



PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

29 MAY 2013

MEDQ

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

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

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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

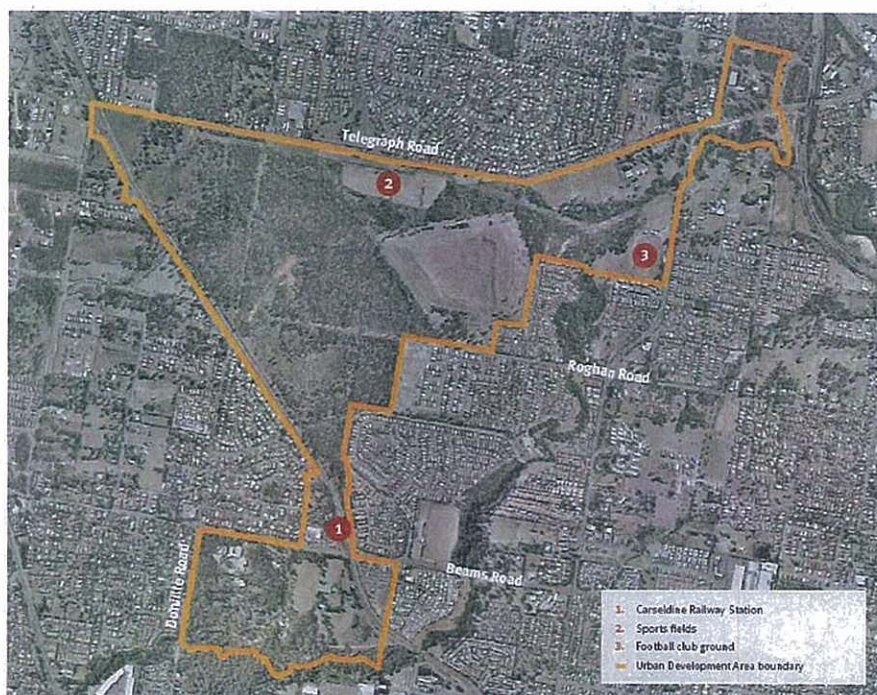
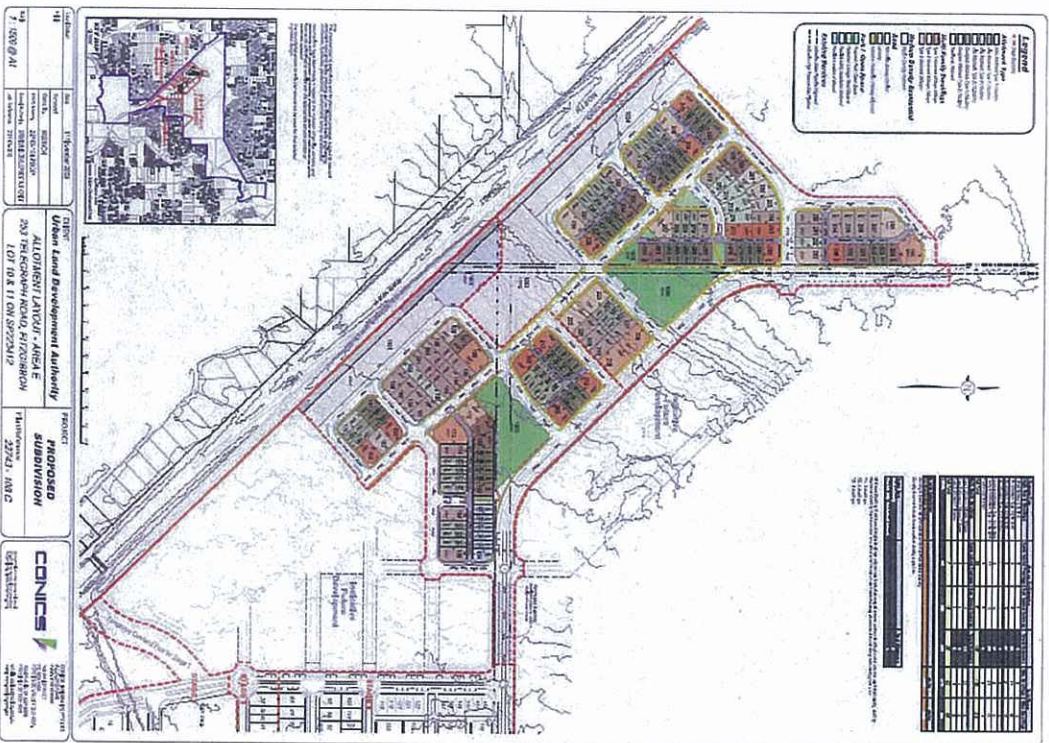


