Appendix 2A

Bulk Earthworks Plans Related to the Southern Section of Lot 54 by VDM Consulting.





RIVERSIDE CENTRAL

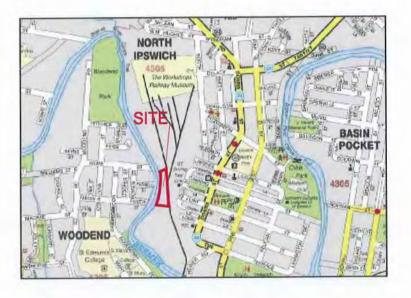
SOUTHERN BULK EARTHWORKS

CONTRACT QC00:3754:04



LOCALITY PLAN

	SCHEDULE OF DRAWINGS			
Drawing No. Drawing Title				
SK03	BULK EARTHWORKS OVERALL LAYOUT PLAN			
SK020	DELETED			
SK021	BULK EARTHWORKS FINISHED SURFACE LEVELS			
SK022	BULK EARTHWORKS CROSS SECTIONS No. 1			
SK023	BULK EARTHWORKS CROSS SECTIONS No. 2			
SK024	BULK EARTHWORKS CROSS SECTIONS No. 3			
SK025	BULK EARTHWORKS CROSS SECTIONS No. 4			
SK026	BULK EARTHWORKS CROSS SECTIONS No. 5			
SK030	SEDIMENT BASIN OUTLET PLAN, SECTION AND DETAILS			
SK100	EROSION AND SEDIMENT CONTROL SHEET 1 PRE-CONSTRUCTION			
SK101	EROSION AND SEDIMENT CONTROL SHEET 2 TECHNICAL NOTES AND DETAILS			
SK102	EROSION AND SEDIMENT CONTROL SHEET 3 CONSTRUCTION PERIOD			
SK500	SP222487			



NEIGHBOURHOOD PLAN

PREPARED FO

LEDA DEVELOPMENTS PTY LTD

CONSULTING
BURCHILL

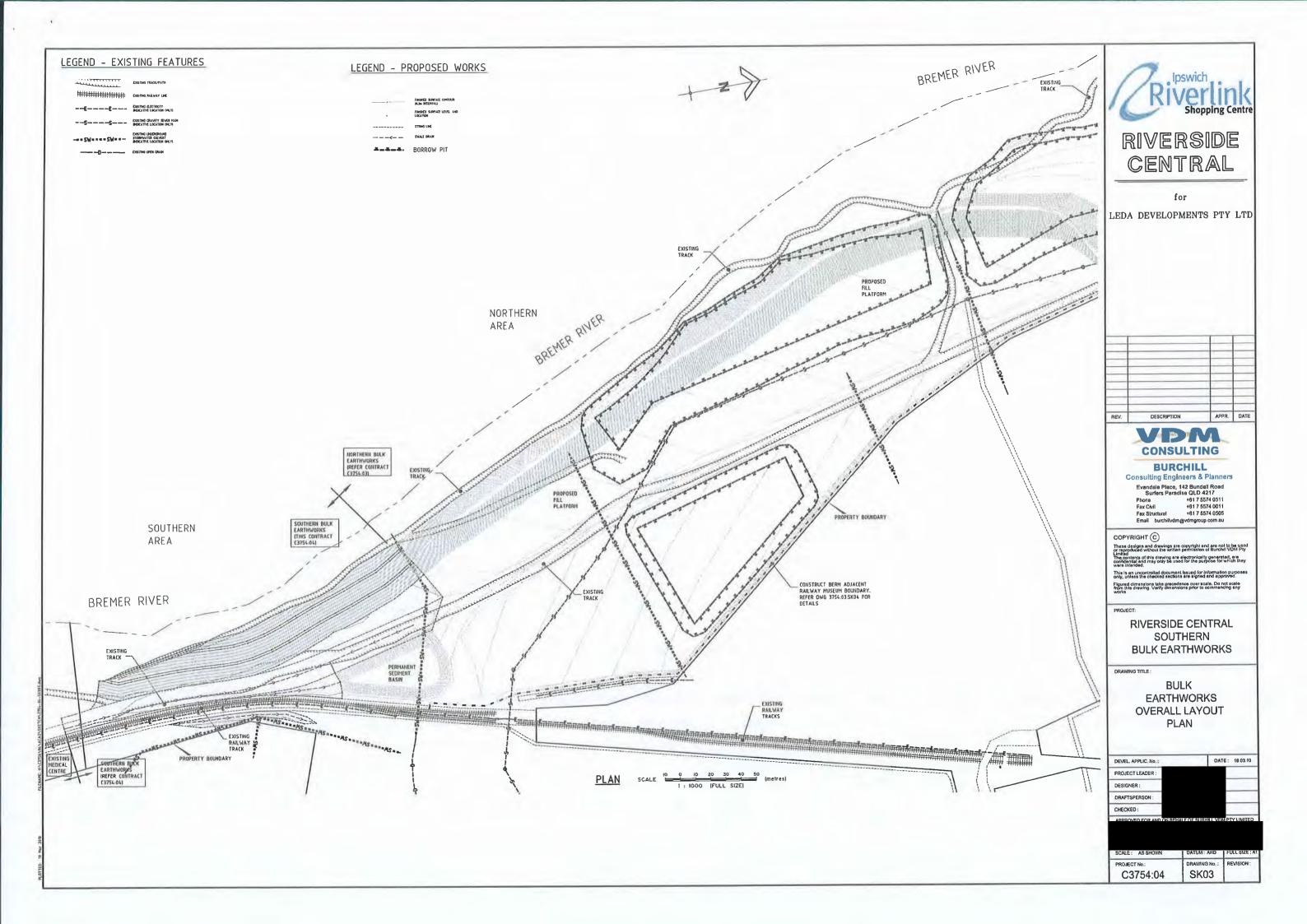
Consulting Engineers & Planners

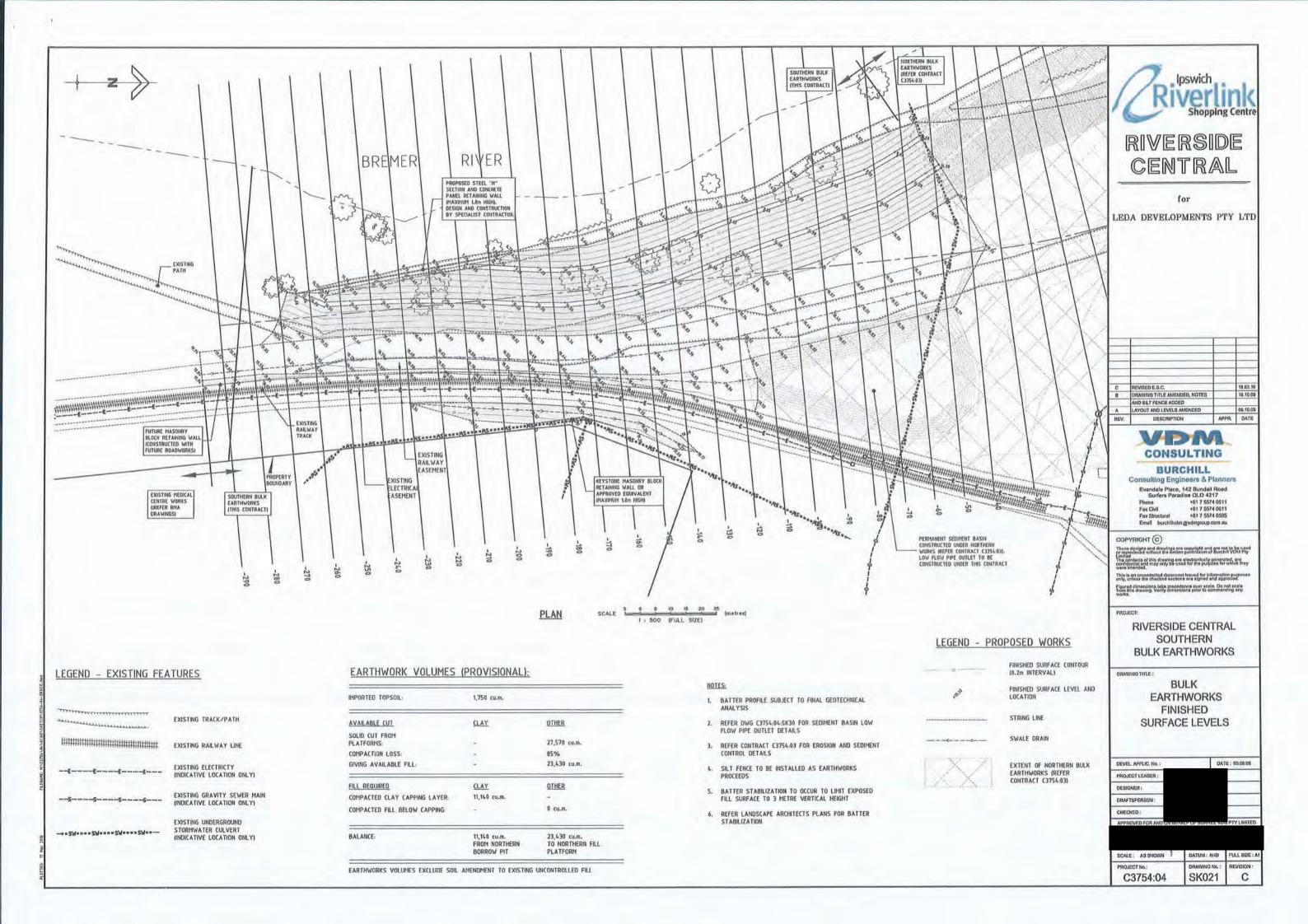
Level 8, Australia Fair Office Tower 42 Marine Parade, Southport QLD 4215 PO Box 3766, Australia Fair, Southport QLD 4215

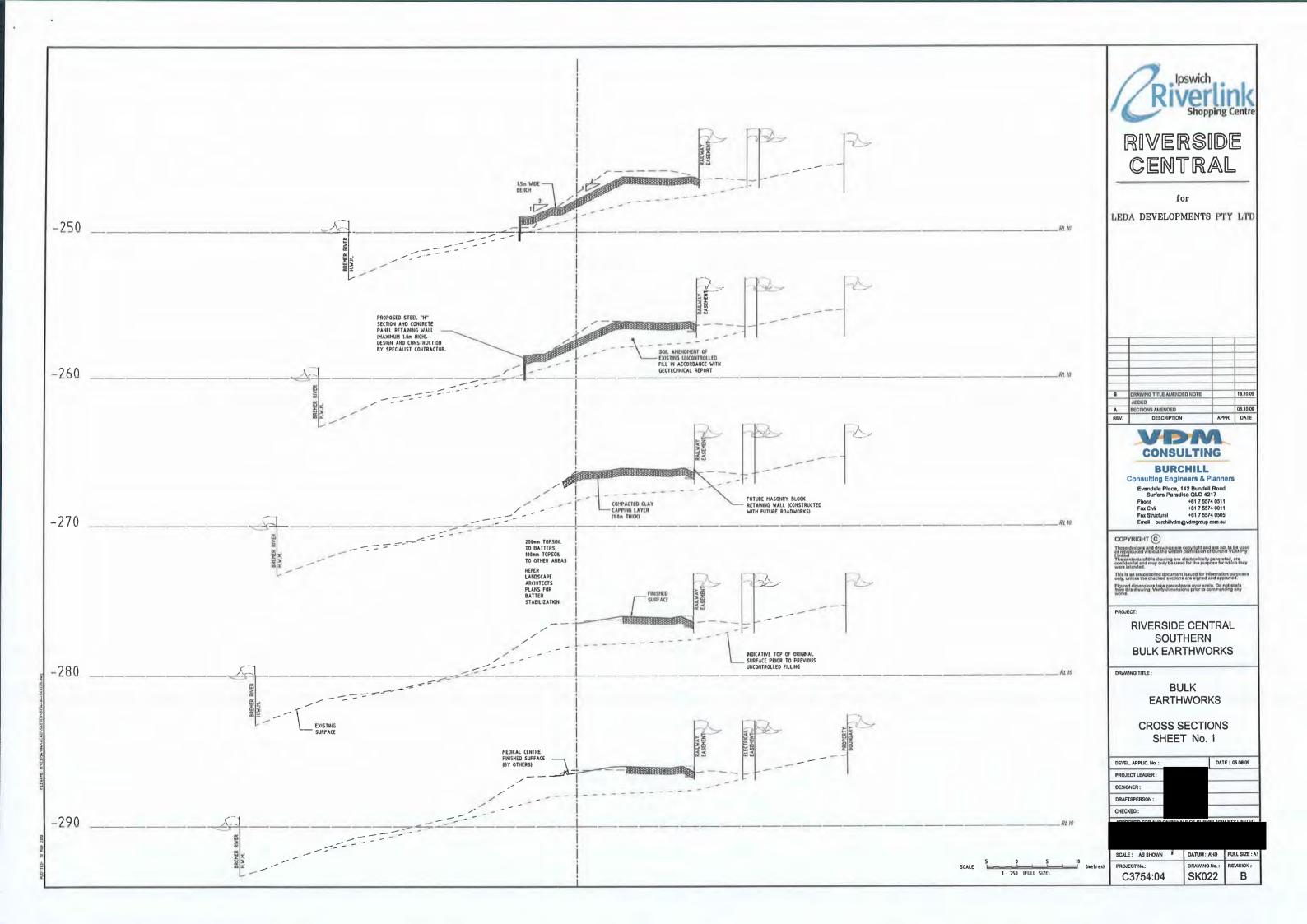
> Phone +61 7 5509 6400 Fax +61 7 5509 6411 Email goldcoast @vdmgroup.com.au

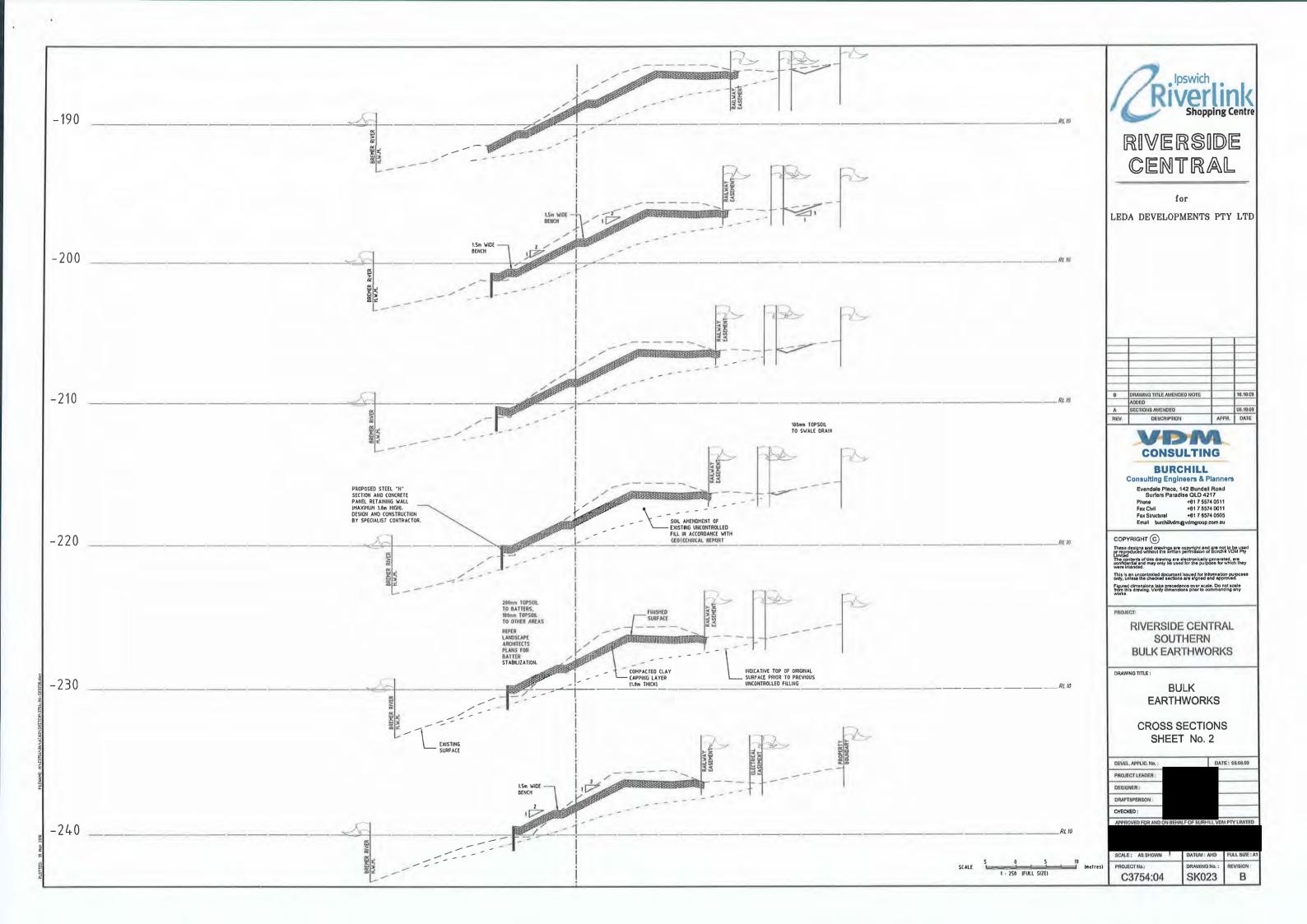
ASSOCIATED CONSULTANTS

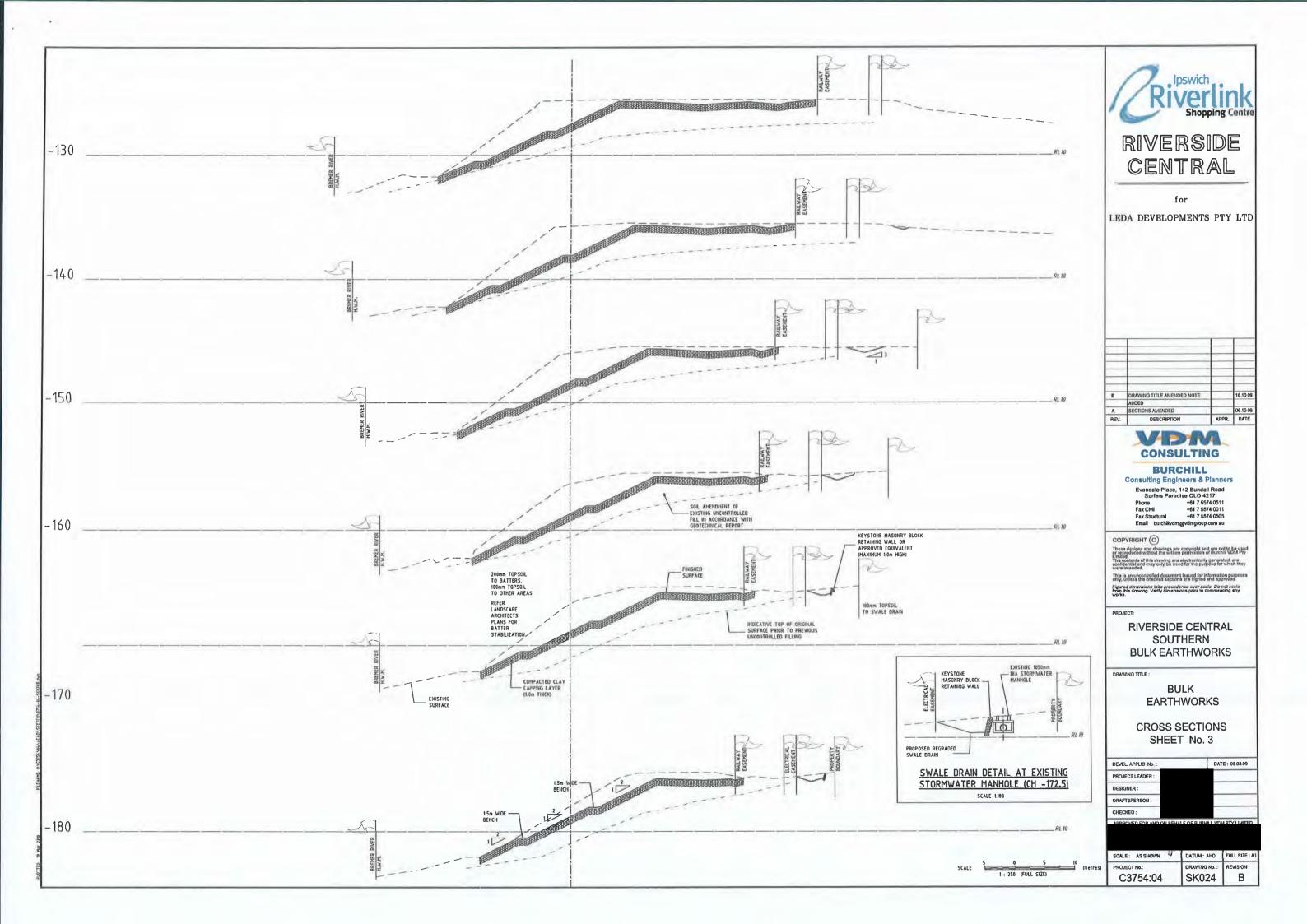
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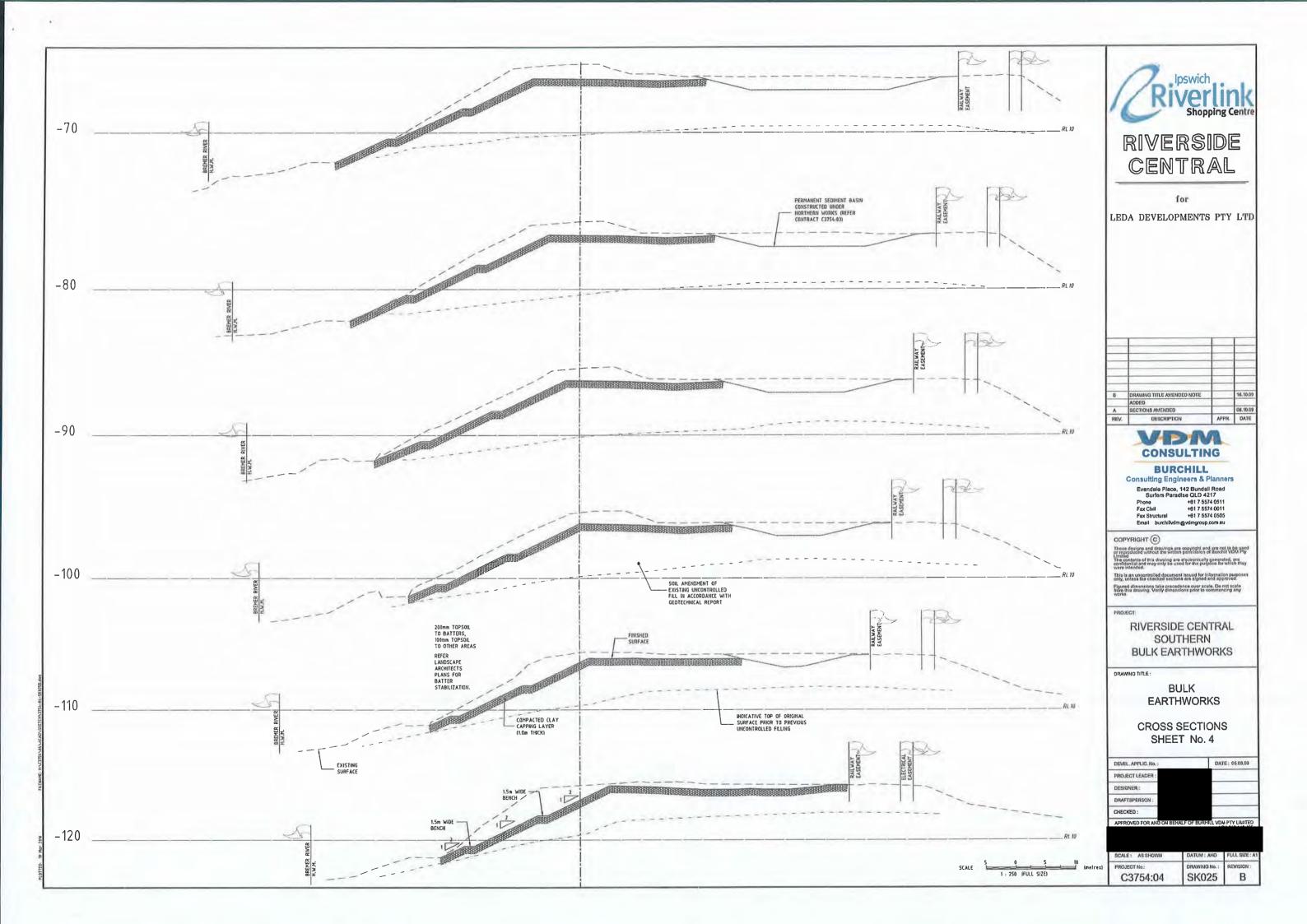


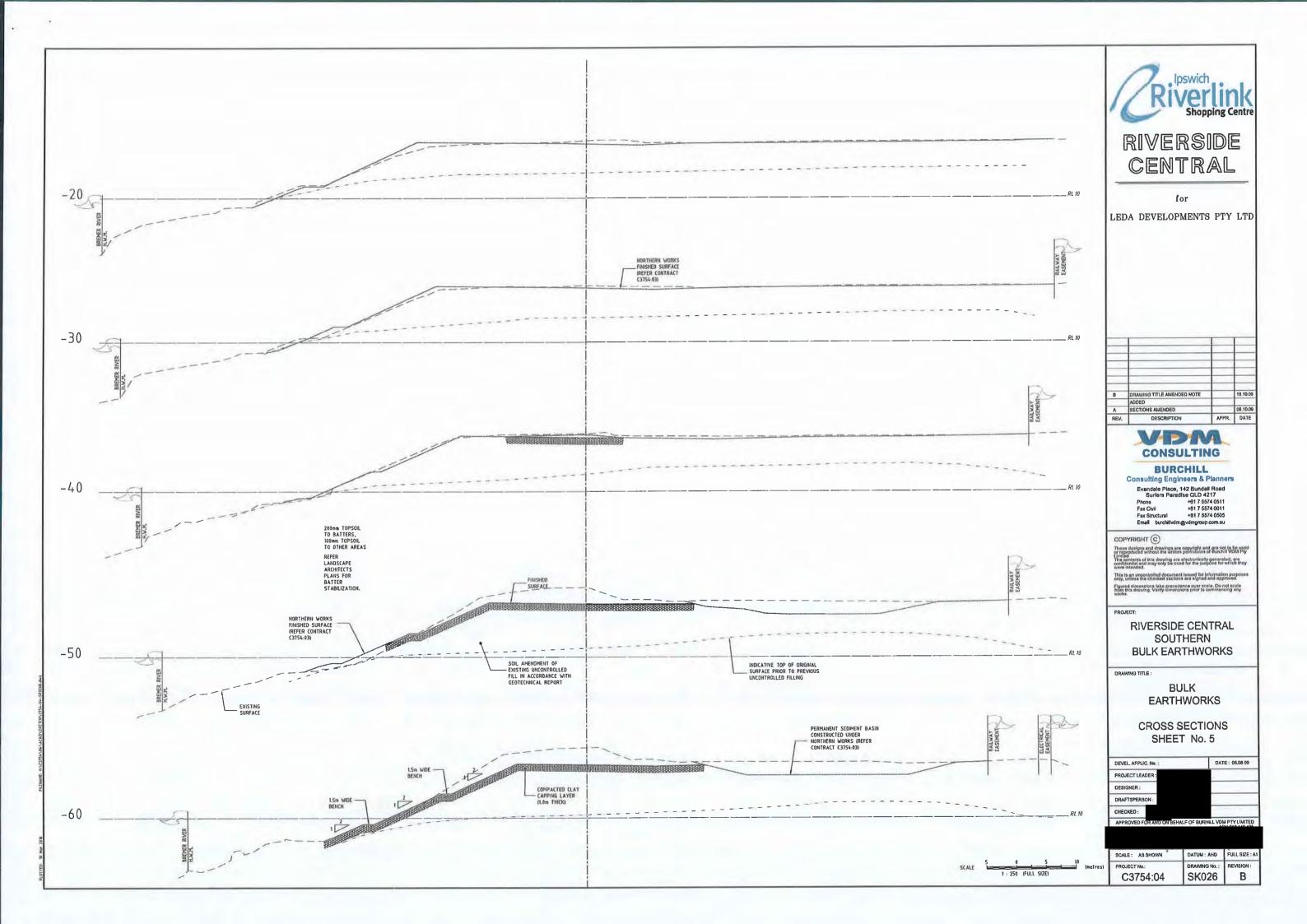


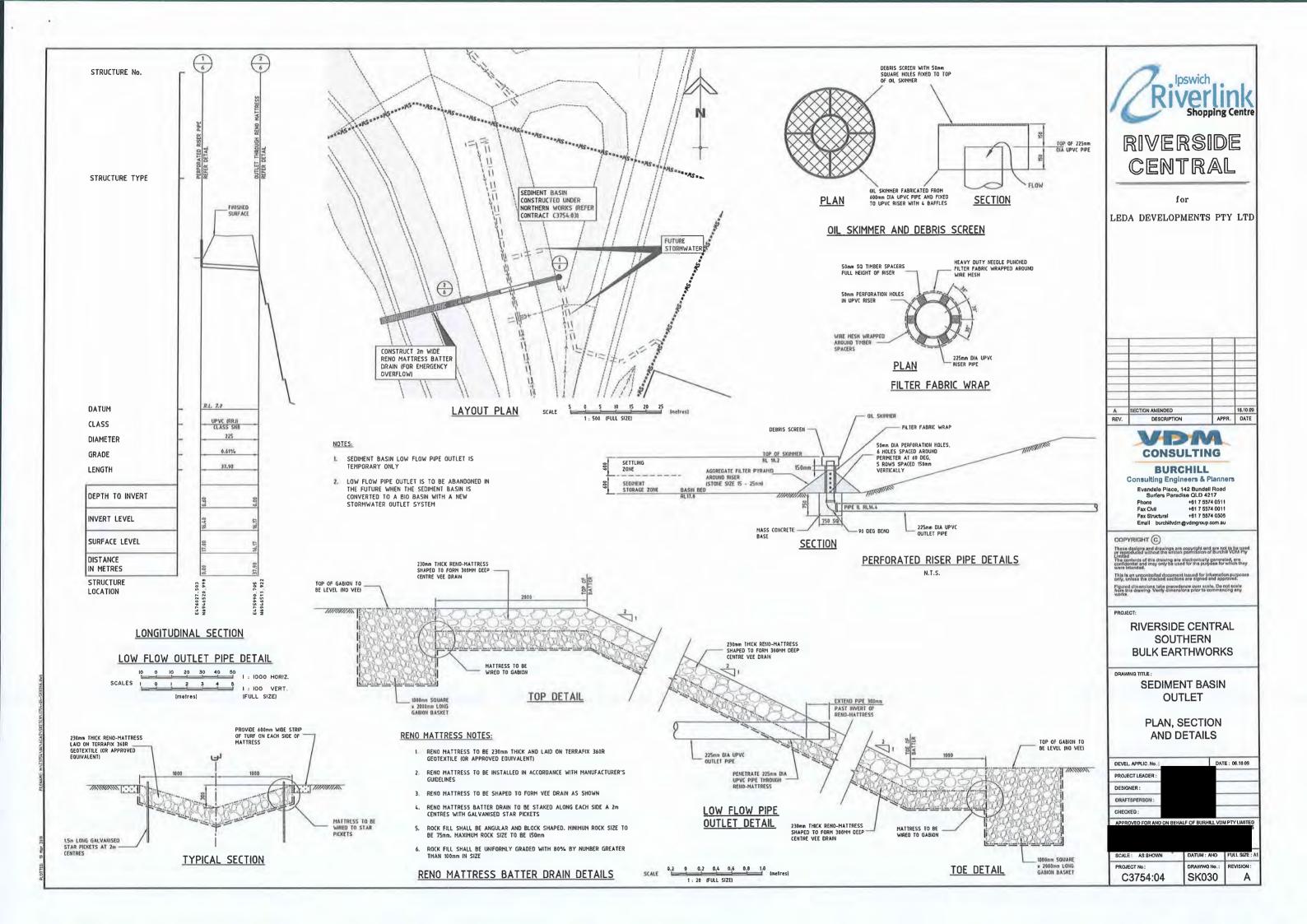


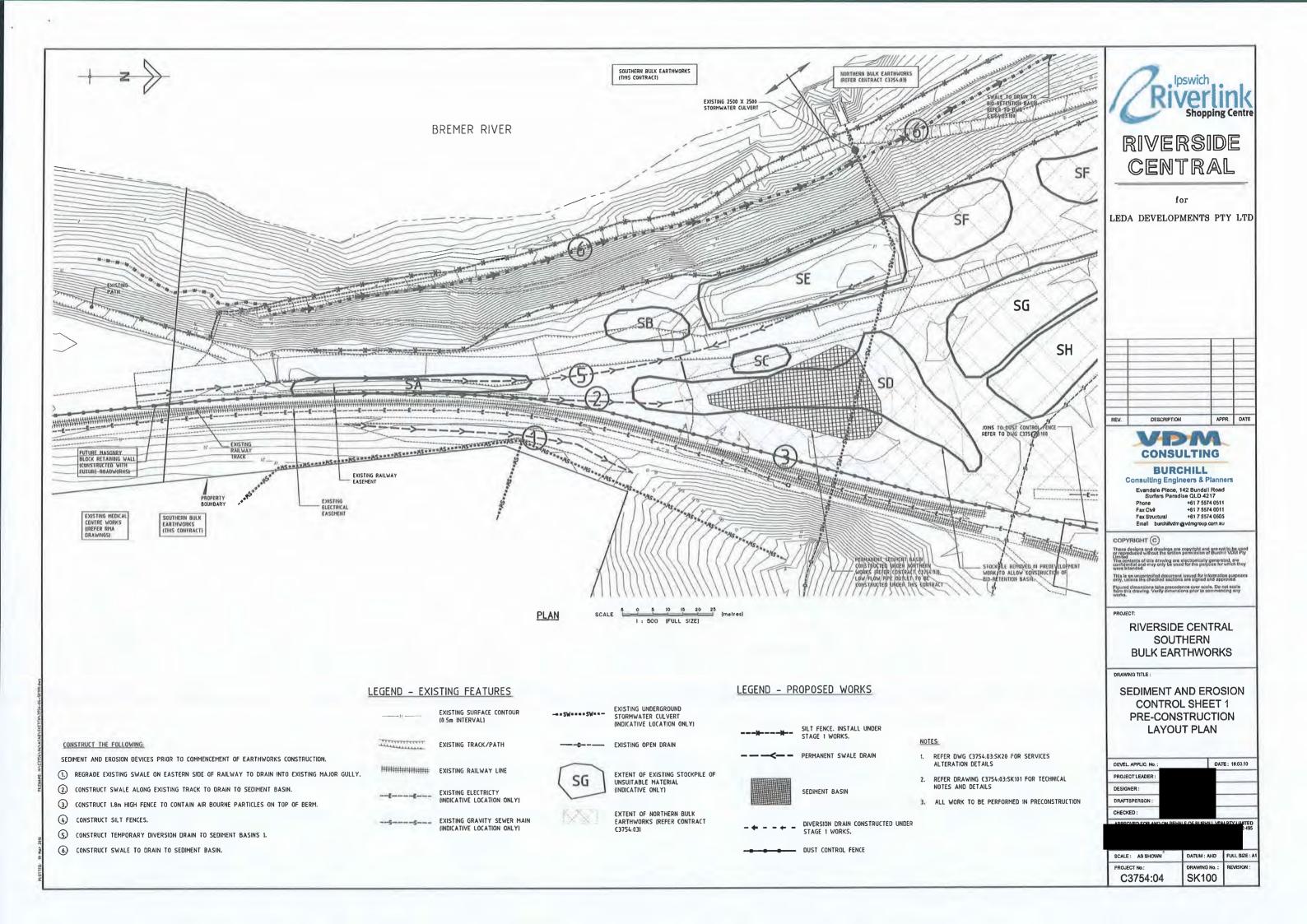


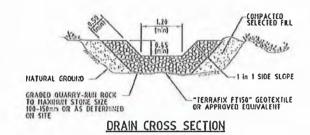


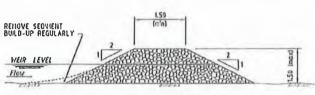












DRAIN LONGITUDINAL SECTION

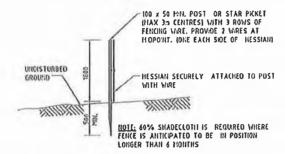
ROCK FILTER DAM

SCALE 1:50

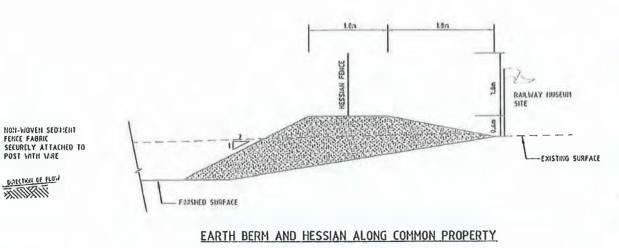
50 SQ. POST AT

SILT FENCE

MAX. 2.05 CR5



DUST CONTROL FENCE



BOUNDARY WITH RAILWAY MUSEUM

SCALE 1:50

GENERAL NOTES:

- 1. THIS DRAWING HAS BEEN PREPARED AS A GUIDE IT IS THE CONTRACTOR'S RESPONSIBILITY TO MANAGE SITE SEDERHT AND EROSON CONTROL MEASURES AND DURING THE CONSTRUCTION PERIOD INSTALL ADDITIONAL MEASURES WHERE SCOUR OR SEDIMENT TRANSPORT IS LIKELY TO OCCUR.
- 2. DELAY CLEARING, GRUBBING AND TOPSOL STRIPPING UNTA MECESSARY.
- 3. EARTHWORK OPERATIONS CAN COLDIENCE ONLY AFTER SILT FERCE IS IN PLACE.
- 4. HAHAGE SITE ENTRY/EXIT POINT TO ENSURE SEDIMENT IS NOT TRACKED OFF SITE.
- 5. SHAKEDOWN AREA: PROVIDES FOR CONSTRUCTION, SERVICE AND STAFF VERCLES ENTERING PUBLIC ROADS.
 CONTRACTOR SHALL LOCATE TO SUIT SITE ACTIVITIES, CONSTRUCTED AS 250mm THICK LAYER OF COARSE (150mm 200mm) RIVER GRAVEL OVER A SINGLE LAYER OF HIGH STRENGTH GEOTEXTRE (15m x 5m).
- 6. ARRANGE FOR EROSION CONTROL MEASURES TO BE WISTALLED AS CLOSE AS POSSIBLE TO THE SOURCE OF EROSION.
- 7. ENSURE STOCKPLES ARE NOT ERODED BY WARD AND STORHWATER RUN-OFF AND ARE PROVIDED WITH A SELT FERCE AROUND THE LOW SIDE.
- 8. ERECT SILT FENCES WHERE SHOWN ON THE ORAWINGS, GENERALLY ALONG THE LOW SIDE OF THE CONSTRUCTION SITE. AS AN ALTERNATIVE TO BURYRIG THE SILT FENCE LOWER EGGS, THE CONTRACTOR MAY ELECT TO PLACE 2002 OF THE FABRIC ON THE GROUND UP-SLOPE OF THE FENCE AND COVER WITH 1002 TO IN LAYER OF AGGREGATE.
- 9. TO PREVENT EROSION, TOPSOL AND GRASS UNKEDIATELY AFTER COMPLETION OF DULK EARTHWORKS TO FUSSHED PROFILES.
- 10. SWEEP EXTERNAL ROADS WHERE SECRIENT HAS DEEN DROPPED FROM CONSTRUCTION VEHICLES. DO NOT WASH SLT INTO THE STORNWATER SYSTEM.
- 11. ALL SECHENT AND EROSION CONTROL STRUCTURES SHALL BE REGULARLY HAWITAINED AND DISPECTED FOR EFFECTIVENESS.
- 12. REFER LANDSCAPE ARCHITECTS PLAN FOR BATTER TREATMENT DETAILS
- 13. ALL WORK IS TO BE IN ACCORDANCE WITH THE I.C.E.A. NOVEMBER 2008 'BEST PRACTICE EROSION AND SEDMENT CONTROL" MANUAL

DEWATERING NOTES:

- ALL SECHIENT BASKIS, BORROW PITS AND EXCAVATIONS ARE TO BE DE-WATERED BY APPROVED PUMPED OUTLET SYSTEMS. THE WITAKE PIPES MUST BE HOUSED IN AN APPROPRIATE FLOW CONTROL CHAMBER TO PREVENT RE-SUSPEMSION OF THE SETTLED SECHENT (SUCH AS FLOATING RAFT OR PERFORATED MILET PIPE).
- DISCHARGE WATER QUALITY STANDARD.
 TOTAL SUSPENDED SOLUS (TSS) CONCENTRATION NOT TO EXCEED SO HALLIGRAMS PER LITRE
 WATER OF DETWEEN 4.5 AND 8.5
- ALL WATERS CAPTURED SHALL BE TREATED WITH AN APPROVED FLOCCULATING AGENT TO ACHEVE THE SPECIFIED WATER QUALITY BEFORE THE WATER IS DISCHARGED.
- 4. THE DUTFLOW FROM PUMPED OUTLET SYSTEM HUST NOT CAUSE EROSION OR ADVERSELY AFFECT THE DOWNSTREAM ENVIRONMENT.

RISK MANAGEMENT PLAN:

PRIOR TO COMMERCEMENT OF CONSTRUCTION THE CONTRACTOR SHALL PROVIDE A RISK MANAGEMENT PLAN TO OUTLINE PROCEDURES TO MANAGE THE RISK ASSOCIATED WITH CONTAMINATED SOL EXPOSED DURING FLOOD EVENTS. THE MANAGEMENT PLAN SHALL INCLUDE:

- 1. STOCKPILING CLAY CAPPING FOR EMERGENCY USE
- 2. WISTALLEIG CLAY CAPPENG CONTINUOUSLY AS CONSTRUCTION OF THE EMBAIKMENT PROCEEDS
- 3. CLAY CAPPING OF REHAMING EXPOSED CONTAINMATED SURFACES SUBJECT TO MUNOVINATION PRIOR TO THE FLOOD EVENT
- 4. PROCEDURES IN PLACE FOR TRACKING FLOOD WARNING AND RANFALL BROADCASTS FOR THE DREHER RIVER
- 5. DETAILED CONSTRUCTION PROGRAM OUTLIVING THE ACTIVITIES RELATIVE TO SPECIFIC HONTHS OF THE YEAR.

