

**ROCKHAMPTON REGIONAL COUNCIL**

**AMENDED PLANS APPROVED**

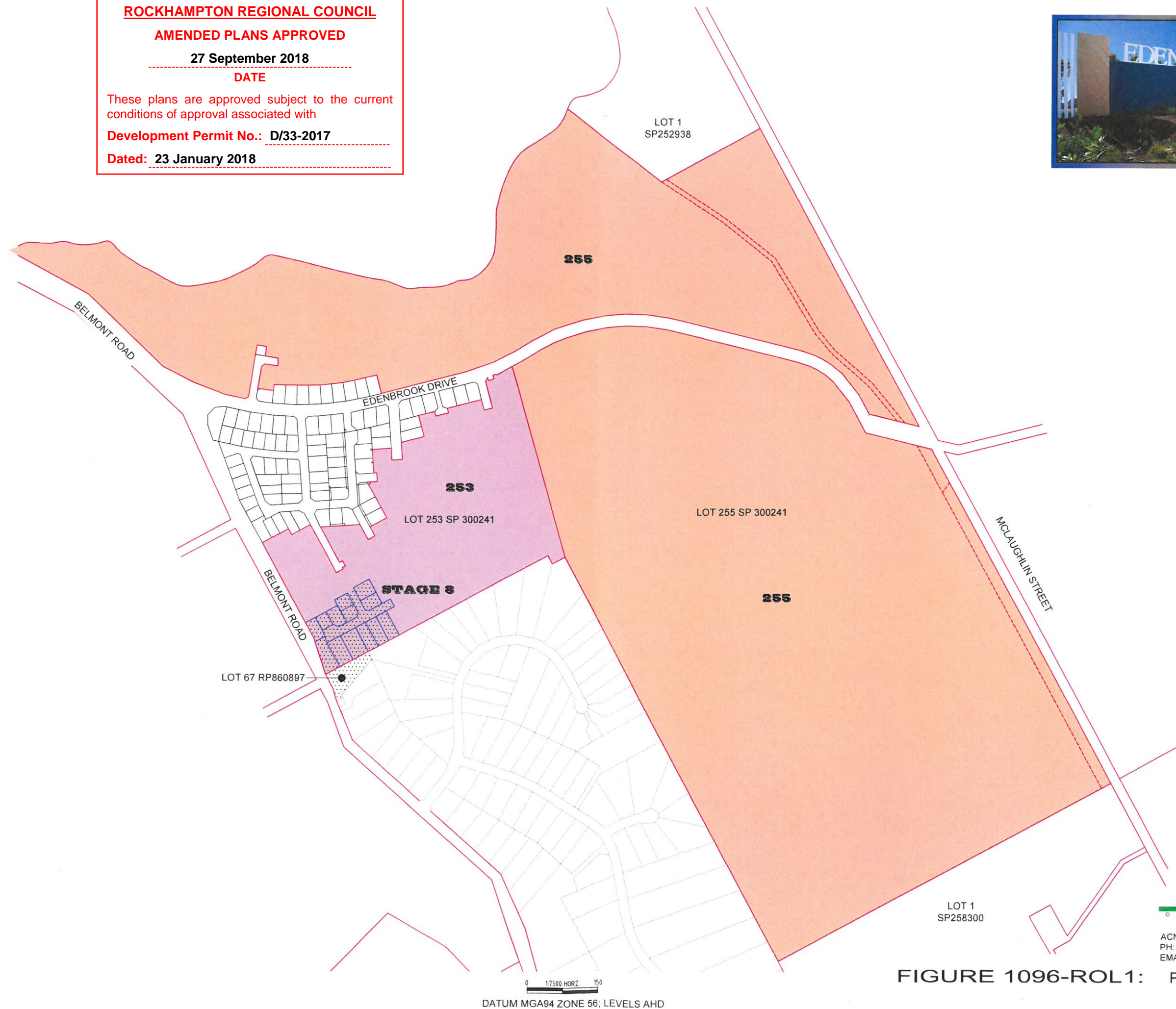
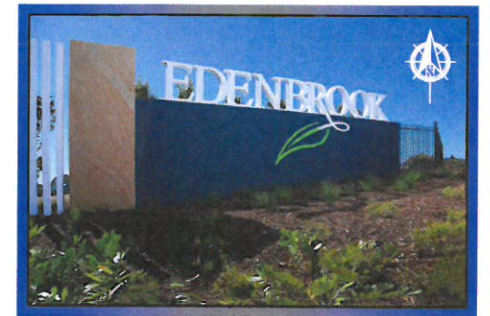
**27 September 2018**

**DATE**

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**Dated: 23 January 2018**






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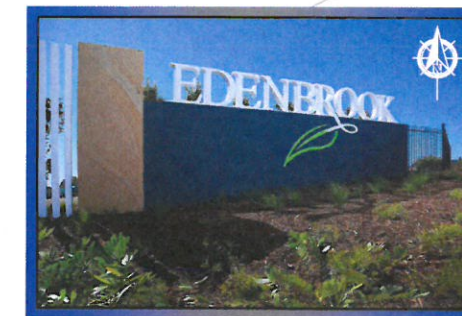
**FIGURE 1096-ROL1: Property Description**

05/09/18 Rev 3



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LEGEND EASEMENTS:	
	SEWER EASEMENT
	SEWER & STORM WATER (ROOF WATER)
	STORM WATER



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BELMONT ROAD

MOSSVALE DRIVE

STAGE 8B

RIDGEWOOD TERRACE

STAGE 8C

STAGE 8A

73m2 (TO BE ADDED TO LOT 67)  
LOT 67 RP860897  
3997m2

EXIST DRAINAGE EMT B RP860897

NEW DRAINAGE EMT

LOT 70 RP859705

LOT SP251142

0 1:1000 HORZ. 20  
DATUM MGA94 ZONE 56; LEVELS AHD

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**FIGURE 1096-ROL2: Proposal Plan**  
05/09/18 Rev 3



LEGEND

W H V

150Ø WATER MAIN; CONNECTION TO LOT (W); HYDRANT(H); VALVE (V)

E E E

UNDERGROUND ELECTRICAL, ALLOTMENT SERVICE TURRET (E), STREET LIGHT (70W)

