QUEENSLAND UrbanUtilities

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 9/12/11

Revision History

Rev No	Author	Branch	Approved for Issue			
			Position	Name	Signature	Date
0	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Krumins		Feb 26, 2010
1	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Krumins		Mar 17, 2010

PLANS AND DOCUMENTS
retained to in the UDA
APPROVAL dated / /

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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).

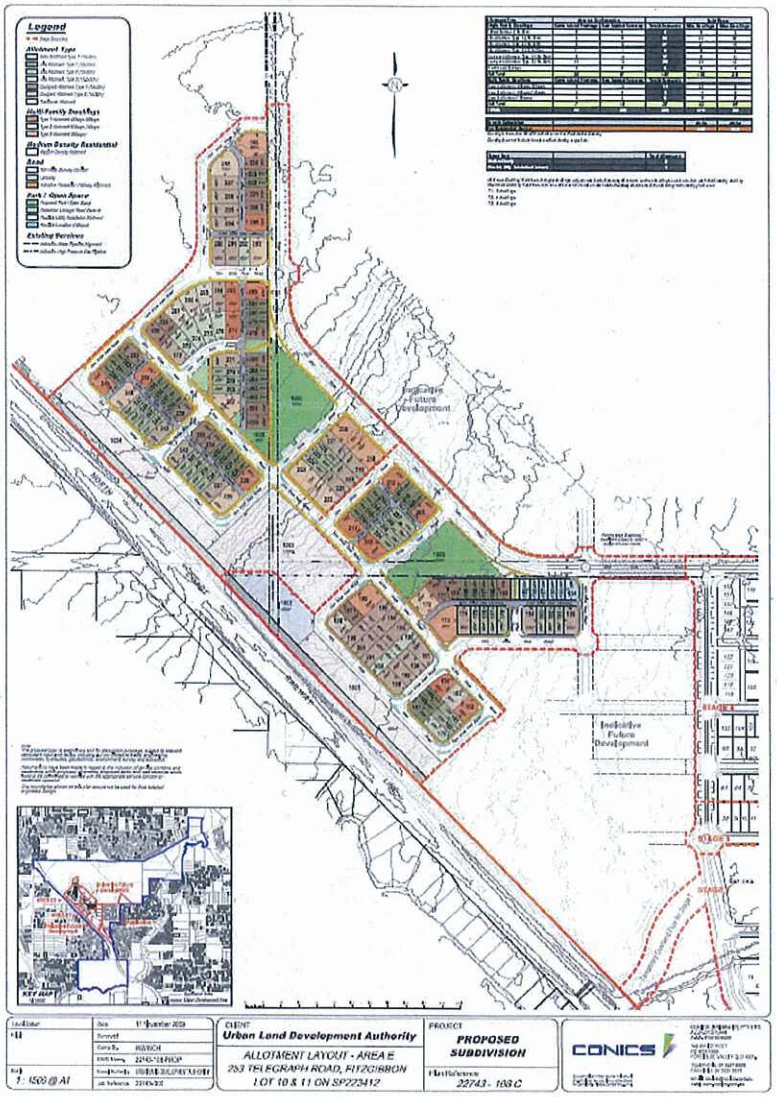
The study area is within the Bracken Ridge Water Supply Area (WSA) and is supplied by gravity from Bracken Ridge reservoir (50.4 mAHD Minimum Operating Level) (see Figure 1-3).