SEDIMENT POND CALCULATION:

REFER TO CONTRACT C3754.03 FOR PERHANENT SEDIMENT BASIN DETAILS.

AIR BOURNE PARTICLES:

AIR BOURNE PARTICLES HAVE BEEN ADDRESSED BY A PROCESS THAT INVOLVES CONTINUOUS USE OF WATERING EQUIPMENT TO DAILPEN THE SUBFACE PREVENTING AIR BOURNE HATERIALS PLUS THE CESSATION OF SHE WORKS ALTOGETHER WHEN PAND VELOCITY REACH A LEVEL SUCH THAT AIR BOURNE HATERIAL IS TRANSPORTED OUTSIDE THE CONFRES OF THE SHE. THE SEDIENT AND EROSION STAGRIG PLANS ALSO RICLIDES THE USE OF A 1.8 METRE HIGH MOCH MESSIAN FENCE ALONG THE CONFORM BOUNDARY WHIT THE OUTSIDES AND DAM WAYS FASSIFIED AND PROPERTY REFER FEBRE HOST MONTORING PROCEDURES.

Ipswich
Shopping Centre

RIVERSIDE CENTRAL

for

LEDA DEVELOPMENTS PTY LTD

		_	
			_
REV.	DESCRIPTION	MFR	DATE



BURCHILL. Consulting Engineers & Planners

Evandala Piaco, 142 Bundali Road Surfera Paradisa QLO 4217 Phona Fax Chi 481 76574 0511 Fax Surchali 481 76574 0501 Fax Surchali 481 76574 0500 Email turbihdmajudnysooy con su

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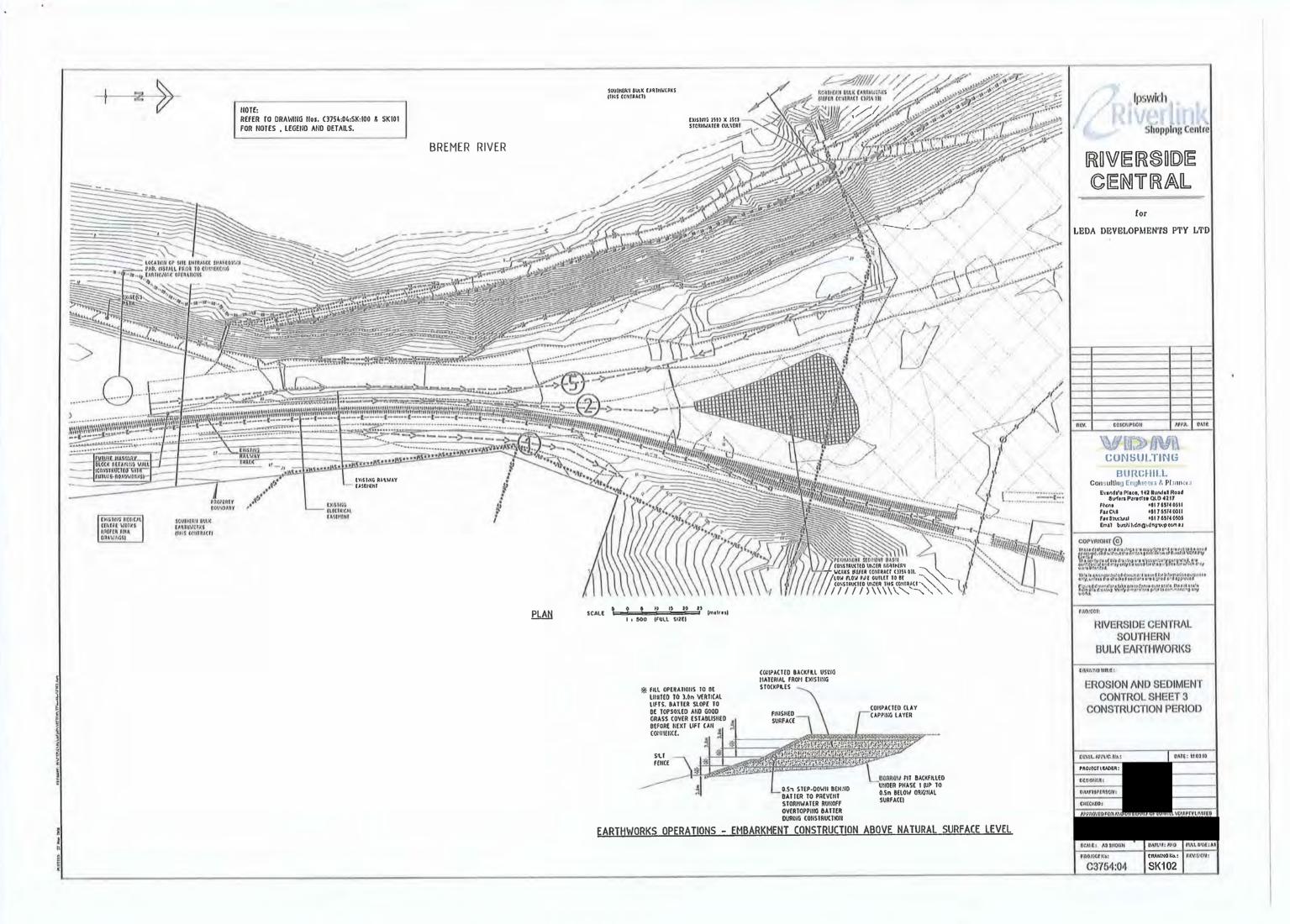
RIVERSIDE CENTRAL SOUTHERN BULK EARTHWORKS

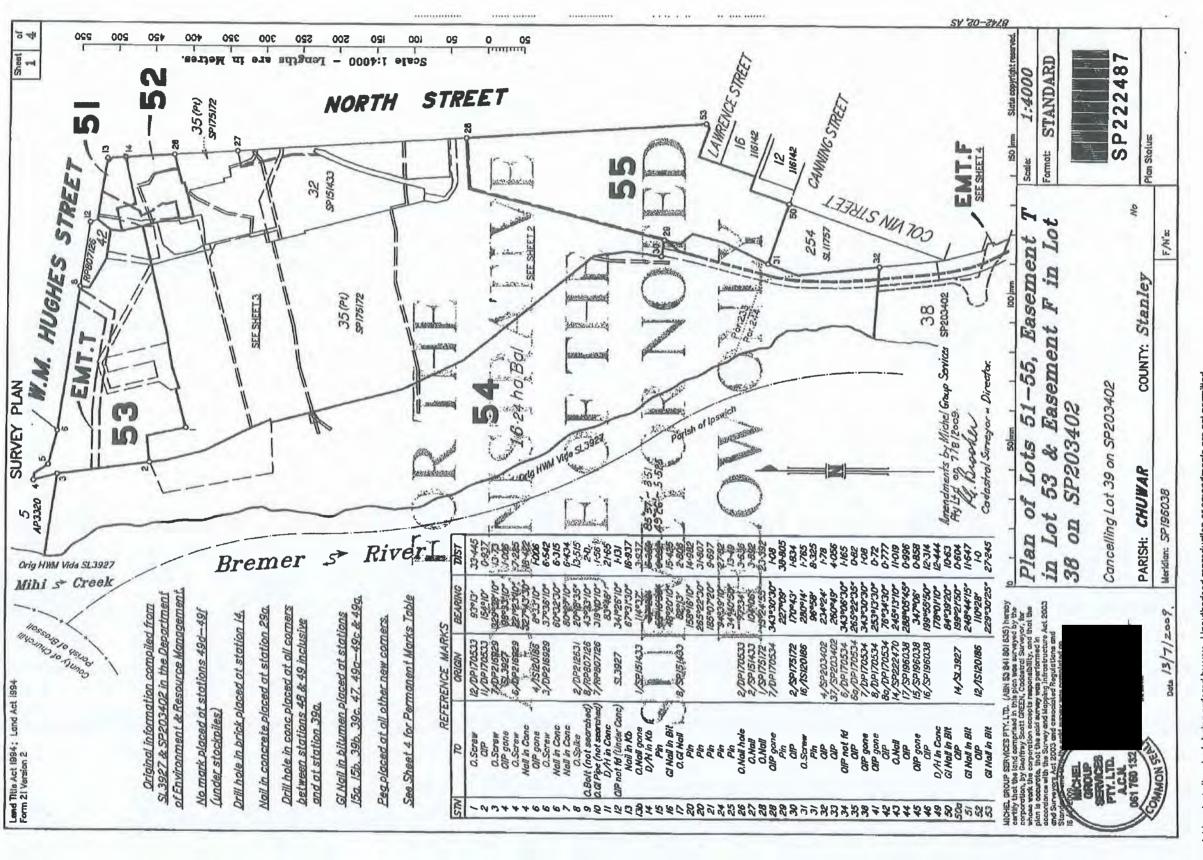
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EROSION AND SEDIMENT CONTROL SHEET 2 TECHNICAL NOTES AND DETAILS

DEVEL APPLIC. NA.:	DATE: 1503.1
PROJECT LEADER:	
DESIGNER:	
DRAFTSPERSON:	
CPECKEO:	

SCALE: ASSIGNIN	DATUM: NO	FULL ECT &: AT
С3754:04	SK101	REVISION:





RIVERSIDE CENTRAL LEDA DEVELOPMENTS PTY LTD REV. CONSULTING BURCHILL nsulting Engineers & Planners Evandale Place, 142 Bundali Road Surfers Paradise QLD 4217 Phone +61 7 5574 0511 Fax Chril +81 7 5574 0011 Phone Fax Civil +61 7 5574 0505 Unauth RIVERSIDE CENTRAL ordered by you. SOUTHERN **BULK EARTHWORKS** SP222487 Copyright protects the plan/s being DATE: 16.03.10 DEVEL APPLIC No.

CHECKED:

SCALE: AS SHOWN

C3754:04

PROJECT No .:

APPROVED FOR AND ON BEHALF OF BURHILL VOM PTY LIMITED
ACH 010 140 495

R.P.E.Q. No.

DRAWING No. :

SK500

DATUM: AHD | FULL SIZE: A REVISION:

NOT TO SCALE

Appendix 3

Bulk Earthworks Plans Related to Lot 55 by Yeats Consulting Engineers (Drawing No's YC0175-BE00 – YC0175-BE24).



RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH

CIVIL ENGINEERING WORKS BULK EARTHWORKS

DRAWING SCHEDULE

DWG. No.	DESCRIPTION
STAGE 1	
YC0175-BE00	DRAWING SCHEDULE & LOCALITY PLAN
YC0175-BE01	EXISTING SERVICES PLAN
YC0175-BE02	CONTAMINATED LAND REMOVAL LAYOUT PLAN
YC0175-BE03	CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 1 OF 3
YC0175-BE04	CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 2 OF 3
YC0175-BE05	CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 3 OF 3
YC0175-BE06	BULK EARTHWORKS CUT FILL PLAN
YC0175-BE07	BULK EARTHWORKS ACCESS ROAD AND BLOCKS SETTING OUT DETAILS
YC0175-BE08	BULK EARTHWORKS SITE LAYOUT / KEY SHEET & NOTES
YC0175-BE09	BULK EARTHWORKS LAYOUT PLAN -SHEET 1 OF 4
YC0175-BE10	BULK EARTHWORKS LAYOUT PLAN -SHEET 2 OF 4
YC0175-BE11	BULK EARTHWORKS LAYOUT PLAN -SHEET 3 OF 4
YC0175-BE12	BULK EARTHWORKS LAYOUT PLAN -SHEET 4 OF 4
YC0175-BE13	BULK EARTHWORKS INTERNAL ACCESS ROAD LONGITUDINAL SECTION
YC0175-BE14	BULK EARTHWORKS TYPICAL SECTIONS – SHEET 1 OF 2
YC0175-BE15	BULK EARTHWORKS TYPICAL SECTIONS - SHEET 2 OF 2
YC0175-BE16-1	EROSION & SEDIMENT CONTROL PLAN STAGE 1 - PRE-CONSTRUCTION & CONTAMINATED LAND REMOVAL
YC0175-BE16-2	EROSION & SEDIMENT CONTROL PLAN STAGE 2 – BULK EARTHWORKS
YC0175-BE16-3	EROSION & SEDIMENT CONTROL PLAN STAGE 3 - POST EARTHWORKS
YC0175-BE17-1	BULK EARTHWORKS EROSION & SEDIMENT CONTROL DETAILS
YC0175-BE17-2	BULK EARTHWORKS SEDIMENT BASIN DETAILS
YC0175-BE17-3	BULK EARTHWORKS SEDIMENT BASIN SIZING CALCULATIONS
YC0175-BE18	BULK EARTHWORKS CENTRAL GULLY UPGRADE LAYOUT PLAN
YC0175-BE19	BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 1 OF 3
YC0175-BE20	BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 2 OF 3
YC0175-BE21	BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 3 OF 3
STAGE 2	
YC0175-BE22	BULK EARTHWORKS LAYOUT PLAN - STAGE 2 COLVIN STREET
YC0175-BE23	BULK EARTHWORKS EROSION & SEDIMENT CONTROL - STAGE 2 COLVIN STREET
YC0175-BE24	BULK EARTHWORKS DETAILS - STAGE 2 COLVIN STREET

EXTERNAL DRAWINGS

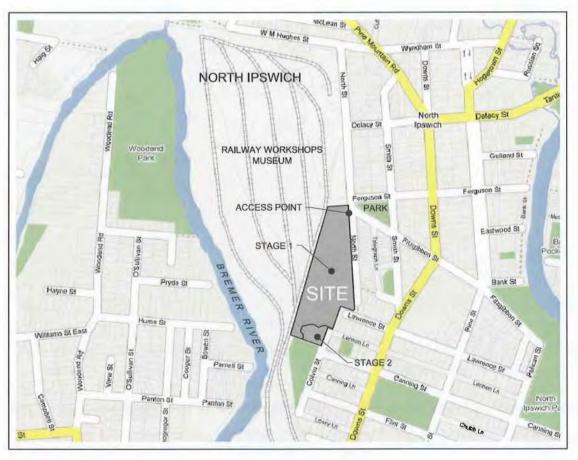
DWG. No.

DESCRIPTION

8742-11 - F

PLAN OF OVERALL LEVEL & FEATURE SURVEY OF RAILWAY AREA & ADJOINING SURROUNDS IPSWICH RIVERLINK CENTRAL





SCALE NTS

LEVELS & GRID

LEVELS TO AHD
(AUSTRALIAN HEIGHT DATUM)
GRID ASSUMED LOCAL

STAT	US FOR ISSUE
В	RFI AMENDMENTS
A	ORIGINAL ISSUE

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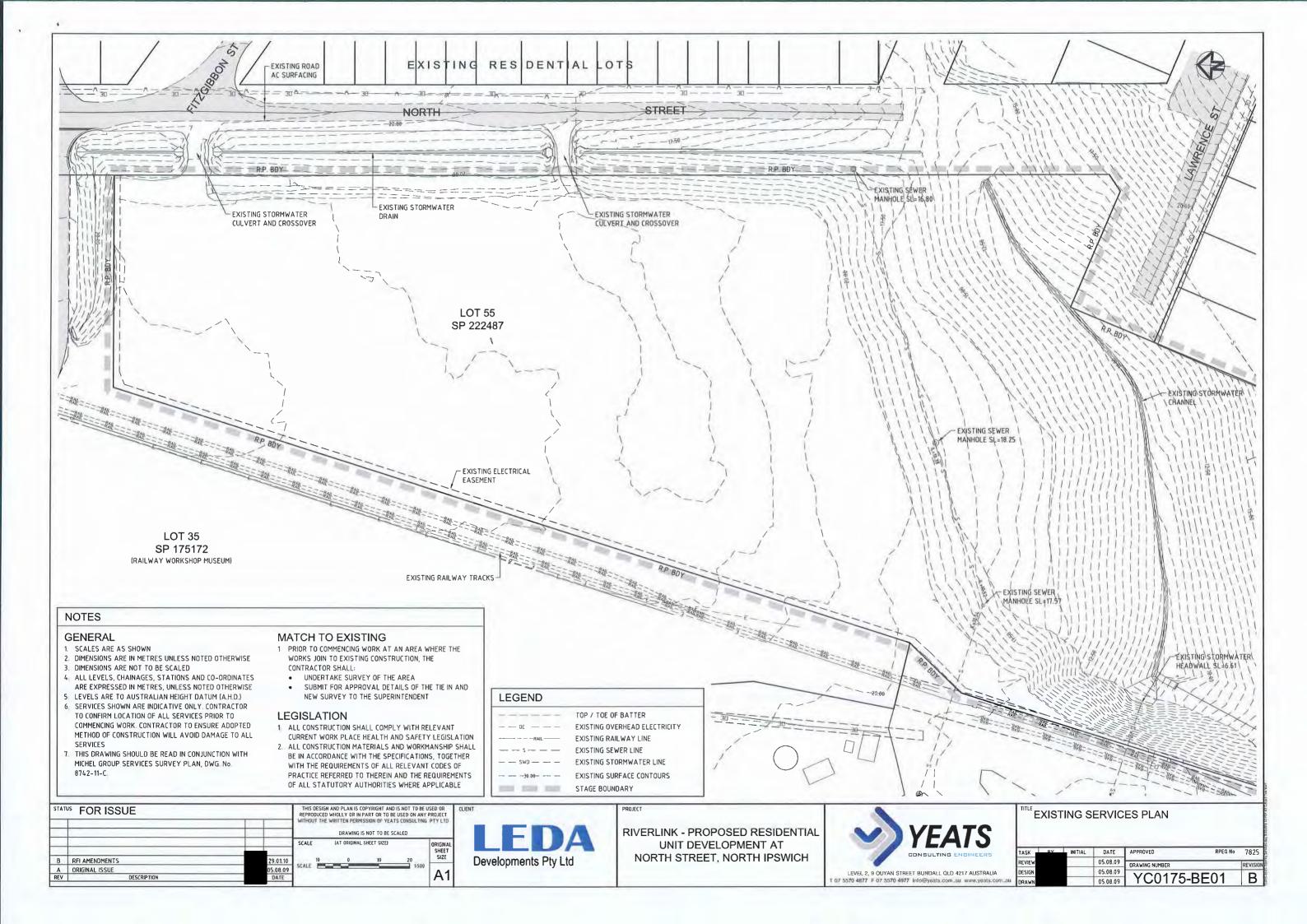
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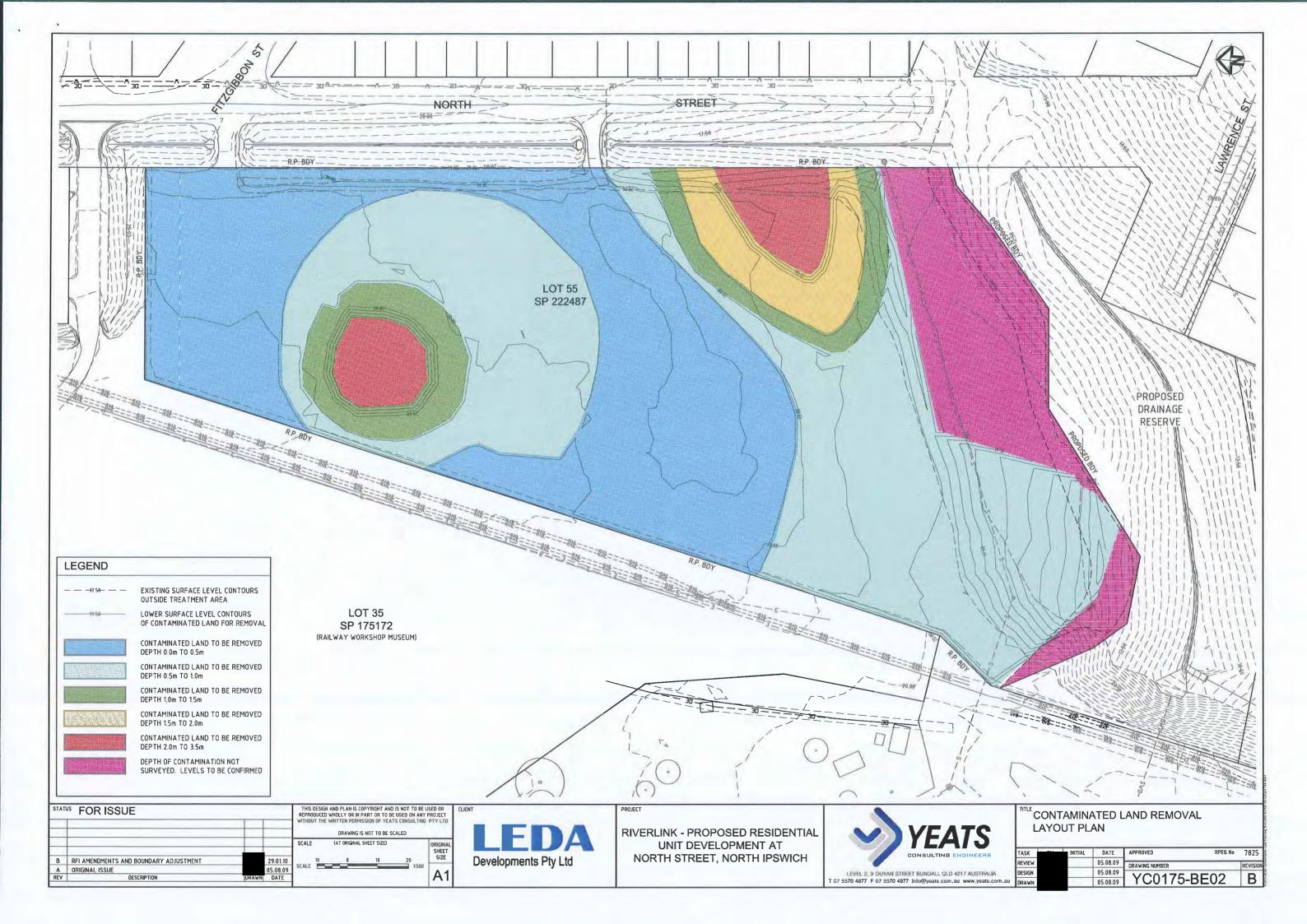


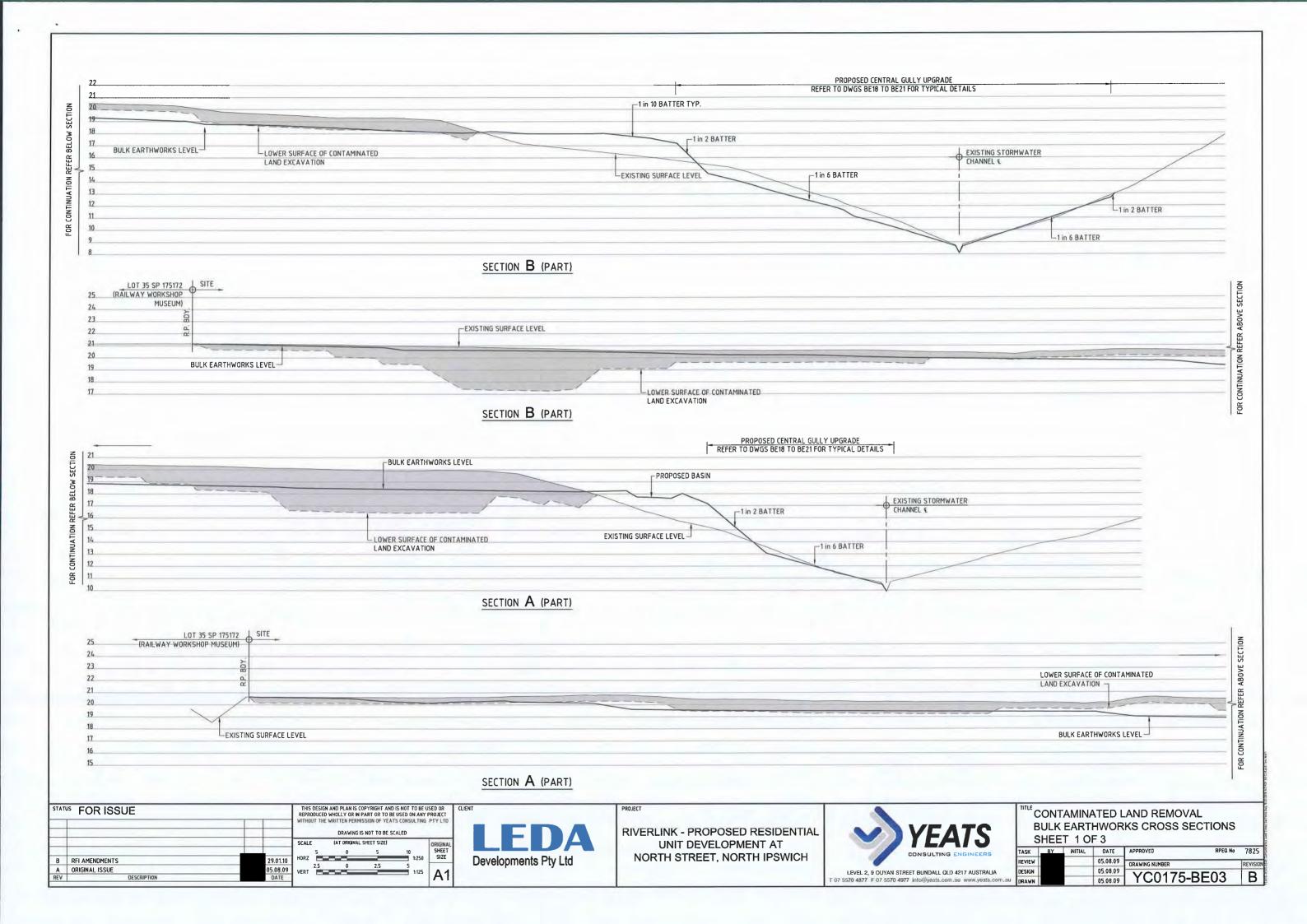


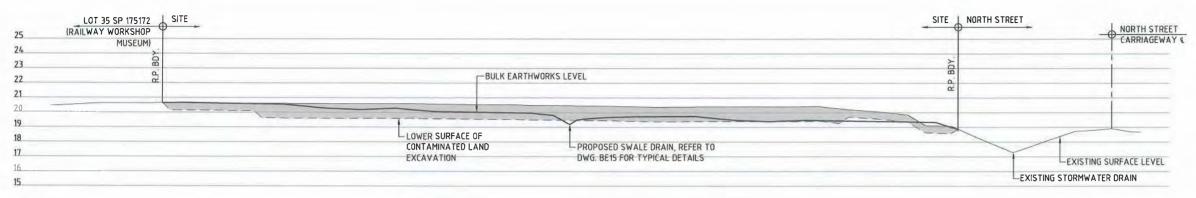
	DRAWING SCHEDULE & LOCALITY PLAN
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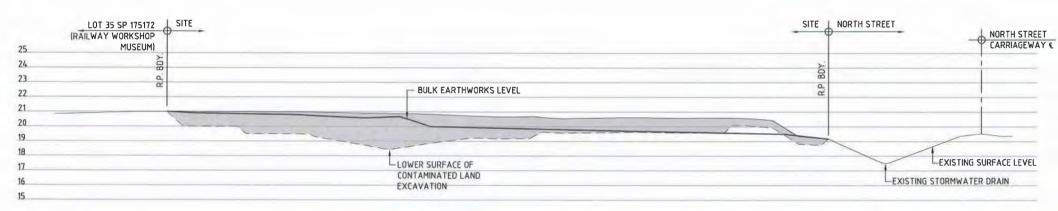




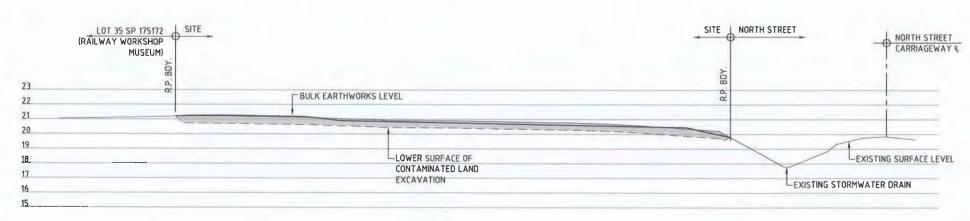




SECTION E



SECTION D



SECTION C

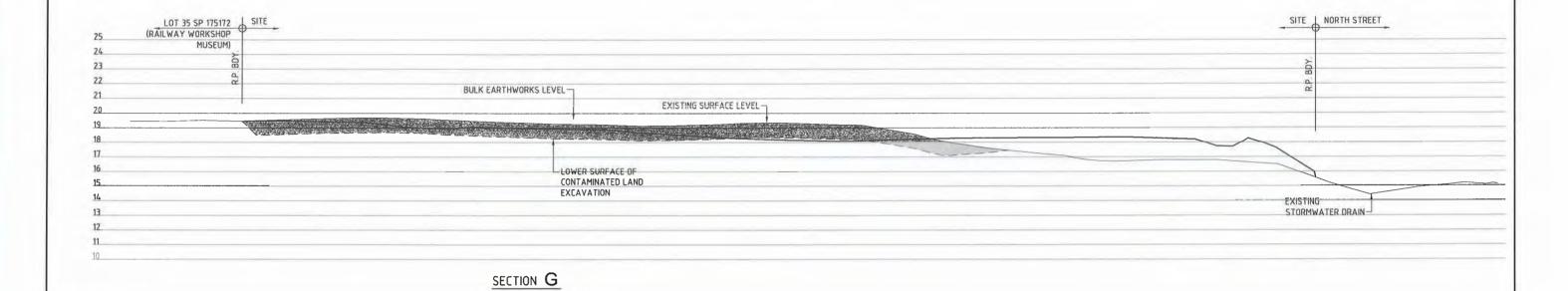


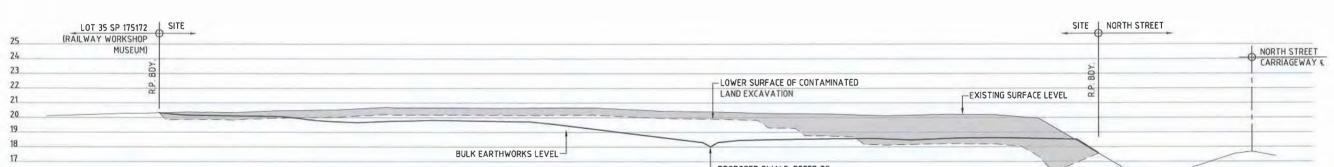




CONTAMINATED LAND REMOVAL
BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 3
SHEET 2 OF 3

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PROPOSED SWALE, REFER TO DWG. BE13 FOR TYPICAL DETAILS LEXISTING STORMWATER DRAIN SECTION F

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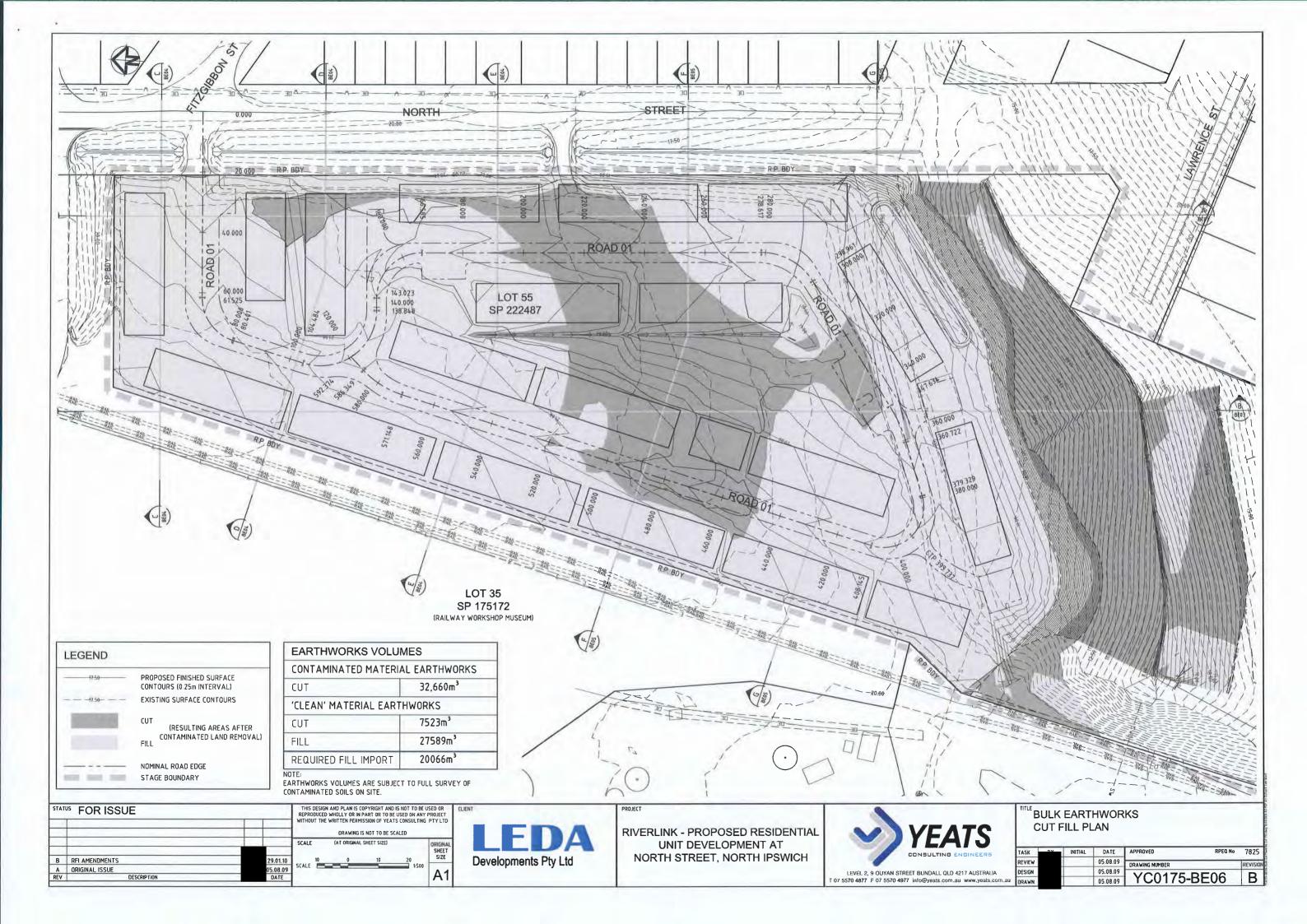


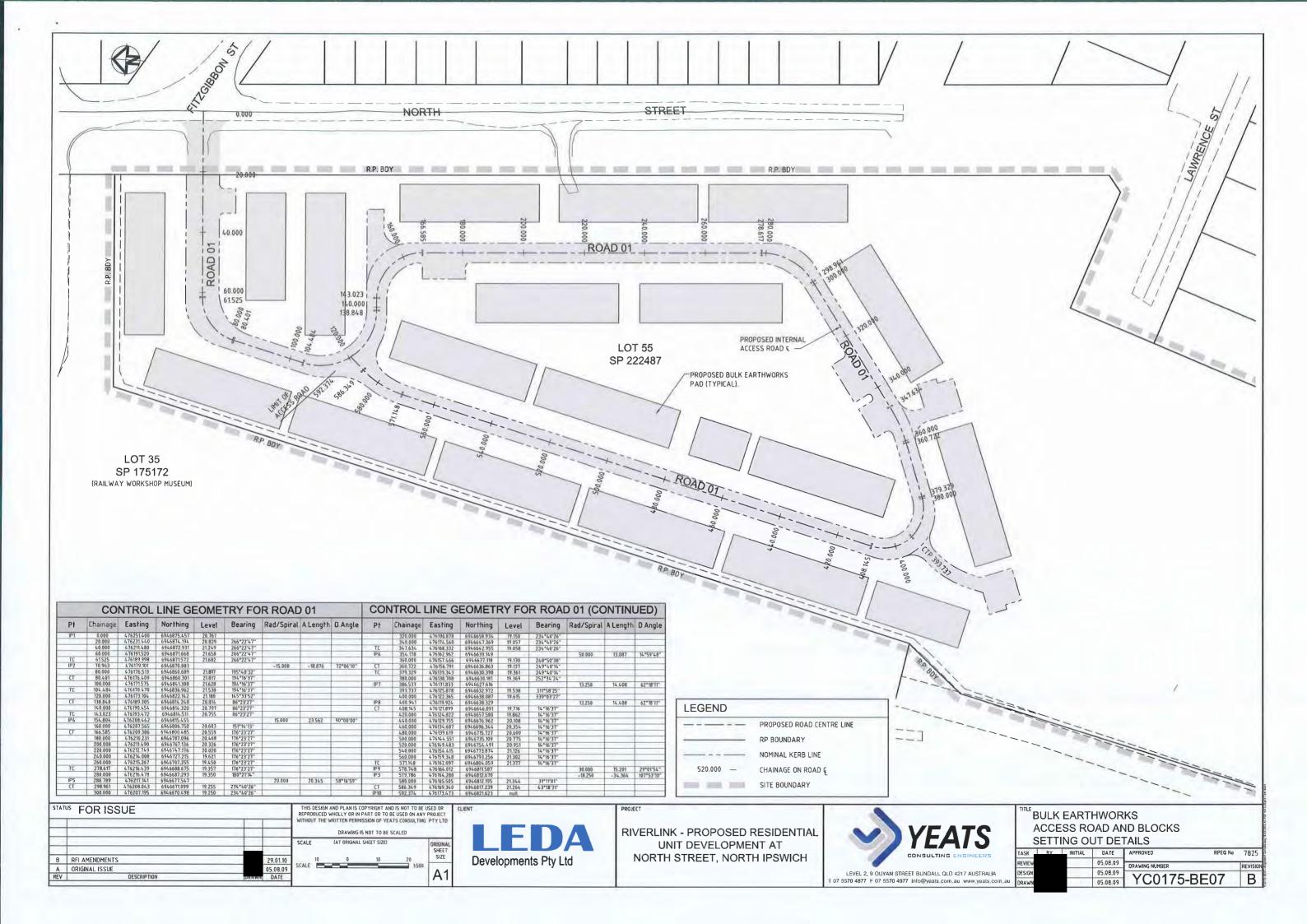
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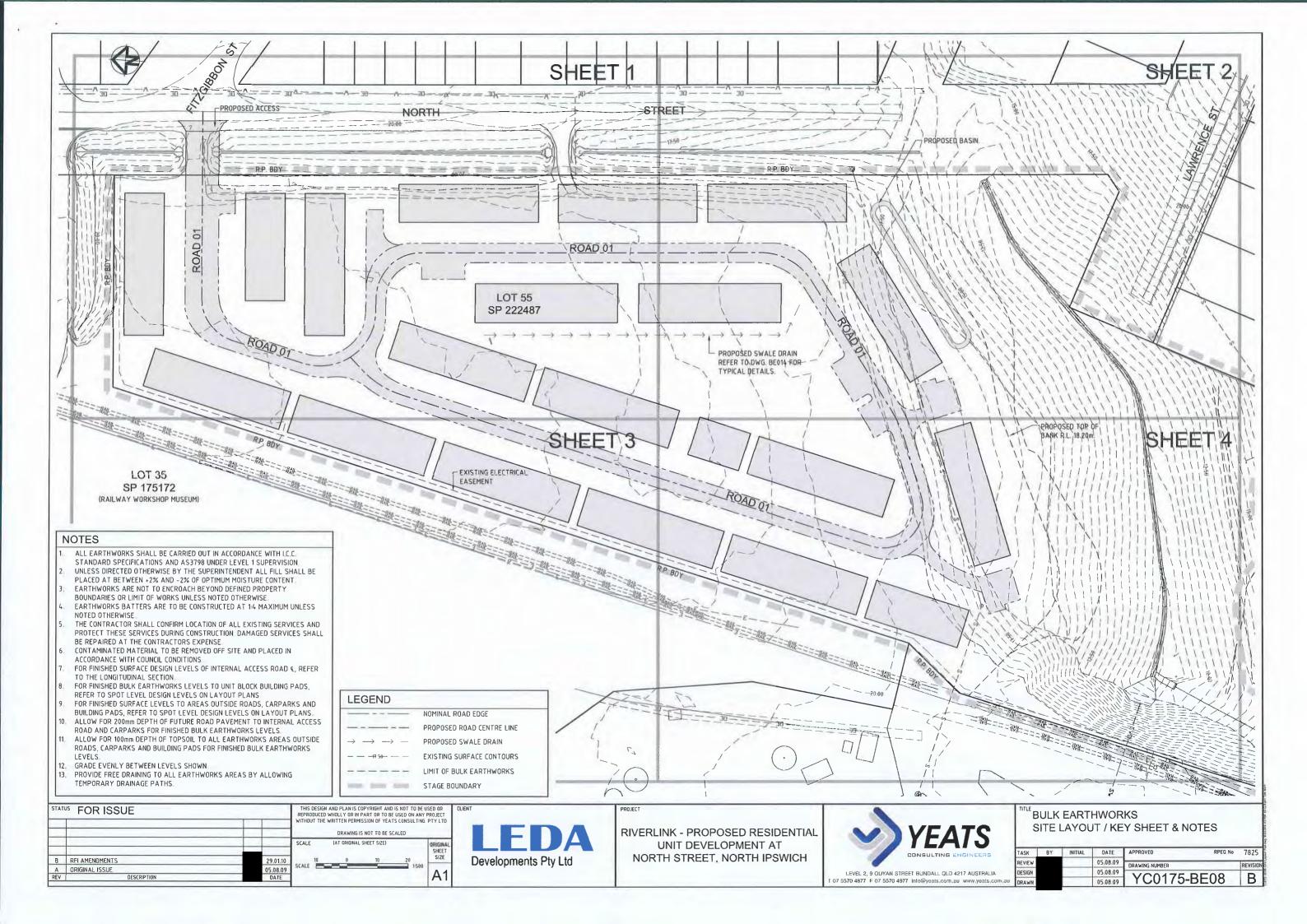
YEATS GONSULTING ENGINEERS
LEVEL 2, 9 OUYAN STREET BUNDALL QLD 4217 AUSTRALIA T 07 5570 4877 F 07 5570 4977 into@yeats.com.au www.yeats.com.au