S

SEWER; MANHOLE,

INTER-ALLOTMENT ROOF WATER DRAINAGE PIT & PIPE

ROAD GULLY PIT & DRAINAGE PIPE

7.5/16

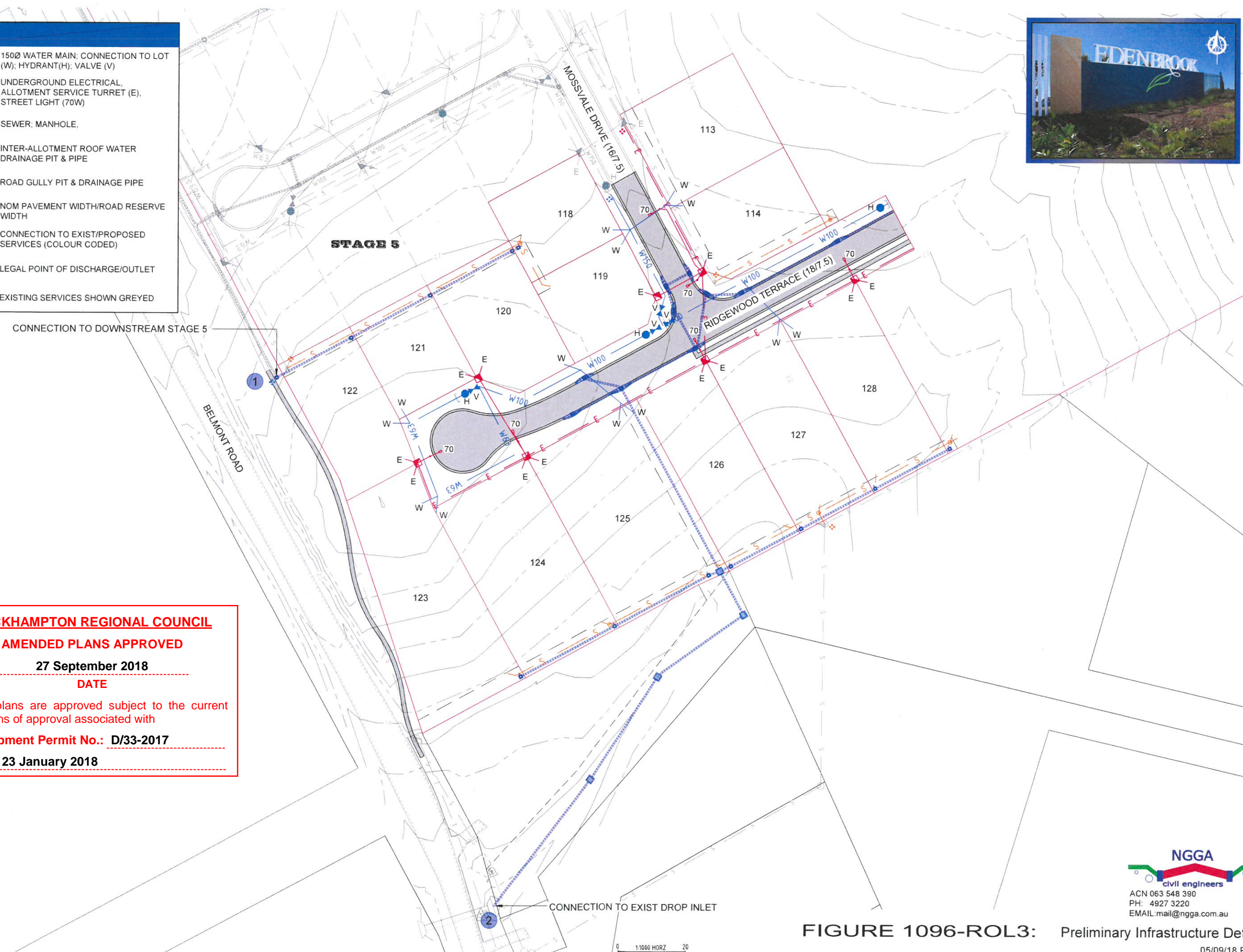
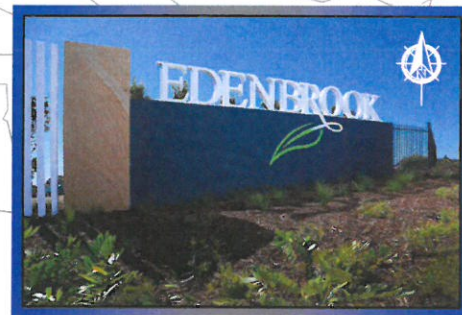
NOM PAVEMENT WIDTH/ROAD RESERVE WIDTH

CONNECTION TO EXIST/PROPOSED SERVICES (COLOUR CODED)

1

LEGAL POINT OF DISCHARGE/OUTLET

EXISTING SERVICES SHOWN GREYED



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FIGURE 1096-ROL3: Preliminary Infrastructure Details

05/09/18 Rev 3

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DATUM MGA94 ZONE 56; LEVELS AHD



1. REFERENCES STORM WATER MANAGEMENT & HEALTHY WATERWAY REQUIREMENTS

The site based storm water management plan has been based on the following publications and guidelines:

- Healthy Waters Music Modeling Guidelines (HWMMG).
- State Planning Policy April 2016 (SPP)
- Queensland Urban Drainage Manual (QUDM)
- Water Sensitive Urban Design (WSUD)
- Storm water quality improvement devices are referred to as SQUID's.

2. OPPORTUNITIES, CONSTRAINTS & PRECEDENTS

The type of development complies with the Council standards for Residential subdivisional works. This development is the continuation of a staged development.

The principal pollutants likely to be generated from the site development will be hydrocarbons, metals, sediment and nutrients such as nitrogen and phosphorus fixed to the sediments.

- This development is part of a staged development. Existing downstream stages have either been constructed, are being constructed or approved for construction. Part of this stage connects to a downstream drainage system in a stage currently before Council for approval. The downstream stage includes storm water improvement devices (SQUID's);
- The existing stages include underground storm water drainage collection systems that have been sized for a 1 in 10 year design storm and incorporate in-line SQUIDs sized for the ultimate catchment area(s);
- Road and allotment layout and sizing, soil types and functionality requirements precludes the practical and feasible use of above ground in-line and end of line SQUIDs (vegetated swales; bioretention beds; wetlands) installed in the road verge area;
- Current best practice policies in Queensland generally acknowledge that other than for small selected infill developments or specific isolated areas such as the central area of large roundabouts, the use of above ground SQUIDs (vegetated swales; bioretention beds) located within the road reserves, generally in the road verge area, are not a long term successful option and are high long term maintenance;
- Council can adopt and set storm water quality targets different to the those recommended in the State Planning Policy if considered more appropriate to the the site and available opportunities and constraints; and
- The storm water management strategy proposed for these current stages is the continuation of the same adopted and approved by Council for the existing constructed stages. Outlet/area 2 has already been included in the treatment provided for a previous stage.

3. RECEIVING WATERS

The nominated receiving waterway is Ramsay Creek. Although some infiltration of storm water is likely to occur at the site, use of groundwater does not occur downstream of the site. Consequently, only surface water Environmental Values (EVs) and water quality objectives (WQOs) have been identified.

