Form.	Top Width B (m)	Base Width b (m)	Base Slope kdH Vert k Hor	Centre Height or Dia. H or D (m)	Flow-line HdF (m)	Wall Height y (m)	Wall Slope kdV Hor k Ver	Trap Circ Only depth d (m)	Trap Circ Only radius r (m)	Xsect. Area Ado (mu2)	Wet. Perim. Pdo (m)	Hydr. Rad. Rdo (m)	Section Slope S (Grade) (%)	Mannin Rough ndo	No. Off	Capacity as built Qdo (cumecs)	revious Analys I if relevant I Mc4Fillwraith, n	Capacity (cumecs)	Overban Ratio Q/Qdo	Capacity referred to Sheet A: (cumecs)	See Note
A-B	OC	Trap.Sp	Open	15.545		15	1.360			5			17.16	16.98	1.01	0.0803%	0.014	1	35.00	0.013	36.05		35.00	2,3
B-C		ditto											17.16	16.98	1.01	0.0803%	0.014	1	35.00	0.013	36.05		35.00	2
C-D		ditto					1.360						17.16	16.98	1.01	0.0800%	0.014	1	34.90	0.013	35.79	1.60	56.00	2
D-E	OC	Trap.Sp	Open	12.650		15	1.360			5			14.53	14.23	1.02	0.0800%	0.014	1	29.80	0.013	30.81		29.80	2
E-F		ditto											14.53	14.23	1.02	0.0800%	0.014	1	29.80	0.013	30.81		29.80	2
F-G	OC	Trap.Sp	Open	11.580		15	1.360			5			13.49	13.22	1.02	0.0800%	0.014	1	27.60	0.013	24.04	1.72	47.00	2
G-H	OC	Trap.Sp	Open	11.885		15	1.935			5			20.34	14.47	1.41	0.0800%	0.014	1	51.60	0.013	55.93		51.60	2
H-J	OC	Special	Open	8.535		15	2.185			Var.			14.81	11.37	1.30	0.168%	0.014	1	51.70	0.013	53.52		51.70	
J-K		Transiti	=Min													0.168%	0.014		51.70	0.013	54.51		51.70	
K-L	OC	Trap.Sp	Open	6.170		15	2.845			Var.			14.11	10.02	1.41	0.168%	0.014	1	51.90	0.013	54.31		51.90	
L-M	OC	Special	Open	5.270		15	2.970			Var.			12.51	9.42	1.33	0.168%	0.014	1	44.30	0.013	47.91		44.30	
M-N	CV	Trap.Sp	lowlin	2.310	1.390	Circ	2.985	2.925		Var.	0.710		5.07	6.77	0.75	2.220%	0.014	1	44.50	0.013	41.06		44.50	1*
N-O		ditto		2.310	1.390	Circ	2.830	2.775		Var.	0.710		4.73	6.48	0.73	2.220%	0.014	1	40.80	0.013	36.81		40.80	1*
O-P		ditto		2.310	1.390	Circ	2.590	2.540		Var.	0.710		4.18	6.00	0.70	2.220%	0.014	1	35.00	0.013	30.58		35.00	1*
P-Q		ditto		2.230	1.370	Circ	2.590	2.540		Var.	0.700		4.10	5.97	0.69	1.110%	0.014	1	24.00	0.013	21.15		24.00	1*
Q-R	CV	Trap.Sp	Open	2.110	1.370	Circ	2.235			Var.	0.700		3.45	5.39	0.64	1.315%	0.014	1	21.00	0.013	22.43		21.00	
R-S	CV	Fillet.R	lowlin	1.550		10	1.245	1.220					1.80	3.83	0.47	0.847%	0.014	1	7.18	0.013	6.65		7.18	1*
S-T		ditto											1.80	3.83	0.47	0.730%	0.014	1	6.66	0.013	6.15		6.66	1*
T-U	CV	Fillet.R	lowlin	1.295		10	1.065	1.045					1.28	3.24	0.40	0.730%	0.014	1	4.21	0.013	4.39		4.21	1*
U-V		ditto		1.065		10	0.940	0.920					0.92	2.78	0.33	1.455%	0.014	1	3.80	0.013	3.37		3.80	1*
V-VA		Variable	lowline													2.220%	0.014			0.014	4.08		4.08	1(b)
VA-W	P	Circular	Full				1.170						1.08	3.68	0.29	2.220%	0.013	1	5.43	0.014	4.08		5.43	
B-B1	CT	Transiti	=U/S										1.26	3.03	0.42	0.180%	0.014	1	2.12	0.013	2.23		2.12	
B-B1	P	Circular	Full				1.370						1.47	4.30	0.34	0.200%	0.013	1	2.48		0.00		2.48	
B1-B1A	CV	Trap.Ci	lowlin	1.360	1.050	Circ	1.220	1.195		5	0.535		1.26	3.03	0.42	0.180%	0.014	1	2.12	0.013	2.23		2.12	
B1-B1A	P	Circular	Full				1.370						1.47	4.30	0.34	0.200%	0.013	1	2.48		0.00		2.48	
B1A-B2	CV	Trap.Ci	lowlin	1.360	1.050	Circ	1.220	1.195		5	0.535		1.26	3.03	0.42	0.180%	0.014	1	2.12	0.013	2.23		2.12	

