

0541-02-I
15 April 2010



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Ian Purssey
ULDA
PO Box 3643
South Brisbane BC QLD 4101

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 5 / 12 / 12

Dear Ian,

**SUBJECT: ULDA FITZGIBBON DEVELOPMENT – REVIEW OF BULK
EARTHWORKS FOR AREAS C, E, F & G**

As requested by Bruce McArthur from ETS we have reviewed the following design drawings for bulk earthworks in Areas C, E, F and G for the Fitzgibbon development:

ULDEFG C200 P2 – 22/3/2010
ULDEFG C201 P2 – 22/3/2010
ULDEFG C202 P2 – 22/3/2010

We have assumed that the required minimum fill level is based on the Brisbane City Council requirement for residential allotments to be a minimum of 300 mm above the 100 year ARI (Q100) design flood level. We have also assumed that potential flood mitigation works for Cabbage Tree Creek that would reduce flood levels on the site (though included in planning investigations for the UDA) may not be constructed.

Subject to the comments provided below, which may require some minor adjustment to fill levels, the proposed filling is generally compliant with the results of flood investigations undertaken to date for the UDA:

- C200 P2 - The minimum fill level at the southeast corner of the filled area shown on this plan should be 11.45 mAHD at the upstream end of the adjacent channel, and 11.40 mAHD at the downstream end of the channel.
- C200 P2 - We note that the design of the waterway culvert crossing adjacent to the southeast corner of the filled area (box culverts at Ch 590 on dwg. ULDSFG C304 D) indicates that the overflow point for flows exceeding the culvert capacity, with a minimum elevation of about 11 mAHD, is located about 50 m to the north of the culvert. The design of the final landform should ensure that overflows from the waterway, due to events greater than Q100 or substantial culvert blockage, can access this low point with minimal impact on residential allotments.
- C201 P2 - The minimum fill level at the northern limit of the filled area shown on this plan (near the future Roghan Road culvert crossing) should be 10.95 mAHD. The minimum fill level at the western corner of the filled area, adjacent to the Carseldine Drain open space reserve, should be 11.25 mAHD.
- C202 P2 - The minimum fill level for the fill pads shown on this plan should be 10.95 mAHD, increasing to 11.25 mAHD at the upstream (western) end of the site.

0541-02-I
15 April 2010



Please do not hesitate to contact me if you require further information.

For and on behalf of

WRM Water & Environment Pty Ltd

A handwritten signature in black ink, appearing to read 'D Newton', is written over the text 'referred to in the UDA'.

David Newton

Principal Engineer

RPEQ # 5386



**ASSESSMENT of the PROPOSED WATER
SERVICING PLAN
of the**

**FITZGIBBON URBAN DEVELOPMENT AREA
- AREAS B, C, E1, E2, F & G**

Document Date: 17 March 2010

**PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 5 / 12 / 12**

Revision History

Rev No	Author	Branch	Approved for Issue		
			Position	Name	Signature
0	Arath Alkadiah	Asset Management	Manager - Infrastructure Planning	Andy Kummins	
1	Arath Alkadiah	Asset Management	Manager - Infrastructure Planning	Andy Kummins	

APPROVAL DOCUMENTS
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1 INTRODUCTION

Queensland Urban Utilities (QUU) was commissioned by the Urban Land Development Authority (ULDA) to assess the required water mains for development of areas B, C, E1, E2, F and G of the Fitzgibbon Urban Development Area (UDA).

The Fitzgibbon UDA covers 295 hectares of land in the northern suburbs of Fitzgibbon, Carseldine, Bald Hills, Taigum and Deagon. The area is located approximately 12 km from the Brisbane Central Business District. (see Figure 1-1)

Areas B, C, E1, E2, F and G of the Fitzgibbon UDA are proposed to contain about 310 low, low-medium and medium residential allotments. The area is located south of Telegraph Rd, north of the railway and west of stages 1-4 which are currently being constructed (see figure 1-2).