4. PROPOSED STORM WATER TREATMENT

After consideration of the available opportunities & constraints, the treatment train for the area not include in a previous stage will comprise reconditioning a downstream swale drain section to promote infiltration to ground water, vegetation growth; and planting of selected high water uptake trees for nutrient extraction.

5. PROPOSED STORM WATER TREATMENT EVALUATION & SIZING

The evaluation & sizing of the components proposed and/or adopted for the treatment train has been carried out using the MUSIC Version 6 computer package and 6 minute rainfall for the period from 1 January 1970 to 31 December 2000. The pollutant types and concentrations evaluated for removal are -

- gross pollutants (GP);
- sediments and dissolved solids, Total Suspended Solids (TSS);
- total dissolved nitrogen (TN); and
- total dissolved phosphorus (TP).

All catchments have been modeled as 'Urban Residential' split catchments. The split catchment surface types & associated runoff generation parameters; pollutant concentrations and generation parameters applicable to these type of catchments and surface compositions recommended in Healthy Waters Music Modeling Guidelines have been adopted. Details of these areas are shown in Table 1.

A reconditioned downstream swale drain section including planting of high water uptake trees has been adopted as the most appropriate treatment for discharges from outlet/area 1. The design parameters adopted for the treatment capacity of the treatment area have been selected from the HWMMG publication for swales plus a 3mm/hr exfiltration allowance for nutrient uptake by trees within the treatment area.

Outlet/area 2 has already been included in the treatment provided for the constructed downstream stages.

6. PERFORMANCE EVALUATION

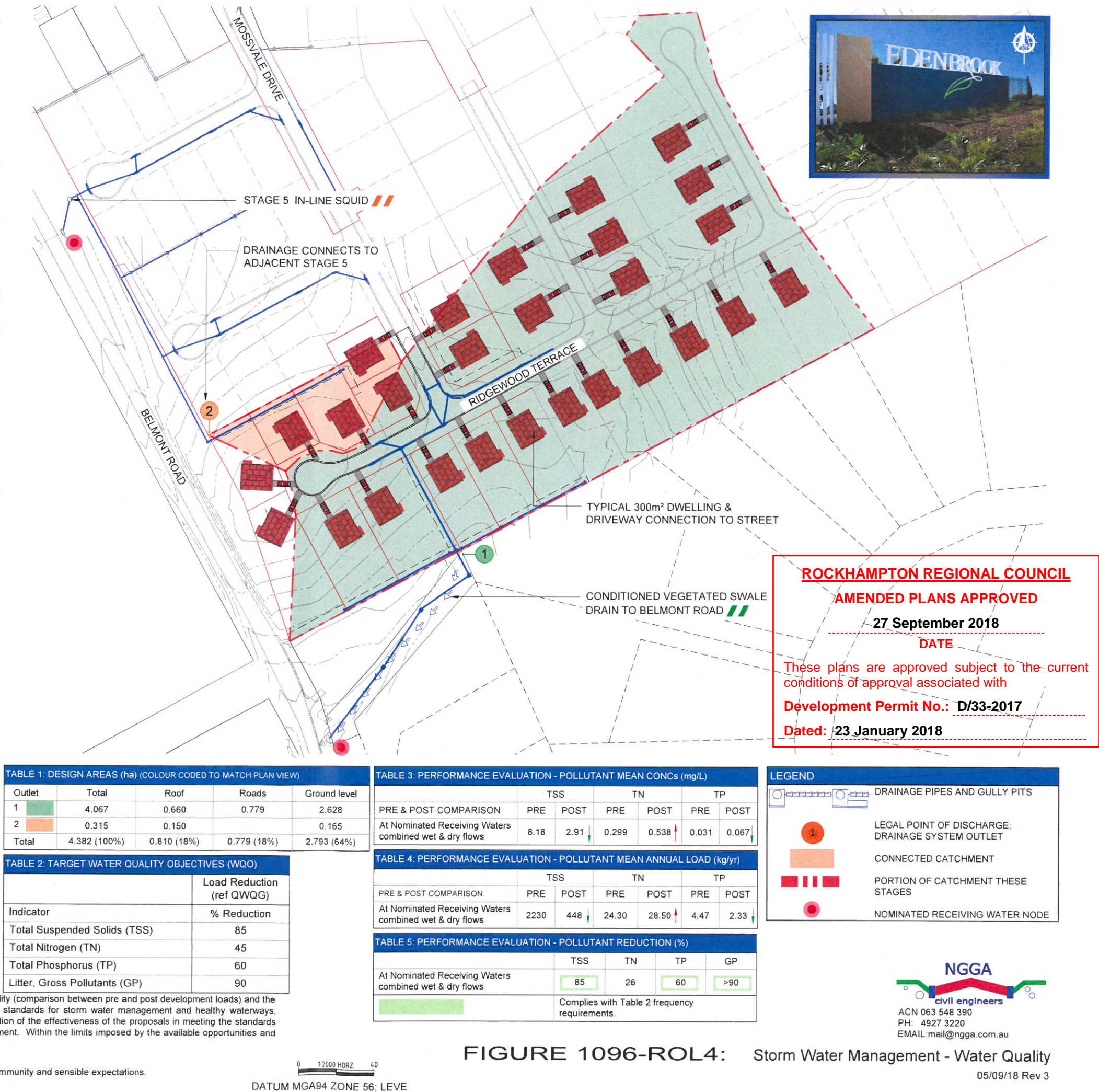
Details of the catchments applicable to this stage are summarised in Table 1. Details of the SPP suggested target water quality objectives (WQO) for storm water discharging from the site to the receiving waters based on nutrient load reduction are summarised in Table 2. Details of performance of the treatment train measured at the nominated receiving water for the whole of the upstream catchments are summarised in Tables 3 to 5. Tables 3 and 4 provide a comparison between the pre and post development scenario. Table 5 provides details of the post development pollutant load reductions for the proposed treatment train and evaluation in relation to target objectives in Table 2

7. CERTIFICATION

An assessment has been carried out of the impact from this proposed development stage on storm water quality (comparison between pre and post development loads) and the effectiveness of the proposed site water quality management in meeting the suggested SPP water quality standards for storm water management and healthy waterways. Details of the nominated standards, comparison between pre and post development pollutant loads & evaluation of the effectiveness of the proposals in meeting the standards have been provided. This is a stage update to the previously approved management for the whole development. Within the limits imposed by the available opportunities and constraints and existing precedents, the proposed storm water management should provide -

- Treatment comparable to the Council approved proposals for existing constructed stages;
- An acceptable water quality management strategy that is the best achievable, cost effective and within community and sensible expectations.