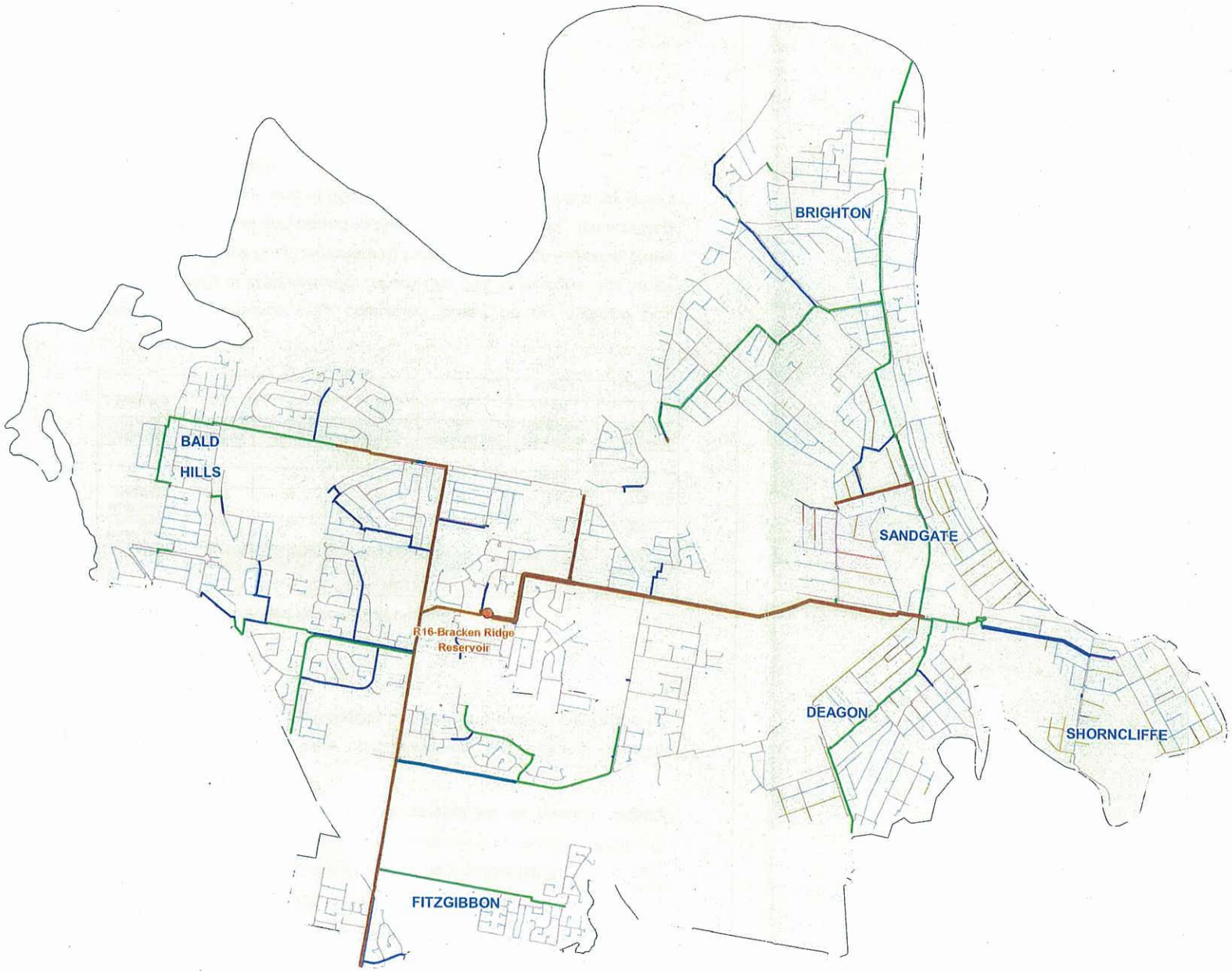
This document has been prepared to assess the required water mains to meet Brisbane City Council (BCC) design standards to:

- 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





Water Supply Zones

- BASKERVILLE ST BOOSTER - WB8
- BRACKEN RIDGE RES
- JUDE ST & BRACKEN RIDGE RES BOOSTER

Study Area

Reticulation Diameter (mm)

- 250
- 200
- 150
- 100
- 80
- < 80

Trunk Main Diameter (mm)

- 1,060 to 3,000
- 755 to 1,060
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350

Location Plan

0 0.75 1.5
Kilometres
Scale 1:30,000 (at A3)
N W E S
* MGA Zone 56 (GDA 94)

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* Brisbane City Council, 2002

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FITZGIBBON UDA - AREAS E & G

BRACKEN RIDGE WSA

EXISTING INFRASTRUCTURE

FIGURE 1-3

PREPARED BY : ARASH ALIZADEH	DATE : 22 FEBRUARY 2010
PHONE : 3403 0220	NOTES :

Fig_01_01_Bracken RIDGE

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	*1,305*
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.

Allotment Type	Access Configuration			Yield Range	
Single Family Dwellings	**Conventional Frontage**	**Rear Loaded Laneway**	**Total Allotments**	**Min. Dwellings**	**Max. Dwellings**
Scho Allotment (10x25m)	0	6	6	6	12
Villa Allotment Type 1 (10x25m)	3	31	34	34	65
Villa Allotment Type 2 (10x32m)	5	22	27	27	49
Villa Allotment Type 3 (12.5x32m)	7	1	8	8	9
Courtyard Allotment Type 1 (15x25m)	3	14	17	17	31
Courtyard Allotment Type 2 (15x32m)	16	13	29	29	42
Traditional Allotment	5	0	5	5	5
Sub Total	***39***	***87***	***126***	***126***	***213***
Multi-Family Dwellings	**Conventional Frontage**	**Rear Loaded Laneway**	**Total Allotments**		
Type 1 Allotment 450sqm-599sqm	2	11	13	26	39
Type 2 Allotment 600sqm-749sqm	2	6	8	16	32
Type 3 Allotment 750sqm+	3	2	5	10	25
Sub Total	***7***	***19***	***26***	***52***	***96***
TOTAL	***46***	***106***	***152***	***178***	***309***

Density Calculation		*dw/ha*	*dw/ha*
Net Residential Density		*14.6*	*25.3*

Density is based on SEQRP definition for Net Residential Density
Density does not include future medium density super lots

Super Lots		Total Allotments
Medium Density		3
Possible Utility Installation Allotment		1

Minimum Dwelling Yield based single dwellings only on rear loaded laneway allotments and two dwellings constructed on each Multi-family dwelling
Maximum Dwelling Yield based on an additional loft home on rear loaded laneway allotments & the following multi-family yield rates:
T1 - 3 dwellings
T2 - 4 dwellings
T3 - 5 dwellings

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

Table 2-2 Study Area Demand Calculation

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

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 advice[1].
- 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.