Figure 1-2 Study Area



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 Dwelling	Total Max EP
			Min Dwellings	Max Dwellings		
Single Family Dwellings	LDR	126	126	213	2.5	553
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 Dwelling
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		Total Allotments	Yield Range	
	Conventional Frontage	Rear Loaded Laneway		Min. Dwellings	Max. Dwellings
Single Family Dwellings					
Soho 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					
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 (L/EP/d)	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 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 Brocken 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 Dorrville 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.

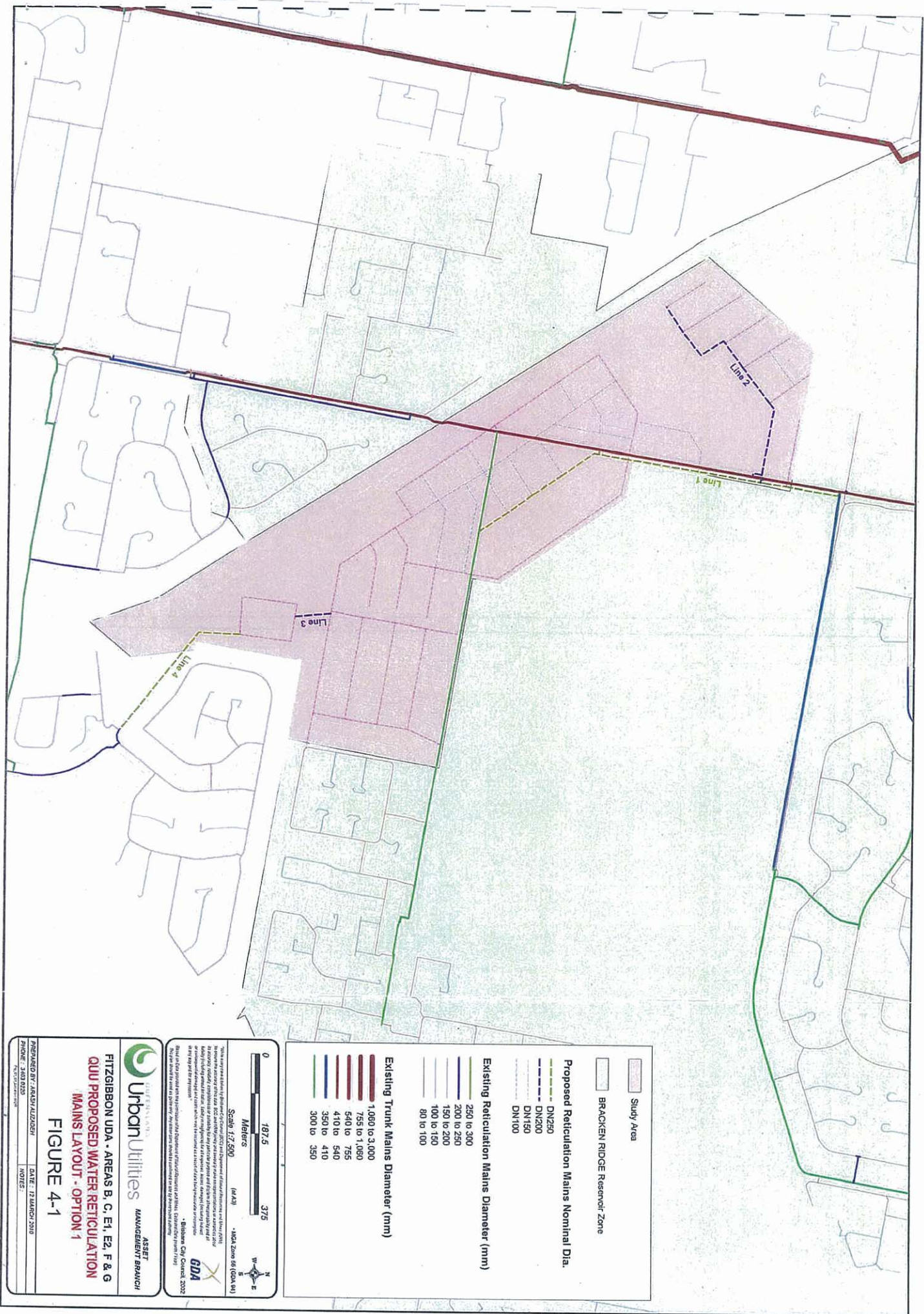
- The proposed DN225 (line 1) is upsized to DN250 as DN225 is not a standard size for BCC's new water mains.
- Two connection points between the proposed Line 3 and the existing DN410 were identified to ensure robust supply to the proposed development.
- The proposed main sizes are expressed as Nominal 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.



