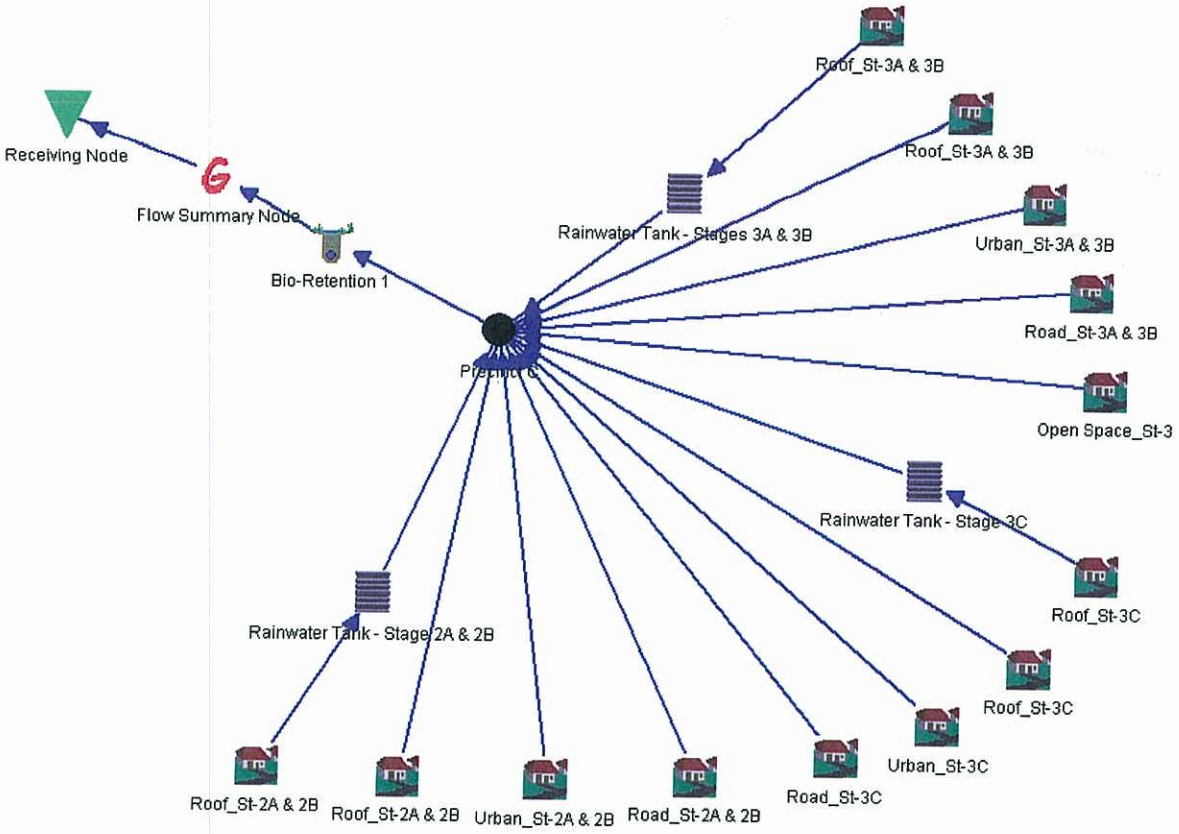
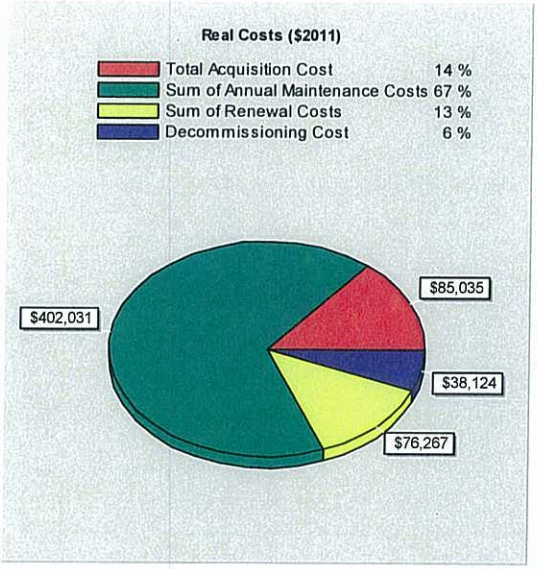
Appendix B

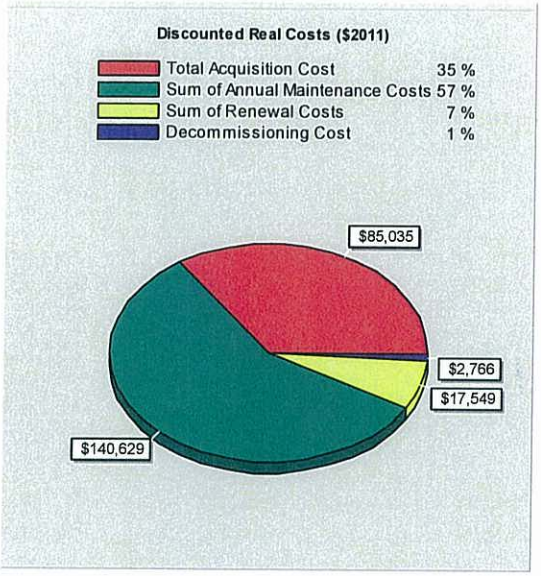
MUSIC Model Schematic


Receiving Node
Flow Summary Node
Bio-Retention 1
Roof_St-3A & 3B
Roof_St-3A & 3B
Rainwater Tank - Stages 3A & 3B
Urban_St-3A & 3B
Road_St-3A & 3B
Open Space_St-3
Rainwater Tank - Stage 3C
Roof_St-3C
Roof_St-3C
Urban_St-3C
Road_St-3C
Rainwater Tank - Stage 2A & 2B
Roof_St-2A & 2B
Roof_St-2A & 2B
Urban_St-2A & 2B
Road_St-2A & 2B

Appendix C

Relative Cost Distribution of all Cost Elements





Bioretention Basin 1

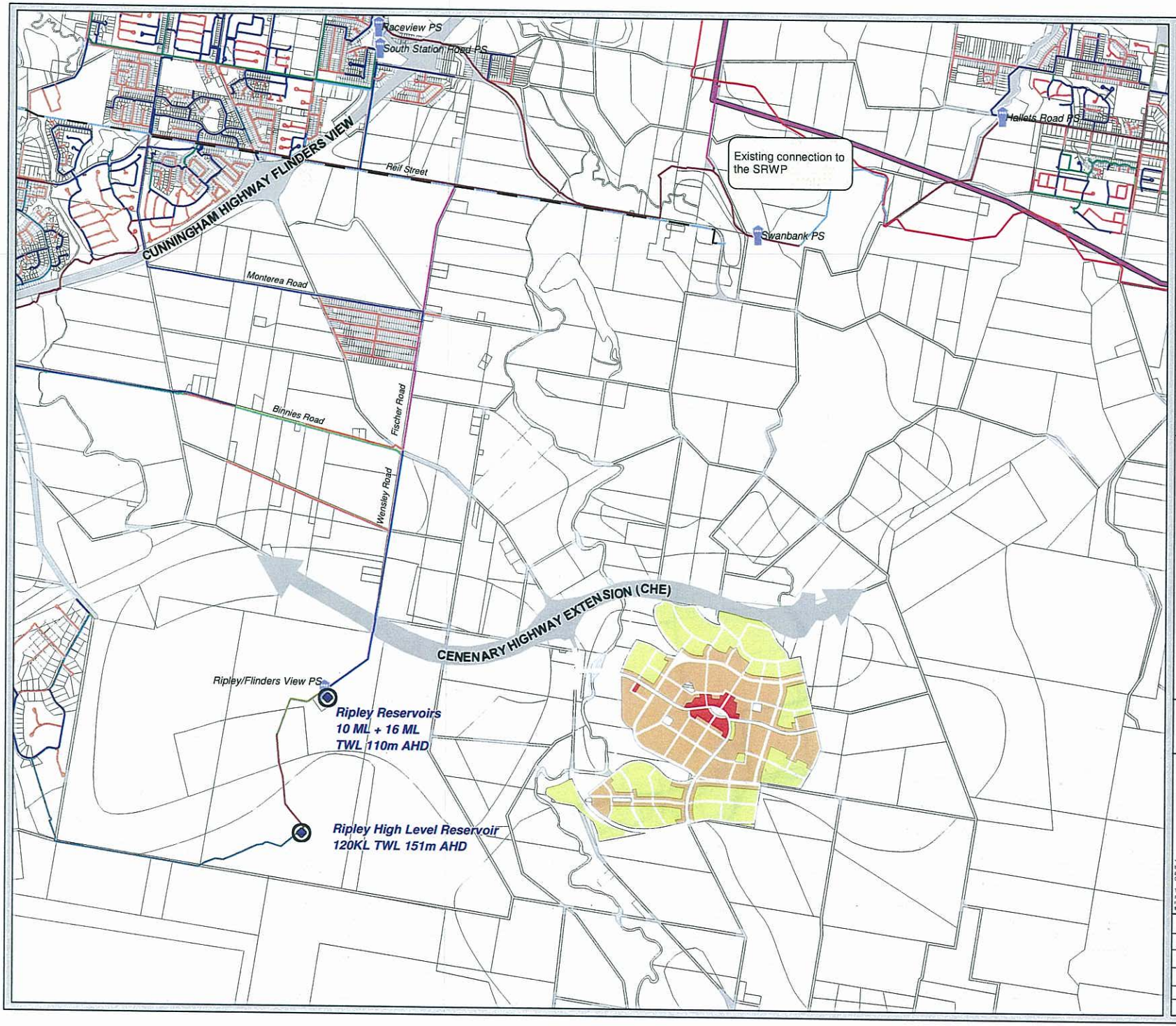


Figure 1

Ripley Valley

SUCE

Existing Water Supply Infrastructure

LEGEND

N W E S

Existing Water Infrastructure

- Reservoir
- Pump Station
- SRWP

SUCE Types by Zone

- T3 Suburban (+Subareas)
- T4 General Urban
- T5 Urban Centre

Water Mains (dia)

- Greater than 600mm
- 600mm
- 525mm
- 450mm
- 375mm
- 300mm
- 250mm
- 225mm
- 200mm
- 150mm
- 100mm and less

- 600mm (Private)

300 0 300 600 900

Metres

Scale: 1:30,000

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SHEET	A3
Project No:	7900-65
Date:	Dec 2009
Revision Number:	2
Designed by:	Josh Lake
Client Name:	Amex Corporation