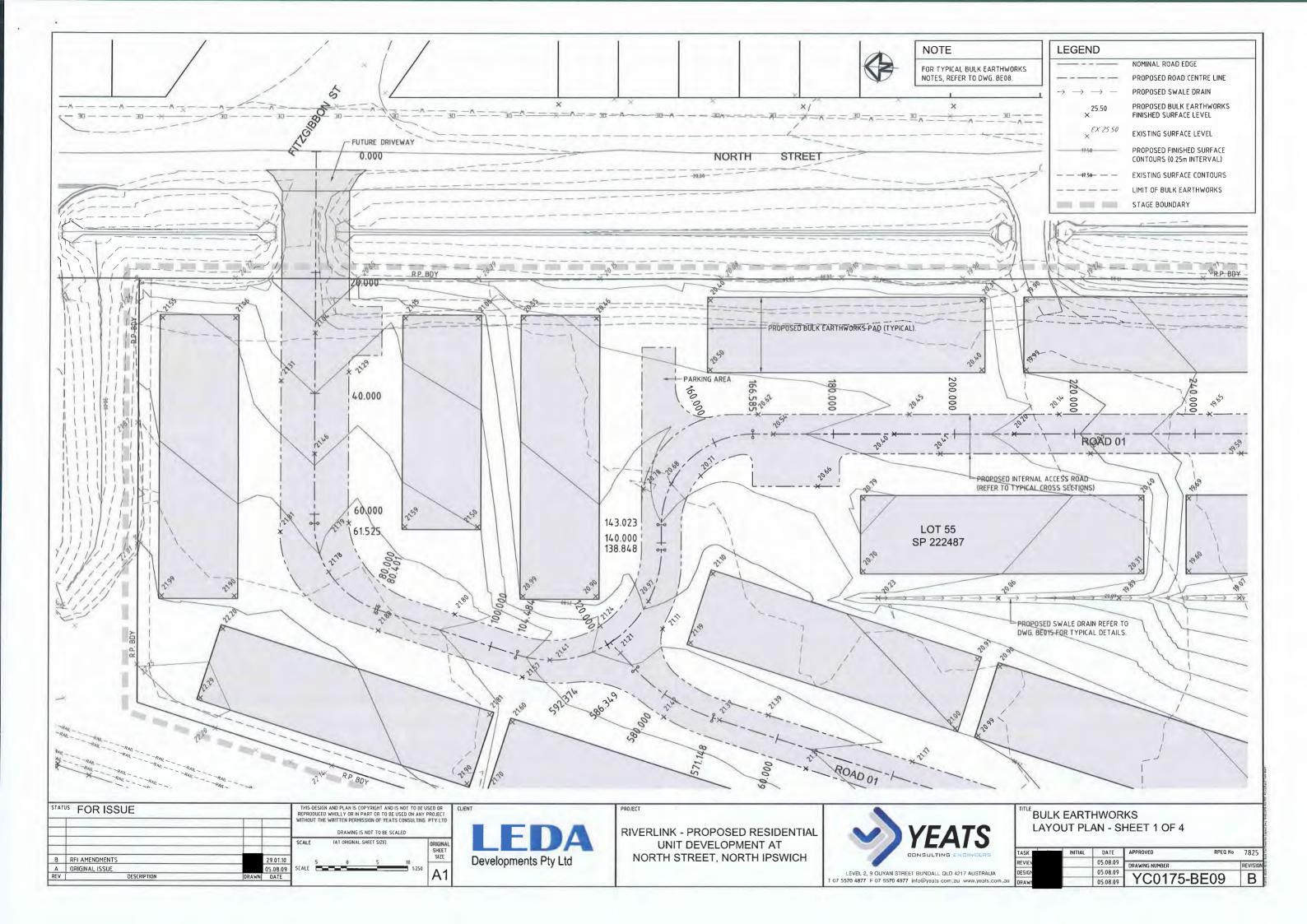
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	BULK EARTHWORKS CROSS SECTIONS
	SHEET 3 OF 3

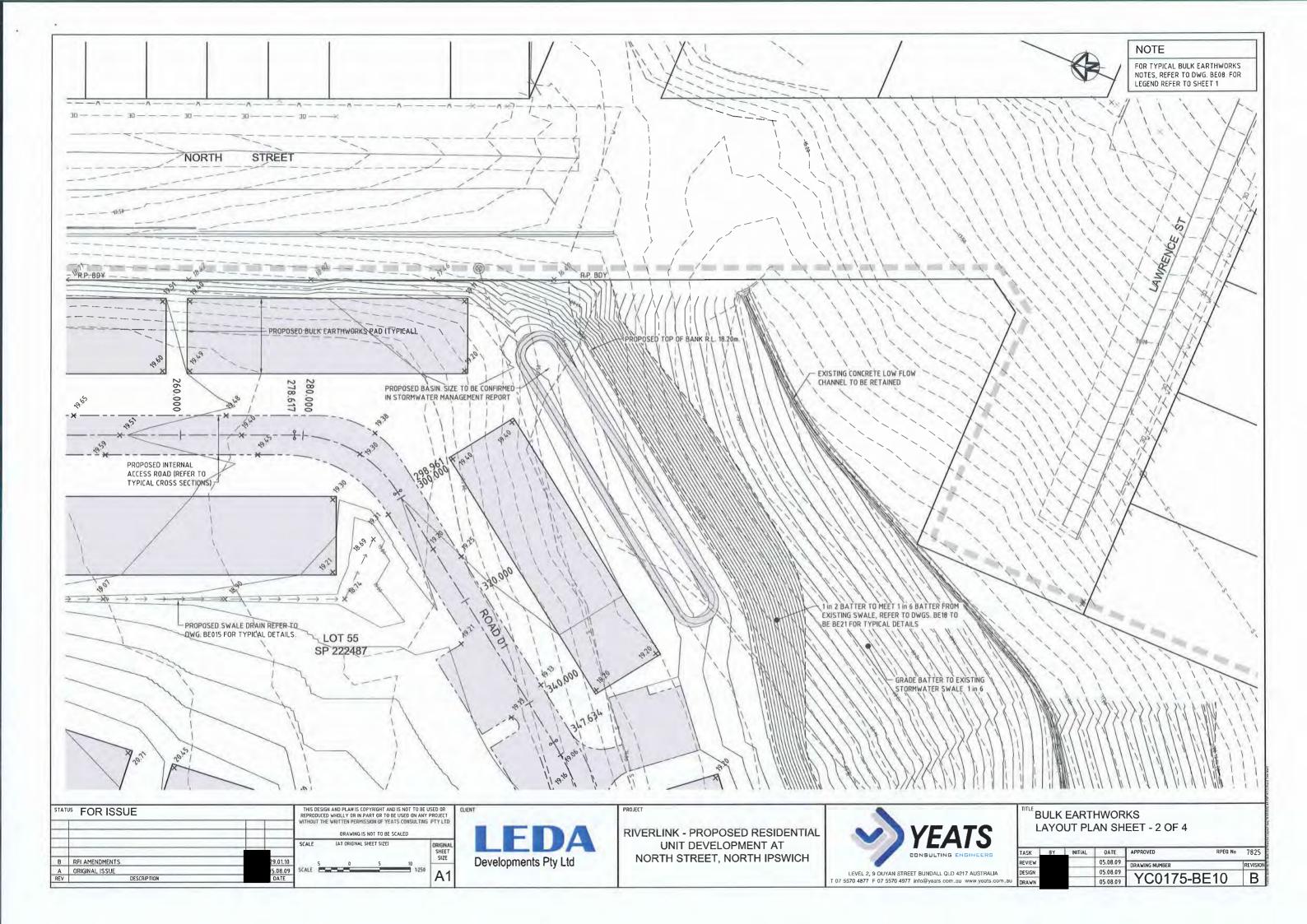
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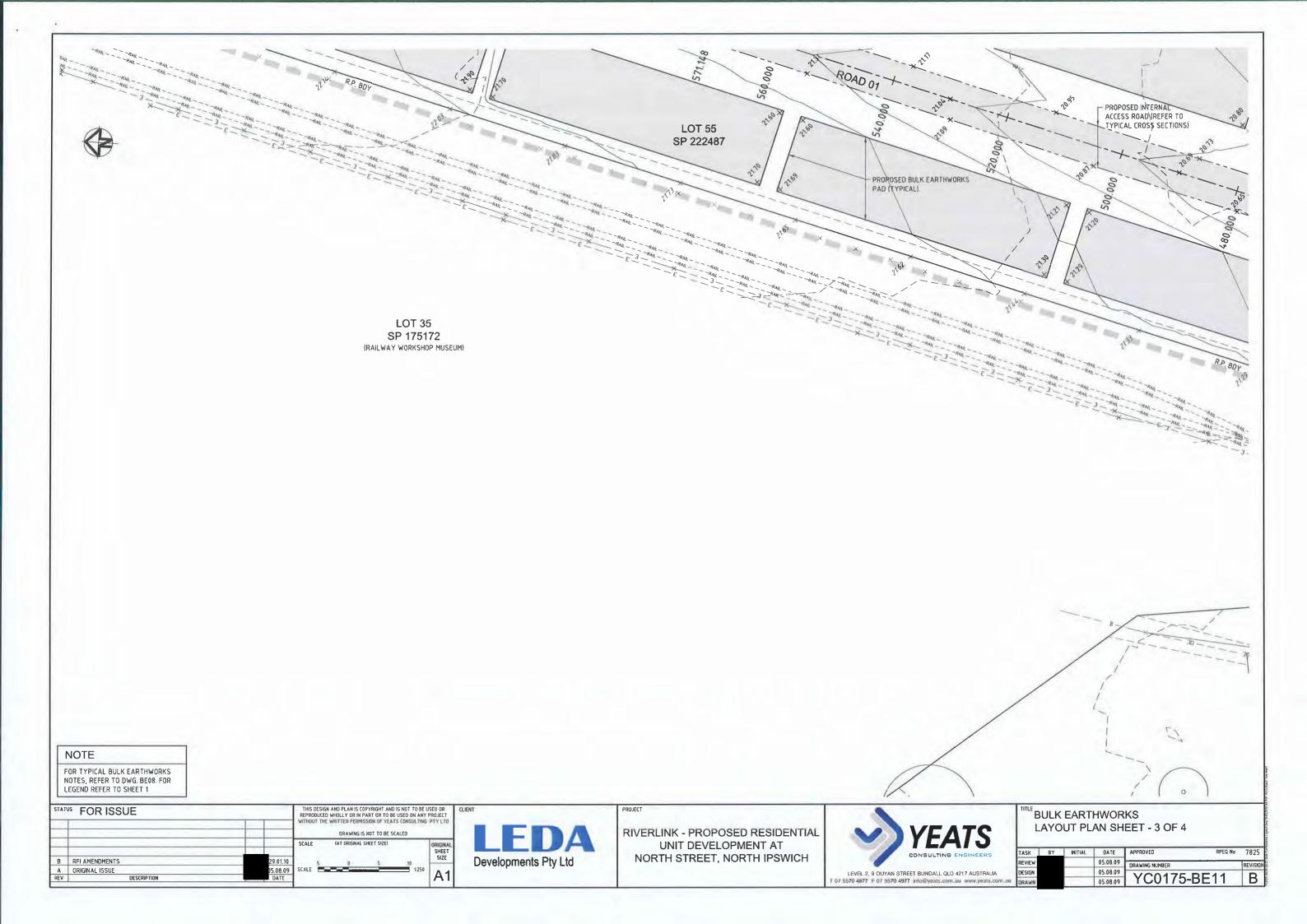


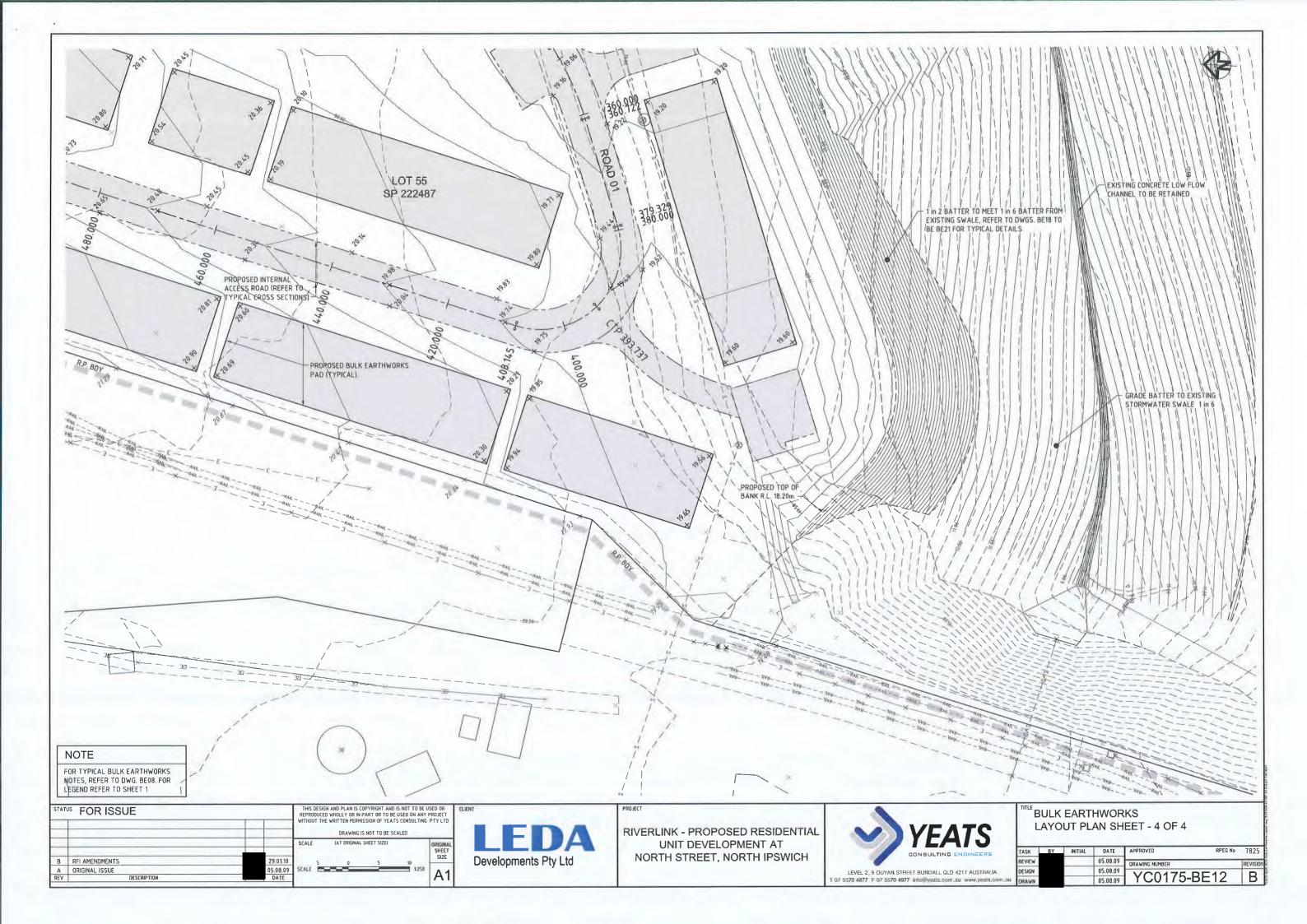


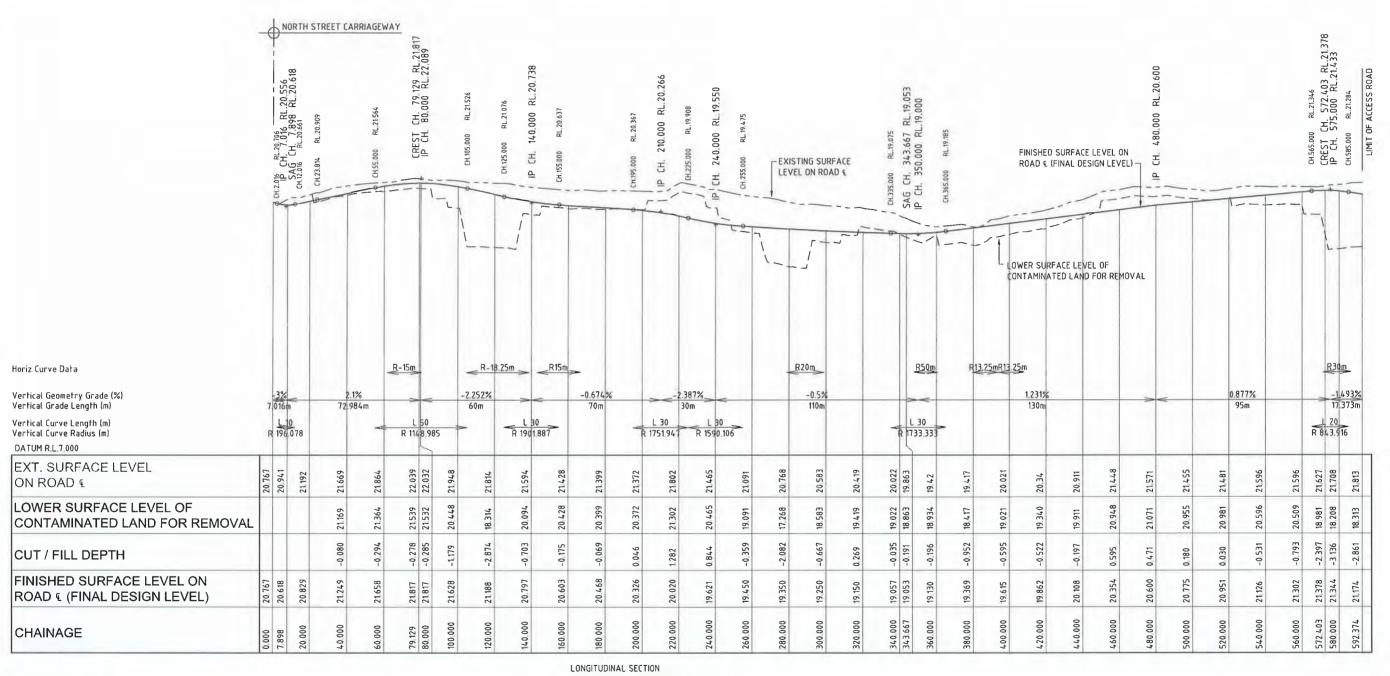












NOTE

REFER TO TYPICAL SECTIONS FOR BULK EARTHWORKS LIMITS INTERNAL ROAD 01

HOWING - FINISHED SURFACE LEVEL ON ROAD &
- LOWER SURFACE LEVEL OF

PROJECT

- LOWER SURFACE LEVEL OF CONTAMINATED LAND FOR REMOVAL

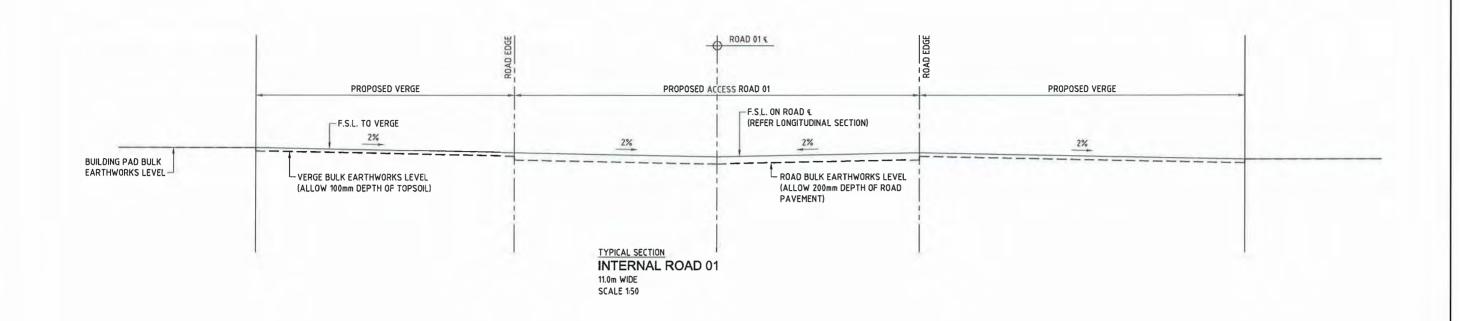
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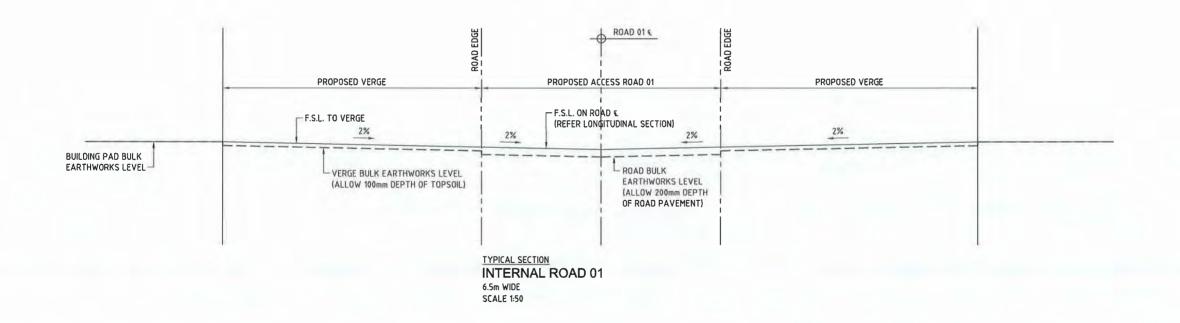


YEATS
CONSULTING ENGINEERS
LEVEL 2, 9 OUYAN STREET BUNDALL QLD 4217 AUSTRALIA
T 07 5570 4877 F 07 5570 4977 Info@yeats.com.au www.yeats.com.au

BULK EARTHWORKS INTERNAL ACCESS ROAL LONGITUDINAL SECTION
INTERNAL ACCESS ROAL
LONGITUDINAL SECTION

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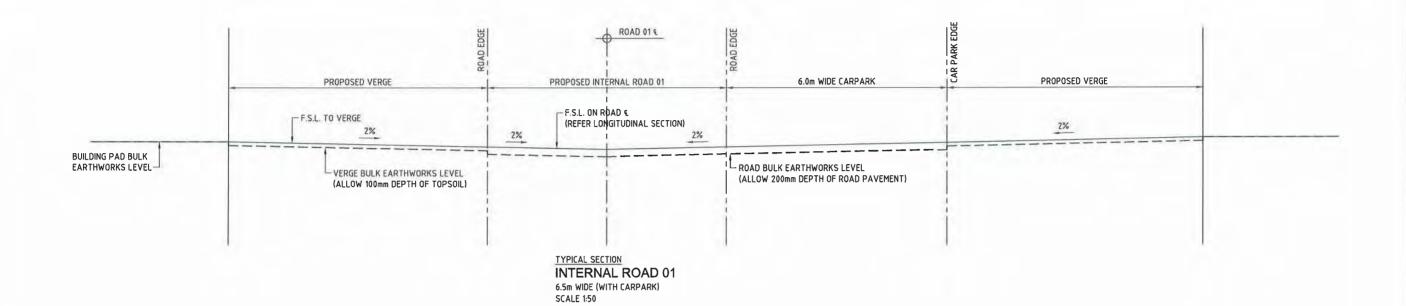


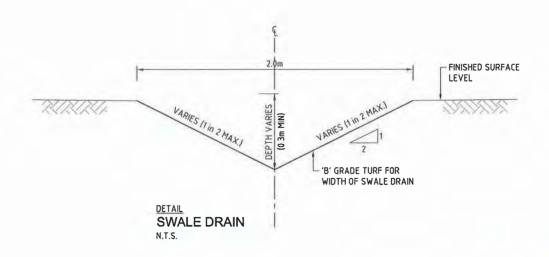




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TYPICAL SECTIONS - SHEET	1 OF 2

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(AT ORIGINAL SHEET SIZE)

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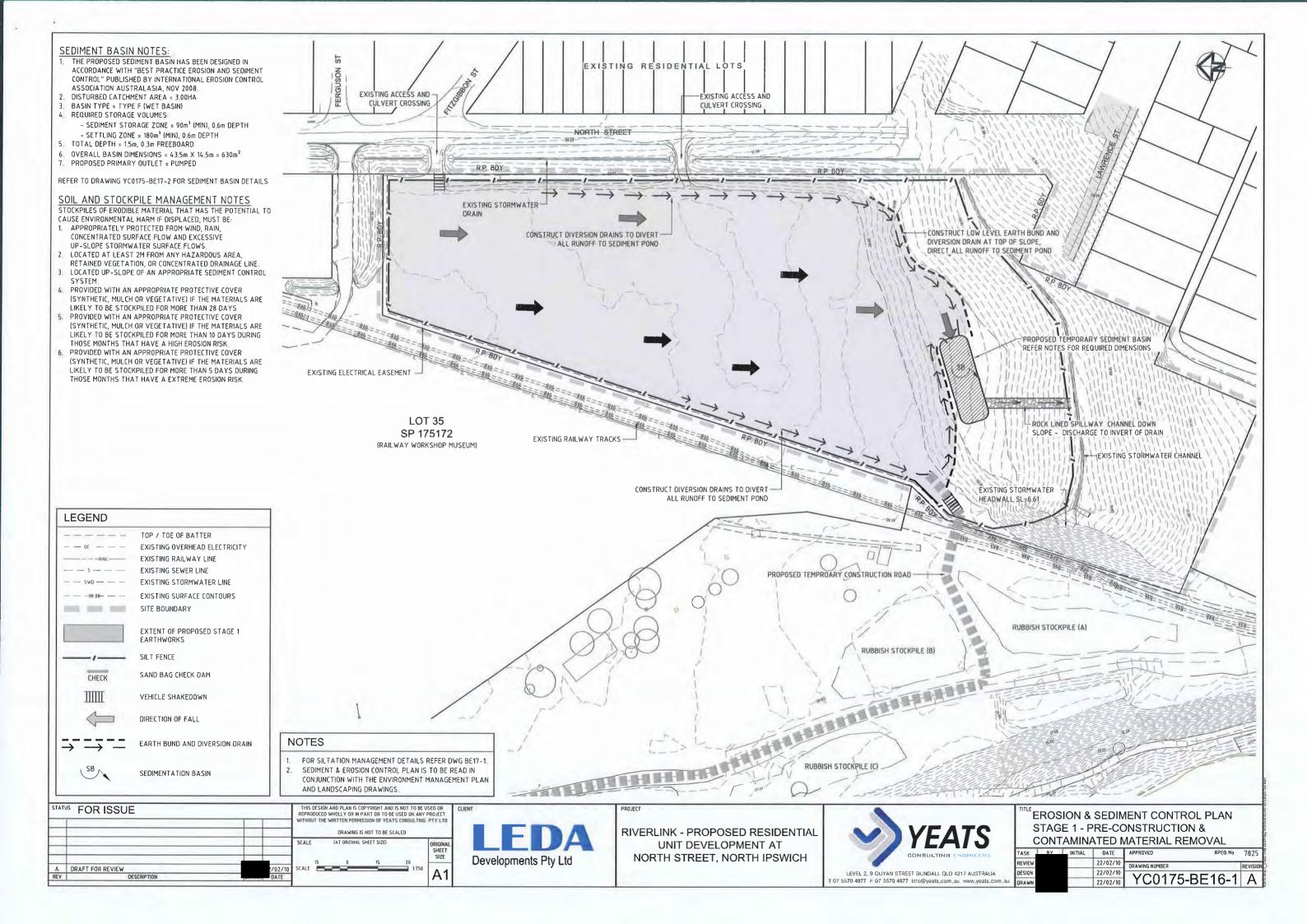


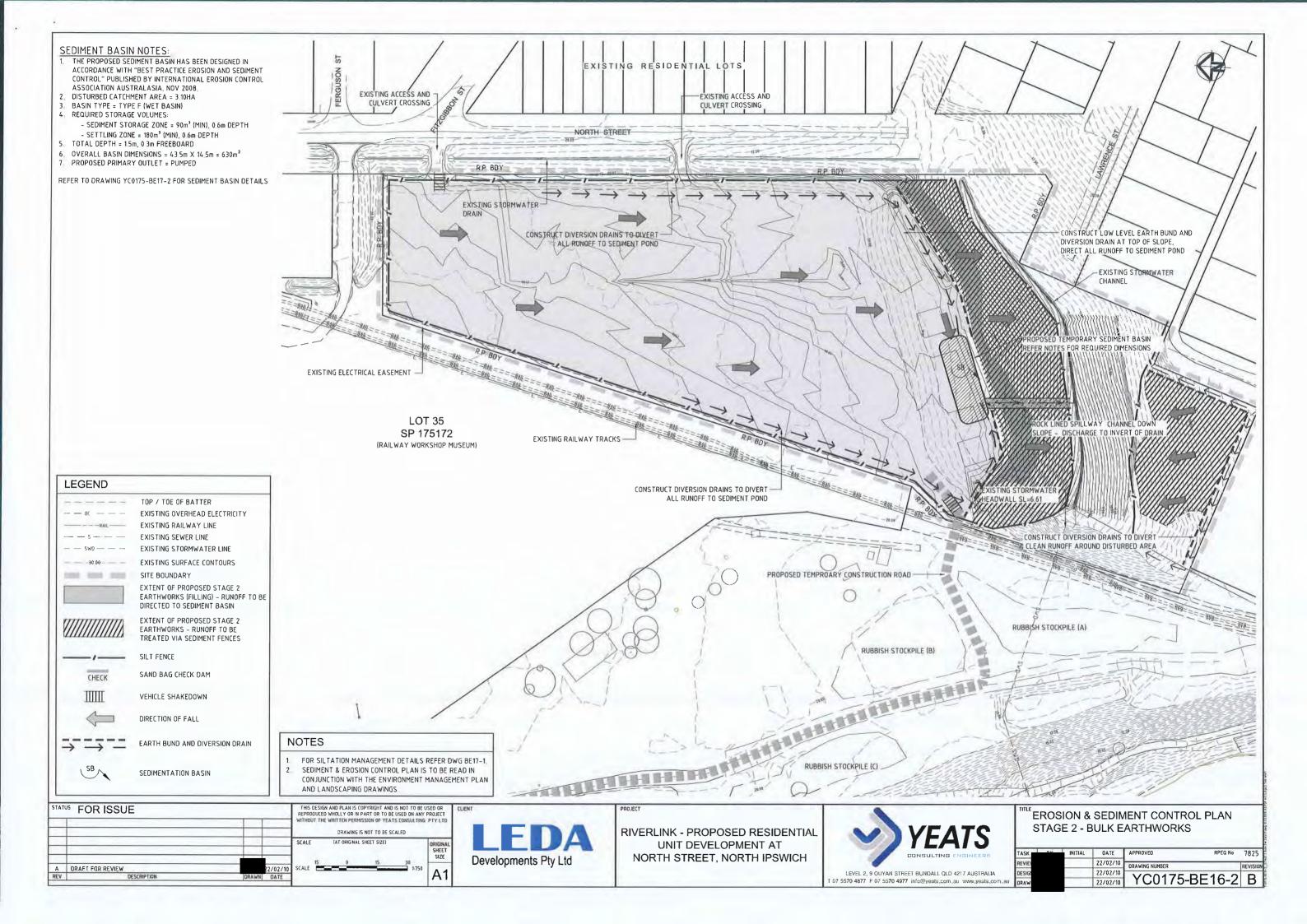
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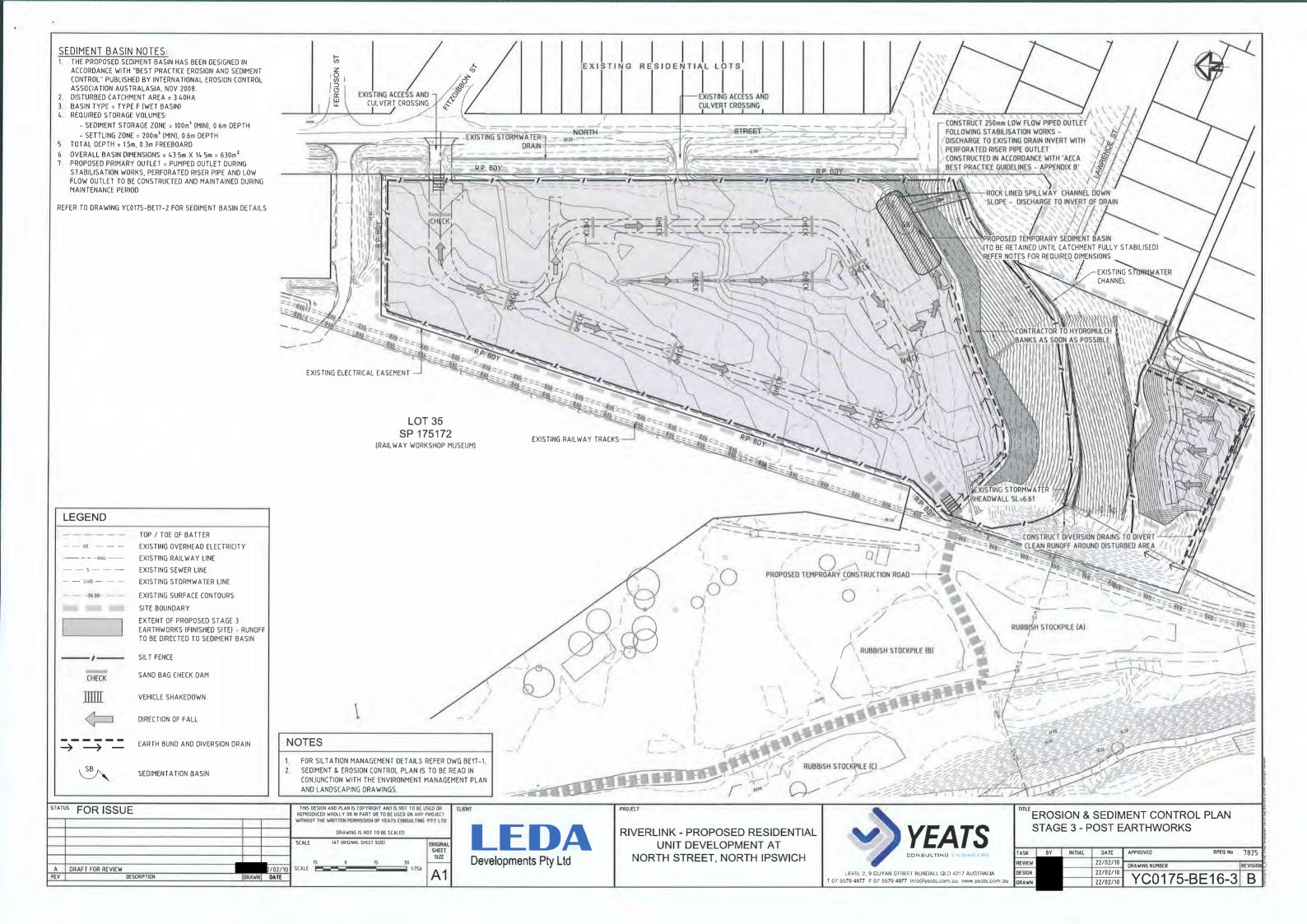


BULK EARTHWORKS	
TYPICAL SECTIONS - SHEET	2 OF 2

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DRA	WI		05.08.09	YC0175-BE15	B







SILT MANAGEMENT PROGRAM

PHASE

DESCRIPTION

ALL WORKS

· SILT FENCES TO BE ERECTED ALONG TOE OF FILL BATTERS

OR AS DIRECTED BY SUPERINTENDENT.

SEWER/WATER STORMWATER/SERVICES.

· EXCAVATED MATERIAL TO BE PLACED ON HIGH SIDE OF TRENCH IN ORDER TO PROTECT PIPE WORK AND DIRECT SURFACE FLOW AWAY FROM EXCAVATIONS.

ROADWORKS

• MEASURES ARE TO BE TAKEN TO PREVENT SILT INGRESS TO

STORMWATER SYSTEM

MAINTENANCE PERIOD

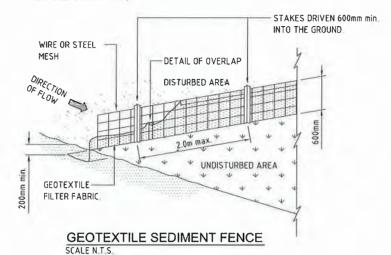
· EROSION CONTROL MEASURES ARE TO BE INSPECTED AFTER MAJOR EVENTS

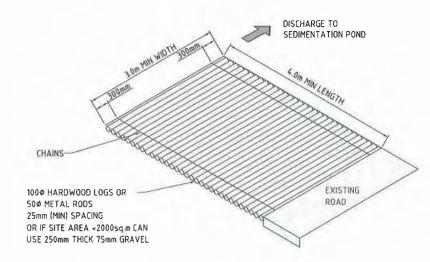
(> 25mm). ANY REPAIRS REQUIRED ARE TO BE EFFECTED IMMEDIATELY.

GENERAL NOTES

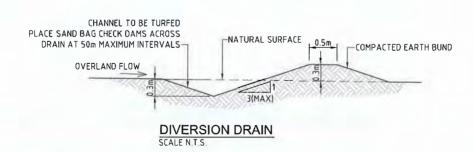
- THE CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION AND DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTION INCLUDING THE MAINTENANCE PERIOD
- 2. ALL SEDIMENT CONTROL DEVICES SHALL BE MONITORED, CLEANED AND/OR REPAIRED WHENEVER THE ACCUMULATED SEDIMENT REDUCES THE CAPACITY BY 50%
- 3. ALL PERIMETER BANK/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
- 4. THE EXTENT OF GRASSING SHALL BE DETERMINED BY THE SUPERINTENDENT AND SHALL BE SEEDED, AS SPECIFIED, WITHIN SEVEN DAYS OF FINAL TRIMMING.
- 5. EXTENT AND POSITION OF SILT FENCE CONTROL MEASURES TO BE DETERMINED. ON SITE BY SUPERINTENDENT, MEASURES SHOWN ON THIS DRAWING ARE MINIMUM REQUIREMENTS ONLY
- 6. SCOUR PROTECTION AND SILT MANAGEMENT MEASURES TO BE PROVIDED AT STORMWATER OUTLET HEADWALLS,
- 7. PROVISION TO BE MADE FOR DIRT/SAND REMOVAL FROM CONSTRUCTION VEHICLES PRIOR TO TRAVEL ON PUBLIC ROADS. METHOD TO BE APPROVED BY SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORK
- 8. ANY SILT OR SEDIMENT CAUSED BY THE MOVEMENT OF CONSTRUCTION TRAFFIC ON EXISTING ROADS IS TO BE REMOVED DAILY.
- 9. THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENT CONTROL PROCEDURES. DURING CONSTRUCTION AND MAINTENANCE STAGES OF THE DEVELOPMENT AND SHALL TAKE ALL NECESSARY ACTIONS TO COMPLY WITH THE OBJECTIVES OF THE IPSWICH CITY COUNCIL EROSION AND SEDIMENT CONTROL POLICIES.
- 10, THE CONTRACTOR IS TO BE RESPONSIBLE FOR THE DAILY REMOVAL OF SILT FOR THE DURATION OF THE CONSTRUCTION AND MAINTENANCE PERIOD, THAT HAS BEEN BLOWN, WASHED OR TRACKED FROM THE SITE ONTO COUNCIL ROADS OR INTO COUNCIL DRAINAGE SYSTEMS, WATERCOURSES AND ANY PRIVATE PROPERTY.
- 11 THE CONTRACTOR IS TO BE RESPONSIBLE FOR THE CONTROL OF DUST EMANTING FROM THE SITE AT ALL TIMES, INCLUDING ON WEEKENDS AND PUBLIC HOLIDAYS, FOR THE DURATION OF THE CONSTRUCTION AND MAINTENANCE PERIOD.
- 12. ALL RUBBISH, WASTE MATERIALS, OILS AND FUELS ARE TO BE CONTAINED APPROPRIATELY. OIL AND FUEL SPILLS ARE NOT TO ENTER ANY DRAINAGE SYSTEM OR WATERCOURSE.
- 13, THE CONTRACTOR IS TO ENSURE THAT NO SILT REACHES THE DOWNSTREAM WATER COURSE AND IS TO PROVIDE ADEQUATE PROTECTION TO PREVENT THIS OCCURRING.
- 14. WHERE TOPSOIL STOCKPILES ARE TO REMAIN IN PLACE FOR A PERIOD OF MORE THAN 14. DAYS, THE STOCKPILE SHALL BE GRASSED WITH A SUITABLE QUICK STRIKING CEREAL GRASS. PROVIDE A DIVERSION DRAIN OR BUND ON THE UPHILL SIDE AND A SEDIMENT FENCE ON THE DOWNHILL SIDE OF ALL STOCKPILES.

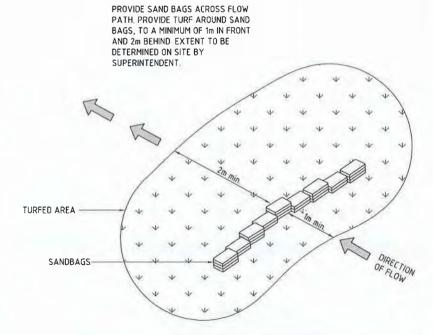
DRAINAGE AREA 0.6ha, MAX. SLOPE GRADIENT 1: 2 MAX. SLOPE LENGTH 60m MAX.