Legend

- 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 1,050
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350

Scale 1:2,500 (MAB)

0 187.5 375 Meters

North Arrow

GDA

This map is a plan view of the ground surface and does not show the vertical alignment of the proposed works. The vertical alignment of the proposed works is shown in the cross-sections. The map is based on the best available information and is not a guarantee of accuracy. The map is for informational purposes only and should not be used for any other purpose.

Urban Utilities

ASSET MANAGEMENT BRANCH

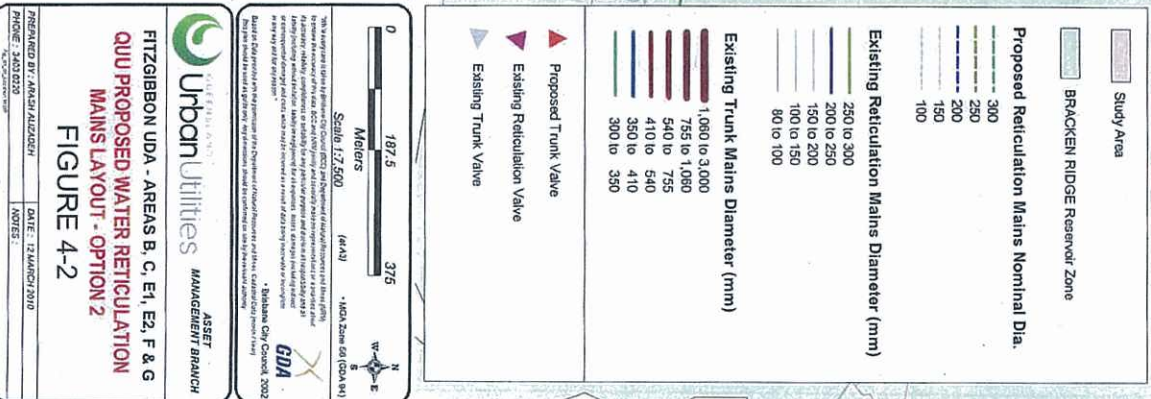
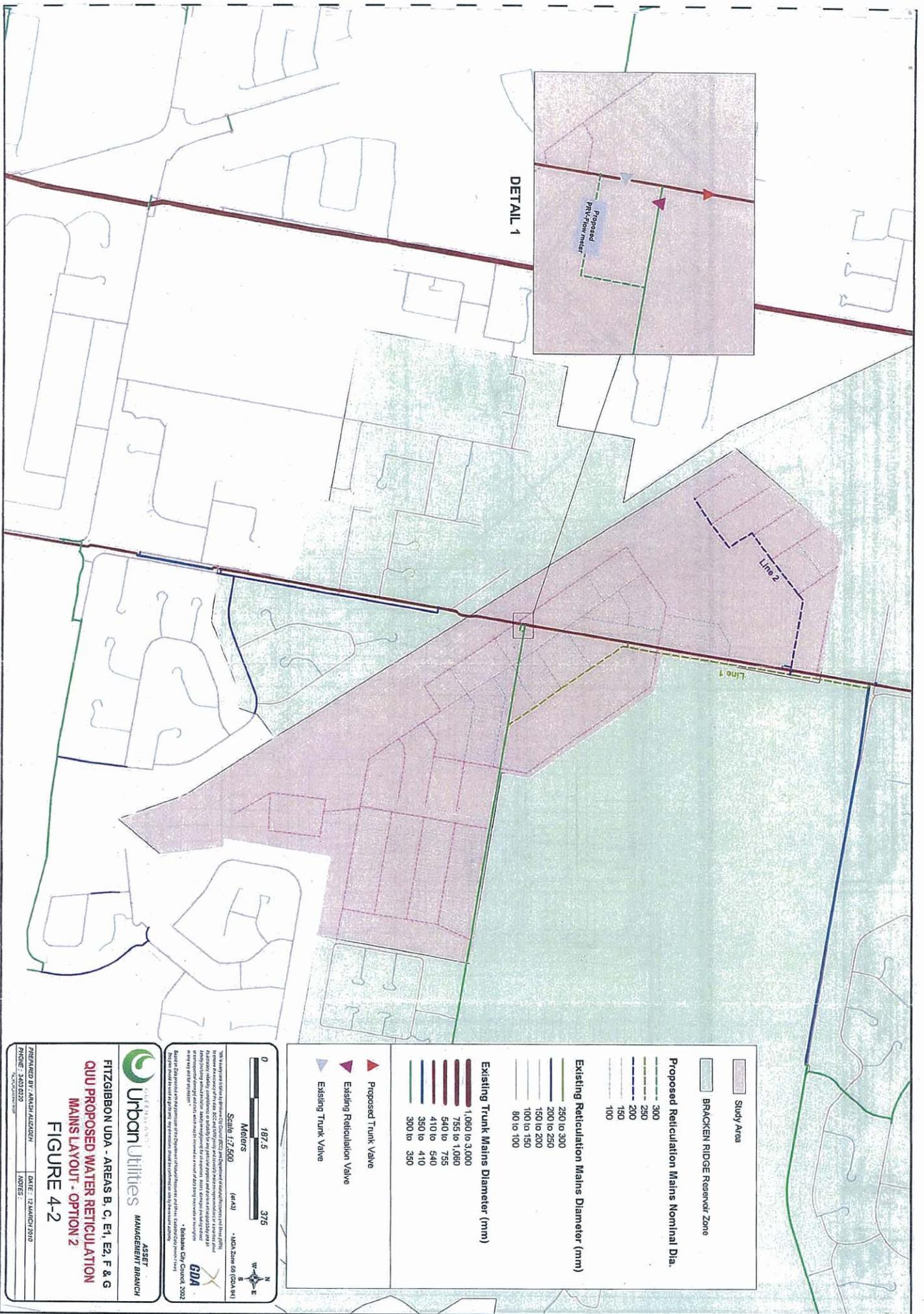
FITZGIBBON UDA - AREAS B, C, E1, E2, F & G