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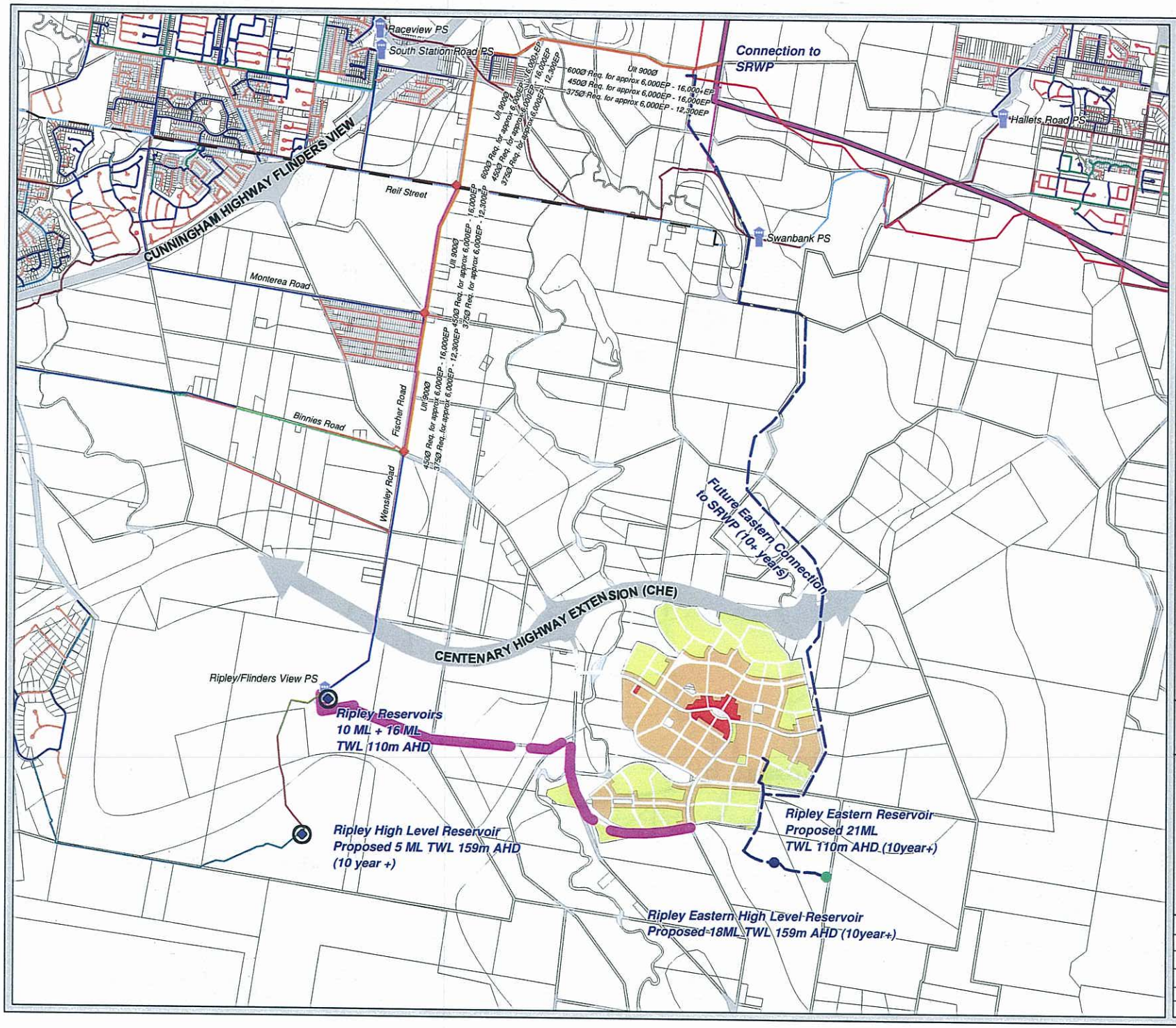

Figure 2

Ripley Valley

SUCE Proposed External Water Supply Infrastructure (0-10 Years)

LEGEND

Existing Water Infrastructure

- Reservoir
- PRV
- Pump Station
- SRWP

SUCE Types by Zone

- T3 Suburban (+Subareas)
- T4 General Urban
- T5 Urban Centre
- Proposed External Water Main (0-10years)

Water Mains (dia)

- Greater than 600mm
- 600mm
- 525mm
- 450mm
- 375mm
- 300mm
- 250mm
- 225mm
- 200mm
- 150mm
- 100mm and less
- 600mm (Private)

Future Ripley Reservoirs

- High Level
- Low Level
- 250mm High Level Supply Main or Eastern High Level Reservoir
- Future Eastern Connection (10years+

300 0 300 600 900

Metres

Scale: 1:30,000

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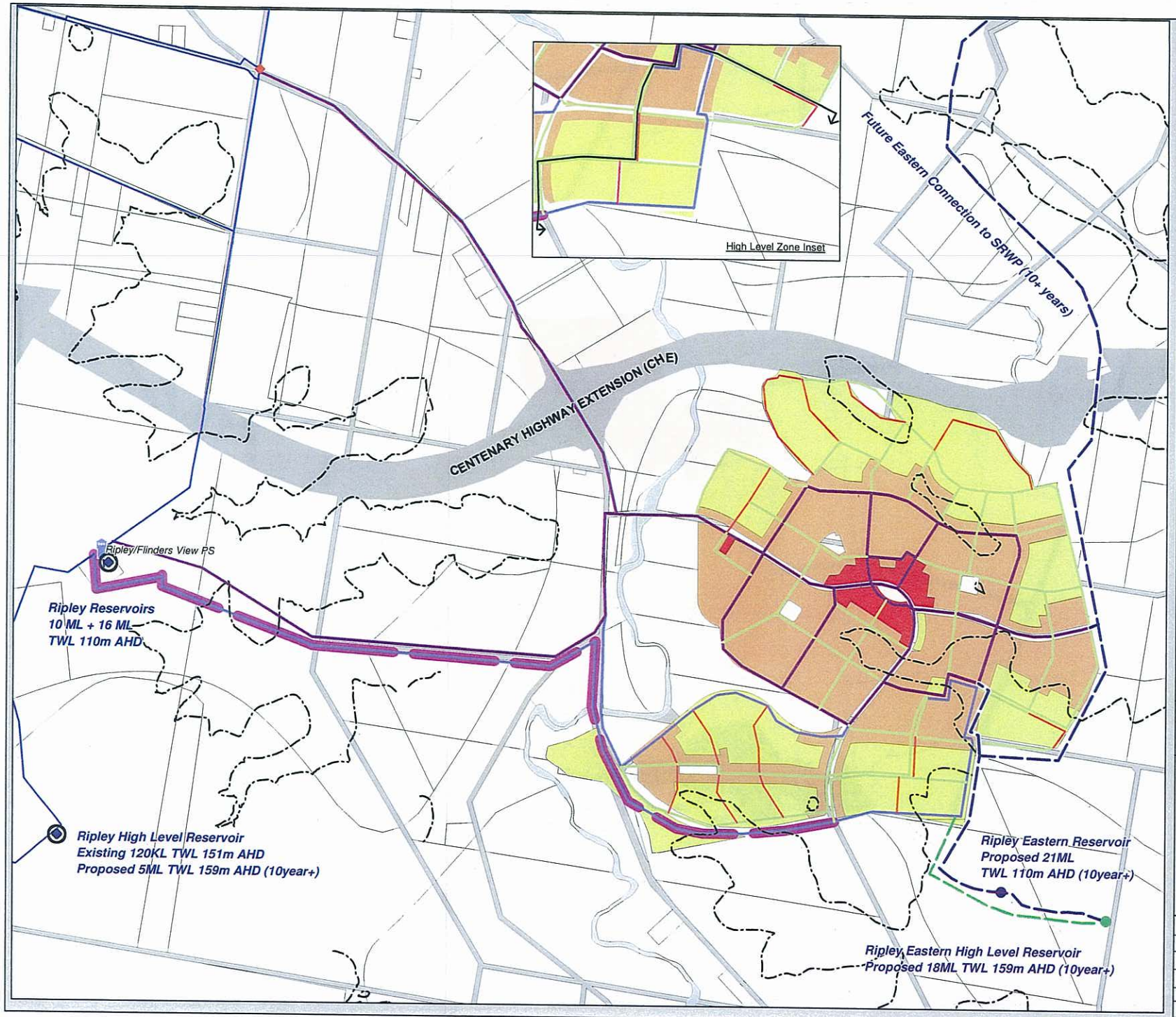

Figure 3

Ripley Valley

SUCE

Proposed Internal Water Supply Infrastructure

LEGEND

N W E S

Existing Water Infrastructure

- Reservoir
- PRV
- Pump Station
- SRWP

SUCE Types by Zone

- T3 Suburban (+Subareas)
- T4 General Urban
- T5 Urban Centre

- Water Main

Proposed Water Mains

- 150mm
- 200mm
- 250mm
- 300mm

- 250mm High Level Supply Main or Eastern High Level Reservoir

Future Ripley Reservoirs

- High Level
- Low Level

- Low Level Supply Main
- High Level Supply Main
- 75m Contour

150 0 150 300 450

Metres

Scale: 1:15,000

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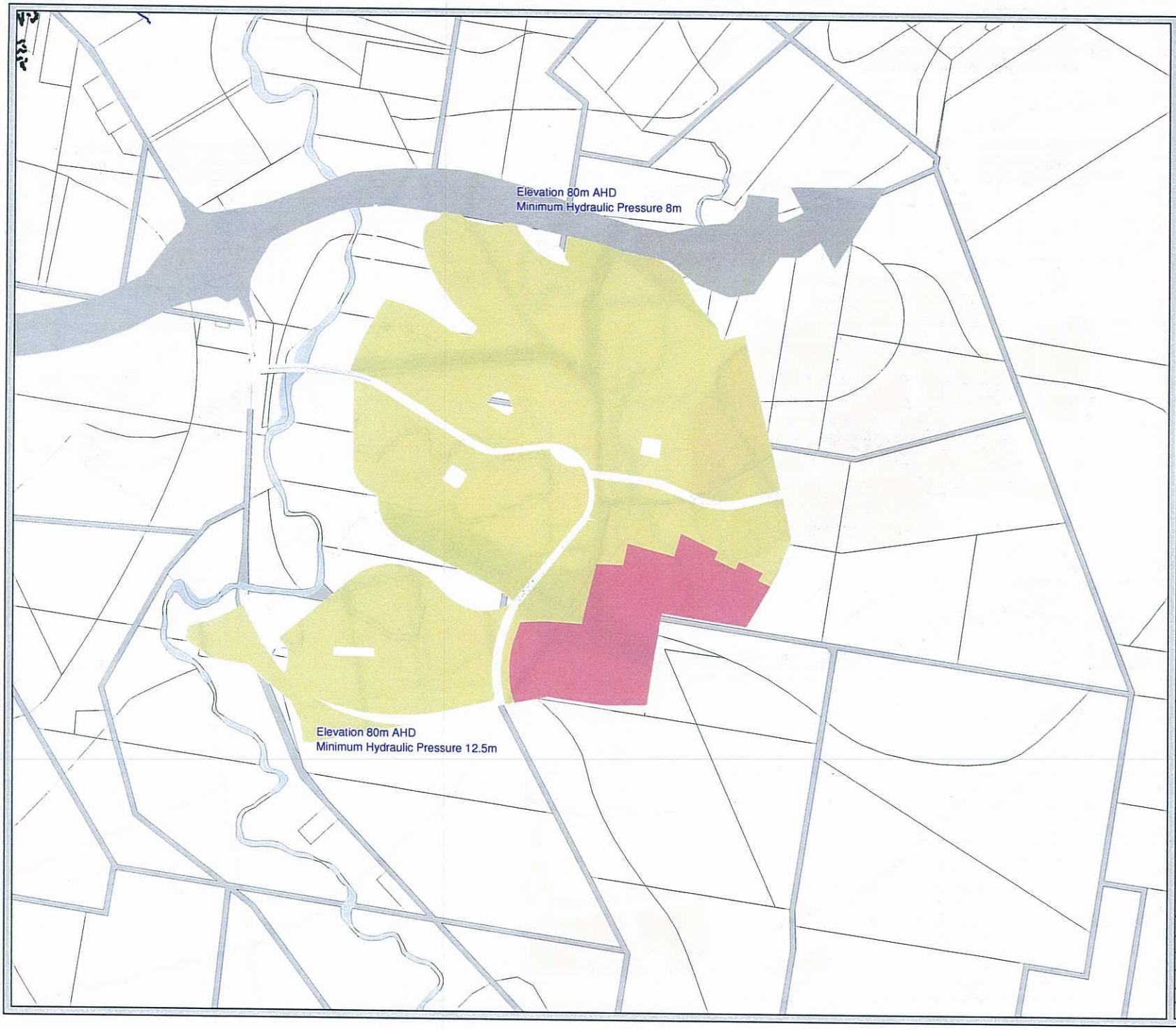

Figure 4

Ripley Valley

SUCE

Proposed Water Supply Zones

LEGEND

N W E S

Water Mains by Water Supply Zone (WSZ)

- Low Level WSZ Mains
- High Level WSZ Mains
- 250mm High Level Supply Main or Eastern High Level Reservoir
- 75m Contour
- SUCE High Level Zone
- SUCE Low Level Zone
- Area above 75m AHD
- DSS Failures in Low Level due to existing elevation. Resolution will depend on Finished Surface Levels and may require local booster.