The study area is within the Bracken Ridge Water Supply Area (WSA) and is supplied by gravity from Bracken Ridge reservoir (50.4 mAH Minimum Operating Level) (see Figure 1-3).

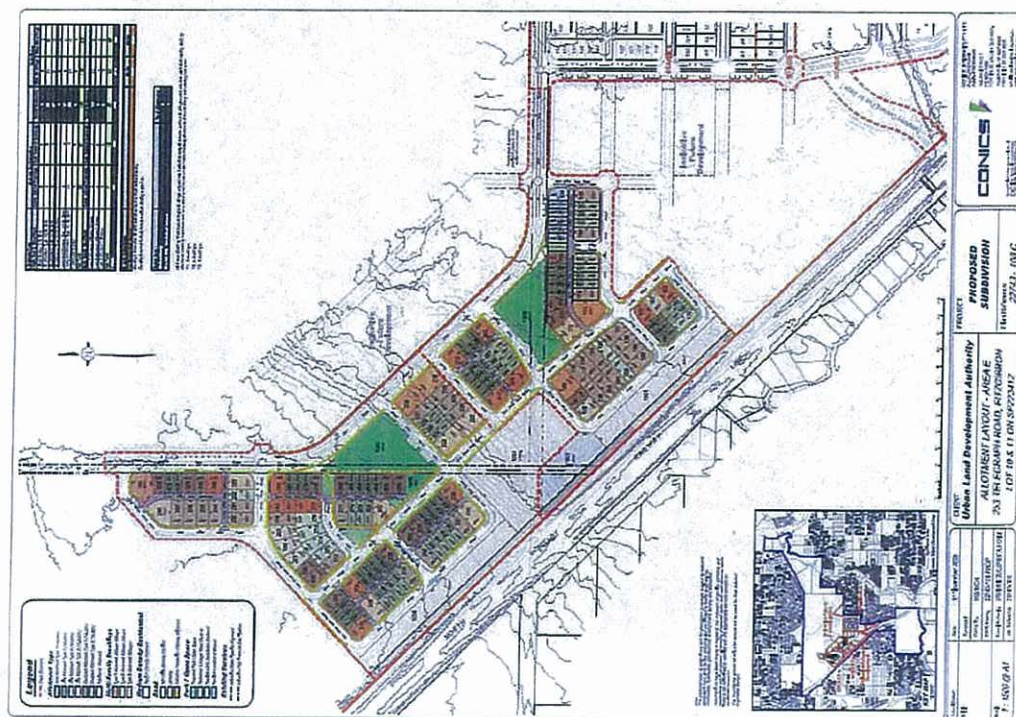
This document has been prepared to assess the required water mains to meet Brisbane City Council (BCC) design standards to:

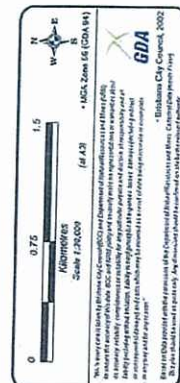
- Achieve minimum pressures;
- Achieve required fire-flow capacities;
- Ensure reliability of supply to the proposed development.

Figure 1-1 Fitzgibbon UDA



Figure 1-2 Study Area





2 POPULATION AND DEMAND

Number and types of allotments for the study area were provided by the ULDA and are shown in Figure 2-1.

The majority of allotments are of Low Density residential (LDR) and Low-Medium Density Residential (LMR) categories with three larger allotments (Super Lots) along the railway line categorised as Medium Density Residential (MR).