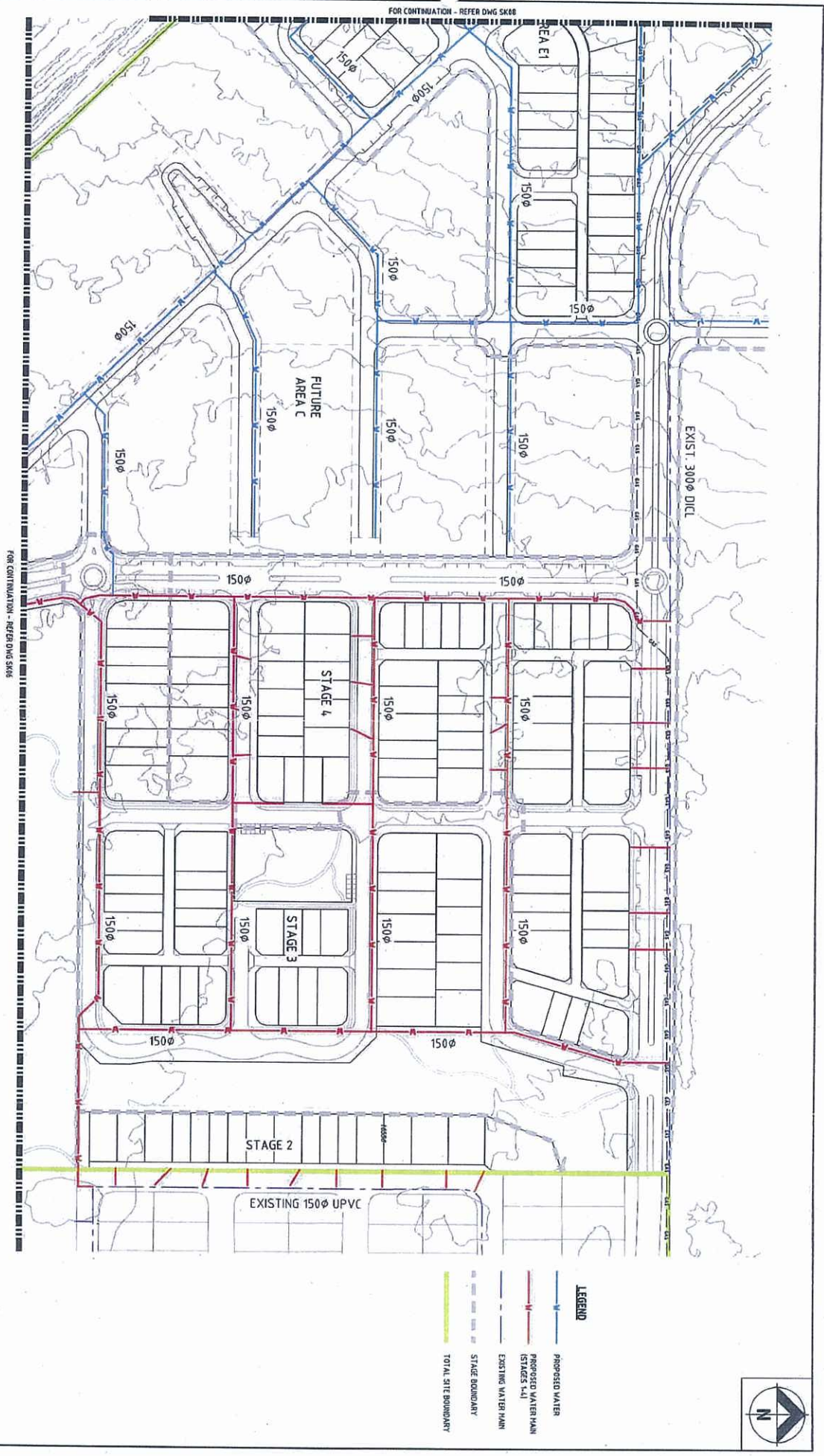
QUU PROPOSED WATER RETICULATION

MAINS LAYOUT - OPTION 1