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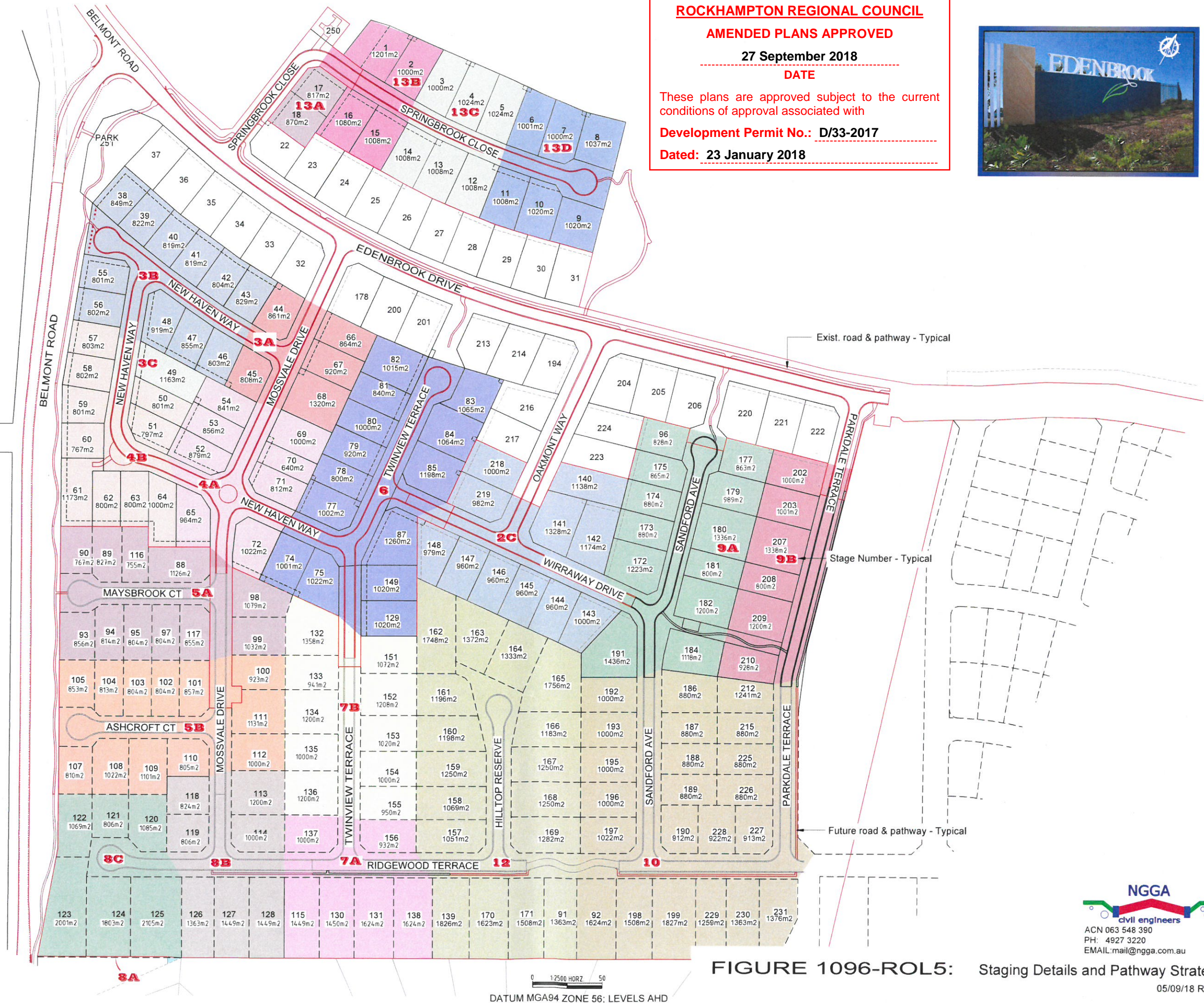
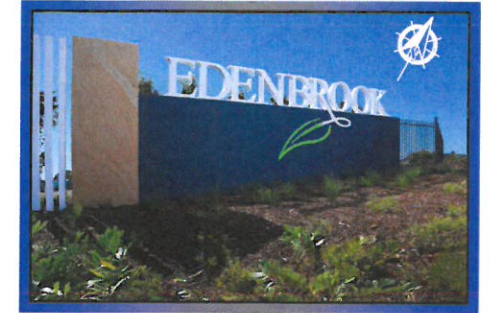
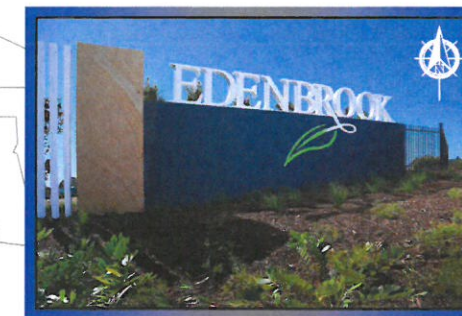


FIGURE 1096-ROL5: Staging Details and Pathway Strategy

05/09/18 Rev 3



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ALLOTMENT COVERING/  
VEGETATION - HYDROMULCH

FOOTPATH TURFING

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LEGEND	
	HYDROMULCH/CHIP MULCH TO DISTURBED ROAD AND ALLOTMENT AREAS NOT COVERED WITH NEW WORKS
	FOOTPATH TREES. REFER TABLE THIS PLAN
	TURF & FOOTPATH TREATMENT
	UNDERGROUND SERVICES (SEWER)
	ROAD/ALLOTMENT DRAINAGE.

LANDSCAPING TREATMENT THROUGH EXISTING EASEMENT TO BE AGREED TO WITH LANDOWNERS. EXISTING EROSION TO BE REMEDIATED

0 1:1000 HORZ 20

DATUM MGA94 ZONE 56; LEVELS AHD

**FIGURE 1096-ROL6: Concept Landscaping Plan**

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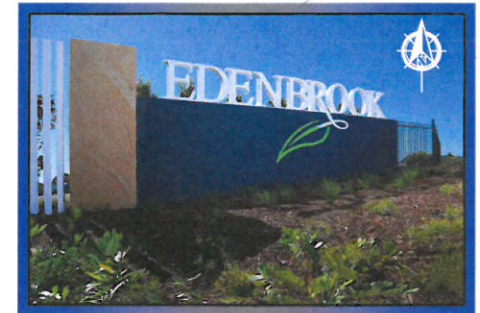
**Dated: 23 January 2018**

**LEGEND EASEMENTS**

SEWER EASEMENT

SEWER & STORM WATER (ROOF WATER)

STORM WATER



**BUILDING LOCATION ENVELOPE SETBACKS**

- FRONT BOUNDARY - 6.0m UNO
- REDUCED FRONT BOUNDARY SETBACK - 4.0m UNO
- SIDE BOUNDARY - 1.5m (REFER NOTE 1. (II) )
- REAR BOUNDARY - 2.0m UNO

ANNOTATED AREAS SHOWN WITHIN EACH LOT DENOTES THE RESPECTIVE BUILDING LOCATION ENVELOPE AREA FOR EACH LOT .