Equivalent Persons (EP) were calculated from the allotment data by equating one LDR and LMR dwelling to 2.5 EP, and one MR dwelling to 1.7 EP. (see Table 2-1)

Table 2-1 Study Area Equivalent Persons Calculation

Allotment Type	City Plan Category	No. of Allotments	Yield Range		EP per Dwellings	Total Max EP
			Min Dwellings	Max Dwellings		
Single Family Dwellings	LDR	126	126	213	2.5	533
Multi-Family Dwellings	LMR	26	178	309	2.5	773
					Total EP	1,306
Allotment Type	City Plan Category	No. of Allotments	Total Area (ha)	Dwellings per ha	Total No. of Dwellings	EP per Dwellings
Super Lots	MR	3	21.76	66	1,436	1.7
					Total EP	2,441

Per capita demands were calculated based on an Average Day Demand (AD) of 268L/person/d, a Peak Day (PD) to Average Day factor of 1.7 and a Peak Hour Demand (PH) factor of 1.89. Non Revenue Water of 46L/EP/day was also added to the calculated demand. This equated to a Peak Hour Demand of 0.011L/s/EP. Table 2-2 shows the study area's demand calculation.

Figure 2-1 Number and Types of Allotments in Study Area

Minimum Dwelling Yield based on an additional lot home on rear loaded laneway allotments and two dwellings constructed on each multi-family dwelling			
T1 - 3 dwellings			
T2 - 4 dwellings			
T3 - 5 dwellings			
Possible Utility Installation Allotment			
Super Lots	Medium Density	Total Allotments	1
Density does not include future medium density super lots			
Density is based on SEORP definition for Net Residential Density			
Density Calculation	Net Residential Density	dw/ha	dw/ha
		14.6	25.3
Access Configuration			
Yield Range	Min. Dwellings	Max. Dwellings	
Allotment Type	Access Configuration		
Single Family Dwellings	Conventional Frontage	Rear Loaded Laneway	Total Allotments
Scho Allotment (10x25m)	0	6	6
Villa Allotment Type 1 (10x25m)	3	31	34
Villa Allotment Type 2 (10x32m)	5	22	27
Villa Allotment Type 3 (12.5x32m)	7	1	8
Courtyard Allotment Type 1 (15x25m)	3	14	17
Courtyard Allotment Type 2 (15x32m)	16	13	29
Traditional Allotment	5	0	5
Sub Total	39	87	126
Multi-Family Dwellings	Conventional Frontage	Rear Loaded Laneway	Total Allotments
Type 1 Allotment 450sqm-599sqm	2	11	13
Type 2 Allotment 600sqm-749sqm	2	6	8
Type 3 Allotment 750sqm+	3	2	5
Sub Total	7	19	26
TOTAL	46	106	152
			178
			309

Table 2-2 Study Area Demand Calculation

City Plan Category	Total EP	AD (L/EP/d)	PD/AD (L/EP/d)	PD (L/EP/d)	MD/MD (L/EP/d)	MD (L/EP/d)	MD Inc. NRW (L/EP/s)	MD (L/EP/s)
LDR/LMR	1,305	268	1.70	456	1.89	861	0.010	0.011
MR	2,441	268	1.70	456	1.89	861	0.010	0.011
								25.75
								13.76

In hydraulic modeling and for LDR and LMR allotments, EP loads were distributed uniformly across the existing parcels within the study area. For the Super Lots, the EP demand for each parcel was applied to the nearest junction in the model.

3 HYDRAULIC ANALYSIS

Hydraulic analysis of the proposed water reticulation mains was undertaken using hydraulic analysis software. The following scenario runs were undertaken:

1. Peak Hour pressures
2. Fire Flow

3.1 PEAK HOUR SCENARIO

System performance was assessed under PH demands with Bracken Ridge reservoir at Minimum Operating Level (MOL). The adequacy of proposed water service mains was checked to ensure a minimum service pressure of 210kPa (21m) is maintained at the water meters.

3.2 FIRE FLOW SCENARIO

System requirements were identified to supply fire fighting flows of 25 (from two hydrants) and 45 L/s (from up to three hydrants) for low and high risk areas respectively. Assessment of fire flow capacity was made with a concurrent background demand equivalent to 2/3 of PH demand with a minimum allowable residual pressure of 100kPa (10m) at the hydrants.