- 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 Dorville 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.

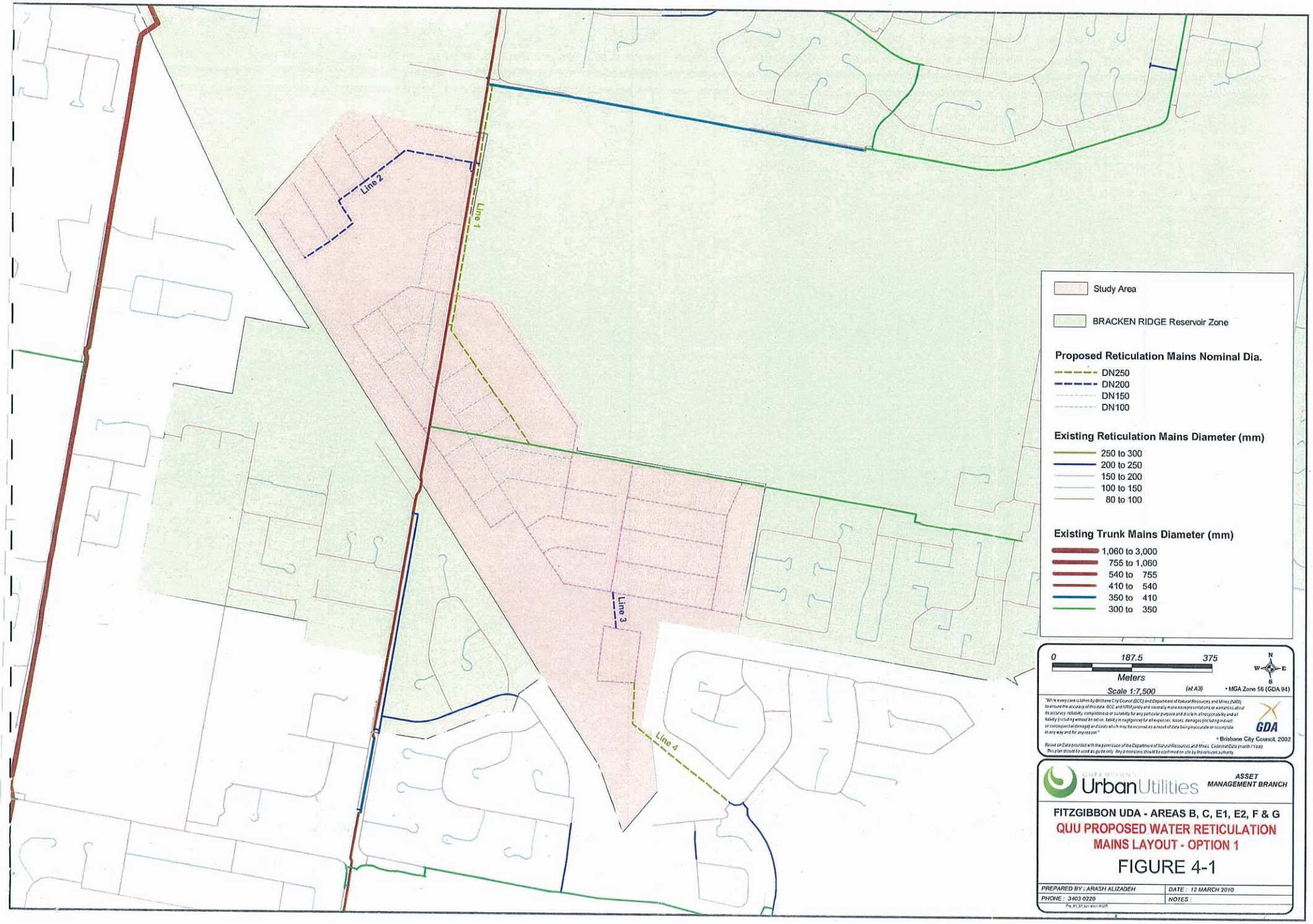
5 CONCLUSION

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.