150 0 150 300 450

Metres

Scale: 1:15,000

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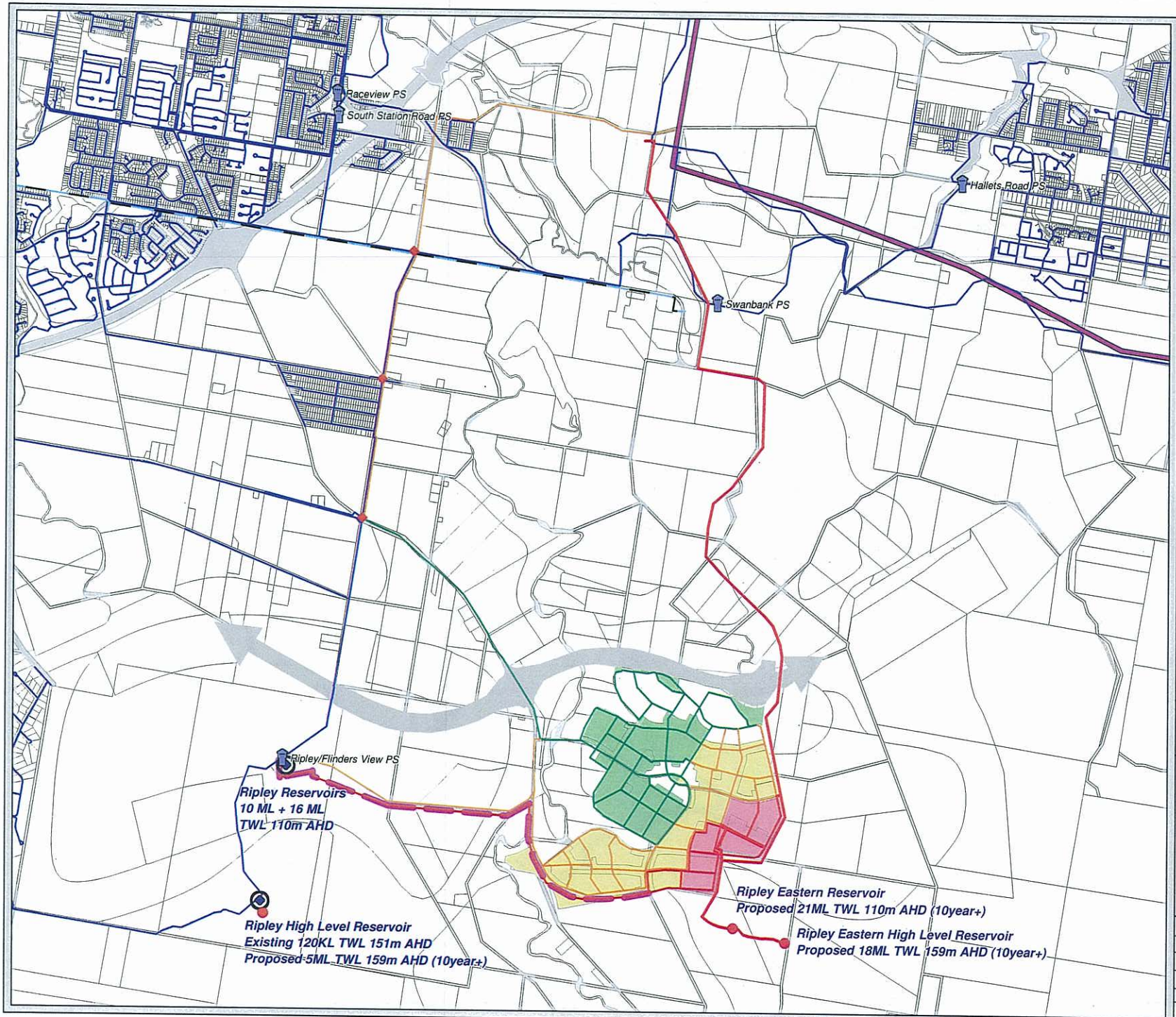

Figure 5

Ripley Valley

SUCE

Proposed Water Supply Infrastructure Staging

LEGEND

N W E S

Existing Water Infrastructure

- Reservoir
- PRV
- Pump Station
- SRWP
- Water Main
- Water Main Private
- 0 - 5 Years Development
- 5 - 10 Years Development
- 10+ Years Development

Water Mains by Year

- 0 - 5 years
- 5 - 10 years
- 10+ Years
- 250mm High Level Supply Main or Eastern High Level Reservoir

300 0 300 600 900

Metres

Scale: 1:30,000

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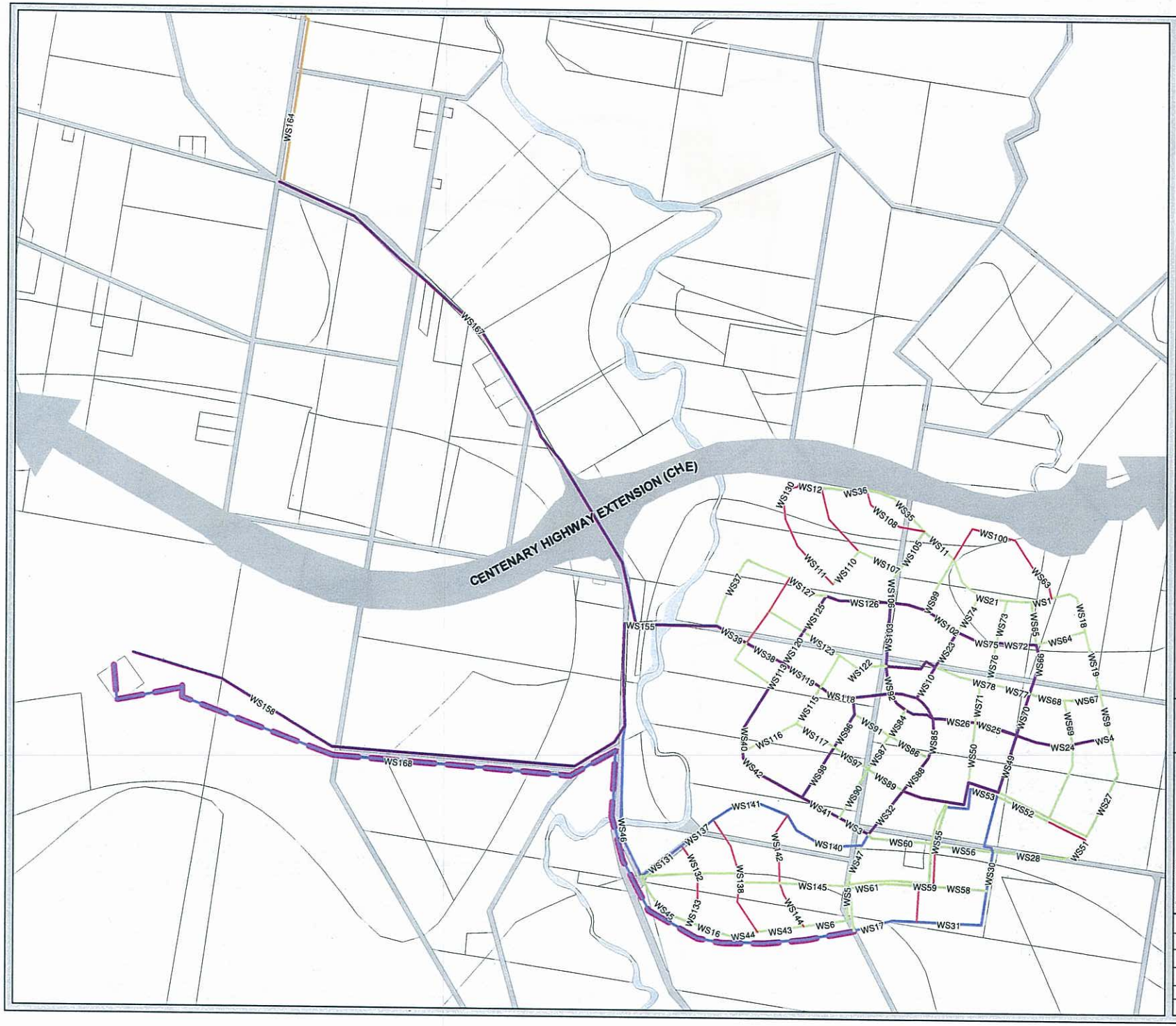

Figure 6

Ripley Valley

SUCE

Proposed Internal Water Supply Infrastructure ID

LEGEND

N W E S

150 0 150 300 450

Metres

Scale: 1:15,000

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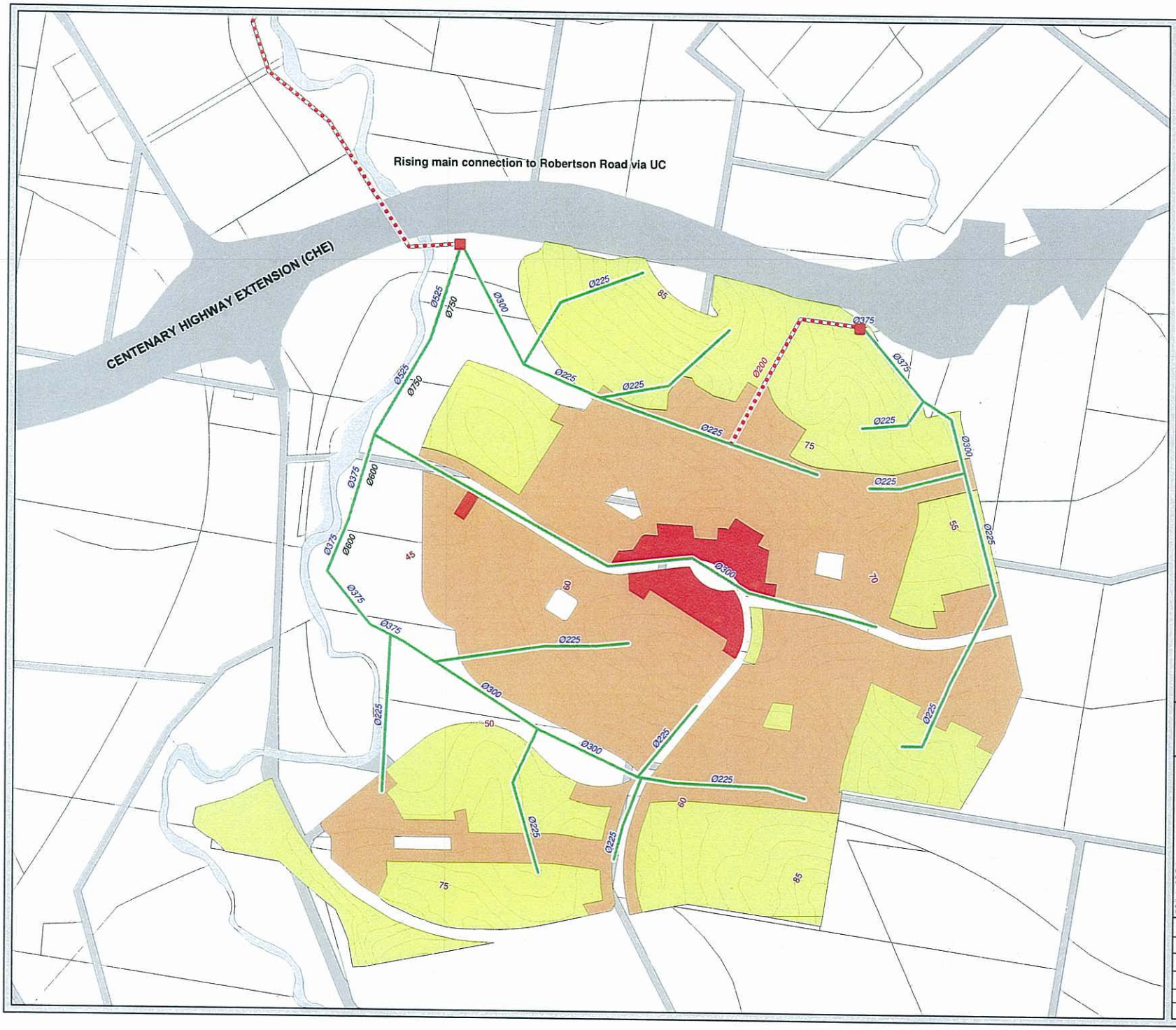

Figure 7

Ripley Valley

SUCE

Proposed Sewerage Infrastructure

LEGEND

N W E S

SUCE Types by Zone

- T3 Suburban (+Subareas)
- T4 General Urban
- T5 Urban Centre
- SUCE Local Pump Station
- Ø225 Ultimate - where indicated
- Ø225 Gravity Mains
- Ø225 0 - 10 Years
- Rising Mains

Note:

Indicative pump station location.