SECTION UPS	Cross Section Type	Shape	Form.	Top Width B (m)	Base Width b (m)	Base Slope kdH Vert k Hor	Centre Height or Dia. H or D (m)	Flow-line HdF (m)	Wall Height y (m)	Wall Slope kdV Hor i k Vert	Trap Circ Only depth d (m)	Trap Circ Only radius r (m)	Xsect. Area Ado (mu2)	Wet. Perim. Pdo (m)	Hydr. Rad. Rdo (m)	Section Slope S (Grade) (%)	Manning Rough ndo	No. Off	Capacity as built Qdo (cumecs)	Previous Analysis [If relevant] Mc4Fillwraith, n	Previous Analysis [If relevant] Mc4Fillwraith, Capacity (cumecs)	Overban Ratio Q/Qdo	Capacity referred to Sheet A: (cumecs)	See Note
D-D3	CT	Part of Transition															0.014		Not Appl	0.013	0.00		0.00	
D3-D4	CV	Fillet.Trlowlin		2.440		15	0.925	0.905		5			1.95	3.80	0.51	0.152%	0.014	1	3.46	0.013	2.79		3.46	1*
D4-D5	P	Circular Full					1.370						1.47	4.30	0.34	1.136%	0.013	1	5.92	0.013	5.93		5.92	
D5-D6	P																0.013			0.013	4.33		4.33	
D6-D7	P																0.013			0.013	3.03		3.03	
D7-D8	P																0.013			0.013	4.22		4.22	
D8-D9	P																0.013			0.013	2.18		2.18	
D9-D10	P																0.013			0.013	2.49		2.49	
D10-D11	P																0.013			0.013	2.03		2.03	
D11-D12	P																0.013			0.013	1.65		1.65	
D12-D13	OV																0.014			0.013	1.32		1.23	
E-E14	P	Circular Full					0.610						0.29	1.92	0.15	0.500%	0.013	1	0.45	0.013	0.46		0.45	
F-F15	CV	Trap.Cir Open		1.080	0.890	Circ	0.830	0.815		5	0.455		0.68	2.17	0.31	0.293%	0.014	1	1.21	0.013	0.74		1.21	4
H-H15	CV	Trapezclowlin		2.820	2.665	15	1.370	1.345	1.280	16.5			3.56	5.19	0.69	0.606%	0.014	1	15.40	0.013	12.46		15.40	1*
H15-H16	CV	ditto											3.56	5.19	0.69	0.758%	0.014	1	17.20	0.013	13.96		17.20	1*
H16-H17	CV	ditto											3.56	5.19	0.69	1.183%	0.014	1	21.50	0.013	17.36		21.50	1*
H17-H18	CV	ditto											3.56	5.19	0.69	0.758%	0.014	1	17.20	0.013	13.96		17.20	1*
H18-H19	CV	Trapezclowlin		2.285	2.135	15	1.370	1.345	1.300	17.5			2.89	4.69	0.62	1.137%	0.014	1	15.90	0.013	12.97		15.90	1*
H19-H20	CV	Fillt.Sp.lowlin		2.210		15	1.370	1.345					2.50	4.36	0.57	1.137%	0.014	1	13.10	0.013	12.77		13.10	
H20-H21	CV	Fillt.Sp.lowlin		1.905		15	1.370	1.345					2.35	4.32	0.54	1.820%	0.014	1	15.10	0.013	12.74		15.10	
H21-H22	B	Rectanglowlin		1.830		10	1.370	1.345	1.280				2.38	4.35	0.55	1.820%	0.014	1	15.30		0.00		15.30	
H22-H23	B	Fillet.Relowlin		1.525		15	1.370	1.345					1.98	4.10	0.48	1.667%	0.014	1	11.30	0.013	10.59		11.30	
H23-H24	B	Fillet.Relowlin		1.370		15	1.220	1.195					1.58	3.65	0.43	1.667%	0.014	1	8.30	0.013	7.63		8.30	
H24-H24A	CV	Fillet.Relowlin		1.370		15	1.065	1.045					1.37	3.35	0.41	1.667%	0.014	1	6.96	0.013	6.29		6.96	
H24A-H25	CV	Fillet.Relowlin		1.370		15	1.065	1.045					1.37	3.35	0.41	1.667%	0.014	1	6.96	0.013	6.29		6.96	
H25-H26	P																0.013			0.013	7.19		7.19	
H26-H27	P																0.013			0.013	3.94		3.94	
H27-H27A	P																0.013			0.013	3.84		3.84	
H27A-H27B	P																0.013			0.013	5.24		5.24	
H27B-H27C	P																0.013			0.013	4.54		4.54	
H27C-H27D	P																0.013			0.013	3.97		3.97	
H27D-H27E	P																0.013			0.013	2.64		2.64	
H27E-H33	P																0.013			0.013	1.47		1.47	

SECTION UPS	Cross Section Type	Shape	Form.	Top Width B (m)	Base Width b (m)	Base Slope kdH Vert k Hor	Centre Height or Dia. H or D (m)	Flow-line HdF (m)	Wall Height y (m)	Wall Slope kdV Hor k Vert	Trap Circ Only deptr d (m)	Trap Circ Only radius r (m)	Xsect. Area Ado (mu2)	Wet. Perim. Pdo (m)	Hydr. Rad. Rdo (m)	Section Slope S (Grade) (%)	Manning Rough ndo	No. Off	Capacity as built Qdo (cumecs)	Previous [if relevant] Mc4Fill n	Analysis Width, Capacity (cumecs)	Overbank Ratio Q/Qdo	Capacity Referred to Sheet A: (cumecs)	See Note
H33-H34	P																0.013			0.013	1.96		1.96	
H34-H35	P																0.013			0.013	1.96		1.96	
H35-H36	P																0.013			0.013	1.44		1.44	
H36-H37	P																0.013			0.013	0.88		0.88	
H37-H38	P																0.013			0.013	0.49		0.49	
H38-H39	P																0.013			0.013	0.61		0.61	
H39-H40	P																0.013			0.013	0.12		0.12	
H24A-H24A	P																0.013				0.00		0.00	
H26-H45	B	Trap.Ciriowlin		0.915	0.890	Circ	0.915	0.895	5		0.305		0.55	2.04	0.27	1.590%	0.014	1	2.07	0.013	2.02		2.07	1*
H45-H46	P																0.013			0.013	0.97		0.97	
H46-H47	P																0.013			0.013	0.62		0.62	
H47-H48	P																0.013			0.013	0.76		0.76	
H26-H49	P																0.013			0.013	1.96		1.96	
H49-H50	P																0.013			0.013	1.87		1.87	
H50-H51	P																0.013			0.013	1.74		1.74	
H51-H52	P																0.013			0.013	2.25		2.25	
H52-H53	P																0.013			0.013	1.62		1.62	
H53-H54	P																0.013			0.013	1.65		1.65	
H54-H55	P																0.013			0.013	2.13		2.13	
H55-H55A	P																0.013			0.013	2.13		2.13	
H55A-H48	P																0.013			0.013	2.13		2.13	
H48-H48A	P	Circular	Full				0.380						0.11	1.19	0.10	3.000%	0.013	1	0.32		0.00		0.32	
H55A-H55A	P	Circular	Full				0.455						0.16	1.43	0.11	1.316%	0.013	1	0.34		0.00		0.34	
H27A-H28	P	Circular	Full				1.065						0.89	3.35	0.27	1.820%	0.013	1	3.83		0.00		3.83	
H28-H29	P	Circular	Full				0.915						0.66	2.87	0.23	3.000%	0.013	1	3.28		0.00		3.28	
H29-H30	P	Circular	Full				0.915						0.66	2.87	0.23	3.000%	0.013	1	3.28		0.00		3.28	
H29-H29A	P																0.013			0.013	0.62		0.62	
H33-H42	P																0.013			0.013	1.18		1.18	
H42-H42A	P	Circular	Full				0.685						0.37	2.15	0.17	2.100%	0.013	1	1.27		0.00		1.27	