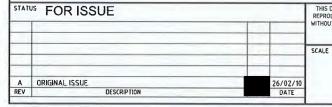


METAL GRID SHAKE DOWN (OR APPROVED EQUIVALENT)





SAND BAG CHECK DAM



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> (AT ORIGINAL SHEET SIZE RIGINA SHEET SIZE N/A A1

Developments Pty Ltd

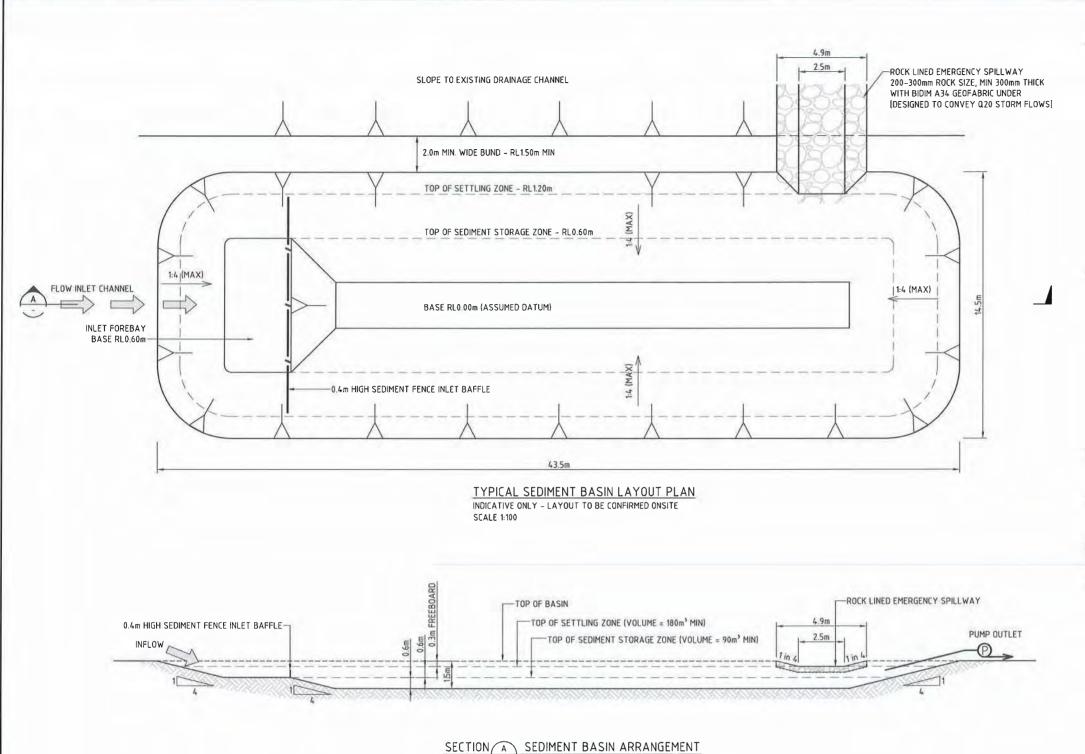
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



07 5570 4877 F 07 5570 4977 info@yeats.com.au www.yeats.com.au

BULK EARTHWORKS	
EROSION & SEDIMENT CONTROL	DETAILS

TASK	BY	INITIAL	DATE	APPROVED RPEQ No	7825
REVIEW			26/02/10	DRAWING NUMBER	REVISION
DESIGN			26/02/10		Λ
DRAWN			26/02/10	YC0175-BE17-1	A



WATER QUALITY CONTROL

1. WATER QUALITY SAMPLES MUST BE TAKEN AND ANALYSED PRIOR TO RELEASE OF ANY WATER FROM THE SEDIMENT PONDS.

2. WATER QUALITY MUST SATISFY THE FOLLOWING CRITERIA AT ALL TIMES:

- TOTAL SUSPENDED SOLIDS (TSS) = 50 mg/L

- DH BETWEEN 6.5 AND 8.5

3. IF REQUIRED, ALL WATERS CAPTURED SHALL BE TREATED WITH AN APPROVED FLOCCULATING AGENT TO ACHIEVE THE SPECIFIED WATER QUALITY BEFORE WATER IS DISCHARGED. REFER TABLE B17 OF THE IECA BEST PRACTICE GUIDELINES FOR APPROVED FLOCCULATING AGENTS.

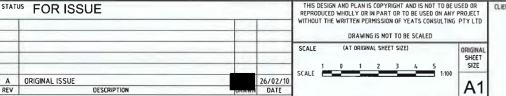
4. EROSION PROTECTED SHALL BE PROVIDED AT THE OUTFLOW FROM ANY OUTLET SYSTEM TO PREVENT SCOUR. $\hspace{-0.4cm}$

5. ALL WATER QUALITY DATA INCLUDING DATES OF RAINFALL, DATES OF TESTING AND WATER RELEASE MUST BE CONTAINED WITHIN AN ONSITE REGISTER. THIS REGISTER MUST BE MAINTAINED FOR THE DURATION OF THE APPROVED WORKS, AND BE AVAILABLE ONSITE FOR INSPECTION BY COUNCIL OFFICERS ON REQUEST.

SEDIMENT BASIN NOTES:

- THE PROPOSED SEDIMENT BASIN HAS BEEN DESIGNED IN ACCORDANCE WITH "BEST PRACTICE EROSION AND SEDIMENT CONTROL" PUBLISHED BY INTERNATIONAL EROSION CONTROL ASSOCIATION AUSTRALASIA, NOV 2008.
- 2. POND GEOMETRY REQUIREMENTS INCLUDE:
 - MAXIMUM EARTH BATTER SLOPES OF 4(H):1(V)
 - POND LENGTH : WIDTH RATIO 3:1 MINIMUM, OTHERWISE BAFFLES SHALL BE INSTALLED
- 3. WATER LEVEL SHOULD BE KEPT AS LOW AS POSSIBLE BETWEEN STORM EVENTS AND SHOULD BE DISCHARGED IF IT FILLS 20% OF THE STORAGE CAPACITY
- 4. ACCUMULATED SEDIMENT HALL BE REMOVED WHEN 10% OF THE STORAGE CAPACITY HAS BEEN LOST. DISPOSE OF SEDIMENT SUCH THAT IT WILL NOT CAUSE FURTHER POLLUTION TO DOWNSTREAM LANDS AND WATERWAYS.
- 5. REQUIRED DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES DURING THE DECOMMISSIONING AND REHABILITATION OR A SEDIMENT BASIN MUST COMPLY WITH SAME STANDARDS SPECIFIED FOR THE NORMAL CONSTRUCTION WORKS
- 6. UPON DECOMMISSIONING OF A SEDIMENT BASIN, ALL WATER AND SEDIMENT MUST BE REMOVED FROM THE BASIN PRIOR TO REMOVAL OF THE EMBANKMENT (IF ANY). ANY SUCH MATERIAL, LIQUID OR SOLID, MUST BE DISPOSE OF IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.
- 7. IF AN ALTERNATIVE, PERMANENT, OUTLET STRUCTURE IS TO BE CONSTRUCTED PRIOR TO STABILISATION OF THE UP-SLOPE CATCHMENT AREA, THEN THIS OUTLET STRUCTURE MUST NOT BE MADE OPERATIONAL IF IT WILL ADVERSELY AFFECT THE REQUIRED OPERATION OF THE SEDIMENT BASIN.
- 8. A SEDIMENT BASIN MUST NOT BE DECOMMISSIONED UNTIL ALL UP-SLOPE SITE STABILISATION MEASURES HAVE BEEN IMPLEMENTED AND ARE APPROPRIATELY WORKING TO CONTROL SOIL EROSION AND SEDIMENT RUNOFF IN ACCORDANCE WITH THE SPECIFIED ESC STANDARD
- IMMEDIATELY PRIOR TO THE CONSTRUCTION OF THE PERMANENT STORMWATER TREATMENT DEVICE, APPROPRIATE FLOW BYPASS CONDITIONS MUST BE ESTABLISHED TO PREVENT SEDIMENT-LADEN WATER ENTERING THE DEVICE.

SECTION A SEDIMENT BASIN ARRANGEMENT



LEDA
Developments Pty Ltd

RIVERLINK - PROPOSED RESIDENTIAL

UNIT DEVELOPMENT AT

NORTH STREET, NORTH IPSWICH



BULK EARTHWORKS
SEDIMENT BASIN DETAILS

TASK	RY	INITIAL	DATE	APPROVED RPEQ No	7825
REVIEW			26/02/10	DRAWING NUMBER	REVISION
DESIGN			26/02/10		Λ
DRAWN			26/02/10	YC0175-BE17-2	. A

IECA SEDIMENT BASIN DESIGN

Project:	RIVERLINK - North Street (Lot 55)	
Date:	26-Feb-10	
Designed:	HV	
Comments:	Stage 1 & 2 Sediment Basin Design	



Design in accrodance with IECA (Australasia) 'Best Practice Erosion and Sediment Control' Appendix B - Sediment basin design and operation

1 - Assess the need for a Sediment Basin

Note: Table 4.5.1recommends the use of Type 1 Sediments Traps within sub-catchments with a catchment area exceeding 2,500m2 and an estimated soil loss rate that exceeds the equivalent of 150t/ha/yr

121.20 t/ha/yr

Revised Universal Soil Loss Equation (RUSLE) - Appendix E - Soil Loss Estilmation

A = Annual Soil Loss due to erosion (t/ha/yr) = R x K x LS x C x P

R = Rainfall erosivity factor =	3705	[Table E1]
K = Soil erodibility factor =	0.047	[Table E5]
LS = topographic factor =	0.58	[Table E3]
C = Cover and Management factor =	1.00	[Table E9]
P = Erosion control pracrtice factor =	1.2	[Table E11]

2 - Select Basin Type

Table B2 - Selection of Basin Type

Adopt Type F Basin (subject to onsite testing to confirm soil dispersive % and whether flocculation is required to achieve the required water quality objectives)

3 - Determine Basin Location

Refer to Erosion and Sediment Control Plan for proposed basin locations

4 - Sizing Type F Basins - SETTLING ZONE

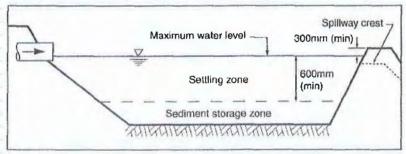


Figure B7 - Settling zone and sediment storage zone

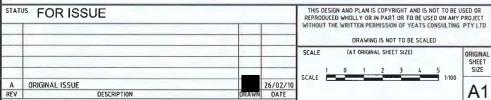
 V_s = Volume of Settling Zone (m³) = 10 x R_(Y%, 5-day) x C_v x A $R_{(Y\%, 5-day)} = Y\%$, 5 day rainfall depth = $K_1 \times I_{(1 \text{tr}, 120 \text{hr})} + K_2$ Table B4 - Basin with a design life less that 6 months 12.9 9.9 0.94 mm/hr [Table B5] I (1yr. 120hr) =

Cv = Volumetric Runoff Coefficient = 0.27 [Table B7 - Group C, Loamy Clay)

A = Effective Catchment Area = V = Therefore, 178.4 m³ Q = Discharge through spillw ay =

5 - SEDIMENT STORAGE VOLUME

	Table B8 - For Type F Basin, Sedime	s = 89.2	m 3		
	V _s	5 05.2	III.		
6 - BASIN LA	YOUT AND DIMENSIONS				
	Length:Width Ratio =	3	L:1W		
	Basin Batter Slope	4	:1		
	Settling Zone Depth, d _s =	0.6			
	Sediment Storage Zone Depth, d _{ss} =				
	Spillw ay Freebaord	0.3	m		
	TOTAL DEPTH	1.5	m		
TOP OF BASIN	DIMENSIONS				
TOT OF EATON	Width	14.5	m		
	Length	43.5			
	AREA, Ac	630,75			
	4				
VOLUMEABO	VE SPILLWAY OVERFLOW				
	Low er Width	12.1	m		
	Low er Length	41.1	m		
	Low er Area	497.31	m²		
	TOTAL VOLUME	168.8			
VOLUME OF S	ETTLING ZONE				
	Low er Width	7.3	m		
	Low er Length	36.3	m		
	Low er Area	264,99	m²		
	TOTAL VOLUME	225,1	m³	OK	
VOLUMEOFS	EDIMENT STORAGE ZONE				
	Basin Base Width	2,5			
	Basin Base Length	31.5			
	Basin Base Area	78.75			
	TOTAL VOLUME	97.6	m³	OK	
7 - DESIGN O	FEMERGENCY SPILLWAY				
Table R12 Des	ign Life = 3 to 12 Months.				
123.0 2 . 2, 200	Therefore, minimum design standard	for Emergency	Spillway = 1 in 20	yr ARI Storm	
	Refer attached Rational Calculation f				
	200	0.550	-3/-		
	Q20	0.858	m³/s		
Emergency Spi	lw ay Design - Trapezoidal Channel				
	$Q = 0.57(2g)^{1/2}(2/3Lh^{3/2} + 8/15Zh^{5/2})$	- solve by Tr	ial and Error		
	h = Depth of flow at design flow =	0.3	m		
	Z = Horizontal/Vertical side slope =		H: 1V		
	L = Horizontal bottom width =	2.5			
	E - Hor Editor bottom width -	2.3	-		
	Q = Discharge through spillw ay =	0.00	m³/s	> Q20 Therefore OK	





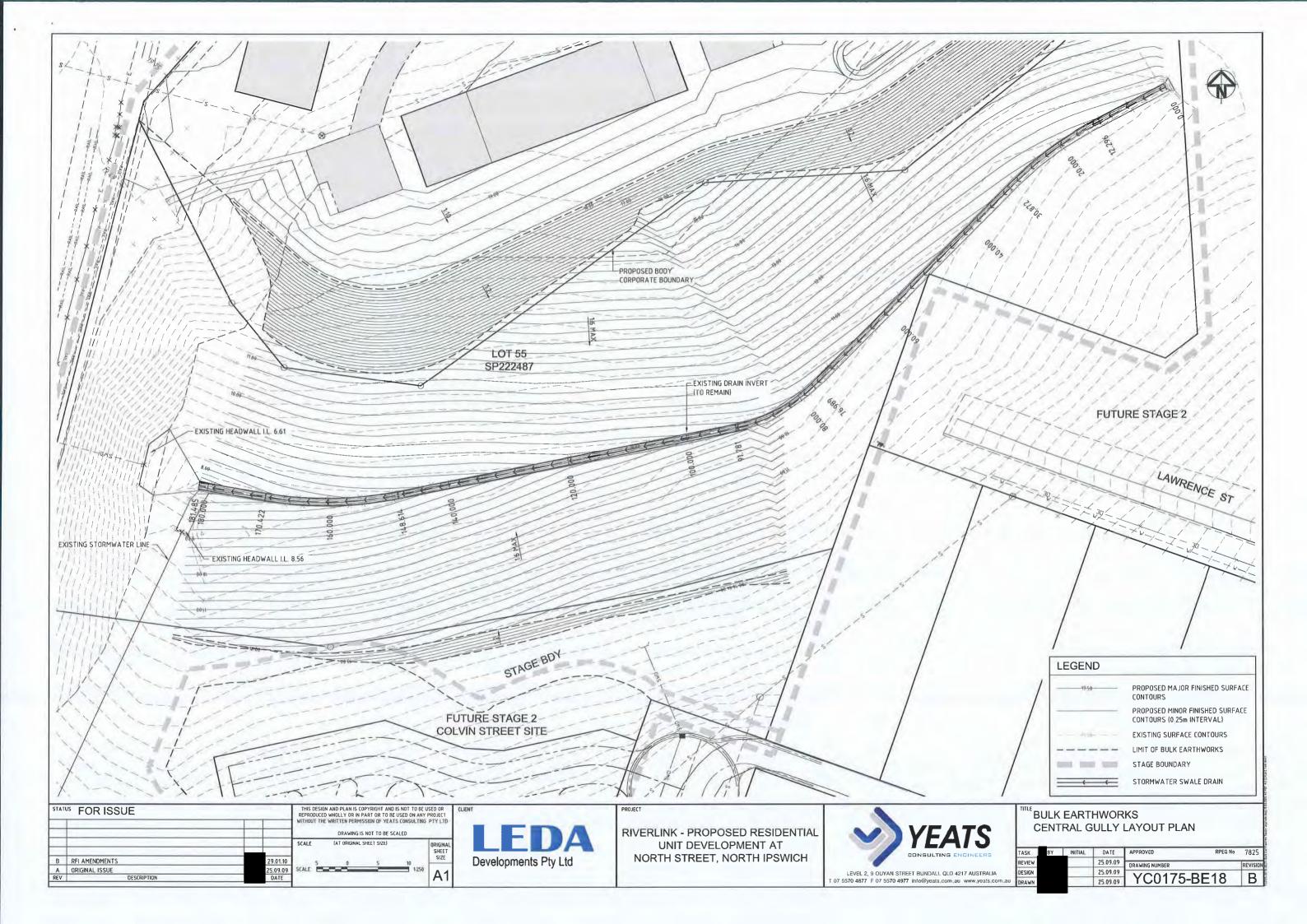
PROJECT

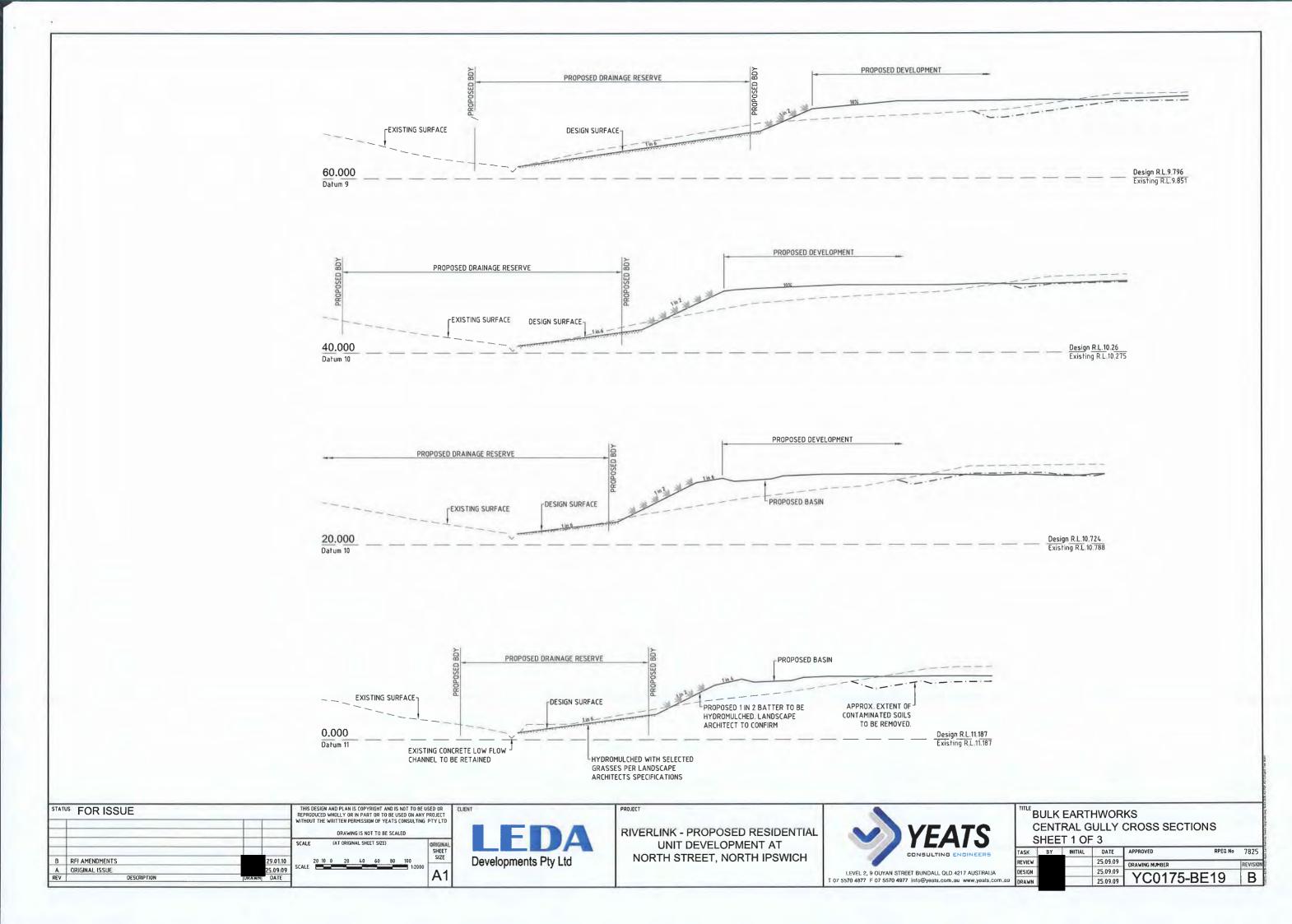
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH

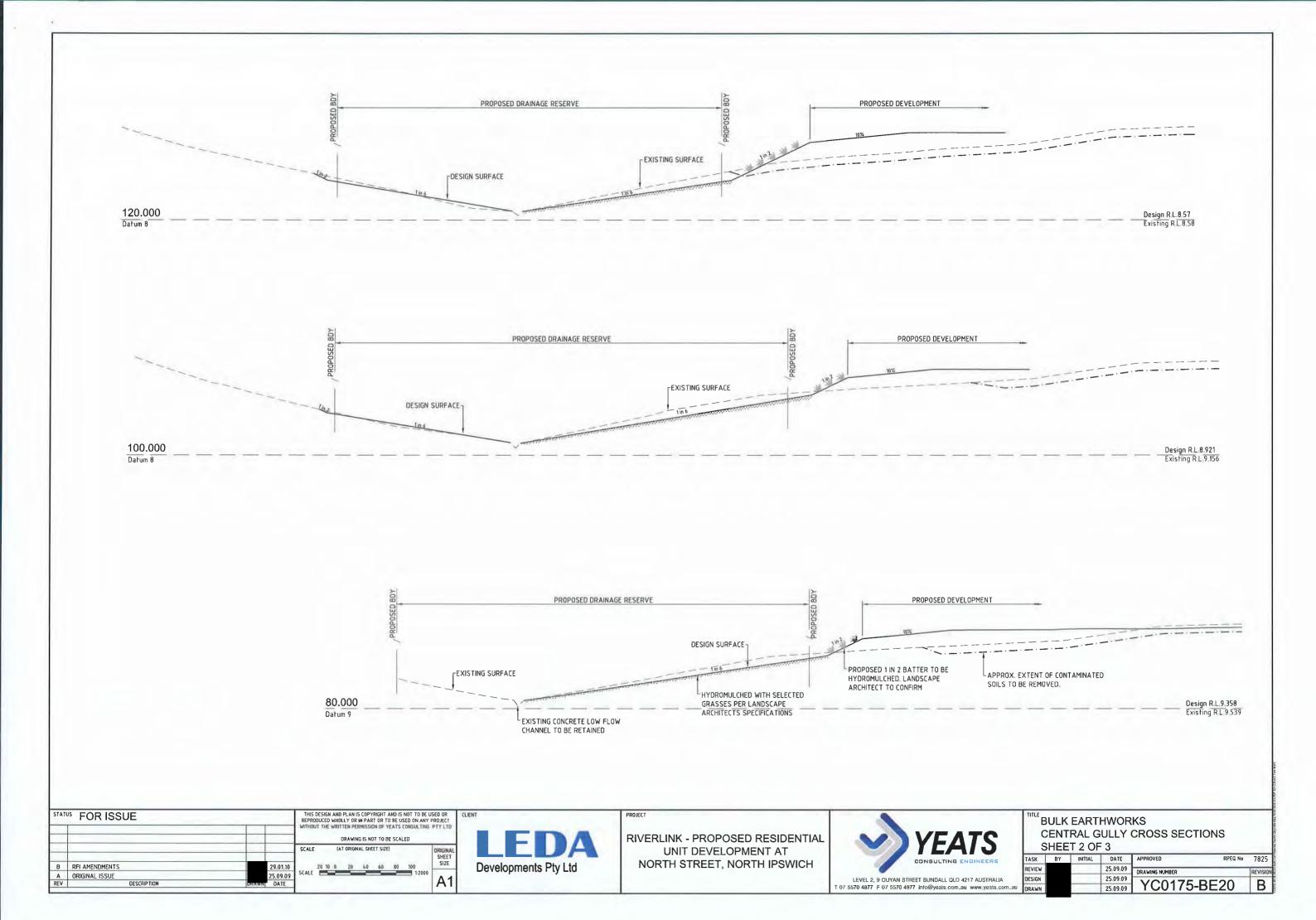


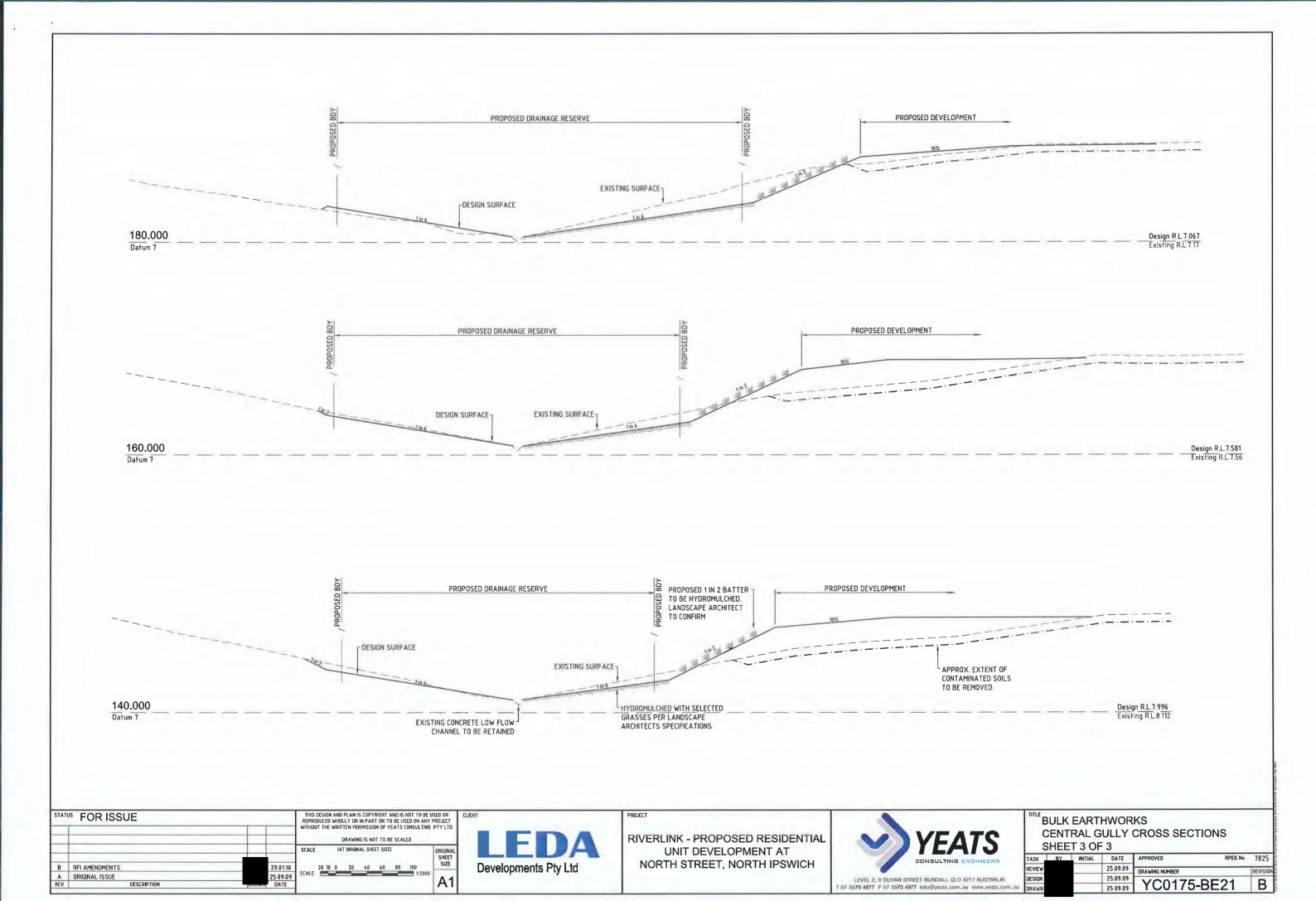
BULK EARTHWORKS
SEDIMENT BASIN SIZING CALCULATIONS

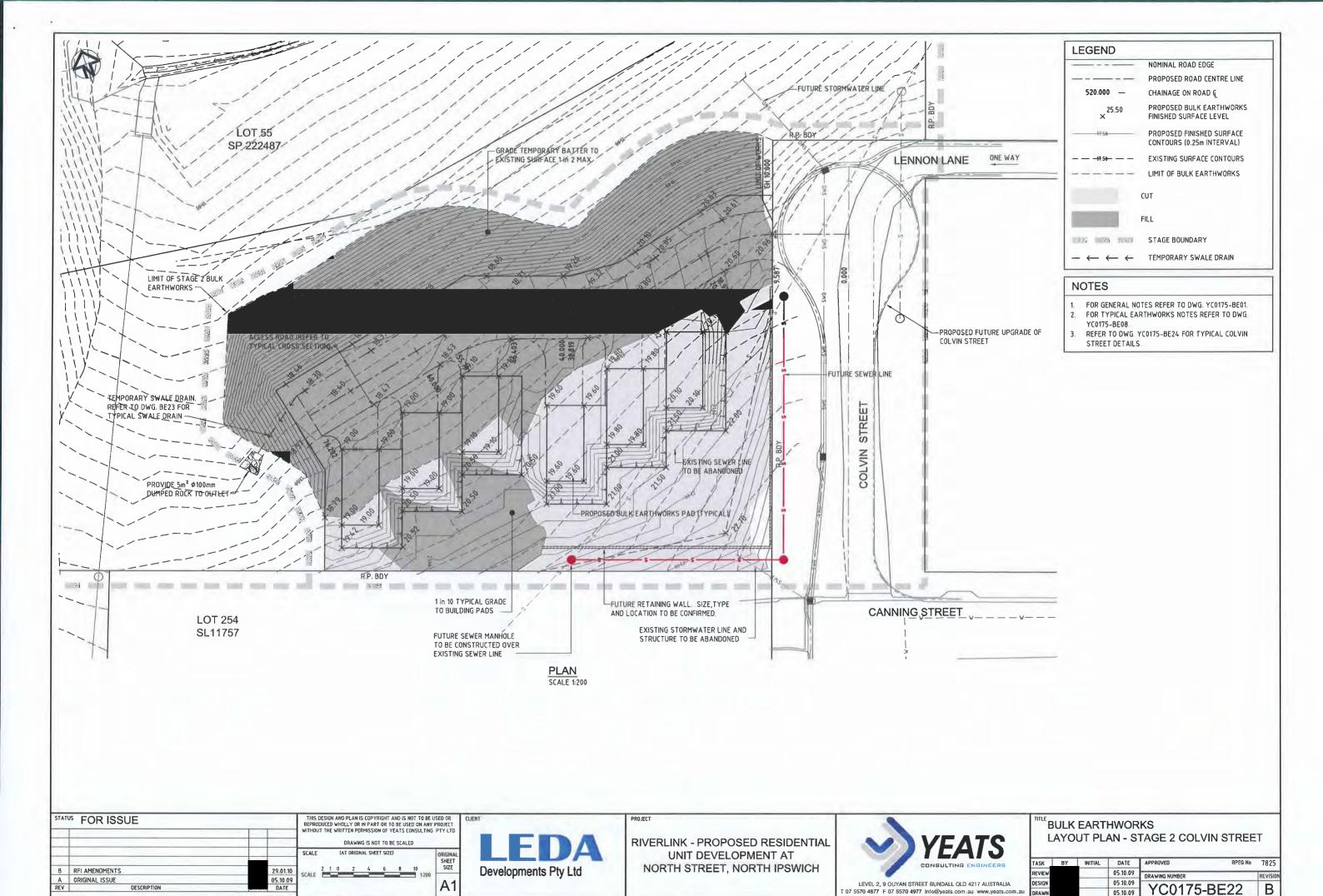
TASK	BY	INITIAL	DATE	APPROVED RPEQ No	7825
REVIEW			26/02/10	DRAWING NUMBER	REVISION
DESIGN			26/02/10		1000000
DRAWN			26/02/10	YC0175-BE17-3	A

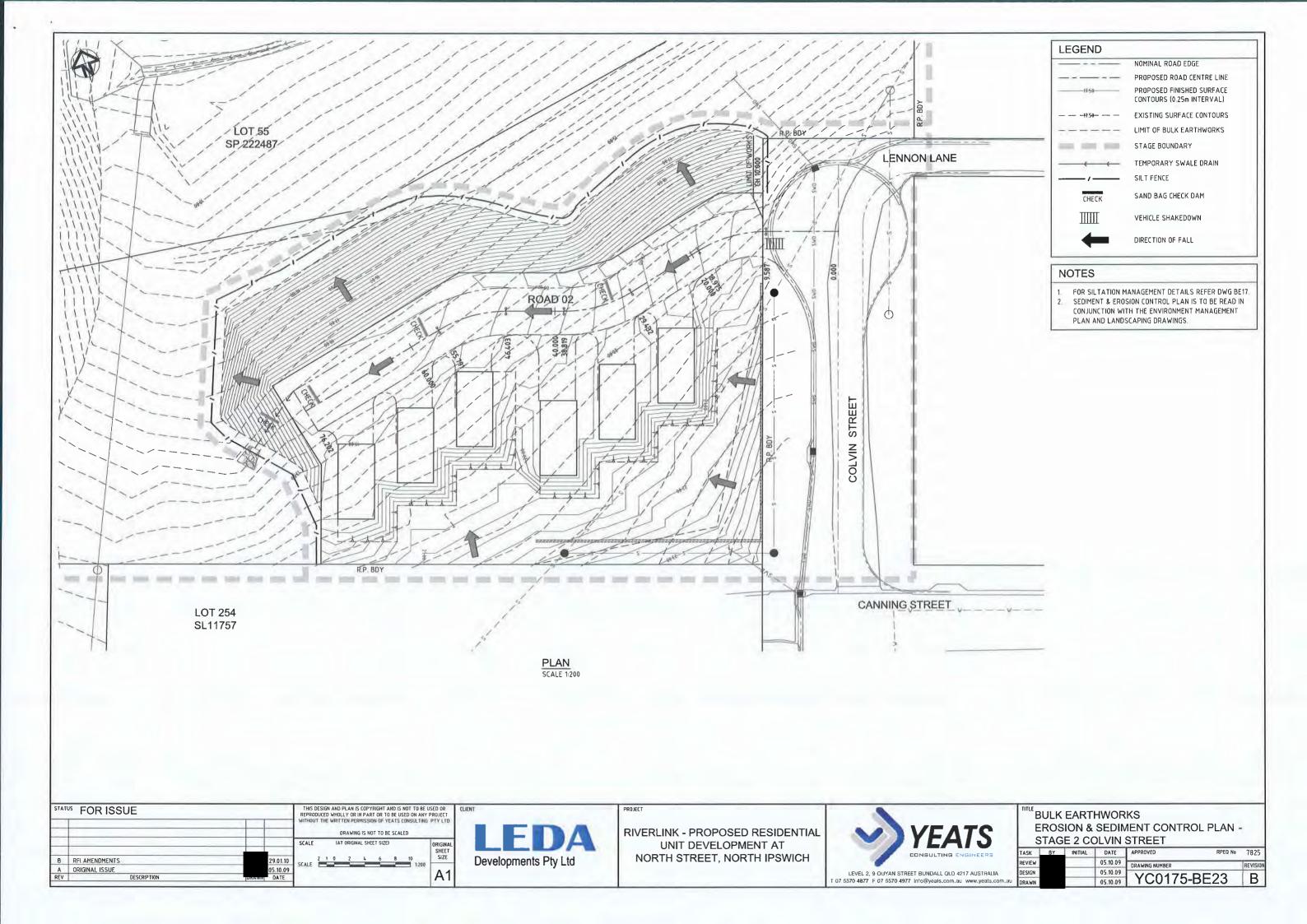


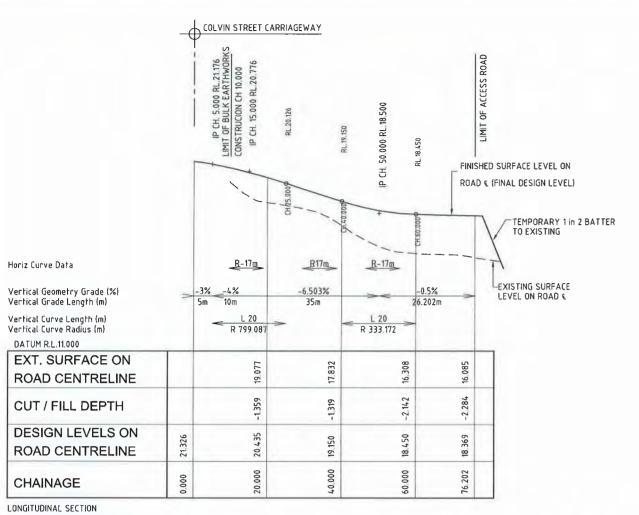




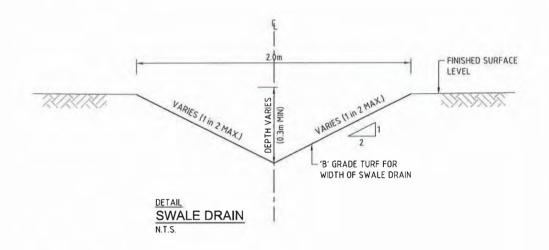








CONTROL LINE GEOMETRY FOR ROAD 02 Chainage Easting Northing Bearing Radius A.Length D.Angle Pt Level 21,326 0.000 476164_141 6946499_780 289°21'57' 476155,096 6946502,959 10,000 476154,705 6946503,092 20.960 287°58'32" 476150 552 6946504 557 -17.000 -9.388 31°38′25″ 476145.845 6946503.533 20.495 257°43'32' 20.000 476144,844 6946503 315 20,435 257°43'32" 29,432 476135.628 6946501.310 19.838 257°43'32" 30.000 476135.070 6946501198 19.801 259°38'28" 31*38'25" 34.126 4.76130 921 6946500 286 17 000 9 388 19 227 289°21'57" CT 38 819 476126 376 6946501883 40 000 476125.263 6946502 274 19 150 289°21'57" 46 403 476119 222 6946504 398 18.795 289°21'57" 50.000 476115.728 6946505 224 18.650 277°14'37" -9.388 31°38'25" 51097 6946505 995 257°43'32" -17,000 IP4 476114 677 18 498 £T. 55.791 476109 970 6946504.971 257°43'32" 476105.858 6946504.076 18 450 257°43'32" 60.000 70,000 476096.086 6946501.950



INTERNAL ROAD 02

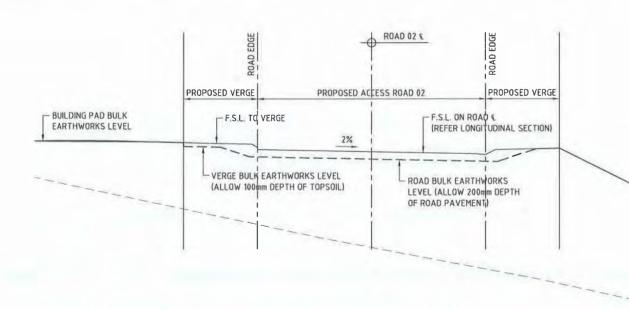
SHOWING - FINISHED SURFACE LEVEL ON ROAD &

- EXISTING SURFACE LEVELS

HORIZ

10 0 10 20 1500

1 0 1 2 3 4 5 1:100



TEMPORARY 1 in 2 BATTER TO

EXISTING SURFACE LEVEL

TYPICAL SECTION
INTERNAL ROAD 02
6.2m WIDE
SCALE 1:100

STATUS FOR ISSUE

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SCALE (AT ORIGINAL SHEET SIZE)

A ORIGINAL SSUE

OS.10.09

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SCALE (AT ORIGINAL SHEET SIZE)

AS SHOWN

A1



PROJECT

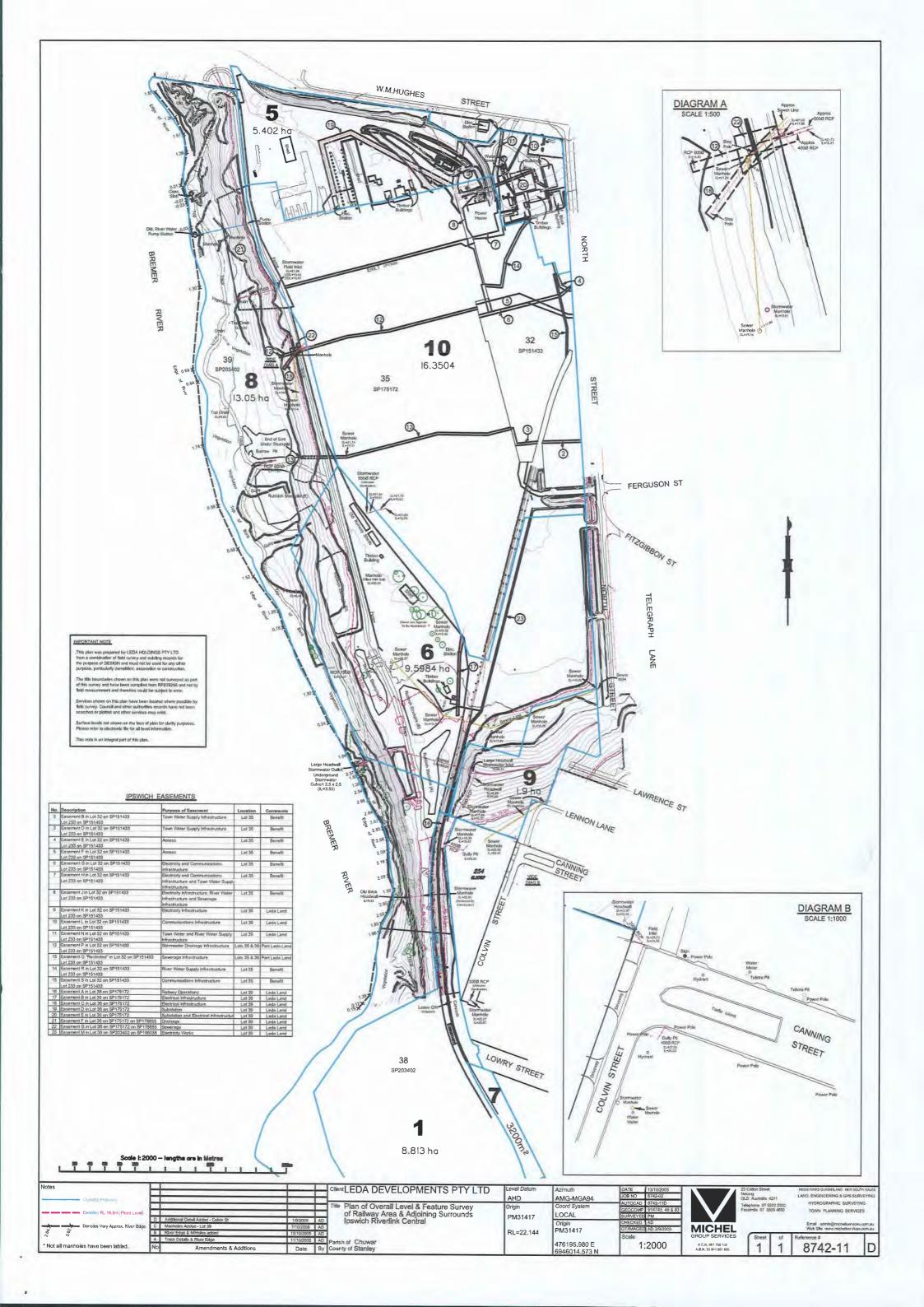
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



T 07 5570 4877 F 07 5570 4977 Info@yeats.com.au www.yeats.com.au

BULK EARTHWORKS
DETAILS - STAGE 2 COLVIN STREET

T	ASK	BY	INITIAL	DATE	APPROVED RPEQ No	7825
R	REVIEW			05.10,09	DRAWING NUMBER	REVISIO
0	ESIGN			05.10.09		D
0	RAWN			05.10.09	YC0175-BE24	B



Attachment GE-2

CIVIL

WATER

8 October 2009

YEATS
CONSULTING ENGINEERS

STRUCTURAL

Chief Executive Officer Ipswich City Council PO Box 191 Ipswich QLD 4305

Our Ref:

YC0175/L001

Your Ref:

INFRASTRUCTURE

Attention: Gary Ellis

Dear Sir

PROJECT DELIVERY

URBAN DEVELOPMENT

OPERATIONAL WORKS APPLICATION - CHANGE TO GROUND LEVEL LOT NORTH STREET, NORTH IPSWICH

We herewith submit our application for Operational Works – Change to Ground Level. We include the following with the submission:

- IDAS Form 1 Development Application Part A
- IDAS Form 1 Development Application Part E
- IDAS Form 1 Development Application Assessment Checklist
- Owners Consent
- Riverlink Central Flood Study (Cardno)
- Remediation Plan (GeoEnvironmental Consultants)
- 3 x A3 copies of the Engineering drawings
- Application fee in the amount of \$5,700

We trust the above is to your satisfaction. Should you require any further information please do not hesitate to contact the undersigned.