Final sewerage strategy to be detemrined in conjunction with Ipwich City Council and Ipswich Water.

100 0 100 200 300
Metres
Scale: 1:10,000

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Appendix D

SUCE Water Supply and Sewerage Supplementary Report

Report No: 790065-025-SUCE-004

May 2010

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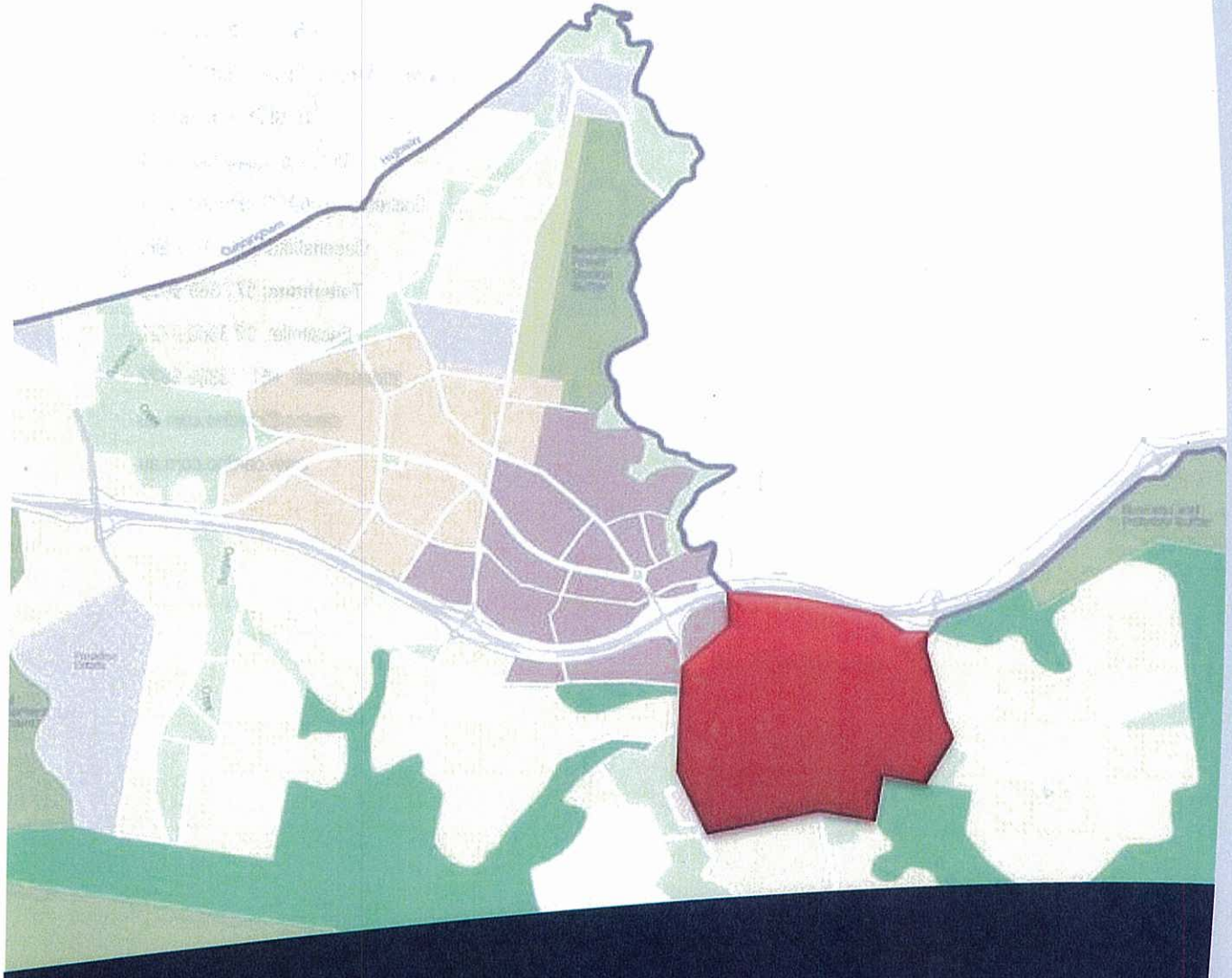

Ripley Valley: Secondary Urban Centre East (SUCE) Neighbourhood Master Plan

Water Supply and Sewerage Supplementary Report

Report No: 790065-025-SUCE-009

Prepared for Amex Corporation Pty Ltd (AMEX)

May 2010

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Document Control

Version	Date	Author		Reviewer	
		Name	Initials	Name	Initials
1	May 2010	Joshua lake	JL	Christopher Smith	CS

TABLE OF CONTENTS

APPENDIX A

1. INTRODUCTION

This *Supplementary Water Supply and Sewerage Report* is in response to questions raised and clarification sort by Ipswich Water (IW) in relation to the Secondary Urban Centre East (SUCE) Neighbourhood Plan submission (December 2009). This report provides supplement information to the initial Water and Sewerage Infrastructure Report document (Report No: 790065-025-SUCE-004) and responds to the following:

1. Review the configuration options for the proposed sewer rising mains from the SUCE to the Urban Core (UC) and from the UC to Robertson Road, and evaluate implications for servicing beyond the first ten years of growth.

   Response is outlined in section 2 of this report.

2. Review the impact of providing dedicated bulk supply mains from the SRWP to the existing reservoirs.
   - The current proposed arrangement includes pressure reducing valves from the existing and proposed mains between the SRWP and the reservoirs to allow supply directly into the distribution network.
   - The proposed corridor and timing for the 600mm diameter water main through Swanbank has not been confirmed.

   Therefore, the alternative configurations are to be considered, including upsizing current proposed mains, alternative routes and easement implicatons.

   Response is outlined in section 3 of this report.

2. SUCE SEWERAGE RISING MAIN ANALYSIS

2.1 Forecast Growth and Loads

The forecast growth and loads for the SUCE from the NMP and the ultimate upstream catchment based on constant growth between years 10 - 20 are summarised in Table 1 and detailed in Table A1 in Appendix A. The nominal start year for development has been taken as 2011.

Table 1 – NMP forecast Growth and Loads*

Description	2011	2013	2015	2017	2019	2021	2023	2026	2031
SUCE (annual EP growth)	0	1,466	1,832	1,834	1,954	2,200	2,931	0	*0*
Balance of Catchment (annual EP growth)	0	0	0	0	0	0	*5,380*	*8,070*	*13,449*
Cumulative EP	***0***	***1,466***	***3,298***	***5,132***	***7,086***	***9,286***	***17,597***	***25,667***	***39,116***
ADWF (l/s)	*0.0*	*3.9*	*8.8*	*13.7*	*18.9*	*24.7*	*46.8*	*68.3*	*104.1*
PWWF (l/s)	*0.0*	*19.5*	*43.9*	*68.3*	*94.3*	*123.6*	*234.2*	*341.6*	*520.6*

**See 'Appendix A' Table A1 for further details*

2.2 Capacity and Cost of Various Rising Main Combinations

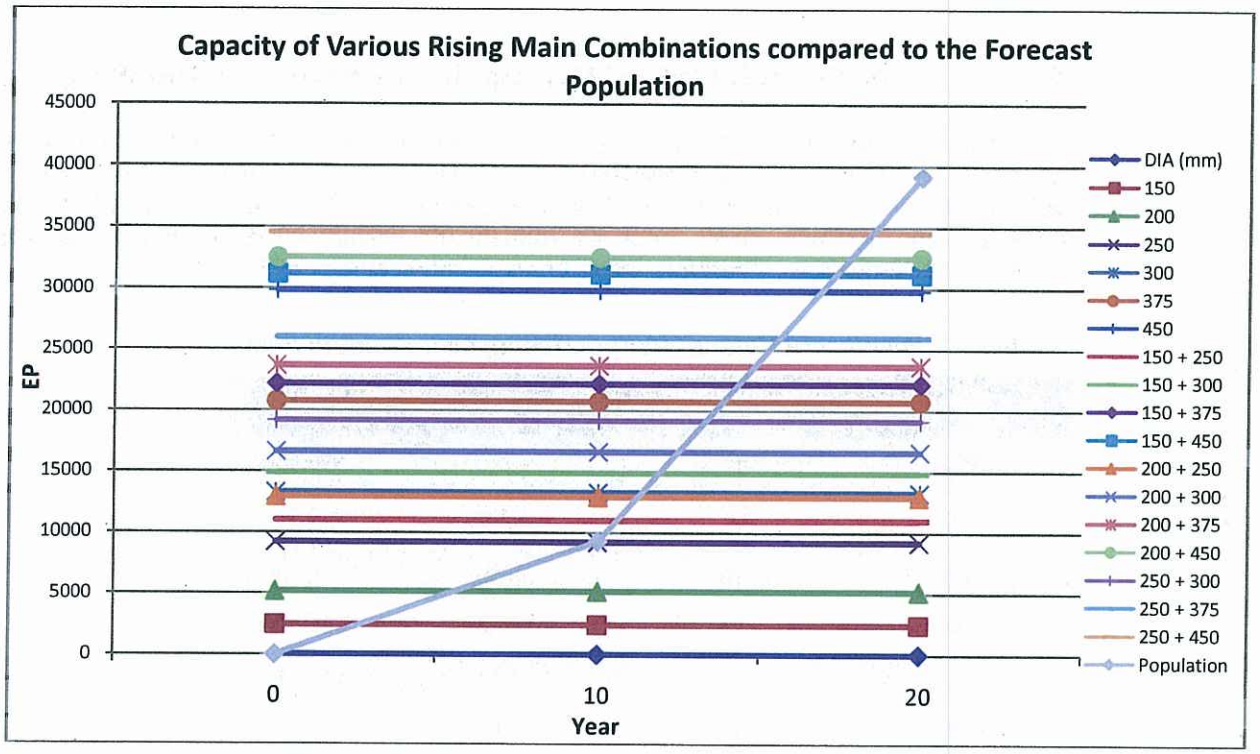
The maximum capacity and cost of various rising main combinations based on limiting the maximum pumping head to approximately 55m (i.e. limit of a typical pump) and a maximum velocity of 2.5 m/s is summarised in Table 2 and detailed in Table A2 in Appendix A. The costs assume minimum cover, good soil and do not include an allowance for adverse geotechnical conditions. Therefore, have an expected accuracy of 50%.