ALL SERVICES ARE CLEAR OF THE BUILDING LOCATION ENVELOPES

**NOTES**

- ALL SETBACKS TO BUILDINGS OR STRUCTURES ARE TO BE IN ACCORDANCE WITH THE QDC MP 1.2, EXCEPT FOR THE FOLLOWING:-
  - ROAD, SIDE, REAR AND / OR ACCESS EASEMENT BOUNDARY SETBACK FOR STRUCTURES ARE AS DEPICTED ON THE PLAN
  - SIDE BOUNDARY SETBACKS TO THE OUTERMOST PROJECTION ARE:
    - WHERE THE HEIGHT OF THAT PART IS 4.5M OR LESS - 1.5M
    - WHERE THE HEIGHT OF THAT PART IS GREATER THAN 4.5M BUT NOT MORE THAN 8.5M - 2.0M

- SITES WITH A GRADIENT GREATER THAN 15% WILL HAVE SPECIAL DESIGN NEEDS
- SWIMMING POOLS ARE PERMITTED TO BE LOCATED WITHIN THE ROAD AND SIDE / REAR BOUNDARY SETBACK IN ACCORDANCE WITH QDC MP 1.2 REQUIREMENT

**DEVELOPMENT CONDITIONS**

- MAXIMUM BUILDING HEIGHT FOR ANY DWELLING IS 7m ABOVE GROUND LEVEL TO THE EAVES AND 9m TO THE HIGHEST POINT ON THE ROOF.
- NO PART OF THE DWELLING INCLUDING EAVES, MAY BE CONSTRUCTED OUTSIDE THE BUILDING LOCATION ENVELOPE.

DATUM MGA94 ZONE 56; LEVELS AHD

**FIGURE 1096-ROL7: Building Setback Details**

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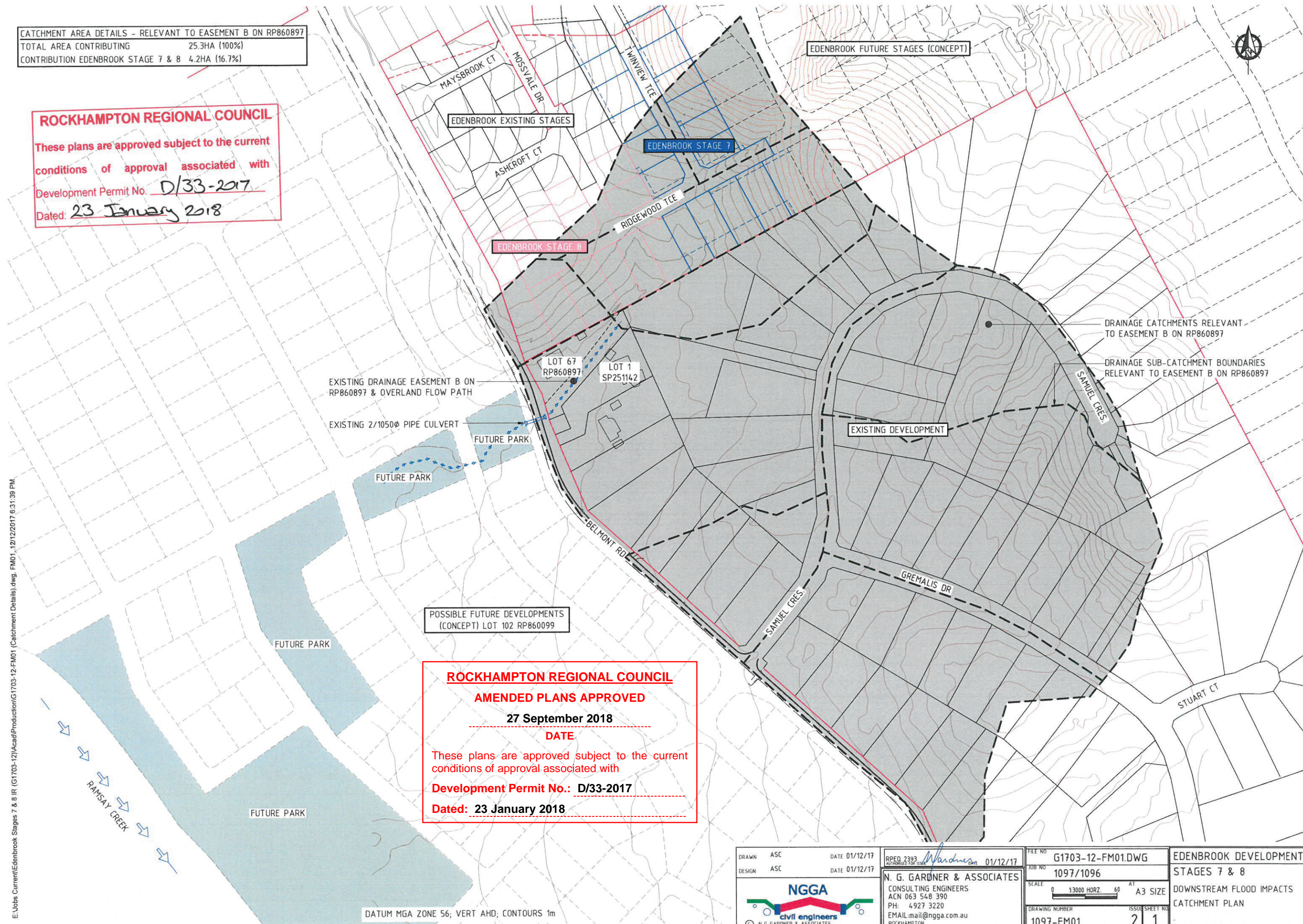
05/09/18 Rev 3



CATCHMENT AREA DETAILS - RELEVANT TO EASEMENT B ON RP860897  
TOTAL AREA CONTRIBUTING 25.3HA (100%)  
CONTRIBUTION EDENBROOK STAGE 7 & 8 4.2HA (16.7%)