3.3 RELIABILITY OF SUPPLY

The network configuration was reviewed to ensure that a reliable supply to the development would be available into the future. Potential connection to the adjacent Aspley WSA and also the number of cross connections between the reticulation and trunk mains were considered to provide an adequate reliability of supply.

4 PROPOSED AND REVIEWED WATER RETICULATION MAINS

The augmentations proposed by ULDA are shown in SK06 - SK10. The plan comprises a DN225 backbone supply that runs parallel to the existing DN410 along the future extension of Roghan Rd and connects to the existing DN300 in Roghan Rd. The proposed water reticulation mains are mostly sized as DN150.

Supplementary information provided by ULDA in the course of reviewing the draft version of the study is also listed below:

- Major parts of the study area are subject to bulk fill. In worst case the fill depth in the vicinity of the existing DN410 trunk main can add as much as 1.7m extra soil depth.
- Some sections of the proposed plan have already been constructed (see sketch SK06) in smaller size than proposed by QUU in previous advice¹.
- It was proposed to lay reticulation mains in the future busway to connect to as existing main in Lavender Pl.

The proposed plan and the background information were reviewed by QUU and recommendations were identified as follows:

- Contingency of Supply: Due to the development being situated on a trunk main branch from Bracken Ridge reservoir, and given the size of the development, it is necessary to ensure that a contingent supply from adjacent Aspley WSA can be delivered in case of failure/maintenance of the trunk mains. Two options were identified either can address the above issue:
 - Option 1: To upsize the proposed DN150 water main supplying Area B to DN250 (Line 4, see Figure 4-1) and to connect it to existing DN225 in Aspley WSA via Carselgrove

¹ "Assessment of the Proposed Water Servicing Plan of the Fitzgibbon Urban Development Area - Areas B, C, E1, E2, F & G - Draft" - Dated 26 February 2010

Ave. It is also proposed to upsize the section further north (line 3, see Figure 4-1) from DN150 to DN200.

- o Option 2: To install a standard 200mm BCC flow meter / PRV pit, with internal pipework as an offtake from the existing DN300 in Roghan Rd (see Figure 4-2). It is recommended to initially install pipe shorts instead of the PRV and flow meter. This will allow relatively easy installation of a PRV and flow meter, if required. It is also required to insert a new valve into the existing DN410 (see Figure 4-2) to isolate the trunk main from Bracken Ridge in case it has to be shutdown.

- Fire Flow Provision: The reticulation has been sized on the basis of providing minimum flows of 45 L/s. However it is suggested the ULDA engage with the fire authority to ascertain the overall level of fire protection required.
- Water main sizing: Opportunities were identified to downsize some of the proposed main sizes from DN150 to DN100 whilst meeting the Peak Hour and Fire Flow requirements. There may be opportunities to downsize the reticulation mains in area G; however it can not be determined until a detailed layout of the development of the surrounding area is known.
- Future busway: It is recommended not to lay any future reticulation mains in the busway as it is not in compliance with the BCC Standards which implies: "water mains shall be located to allow easy access for repairs and maintenance".
- Bulk Fill: It is recommended to lay the proposed water reticulation mains until after the bulk fill within the area is completed, if possible. This is to avoid issues of access the water mains in case of maintenance or repair. With regards to the existing water mains such as the DN410 trunk main between Norris Rd and Darville Rd, the issue is currently being discussed between the BCC and the

ULDA representatives to ensure the necessary actions will be taken to protect the assets.