Table 2 – Capacity and Cost of Various Rising Main Combinations#

Diameter (mm)	Maximum Flow Capacity (l/s)	Equivalent EP	Cost ($)
150	33	2,453	636,300
200	69	5,180	932,400
250	123	9,203	1,045,800
300	177	13,261	1,295,700
375	276	20,736	1,724,100
450	397	29,827	2,221,800
150 + 200	101	7,560	1,568,700
150 + 300	198	14,876	1,932,000
150 + 375	295	22,163	2,360,400
150 + 450	415	12,922	2,858,100
200 + 250	172	12,922	1,978,200
200 + 300	221	16,604	2,228,100
200 + 375	315	23,666	2,656,500
200 + 450	433	32,531	3,154,200
250 + 300	255	19,158	2,341,500
250 + 375	346	25,995	2,769,900
250 + 450	460	34,560	3,267,600

#See 'Appendix A' Table A2 for further details

The maximum capacity of the various rising main combinations and the forecast population growth for the SUCE in the NMP for the first ten years and beyond to ultimate for the catchment is shown on Graph 1.



Graph 1 – Capacity of various Rising Mains compared to the Population Forecast

Graph 1 indicates a minimum hydraulic equivalent diameter of 250mm is required to service the SUCE for the first ten years and that a hydraulic equivalent diameter of 375mm could service approximately half the ultimate catchment. A minimum hydraulic equivalent diameter of 300mm is required to service just the ultimate SUCE.

2.3 Retention Times of Various Combinations

Whilst the rising main between the SUCE and UC is relatively short (i.e. approximately 2,100m) the retention time in the initial years for mains above 200mm diameter is high. To reduce the retention time during the initial years of development the rising main is proposed to be staged. Given the potential high growth forecast the first stage rising main is proposed as a 150mm main (i.e. in lieu of a minimum of 100mm) to provide capacity for approximately the first 2,450 EP. The retention time for various pipe combinations are summarised in Table 3 and detailed in Table A3 in Appendix A. The retention times do not include the retention time from the UC to Robertson Road where it connects to the existing external Bundamba Creek trunk sewer network.

Table 3 – Retention Times of Various Combinations involving an initial 150mm main

Option		First 100 lots	2013	2015	2017	2019	2021	2023	2026
1	Diameter (mm)	150	150	250	250	250	150+250	150+250	
	Retention Time (hrs)	14.3	2.6	3.3	2.1	1.5	1.6		
	Capacity (EP)	2,453	2,453	9,203	9,203	9,203	11,007	11,007	
2	Diameter (mm)	150	150	300	300	300	300	150+300	
	Retention Time (hrs)	14.3	2.6	4.7	3.0	2.2	1.7		
	Capacity (EP)	2,453	2,453	13,261	13,261	13,261	13,261	14,876	
3	Diameter (mm)	150	150	375	375	375	375	375	150+375
	Retention Time (hrs)	14.3	2.6	7.3	4.7	3.4	2.6	1.4	
	Capacity (EP)	2,453	2,453	20,736	20,736	20,736	20,736	20,736	22,163
4	Diameter (mm)	150	150	450	450	450	450	450	450
	Retention Time (hrs)	14.3	2.6	10.6	6.8	4.9	3.8	2.0	1.4
	Capacity (EP)	2,453	2,453	29,827	29,827	29,827	29,827	29,827	29,827

Notes:
Red font indicates where capacity is exceeded.

Table 3 indicates if the 300mm diameter main part of the proposed 150mm and 300mm combination to service the SUCE under the NMP was increased to a 375mm diameter at an additional cost of $430,000 (from Table 2) then this would provide capacity for approximately half the ultimate catchment and delay the trunk gravity sewer by approximately 5 years assuming a constant growth profile for the balance of development after the NMP. However, the retention time transferring from the 150mm to the 375mm when the 150mm reaches capacity is 7.3 hours and this does not include the retention time in the proposed rising main between the UC and Robertson Road.

Increasing the 300mm diameter main to a 450mm diameter at an additional cost of $926,000 (from Table 2) would provide capacity for approximately three quarters of the ultimate catchment and delay the trunk gravity sewer by approximately 7 years assuming a constant growth profile for the balance of development after the NMP. However, the retention time transferring from the 150mm to the 450mm when the 150mm reaches capacity is 10.6 hours and this does not include the retention time in the proposed rising main between the UC and Robertson Road.

The retention time in the 150mm diameter main for the first 100 lots is approximately 14.3 hours and will need careful management. Initially, additional measures may be required depending on actual growth.

3. BULK WATER SUPPLY OPTIONS

The current supply philosophy as outlined in the structure plan is for bulk water to be supplied from the Southern Regional Water Pipeline (SRWP) to the proposed Ripley Valley reservoirs via trunk mains which also have a direct connection to the distribution network through Pressure Reducing Valves (PRVs).

As part of the RFI process and in response to a request from Ipswich Water the impact of the following alternative supply philosophies have also been briefly considered:

1. No eastern connection via the Swanbank Enterprise Park; and
2. No eastern connection via the Swanbank Enterprise Park and the proposed trunk main from the SRWP established as dedicated supply main to the Ripley Valley Reservoirs (i.e. no PRVs with a direct connection to the distribution network).

The above scenarios have been hydraulically modelled and compared to the current supply scenario proposed by the structure plan i.e. Business as Usual (BAU) scenario. The impact on the proposed pipe sizes is shown on the attached figures (see Appendix A).

The analysis indicates the following:

- With no eastern connection main – There is generally a difference in the order of one to two pipe sizes at ultimate for the SRWP to the western low level reservoir trunk main. There is also a requirement for a nominal 675mm diameter main from the direction of the western low level reservoirs to the eastern low level reservoirs in lieu of the 600mm eastern connection main via the Swanbank Enterprise Park;
- With no eastern connection main and no PRVs – There is generally a difference in the order of one to two pipe sizes at ultimate to the trunk main from the SRWP. The trunk main required to provide a dedicated outlet from the western low level reservoirs also needs to increase in size; and
- The required infrastructure for the option for no PRVs but retaining the eastern connection would be no worse than the option with no eastern connection and no PRVs.

The cost of the ultimate pipes for each of the above three options is given in Table 4.

Table 4 – Cost Breakdown

Asset	BAU	No Eastern Conn	No Eastern Connection & No PRV
PRVs	$3,000,000	$2,000,000	$0
Water mains	$36,830,190	$40,445,380	$39,909,920
Total	$39,830,190	$42,445,380	$39,909,920

This indicates a capital cost difference of less than 10% between the options. The option with the lowest capital cost is the BAU scenario. However, the cost analysis does not consider staging or the impact physical site constraints could have on staging (e.g. specific road reserve widths).

The above preliminary investigation is for information purposes only. However, it does indicate that alternate supply arrangements could be addressed through the Infrastructure Agreement and provides an indication of the impact on pipe sizes and capital costs.

Ipswich Water in recent discussions (i.e. phone conversation with Daniel O'Brien on the 12th May 2010) have indicated a preference for dedicated supply mains to the Ripley Valley reservoirs from the SRWP (i.e. no direct connections to the distribution network from this main through PRVs). However, this has not currently been adopted by Ipswich Water and no amendments are currently proposed by Ipswich Water without further investigation and consideration of actual growth rates and associated staging.

4. CONCLUSIONS

4.1 Sewer Rising Main

The following conclusions and recommendations can be drawn from the assessment:

- A minimum 250mm diameter rising main is required to service the first ten years of SUCE development as per the NMP. A minimum 300mm diameter rising main is required to service just the ultimate SUCE development (i.e. excluding the balance of the upstream catchment);
- To reduce initial retention times (i.e. risk of septicity) and provide greater flexibility for various potential growth profiles the proposed rising main between the SUCE and the UC should be staged;
- The proposed first stage should be a 150mm diameter main. This provides capacity for approximately 2,450 EP (i.e. approximately 900 lots at 2.7 EP/ET). Even with a 150mm diameter main there is potential for high retention times for the initial development depending on growth (e.g. 14.3 hours for the first 100 lots). However, given the proposed growth rates that would see the capacity of a 150mm diameter main exceeded within 3 years there is no significant advantage in reducing the first stage main to a 100mm diameter main. The proposed 150mm main rising main will require careful management and, depending on actual growth, additional measures may be required initially to avoid septicity issues in the main;
- In the interim, only a 150mm and 300mm main combination is required to service the SUCE including the area defined in the NMP. Increasing the 300mm to a 375mm or 450mm will cost an additional $430,000 and $930,000 respectively and increase the capacity from 14,880 EP (i.e. 38% of the ultimate catchment of 39,116) to 22,160 EP (i.e. 57% of the ultimate catchment of 39,116) and 31,180EP (i.e. 80% of the ultimate catchment of 39,116) respectively. However, there is an increase in the retention time in the rising main in the hand over from the 150mm main. There will also be an increase in the operating costs for running the pump stations for longer. Offsetting this is the deferment of the gravity trunk sewer capital cost of between 5 to 7 years for a 375mm and 450mm respectively;
- Costs above exclude the capital costs of changing pumps.

4.2 Bulk Water Supply

Investigations into the options for bulk water supply indicates a capital cost difference of less than 10% between the options. The option with the lowest capital cost is the 'Business As Usual' (BUA) scenario. However, the cost analysis does not consider staging or the impact that physical site constraints could have on staging (e.g. specific road reserve widths).

APPENDIX A:

Table A1
NMP forecast Growth and Loads

Table A2
Capacity and Cost of Various Rising Main Combinations

Table A3
Rising Main Options/Combinations

Figure 1(s)
Business As Usual (i.e. as proposed)

Figure 2(s)
Excluding eastern connection

Figure 3(s)
Excluding eastern connection and PRVs

TABLE A1 - PROJECTED GROWTH ASSUMPTION

(Ult)

	2011	2013	2015	2017	2019	2021	2023	2026	2031	Total	ADWF (L/s)	PWWF (L/s)
SUCE (EP Growth)	0	1,466	1,832	1,834	1,954	2,200	2,931	0	0	12,217	32.5	162.6
Balance of Catchment (EP Growth)	0	0	0	0	0	0	5,380	8,070	13,450	26,899	71.6	358.0
Cumulative EP	***0***	***1,466***	***3,298***	***5,132***	***7,086***	***9,286***	***17,597***	***25,667***	***39,116***			
ADWF (L/s)	*0.0*	*3.9*	*8.8*	*13.7*	*18.9*	*24.7*	*46.8*	*68.3*	*104.1*			
PWWF (L/s)	*0.0*	*19.5*	*43.9*	*68.3*	*94.3*	*123.6*	*234.2*	*341.6*	*520.6*			

Note:

ADWF based on 230 L/EP/D

PWWF = 5 x ADWF

TABLE A2 - CAPACITY AND COST OF VARIOUS RISING MAIN COMBINATIONS

CONDITION	D1 (diam, mm)	D2 (diam, mm)	D Equiv. (diam, mm)	Pumped Flow (flow, L/s)	L (length, m)	Static head (m)	V (velocity, m/s)	Total system (m)	L/EP/D	Equivalent EP	Cost Unit Rate ($/m)	Total Cost ($)
Min Pumped Flow	150	0	150	13.2	2100	-10.0	0.75	2.1	230.0	992	303	636,300
Max Pumped Flow	150	0	150	32.7	2100	-10.0	1.85	55.0	230.0	2,453	303	636,300
Min. Pumped Flow	200	0	200	25.3	2100	-10.0	0.81	0.1	230.0	1,901	393	825,300
Max Pumped Flow	200	0	200	69.0	2100	-10.0	2.19	55.0	230.0	5,180	444	932,400
Min. Pumped Flow	250	0	250	45.1	2100	-10.0	0.92	0.1	230.0	3,388	498	1,045,800
Max Pumped Flow	250	0	250	122.5	2100	-10.0	2.50	54.7	230.0	9,203	498	1,045,800
Min. Pumped Flow	300	0	300	72.2	2100	-10.0	1.02	0.1	230.0	5,424	617	1,295,700
Max Pumped Flow	300	0	300	176.5	2100	-10.0	2.50	43.3	230.0	13,261	617	1,295,700
Min. Pumped Flow	375	0	375	128.0	2100	-10.0	1.16	0.1	230.0	9,617	821	1,724,100
Max Pumped Flow	375	0	375	276.0	2100	-10.0	2.50	32.2	230.0	20,736	821	1,724,100
Max. Pumped Flow	450	0	450	397.0	2100	-10.0	2.50	25.0	230.0	29,827	1,058	2,221,800