Line 1
Line 2
Line 3
Line 4
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)
1,060 to 3,000
755 to 1,060
540 to 755
410 to 540
350 to 410
300 to 350
0
187.5
375
Meters
Scale 1:7,500
(at A3)
• MGA Zone 56 (GDA 94)
N
W
E
S
GDA
• Brisbane City Council, 2002
Based on Data provided with the permission of the Department of Natural Resources and Mines. Cadastral Data (month / Year)
This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority.
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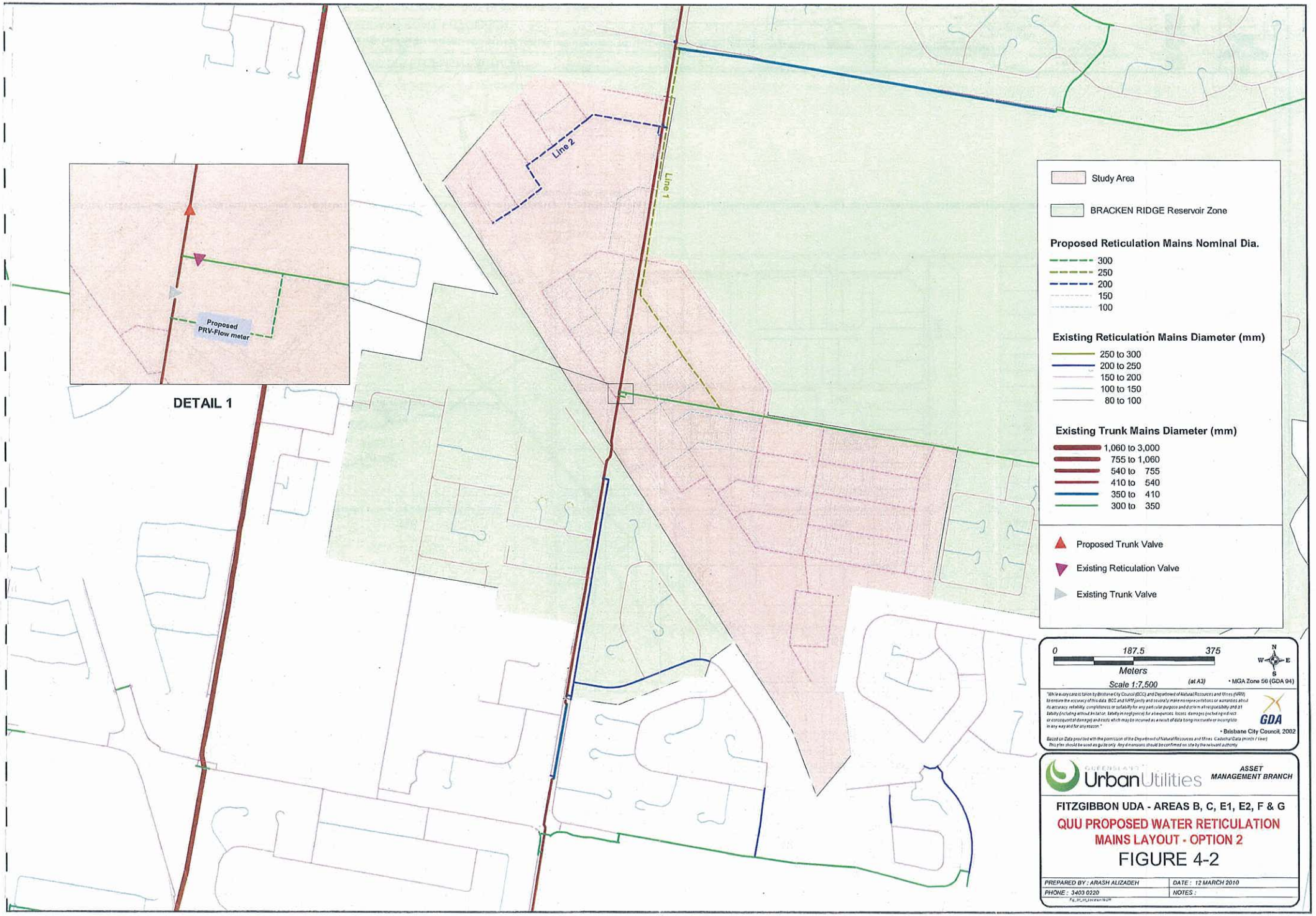
FITZGIBBON UDA - AREAS B, C, E1, E2, F & G
QUU PROPOSED WATER RETICULATION MAINS LAYOUT - OPTION 1
FIGURE 4-1
PREPARED BY : ARASH ALIZADEH
DATE : 12 MARCH 2010
PHONE : 3403 0220
NOTES :