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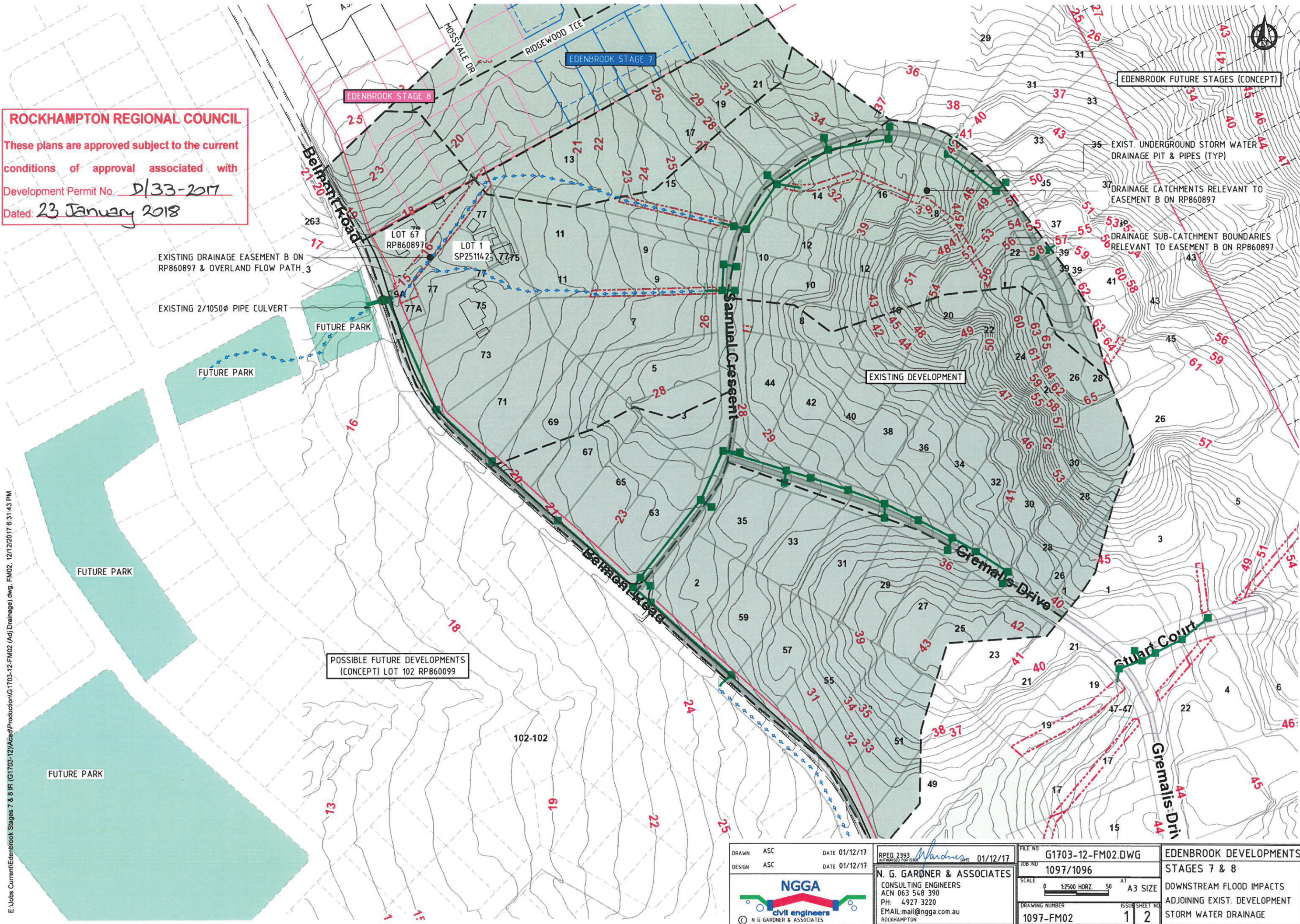
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DATUM MGA ZONE 56; VERT AHD; CONTOURS 1m


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PH: 4927 3220		EMAIL: mail@ngga.com.au		DRAWING NUMBER: 1097-FM01	CATCHMENT PLAN
ROCKHAMPTON				ISSUE SHEET NO: 2 1	