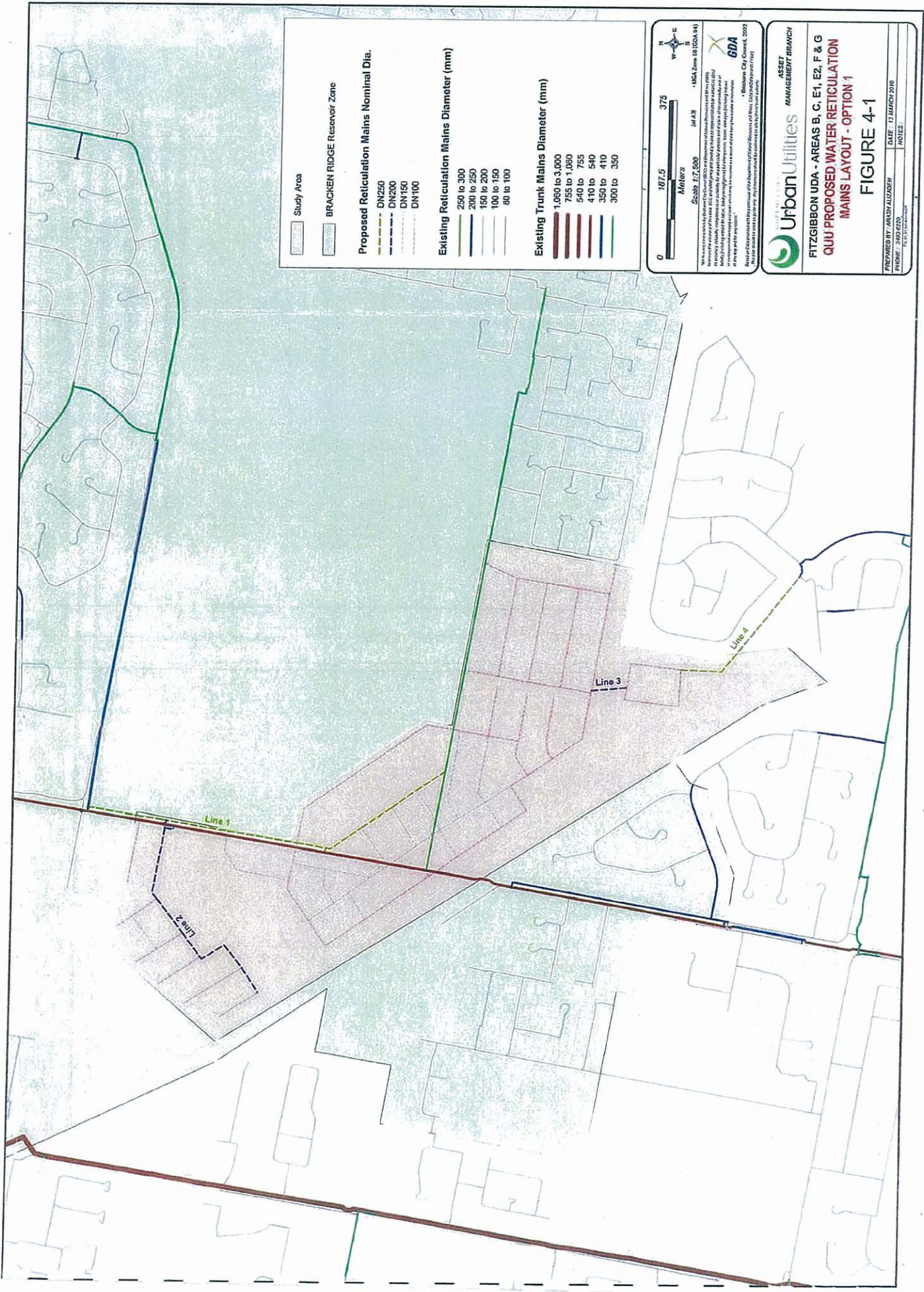
- The proposed DN225 (line 1) is upsized to DN250 as DN225 is not a standard size for BCC's new water mains.
- Two connection points between the proposed Line 3 and the existing DN410 were identified to ensure robust supply to the proposed development.
- The proposed main sizes are expressed as Nominal Bore. The material and class of pipe will need to be selected during design to give hydraulic equivalence.

5 CONCLUSION

The proposed two options for water main network are shown in figures 4-1 and 4-2 for Areas B, C, E1, E2, F and G of the Fitzgibbon UDA.

References

Queensland Urban Utilities. Bracken Ridge WSA Master Planning Report, July 2009.
Urban Land Development Authority. Fitzgibbon Urban Development Area Development Scheme. July 2009.