Line 2
Line 1
Proposed PRV-Flow meter
DETAIL 1
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
80 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
(at A3)
N
W
E
S
• MGA Zone 56 (GDA 94)
GDA
• Brisbane City Council, 2002
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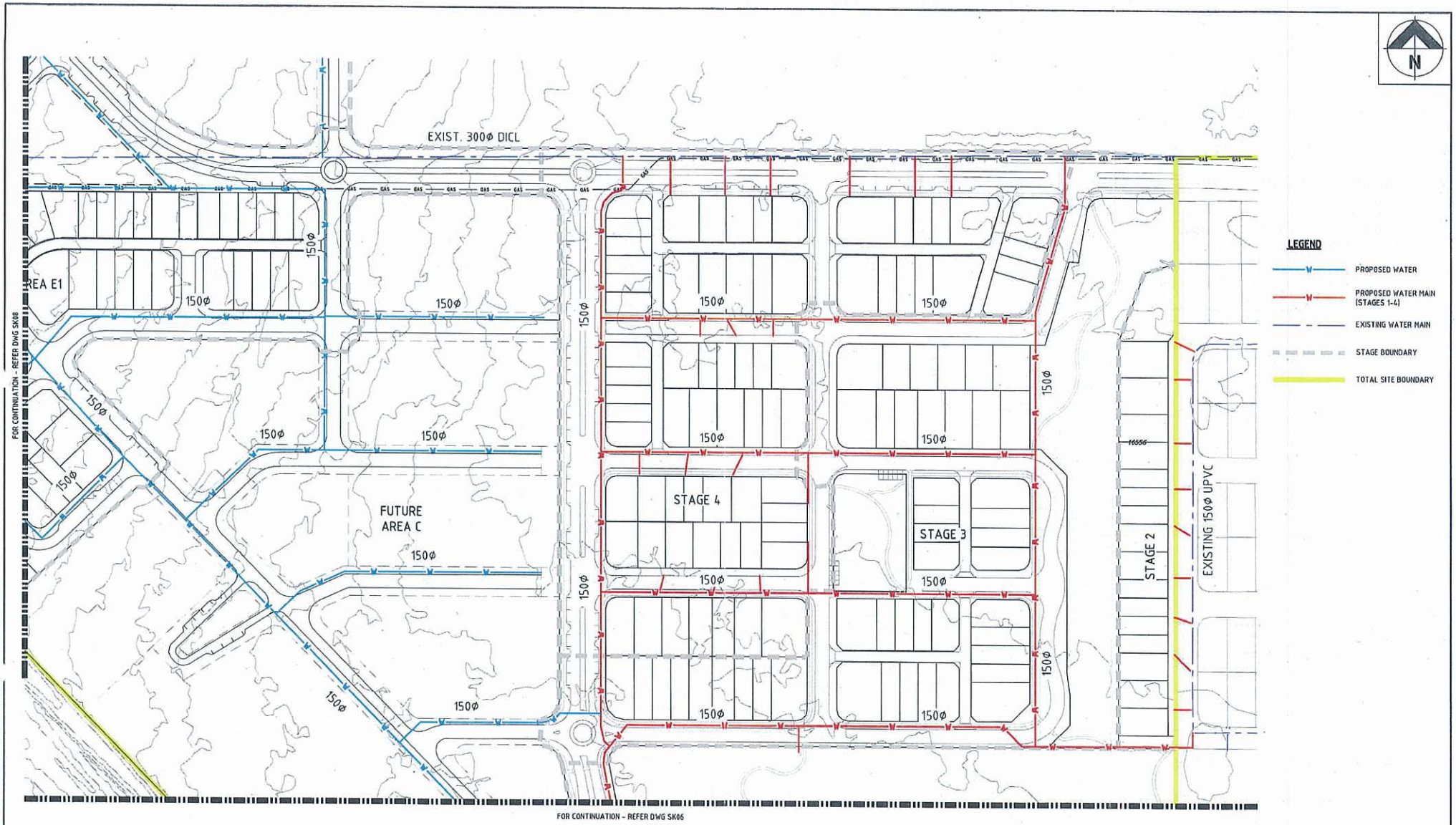
FITZGIBBON UDA - AREAS B, C, E1, E2, F & G
QUU PROPOSED WATER RETICULATION MAINS LAYOUT - OPTION 2
FIGURE 4-2
PREPARED BY : ARASH ALIZADEH
DATE : 12 MARCH 2010
PHONE : 3403 0220
NOTES :



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DATE	REV	DESCRIPTION	APPROVED
8/01/10	P1	PRELIMINARY ISSUE	

REVISIONS

CLIENT: URBAN LAND DEVELOPMENT AUTHORITY

PROJECT: FITZGIBBON CHASE

LOCATION: 153 TELEGRAPH ROAD, FITZGIBBON

SHEET TITLE: WATER RETICULATION LAYOUT PLAN - SHEET 2 OF 5

DESIGNED: AL
DRAWN: AL
CHECKED: DATE
DATE: JANUARY 2010

APPROVED: DATE
KEITH HOWELLS RPEQ 7205
STEPHEN HUGHES RPEQ 7703

SCALE: 0 20 40 60m
SCALE 1:1000 (A1)

AUSTRALIA
BRISBANE
855 CORONATION DRIVE TOOWONG QLD 4069
PH: (07) 3371 7000 FAX: (07) 3371 5870
EMAIL - mail@etsgroup.net.au
SUNSHINE COAST
20 INNOVATION PARKWAY BIRTINYA QLD 4575
PH: (07) 5438 8100 FAX: (07) 5438 8200
EMAIL - mail.sc@etsgroup.net.au
PAPUA NEW GUINEA
PORT MORESBY
5TH FLOOR CUTHBERTSON HOUSE PO BOX 908
TELEPHONE (675) 321 1333 FACSIMILE (675) 321 7853
EMAIL - etspng@datacom.pg
ARCHITECTS · CIVIL & STRUCTURAL ENGINEERS
ETS GROUP
www.etsgroup.net.au