Yours faithfully

YEATS CONSULTING PTY LTD



Director

Encl.

T 07 5570 4877
F 07 5570 4977
E info@yeats.com.au
W www.yeats.com.au

Level 2, 9 Ouyan Street BUNDALL QLD 4217

PO Box 9122 GOLD COAST MC QLD 9726

ABN 99 282 106 832

Form 1 Development Application

idas

Part A

Common details

NOTE: Answer all questions unless directed to go to a particular question. Refer to the end of the form for advice on how to complete this form.

Applicant details (The Applicant is the person responsible for making the application and need not be the owner of the land. The Applicant is responsible for ensuring the information provided on the IDAS Application Form is correct. This information is relied upon by the Assessment Manager and any referral agencies when assessing and deciding this application. By lodging this application, the Applicant incurs the obligations and responsibilities prescribed by the IPA. Any development permit or preliminary approval that may be issued as a consequence of this application will be issued to the Applicant.)

Company/organisation name (if applicable) LIPOMA c/o YEATS CONSULTING ENGINEERS

Individual applicant/Contact person (If there is more than one applicant, provide additional applicant details on an attachment to this form)

Title	First name			Last name	
Postal address	PO BOX 912	2, GOLD COAST MC(QLD 9726		
Contact telephone number			Mobile phone	number	Γ
Facsimile number			e-mail address	S	-

Details of the premises (i.e. the land on which the development is proposed - refer to the advice at the end of the form)

1. Identify the premises by completing Table A, or Table B and/or Table C (ensure adequate information is given to identify the premises)

Table A If the application is for a mobile and temporary Environmentally Relevant Activity (ERA), complete Table A only. Then go to Q2.

	Name of each local government area in which the mobile and temporary ERA is proposed to operate
1	

OR

Table B Street address for the premises (tick applicable box/es below and insert property description in the table. Identify each lot in a separate row.)

- (i) Street address / lot on plan for the premises (Appropriate for most applications including building applications); or
- (ii) Street address /lot on plan for the land adjoining or adjacent to the premises (Appropriate for development in water e.g. jetty, pontoon etc) (Note: Loton plan details may be obtained from title documents, a 'Rate' notice, or from the local government.)

	Street Address					lan description	Local government area (e.g. Logan,
	Unit No.	Street No.	Street Name and official suburb/locality name	Post Code	Lot No.	Plan type and Plan Number	Caims)
1					55	SP222487	Ipswich City Council

AND / OR

Table C Coordinates and/or a map of the premises (Appropriate for development in remote areas, over part of a lot, in water (e.g. channel dredging in Moreton Bay) etc.)

	(Not	Coord e: place each set of co	linates ordinates in a separat	e row)	Zone	Datum	Local government area
	Easting	Northing	Latitude	Longitude	Reference		(If applicable)
1						DGDA94 WGS84 Other -	

^{2.} Identify if any of the following apply to the premises by completing Tables D, E, or F. (Note: In most instances, the premises will not involve any of the following characteristics, however some applications may involve one or more of these characteristics - complete only if applicable)

		IING ACT 1997				rsion 3.1, 3 March 2008
Table D (Complet	te if the premises are adjacent to				lake, canal)
-			Name of water body, water	course or aquifer	(If known)	
	1					
Table E (Complet	te if the premises are on Strateg	ic Port Land under the Trans	port Infrastructur	e Act 1994	
		Lot on plan description fo	r strategic port land		Port Authority for the lot	
	1					
Table F (Complet	te if the premises are in tidal wat	ter			
		Name of local government for t		Name of p	oort authority for the tidal area	(If applicable)
Γ	1					
C Imalia.	- 4- 40- 4	CASI saar allaha maaminan oo suh		1		
3. Indica	ate the t	total area of the premises on wh	ich the development is propo	Sed: (Note: The tot	al area may include land both ab	ove and below water)
	E = 10	Total area of premises				
4.89		m hectares (Tick	k applicable unit)			
Existing us	e of the	premises	Service of the service of the	8 The 18 18		
4. Curre	ent use/s	s of the premises: (e.g. vacant land	, house, townhouses, apartment buil	Iding, shop, service s	station, school, sugar cane farmin	ng etc.)
Γ.		/acant Land				
L						
		y existing easements on the pre		-	•	
_ N		Yes - Ensure the type, location and	d dimensions of each easement are	included in plans, su	ubmitted with the application	
Proposal de	-	Constitution of the second of		3-13-1		
6. Brief	descript	tion of the proposal (e.g. 6 unit apa	rtment building, 30 lot residential sut	bdivision, a bore, aqu	uaculture)	1
Bulk earth	works to	o facilitate decontamination and	rehabilitation of the site and	future townhous	e development	
7. Does	the pop	oosal include new buildings or op	perational work (including an	y services) on th	e premises?	
\square N		Yes - Ensure the nature, location				ne application
Resource e		ent (if applicable) - further information				Flets NOV
8. Does to	he appli State lan	ication involve taking or interfering d (leased and freehold), declared Fish	ng with a State resource and Habitat areas, taking quarry materia	therefore require al, taking or interferin	e a resource entitlement?	e.g. the application t 2000, etc.)
• N	0 - Go to		ele G - provide details for each evide entitlement must be submitted with the	ence required on a sence application. You d	eparate row, if applicable. Evider o not need to answer Q9 - go to	nce of resource the next section.
Owner's co	nsent (if	applicable) - further information is pro	vided in the advice section at the en	d of the form		In the second second
not with	hin a ca	le H for applications involving a mal as defined under the Coasta astructure Act 1994 - provide details	al Protection and Managemer	nt Act 1995; or w	ork on rail corridor land de	
Table H		Premises Owner's name/s and postal address	Details of the premise (street address or lot on plan		Owner's signature*	Date consent was obtained
	1	See attached consent				

Table I

Date

Method of delivery to

assessment manager

Attachments and supporting information (Complete Table I - Use a separate row for each type of attachment or information, including information required under this Part) Please ensure all documentation submitted with this form, including other Parts of Form 1, or owner's consent, etc, are securely attached to this Part of the Form.

Title (if applicable)
(e.g. General Authority, James StreetTraffic Report)

Description of attachment or information

(e.g. Part C of Form 1, owner's consent, evidence of resource allocation/entitlement, plans, drawings, reports)

		1	IDAS Form 1 Part A				July 09	over the counter
		2	IDAS Form 1 Part E				July 09	over the counter
		3	IDAS Assessment Che	ecklist			July 09	over the counter
		4	Engineering Drawings		Proposed Residential Uni Development - North Stre		July 09	over the counter
					Earthworks			
Porta	able Lor	ng Servi	ce Leave (PLSL) levy (A	pplicable for certain buildir	ng and construction work valued over	er \$80,000 only	()	1 1990 1990
10.	The Po	ortable L	ong Service Leave Levy	(PLSL) is <u>not</u> applic	able to this application if any	of the follo	wing apply:	Tick box if applicable)
	th	e applic	ation seeks a preliminar	y approval only;				
	fa re	eave) A arming pu egrowth, I costs,	ct 1991, section 3AA (e.g. proses: land clearing, site thinning vegetation or control that relate to the work be	g. the application is only preparation, earthwork rolling weeds or pests); oth directly and indire	k under the Building and Cor y for a change of use, or for the s, fences, fodder harvesting, cle ectly, are less than \$80,000, i ermit issued under the Quee	following type aring of encr inclusive of	es of work ca oaching vege GST; or	ried out solely for tation, clearing of
11.	si	ghted by t	he assessment manager befor	re a development permit o	payment required if owner-builder pan be given. Refer to Q10 and the Advice belo		,	
		No -	End of Part A					
	•	Yes ·	- Answer Q12 below					
12.	Has th	e PLSL	levy been paid?					
	•		the Assessment Manager befo Notification and Payment Forn	ore a development permit n to QLeave.)	f the applicable PLSL levy. Howeve may be given for this application. To 'yellow' (Local Government's (Coun-	pay the levy	you will need to	complete and submit a
OFFI	CE USI	ONLY	(For use by the Assessme	ent Manager / Private C	ertifier) (Optional)			
Fee	(\$)		Date received	Rece	iving officer's name		Reference numbers	
			NOTI	FICATION OF ENGA	AGEMENT OF PRIVATE CER	RTIFIER	17717	
Го:				Counc	il. I have been engaged as the p	orivate certifie	er for the build	ing work referred to in th application
	ate of agement		OMES THE	Name	В	SA Certification	on number	Building classification/s

QLEAVE NOTIFICATION AND PAYMENT (for completion by assessment manager or private certifier if applicable)

	Description of the work	QLeave Project Number	Amount paid (\$)	Date paid	Date receipted form sighted by assessment manager	Name of officer who sighted the form
1						

Privacy Statement

The information collected on Form 1 will be used by the Department of Infrastructure and Planning (DIP) in accordance with the processing and assessment of your Application. Your personal details will not be disclosed for a purpose outside of the IDAS process, except where required by legislation (including the Freedom of Information Act 1992) or as required by Parliament. This information may be stored in a DIP database. The information collected will be retained as required by the Public Records Act 2002.

Advice for completing Part A

General advice

- Part A of IDAS Development Application Form 1 must be completed and accompany all development applications. The applicant is responsible
 for answering all questions fully and correctly, unless following a response there is a statement to go directly to another question. The
 Assessment Manger may refuse to receive an application that is not properly made.
- The IDAS Assessment Checklist must also be completed for all development applications, other than those requiring assessment against the Building Act 1975 only, i.e. those applications requiring the completion of Parts A and B only.

Applicant details

 If the applicant is a company or organisation, a contact person must be nominated. The applicant's signature is not required to be provided under the IPA.

Details of the premises

- The term 'premises' is defined by the IPA, schedule 10 to mean a building or other structure, and land (whether or not a building or other structure is situated on the land). The term 'land' is also defined to include the estate in, on, over or under the land.
- Details of the land are not required if the application involves a mobile and temporary Environmentally Relevant Activity only. Instead complete Table A.
- The premises may be identified in a number of ways --
 - Street address and lot on plan are most common and will apply to most applications.
 - Coordinates may provide the best means of accurately identifying the location of development proposed in waters, or on a relatively small
 development site distant from property boundaries on a large lot. Sufficient coordinates need to be provided to identify the boundary of the
 premises the subject of the application. Eastings and northings using GDA94 datum is preferred, but longitude and latitude and other
 (specified) datum such as Zone Reference or GS84 may be provided.
- The definition of 'water body' and 'watercourse' can vary from Act to Act.
- StrategicPortLandis within a local government area but a local government's planning scheme does not apply onStrategicPortLand.
 StrategicPortLandis declared under the Transport Infrastructure Act 1994. For further information go to <u>IDAS Guide 11</u> (Development on strategic port land) and the Queensland Transport (Ports) website.
- 'Tidal water' is defined in the Coastal Protection and Management Act 1995 (Schedule) and 'tidal area' for a local government and for strategic port land is defined in the IPA (schedule 10). Generally, the area below 'high-water mark' (defined by the Coastal Act in relation to high water mark at spring tides) establishes the boundary of a tidal area. Land below high water mark is not within a local government's area unless provided for under the Local Government Act 1993. Unless otherwise provided for by legislation, a local government has no jurisdiction below high water mark. A tidal area for strategic port land is within the jurisdiction of the relevant port authority, while the Environmental Protection Agency generally has jurisdiction for a local government tidal area. However, the IPA gives local governments jurisdiction for assessing and deciding applications for prescribed tidal works within the local government tidal area, and the planning scheme may be applied to that assessment (to the extent provided for in the code for prescribed tidal work).

Resource entitlement

- Section 3.2.1(5) of the IPA requires evidence of resource entitlement be given for applications if they involve taking or interfering with a
 prescribed State resource. Schedule 10 of the Integrated Planning Regulation 1998 (IPR) prescribes the State resources, including Stateowned land, where evidence is required to be given, and the evidence required to support the application. Link to <u>Integrated Planning</u>
 Regulation. Section 3.2.1(10)(a)(ii) states an application cannot be taken to be properly made without the required evidence.
- For applications involving the taking or interfering with water under the Water Act, the development application may be made at the same time as the request for resource entitlement, and the Department of Natural Resources and Water will accept the application as properly made.
- For State-controlled roads, a resource entitlement is not required for an activity that is exempt ancillary works or encroachment (identified by
 gazette notice under the Transport Infrastructure Act 1994, section 50), or if the activity requires referral to the Department of Main Roads.
- Evidence may be required from more than one Department responsible for a State-owned resource, e.g. from the Environmental Protection
 Agency for quarry material below high water mark, and the Department of Natural Resources and Water in relation to the State-owned land
 above high water mark.

Owner's consent

- Section 3.2.1(3) of the IPA prescribes that an application must contain, or be supported by, the written consent of the land owner/s, if the application involves: a material change of use; reconfiguration of a lot; work on land below high-water mark and not within a canal as defined under the Coastal Protection and Management Act 1995; or work on rail corridor land defined under the Transport Infrastructure Act 1994.
- Evidence of this consent may need to be provided before the application will be accepted as properly made by the Assessment Manager, during
 the processes of the application or in the event of an appeal about the outcome of the application.
- Owner for the purpose of a lodging an IDAS development application means the person at the time of lodging the application, entitled to receive the rent for the land (or would be entitled to receive the rent for it if it were let to a tenant at a rent).
- Templates are available from the <u>IPA website</u> for the provision of owner's consent as an attachment to this form. However other documentation
 may be used for providing owner's consent provided it is clear the documentation relates to the development application for the premises.
- Owner's consent, if required, must be provided even if the applicant is the owner. Owner's consent is not required for a mobile and temporary FRA

Portable Long Service Leave (PLSL) Levy

- The Building and Construction Industry Portable Long Service Leave Scheme provides long service leave entitlements to workers in the building
 and construction industry who would be unlikely to accrue enough service with one employer to qualify for long service leave. To fund the
 scheme, a Portable Long Service Leave Levy (PLSL levy) is collected on certain building and construction work carried out inQueensland.
- The PLSL levy amount and other prescribed percentages and rates for calculating the levy are stated in the Building and Construction Industry
 (Portable Long Service Leave) Regulation 2002. Included in the amount collected by QLeave is the Workplace Health and Safety Fee and the
 Building and Construction IndustryTrainingLevy.
- The Building and Construction Industry (Portable Long Service Leave) Act 1991 (PLSL Act) defines the building and construction work subject to
 the PLSL levy and includes renovating, relocating, constructing, altering, demolishing, maintaining or repairing buildings, pools, roads, jetties,
 pipelines, fences or earthworks, and works for subdividing, irrigating or draining land.
- The PLSL levy need not be paid when the application is made, but the PLSL Act requires the levy to be paid before a development permit may
 be issued.
- The Assessment Manager must sight an approved form issued by QLeave advising of the status of the payment of the PLSL levy. Building and Construction Industry Notification and Payment Forms are available from anyQueenslandpost office or agency, on request from QLeave, or can be completed on the QLeave website at www.qleave.qld.gov.au. For further information contact QLeave (Tel: 1800 803 481 Web: www.qleave.qld.gov.au)

Company Owner's consent to the making of an IDAS development application

l,		(insert name in full),
Director, AND		
l,		(insert name in full),
in full – i.e. another director, or a if not applicable, i.e. for a proprie company secretary, only that director of LIPOMA Prompany) owner of premises identified	company secretary – strietary company that has a sector needs to complete to	(insert Company position ike out above name and company position sole director who is also the sole
NORTH ST. NORTH (address; lot on plan description;	PSWICH (LOT 55) or coordinates of the pren	SP222487 (insert street nises the subject of the application)
<i>Act 1997</i> by	/- P.O.Box 1914 S	ion under the Integrated Planning GULFERS (insert name of applicant) 924217 es of
OPW - BULK details of the proposed developm	EARTH W OR ent, eg material change d	(insert of use for 3 storey apartment building))
Signed on the GTH	day of octo	(signature of Director)
		ignature of Director/ Company Secretary)
Signed on the	day of	, 2008.
Company seal (if used)		

Form 1 Development Application

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Part E

7	Building &/or operat	ionai works as	ssessable		
	against a pla	anning schem	e ¹		
ature of the works					-
Nature of work that requires	assessment against a planning scho	eme:			
Building work - Comple		nal work - Complete	Table B		
Table B					
(i) What is the nature	of the operational work?				
Roadworks	Stormwater	☐ Water	infrastructure	☐ Sewe	erage infrastructure
Landscaping	_	-	ge Works	☐ Signa	-
Clearing veg	jetation under the planning scheme		- Specify below		
	oval is being sought? (NOTE: If you have				
question would be different	erent for different operational work, it may be t Permit	more appropriate to pro Himinary approval	ovide these details	in an attachment to the Both (Spe	
	work necessary to facilitate the crea	• • •	subdivision)?		,,
	<u> </u>	1.0.1 O1 11011 1010 (1.0.	. cabarrolon, .		
■ No TTY	es - Specify the number of lots being cro	eated			
	es - Specify the number of lots being cre ent approvals associated with this a		elopment Permit o	r Preliminary Approval	for MCU or reconfiguring
(iv) Are there any curre	ent approvals associated with this a		elopment Permit o	r Preliminary Approval	for MCU or reconfigurin
(iv) Are there any curre			elopment Permit o	r Preliminary Approval	for MCU or reconfigurin
(iv) Are there any curre	ent approvals associated with this a	pplication? (e.g. Deve	elopment Permit o		for MCU or reconfigurin
(iv) Are there any curre a lot) No • Ye	ent approvals associated with this approvals - Complete Table B(a)	pplication? (e.g. Deve			
(iv) Are there any curre a lot) No Table B(a)	ent approvals associated with this approval es - Complete Table B(a) List of approval refere	pplication? (e.g. Deve			
(iv) Are there any curre a lot) No Table B(a)	ent approvals associated with this approval es - Complete Table B(a) List of approval refere	pplication? (e.g. Deve			
(iv) Are there any curron a lot) No Table B(a)	ent approvals associated with this approval reference of approval	pplication? (e.g. Deve	Date approve	d Date approv	
(iv) Are there any curre a lot) No Yes Table B(a) 1 What is the dollar value of this	ent approvals associated with this approval es - Complete Table B(a) List of approval refere	pplication? (e.g. Deve	Date approve	d Date approv	
(iv) Are there any curre a lot) No Ye Table B(a) 1 What is the dollar value of this andatory Information	ent approvals associated with this approval reference and approval r	pplication? (e.g. Deve	Date approve	d Date approv	
(iv) Are there any curre a lot) No Ye Table B(a) 1 What is the dollar value of this andatory Information	ent approvals associated with this approval reference of approval	pplication? (e.g. Deve	Date approve	d Date approv	
(iv) Are there any curre a lot) No Ye Table B(a) 1 What is the dollar value of this andatory Information	ent approvals associated with this approval reference and approval r	pplication? (e.g. Deve	Date approve	Date approve	
(iv) Are there any curre a lot) No Ye Table B(a) 1 What is the dollar value of this andatory Information Confirm that the following manual current and a current according a current and a current and a current according a current according a current and a current according a curr	ent approvals associated with this approval reference and approval r	pplication? (e.g. Deve ences OVAL PLAN including GST, materials	Date approved	d Date approv	val lapses (if known)
(iv) Are there any curre a lot) No Yes Table B(a) Table B(a) What is the dollar value of this andatory Information Confirm that the following ma	ent approvals associated with this approval reference are complete Table B(a) List of approval reference RIVERLINK PRELIMINARY APPROVAL s operational work? (i.e. the total value in a companies the companies tha	pplication? (e.g. Deve ences OVAL PLAN including GST, materials	Date approved	Date approves 5 500000 Confirmation of lodgement	val lapses (if known) Method of lodgemen
(iv) Are there any curre a lot) No Yes Table B(a) 1 What is the dollar value of this andatory Information Confirm that the following ma	ent approvals associated with this approval reference are complete Table B(a) List of approval reference RIVERLINK PRELIMINARY APPROVAL s operational work? (i.e. the total value in a companies the companies tha	pplication? (e.g. Deve ences OVAL PLAN including GST, materials	Date approved	Date approves 5 500000 Confirmation of lodgement	val lapses (if known) Method of lodgemen

Advice for completing Part E

General advice

- Part A must also be completed for all IDAS development applications.
- The applicant is responsible for answering all questions fully and correctly, unless following a response there is a statement to go directly to another question.

A development permit authorises development to occur, while a preliminary approval is a step in the approval process and does not authorise development to occur

¹ This form is also used for building or operational work assessable against the land use plan for Caims airport land or Mackay airport land. Wherever planning scheme is mentioned, take it to mean the land use plan for the airport land.

Form 1 Development Application

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IDAS Assessment Checklist

IDAS Development Application Form 1 is the approved form for all development applications under the *Integrated Planning Act 1997* IPA). Form 1 is made up of various Parts.

Part A (Common details) of Form 1 must be completed for all applications. The relevance of other Parts of Form 1 depends on the nature of the application.

Form 1 also includes this IDAS Assessment Checklist, which is used to assist in determining State assessment and referral requirements, and the Parts of Form 1 relevant to the application.

Section 1 and all other relevant sections of the IDAS Assessment Checklist, as identified in the Table below, must be completed for all development applications except those proposed on land in an urban development area, or for building work requiring assessment against the *Building Act 1975* only.

For more information about development applications on land in an urban development area, refer to www.ulda.qld.qov.au.

For more advice about building applications refer to Part B of the IDAS Application Form.

Answering the following questions will assist you in determining which sections of the checklist must be completed for your application. If unsure, phone or visit your local government or log onto the DIP website www.dip.qld.gov.au for help

For <u>all</u> IDAS development applications (except those for building work requiring assessment against the <i>Building Act 1975</i> only) – <i>complete checklist</i>	Section 1 o	f this
Does the application seek approval to make a material change of use of the premises? If yes – complete Section 2 of this checklist.	☐ Yes	₽ No
Does the application seek approval to reconfigure a lot? If yes - complete Section 3 of this checklist and Part F of IDAS Application Form 1. If the premises are completely within a single local government area assessment is by the local government.	Yes	No
Does the application seek approval to carry out operational work? If yes - complete Section 4 of this checklist.	Yes	□No
Does the application seek approval to carry out building work requiring assessment against the Fisheries Act 1994? If yes - complete Section 5 of this checklist.	☐ Yes	
Have you received a referral agency response under section 3.3.2.of the IPA, in relation to this development application? If yes - complete Section 6 of this checklist.	☐ Yes	No
Does the application seek approval to carry out building work requiring assessment against a local government planning scheme? If yes - complete Form 1 Part E of IDAS Application Form 1. Assessment is by the local government.	Yes	□ No
Does the application seek approval to carry out building work requiring assessment against the <i>Building Act 1975?</i> If yes - go to Appendix 1 of this checklist for advice on building referrals. Complete Part B of IDAS Application Form 1. Assessment is by a building certifier.	☐ Yes	₽No
Do you wish the application to be assessed against a superseded planning scheme? If yes - complete Form 1 Attachment 1.	☐ Yes	No
Is the application for development completely or partly on Cairns or Mackay airport land under the Airport Assets (Restructuring and Disposal) Act 2008?	☐ Yes	No
If yes -Assessment is by the Department of Infrastructure and Planning. Complete Form 1 Part D of IDAS Application Form 1 if the application is for a material change of use, and Part E if for building or operational work. Also, the application must be referred to the local government as Advice Agency.		

SECTION 1 Section 1 must be completed for all applications that require completion of the IDAS Assessment Checklist.

HER	RITAGE
1.1A	Is apy part of the proposal intended to be carried out on a Queensland heritage place under the <i>Queensland Heritage Act 1992</i> ? No - Go to Q1.18 Yes
	If yes, has an exemption certificate for the proposal ^{1,1} been issued under the <i>Queensland Heritage Act 1992</i> ? ☐ Yes ☐ No
	If no, is the proposed work liturgical development under <i>Queensland Heritage Act 1992</i> , section 78? ☐ Yes ☐ No
	If no, is the work being carried out by the State? Yes No - (Complete Form 1, Part C1) This application requires assessment by the Environmental Protection Agency (EPA), If EPA is not the Assessment Manager for the application, the EPA has jurisdiction as Concurrence Agency. IPA schedule 8, part 1, table 5, item 2: IP Regulation schedule 2, table 2, item 18
1.1B	Does the proposal involve development intended to be carried out on a place entered in a local heritage register under part 11 of the Queensland Heritage Act 1992, other than if place is on Caims or Mackay airport land? Two - Go to Q1.2
	(i) development for public housing, as defined by the <i>Integrated Planning Act 1997</i> (IPA <i>)</i> , chapter 5,
	(ii) development carried out by the state on land designated for community infrastructure under the No Yes IPA, chapter 2, part 6
	(iii) development that is exempt from assessment against a planning scheme under the IPA, schedule No Yes 9
	If no to all of (i) – (ii) above – (Complete Form 1, Part C2) This application requires assessment by the relevant local government as Concurrence Agency.
	IPA. schedule 8, part 1, lable 5, item 2A, IP Regulation schedule 1, part 2, lable 5, item 2; Airport Assets (Restructuring and Disposal) Act 2008, s 54.
REM	OVING QUARRY MATERIAL; WILD RIVER AREA
1.2	Does the proposal involve removing quarry material from a watercourse or lake as defined under the <i>Water Act 2000</i> ? No - Go to Q1.3 Yes
	If yes, is an allocation notice required under the Water Act 2000? No Yes
	If yes, is any part of the removal of quarry material intended to be located in a declared wild river area under the Wild Rivers Act 2005?
	No – (Complete Form 1, Part K ₁) This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	Yes - Unless the application is consistent with any property development plan applying to the land, the Assessment Manager must refuse to receive it. (Complete Form 1, Part K ₁). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. Subject to the declaration for the relevant wild river area, assessment is also required for the purposes of the Wild Rivers Act 2005.
	IPA, schedule 8, part 1, table 5, frem 1; IP Regulation, schedule 2, table 2, frem 11; IP Regulation, schedule 1, table 5, frem 2 (wild river area), Water Act 2000, section 9650; Wild Rivers Act 2005, section 978, section 978.

¹¹ In this IDAS Assessment Checklist, the term proposal refers to the proposed use, work or lot reconfiguration the subject of the application.

ENV	RONMENTALLY RELEVANT ACTIVITY; WILD RIVER AREA
1.3	Does the proposal involve an environmentally relevant activity (ERA), other than a mining activity or a petroleum activity? No - Go to Q1.4 Yes
	If yes, is any part of any ERA intended to be located in a wild river area declared under the Wild Rivers Act 2005? No
	If no, is there a code of environmental compliance under the Environmental Protection Regulation 2008 for every aspect of each proposed ERA?
	No - (Complete Form 1, Part G) This application requires assessment by the Administering Authority. If the Administering Authority is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. Go to Q1.4
	☐ Yes - Go to Q1.4
	If yes, is any extraction ERA intended to be located in waters? ☐ Yes
	If yes, will the application be accompanied by an allocation notice for that ERA, as defined under the <i>Environmental Protection Act 1994</i> , section 73AA(9)?
	Yes - Unless the application is consistent with any property development plan applying to the land, and the application is accompanied by an allocation notice, the Assessment Manager must refuse to receive it. (Complete Form 1, Part G). This application requires assessment by the Administering Authority for the purposes of both the Environmental Protection Act 1994 and, subject to the declaration for the relevant wild river area, the Wild Rivers Act 2005. If the Administering Authority is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. No – An application for the ERA will be taken to be not properly made and the Assessment Manager must refuse to receive it.
	☐ No If no, is any part of any ERA intended to be located in a high preservation area? ☐ Yes
	If yes, is each proposed ERA one of the following?
	(i) a sewage ERA
	(ii) a water treatment ERA
	(iii) a dredging ERA
	(iv) an extraction ERA carried out outside waters and the activity is a borrow pit of not more than 10,000m³ for - • specified works under the Wild Rivers Act 2005; or • residential complexes, as defined under the Environmental Protection Act 1994
	(v) a screening ERA carried out outside waters and the activity is for -
	 (vi) a crude oil or petroleum product storage ERA and the activity is - • for residential complexes, as defined under the Environmental Protection Act 1994, & • carried out outside a designated urban area, as defined under the Wild Rivers Act 2005
	(vii) An exempt environmentally relevant activity, as defined under <i>Environmental Protection</i> Act 1994, in a designated urban area, as defined under the Wild Rivers Act 2005
	If yes to any one of (i) – (vii) above – Unless the application is consistent with any property development plan applying to the land, and the application is accompanied by an allocation notice, the Assessment Manager must refuse to receive it. (Complete Form 1, Part G). This application requires assessment by the Administering Authority for the purposes of the Environmental Protection Act 1994. If the Administering Authority is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. Subject to any limitations in the declaration for the wild river area and the Wild Rivers code, assessment is also required for the purposes of the Wild Rivers Act 2005. In particular, a sewage ERA, a water treatment ERA and an 'exempt environmentally relevant activity' do not require assessment for the purposes of the Wild Rivers Act 2005 if the ERA is proposed in a designated urban area.
	If no to all of (i) – (vii) above - An application for the ERA/s will be taken to be not properly made and the Assessment Manager must refuse to receive it.
	No - Answer the following question on the next page

ENV	/IRONMENTALLY RELEVANT ACTIVITY; WILD RIVER AREA (continued)	451	W 3/11/2
	If no, is any ERA an extraction ERA intended to be located outside waters? No – Unless the application is consistent with any property development plan applying to the land, and the application notice, the Assessment Manager must refuse to receive it. (Complete Form 1, Part G). This application notice, the Administering Authority for the purposes of both the Environmental Protection Act 1994 a 2005. If the Administering Authority is not the Assessment Manager for the application, the agency has jurisd Agency. Yes If yes, does the ERA meet the following?	plication requ nd the Wild	uires Rivers Act
	(i) the activity is located <u>inside</u> a flood management area and a borrow pit of not more than 10,000m³ for - specified works under the <i>Wild Rivers Act 2005</i> ; or residential complexes, as defined under the <i>Environmental Protection Act 1994</i>	□ No	Yes
	(ii) the activity is located outside a flood management area	□No	Yes
	If yes to either (i) or (ii) above – Unless the application is consistent with any property development plan application is accompanied by an allocation notice, the Assessment Manager must refuse to receive Part GJ. This application requires assessment by the Administering Authority for the purposes of both the Protection Act 1994 and, subject to the declaration for the relevant wild river area, the Wild Rivers Act 2 Authority is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence.	olying to the it. (Comple e Environm 005. If the A e Agency.	land, and ete Form 1, ental Administering
	If no to both (i) and (ii) above - An application for the ERA will be taken to be not properly made and the Ass refuse to receive it.	essment ma	anager must
	IPA, schedule 8, part 1, table 2, item 1; IPA, schedule 8, part 1, table 5, items 3 and 4, IP Regulation, schedule 2, table 2, items 1 and 23; Environmental Protection Astrier area). Wild Rivers Act 2005, section 43A-relevant with river declaration; Wild Rivers Code	n 1994, secti	on 73AA (sold
WITH	HIN THE LIMITS OF A PORT		
1.4	Is any part of the premises within the limits of a port under the <i>Transport Infrastructure Act 1994</i> ? No - Go to Q1.5 Yes		
	If yes, is that part of the premises below high water mark? No Yes - If answers to questions in other sections of this checklist indicate that the proposed development is assessable uses - Answer (a) to (c) below. This application requires assessment by the Port Authority for the land. If you answer (c) below, the Port Authority for the Port has jurisdiction as Advice Agency.	n der IPA, er no to (a)	schedule), (b) and
	(a) Is any part of the proposal within 200m of a shipping channel or an entry and exit shipping corridor No Yes - The Port Authority for the Port has jurisdiction as Concurrence Agency.	for the Po	ort?
	(b) Is any part of the proposal within 1,000m of a swing basin, a commercial fishing wharf, a mooring, anchora No Lycs - The Port Authority for the Port has jurisdiction as Concurrence Agency.	ge or spoi	il grounds?
	(c) Is any part of the proposal within 1,000m of a planned port facility identified in a land use plan? No Yes - The Port Authority for the Port has jurisdiction as Concurrence Agency.		
17075.33	IP Regulation, schoolde 2, table 2, tions 15 and 16.		
-	ARED FISH HABITAT AREA		1
1.5	Does any part of the premises adjoin a declared fish habitat area under the Fisheries Act 1994? No - Go to Q1.6 Yes - If answers to questions in other sections of this checklist indicate that the proposed development is assessable under this application requires assessment by the Department of Primary Industries and Fisheries (DPI&F). If DPI&F is not the Manager for the application, the agency has jurisdiction as Advice Agency. IF Regulation, schedule 2, table 2, tem 26.	IPA, sche e Assessn	edule 8, nent

COM	MUNITY INFRASTRUCTURE
1.6	Is app part of the premises designated for community infrastructure? No - Go to Q1.7 Yes
	If yes, is the community infrastructure intended to be provided by a public sector entity? No Yes
	If yes, is the land owned by or on behalf of the State? ☐ Yes ☐ No
	If no, is the development for the following? (i) For the designated purpose
	If no to either or both (i) or (ii) above, is the proposed development assessable under the planning scheme? No Yes - This application must be referred to the Queensland Government department administering the Act authorising the development for the designation as Concurrence Agency.
Seria de la companya della companya	IF Regulation, schedule 2, table 3, item 7.
WAS	TE WATER MANAGEMENT
1.7	Does the proposal involve the establishment or expansion of a waste water disposal system? No - End of Section 1 Yes
	If yes, is any part of the disposal system proposed to be located in an area declared to be a catchment area under the <i>Water Act 2000</i> ? No - End of Section 1 Yes
	If yes, is the proposed waste water disposal system an environmentally relevant activity (ERA) under the <i>Environmental Protection Act 1994</i> ?
	Yes - End of Section 1 No
	If no, is the proposed development involving the waste water disposal system assessable under the planning scheme? No - End of Section 1 Yes - This application requires assessment by the Department of Natural Resources and Water (NRW) as Concurrence Agency. End of Section 1
	IP Regulation, schedule 2, table 3, irom 5.

SECTION 4 Section 4 must be completed when the application seeks approval to carry out operational work.

PLAN	NING SCHEME
4.1	Is the proposed operational work assessable under any State planning regulatory provisions?
	If no, is the proposed operational work assessable under the planning scheme? No – Go to Q4.2 Yes – Complete Form 1, Part E and answer Q4.1.1 – 4.1.7 below
	Yes
	If yes, is the proposed operational work assessable under the planning scheme? No – Answer Q4.1.1 – 4.1.7 Yes – Complete Form 1, Part E and answer Q4.1.1 – 4.1.7 below
STAT	E-CONTROLLED ROAD
4.1.1	Is any part of the premises located in part of a future State-controlled road, or within 100m of a State-controlled road?
	If no, is the proposed operational work for filling or excavating listed in <i>Integrated Planning Regulation 1998</i> , schedule 5 and does it exceed the threshold?
	Yes - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency.
	If yes, is all of the proposed operational work associated with either -
	 A material change of use that is assessable under the planning scheme; or Reconfiguring a lot that increases the total number of lots, or increases the total number of lots abutting the State-controlled road
	If no - Answer (a) - (c) below
	(a) Is any of the proposed operational work associated with access to a State-controlled road? No Yes - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency.
	(b) Is any of the proposed operational work for filling or excavation?
	□ No □ Yes
	If yes, is the operational work proposed in a future State-controlled road <u>not</u> defined by route? No - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency Yes - This application must be referred to DMR as Advice Agency.
	(c) Does any of the proposed operational work involve the redirection or intensification of site stormwater from the land, through a pipe with a cross-sectional area greater than 625cm² that directs stormwater to a State-controlled road? No Yes
	If yes, is the operational work proposed in a future State-controlled road <u>not</u> defined by route? No - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency. Yes - This application must be referred to DMR as Advice Agency.
	IP Regulation, schedule 2, table 3, nem 3; IP Regulation, schedule 2, table 3, nem 1(b).
	ULFATE SOILS
4.1.2	Is any of the operational work proposed in a local government area listed⁴¹¹ in State Planning Policy 2/02: Planning and Managing Deyelopment Involving Acid Sulfate Soils? ☑ No - Go to Q4.1.3 ☐ Yes
	If yes, is the natural ground level of any point where work is being carried out less than 20m AHD? ☐ No ☐ Yes
	If yes, does the proposed operational work involve the following?
	(i) Excavating more than 1,000m³ of soil or sediment at or below 5m AHD
	(ii) Filling the premises with 1,000m³ or more of material with an average depth of 0.5m on No Yes land, soil or sediment at or below 5m AHD
	If yes to either or both (i) or (ii) above - This application must to be referred to the Department of Natural Resources and Water (NRW) as Advice Agency
	IP Regulation, schicking 2-tuble 3, item 4. State Planning Policy 2022, Planning and Alamograp Development involving Acid Softine Soils-section 3.5

⁴¹ Aurukun, Bowen. Brisbane, Broadsound, Bundaberg, Burdekin, Burke, Burmett, Caboolture, Cairns, Calliope, Caloundra, Cardwell, Carpentaria, Cook, Cooloola, Douglas, Filzroy, Gladstone, Gold Coast, Hervey Bay, Hinchinbrook, Isis, Johnstone, Livingstone, Logan, Mackay, Maroochy, Maryborough, Miriam Vale. Mornington, Noosa, Pine Rivers, Redcliffe, Redland, Rockhampton, Sarina, Thuringowa, Tiaro, Torres, Townsville, Whitsunday

EASE	MENTS AND SUBSTATIONS
4.1.3	Is any of the proposed operational work for filling or excavation? No - Go to Q4.1.4 Yes
	If yes, is the filling or excavation associated with reconfiguring a lot? Yes No – Answer both (a) and (b) below
	(a) Is any part of the premises subject to an easement in favour of a distribution entity or transmission entity under the <i>Electricity Act 1994</i> ? No Yes
	If yes, is any of the operational work proposed to be located in any part of the easement? No Ses - This application must be referred to the entity as Advice Agency.
	(b) Is any of the operational work proposed to be located within 10m of a substation site under the <i>Electricity Act</i> 1994 Yes - This application must be referred to the entity responsible for the substation as Advice Agency
	The special state of the state
4.1.4	IF Regulation, schedule 2, table 3 nem 10(a); IF Regulation, schedule 2, table 3 nem 10(b). Is any part of the premises subject to an easement in favour of the holder of Pipeline Licence Number 1 issued under the Petroleum Act 1623 for the construction or operation of the Moonie to Brisbane strategic pipeline under that Act? No – Go to Q4.1.5 Yes
	If yes, is any of the proposed operational work for filling, excavation, compaction, drilling, boring or piping, not associated with reconfiguring a lot? No Yes
	If yes, is any of the operational work proposed to be located in any part of the easement? No Yes - This application must be referred to the licence holder as Advice Agency.
DUDLI	IF Regulation schedule 2, rable 3, nom 17.
4.1.5	C PASSENGER TRANSPORT
4.1.5	Is any of the proposed operational work listed in schedule 13C of the Integrated Planning Regulation 1998 and does it exceed the specified threshold? No - Go to Q4.1.6 Yes - This application must be referred to Queensland Transport (QT) as Concurrence Agency.
	IP Regulation, scriedule 2, table 3, dem 14,
-	AY SAFETY AND EFFICIENCY
4.1.6	Is any of the proposed operational work listed in schedule 13D of the Integrated Planning Regulation 1998 and does it exceed the specified threshold? No - Go to Q4.1.7 Yes - This application must be referred to Queensland Transport (QT) as Concurrence Agency.
	IP Regulation, schedule 2, table 3, from 15.
	CONSERVATION (outside SEQ urban footprint)
4.1.7	Is any part of the premises in a koala conservation area or koala sustainability area, other than in an SEQ urban footprint area? No - Go to Q4.2 Yes
	If yes, is all of the proposed operational work associated with a material change of use or reconfiguring a lot for which referral is required in relation to koala conservation (i.e. did you answer 'yes' to all questions in either Q2.1.8 or Q 3.12)? Yes – Go to Q4.2 No
	If no, is the proposed operational work for a domestic activity, as defined by the <i>Environmental Protection Act 1994?</i> Yes - Go to Q4.2 No
	If no, will the activity result in the following?
	(i) Clearing of native vegetation over an area greater than 2,500m ² No Yes
	(ii) Extracting gravel, rock or sand from an area greater than 5,000m ² No Yes
	(iii) Excavating or filling an area greater than 5,000m ²
	If yes to one or more of (i) – (iii) above - This application must be referred to the Environmental Protection Agency (EPA) as Concurrence Agency.
	IP Regulation, schedule 2, table 3, dem 19

WILD RIVER AREA — Although legislation provides for assessment of operational works for residential, commercial and industrial development for the purposes of the Wild Rivers Act 2005, currently no declarations for any of the wild river areas apply the Wild Rivers code to that type of development.

	of the prop No - Go to Q4.	osed operational work associated with reconfiguring a lot and the r	reconfiguration	on is also asso	essable?	
	If yes, is any	part of the premises in a wild river area declared under the Wild R	Pivers Act 20	05?		
	No - (Con	plete Form 1, Part E) If the premises are completely within a single local government.	ent area, the op	erational work as	sociated with reconfigu	
	☐ Yes					
	If yes, is the proposed operational work for residential, commercial or industrial purposes outside a designated urban area as defined by the Wild Rivers Act 2005?					
	as defin No -	(Complete Form 1, Part E) If the premises are completely within a single local gove reconfiguring is assessed by the local government.	ernment area, t	he operational wo	ork associated with	
		(Complete Form 1, Part E) If the premises are completely within a single local gove reconfiguring is assessed by the local government, and subject to the declaration I government is required for the purposes of the Wild Rivers Act 2005.	for the relevant	wild river area, as	ssessment by the local	
IPA.	schedule 8. part 1.	able 4, item 2: IP Regulavon, schodule 1, part 2, table 5, item 1(c), Willd Rivers code (Note: the development i <u>nside</u> a designated urban area).	e code does not a	urrently contain app	dicable provisions for resid	
		N (inside SEQ urban footprint)				
I						
	planning reg	proposed operational work for clearing native vegetation, as defin- quilatory provisions (koala regulatory provisions) 4.2? To Q4.3B Yes S, does the following apply?			eensland Koala St	
	planning reg	proposed operational work for clearing native vegetation, as definitulatory provisions (koala regulatory provisions) 4.2? 10 04.38 Yes	ed in <i>draft S</i>	Yes	eensland Koala St	
	planning reg No – Go	proposed operational work for clearing native vegetation, as definitulatory provisions (koala regulatory provisions) 4.2? 10 Q4.3B Yes 1. does the following apply? 1. the proposed clearing is for a domestic activity, as defined in	□ No	☐ Yes	eensland Koala St	
	planning reg	proposed operational work for clearing native vegetation, as definitulatory provisions (koala regulatory provisions) 4.2? Wes vegetation (koala regulatory provisions) 4.2? The proposed clearing is for a domestic activity, as defined in the koala regulatory provisions The proposed clearing is for a building or structure of less than 500 m² gross floor area The proposed clearing will result in —	□ No	Yes	eensland Koala St	
	planning reg	proposed operational work for clearing native vegetation, as defining the proposed operations (koala regulatory provisions) 4.2? So Q4.38 Yes So, does the following apply? The proposed clearing is for a domestic activity, as defined in the koala regulatory provisions The proposed clearing is for a building or structure of less than 500 m² gross floor area	□ No	☐ Yes	eensland Koala St	
	planning reg	proposed operational work for clearing native vegetation, as defining a provisions (koala regulatory provisions). Ves s, does the following apply? the proposed clearing is for a domestic activity, as defined in the koala regulatory provisions the proposed clearing is for a building or structure of less than 500 m² gross floor area the proposed clearing will result in — the clearing of less than 2,500m² of native vegetation, as defined in the koala regulatory provisions; and no loss of mature koala habitat trees, as defined in the koala regulatory provisions.	□ No □ No	☐ Yes ☐ Yes ☐ Yes	eensland Koala St	
	planning reg	proposed operational work for clearing native vegetation, as defining a provisions (koala regulatory provisions). 4.2? So Q4.38 Yes So, does the following apply? The proposed clearing is for a domestic activity, as defined in the koala regulatory provisions The proposed clearing is for a building or structure of less than 500 m² gross floor area The proposed clearing will result in — The clearing of less than 2,500m² of native vegetation, as defined in the koala regulatory provisions; and The proposed clearing will result in — The clearing of less than 2,500m² of native vegetation, as defined in the koala regulatory provisions; and	□ No □ No	☐ Yes	eensiand Koala St	
	planning reg	proposed operational work for clearing native vegetation, as definitulatory provisions (koala regulatory provisions) 4.2? Wes yes does the following apply? The proposed clearing is for a domestic activity, as defined in the koala regulatory provisions The proposed clearing is for a building or structure of less than 500 m² gross floor area The proposed clearing will result in — The clearing of less than 2,500m² of native vegetation, as defined in the koala regulatory provisions; and The proposed clearing is consistent with a development approval for a material change of use, reconfiguring a lot or operational	□ No □ No	☐ Yes ☐ Yes ☐ Yes	eensland Koala St	

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¹² Native vegetation is defined in the draft South East Queensland Koala State planning regulatory provisions. The term 'clearing' has the meaning given in the Integrated Planning Act 1997, schedule 10 (dictionary).