Study Area

BRACKEN RIDGE Reservoir Zone

Proposed Reticulation Mains Nominal Dia.

- DN250
- DN200
- DN150
- DN100

Existing Reticulation Mains Diameter (mm)

- 250 to 300
- 200 to 250
- 150 to 200
- 100 to 150
- 80 to 100

Existing Trunk Mains Diameter (mm)

- 1,000 to 3,000
- 755 to 1,000
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350

0 187.5 375
Meters

Scale 1:1,500

North Arrow

UDA Zone 10 (ODA 14)

GDA

Blairgowrie City Council, 2003

ASSET MANAGEMENT BRANCH

UrbanUtilities

FITZGIBBON UDA - AREAS B, C, E1, E2, F & G

QUU PROPOSED WATER RETICULATION

MAINS LAYOUT - OPTION 1

FIGURE 4-1

PREPARED BY: MALSH ALZADDEN DATE: 13 MARCH 2010

PROJECT: 2403 0220

NOTES:



Study Area

BRACKEN RIDGE Reservoir Zone

Proposed Reticulation Mains Nominal Dia.

300

250

200

150

100

Existing Reticulation Mains Diameter (mm)

250 to 300

200 to 250

150 to 200

100 to 150

90 to 100

Existing Trunk Mains Diameter (mm)

1,060 to 3,000

755 to 1,060

540 to 755

410 to 540

350 to 410

300 to 350

Proposed Trunk Valve

Existing Reticulation Valve

Existing Trunk Valve

0 187.5 375

Meters

Scale 1:7,500 (A/N)

1:63,000 (GDA 84)

N

W E

Who is responsible for the design and construction of the water supply system? The design and construction of the water supply system is the responsibility of the local government. The design and construction of the water supply system is the responsibility of the local government. The design and construction of the water supply system is the responsibility of the local government.