COMBINED MAINS

CONDITION	D1 (diam, mm)	D2 (diam, mm)	D Equiv. (diam, mm)	Pumped Flow (flow, L/s)	L (length, m)	Static head (m)	V (velocity, m/s)	Total system (m)	L/EP/D	Equivalent EP	Cost Unit Rate ($/m)	Total Cost ($)
Max Pumped Flow	150	250	273	146.5	2100	-10.0	2.50	49.2	230.0	11,007	0	1,568,700
Max Pumped Flow	150	300	318	198.0	2100	-10.0	2.50	40.3	230.0	14,876	0	1,932,000
Max Pumped Flow	150	375	387	295.0	2100	-10.0	2.50	30.9	230.0	22,163	0	2,360,400
Max Pumped Flow	150	450	459	415.0	2100	-10.0	2.50	24.5	230.0	31,179	0	2,858,100
Max Pumped Flow	200	250	296	172.0	2100	-10.0	2.50	44.4	230.0	12,922	0	1,978,200
Max Pumped Flow	200	300	336	221.0	2100	-10.0	2.50	37.3	230.0	16,604	0	2,228,100
Max Pumped Flow	200	375	401	315.0	2100	-10.0	2.50	29.4	230.0	23,666	0	2,656,500
Max Pumped Flow	200	450	470	433.0	2100	-10.0	2.50	23.6	230.0	32,531	0	3,154,200
Max Pumped Flow	250	300	360	255.0	2100	-10.0	2.50	34.1	230.0	19,158	0	2,341,500
Max Pumped Flow	250	375	420	346.0	2100	-10.0	2.50	27.7	230.0	25,995	0	2,769,900
Max Pumped Flow	250	450	484	460.0	2100	-10.0	2.50	22.5	230.0	34,560	0	3,267,600

Notes:

Max pumped flow either 55m head (i.e general limit of pumps) or velocity of 2.5m/s

Min pumped flow either velocity of 0.75m/s or to achieve head of 0.1m

EP PROJECTIONS

First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116

First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116
270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116

RETENTION TIME (hrs)

DIA (mm)	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031
150	14.3	2.6							
150	14.3	2.6							
200	25.5	4.7	2.1						
200	25.5	4.7	2.1						
250	39.8	7.3	3.3	2.1	1.5	1.2			
250	39.8	7.3	3.3	2.1	1.5	1.2			
300	57.4	10.6	4.7	3.0	2.2	1.7			
300	57.4	10.6	4.7	3.0	2.2	1.7			
375	89.6	16.5	7.3	4.7	3.4	2.6	1.4		
375	89.6	16.5	7.3	4.7	3.4	2.6	1.4		
450	129.1	23.8	10.6	6.8	4.9	3.8	2.0	1.4	

Below retention times are for the total combined pipe diameter. For combinations see Table 3.

DIA (mm)	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031
150 + 250	54.2	10.0	4.4	2.9	2.1	1.6			
150 + 300	71.7	13.2	5.9	3.8	2.7	2.1			
150 + 375	104.0	19.2	8.5	5.5	4.0	3.0	1.6		
150 + 450	143.4	26.4	11.7	7.5	5.5	4.2	2.2	1.5	
200 + 250	65.3	12.0	5.3	3.4	2.5	1.9			
200 + 300	82.9	15.3	6.8	4.4	3.2	2.4			
200 + 375	115.1	21.2	9.4	6.1	4.4	3.3	1.8		
200 + 450	154.6	28.5	12.7	8.1	5.9	4.5	2.4	1.6	
250 + 300	97.2	17.9	8.0	5.1	3.7	2.8	1.5		
250 + 375	129.5	23.8	10.6	6.8	4.9	3.8	2.0	1.4	
250 + 450	168.9	31.1	13.8	8.9	6.4	4.9	2.6	1.8	

TABLE A3 - RISING MAIN OPTIONS/COMBINATIONS

PROJECTED EP's

	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031
PROJECTED EP	270	1,466	3,298	5,132	7,086	9,286	17,597	25,667	39,116

SCENARIO - 150 mm + 250 mm dia

Option 1	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031	Capital Cost
Augmentation (mm dia)	150	150	250	250	250	150+250	150+250	150+250	150+250	1,568,700
Retention Time (Hrs)	14.3	2.6	3.3	2.1	1.5	1.6				
Max Capacity (EP)	2,453	2,453	9,203	9,203	9,203	11,007	11,007	11,007	11,007	

SCENARIO - 150 mm + 300 mm dia

Option 2	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031	Capital Cost
Augmentation (mm dia)	150	150	300	300	300	300	150+300	150+300	150+300	1,932,000
Retention Time (Hrs)	14.3	2.6	4.7	3.0	2.2	1.7				
Max Capacity (EP)	2,453	2,453	13,261	13,261	13,261	13,261	14,876	14,876	14,876	

SCENARIO - 150 mm + 375 mm dia

Option 3	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031	Capital Cost
Augmentation (mm dia)	150	150	375	375	375	375	375	150+375	150+375	2,360,400
Retention Time (Hrs)	14.3	2.6	7.3	4.7	3.4	2.6	1.4			
Max Capacity (EP)	2,453	2,453	20,736	20,736	20,736	20,736	20,736	22,163	22,163	

SCENARIO - 150 mm + 450 mm dia

Option 4	First 100 lots	2013	2015	2017	2019	2021	2023	2026	2031	Capital Cost
Augmentation (mm dia)	150	150	450	450	450	450	450	450	150+450	2,858,100
Retention Time (Hrs)	14.3	2.6	10.6	6.8	4.9	3.8	2.0	1.4		
Max Capacity (EP)	2,453	2,453	29,827	29,827	29,827	29,827	29,827	29,827	31,179	

Note:

Red font indicates capacity exceeded

Max Capacity assumes max pump operating head of 55m

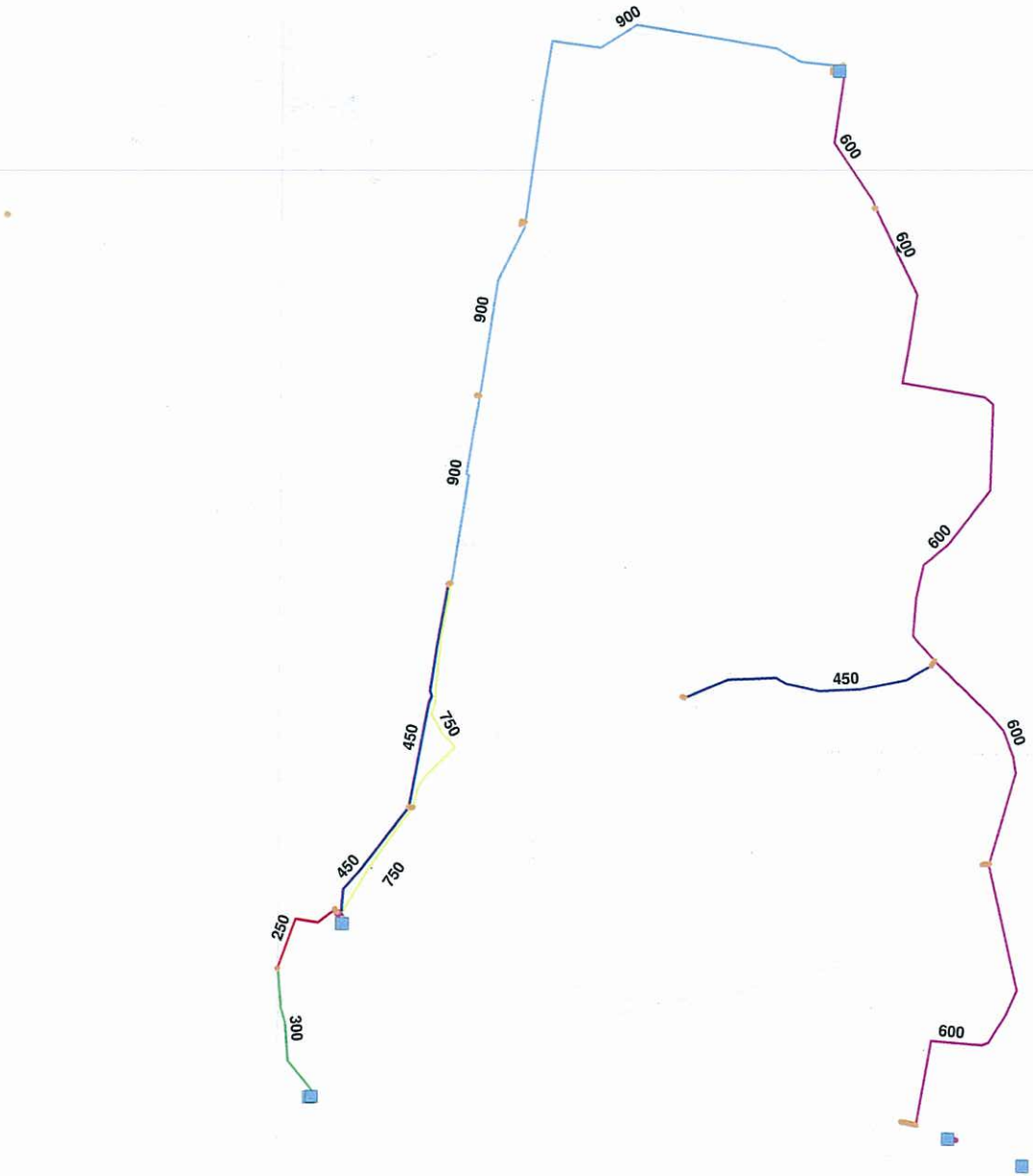


Figure 1

RIPLEY BAU

LEGEND

N
W E
S

Pipe Diameter

- 250 (1)
- 300 (1)
- 450 (10)
- 600 (6)
- 750 (2)
- 900 (3)

- Reservoir
- Valve
- Pump

300 0 300 600 900

Metres

Scale: 1:30,000

Cardno
Shaping the Future

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Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722

SHEET	A3
Project No:	7900-34
Date:	April 2010
Revision Number:	1
Designed by:	AL
Client Name:	Ipswich Water