SECTION UPS	Cross Section Type	Shape	Form.	Top Width B (m)	Base Width b (m)	Base Slope kdH Vert k Hor	Centre Height or Dia. H or D (m)	Flow-line HdF (m)	Wall Height y (m)	Wall Slope kdV Hor k Ver	Trap Circ Only depth d (m)	Trap Circ Only radius r (m)	Xsect. Area Ado (mu2)	Wet. Perim. Pdo (m)	Hydr. Rad. Rdo (m)	Section Slope S (Grade) (%)	Manning Rough ndo	No. Off	Capacity as built Qdo (cumecs)	Previous (If relevant) Mc4Fillwraith, n	Analysis Capacity (cumecs)	Overban Ratio Q/Qdo	Capacity Referred to Sheet A: (cumecs)	See Note
H42A-H43	P	Circular	Full				0.610						0.29	1.92	0.15	3.570%	0.013	1	1.21	0.013	1.21		1.21	
H43-H44	P																0.013			0.013	1.66		1.66	
L-L56A	CV	Trap.Cr	lowlin	1.235	0.890	Circ	1.215	1.190		5	0.455		1.11	2.93	0.38	0.488%	0.014	1	2.90	0.013	2.68		2.90	1*
L56A-L56	P	Circular	=D/s														0.013		2.90		0.00		2.90	
L56-L57	P	Circular	Full				0.760						0.45	2.39	0.19	3.000%	0.013	1	2.00		0.00		2.00	
L57-L58	P	Circular	Full				0.760						0.45	2.39	0.19	4.000%	0.013	1	2.31		0.00		2.31	
N-Q66	CV	Rectang	Open	1.830		16	2.285		2.230				4.13	6.29	0.66	1.268%	0.014	1	25.10	0.013	23.02		25.10	1*
Q66-N59	CV	ditto											4.13	6.29	0.66	1.268%	0.014	1	25.10	0.013	23.02		25.10	1*
N59-N60	CV	ditto		1.830		16	1.525	1.495	1.470				2.69	4.71	0.57	1.268%	0.014	1	14.80	0.013	13.31		14.80	1*
N60-N61	CV	ditto		1.830		16	1.370	1.345	1.315				2.41	4.41	0.55	1.820%	0.014	1	15.50	0.013	13.68		15.50	1*
N61-N62	CV	ditto		2.285		16	1.370	1.345	1.300				2.99	4.84	0.62	0.813%	0.014	1	14.00	0.013	12.04		14.00	1*
N62-N62A	CV	ditto		1.905		16	1.220	1.195	1.160				2.22	4.18	0.53	1.316%	0.014	1	11.90	0.013	10.31		11.90	1*
N62A-N63	CV	ditto											2.22	4.18	0.53	1.250%	0.014	1	11.60	0.013	10.31		11.60	1*
N63-N64	CV	ditto		1.600		16	1.220	1.195	1.170				1.87	3.89	0.48	1.855%	0.014	1	11.20	0.013	10.11		11.20	1*
N64-N65	CV	ditto											1.87	3.89	0.48	2.085%	0.014	1	11.90	0.013	10.73		11.90	1*
N65-N65A	CV	ditto		2.515		16	1.220	1.195	1.140				2.90	4.75	0.61	0.244%	0.014	1	7.38	0.013	6.13		7.38	1*
N65A-Z	B							1.220									0.014			0.013	5.58		5.18	
Z-VB1	B	Rectang	lowlin	1.370		10	0.915	0.895	0.845				1.18	3.03	0.39	1.000%	0.014	1	4.49	0.013	3.98		4.49	1*
VB1-VC	B	Rectang	lowlin	1.525		10	1.065	1.045	0.990				1.54	3.47	0.44	1.000%	0.014	1	6.37	0.013	5.61		6.37	1*
VC-VC1	B	Rectang	lowlin	1.065		10	1.065	1.045	1.010				1.08	3.05	0.36	2.000%	0.014	1	5.49	0.013	4.93		5.49	1*
VC1-VD	P																0.013			0.013	5.43		5.43	
VD-VE	P																0.013			0.013	4.16		4.16	
VE-VE1	P																0.013			0.013	3.96		3.96	
VE-VEL	P																0.013			0.013	1.11		1.11	
VE-VEL	P																0.013			0.013	0.85		0.85	
VE1-VE2	P																0.013			0.013	3.96		3.96	
VEL-VEM	B	Rectang	lowlin	0.915		10	0.915	0.895	0.870				0.80	2.62	0.30	2.840%	0.014	1	4.35	0.013	3.95		4.35	1*
VE2-VF	P																0.013			0.013	2.85		2.85	
VEM-VF	P																0.013			0.013	1.60		1.60	
VD-VDA	P	Circular	Full				0.915						0.66	2.87	0.23	0.580%	0.013	1	1.44		0.00		1.44	