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ASSET MANAGEMENT BRANCH

FITZGIBBON UDA - AREAS B, C, E1, E2, F & G

QUU PROPOSED WATER RETICULATION

MAINS LAYOUT - OPTION 2

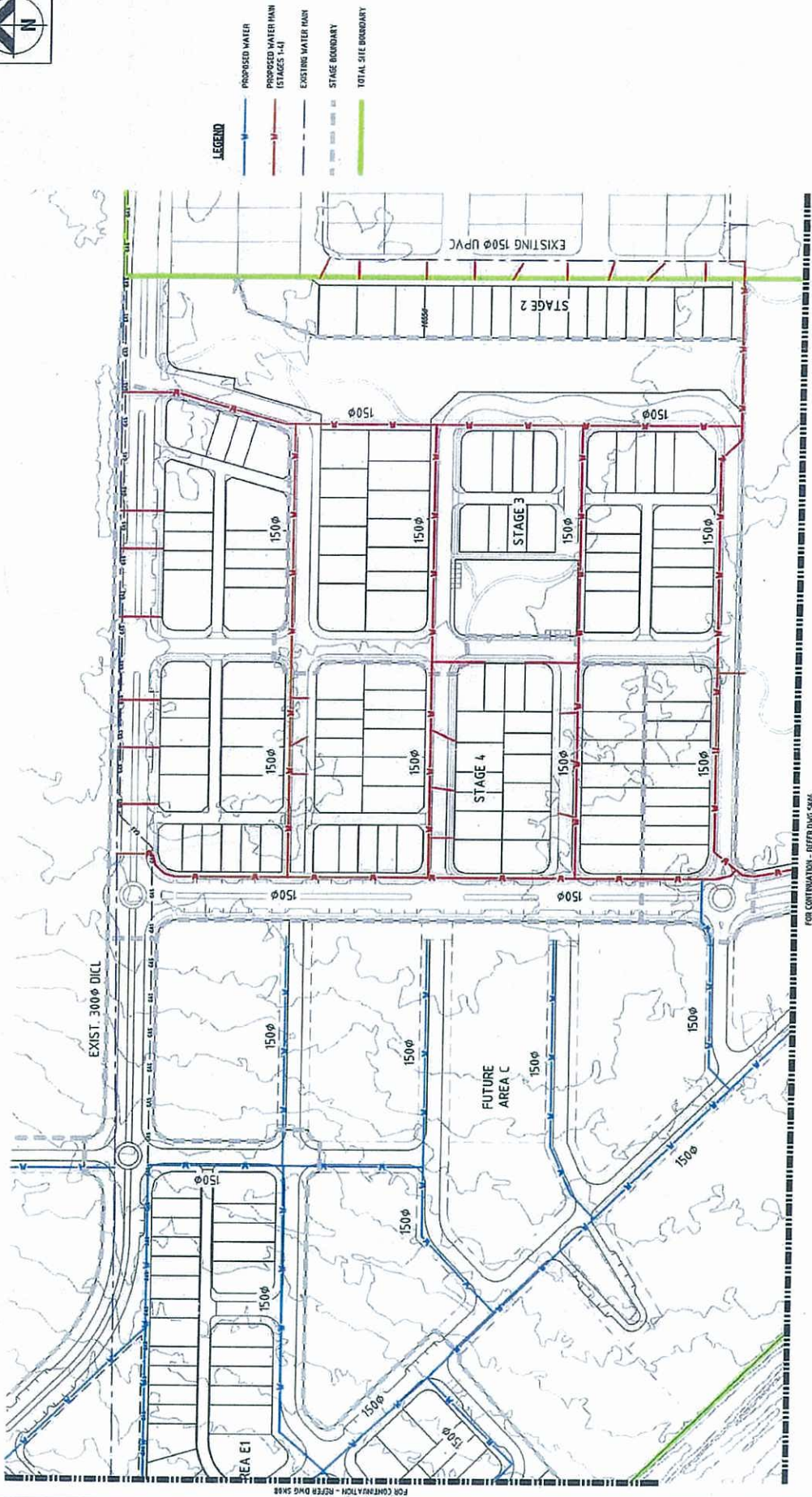
FIGURE 4-2

PREPARED BY: ARASH ALIZADEH

DATE: 12 MARCH 2019

PHONE: 3 403 0020

NOTES:



FOR CONTINUATION - REFER DWG SK46

URBAN LAND DEVELOPMENT AUTHORITY

FITZGIBBON CHASE
153 TELEGRAPH ROAD, FITZGIBBON

WATER RETICULATION LAYOUT PLAN - SHEET 2 OF 5

ARCHITECTS - CIVIL & STRUCTURAL ENGINEERS

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

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DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)

PROJECT NO: 153 TELEGRAPH ROAD, FITZGIBBON

DATE: 2010

SCALE: 1:1000 (A1)