	If yes, is the proposed vegetation clearing a relevant purpose for one or more of the following?	under the Vegetation Management Act 19	99, section 2
	(i) A project declared to be a significant project under the Son Organisation Act 1971, section 26	tate Development and Public Works	lo 🗌 Ye:
	(ii) Necessary to control non-native plants or declared pest		lo 🗌 Ye:
	(iii) To ensure public safety		lo 🗌 Ye
	 (iv) For establishing a necessary fence, firebreak, road or vel necessary built infrastructure, if there is no suitable alterr road, track or infrastructure 		lo 🗌 Ye
	 A natural and ordinary consequence of other assessable development approval as defined under the Planning Act application as defined under the Planning Act was made, 	was given, or a development	lo Ye
	(vi) For fodder harvesting		lo 🗌 Ye
	(vii) For thinning		lo 🗌 Ye
	(viii) For clearing of encroachment		lo 🔲 Ye
	(ix) For an extractive industry		o 🗌 Ye
	(x) For clearing regrowth on leases issued under the Land A purposes	ct 1994 for agriculture or grazing	lo 🗌 Ye
	(xi) For clearing regrowth on freehold land, or indigenous land area.	d, in a wild river high preservation	lo 🗌 Ye
1	no to all (i) – (xi) above – The clearing is not a relevant purpose and the yes to any one of (i) – (xi) above, is the proposed clearing asset for which referral is required in relation to clearing vegetation Yes – Go to Q4.4 No – Answer (a) (b) and (c) on the next page of this Checklist.	sociated with a material change of use or re	configuring

VEGE	TATION CLEARING; KOALA CONSERVATION; WILD RIVER AREA (continued)	- UA.	
	(a) Is any of the proposed clearing in an area declared as an area of high nature conse wild river high preservation area) or an area vulnerable to land degradation under the Act 1999?	ne <i>Vegetatio</i>	on Management
	No - (Complete Form 1, Part J). This application requires assessment by the Department of Na If NRW is not the Assessment Manager, the agency has jurisdiction as Concurrence Agenc Yes		es and Water (NRW).
	If yes, is any of the proposed clearing for (v), (vi), (ix) or (x) above? No - (Complete Form 1, Part J). This application requires assessment by the Department (NRW). If NRW is not the Assessment Manager, the agency has jurisdiction as Con		
	Yes – The clearing is not a relevant purpose and the Assessment Manager must refuse to	-	-
	(b) Is any of the proposed clearing in the high preservation area of a declared wild rive	r area?	
	No - (Complete Form 1, Part J). This application requires assessment by the Department of Na If NRW is not the Assessment Manager, the agency has jurisdiction as Concurrence Age	tural Resource ncy.	s and Water (NRW).
	Yes If yes, is any of the proposed clearing for the following purposes?	-1	
	(i) For (i), (vi), (vii) or (ix) above	☐ No	Yes
	(ii) For (x) or (xi) above and in a high preservation area outside of a registered area of agriculture as defined under the Vegetation Management Act 1999	□ No	Yes
	If no to either or both (i) or (ii) above – Subject to the declaration for the relevant w requires assessment for the purposes of the Wild Rivers Act 2005 – Complete Fo requires assessment by the Department of Natural Resources and Water (NRW). Manager, the agency has jurisdiction as Concurrence Agency.	rın 1, Part J. T. If NRW is not	his application the Assessment
	If yes to either or both (i) or (ii) above, is there a property development planch Rivers Act 2005 applying to the land?	n approved	under the Wild
	No − The clearing is not a relevant purpose and the Assessment Manager must re Yes − Unless the application is consistent with any approved property developme Assessment Manager must refuse to receive it. Subject to the declaration application requires assessment for the purposes of the Wild Rivers Act 20 complete Form 1, Part J. This application requires assessment by the Dep Water (NRW). If NRW is not the Assessment Manager, the agency has jurn	nt plan applyir for the relevan 105 – If an app artment of Nati	ng to the land, the t wild river area, the lication is made ural Resources and
	(c) Is any of the proposed clearing in a koala conservation area or koala sustainabilii SEQ urban footprint area?		
	□ No - Go to Q4.4 □ Yes		
	If yes, is any of the proposed clearing associated with reconfiguring a lot for vertical relation to proposed clearing in a koala conservation area or koala sustainab byes' to all questions in Q3.12]?		
	Yes - Go to Q4.4 No		
	If no, is any of the proposed clearing over an area greater than 2,500r	n²?	
	□ No - Go to Q4.4		
	Yes - This application must be referred to the Environmental Protection Agency.	Agency (EPA) as Concurrence
	IPA schechte 8 pan 1. telže 4. tiens 1A-1G; IP Regulation, schechte 2. telde 2. tenn 5 (september eksarar), IP Regulation, schechte 2. telde 2. tenn 54 (keete ee 3. telde 4. teen eurgenation eksararjaald mer aroa), Vegelation Managenten Act 1999, sextum 224 eurgenbon eksararjaald mer aroa), Veld (Rivers Act 2005, so	rechalkin); IP R diors 31F and 43	golvika, selvalde i, part 4. Whi Ribers Cide

Act 2900,: No - 6 (a)	g with water from a watercourse, lake or spring (other than usection 20(2), (3) or (5)), or from a dam constructed on a walk to 0.04.5 Yes – Answer (a) and (b) below Are the operations mentioned as self-assessable developmental (i) A water resource plan under the Water Act 2000 (ii) A wild river declaration under the Wild Rivers Act 2005	ercourse or lake?	ne W
(a)	Are the operations mentioned as self-assessable developm (i) A water resource plan under the Water Act 2000		
	(i) A water resource plan under the Water Act 2000		
	,	☐ No ☐ Yes	
	,		
	, ,	□ No □ Yes	
1	(iii) A regulation under the IPA or the Water Act 2000	□ No □ Yes	
	f no to all of (i) to (iii) above - This application requires assessmen		NAV ic +
1 '	Assessment Manager for the application, the agency h		W 15 7
(b) I	s any of the proposed operational work to be carried out in	a wild river area under the Wild Rivers Act 2005?	
	Yes		
	If yes, is the work for the following?		-
1.6	(i) A water pump	☐ No ☐ Yes (Complete Form 1, Part K₂)	
	(ii) Water storage	☐ No ☐ Yes (Complete Form 1, Part K₃)	
	(iii) Gravity diversion from a watercourse	☐ No ☐ Yes (Complete Form 1, Part K₄)	
	(iv) Watercourse diversion	☐ No ☐ Yes (Complete Form 1, Part K ₀)	
	(v) Other work for taking or interfering with water	☐ No ☐ Yes (Complete Form 1, Part K₂)	
	Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. The and Water (NRW). If NRW is not the Assessment Manager	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assessn e application will require assessment by the Department of Natural Re or the application, the agency has jurisdiction as Concurrence Agenc	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or w Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. Th and Water (NRW). If NRW is not the Assessment Manager (Complete the relevant Form 1, Part K as indicated in the table a	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assessn e application will require assessment by the Department of Natural Re or the application, the agency has jurisdiction as Concurrence Agenc	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or w Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. Th and Water (NRW). If NRW is not the Assessment Manager (Complete the relevant Form 1, Part K as indicated in the table a No If no, is the work for the following?	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assess e application will require assessment by the Department of Natural Re or the application, the agency has jurisdiction as Concurrence Agenchove if an application is made.)	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or w Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. Th and Water (NRW). If NRW is not the Assessment Manager (Complete the relevant Form 1, Part K as indicated in the table a No If no, is the work for the following? (i) A water pump	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assess a application will require assessment by the Department of Natural Refor the application, the agency has jurisdiction as Concurrence Agency has a polication is made.) No Yes (Complete Form 1, Part K2)	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or w Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. Ti and Water (NRW). If NRW is not the Assessment Manager (Complete the relevant Form 1, Part K as indicated in the table a No If no, is the work for the following? (i) A water pump (ii) Water storage	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assessment of application will require assessment by the Department of Natural Report the application, the agency has jurisdiction as Concurrence Agency over if an application is made.) No Yes (Complete Form 1, Part K2) No Yes (Complete Form 1, Part K3)	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or with Manager must refuse to receive it. All other proposals are so be required for the purposes of the Wild Rivers Act 2005. The and Water (NRW). If NRW is not the Assessment Manager of (Complete the relevant Form 1, Part K as indicated in the table at No If no, is the work for the following? (i) A water pump (ii) Water storage (iii) Gravity diversion from a watercourse	eir), the application will be taken to be not properly made and the As ibject to the declaration for the relevant wild river area, and assessing application will require assessment by the Department of Natural Refor the application, the agency has jurisdiction as Concurrence Agency has jurisdiction as Concurrence Agency has purisdiction as Concurrence Agency if an application is made.) No Yes (Complete Form 1, Part K ₂) No Yes (Complete Form 1, Part K ₃) No Yes (Complete Form 1, Part K ₄)	ssessi ment i lesourd
	area, or in a nominated waterway (other than for a dam or w Manager must refuse to receive it. All other proposals are s be required for the purposes of the Wild Rivers Act 2005. Ti and Water (NRW). If NRW is not the Assessment Manager (Complete the relevant Form 1, Part K as indicated in the table a No If no, is the work for the following? (i) A water pump (ii) Water storage	eir), the application will be taken to be not properly made and the As ubject to the declaration for the relevant wild river area, and assessment of application will require assessment by the Department of Natural Report the application, the agency has jurisdiction as Concurrence Agency over if an application is made.) No Yes (Complete Form 1, Part K2) No Yes (Complete Form 1, Part K3)	ssessi ment i lesourd

TAKI	NG OR INTERFERING WITH WATER; WILD RIVER AREA (continued)
4.6	Is any of the proposed operational work for any thing constructed or installed that allows, under the Water Act 2000, for taking overland flow water (other than using a water truck to pump water)? No - Go to Q4.7 Yes - Answer (a) and (b) below
	(a) Are the operations mentioned as assessable development in the following?
	(i) A water resource plan under the Water Act 2000 No Yes
	(ii) A regulation under the IPA or the Water Act 2000 No Yes
	If yes to either or both of (i) or (ii) above – (Complete Form 1, Part K ₆). This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	(b) Is any of the proposed operational work mentioned as assessable in a wild river declaration and to be carried out in a wild river area declared under the Wild Rivers Act 2005?
	No See - If any part of the proposal relates to operational work in a high preservation area other than works stated in a wild river declaration for the area to be assessable development for which a development application may be made, the application will be taken to be not propedy made and the Assessment Manager must refuse to receive it. All other proposals are subject to the declaration for the relevant wild river area, and assessment may be required for the purposes of the Wild Rivers Act 2005. (Complete Form 1, Part Keif an application is made.)
	IPA, schedule 8, part 1. table 4, item 3(cht). IP Regulation, schedule 2, item 8, IP Regulation, schedule 1, part 3, table 4, item 3; Water Act 2000, section 966A livitativer area), Wild Rivers Act 2005, section 43A, relevant solid river declaration; Wild Rivers Code.
4.7	Is any of the proposed operational work for any thing constructed or installed that allows, under the <i>Water Act 2000</i> , for taking or interfering with subartesian water (other than using a water truck to pump water)? No - Go to Q4.8 Yes
	If yes, are the operations mentioned as assessable development in the following?
	(i) A water resource plan under the <i>Water Act 2000</i> No Yes
	(ii) A regulation under the IPA or the <i>Water Act 2000</i> No Yes
	If yes to either or both of (i) or (ii) above – (Complete Form 1, Part K ₁) This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	IPA, schedule B, part I, table A, item 3(1)(ii); IP Regulation schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre)(blace no cancer with discretization discretization in a schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre) (blace no cancer with discretization in a schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre) (blace no cancer with discretization in a schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre) (blace no cancer with discretization in a schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre) (blace no cancer with discretization in a schedule 2 table 2, item 8; IP Regulation, schedule 1, part 3, table 4, item 3; Weber Act 2000, section 966A (with more acre) (blace no cancer with more acre) (blace no can
4.8	Does any of the proposed operational work for any thing constructed or installed that allows, under the Water Act 2000, for interfering with overland flow water (other than using a water truck to pump water)? Yes - Answer both (a) and (b) below Yes - Answer both (a) and (b) below
	(a) Is the proposed operational work to be carried out in a floodplain management area of a wild river area declared under the Wild Rivers Act 2005?
	☐ Yes If yes, indicate what the proposed operational work relates to
	(i) Specified works for the area
	(ii) Work state in the relevant wild river declaration to be No Yes assessable development for which an application may
	be lodged If yes to either or both of (i) or (ii) above - (Complete Form 1, Part K ₁₀ , Subject to the declaration for the relevant wild river area, assessment
	may be required for the purposes of the Wild Rivers Act 2005)
	If no to both (i) and (ii) above - the application will be taken to be not properly made and the Assessment Manager must refuse to receive it. No
	If no, are the operations mentioned as assessable development in the following?
	(i) A water resource plan under the Water Act 2000 No Yes
	(ii) A regulation under the IPA or the Water Act 2000 No Yes
	If yes to either or both of (i) or (ii) above - (Complete Form 1, Part K ₁₀) This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	(b) Is the interfering with overland flow water proposed in an area declared under the <i>Water Act 2000</i> to be a drainage and embankment area (other than a wild river floodplain management area) and declared to be assessable under that Act? No Yes - (Complete Form 1, Part K ₁₀) This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	IFA, schedule 9 part 1, lable 4, items (Icid) and Sed; if Regulation, schedule 2, latte 2, item 9, if Regulation, schedule 1, part 1, lable 4, item 94. Water Act (1989), section 9608 (and river mea), teknom yild fiver declaration Wild Revers Cents.

TAKIN	NG OR INTERFERING WITH WATER; WILD RIVER AREA (continued)
4.9	Is the proposed operational work for the following?
	(i) For the construction of a referable dam as defined under the Water Supply (Safety No Yes and Reliability) Act 2008
	(ii) To increase the storage capacity of a referable dam by more than 10% ☐ Yes
	If yes to either or both of (i) or (ii) above - (Complete Form 1, Part Ks) This application requires assessment by the Department of Natural Resources and Water (NRW). If NRW is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.
	IPA schedule 9, part 1, table 4, uem 4; IP Regulation, schedule 2, table 2, tem 10
TIDAL	WORK; WILD RIVER AREA
4.10	Is any of the proposed operational work tidal work, other than excluded work defined under the IPA?
	No - Go to Q4.11 Yes - Answer (a) and (b) below
	(a) Is any of the proposed tidal work prescribed tidal work?
	☐ Yes
	If yes, is any of the proposed prescribed tidal work to be carried out in a wild river area declared under the Wild Rivers Act 2005? No
	If no, is the work proposed in a canal? ☐ No
	If no, is any of the proposed tidal work for a marina with more than 6 vessel berths?
	No – (Complete Form 1, Part P). If the Environmental Protection Agency (EPA) is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. The application also requires assessment by Queensland Transport (Maritime Salety Qld) as Concurrence Agency.
	Yes – (Complete Form 1, Part P). If the Environmental Protection Agency (EPA) is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. The application also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency and Qld Fire and Rescue Service as Advice Agency.
	Yes
	If yes, is any of the proposed tidal work for a marina with more than 6 vessel berths?
	No – (Complete Form 1, Part P). This application must be referred to Queensland Transport (Maritime Safety Qld) as
	Concurrence Agency. Yes – (Complete Form 1, Part P). This application must be referred to Queensland Transport (Maritime Safety Qld) as
	Concurrence Agency and Qld Fire and Rescue Service as Advice Agency.
	Yes
	If yes, is all of the proposed prescribed tidal work for specified works under the Wild Rivers Act 2005? No – An application for the operational work will be taken to be not properly made and the Assessment Manager must refuse to receive it.
	☐ Yes If yes, is the work proposed in a canal? ☐ No
	If no, is any of the proposed tidal work for a marina with more than 6 vessel berths?
	No - Unless the application is consistent with any property development plan applying to the land, the Assessment Manager must refuse to receive it. (Complete Form 1, Part P) If the Environmental Protection Agency (EPA) is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. The application also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency and assessment for the purposes of the Wild Rivers Act 2005.
	Yes – Unless the application is consistent with any property development plan applying to the land, the Assessment Manager must refuse to receive it. (Complete Form 1, Part P) If the Environmental Protection Agency (EPA) is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. The application also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency and Qld Fire and Rescue Service as Advice Agency. Subject to the declaration for the relevant wild river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005.
	Yes
	If yes, is any of the proposed tidal work for a marina with more than 6 vessel berths?
	No - Unless the application is consistent with any property development plan applying to the land, the Assessment Manager must refuse to receive it. (Complete Form 1, Part P) This application must be referred to Queensland Transport (Maritime Safety Qld) as Concurrence Agency. Subject to the declaration for the relevant wild river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005.
	Yes – Unless the application is consistent with any property development plan applying to the land. the Assessment Manager must refuse to receive it. (Complete Form 1, Part P) This application must be referred to Queensland Transport (Maritime Safety Qld) as Concurrence Agency and Qld Fire and Rescue Service as Advice Agency. The application also requires assessment for the purposes of the Wild Rivers Act 2005.
	No – Go to the first question on the next page of this Checklist

	If no, is any of the proposed tidal work to be carried out in a wild river area declared under the Wild Rivers. Yes	Act 2005?	
	If yes, is all of the proposed operational work for specified works under the Wild Rivers Act 20 No – An application for the operational work will be taken to be not properly made and the Assessn refuse to receive it. Yes		ger must
	If yes, is any of the proposed tidal work for a marina with more than 6 vessel berths?		
	Mo – Unless the application is consistent with any property development plan applying to the land, the Asmust refuse to receive it. (Complete Form 1, Part M) This application requires assessment by the En Agency (ΕΡΑ). If ΕΡΑ is not the Assessment Manager for the application, the agency has jurisdiction a Agency. The application also requires assessment by Queensland Transport (Maritime Safety Qld) as and, subject to the declaration for the relevant wild river area, assessment for the purposes of the Wilo	vironmental as Concurrei Concurrenc	Protection nce re Agency
	Yes – Unless the application is consistent with any property development plan applying to the land, the Anust refuse to receive it. (Complete Form 1, Part M) This application requires assessment by the Protection Agency (EPA). If EPA is not the Assessment Manager for the application, the agency he Concurrence Agency. The application also requires assessment by Queensland Transport (Maritin	Environmen as jurisdictio ne Safety Qi	ntal on as ld) as
	Concurrence Agency and Old Fire and Rescue Service as Advice Agency. Subject to the declaration also requires assessment for the purposes of the Wild Rivers Act 2005.	on for the re	elevant wild
	Concurrence Agency and Qld Fire and Rescue Service as Advice Agency. Subject to the declaration river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No	on for the re	elevant wil
	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Yes – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection	Agency (EP. ency. The a _l '. ' Agency (El	A). If EPA oplication PA). If EPA
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(b)	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency	Agency (EP) ency. The a _l '. I Agency (EI ency. The a	A). If EPA oplication PA). If EPA polication
(b)	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Yes – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Rescue Service as Advice Agency.	Agency (EP) ency. The a _l '. I Agency (EI ency. The a	A). If EPA oplication PA). If EPA polication
(b)	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Yes – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Rescue Service as Advice Agency. Is any of the proposed tidal work to be carried out in one or more of the following tidal areas?	Agency (EP, ency. The a _l , , , Agency (EI ency. The a y) and Qld F	A). If EPA oplication PA). If EP. pplication ire and
(b)	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency Yes – (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Safety Qld) as Concurrence Agency Rescue Service as Advice Agency. Is any of the proposed tidal work to be carried out in one or more of the following tidal areas? (i) One only local government tidal area and extending into another local government tidal	Agency (EP, ency. The a _l to Agency (EI ency. The a _l to) and Old F	A). If EPPoplication PA). If EP. pplication ire and Ye
(b)	river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No If no, is any of the proposed tidal work for a marina with more than 6 vessel berths? No - (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment by Queensland Transport (Maritime Salety Qld) as Concurrence Agency (Complete Form 1, Part M) This application requires assessment by the Environmental Protection is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency also requires assessment Manager for the application, the agency has jurisdiction as Concurrence Agency Rescue Service as Advice Agency. Is any of the proposed tidal work to be carried out in one or more of the following tidal areas? (i) One only local government tidal area (ii) Starting in one local government tidal area and extending into another local government tidal area (but in no strategic port tidal area)	Agency (EP), ency. The a _l of Agency (EI ency. The a ency. The a of Old F	A). If EPA oplication PA). If EPA pplication fire and

COAS	STAL MANAGEMENT DISTRICT; WILD RIVER AREA	B. V.	E 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10000
4.11	Is any of the operational work proposed to be carried out within a coastal management district? No - Go to Q4.12 Yes			
	If yes, is the proposed operational work for the following?			
	(i) Interfering with quarry material on State coastal land above high-water mark	☐ No	☐ Yes	1
	(ii) Disposing of dredge spoil or other solid waste material in tidal water¤	☐ No	☐ Yes	1
	(iii) Draining or allowing drainage or flow water or other matter across State costal land above high-water mark	□No	☐ Yes	1
	(iv) Constructing or installing works in a watercourse where the works are not assessable under IPA, schedule 8, part 1, table 4, items 3 or 4	☐ No	☐ Yes	-
	(v) Reclaiming land under tidal water¤	☐ No	☐ Yes	1
	(vi) Constructing an artificial waterway, other than a canal, associated with reconfiguring a lot	□No	☐ Yes	1
	(vii) Constructing an artificial waterway that is a canal, associated with reconfiguring a lot¤	□No	Yes	1
	j described and the second and the s	☐ No	☐ Yes	-
	(ix) Constructing a bank or bund wall to establish a ponded pasture on land, other than State coastal land, above high-water mark	□ No	☐ Yes	-
	(x) Removing or interfering with coastal dunes on land, other than State coastal land, that is in an erosion prone area and above high-water mark	□ No	☐ Yes	1
WATE 4.12	If yes to one or more of (i) – (x) above, is any of the proposed work to be carried out in a wild river area under the 2005? No - (Complete Form 1, Part M) This application requires assessment by the Environmental Protection Agency (EPA). If EPA is not to Manager for the application, the agency has jurisdiction as Concurrence Agency. If yes, above, to any shown bold and market the application also requires assessment by Queensland Transport (Marine Safety Qid) as Concurrence Agency. Yes If yes, is all of the proposed operational work for specified works under the Wild Rivers Act 2005? Yes - Unless the application is consistent with any property development plan applying to the land, the Assessment Manager must recommended for the application is consistent with any property development plan applying to the land, the Assessment Manager must recommended application Agency (EPA). If EPA is not Manager for the application, the agency has jurisdiction as concurrence Agency. If yes, above, to any shown bold and marked application also requires assessment by Queensland Transport (Marine Safety Ofd) as Concurrence Agency. Subject to the decomid river area, the application also requires assessment for the purposes of the Wild Rivers Act 2005. No - An application for the operational work will be taken to be not properly made and the Assessment Manager must refuse to recommended in the Assessme	the Assessed with the diffuse to receive the Assessed with the syclaration for ecceive it.	eive it sment enternit embol ¤, the or the relevan	nt
	If no, is all of the operational work for constructing or raising waterway barrier works - tick applicable box/es and answ	ver (a) and	Yor (b) below	V
8	(i) temporary			
	(ii) minor			
	(iii) rebuilt on a regular basis			
	 (a) If yes to one or more of (i) – (iii) above, does all the proposed operational work comply with any applic of Primary Industries and Fisheries (DPI&F) self-assessable code? ☐ Yes – A permit for that aspect of the operational work is not required. Go to Q4.13 ☐ No – Go to (b) (b) If no to all of (i) – (iii) or no to (a) above - (Complete Form 1, Part O₂) This application requires assessment by the Dept Industries and Fisheries (DPI&F). If DPI&F is not the Assessment Manager for the application, the agency has jurisdiction as Co. ☐ Yes If yes, is any of the proposed operational work to be carried out in a wild river high preservation area? ☐ No – Unless the application is consistent with any property development plan applying to the land, the Assessment Manager it (Complete Form 1, Part O₂) This application requires assessment by the Department of Primary Industries and Fisher subject to the declaration for the relevant wild river area, assessment for the purposes of the Wild Rivers Act 2005. If Dial Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. 	partment o ncurrence must refus ries (DPI&I PI&F is no	of Primary Agency. See to receive F). and, of the	
	Yes - An application for the operational work will be taken to be not properly made and the Assessment Manager must refuse 1PA. schedule 8. part 1. table 1, item 6. IPA. schedule 8. part 2, table 4, item 2; Fisheries Regulation 1985 x115A (self-assessable codes): IP Regulation, schedule			
	tra, schoole 6, part i meet i, non 6 fra schoole 6 part, sole a nem 2, reactes requiente reto si isa iste-istessian coloris; ir requiente schoole Regulation, schoole 6 i, part 1, table 4, nem 6, risheries Act 1994, section 760 (wild river area). Peld Rivers Act 2006, section 43%	e mary z. tl	MARKE H	

IDAS Assessment Checklist, Version 22

Act 199	f the proposed operational work to be carried out completely or partly within a declared fish habitat area und. 4. Go to Q4.14 Yes	nder the i	Fisheries
If ve	s, is the operational work reasonably necessary for: (Tick applicable box/es and answer (a) and/or (b) below)		
(0)	The maintenance of existing structures, including for example the following structures, if the structures were constructed in compliance with all the requirements, under any Act, relating to a structure of that type – • Boat ramps, boardwalks, drains, fences, jetties, roads, safety signs, swimming enclosures & weirs; • Existing powerlines or associated powerline infrastructure	□ No	☐ Yes
(ii)	Educational or research purposes relating to the fish habitat area	☐ No	☐ Yes
(iii)	Monitoring the impact of development on the declared fish habitat area	☐ No	☐ Yes
(iv)	The construction or placement of structures, including for example, safety signs, swimming enclosures and aids to navigation, if — The impact on the area is minor; and The structures are constructed in compliance with all the requirements, under any Act, relating to a structure of that type	□ No	☐ Yes
(v)	Public benefit works, including, for example, the construction of runnels for mosquito control, the removal of <i>Lyngbya</i> and seed collection for site rehabilitation, if the impact on the area is minor	☐ No	☐ Yes
(a) (b)	If yes to one or more of (i) – (v) above, does all the proposed operational work comply with any application of the proposed operational work comply with any application of the proposed operational work is not required. Go to Q4.14 No – Go to (b) If no to all of (i) – (v) or no to (a) above, is that proposed operational work to be carried out in a wild rive under the Wild Rivers Act 2005? No - (Complete Form 1, Part O ₂) This application requires assessment by the Department of Primary Industries and Fisheries (Department of Primary Industries and F	r area de	clared
	If yes, is all of the proposed operational work for specified works under the Wild Rivers Act 2005? Yes – Unless the application is consistent with any property development plan applying to the land, the Assessment Mann receive it. (Complete Form 1, Part 0 ₂) This application requires assessment by the Department of Primary Industry (DPI&F) and assessment for the purposes of the Wild Rivers Act 2005. If DPI&F is not the Assessment Manager I agency has jurisdiction as Concurrence Agency. No	ies and Fish	eries
	If no, is any of the proposed operational work to be carried out in a wild river high preservation are	ea?	
	No – Unless the application is consistent with any property development plan applying to the land, the Assessme to receive it. (Complete Form 1, Part O ₂) This application requires assessment by the Department of Prima. Fisheries (DPl&F) and, subject to the declaration for the relevant wild river area, assessment for the purpos Act 2005. If DPl&F is not the Assessment Manager for the application, the agency has jurisdiction as Conc.	ry Industries es of the W	and Id Rivers
	Yes - An application for the operational work will be taken to be not properly made and the assessment mana receive it.		
	a 9-part 1, table 4, ham 7-1126, schedule 8, part 2, table 4-item 3; Eisheries Regulation 1995 s113A (sult assessable codes); ID Regulation-schedul schedule 1, part 3, table 4, item 7, Vold Rivers Act 2005, sections 43A, Fisheries Act, section 76DC (wild mor area).	e 2, table 2-n	iem 25; iP

	- Go to Q4.15 Yes		
If	yes, is the proposed operational work reasonably necessary for: (Tick applicable box/es and answer (a) and	Vor (b) belo	ow)
(i)	The removal, destruction or damage of dead marine wood on unallocated State land, other than in a wild river area, for trade or commerce	□ No	Yes
(ii	 The maintenance of existing structures, including, for example, the following structures, if the structures were constructed in compliance with all the requirements, under any Act, relating to a structure of that type — boat ramps, boardwalks, drains, fences, jetties, roads, safety signs, swimming enclosures and weirs; existing drainage structures; existing powerlines or associated powerline infrastructure 	□ No	Yes
(iii) For educational or research purposes or for the monitoring the impact of development on marine plants	□ No	☐ Yes
(iv) For the construction or placement of structures, including, for example, swimming enclosures, safety signs, aids to navigation, fences, pontoons, public boat ramps and pipelines, if – • The extent of the removal, destruction or damage is minor; and • The structures were constructed in compliance with all the requirements, under any Act, relating to a structure of that type 	□ No	Yes
(v)	For the construction of runnels for mosquito control, removal of <i>Lyngbya</i> , seed collection for site rehabilitation or the collection of marine plants for fishing bait, or handicraft	☐ No	Yes
	Primary Industries and Fisheries (DPI&F) self-assessable code?		
(b)	Yes - A permit for that aspect of the operational work is not required. Go to Q4.15 No - Go to (b) If no to all of (i) - (v) or no to (a) above, is that proposed operational work to be carried out in a wild riunder the Wild Rivers Act 2005? No - (Complete Form 1, Part O ₃) This application requires assessment by the Department of Primary Industries and Fisheries the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.		
(b)	Yes - A permit for that aspect of the operational work is not required. Go to Q4.15 No - Go to (b) If no to all of (i) - (v) or no to (a) above, is that proposed operational work to be carried out in a wild riunder the Wild Rivers Act 2005? No - (Complete Form 1, Part O ₂) This application requires assessment by the Department of Primary Industries and Fisheries the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. Yes		
(b)	Yes - A permit for that aspect of the operational work is not required. Go to Q4.15 No - Go to (b) If no to all of (i) - (v) or no to (a) above, is that proposed operational work to be carried out in a wild riunder the Wild Rivers Act 2005? No - (Complete Form 1, Part O ₃) This application requires assessment by the Department of Primary Industries and Fisheries the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.	(DPI&F). If i Manager mi. lustries and i ld Rivers Aci	DPI&F is no ust refuse to Fisheries
(b)	Yes - A permit for that aspect of the operational work is not required. Go to Q4.15 No - Go to (b) If no to all of (i) - (v) or no to (a) above, is that proposed operational work to be carried out in a wild riunder the Wild Rivers Act 2005? No - (Complete Form 1, Part O ₂) This application requires assessment by the Department of Primary Industries and Fisheries the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency. Yes If yes, is all of the proposed operational work for specified works under the Wild Rivers Act 2005? Yes - Unless the application is consistent with any property development plan applying to the land, the Assessment (DPI&F) and, subject to the declaration for the relevant wild river area, assessment for the purposes of the Wild DPI&F is not the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.	(DPI&F). If a Manager ma fustries and a Id Rivers Act taining wo	DPI&F is no ust refuse t Fisheries I 2005. If
(b)	 Yes - A permit for that aspect of the operational work is not required. Go to Q4.15	Manager mulustries and it defining wo ed or, if a mulustries and it Manager mulustries and tild Rivers Activities and tild Rivers	DPI&F is no ust refuse t Fisheries 1 2005. If rks or ust refuse a 1 Fisheries
(b)	Yes - A permit for that aspect of the operational work is not required. Go to Q4.15	(DPI&F). If a Manager mulustries and a deciral mulustries and a deciral mulustries and a deciral mulustries and the deciral mulustrian mulustria	DPI&F is no ust refuse t Fisheries t 2005. If rks or ust refuse t Fisheries ct 2005. If

WILD	RIVER AREA	
4.15	s and of the operational work proposed to be carried out in a wild river area declared under the Wild River Act 2005? No - Go to Q4.16 Yes	
	If yes, is the proposed operational work for the following and also declared under the wild river declaration for the assessable?	areas to be
	(i) Agricultural activities as defined under the Wild Rivers Act 2005	
	(ii) Animal husbandry activities as defined under the Wild Rivers Act 2005 No Yes	
	If yes to either (i) or (ii) above, is any part of the premises in the wild river high preservation area? Yes - An application for the operational work will be taken to be not properly made and the Assessment Manager must refuse to the No.	receive it.
	If no, is the proposed use in relation to the production of a high risk species as defined under the Wild Riv Yes - An application for the operational work will be taken to be not properly made and the Assessment Manager must refu No - Unless the application is consistent with any property development plan applying to the land, the Assessment Manage receive it (Complete Form 1, Part Q if agriculture. Complete Form 1, Part R if animal husbandry) Subject to the declar relevant wild river area, this application requires assessment by the Department of Natural Resources and Water (NR the Assessment Manager for the application, the agency has jurisdiction as Concurrence Agency.	use to receive it. Fr must refuse to Pation for the
(Meta-december)	PA, schedule 8, part 1, table 4, kiem 10; IP Regulation, schedule 2, table 2, item 37; Wild Rivers Act 2005, sections 42, 41A.	
(SCALARS INFO	CONTROLLED ROAD	NA SIE
4.16	s app part of the premises located in part of a future State-controlled road, or within 100m of a State-controlled road? No - End of section 4 Yes	
	If yes, is the proposed operational work associated with either -	—
	 A material change of use that is assessable under the planning scheme; or Reconfiguring a lot that increases the total number of lots, or increases the total number of lots abutting the State-controlled road 	∐ Yes
	If no, and answers to questions in this section of the checklist indicate the proposed operational work is assess IPA, schedule 8 - Answer (a) - (c) below.	able under
	(a) Is any of the proposed operational work associated with access to a State-controlled road? No Yes - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency	<i>t</i> .
	(b) Is any of the proposed operational work for filling or excavation? No Yes	
	If yes, is the operational work proposed in a future State-controlled road <u>not</u> defined by route? No - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency. Yes - This application must be referred to the DMR as Advice Agency.	
	(c) Does any of the proposed operational work involve the redirection or intensification of site stormwater from through a pipe with a cross-sectional area greater than 625cm² that directs stormwater to a State-controlled. No Yes	the land, d road?
	If yes, is the operational work proposed in a future State-controlled road <u>not</u> defined by route? No - This application must be referred to the Department of Main Roads (DMR) as Concurrence Agency. Yes - This application must be referred to the DMR as Advice Agency.	
	Regulation, schedula 2, table 2, lean 3.	

REMEDIATION PLAN (2 nd October 2009)
LOTS: PLAN:
RIVERLINK PROJECT, NORTH IPSWICH, QLD
Prepared for LEDA Developments By GeoEnvironmental Consultants
1. INTRODUCTION
This Remediation Plan has been prepared for Lots covering a total area of 26.1165 hectares. The lots are included on the Environmental Management Register (EMR) but not the Contaminated Land Register (CLR). The Remediation Plan presents a classification of existing stockpiles and soil types across Lot on and nominates destinations and management requirements for the stockpiles and soil types. The two smaller Lots located on higher ground in the north east corner of the site are not currently subject to any proposed remediation.
The subject site has been assessed across three areas referred to as Hughes Street , the Riverbank Area (and North Street . The lot layout is shown on the attached plan (Page 1 of 4) and nominated assessment and management areas are shown on Drawing No. 1.
1.1 Purpose
This Remediation Plan presents an approach whereby excavation and stockpile movement across the entire site is to be supervised by a Suitably Qualified person with oversight by the appointed Third Party Reviewer (TPR) to ensure that any suspected or unforeseen contamination issues are appropriately addressed. The purpose of this Remediation Plan is to outline the bulk handling of contaminated soil so that future development can proceed with appropriate controls in place.
1.2 Objective
The objective of the Remediation Plan is to provide a strategy to manage contaminated soils being excavated and moved during site redevelopment in a manner that protects human health and the environment. The intent is to remove contaminated soil and stockpiles from Hughes Street and North Street and to incorporate the material into the bulk earthworks occurring in the Riverbank area. This approach could result in Hughes Street and North Street being removed from the EMR while retaining the Riverbank on the EMR under an approved Site Management Plan (SMP).
2. BACKGROUND
Lot has been used in the past for rail purposes. In the last few years stockpiles of soil have been added to the Riverbank area, Hughes Street area and at the southern end of the North Street area. The stockpiles have been sourced from excavation works on the southern rail yards during redevelopment by Leda.

This Remediation Plan has been based on the following assessment documents and information:

- GeoEnvironmental Letter Report *Ipswich Riverlink Project Northern Region, North Street Sampling Results Update* dated 3rd April 2009 Ref: 6062/01;
- GeoEnvironmental Letter Report *Ipswich Riverlink Project Northern Region, Hughes Street Sampling Results Update* dated 6th April 2009 Ref: 6062/01;
- GeoEnvironmental Letter Report Results of "SQ" (Medical Centre) Stockpile Soil Sampling, Riverlink Project, North Ipswich, Old dated 4th June 2009 Ref: 6062/01;
- GeoEnvironmental Letter *Preliminary Review of Soil Volumes and Classification, Riverlink Project, North Ipswich, Qld* dated 30th July 2009 Ref: 6062/01;

3. SOIL CLASSIFICATION

The following project specific classifications have been adopted for application to soil that is to be managed at this site:

- **Clean** = Not contaminated, suitable for use in any location without capping.
- Class 1 = Slightly contaminated, mostly clay/silt/sand/rock, minor ash, aesthetically good, suitable for use immediately below capping concrete, asphalt and designed landscape areas and below 0.5m depth when covered by clean material in unsealed areas.
- Class 2 = Moderately contaminated, mostly clay/silt/sand/rock, some ash and fine rubble, aesthetically reasonable, suitable for use below 1.0m beneath capping concrete, asphalt and designed landscaped areas.
- Class 3 = Heavily contaminated, clay/silt/sand/rock, common ash and/or rubble, aesthetically poor, suitable for use below 1.0m of Clean or Class 1 material in concrete or asphalt capped and designed landscaped areas.
- Class 4 = Heavily contaminated, clay/silt/sand/rock, common ash and/or rubble, aesthetically poor, not suitable for retention on site, dispose offsite.

4. VOLUMES

Riverbank Stockpiles are defined in attached Table No. 1. The following table summarises all contaminated soil, both insitu requiring excavation and in stockpiles across all areas of and

Area	Location	Classification							
		Clean m³ (loose)	Class 1 m³ (loose)	Class 2 m³ (loose)	Class 3 m³ (loose)	Class 4 m³ (loose)	Separated Rubble		
North	Stockpile	6,000							
Street	In situ			15,000	500				
Hughes	Stockpiles				5500				
Street	In situ			22,000					
Riverbank	Stockpiles	6,500	87,500	20,000	4,000	0	9,000		
	In situ				17,500*				
	Totals	12,500	87,500	57,000	27,500	0	9,000		

* 17,500 is the estimated volume of fill to be excavated from the Wide Gully steep batter stabilisation.

The total volume of contaminated soil that is to be excavated from North Street and Hughes Street areas and from all stockpiles is estimated to be approximately 190,000 m³ (loose).

Separated rubble is material comprising coarse building, construction and demolition waste and other coarse materials such as railway sleepers that can be physically screened, sorted and separated. It is expected that most of this material, with the exception of possibly some concrete will not be suitable for retention on site and will require offsite disposal to landfill or other acceptable destination.