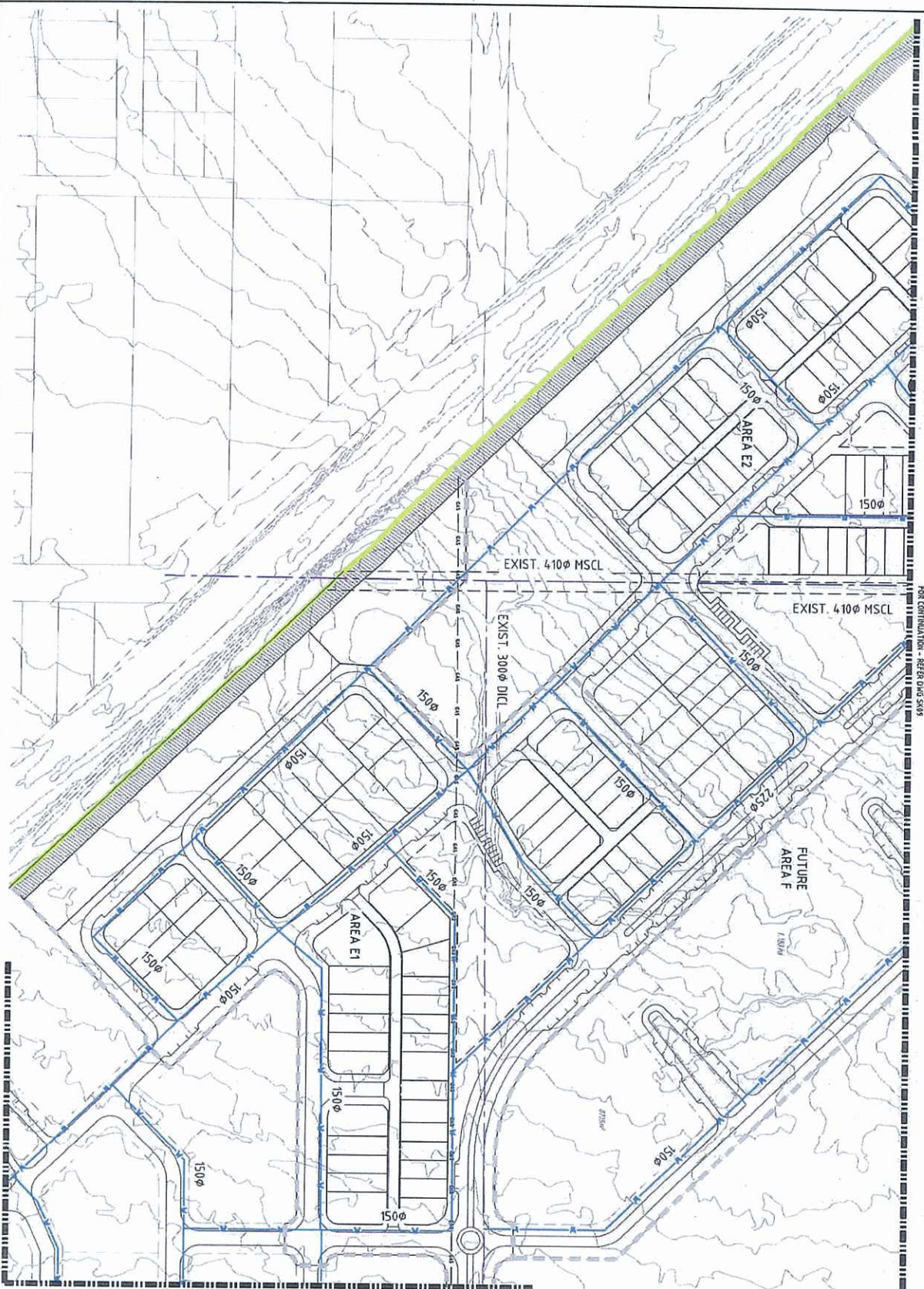
FIGURE 4-1

PREPARED BY: AARAH ALJADHAI DATE: 17 MARCH 2010
 PHONE: 3463 0230 NOTES:





PROPOSED CONTINUATION PROJECT: URBAN LAND DEVELOPMENT AUTHORITY LOCATION: FITZGIBBON CHASE 153 TELEGRAPH ROAD, FITZGIBBON WATER RETICULATION LAYOUT PLAN - SHEET 2 OF 5		DRAWN: AL CHECKED: AL DATE: JANUARY 2010 SCALE: 1:1000 (A1)	SHEET NO: SK07 OF: P1
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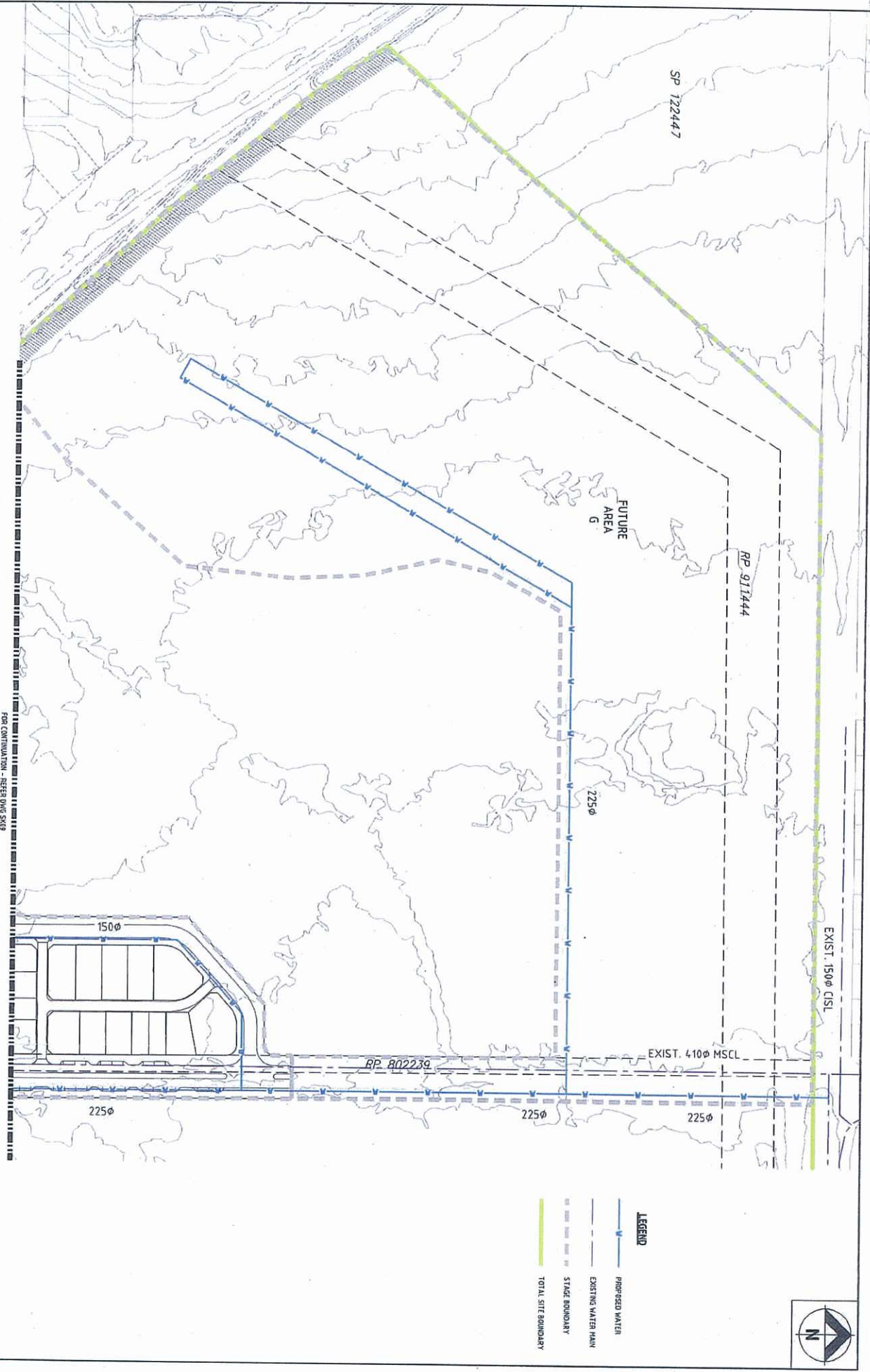
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FOR CONTINUATION - REFER DWG 5K08

TOTAL FIVE COLUMNS

21



FOR CONTINUATION - REFER DWG SK69

PROJECTED CIVIL WORKS PROJECTED FITZGIBBON CHASE 153 TELEGRAPH ROAD, FITZGIBBON WATER RETICULATION LAYOUT PLAN - SHEET 5 OF 5		DATE 2010		SCALE 1:1000 (A1)		ARCHITECTS CIVIL & STRUCTURAL ENGINEERS		JOB CODE UIDSFC SK10 P1	
DESIGN DATE 2010		CHECKED DATE 2010		SCALE 1:1000 (A1)		ARCHITECTS CIVIL & STRUCTURAL ENGINEERS		JOB CODE UIDSFC SK10 P1	