SECTION UPS	Cross Section Type	Shape	Form.	Top Width B (m)	Base Width b (m)	Base Slope kdH Vert k Hor	Centre Height or Dia. H or D (m)	Flow-line HdF (m)	Wall Height y (m)	Wall Slope kdV Hor k Ver	Trap Circ Only depth d (m)	Trap Circ Only radius r (m)	Xsect. Area Ado (mu2)	Wet. Perim. Pdo (m)	Hydr. Rad. Rdo (m)	Section Slope S (Grade) (%)	Manning Rough ndo	No. Off	Capacity as built Qdo (cumecs)	previous Analysis [if relevant] Mc4Fillwraith, n	previous Analysis [if relevant] Mc4Fillwraith, Capacity (cumecs)	Overban Ratio Q/Qdo	Capacity Referred to Sheet A: (cumecs)	See Note
Q66-Q67	B	Fillet.Relowlin		1.065		10	0.915	0.895					0.89	2.73	0.33	2.410%	0.014	1	4.71	0.013	4.45		4.71	1*
N59-Q89	P																0.013			0.013	8.76		8.76	
Q67-Q68	P																0.013			0.013	5.48		5.48	
Q89-Q90	P																0.013			0.013	7.48		7.48	
Q68-Q69	P																0.013			0.013	5.01		5.01	
Q90-Q91	P																0.013			0.013	5.48		5.48	
N61-T71	P	Circular	Full				0.760						0.45	2.39	0.19	1.153%	0.013	1	1.24		0.00		1.24	
N62-T71	C	Circular	Full				0.840						0.55	2.64	0.21	1.856%	0.014	1	1.91	0.013	2.04		1.91	
R-R70	CV	Fillet.Trlowlin		1.065		15	1.065	1.045		5			0.86	2.73	0.32	1.516%	0.014	1	3.51	0.013	3.65		3.51	
R-R70	CV	Fillet.ReOpen		1.295		10	1.065						1.31	3.28	0.40	1.265%	0.014	1	5.68	0.013	4.98		5.68	
R70-R71	CV	Fillet.Trlowlin		1.065		15	1.065	1.045		5			0.86	2.73	0.32	1.266%	0.014	1	3.21	0.013	3.33		3.21	
R70-R71	CV	Fillet.ReOpen		1.295		10	1.065						1.31	3.28	0.40	1.266%	0.014	1	5.69	0.013	4.98		5.69	
R71-R72	P	Circular	Full				0.915						0.66	2.87	0.23	1.220%	0.013	1	2.09	0.013	2.08		2.09	
R71-R72	CV	Fillet.Relowlin		1.295		10	1.065	1.045					1.28	3.24	0.40	1.268%	0.014	1	5.55	0.013	4.98		5.55	
R72-R73	P	Circular	Full				0.915						0.66	2.87	0.23	1.220%	0.013	1	2.09	0.013	2.08		2.09	
R72-R73	CV	Fillet.Relowlin		1.040		10	0.965	0.945					0.93	2.81	0.33	1.854%	0.014	1	4.30	0.013	4.01		4.30	
R73-R74	P	Circular	Full				0.760						0.45	2.39	0.19	1.667%	0.013	1	1.49	0.013	1.50		1.49	
R73-R74	CV	Fillet.Relowlin		1.040		10	0.865	0.850					0.83	2.62	0.32	1.854%	0.014	1	3.73	0.013	3.36		3.73	
R74-R75	P	Circular	Full				0.915						0.66	2.87	0.23	0.910%	0.013	1	1.80	0.013	1.80		1.80	
R74-R75	CV	Fillet.Relowlin		1.040		10	0.865	0.850					0.83	2.62	0.32	1.854%	0.014	1	3.73	0.013	3.36		3.73	
R75-R76	CV	ditto											0.83	2.62	0.32	1.854%	0.014	1	3.73	0.013	3.36		3.73	
R76-R77	CV	ditto											0.83	2.62	0.32	1.854%	0.014	1	3.73	0.013	3.36		3.73	
R77-R78	CV	ditto											0.83	2.62	0.32	1.590%	0.014	1	3.46	0.013	3.39		3.46	
R78-R79	P	Circular	Full				0.610						0.29	1.92	0.15	3.333%	0.013	1	1.17	0.013	1.17		1.17	
VA-VB	P																0.013			0.013	4.03		4.03	
VB-VB1	P																0.013			0.013	1.89		1.89	

1. Previous calculation by McIlwraith unless noted as: (a) Work plan or similar; (b) A flow schedule. * denotes that McIlwraith treated as a closed section while others are
2. H, as if section did not have a low flow channel, for use in standard formula. Area and extra wetted perimeter for this less same for the fillets are added/subtracted.
3. Capacity of the portion of A-B downstream of footbridge is 3.1 times that of the formal channel which would raise its event capacity to 20-25 years ARI.
4. The capacity for the Taylor St Branch, which varies continuously, ranges from 0.88 cumecs to 1.56 cumecs. The value shown is that at midreach at Taylor St.