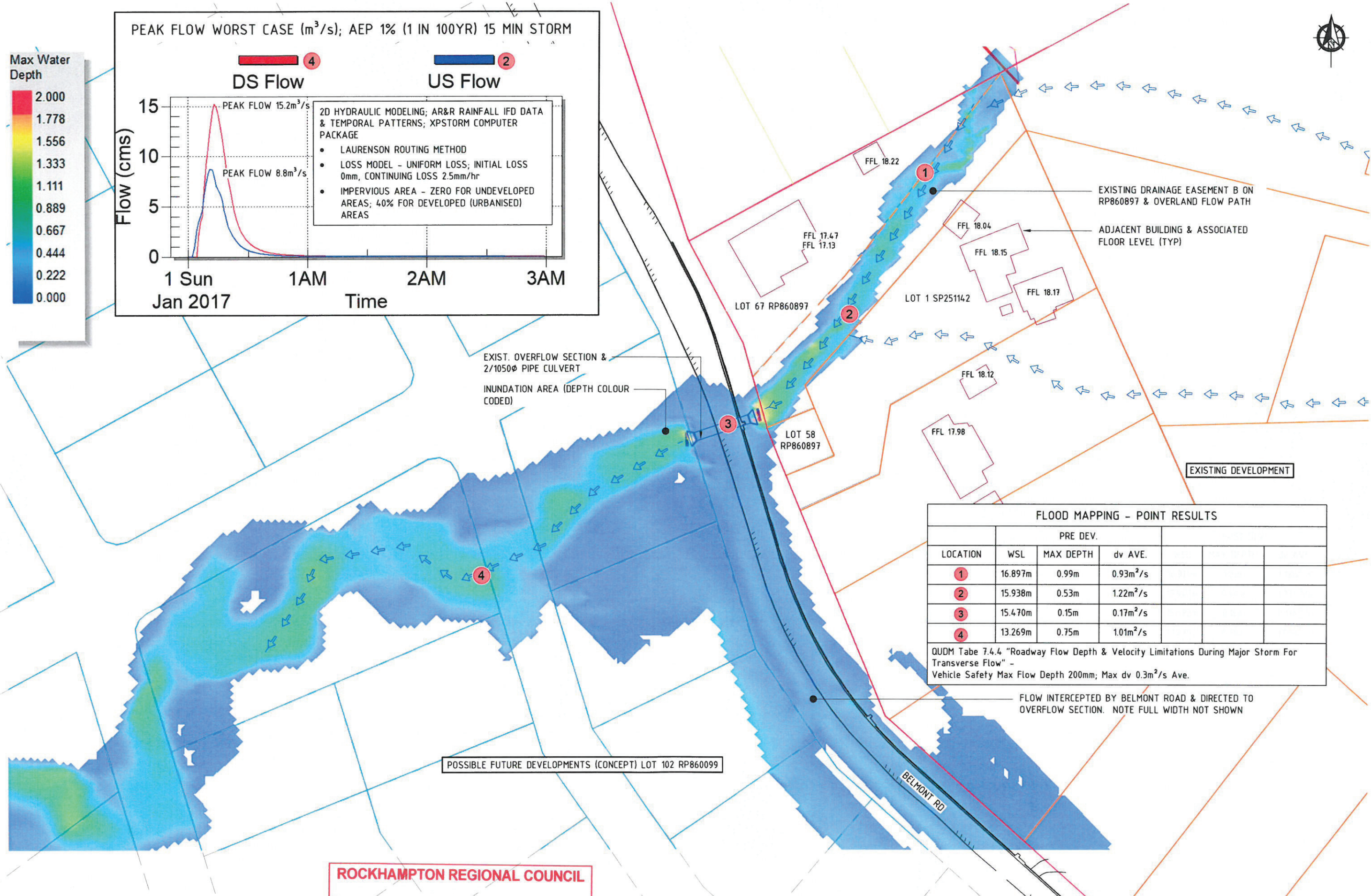
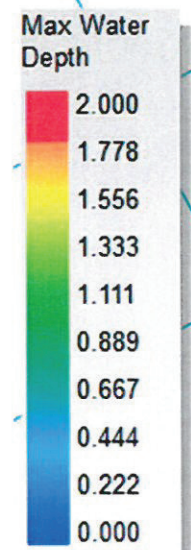
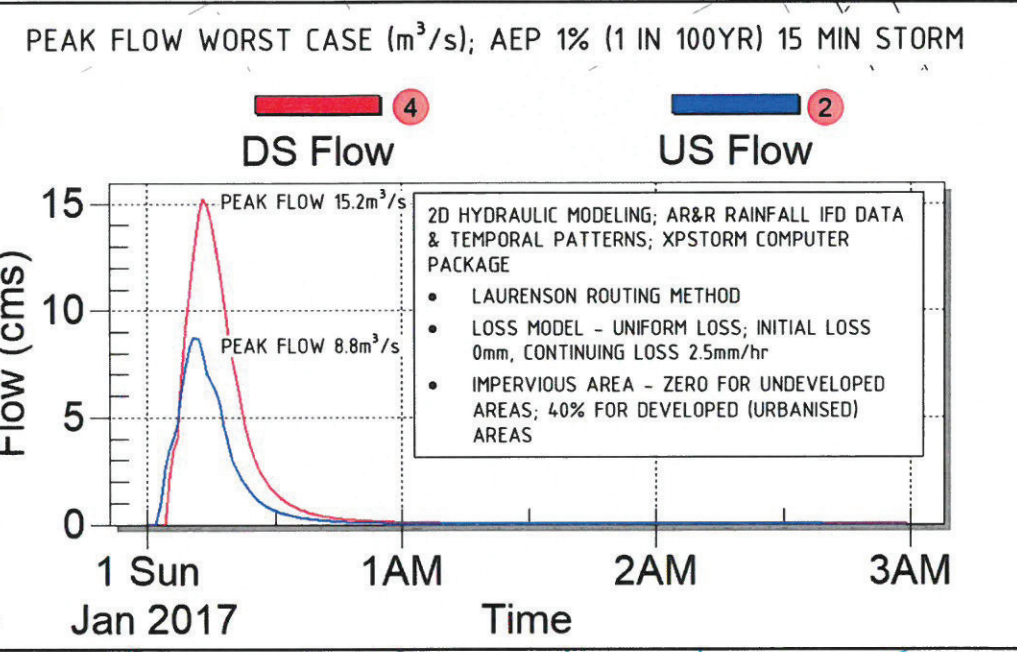
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				ACN 063 548 390		AT	A3 SIZE	ADJOINING EXIST. DEVELOPMENT
				PH: 4927 3220		DRAWING NUMBER	1097-FM02	STORM WATER DRAINAGE
				EMAIL: mail@ngga.com.au		ISSUE SHEET NO	1 2	
				ROCKHAMPTON				