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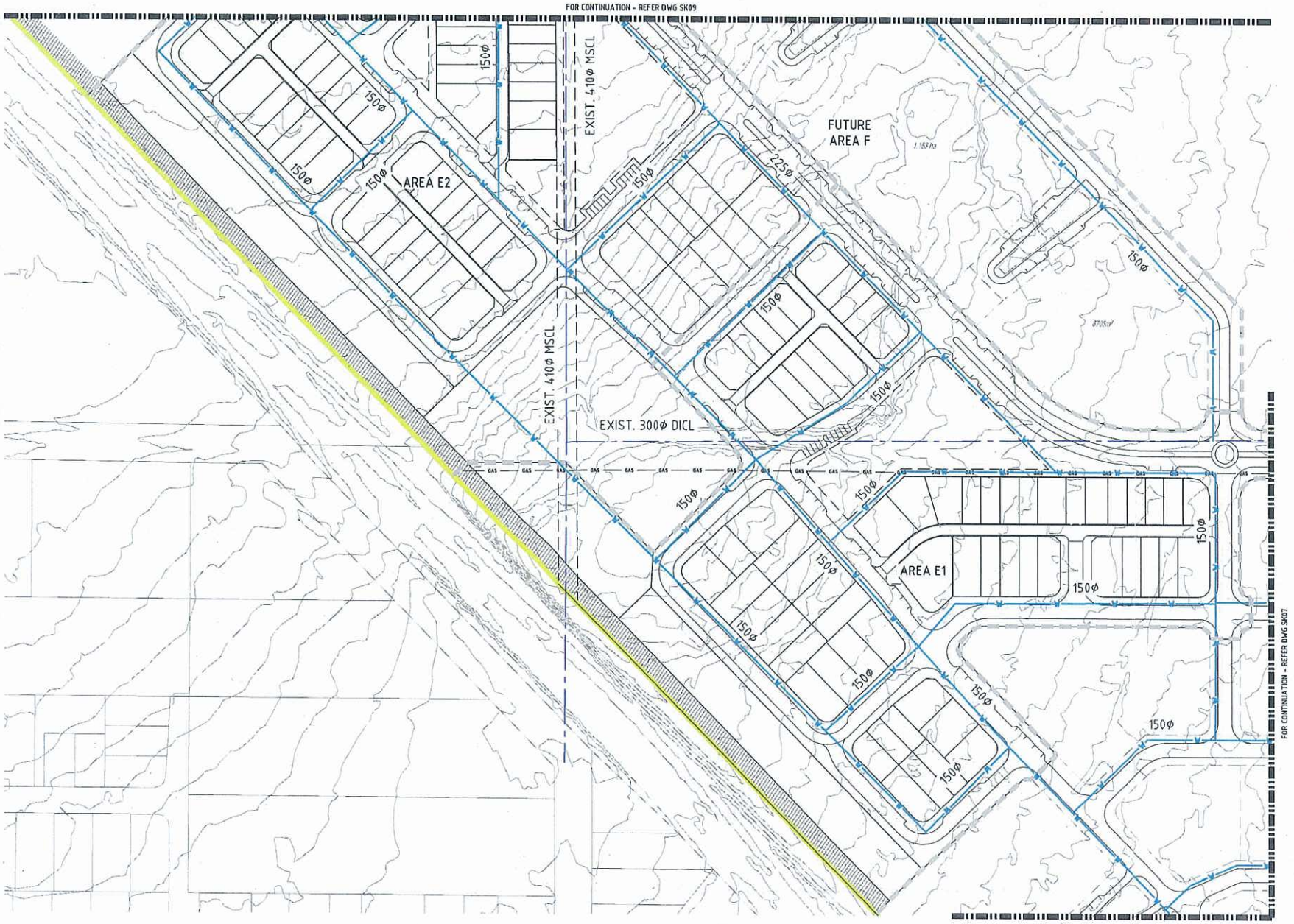

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DRAWN: AL
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DATE: JANUARY 2010

APPROVED: DATE
KEITH HOWELLS RPEQ 7366
STEPHEN HUGHES RPEQ 7700

SCALE: 0 20 40 60m
SCALE 1:1000 (A1)