TABLE 2-4. CO-EFFICIENT OF RUNOFF (CoR), PEAK FLOW CALCULATION
JOHNSTONS CREEK SWC 55

SECTION UPS	RUNOFF PeakFlow 5 yr AR (cumecs	CATCHMENT AREA Cum. (ha)	Increm. (ha)	ToC (min)	INTENSITY Kd5= 612 md5= 0.582 (mm/hr	Equiv percent mperv. %	CoR□d5 d1 = 61.9 mm/ Cum.	ubAre	LAND ZONING Open Space % Area	% Imp	CoRd5	Commercial % Area	% Imp	CoRd5	Industrial % Area	% Imp	CoRd5	Special Uses % Area	% Imp	CoRd5	Residential % Area	edu /ha	% Imp	CoRd5	% Area	edu /ha	% Imp	CoRd5	See Note
																					Show actual, adopt minim			9 ctra ?		Nil		edu/ha		
A-B	72.32	457.71	26.50	30.3	77.0	63%	0.74	0.59	80%	5%	0.57							15%	40%	0.67	5%	28	69%	0.76						
B-C	71.52	431.21	5.50	27.6	80.6	64%	0.74	0.72	10%	5%	0.57							40%	55%	0.72	20%	26	66%	0.75	30%	28	69%	0.76			
C-D	71.17	425.71	49.73	27.2	81.2	64%	0.74	0.72	30%	5%	0.57							40%	75%	0.77	30%	40	81%	0.79							
D-E	64.67	375.98	10.30	25.8	83.3	65%	0.74	0.72																							
E-F	65.75	365.68	13.00	23.6	87.0	65%	0.74	0.72																							
F-G	64.88	352.68	1.90	22.4	89.2	64%	0.74	0.72																							
G-H	65.81	350.78	96.94	21.5	90.9	65%	0.74	0.72																							
H-J	48.98	253.84	1.50	21.0	92.0	69%	0.76	0.72																							
J-K	49.02	252.34	20.40	20.7	92.6	69%	0.76	0.79	2%	10%	0.58	7%	90%	0.82	50%	85%	0.80	28%	75%	0.77	9%	35	77%	0.78	4%	40	81%	0.79			
K-L	44.88	231.94	9.20	20.7	92.6	68%	0.75	0.78	3%	5%	0.57				30%	85%	0.80	25%	70%	0.76	21%	35	77%	0.78	21%	40	81%	0.79			
L-M	44.15	222.74	1.10	19.6	95.0	67%	0.75	0.78																							
M-N	44.53	221.64	111.42	19.0	96.3	67%	0.75	0.78																							
N-O	22.16	110.22	6.80	18.8	96.8	66%	0.75	0.78				12%	90%	0.82	60%	85%	0.80	8%	75%	0.77	20%	20	56%	0.72							
O-P	20.76	103.42	2.40	18.7	96.9	65%	0.75	0.78																							
P-Q	20.30	101.02	3.50	18.6	97.2	65%	0.74	0.77				10%	90%	0.82	20%	85%	0.80	10%	75%	0.77	10%	25	64%	0.74	45%	27	67%	0.75	5%	40	81%	0.79
Q-R	19.65	97.52	73.52	18.5	97.6	65%	0.74	0.77																							
R-S	5.40	24.00	1.10	15.0	107.1	69%	0.76	0.75										25%	75%	0.77	75%	26	66%	0.75							
S-T	5.15	22.90	0.40	15.0	107.1	69%	0.76	0.75																							
T-U	5.06	22.50	4.40	15.0	107.1	69%	0.76	0.76										35%	75%	0.77	50%	26	66%	0.75	15%	35	77%	0.78			
U-V	4.07	18.10	4.50	15.0	107.1	69%	0.76	0.74										60%	60%	0.73	40%	26	66%	0.75							
V-VA	3.08	13.60	13.50	15.0	107.1	71%	0.76	0.74																							
VA-W	0.02	0.10	0.10	15.0	107.1	75%	0.77	0.77										100%	75%	0.77											
B-B1				15.0																											
B-B1	3.88	17.40		15.0	107.1	67%	0.75	0.77										100%	75%	0.77											
B1-B1A				15.0				0.77																							
B1-B1A	3.88	17.40	1.90	15.0	107.1	67%	0.75	0.77																							
B1A-B2	3.44	15.50	15.50	15.0	107.1	66%	0.75	0.75										5%	75%	0.77	15%	22	59%	0.73	30%	24	62%	0.74	###	28	69%	0.76