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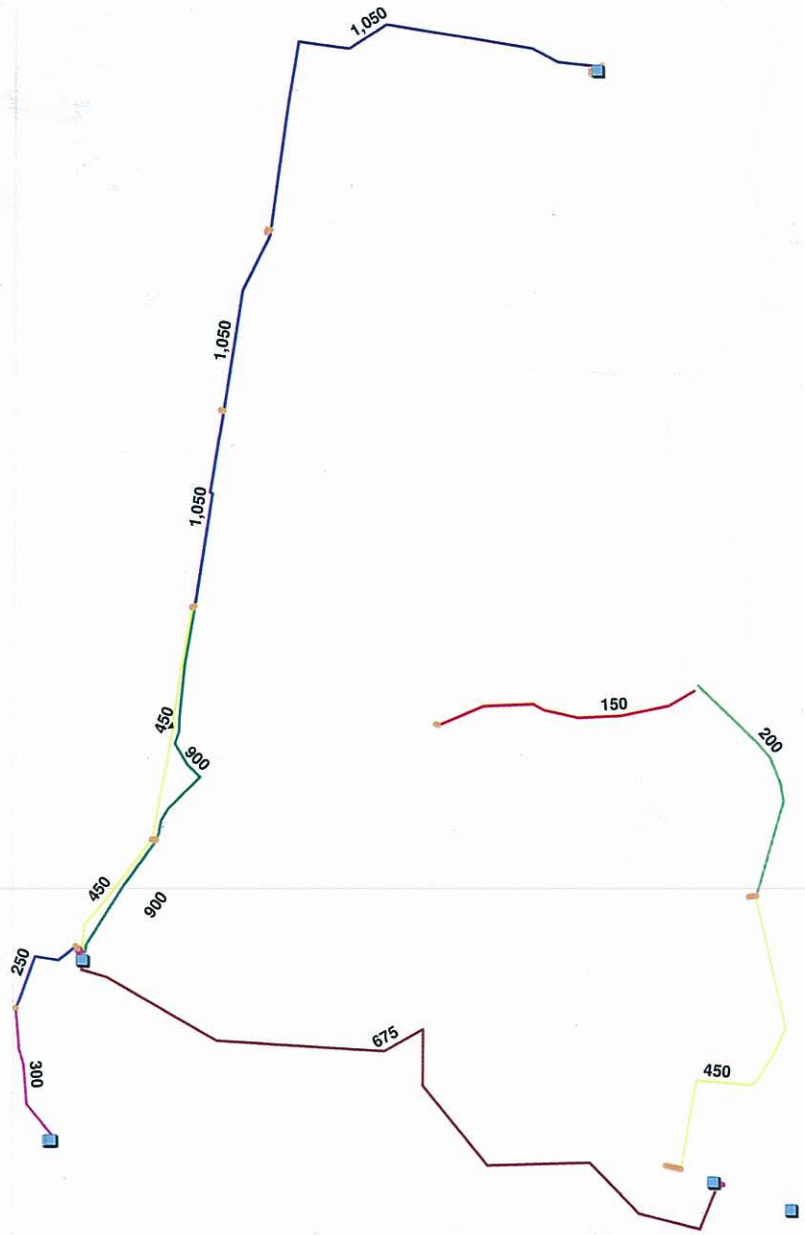

Figure 2

RIPLEY

EXCLUDING EASTERN CONNECTION
PRV's INCLUDED

LEGEND

N
W E
S

Pipe Diameter

- 150 (2)
- 200 (1)
- 250 (1)
- 300 (1)
- 450 (9)
- 675 (1)
- 900 (2)
- 1,050 (3)

- Reservoir
- Valve
- Pump

300 0 300 600 900
Metres
Scale: 1:30,000

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Client Name:	Ipswich Water

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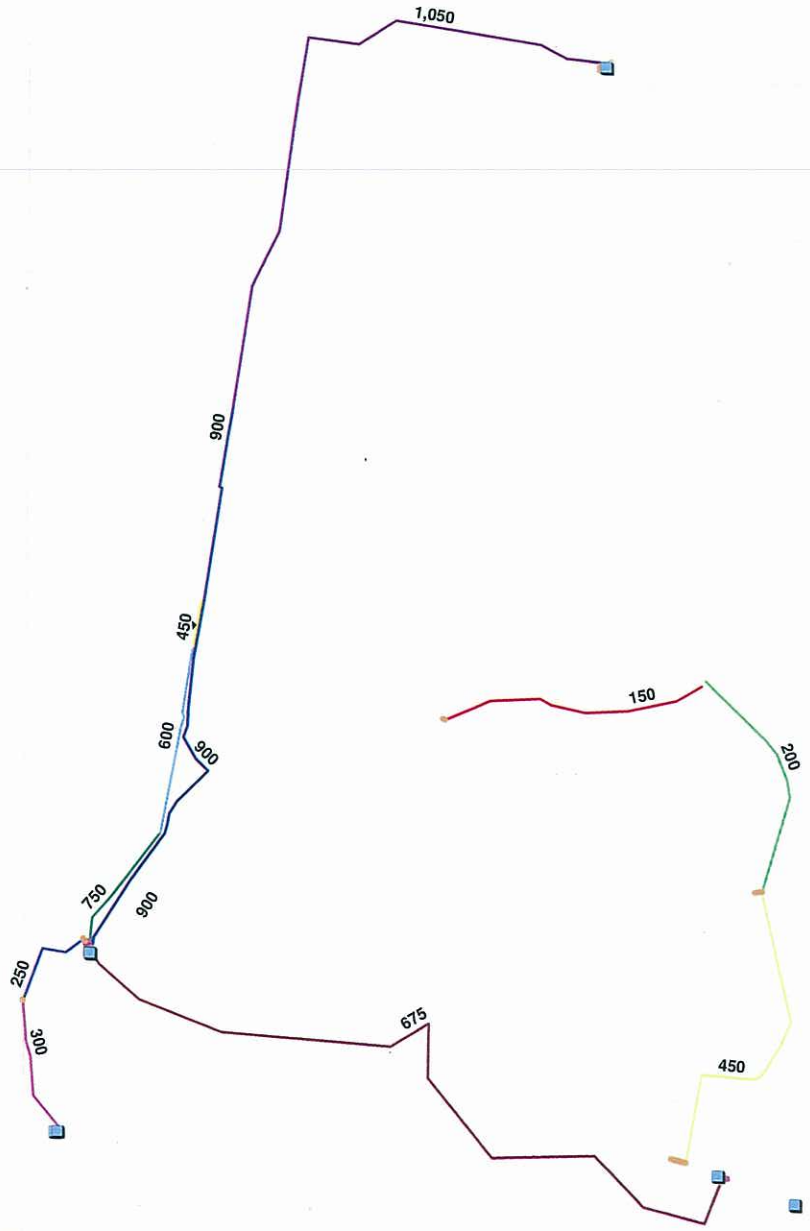

Figure 3

RIPLEY

NO EASTERN CONNECTION
NO PRV's

LEGEND

N
W E
S

Pipe Diameter

- 150 (2)
- 200 (1)
- 250 (1)
- 300 (1)
- 450 (2)
- 600 (4)
- 675 (1)
- 750 (3)
- 900 (3)
- 1,050 (2)

- Reservoir
- Valve
- Pump

300 0 300 600 900
Metres
Scale: 1:30,000

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Appendix E

Sewer Rising Main Route Options

790147/012/SK005

Option 1

Reserve rights required from Investa & SHDS

Clarification of topographic and geotechnical constraints required.

Option 2

Reserve rights agreement needed with SHDS only.

Clarification of topographic and geotechnical constraints required.

DTMR input required for creek crossing in the CHE reserve.

Investa may require later connection (technical issue).

Legend

- Rising Main
- Rising Main Creek Crossing
- Sewage Pumping Station

NOT TO SCALE

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Quality Endorsed Company

SUCE STAGE 1

Rising Main Options

The contents of this plan are conceptual only. All areas and dimensions are approximate and subject to relevant studies, Survey, Engineering and Council approval.

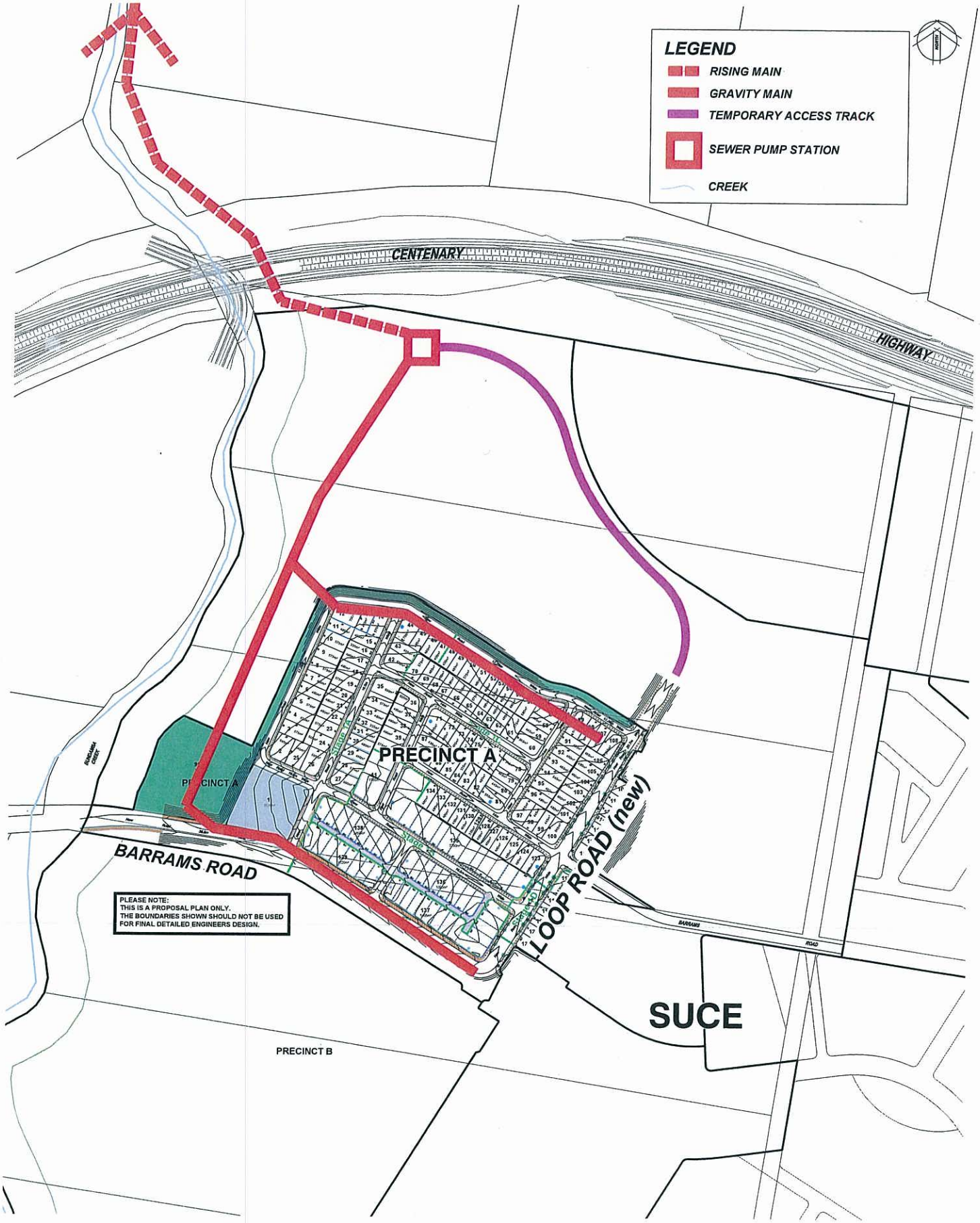
Ref Number: 7901-47/12-SK005
Date: 05/11/2010 REV: C

File: L:\7901-47 AMEX SUCE\012 SUCE - Stage 1 DA\012 Civils\AutoCAD\2010 11 05 Rising Main Route Investigation.dwg

Appendix F

Pump Station Temporary Access

790147/012-SK008.TempAcc



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Ripley Valley - SUCE Precinct A

NOT TO SCALE

Temporary Pump Station Access Track

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Ref Number: 7901-47/012/SK008.TempAcc
Date: 11/10/2010