AUSTRALIA
BRISBANE
555 CORONATION DRIVE TOOWONG QLD 4066
PH: (07) 3371 7000 FAX: (07) 3371 5373
EMAIL - mail@etsgroup.net.au
SUNSHINE COAST
20 INNOVATION PARKWAY BIRTINYA QLD 4575
PH: (07) 5438 8100 FAX: (07) 5438 8200
EMAIL - mail.sc@etsgroup.net.au
PAPUA NEW GUINEA
PORT MORESBY
5TH FLOOR CITI-BUNTSCH HOUSE PO BOX 968
TELEPHONE (675) 311 1330 FACSIMILE (675) 321 7653
EMAIL - etspng@datac.net.pg
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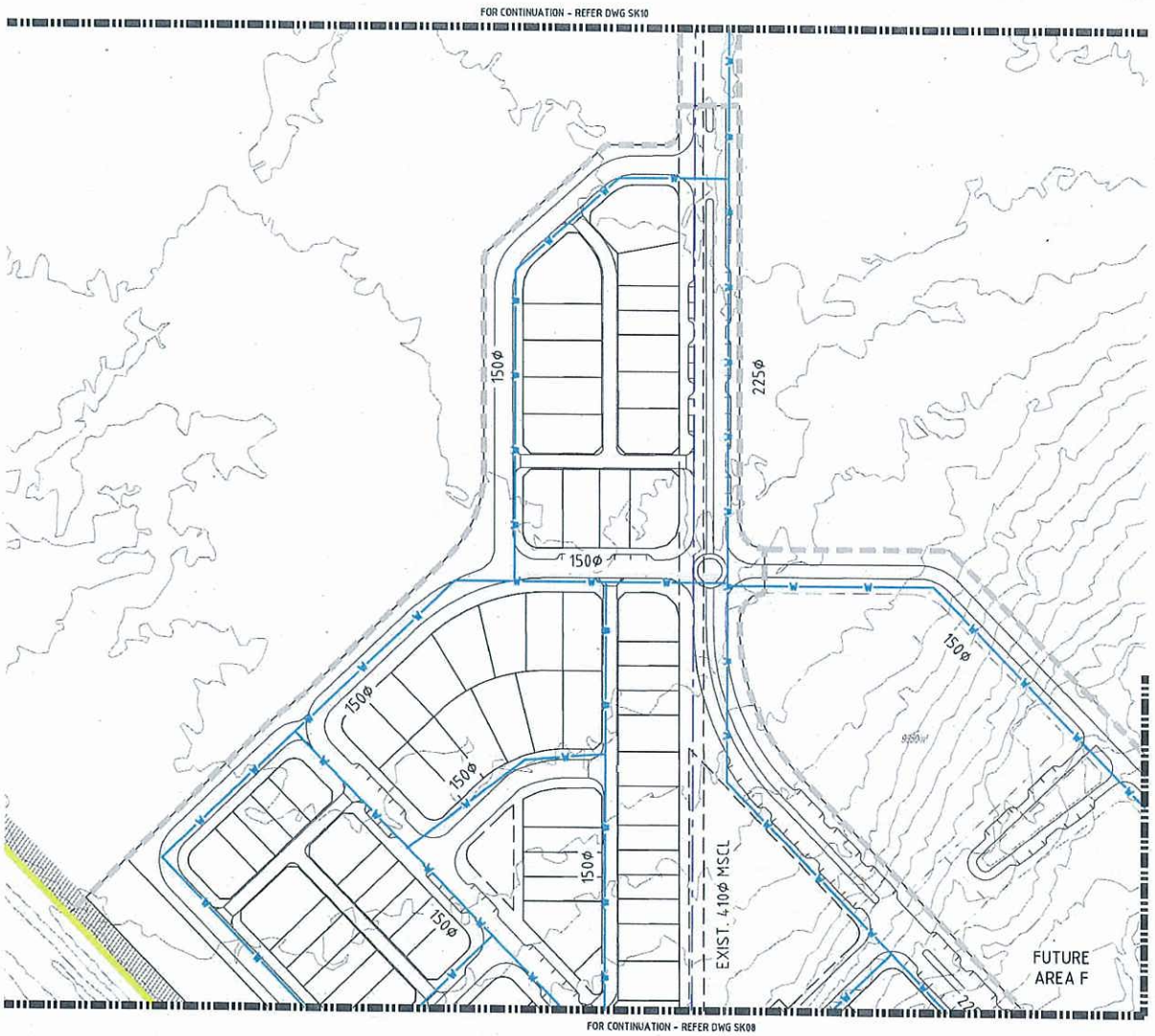

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LEGEND

- PROPOSED WATER
- EXISTING WATER MAIN
- STAGE BOUNDARY
- TOTAL SITE BOUNDARY

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LOCATION: 153 TELEGRAPH ROAD, FITZGIBBON

SHEET TITLE: WATER RETICULATION LAYOUT PLAN - SHEET 4 OF 5

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CHECKED	DATE	SCALE	
DATE	JANUARY 2010	0 20 40 60m SCALE 1:1000 (A1)	

AUSTRALIA

BRISBANE
555 CORONATION DRIVE TOOWONG QLD 4066
PH: (07) 3371 7000 FAX: (07) 3371 5679
EMAIL - mail@etsgroup.net.au

SUNSHINE COAST
29 INNOVATION PARKWAY BIRTINYA QLD 4575
PH: (07) 5458 8100 FAX: (07) 5458 8200
EMAIL - mail.sc@etsgroup.net.au

PAPUA NEW GUINEA
PORT MORESBY
5TH FLOOR CUTHBERTSON HOUSE PO BOX 968
TELEPHONE: (675) 321 1333 FACSIMILE (675) 321 2653
EMAIL - ecoeng@datec.net.pg