SECTION	RUNOFF	CATCHMENT AREA		ToC	INTENSITY	Equiv	CoR□d5	LAND ZONING																See
	PeakFlov			Kd5= 612		ercer	d1 = 61.9	Open Space			Commercial			Industrial			Special Uses			Residential								
UPS	5 yr AR	Cum.	increm.	md5= 0.582		mperv.	mm/	%	%	CoRd5	%	%	CoRd5	%	%	CoRd5	%	%	CoRd5	%	edu	%	CoRd5	%	edu	%	CoRd5	%	edu	%	CoRd5	Note
	(cumecs	(ha)	(ha)	(min)	(mm/hr	%	Cum.	ubAre	Area	Imp		Area	Imp		Area	Imp		Area	Imp		Area	/ha	Imp		Area	/ha	Imp		Area	/ha	Imp	
D-D3	10.36	48.23	3.40	15.2	106.5	59%	0.73	0.64	15%	30%	0.64						85%	30%	0.64												
D3-D4	9.74	44.83	10.70	15.1	106.8	61%	0.73	0.67	75%	30%	0.64									25%	26	66%	0.75								
D4-D5	7.64	34.13	9.70	15.0	107.1	68%	0.75	0.75	3%	5%	0.57	3%	90%	0.82			3%	60%	0.73	42%	23	61%	0.73	29%	32	74%	0.77	###	41	82%	0.79	
D5-D6	5.47	24.43		15.0	107.1	68%	0.75	0.75																							
D6-D7	5.47	24.43	2.00	15.0	107.1	68%	0.75	0.75																							
D7-D8	5.02	22.43	6.80	15.0	107.1	68%	0.75	0.75																							
D8-D9	3.50	15.63	1.14	15.0	107.1	68%	0.75	0.75																							
D9-D10	3.25	14.49		15.0	107.1	68%	0.75	0.75																							
D10-D11	3.25	14.49	4.80	15.0	107.1	68%	0.75	0.75																							
D11-D12	2.17	9.69	1.60	15.0	107.1	68%	0.75	0.75																							
D12-D13	1.81	8.09	8.09	15.0	107.1	68%	0.75	0.75																							
E-E14	1.17	5.20	5.20	15.0	107.1	69%	0.76	0.76	5%	5%	0.57						20%	75%	0.77	55%	28	69%	0.76	20%	40	81%	0.79					
F-F15	2.26	9.60	9.60	15.0	107.1	82%	0.79	0.79				15%	90%	0.82			20%	75%	0.77	65%	41	82%	0.79									
H-H15	19.26	94.94	4.36	16.5	102.8	53%	0.71	0.78	2%	5%	0.57	2%	90%	0.82	36%	85%	0.80	15%	75%	0.77	20%	29	70%	0.76	10%	40	81%	0.79	###	45	86%	0.80	
H15-H16	18.49	90.58		16.1	103.9	52%	0.71	0.78																							
H16-H17	18.51	90.58		16.0	104.1	52%	0.71	0.78																							
H17-H18	18.53	90.58	1.25	16.0	104.2	52%	0.71	0.78																							
H18-H19	18.35	89.33	0.30	15.8	104.8	52%	0.71	0.78																							
H19-H20	18.35	89.03	3.68	15.6	105.2	52%	0.71	0.78																							
H20-H21	17.63	85.35		15.4	105.9	51%	0.70	0.78																							
H21-H22	17.68	85.35	6.60	15.3	106.2	51%	0.70	0.78																							
H22-H23	16.20	78.75	5.90	15.2	106.5	48%	0.70	0.78																							
H23-H24	14.92	72.85	22.76	15.0	107.1	46%	0.69	0.66									100%	35%	0.66												
H24-H24A	10.47	50.09	2.76	15.0	107.1	51%	0.70	0.66																							
H24A-H25	9.83	47.33		15.0	107.1	49%	0.70	0.66																							
H25-H26	9.83	47.33	23.93	15.0	107.1	49%	0.70	0.66																							
H26-H27	4.86	23.40		15.0	107.1	49%	0.70	0.66																							
H27-H27A	4.86	23.40	11.28	15.0	107.1	49%	0.70	0.66																							
H27A-H27	2.64	12.12		15.0	107.1	61%	0.73	0.66																							
H27B-H27	2.64	12.12	0.80	15.0	107.1	61%	0.73	0.66																							
H27C-H27	2.49	11.32		15.0	107.1	63%	0.74	0.66																							
H27D-H27	2.49	11.32		15.0	107.1	63%	0.74	0.66																							
H27E-H33	2.49	11.32	8.46	15.0	107.1	63%	0.74	0.66																							

SECTION / UPS	RUNOFF PeakFlov 5 yr AR (cumecs	CATCHMENT AREA Cum. (ha)	Increm. (ha)	ToC Kd5= 612 md5= 0.582 (min)	INTENSITY (mm/hr	Equiv ercer mperv. %	CoRd5 d1 = 61.9 Cum.	mm/ ubAre	LAND ZONING Open Space % Area	% Imp	CoRd5	Commercial % Area	% Imp	CoRd5	Industrial % Area	% Imp	CoRd5	Special Uses % Area	% Imp	CoRd5	Residential % Area	edu /ha	% Imp	CoRd5	% Area	edu /ha	% Imp	CoRd5	Area	edu /ha	% Imp	CoRd5	See Note
H33-H34	0.67	2.86		15.0	107.1	78%	0.78	0.66																									
H34-H35	0.67	2.86	0.29	15.0	107.1	78%	0.78	0.70										100%	50%	0.70													
H35-H36	0.61	2.57	0.22	15.0	107.1	81%	0.79	0.83										100%	95%	0.83													
H36-H37	0.55	2.35	1.03	15.0	107.1	80%	0.79	0.79										100%	80%	0.79													
H37-H38	0.31	1.32	0.50	15.0	107.1	80%	0.79	0.79																									
H38-H39	0.19	0.82		15.0	107.1	80%	0.79	0.79																									
H39-H40	0.19	0.82	0.82	15.0	107.1	80%	0.79	0.79																									
H24A-H24	0.63	2.76	2.76	15.0	107.1	75%	0.77	0.77										100%	75%	0.77													
H26-H45	3.57	16.46	8.99	15.0	107.1	60%	0.73	0.73										100%	60%	0.73													
H45-H46	1.62	7.47	2.83	15.0	107.1	60%	0.73	0.73																									
H46-H47	1.01	4.64	3.15	15.0	107.1	60%	0.73	0.73																									
H47-H48	0.32	1.49	1.49	15.0	107.1	60%	0.73	0.73																									
H26-H49	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H49-H50	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H50-H51	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H51-H52	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H52-H53	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H53-H54	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H54-H55	1.40	7.47		15.0	107.1	26%	0.63	0.00																									
H55-H55A	1.40	7.47	4.84	15.0	107.1	26%	0.63	0.70										100%	50%	0.70													
H55A-H48	0.60	2.63	0.53	15.0	107.1	74%	0.77	0.70																									
H48-H48A	0.49	2.10	2.10	15.0	107.1	80%	0.79	0.79										100%	80%	0.79													
H55A-H55	0.80	4.84	4.84	15.0	107.1	0%	0.56	0.56										100%	0%	0.56													
H27A-H28	2.21	11.28	6.28	15.0	107.1	36%	0.66	0.66										100%	35%	0.66													
H28-H29	0.99	5.00	4.06	15.0	107.1	37%	0.66	0.66																									
H29-H30	0.18	0.94	0.94	15.0	107.1	35%	0.66	0.66																									
H29-H29A	0.07	0.30	0.30	15.0	107.1	70%	0.76	0.76										100%	70%	0.76													
H33-H42	1.82	8.46	1.00	15.0	107.1	58%	0.72	0.63										100%	25%	0.63													
H42-H42A	1.63	7.46	3.00	15.0	107.1	62%	0.74	0.63																									
H42A-H43	1.07	4.46		15.0	107.1	87%	0.81	0.63																									
H43-H44	1.07	4.46	4.46	15.0	107.1	87%	0.81	0.81				25%	90%	0.82				60%	85%	0.80	15%	50	90%	0.82									