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Appendix G

Trunk Infrastructure Plans

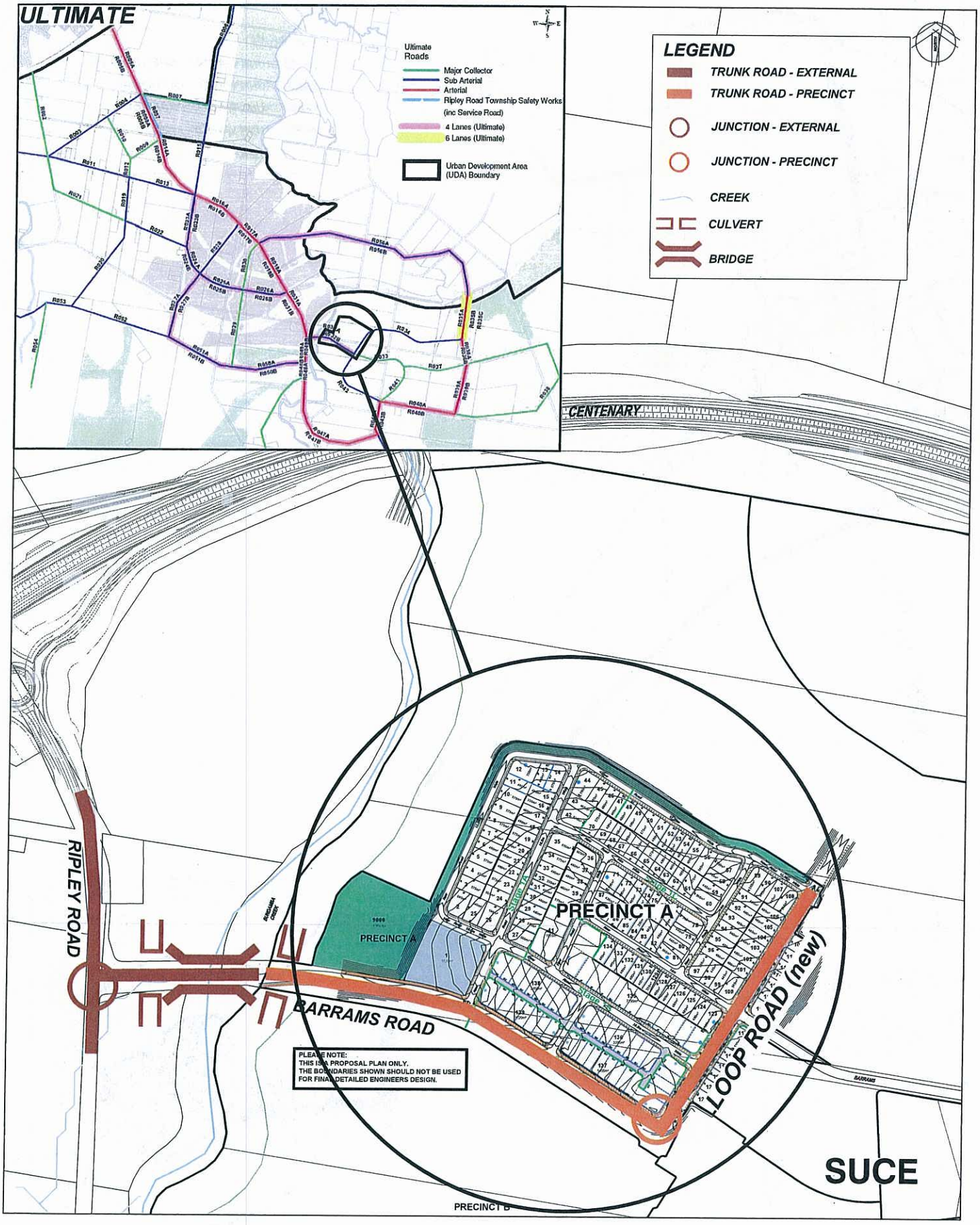
790147/012-SK008.R

790147/012-SK008.S

790147/012-SK008.W

790147/012-SK008.E

790147/012-SK008.P



Ripley Valley - SUCE Precinct A

NOT TO SCALE

Proposed Trunk Road Infrastructure

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Ref Number: 7901-47/012/SK008.R
Date: 12/10/2010

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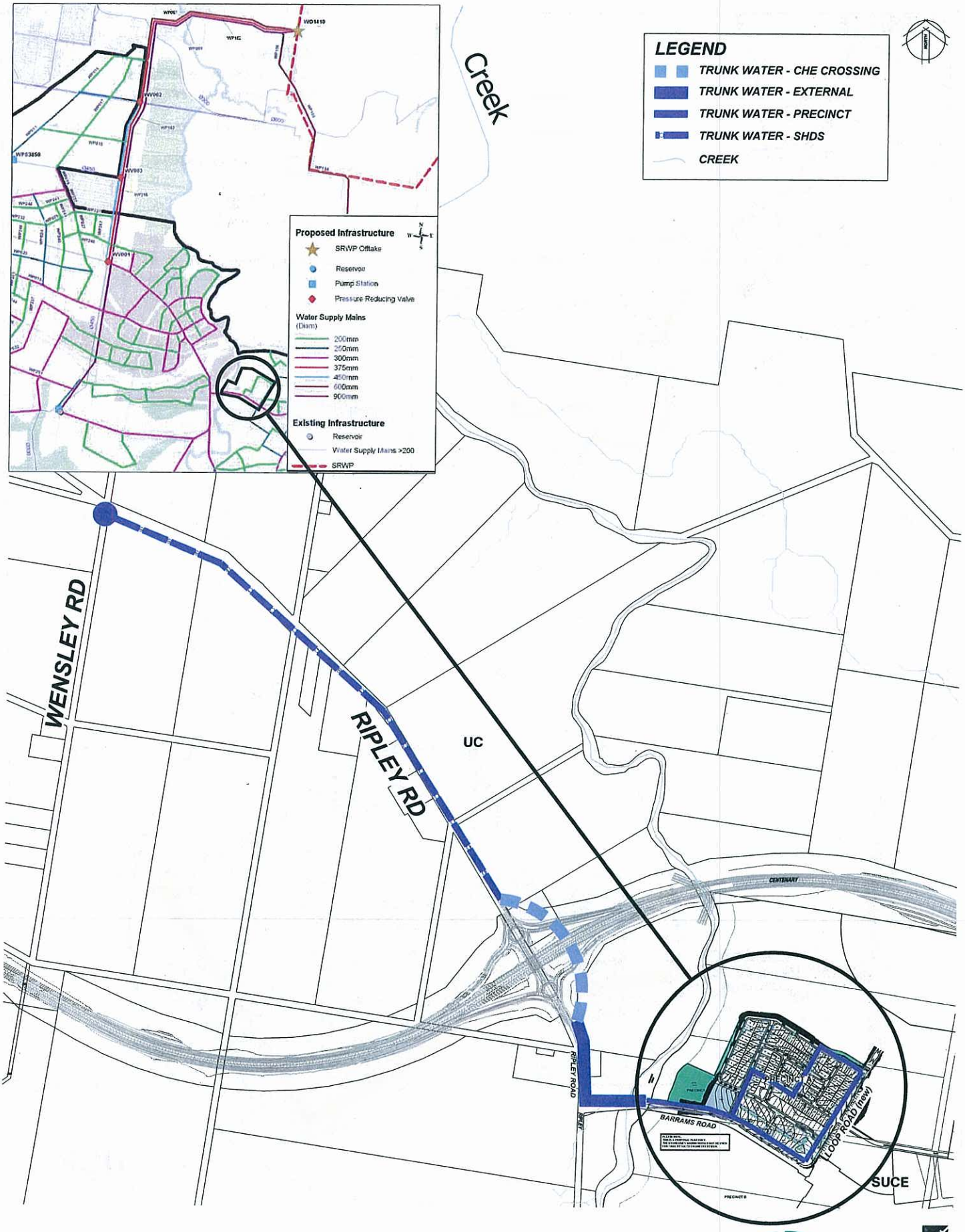

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Quality Endorsed Company

Ripley Valley - SUCE Precinct A

NOT TO SCALE

Proposed Trunk Water Infrastructure

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Ref Number: 7901-47/012/SK008.W
Date: 12/10/2010

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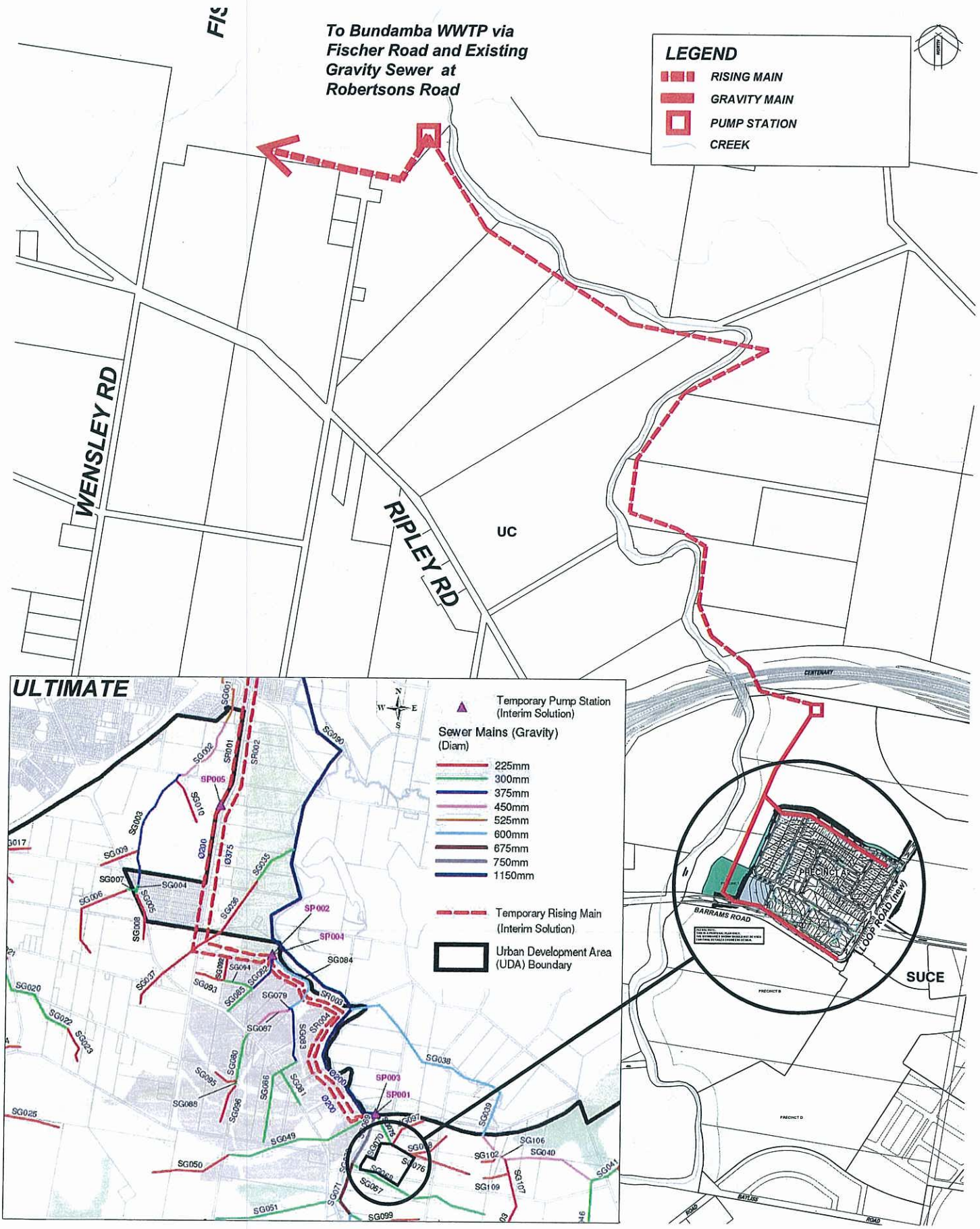

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Quality Endorsed Company

Ripley Valley - SUCE Precinct A

Proposed Trunk Sewer Infrastructure

NOT TO SCALE

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Ref Number: 7901-47/012/SK008.S
Date: 12/10/2010

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