FLOOD MAPPING - POINT RESULTS					
LOCATION	PRE DEV.				
	WSL	MAX DEPTH	dv AVE.		
1	16.897m	0.99m	0.93m <sup>2</sup> /s		
2	15.938m	0.53m	1.22m <sup>2</sup> /s		
3	15.470m	0.15m	0.17m <sup>2</sup> /s		
4	13.269m	0.75m	1.01m <sup>2</sup> /s		

QUDM Tab 7.4.4 "Roadway Flow Depth & Velocity Limitations During Major Storm For Transverse Flow" - Vehicle Safety Max Flow Depth 200mm; Max dv 0.3m<sup>2</sup>/s Ave.

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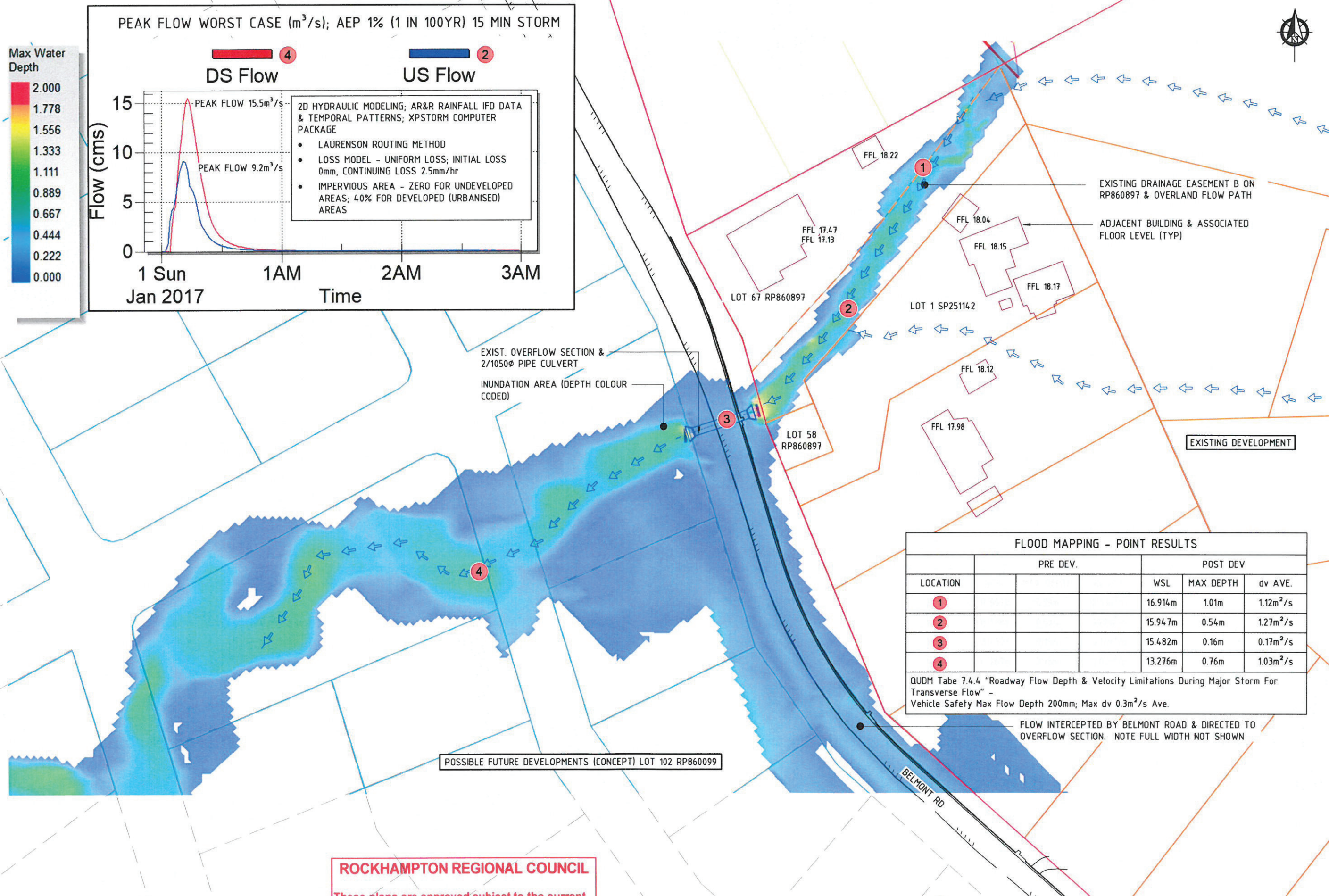
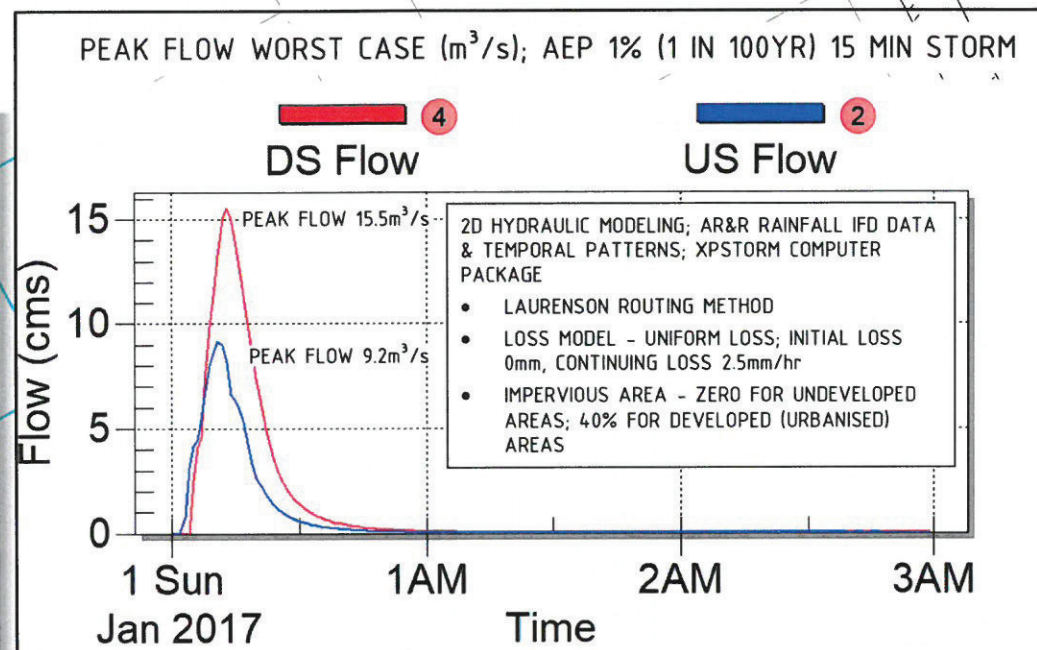
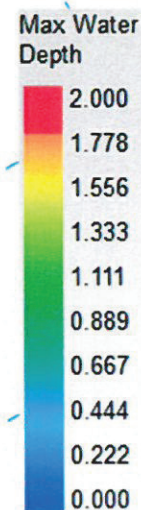
Dated: 23 January 2018

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FLOOD MAPPING - POINT RESULTS						
LOCATION	PRE DEV.			POST DEV		
				WSL	MAX DEPTH	dv AVE.
1				16.914m	1.01m	1.12m <sup>2</sup> /s
2				15.947m	0.54m	1.27m <sup>2</sup> /s
3				15.482m	0.16m	0.17m <sup>2</sup> /s
4				13.276m	0.76m	1.03m <sup>2</sup> /s

QUDM Tab 7.4.4 "Roadway Flow Depth & Velocity Limitations During Major Storm For Transverse Flow" - Vehicle Safety Max Flow Depth 200mm; Max dv 0.3m<sup>2</sup>/s Ave.

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DESIGN: ASC	DATE: 01/12/17	01/12/17	JOB NO: 1097/1096	STAGES 7 & 8	
N. G. GARDNER & ASSOCIATES		CONSULTING ENGINEERS	SCALE: 0 1:1000 HORZ. 20 AT A3 SIZE	DOWNSTREAM FLOOD IMPACTS	
ACN 063 548 390		PH: 4927 3220	DRAWING NUMBER: 1097-FM04	1 IN 100YR FLOOD MAPPING	
EMAIL: mail@ngga.com.au		ISSUE SHEET NO: 2 4		POST EDENBROOK STAGE 7 & 8	
ROCKHAMPTON					



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EDENBROOK STAGE 8

EDENBROOK STAGE 7

PROPOSED ROADS & UNDERGROUND  
DRAINAGE STAGES 7 & 8

INDICATIVE STAGE 8 STORM WATER  
DRAINAGE CONNECTION

INDICATIVE STAGE 8 ALLOTMENT  
REAR OF ALLOTMENT DRAINAGE

EXIST. DWELLING (TYP)

PROPOSED FIELD INLET (TYP)

EXISTING DRAINAGE EASEMENT B ON  
RP860897 & OVERLAND FLOW PATH

UNDER GROUND PIPE DRAINAGE  
CONNECTION FROM STAGES 7 & 8

EXISTING 2/1050Ø PIPE CULVERT

EXIST. UNDERGROUND STORM WATER  
DRAINAGE PIT & PIPES (TYP)

POSSIBLE FUTURE DEVELOPMENTS (CONCEPT) LOT 102 RP860099

LOT 67 RP860897

LOT 1 SP251142

LOT 58  
RP860897

EXISTING DEVELOPMENT

DRAWN ASC DATE 01/12/17  
DESIGN ASC DATE 01/12/17



RPEQ 2393  
N. G. GARDNER & ASSOCIATES  
CONSULTING ENGINEERS  
ACN 063 548 390  
PH: 4927 3220  
EMAIL: mail@ngga.com.au  
ROCKHAMPTON

FILE NO G1703-12-FM02.DWG  
JOB NO 1097/1096  
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DRAWING NUMBER 1097-FM05  
ISSUE SHEET NO 2 5

EDENBROOK DEVELOPMENTS  
STAGES 7 & 8  
DOWNSTREAM FLOOD IMPACTS  
EDENBROOK STAGES 7 & 8 STORM  
WATER DRAINAGE CONNECTION