SECTION UPS	RUNOFF PeakFlov 5 yr AR (cumecs	CATCHMENT AREA Cum. (ha)	Increm. (ha)	ToC (min)	INTENSITY Kd5= 612 md5= 0.582 (mm/hr	Equiv Percer mperv. %	CoR d5 d1 = 61.9 Cum.	mm/ ubAre	LAND ZONING Open Space % Area	% Imp	CoRd5	Commercial % Area	% Imp	CoRd5	Industrial % Area	% Imp	CoRd5	Special Uses % Area	% Imp	CoRd5	Residential % Area	edu /ha	% Imp	CoRd5	% Area	edu /ha	% Imp	CoRd5	See Note
L-L56A	0.74	3.10		15.0	107.1	85%	0.80	0.80							100%	85%	0.80												
L56A-L56	0.74	3.10	0.50	15.0	107.1	85%	0.80	0.80																					
L56-L57	0.62	2.60	0.80	15.0	107.1	85%	0.80	0.80																					
L57-L58	0.43	1.80	1.80	15.0	107.1	85%	0.80	0.80																					
N-Q66	20.34	97.42	15.84	17.4	100.1	67%	0.75	0.72	30%	10%	0.58							45%	75%	0.77	25%	40	81%	0.79					5
Q66-N59	17.36	81.58	29.46	17.0	101.3	69%	0.76	0.72																					5
N59-N60	11.17	52.12	2.20	17.0	101.4	71%	0.76	0.72																					
N60-N61	10.85	49.92	7.52	16.5	102.6	71%	0.76	0.72																					4
N61-N62	9.46	42.40	9.28	15.9	104.3	74%	0.77	0.72																					4
N62-N62A	7.32	33.12		15.5	105.5	69%	0.75	0.78										5%	75%	0.77	95%	35	77%	0.78					
N62A-N63	7.39	33.12	1.60	15.2	106.5	69%	0.75	0.78																					
N63-N64	7.06	31.52		15.0	107.1	68%	0.75	0.78																					
N64-N65	7.06	31.52	0.96	15.0	107.1	68%	0.75	0.78																					
N65-N65A	6.84	30.56	4.40	15.0	107.1	68%	0.75	0.78																					
N65A-Z	5.82	26.16		15.0	107.1	66%	0.75	0.78																					
Z-VB1	5.82	26.16	1.10	15.0	107.1	66%	0.75	0.79										30%	65%	0.74	70%	45	86%	0.80					
VB1-VC	5.57	25.06	1.90	15.0	107.1	66%	0.75	0.79																					
VC-VC1	5.12	23.16		15.0	107.1	65%	0.74	0.79																					
VC1-VD	5.12	23.16	5.96	15.0	107.1	65%	0.74	0.79																					
VD-VE	3.72	17.20		15.0	107.1	59%	0.73	0.79																					
VE-VE1				15.0																									
VE-VEL				15.0																									
VE-VEL	3.72	17.20		15.0	107.1	59%	0.73	0.79																					
VE1-VE2				15.0																									
VEL-VEM	3.72	17.20		15.0	107.1	59%	0.73	0.79																					
VE2-VF				15.0																									
VEM-VF	3.72	17.20	17.20	15.0	107.1	59%	0.73	0.73	15%	10%	0.58	35%	90%	0.82				25%	25%	0.63	8%	35	77%	0.78	14%	40	81%	0.79	3%	45	86%	0.80	
VD-VDA	1.19	5.08	5.08	15.0	107.1	81%	0.79	0.79				20%	90%	0.82	20%	85%	0.80	10%	30%	0.64	50%	45	86%	0.80					

SECTION / UPS	RUNOFF PeakFlov 5 yr AR (cumecs	CATCHMENT AREA Cum. (ha)	Increm. (ha)	ToC (min)	INTENSITY Kd5= 612 md5= 0.582 (mm/hr	Equiv. percen mperv. %	CoR□d5 d1 = 61.9 mm/ Cum.	ubAre	LAND ZONING Open Space % Area	%	CoRd5 Imp	Commercial % Area	%	CoRd5 Imp	Industrial % Area	%	CoRd5 Imp	Special Uses % Area	%	CoRd5 Imp	Residential % Area	edu /ha	% Imp	CoRd5	% Area	edu /ha	% Imp	CoRd5	See Note
Q66-Q67				15.0																									
N59-Q89	9.96	45.30	1.60	15.0	107.1	63%	0.74	0.79	5%	10%	0.58				75%	85%	0.80	5%	75%	0.77	15%	40	81%	0.79						
Q67-Q68				15.0																									
Q89-Q90	9.58	43.70	4.50	15.0	107.1	62%	0.74	0.79																					
Q68-Q69				15.0																									
Q90-Q91	8.53	39.20	39.20	15.0	107.1	60%	0.73	0.73	23%	5%	0.57				3%	85%	0.80	17%	65%	0.74	30%	31	73%	0.77	10%	45	86%	0.80	###	53	90%	0.82	
N61-T71				15.0																									
N62-T71	3.57	15.30	15.30	15.0	107.1	79%	0.78	0.78										5%	75%	0.77	65%	35	77%	0.78	10%	40	81%	0.79	###	45	86%	0.80	
R-R70				17.7																									
R-R70	11.50	57.02	2.48	17.7	99.4	60%	0.73	0.73	5%	5%	0.57	1%	90%	0.82				15%	45%	0.69	7%	23	61%	0.73	69%	25	64%	0.74	3%	29	70%	0.76	
R70-R71				17.4																									
R70-R71	11.09	54.54	7.30	17.4	100.2	60%	0.73	0.73																					
R71-R72				16.3																									
R71-R72	9.90	47.24	9.95	16.3	103.2	61%	0.73	0.73																					
R72-R73				16.1																									
R72-R73	7.88	37.29	5.75	16.1	103.8	61%	0.73	0.73																					
R73-R74				15.8																									
R73-R74	6.73	31.54	1.18	15.8	104.6	62%	0.73	0.75				30%	90%	0.82				10%	35%	0.66	60%	24	62%	0.73						
R74-R75				15.0																									
R74-R75	6.63	30.36	8.66	15.0	107.1	61%	0.73	0.75																					
R75-R76	4.69	21.70	2.60	15.0	107.1	59%	0.73	0.73	5%	5%	0.57							10%	40%	0.67	78%	25	64%	0.74	7%	28	69%	0.76				
R76-R77	4.13	19.10		15.0	107.1	59%	0.73	0.73																					
R77-R78	4.13	19.10	15.40	15.0	107.1	59%	0.73	0.73																					
R78-R79	0.80	3.70	3.70	15.0	107.1	59%	0.73	0.73																					
VA-VB	3.06	13.50	9.50	15.0	107.1	71%	0.76	0.76										20%	70%	0.76	22%	25	64%	0.74	23%	28	69%	0.76	###	36	77%	0.78	
VB-VB1	0.91	4.00	4.00	15.0	107.1	71%	0.76	0.76																					