URBAN LAND DEVELOPMENT AUTHORITY
FITZGIBBON CHASE
153 TELEGRAPH ROAD, FITZGIBBON
WATER RETICULATION LAYOUT PLAN - SH1

ASSOCIATED COMPANIES	DATE	BY	FINANCIAL CO.	DESCRIPTION
	3/24/88	P1		

RECEIVED	AL	DATE
DEPT	AL	DATE
CHECKED		DATE
DATE		JANUARY 2010



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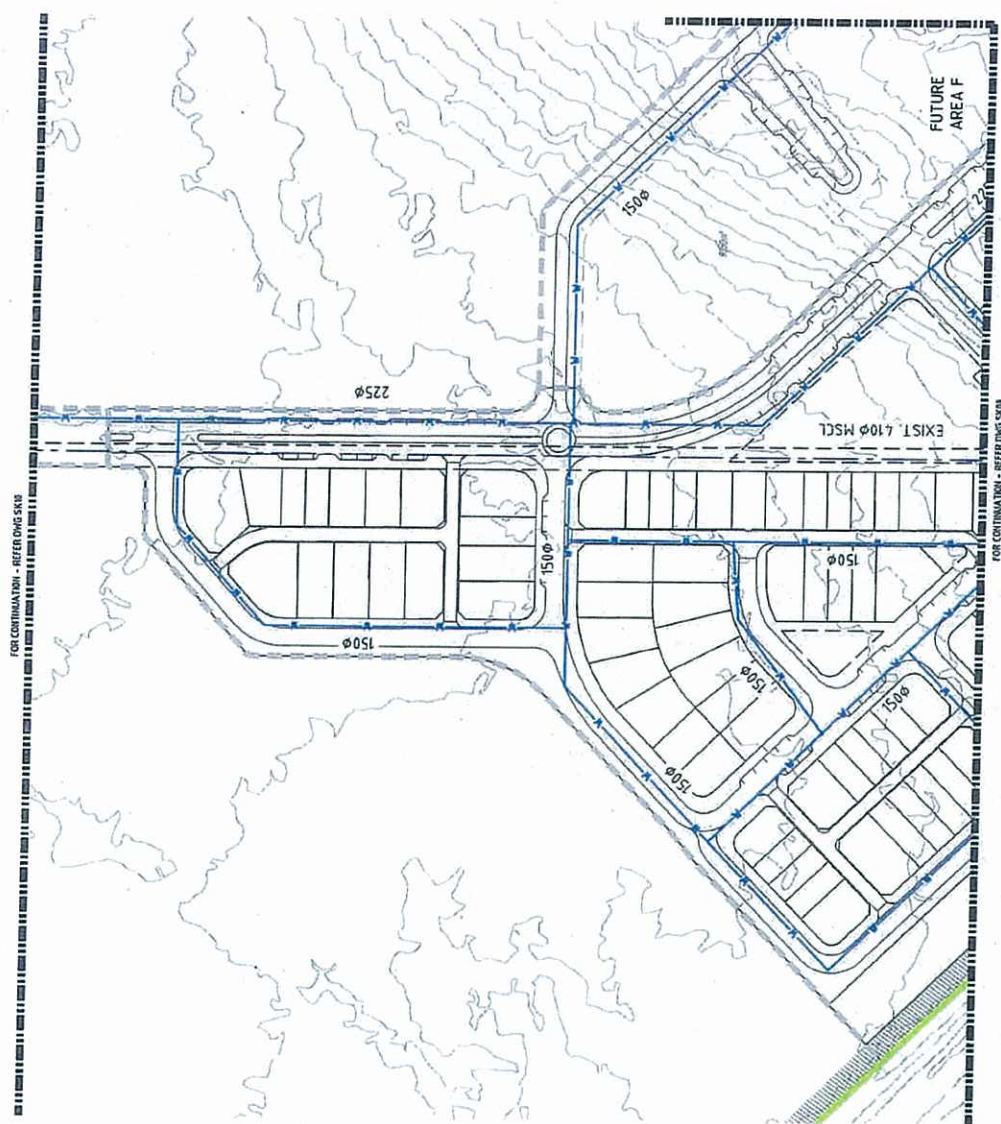
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ESSCD

ULDSFC	SK08	P1
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- LEGEND
- PROPOSED WATER
 - EXISTING WATER MAIN
 - STAGE BOUNDARY
 - TOTAL SITE BOUNDARY

EXIST. 1500 CISL

RP 911444

SP 122447

FUTURE
AREA
G

EXIST. 6100 MSCL

2250

2250

2250

RP B02239

1500

2250

FOR CONTINUATION - REFER DWG 5009

URBAN LAND DEVELOPMENT AUTHORITY

FITZGIBBON CHASE

153 TELEGRAPH ROAD, FITZGIBBON

WATER RETICULATION LAYOUT PLAN - SHEET 5 OF 5

DESIGNED BY	AL	SCALE	1:1000
CHECKED BY	AL	DATE	JANUARY 2010
DRAWN BY	AL	SCALE	1:1000 (A3)

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