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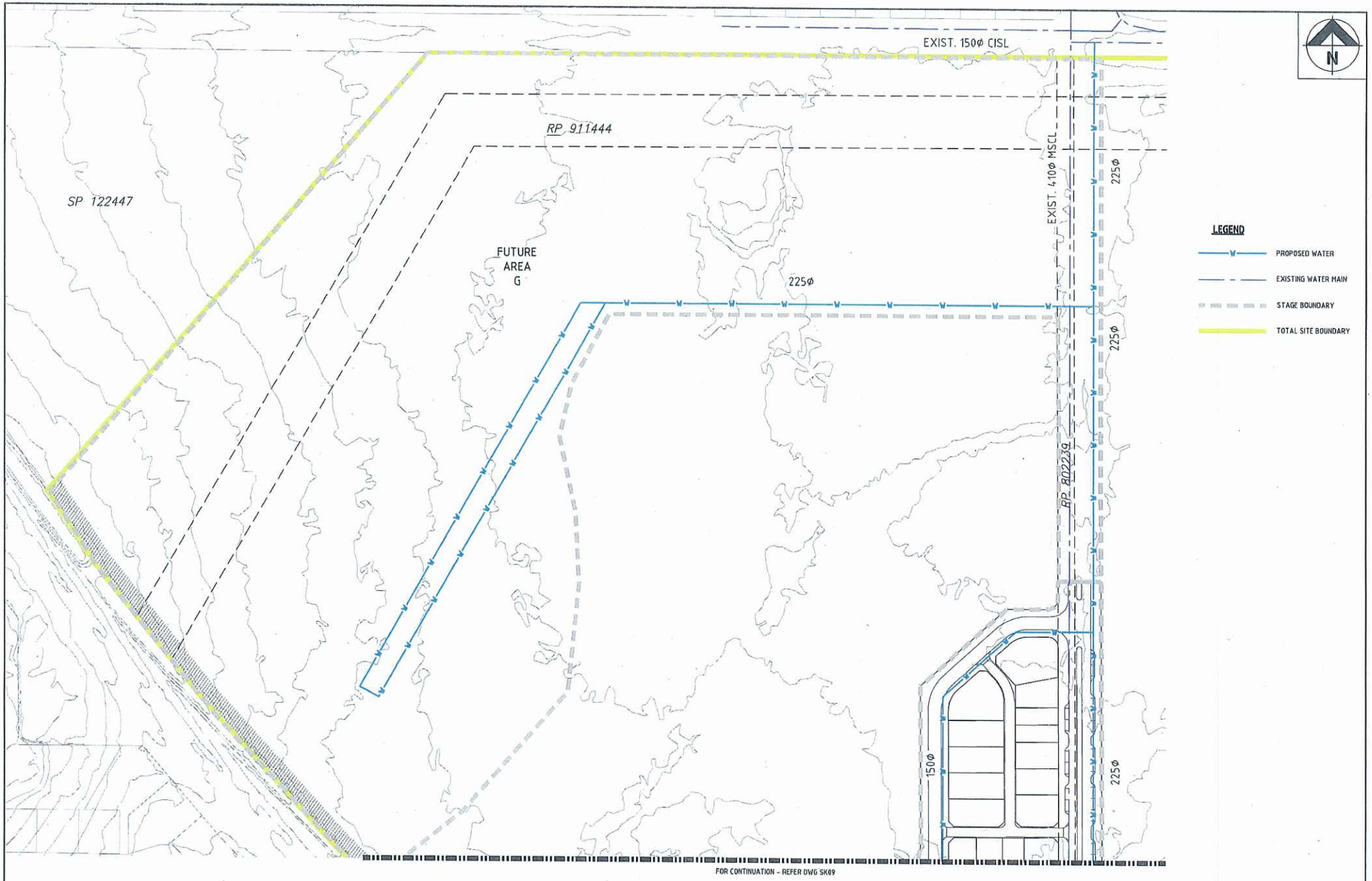

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PROJECT: FITZGIBBON CHASE
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DRAWING TITLE: WATER RETICULATION LAYOUT PLAN - SHEET 5 OF 5

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DRAWN: AL
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DATE: JANUARY 2010

APPROVED: DATE
KEITH HOWELLS REG 7055
STEPHEN HUGHES REG 7755

SCALE: 0 20 40 60m
SCALE 1:1000 (A1)

AUSTRALIA
BRISBANE
555 CORONATION DRIVE TOOWONG QLD 4066
PH: (07) 3371 7066 FAX: (07) 3371 5679
EMAIL - mail@etsgroup.net.au

SUNSHINE COAST
29 INNOVATION PARKWAY BERTHA QLD 4575
PH: (07) 5438 8100 FAX: (07) 5438 8299
EMAIL - mailsc@etsgroup.net.au

PAPUA NEW GUINEA
PORT MORESBY
5TH FLOOR CUTHBERTSON HOUSE PO BOX 968
TELEPHONE: (675) 321 1333 FACSIMILE: (675) 321 7653
EMAIL - etspng@etsgroup.net.au

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