4. BULK EARTHWORKS PRELIMINARY PLAN

The bulk earthworks preliminary plan broadly involves the creation of an extended platform along the upper riverbank by placement and compaction of fill up to between RL 19.5m AHD and RL 20.5 mAHD. The current plan for each Lot is discussed in more detail below.

There is scope to win clean clay material from borrow pits along the lower riverbank terraces for use in areas where clean clay capping is required and to make up any shortfall in required fill quantities. Engineering estimates indicate that up to 79,000m³ (compacted) of clean clay will be required in selected areas including the batter stabilisation program along the Wide Gully area towards the new Medical Centre development at the south end.

Old "QR Fill" located beneath Stockpiles SA to SQ along the Riverbank Area and in the southern Wide Gully area is considered to be contaminated and by default it is to be allocated to Class 3.

In accordance with the soil classes specified above in Section 3, there will be no Class 4 material retained on site. Class 2 and Class 3 material will be placed in areas where there will be at least 1.0m of Clean or Class 1 material placed over the top. Class 3 material will be placed as deep as possible to achieve a covering layer of greater than 1.0m when practical.

Class 1 material will be placed in areas that are to be covered with concrete, asphalt or designed landscape areas. Designed landscaping can include a minimum 0.5m of clean soil cover or contained planter boxes of lesser depth. In areas without concrete, asphalt or designed landscape areas, Class 1 material will be placed so that there will be a minimum cover of at least 0.5m of Clean material. This will apply on stabilised batter areas.

4.1 Lot 53 – W.M. Hughes St.

The existing contaminated material (27,500 m³ approx) will be removed / scraped off the site with the resultant uncontaminated surface being validated prior to filling back (using Clean material) to the finished earthworks levels shown on Yeats Bulk Earthworks Plans YC0716 – BE00 to BE15.

The contaminated material (predominantly Class 2 and some Class 3) will be removed and compacted into the "extended Riverbank Platform" on Lot 54 at depths set out in the "Soil Classification" section of this Remediation Plan.

4.2 Lot 54 (Part) – Southern Area and Wide Gully/Riverbank area.

The existing river bank is to be re-profiled as per VDM engineering drawings – C3574:04 – SK020 – SK026, by removing contaminated material and placing it in the "extended Riverbank Platform". The resultant exposed surface will then be capped with at least 0.5m of Clean or Class 1 material with a minimum cover of at least 0.5m Clean Clay.

These remediation works will achieve the "Remediation Plan objectives" by capping the old QR Fill Class 3 material with a minimum 1.0m of Class 1 and Clean material.

4.3 Lot 54 (Part) – "Extended River Platform".

These works are shown on VDM Bulk Earthworks Plans C3574:03 – SK01 – SK16. It is proposed to expand the existing borrow pit on the lower river terraces to win the required Clean clay capping material. This borrow area and the base of the extended Terrace will be filled with compacted Class 2 and Class 3 contaminated material to create the sub-profile shown on the VDM drawings. The Class 3 material will be placed as deep as possible with progressively cleaner material placed higher (closer to the surface) in the fill area. This sub profile will then be capped by the Clean material in accordance with the VDM drawings.

4.4 Lot 55 – North St

The existing contaminated material (21,500 m³ approx) will be removed / scraped off the site with the resultant uncontaminated surface being validated prior to filling back (using Clean material) to the finished earthworks levels shown on Yeats Bulk Earthworks plans – YC0175-BE00 to BE24.

The contaminated material (predominantly Class 2 and some Class 3) will be removed and compacted into the "extended Riverbank Platform" on Lot 54 at depths set out in the "Soil Classification" section of this Remediation Plan.

4.5 Underground Services

The objective for Hughes Street (Lot 53) and North Street (Lot 55) is to remove contaminated soil and achieve removal of the lots from the EMR. In the event that removal from the EMR is achieved, underground services will be located within validated clean soil. Should some areas such as the existing electricity easement (Emt M) along the western side of Lot 55 not be fully remediated, management of any shallow and deep service trenches in these areas will be managed under a revised Site Management Plan (SMP) for the relevant Lots once design details are defined.

In the Riverbank Area (Lot 54) the implemented Remediation Plan will enable future shallow underground services to be placed in Clean or Class 1 material in the top 1.0m. Where underground services are required to be installed below 1.0m depth, Class 2 and/or Class 3 material may be intersected. The management of shallow and deep service trenches will be managed under a revised SMP for Lot 54 once design details are defined.

5. CLOSING

All works will be validated by GeoEnvironmental Consultants and approved by the TPR.

All remediation works will be completed in conjunction with other works and control plans, including the Erosion and Sediment Management plan prepared by Yeats Engineers. The Erosion and Sediment Management Plan addresses transport routes, designed gravel pads or other devices, vegetated areas and grass filter strips, sediment fences, dust control, runoff chutes and temporary bunds, and monitoring requirements.

All check dams and sediment basins will be located in non-contaminated areas where possible or otherwise designed to prevent the spread of contaminated soil. Landscaping and revegetation in accordance with the Landscape Plan will be conducted to achieve the objectives of the Remediation Plan.

Post-development management of Lots that remain on the EMR due to the presence of retained contaminated material will be achieved through a Site Management Plan (SMP) to be approved by DERM. The SMP will specify monitoring and cap maintenance requirements.

Attachments:

- 1. Ipswich Riverlink Northern Region, Riverbank Stockpile Classification Table
- 2. Plan SP222487 (Page 1 of 4)
- 3. Drawing No. 1. Hughes Street Remediation Plan
- 4. Drawing No. 2. North Street Remediation Plan
- 5. Drawing No. 3. River South Remediation Plan
- 6. Drawing No. 4. River Central Remediation Plan
- 7. Drawing No. 5. River North Remediation Plan

IPSWICH RIVERLINK - NORTHERN REGION RIVERBANK STOCKPILE CLASSIFICATION

For LEDA Developments

by GeoEnvironmental Consultants

Stockpile Name	Length ~m	Width ~m	Max Height	Average Height	Approx Volume	Characteristics/Comments	Fines Content	Fines Volume	Sampling Results	Class Clean,
			~m	~m	m3		%	m3		1, 2, 3, 4
SA	80	6	3	2	960	Recently crushed concrete	NA	NA	Not sampled	Clean
SB	22	10	2.2	2	440	Silt, clay, ash, old slag, rubble, metal	100	440	Relatively high total copper, lead, zinc. TCLP lead leachable, ASLP lead not readily leachable	3
SC	25	6	3	2.5	375	Recently crushed concrete	NA	NA	Not sampled	Clean
SD	120	20	2.5	1.8	4320	Clay, silt, sand, ash, slag, metal, concrete, rubble ~30% screen out ~1300m3.	70	3024	Moderate to low total copper, lead, zinc. TCLP lead leachable, ASLP lead not readily leachable	2
SE	70	25	3	2	3500	Placed by QR as cap over underground fire. Clay, silt, ash, metal, fine rubble	100	3500	Relatively high total PAH, copper, lead, zinc. TCLP lead readily leachable, ASLP lead not readily leachable	3
SF	40	20	3.5	2	1600	Silt, sand, gravel, ash, rubble ~20% screen out ~320m3.	80	1280	South end (SF1, SF2) with elevated total copper, lead, zinc. TCLP and ASLP lead not readily leachable.	2
SG	80	20	1.5	1	1600	Clay, sand, gravel and reworked concrete rubble, some scrap metal. Appears to have been disturbed recently as weed growth is new. Concrete/rubble ~30% screen out ~480m3. Most of 480m3 should be larger concrete.	70	1120	Moderate to low total copper, lead, zinc. TCLP and ASLP expected to have low leachability	2
SH	60	20	3.5	2.5	3000	clay, silt, sand, ash, concrete, steel, pipes, sleepers, <50% fines, old fill in steep grass covered pile. Rubble >50% screen out ~1500m3	50	1500	Moderate to low total copper, lead, zinc. TCLP metals not readily leachable, ASLP metals not readily leachable	2
SI	95	15	3.5	2	2850	Concrete, soil, ash, rubble, timber, >50% fines, centre ridge to 3.5m high. Rubble ~30% or more screen out ~855m3.	70	1995	Moderate to low total copper, lead, zinc. TCLP metals not readily leachable, ASLP metals not readily leachable.	2

SJ	220	50	6	5.5	60500	"Ayers Rock" commercial fill, soil, sand, some asphalt, minor ash and some rubble.	100	60500	Low total copper, lead, zinc. TCLP and ASLP metals not readily leachable.	1
SK	105	40	3	2	8400	Large flat topped pile, soil, concrete, plastic, rubble, asphalt, Rubble ~20% screen out ~1680m3	80	6720	Generally low total copper, lead, zinc with north east corner (SK16 to SK19) higher. TCLP and ASLP metals not readily leachable.	2 large proportion could be Category 1
SL	40	25	3	1.5	1500	Former stockpile that appears to have been pushed westwards down the embankment creating an area level with the road. Soil and rubble in embankment. Volume estimate is a best guess as underlying countours unknown.	100	1500	Moderate to low total copper, lead, zinc. TCLP lead leachable, ASLP metals not readily leachable	2
SM	85	35	4	2	5950	Sand, silt, clay, rubble, bricks, concrete, steel, not screened, large pieces, Steep west face to ~ 4m high. Volume estimate is a best guess as underlying contours unknown. Rubble ~50% screen out ~ 2975m3	50	2975	Moderate to low total copper, lead, zinc. TCLP and ASLP metals not readily leachable	2
SN	70	50	2	1.5	5250	Large concrete blocks, steel, not screened or sorted, minor fines. Rubble concrete ~100% or 5250m3	NA	NA	Not sampled	clean
SO	90	40	5	4	14400	Clay,silt, sand, gravel with minor ash and minor rubble, crest to ~5m above road level, Steep west face. Volume estimate is a best guess as underlying contours unknown. Separate out small percentage of rubble.	100	14400	Moderate to low total copper, lead, zinc. TCLP and ASLP metals not readily leachable	1

SP	50	40	4	4	8000	Clay, silt, sand, gravel with minor ash and minor rubble metal bricks, crest to ~4m above road level, Steep west face. Volume estimate is a best guess as underlying contours unknown. Separate out small percentage of rubble.	100	8000	Low to negligible total copper, lead, zinc. TCLP and ASLP metals not readily leachable	1
SQ	65	20	4	3.5	4550	Clay, silt with minor ash and minor metal rubble, on top of Stockpile SJ. Recently sourced from Medical Centre excavations in southern shopping centre area. Separate out small percentage of rubble.	100	4550	Low to negligible total copper and lead. TCLP and ASLP leachable metals expected to be low, not analysed.	1
Borrow						From natural riverbank unfilled areas				Clean
ld QR Fill						From old filled areas typified by ash, slag,	metal			3

~ TOTAL 127195 111504

NOTES:

Clean = Not contaminated, suitable for use in any location without capping.

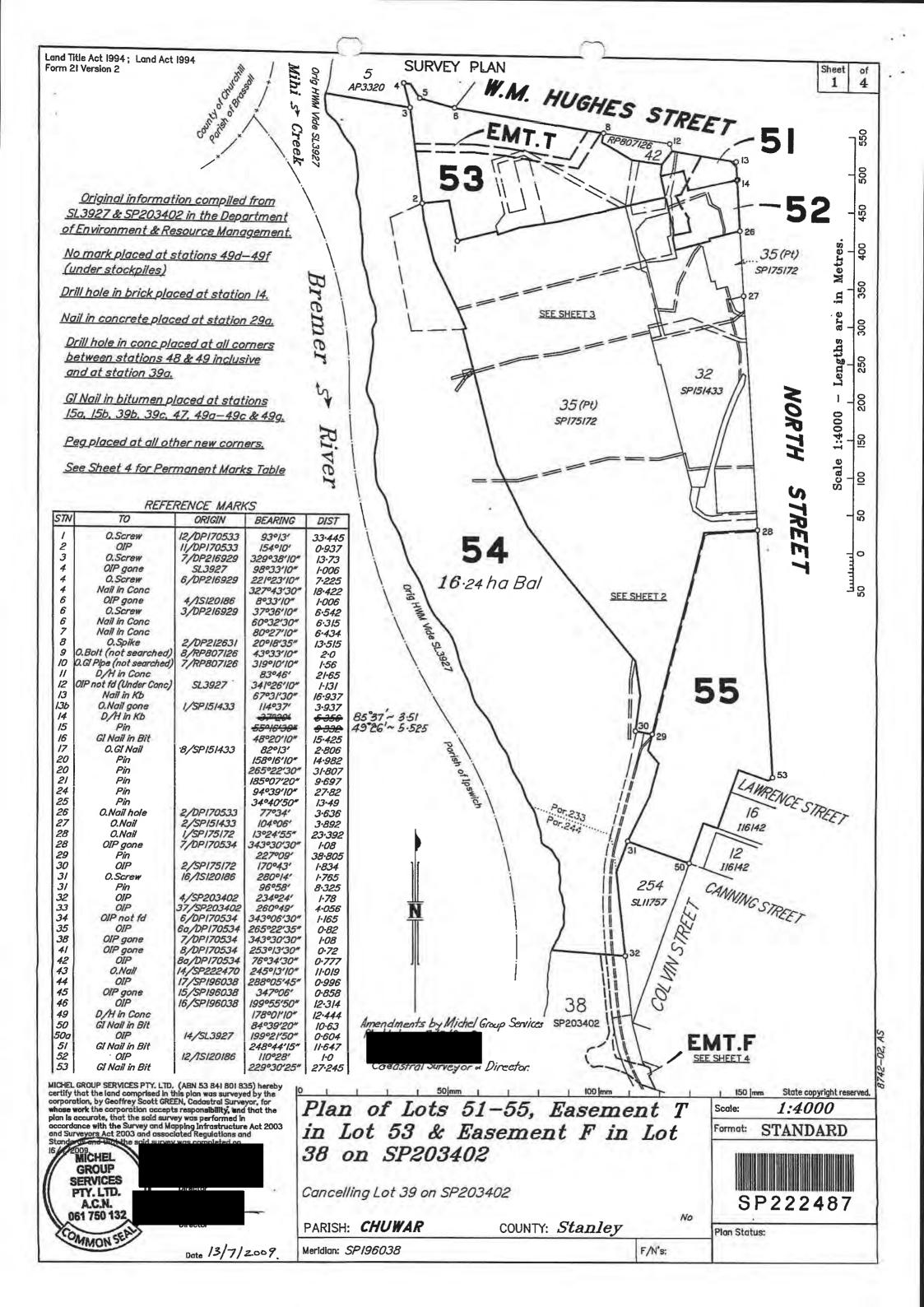
Class 1 - Slightly contaminated, mostly clay/silt/sand/rock, minor ash, aesthetically good, suitable for use immediately below capping concrete, asphalt and designed landscaped areas and below 0.5m depth when covered by clean material in unsealed areas.

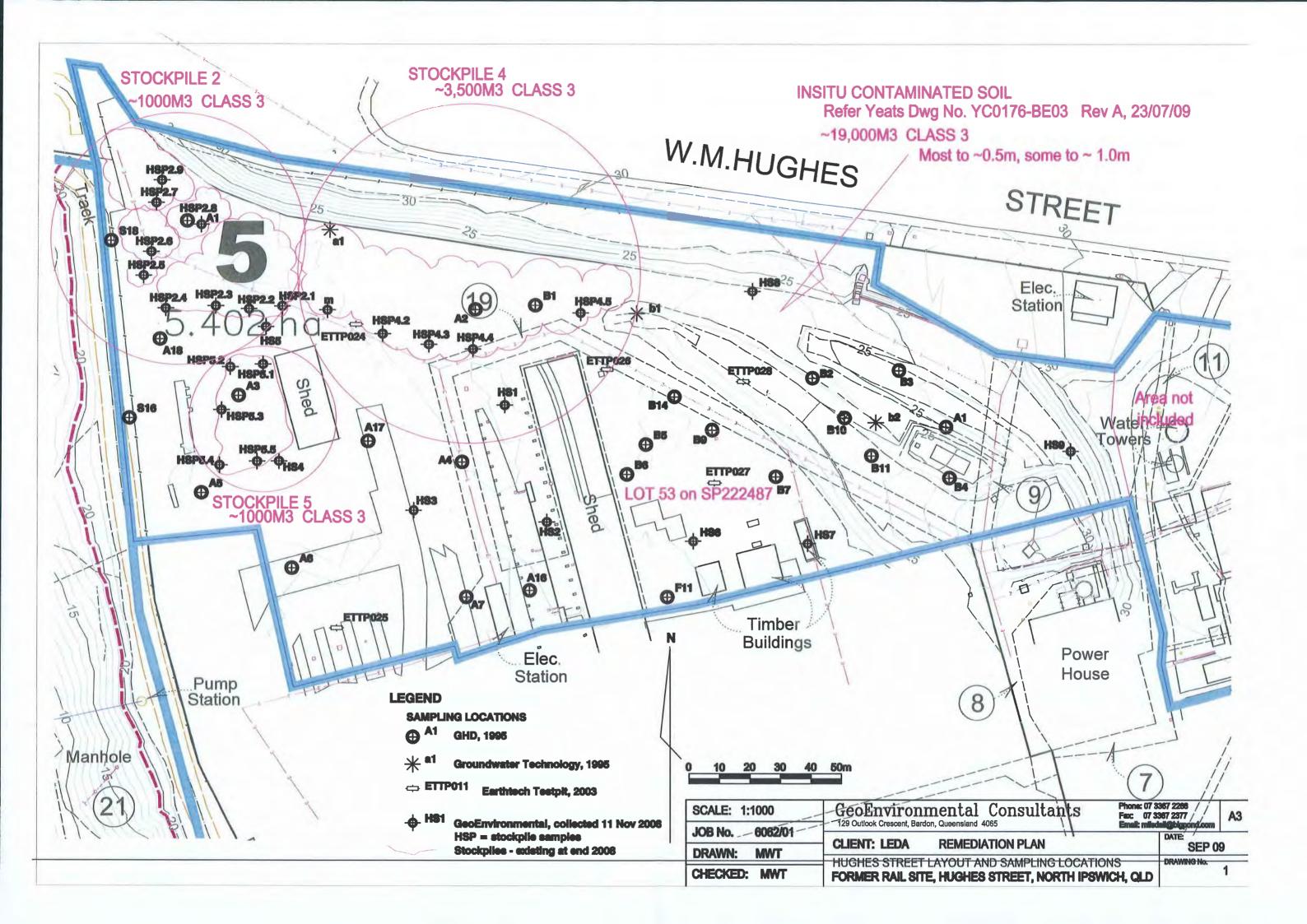
Class 2 - Moderately contaminated, mostly clay/silt/sand/rock, some ash and fine rubble, aesthetically reasonable, suitable for use below 1.0m depth beneath capping concrete, asphalt and designed landscaped areas.

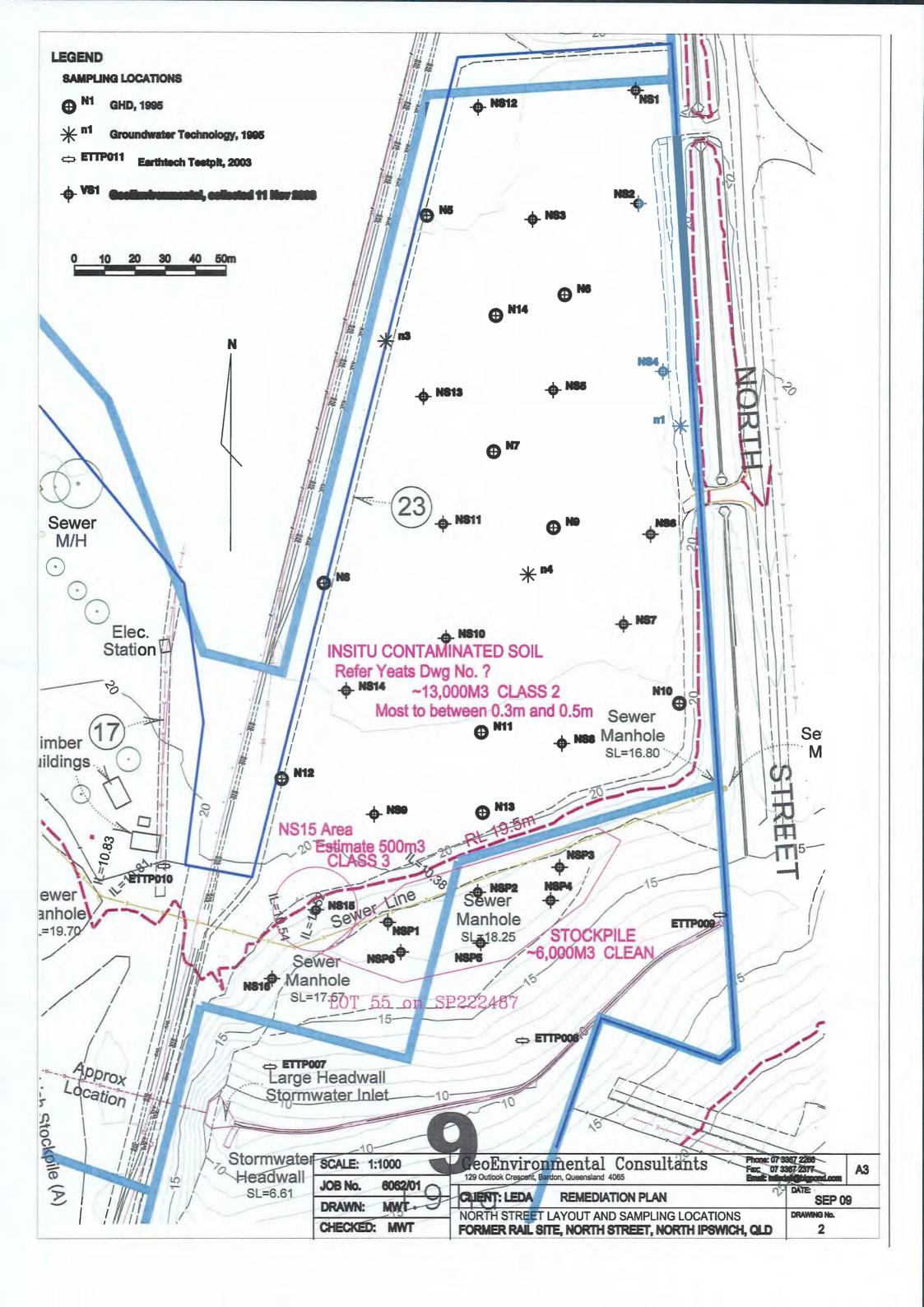
Class 3 - Heavily contaminated, clay, silt, sand, rock, common ash and fine rubble, aesthetically poor, suitable for use below 1.0m of Clean or Category 1 material in concrete or asphalt capped and designed landscaped areas.

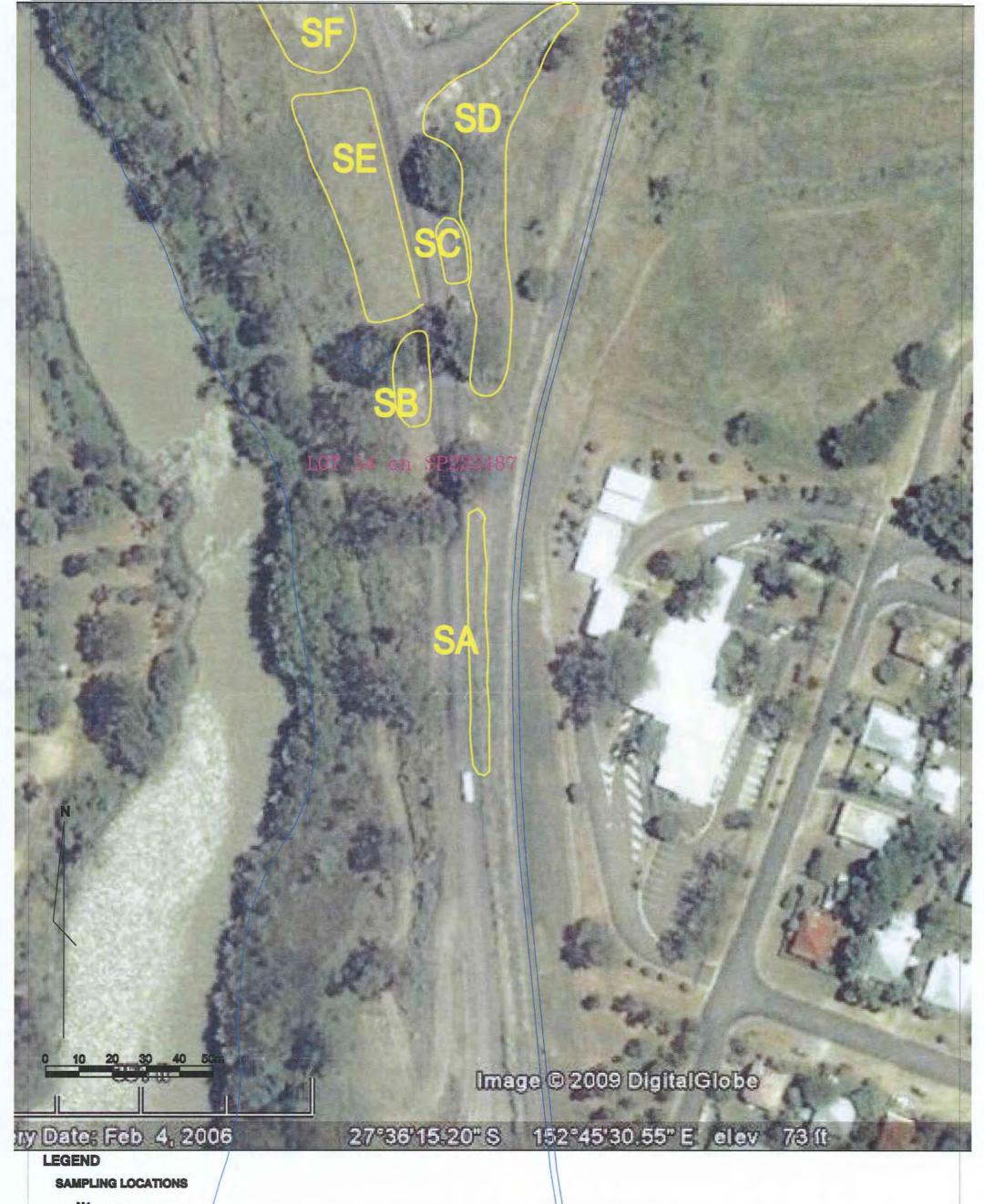
Class 4 - Heavily contaminated, clay, silt, sand, rock, common ash and/or rubble, aesthetically poor, not suitable for retention on site, dispose offsite.

VOLUMES (Estimated)	m3	
Clean	6585	Clean includes the concrete stockpiles SA, SC and SN.
Class 1	87450	
Class 2	20114	
Class 3	3940	
Class 4	0	
Separated Rubble	9110	Rubble would include some proportion requiring offsite disposal to landfill and some suitable for retention onsite.
Total	127199	and some suitable for retention offsite.









⊕ N1 GHD, 1995

* n1 Groundwater Technology, 1995

EITP011 Earthtech Teetpit, 2003

- V81 GeoEnvironmental

SCALE: 1:1000	GeoEnvironm 129 Outlook Crescent, Bardon,	ental Consultants Queensland 4065 Phone Fac Emple	A3	
JOB No. 6062/01	CLIENT: LEDA	REMEDIATION PLAN	SEP 09	
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CHECKED: MWT		FORMER RAIL SITE, NORTH STREET, NORTH IPSWICH, QLD		





RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH

CIVIL ENGINEERING WORKS BULK EARTHWORKS

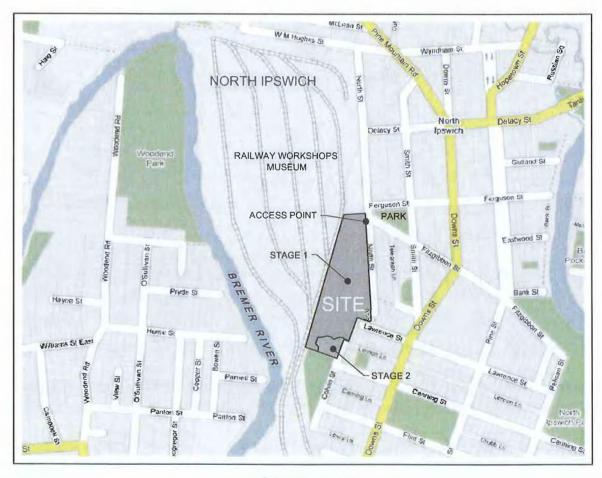
DRAWING SCHEDULE

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YC0175-BE02	CONTAMINATED LAND REMOVAL LAYOUT PLAN
YC0175-BE03 YC0175-BE04 YC0175-BE05	CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 1 OF 3 CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 2 OF 3 CONTAMINATED LAND REMOVAL BULK EARTHWORKS CROSS SECTIONS - SHEET 3 OF 3
YC0175-BE06	BULK EARTHWORKS CUT FILL PLAN
YC0175-BE07 YC0175-BE08	BULK EARTHWORKS ACCESS ROAD AND BLOCKS SETTING OUT DETAILS BULK EARTHWORKS SITE LAYOUT / KEY SHEET & NOTES
YC0175-BE09 YC0175-BE10	BULK EARTHWORKS LAYOUT PLAN -SHEET 1 OF 4 BULK EARTHWORKS LAYOUT PLAN -SHEET 2 OF 4
YC0175-BE11 YC0175-BE12	BULK EARTHWORKS LAYOUT PLAN -SHEET 3 OF 4 BULK EARTHWORKS LAYOUT PLAN -SHEET 4 OF 4
YC0175-BE13 YC0175-BE14	BULK EARTHWORKS INTERNAL ACCESS ROAD LONGITUDINAL SECTION BULK EARTHWORKS TYPICAL SECTIONS - SHEET 1 OF 2
YC0175-BE15 YC0175-BE16	BULK EARTHWORKS TYPICAL SECTIONS - SHEET 2 OF 2 BULK EARTHWORKS EROSION & SEDIMENT CONTROL PLAN
YC0175-BE17	BULK EARTHWORKS EROSION & SEDIMENT CONTROL DETAILS
YC0175-BE18 YC0175-BE19	BULK EARTHWORKS CENTRAL GULLY UPGRADE LAYOUT PLAN BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 1 OF 3
YC0175-BE20 YC0175-BE21	BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 2 OF 3 BULK EARTHWORKS CENTRAL GULLY CROSS SECTIONS-SHEET 3 OF 3
YC0175-BE22 YC0175-BE23	BULK EARTHWORKS LAYOUT PLAN - STAGE 2 COLVIN STREET
YC0175-BE24	BULK EARTHWORKS EROSION & SEDIMENT CONTROL – STAGE 2 COLVIN STREET BULK EARTHWORKS DETAILS – STAGE 2 COLVIN STREET

EXTERNAL DRAWINGS

DWG. No.	DESCRIPTION
8742-11 - D	PLAN OF OVERALL LEVEL & FEATURE SURVEY OF RAILWAY AREA & ADJOINING SURROUNDS IPSWICH RIVERLINK CENTRAL





LEVELS & GRID

LEVELS TO AHD (AUSTRALIAN HEIGHT DATUM) GRID ASSUMED LOCAL LOCALITY PLAN
SCALE N.T.S

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N.M. 05.08.09

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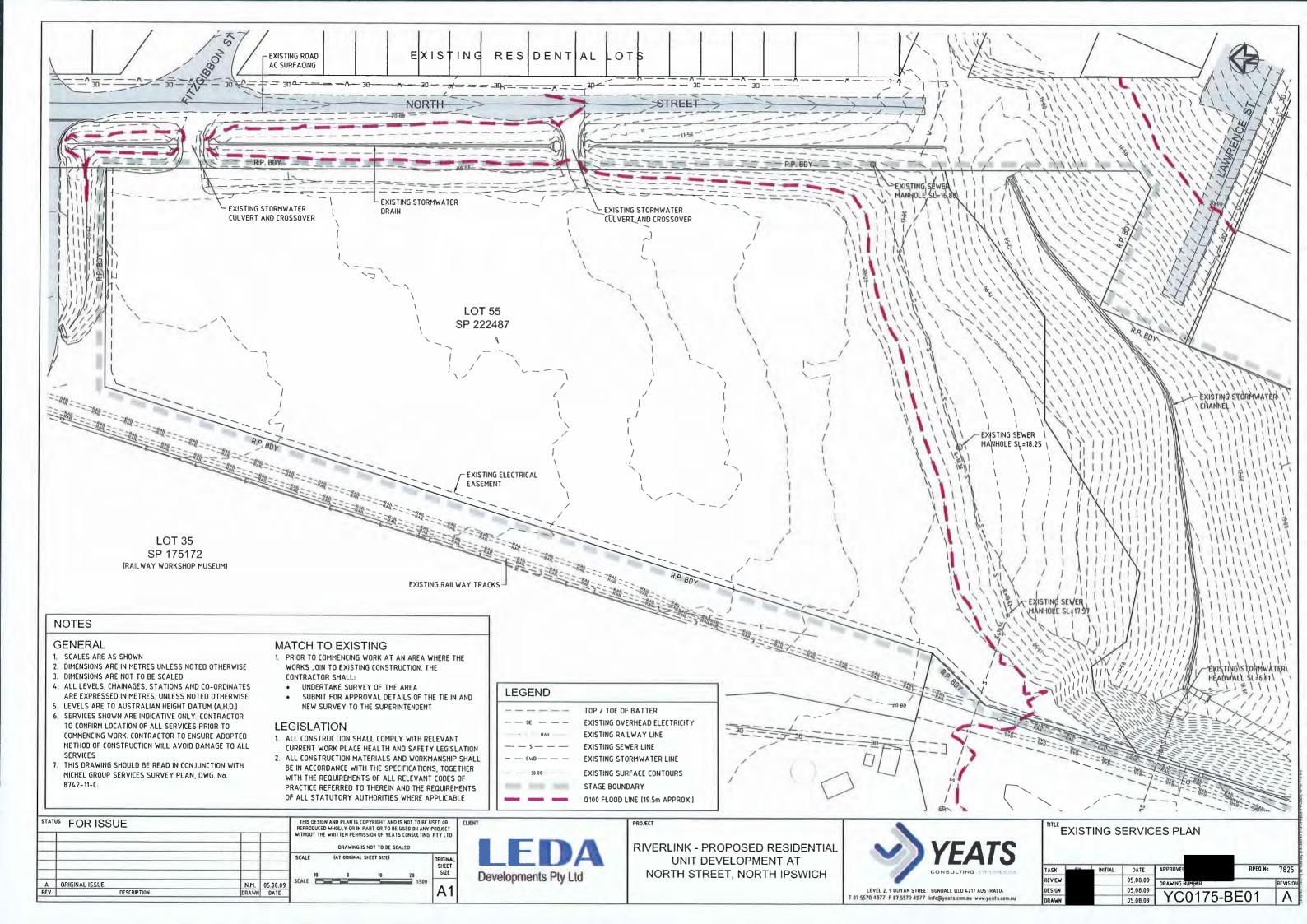
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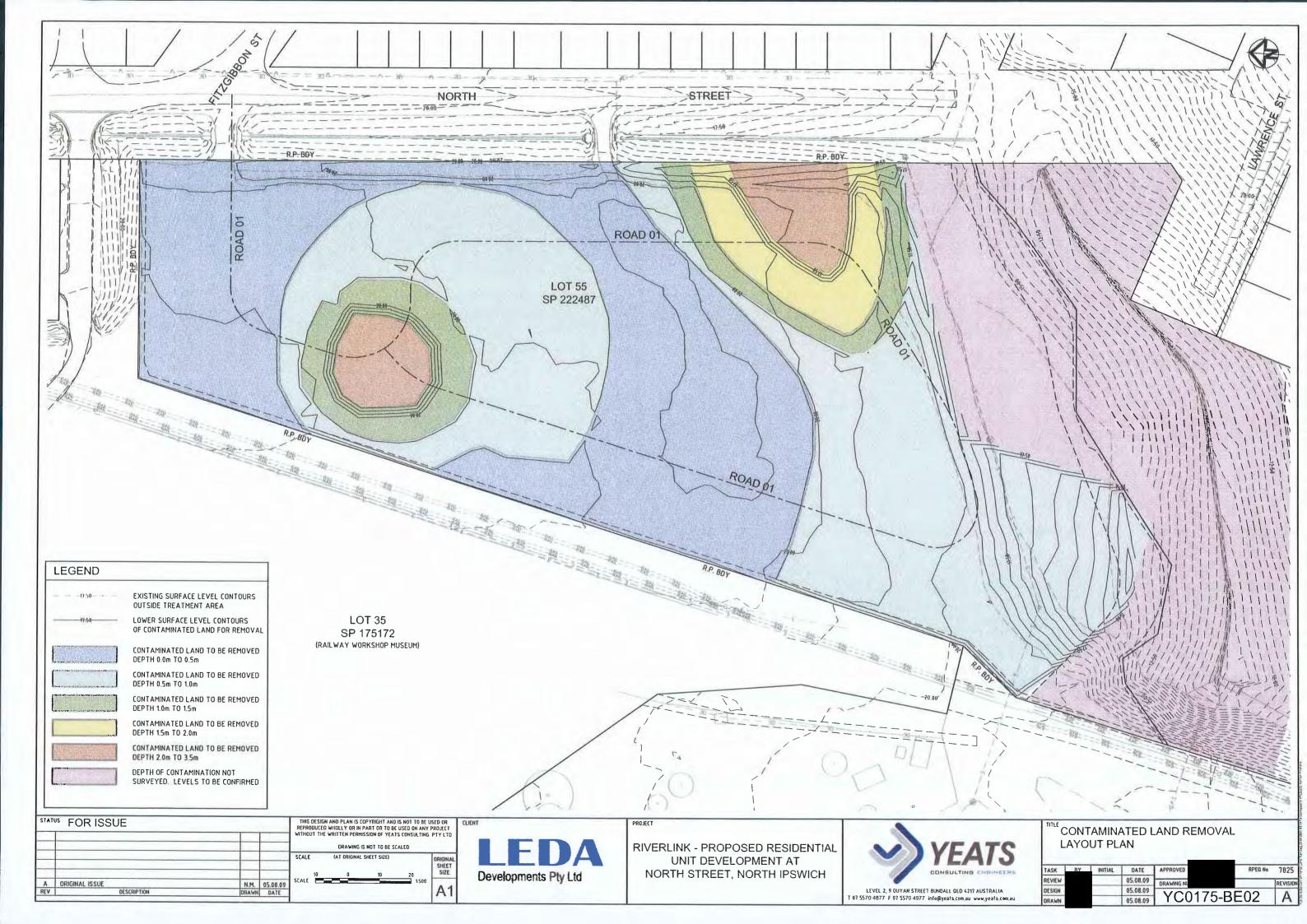
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH

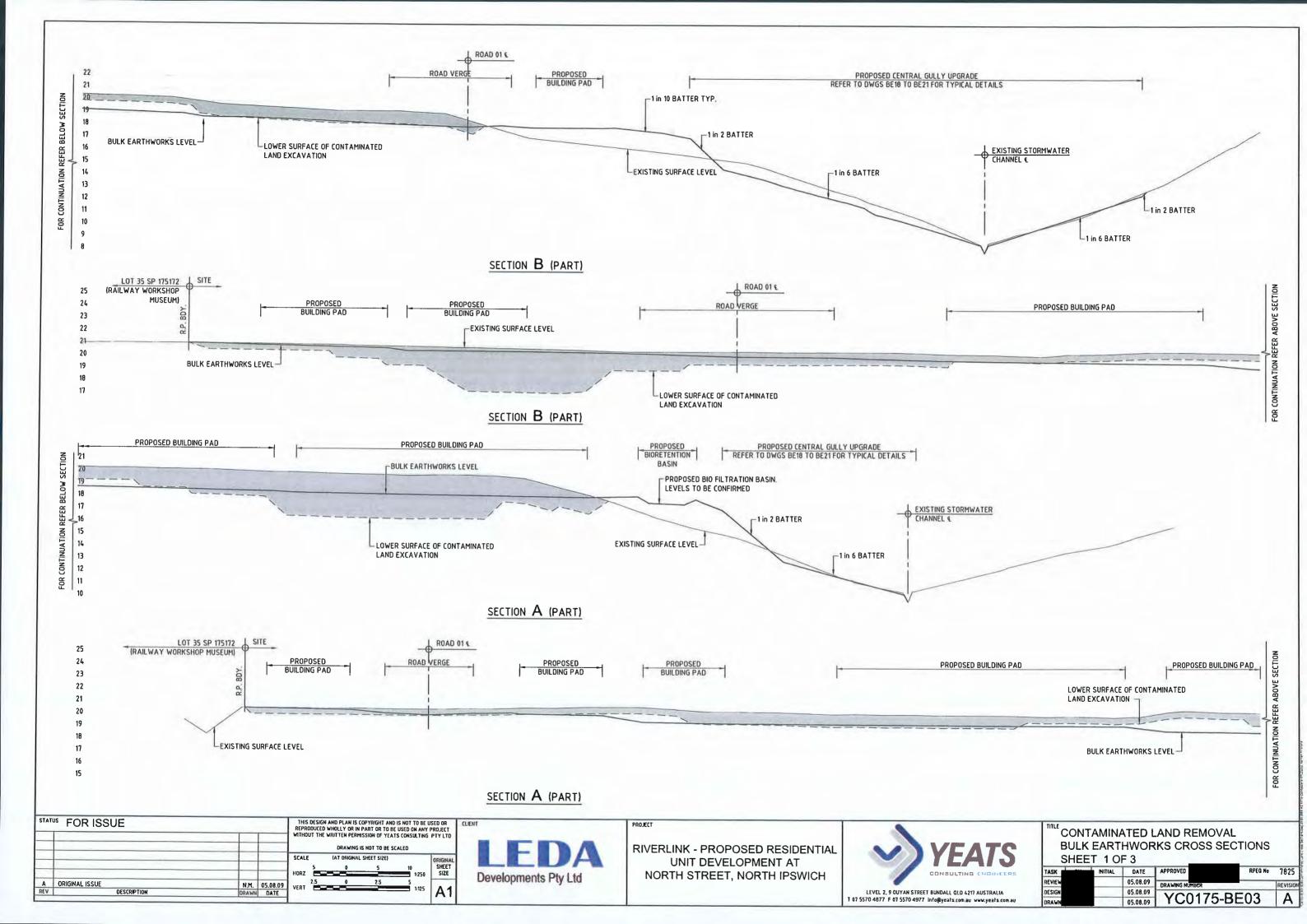


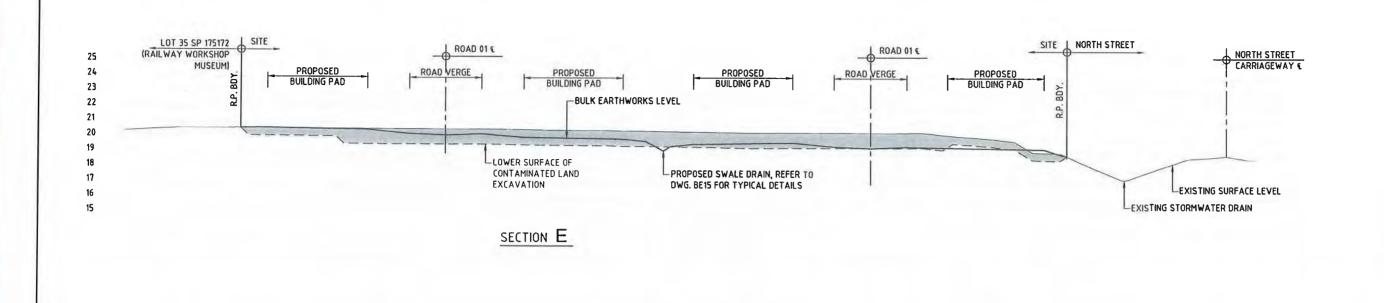
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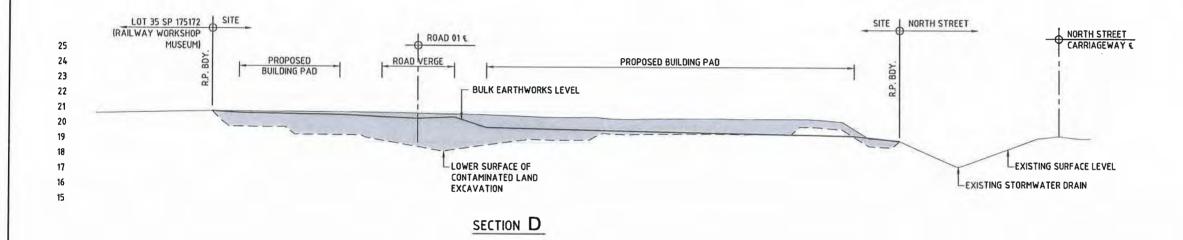
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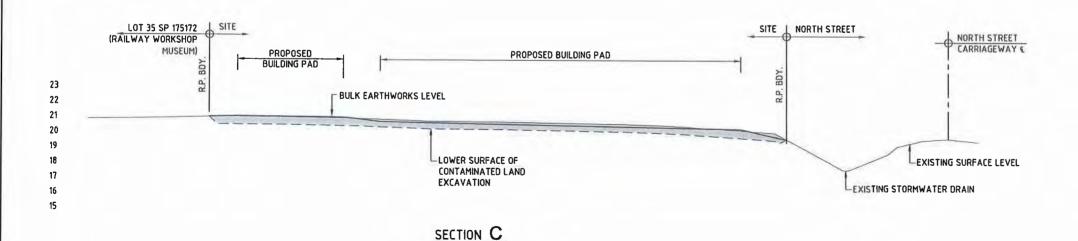