1 Residential dwelling densities - Actual average equivalent (grour 32 - Range: 2F2c 22 to2I The percent impervious is based on the actual edu/ha but not 9 edu/ha or including an e) Nil edu/h

2 Sub/incremental areas and cumulative coefficients of runoff outlined with double lines include Branches confluent with the reach.

3 Catchment areas based on the Region's Johnston's Creek Flood Study, 1995 andHydraulic Survey Sheets. The total calculated by the UPS GIS is 460.0 ha.

4 Flow from in-coming sub-catchment (ie the sub-catchment area) has been split between the Kingston Rd Branch and its relief in the ratio of their hydraulic capacity.

5 Flow from Fowlers Creek Branch (ie its sub-catchment area) has been split between the branch and its amplification in the ratio of their hydraulic capacity.

TABLE 2-5. RAINFALL INTENSITY and STORM EVENT CAPACITY LOOKUP JOHNSTONS CREEK SWC 55

(a) RAINFALL INTENSITY and VARIOUS FACTORS

ARI years (y)	IFD Rainfall Inter AR&R 1987 (Rainmar UBD (28th 67 M2 uy4Fld15r	uy4Fld60r	Rainfall Intensity 4Fldy = Kdy / (ToC + Equation Constants Kdy	mdy	2FFactors/Coef. with % and Duration =Avg of 4Fldy / 4I F'dy	unoff Coef CoRdy	63% 23 F'dy.CoRdy/CoRd5 Ndy	Kdy . Fdy
0.5	47.08	22.83	296	0.614	0.435	0.581	0.342	219
1	64.49	31.27	406	0.614	0.596	0.629	0.507	325
2	83.09	40.71	509	0.605	0.770	0.676	0.705	438
3			555	0.595	0.868	0.704	0.827	497
4			587	0.588	0.941	0.723	0.922	540
5	107.10	53.95	612	0.582	1.000	0.739	1.000	575
6			626	0.579	1.035	0.751	1.052	599
7			638	0.576	1.064	0.762	1.097	619
8			649	0.573	1.090	0.771	1.138	636
9			658	0.571	1.114	0.779	1.174	652
10	121.03	61.85	667	0.570	1.135	0.786	1.207	667
12			687	0.567	1.180	0.798	1.276	698
15			712	0.564	1.237	0.814	1.362	737
20	139.39	72.09	745	0.559	1.311	0.833	1.479	790
25			769	0.557	1.366	0.849	1.570	830
50	163.41	85.66	844	0.548	1.543	0.896	1.872	962
100	181.68	96.09	917	0.540	1.720	0.943	2.196	1100

(b) STORM EVENT CAPACITY (SEC) LOOKUP TABLE

ARI years (y)	Lookup Factor For Cap/q Ndy base average T Ndy	With the applicable each section Kdy . Fdy	Storm Event Capacity Rating is (Alternative Display Options) Stand. Rat	At least	Colour	GIS Databas	roup Ratin	mdy
<0.5			Below.5	Below.5	Purple	0.25	< 0.5	0.614
0.5	0.342	219	0.5-1	0.5	Purple	0.50	< 1	0.614
1	0.507	325	1-2	1	Purple	1.00	1-2	0.614
2	0.705	438	2-3	2	Red	2.00	2-5	0.605
3	0.827	497	3-4	3	Red	3.00	2-5	0.595
4	0.922	540	4-5	4	Orange	4.00	5	0.588
5	1.000	575	5-6	5	Orange	5.00	5	0.582
6	1.052	599	6-7	6	Yellow	6.00	5-10	0.579
7	1.097	619	7-8	7	Yellow	7.00	5-10	0.576
8	1.138	636	8-9	8	Yellow	8.00	5-10	0.573
9	1.174	652	9-10	9	Light gr	9.00	10	0.571
10	1.207	667	10-12	10	Light gr	10.00	10	0.570
12	1.276	698	12-15	12	Light bl	12.00	10-20	0.567
15	1.362	737	15-20	15	Light bl	15.00	10-20	0.564
20	1.479	790	20-25	20	Grey	20.00	20-50	0.559
25	1.570	830	25-50	25	Grey	25.00	20-50	0.557
50	1.872	962	50-100	50	Grey	50.00	50-100	0.548
100	2.196	1,100	100 &>	100	Grey	100.00	> 100	0.540