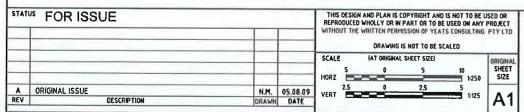














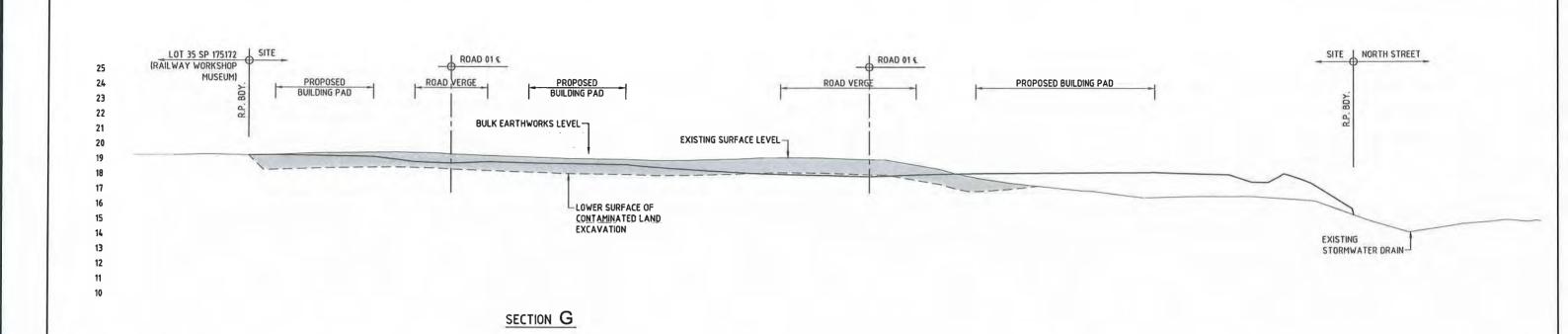
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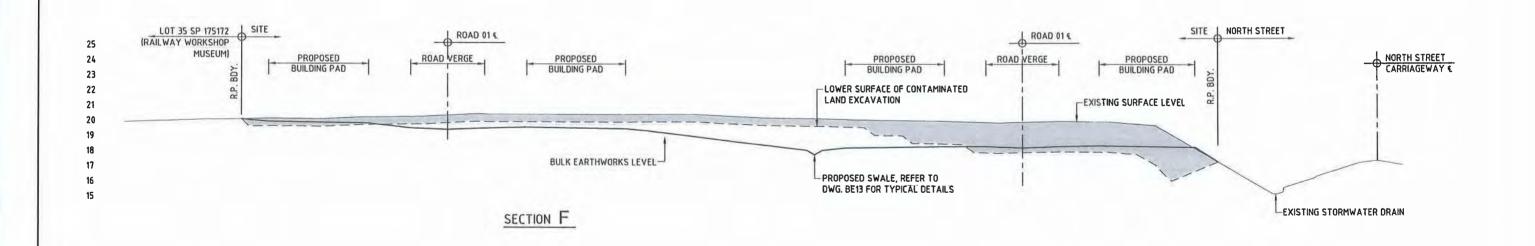
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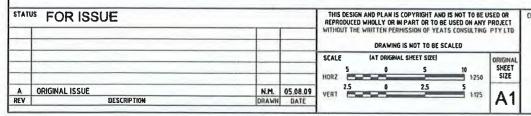


CONTAMINATED LAND REMOVAL
CONTAININATED LAND REMOVAL
BULK EARTHWORKS CROSS SECTIONS
SHEET 2 OF 3

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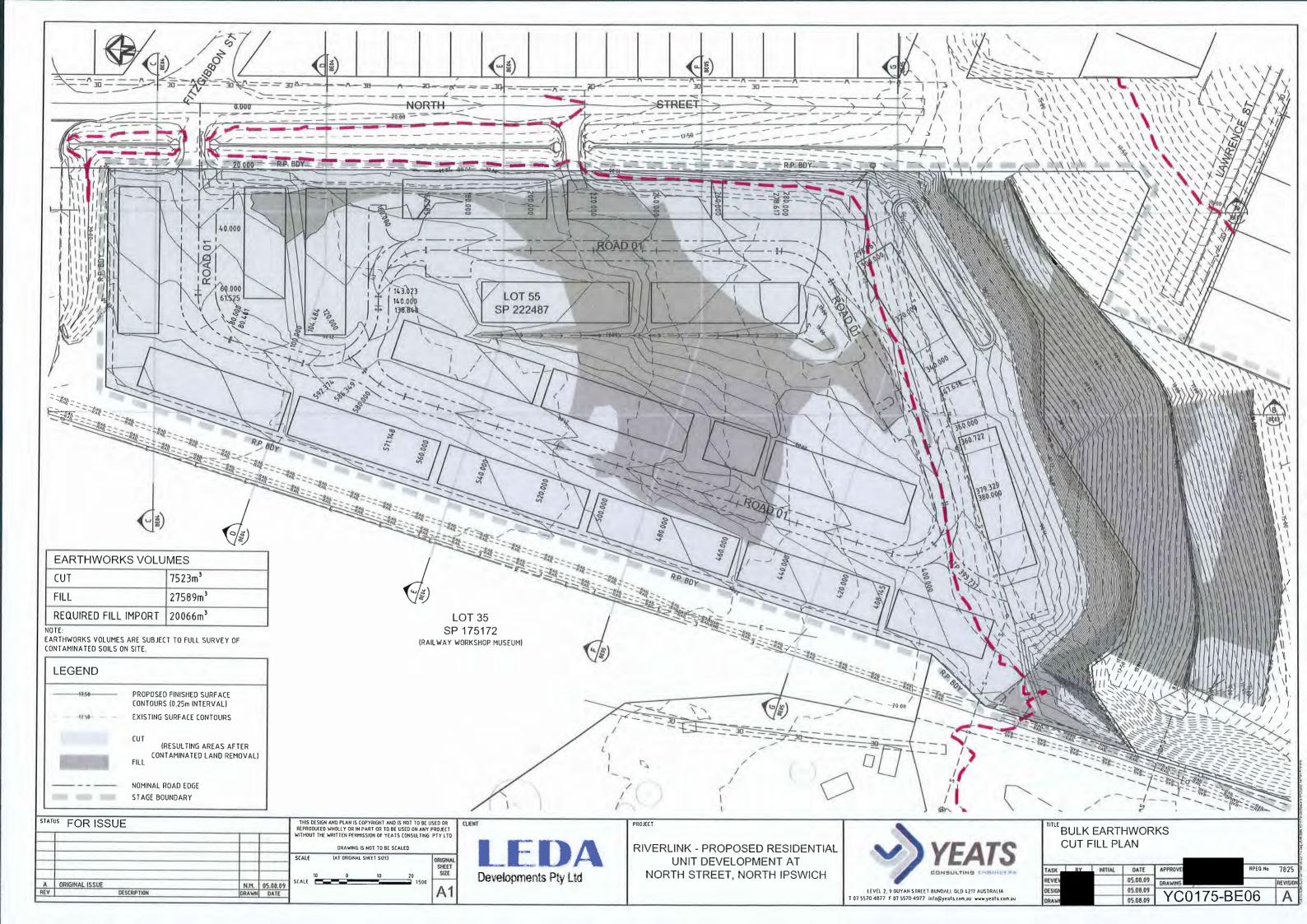
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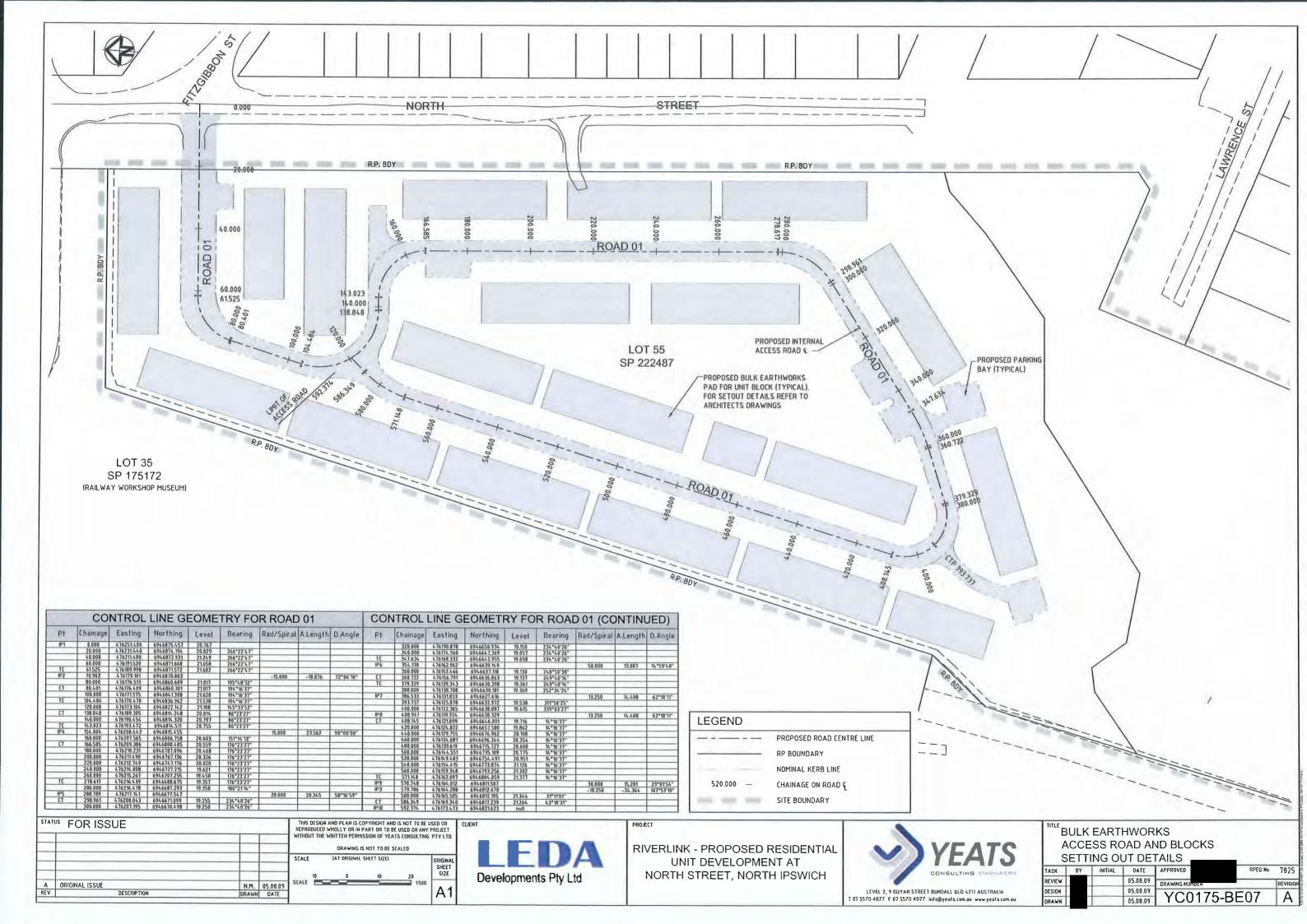
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH

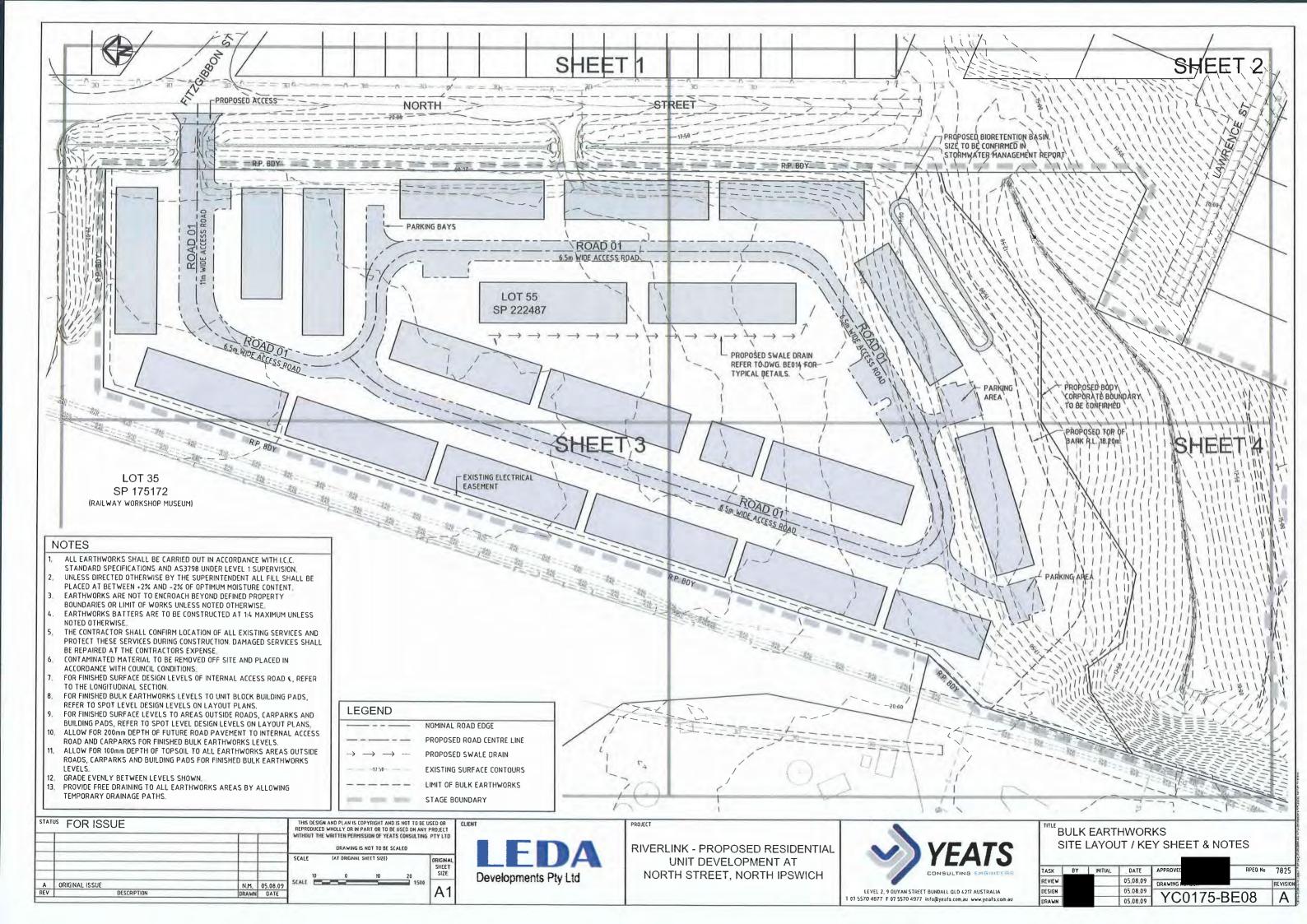


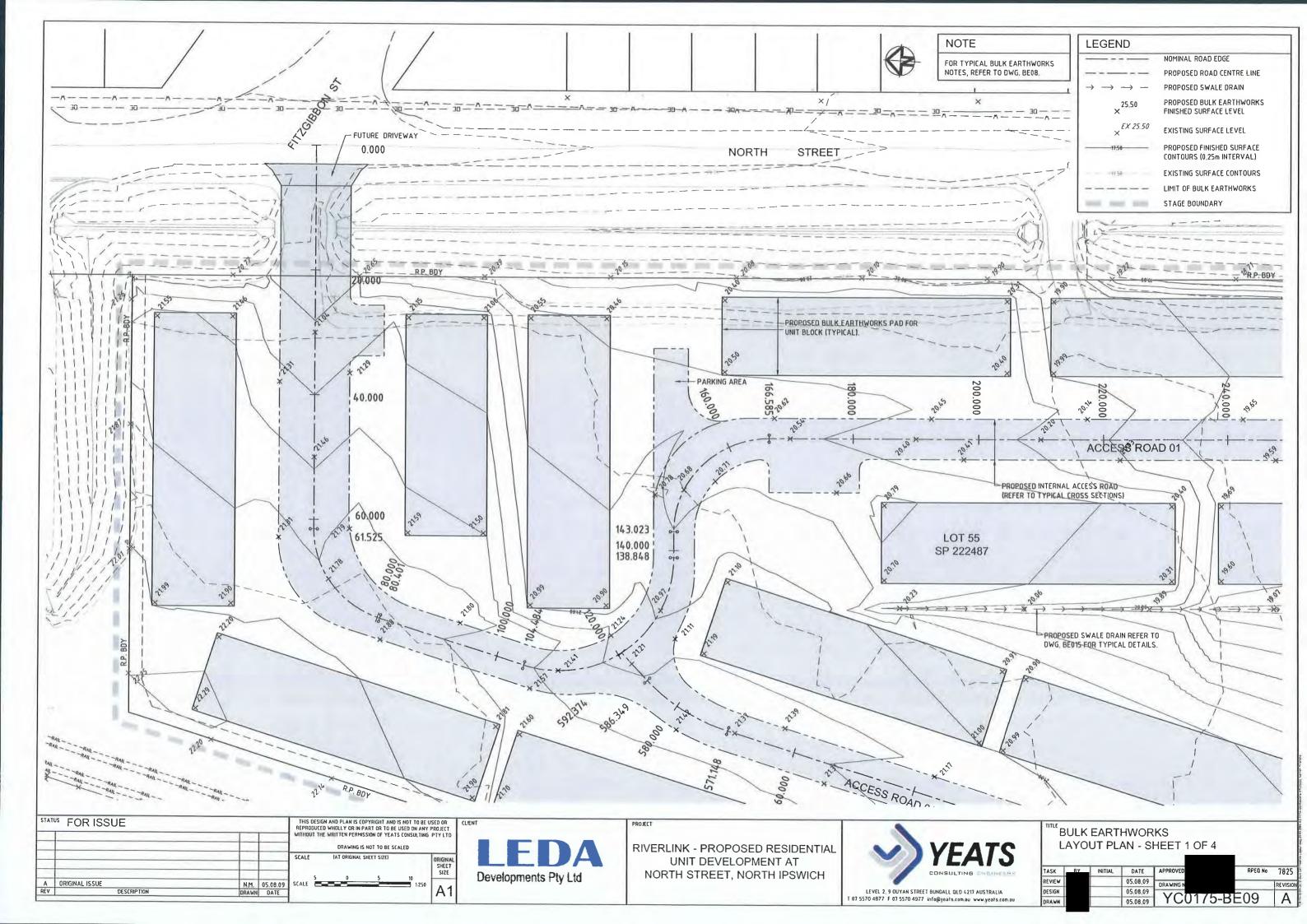
BULK EARTHWORKS CROSS SECTIONS
SHEET 3 OF 3

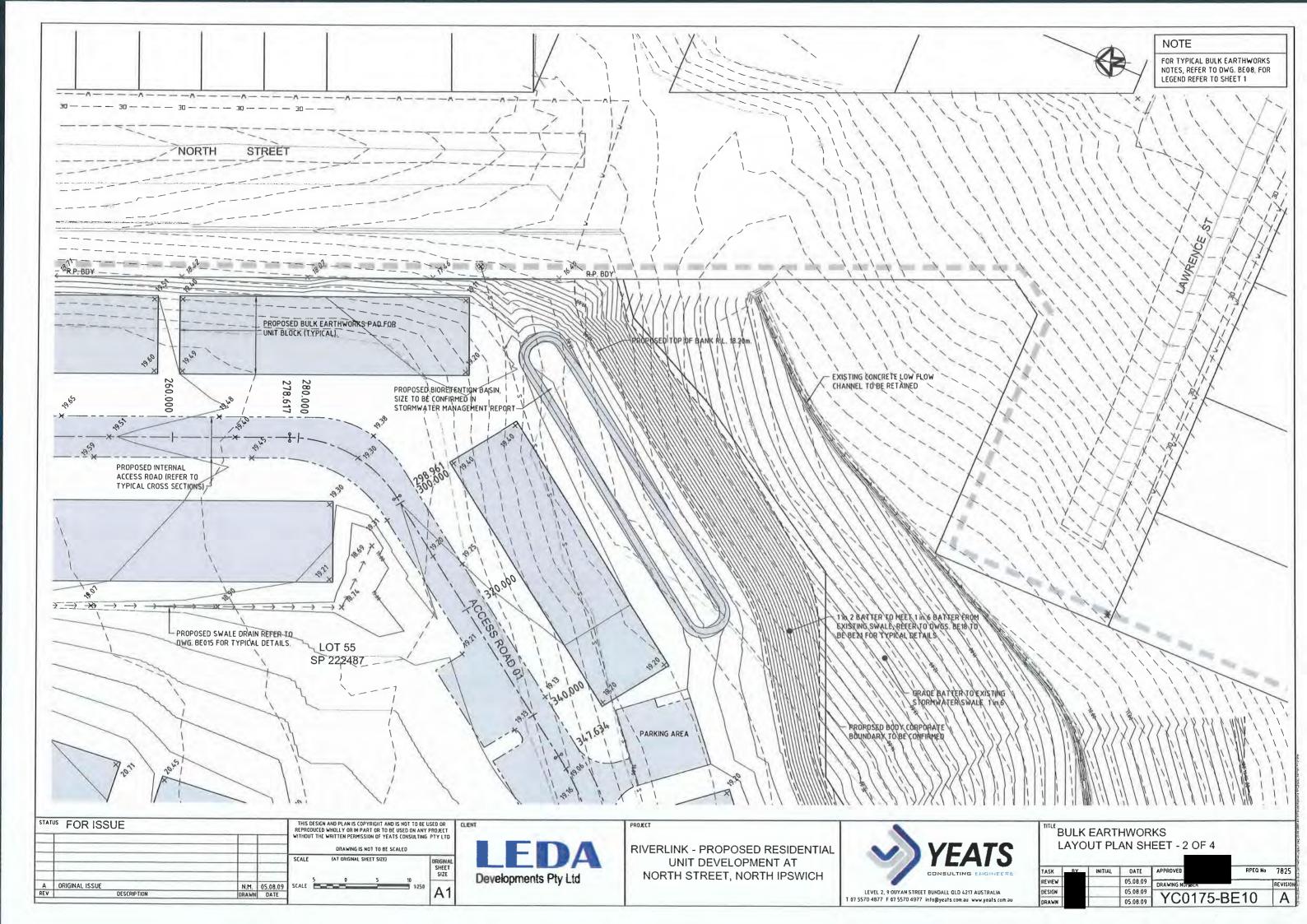
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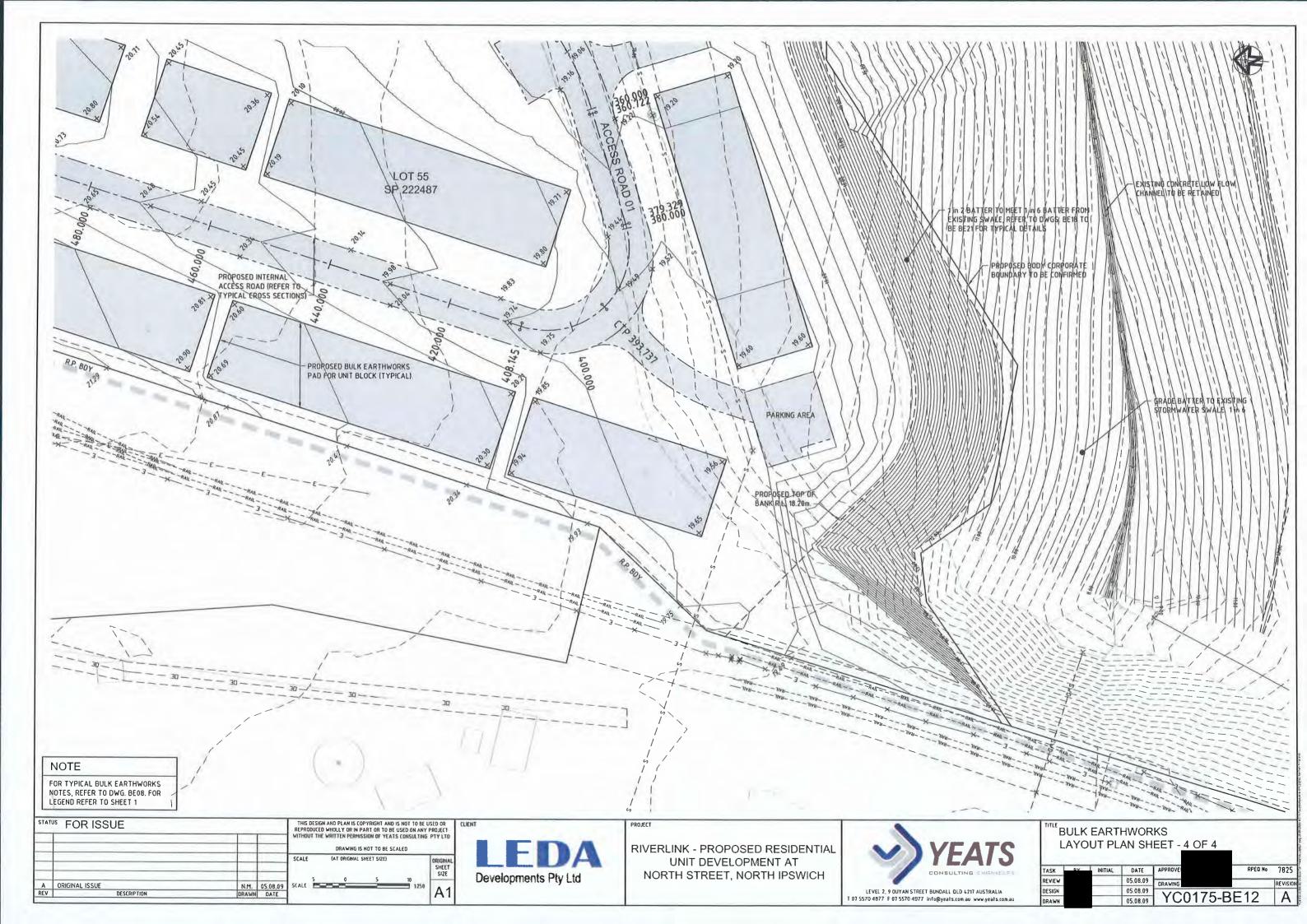


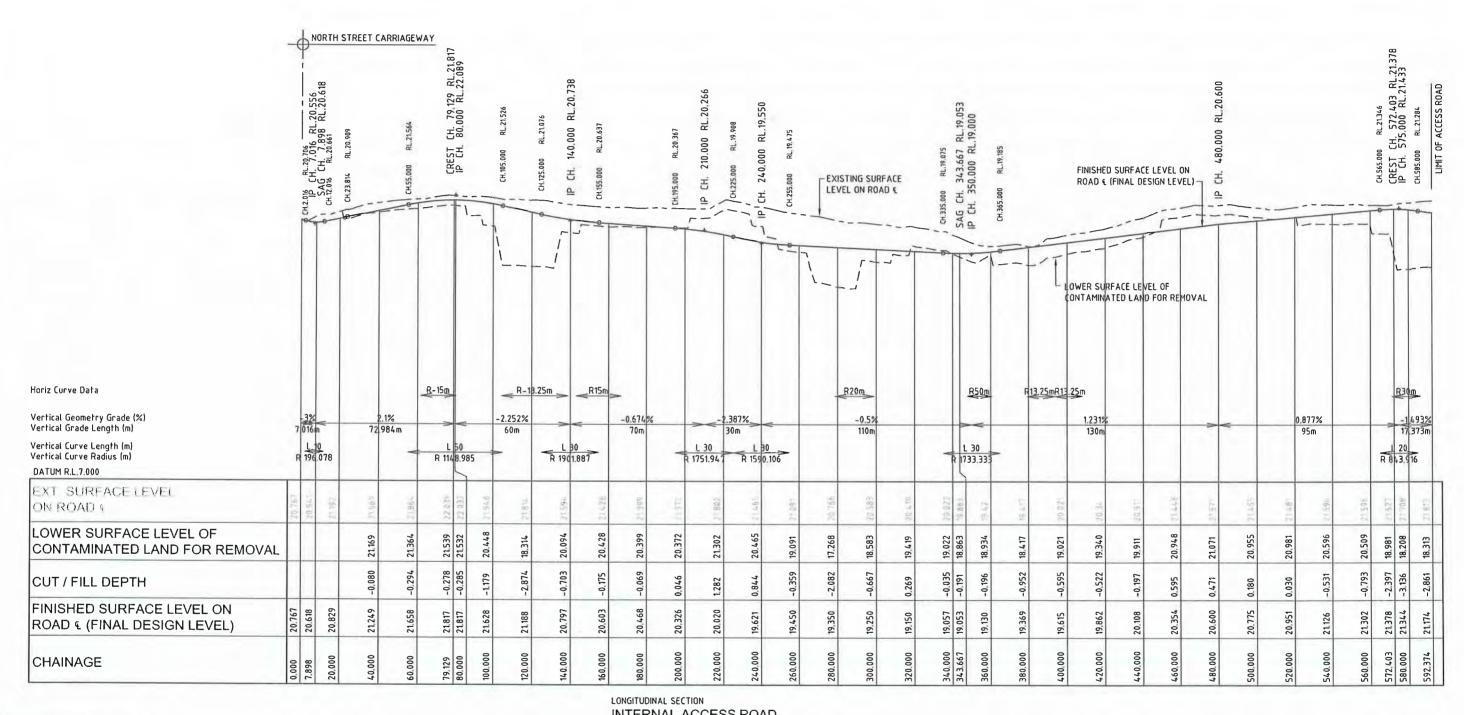












NOTE

REFER TO TYPICAL SECTIONS FOR BULK EARTHWORKS LIMITS

INTERNAL ACCESS ROAD

SHOWING - FINISHED SURFACE LEVEL ON ROAD €
- LOWER SURFACE LEVEL OF
CONTAMINATED LAND FOR REMOVAL

STATUS FOR ISSUE A ORIGINAL ISSUE DESCRIPTION

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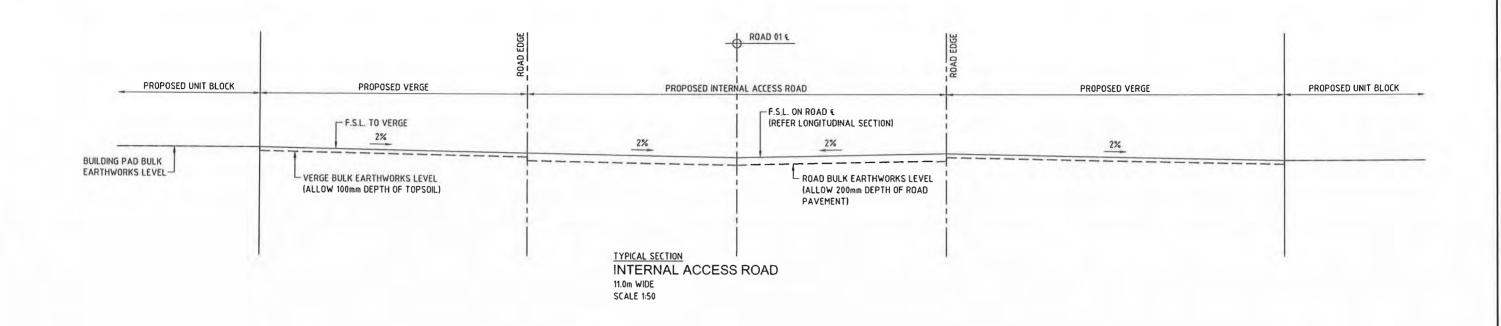
PROJECT RIVERLINK - PROPOSED RESIDENTIAL

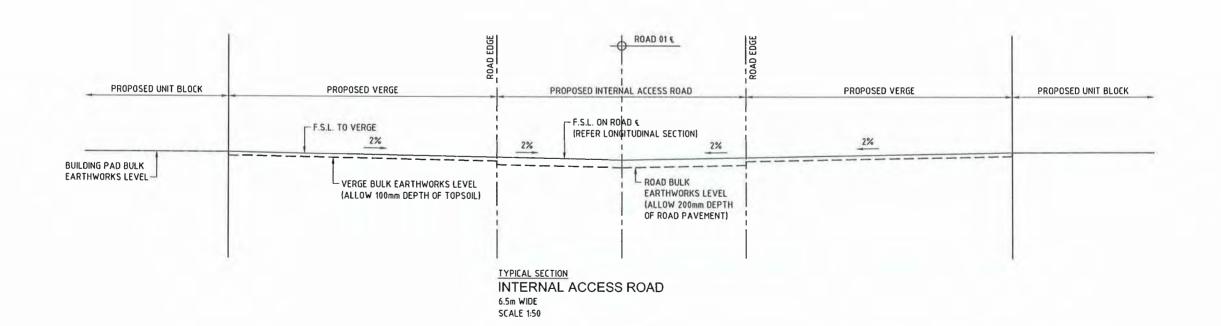
UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



"BULK EARTHWORKS INTERNAL ACCESS ROAD

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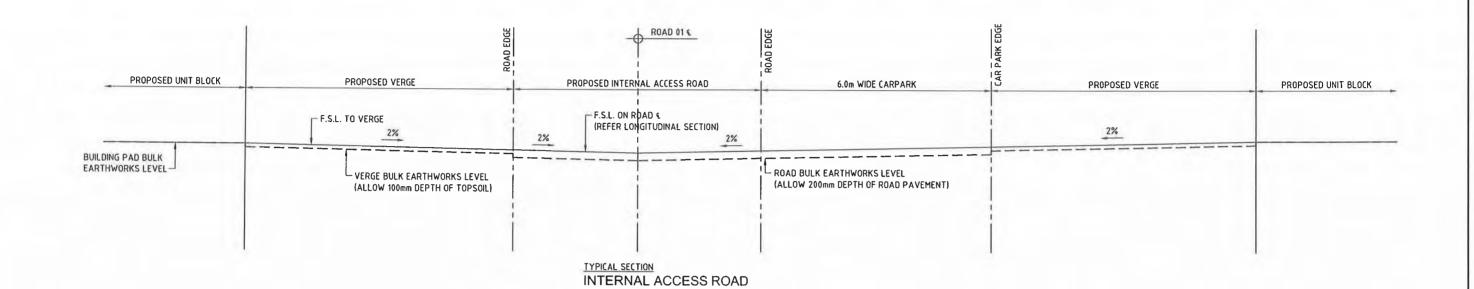


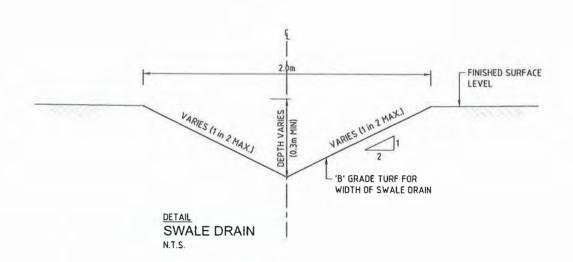
RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



BULK EARTHWORKS
TYPICAL SECTIONS - SHEET 1 OF 2

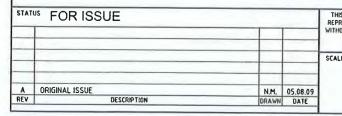
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6.5m WIDE (WITH CARPARK)

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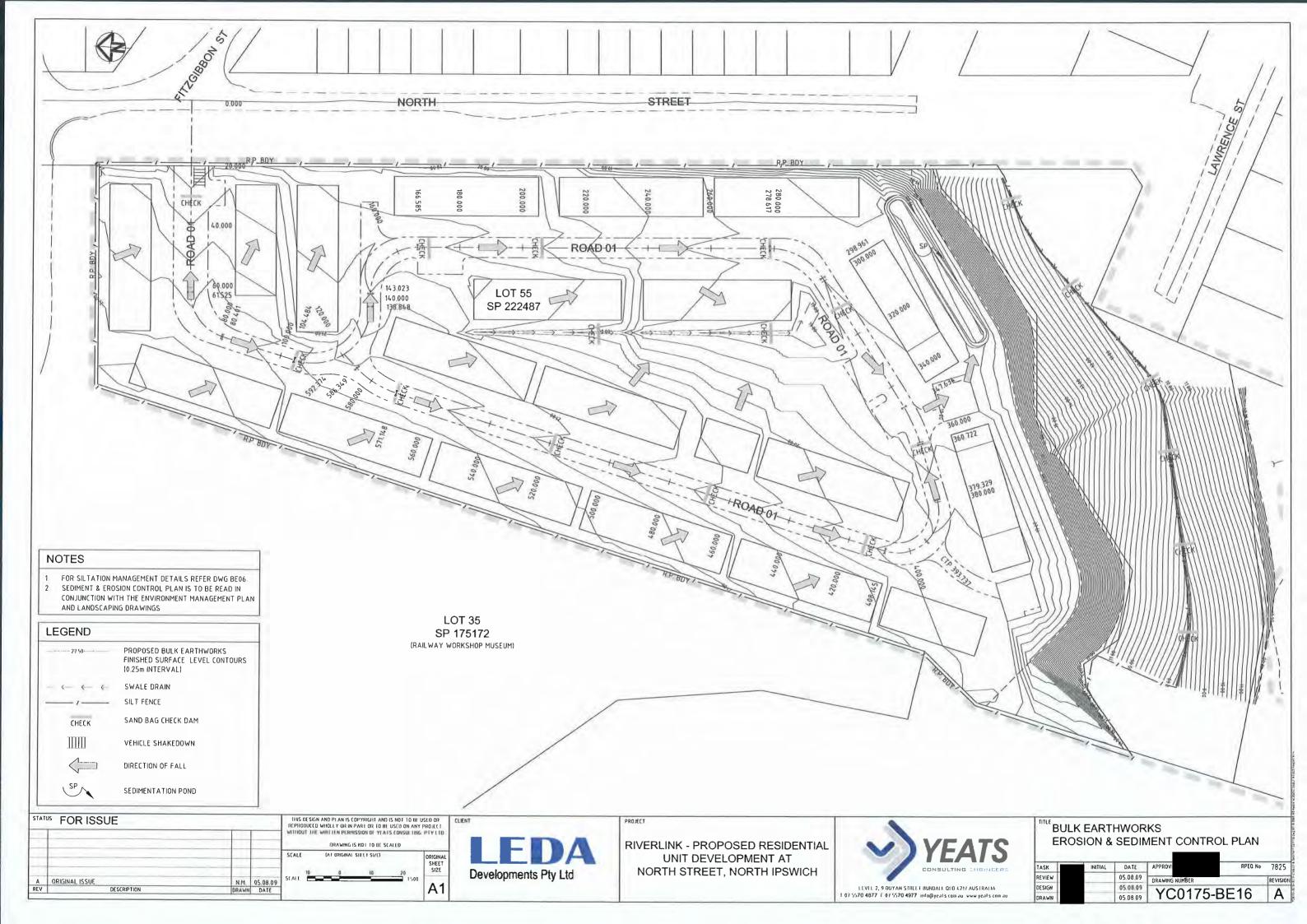
PROJECT

RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



BULK EARTHWORKS
TYPICAL SECTIONS - SHEET 2 OF 2

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SILT MANAGEMENT PROGRAM

PHASE DESCRIPTION

ALL WORKS · SILT FENCES TO BE ERECTED ALONG TOE OF FILL BATTERS

OR AS DIRECTED BY SUPERINTENDENT

SEWER/WATER STORMWATER/SERVICES · EXCAVATED MATERIAL TO BE PLACED ON HIGH SIDE OF TRENCH IN ORDER TO PROTECT PIPE WORK AND DIRECT SURFACE FLOW AWAY FROM EXCAVATIONS

ROADWORKS

· MEASURES ARE TO BE TAKEN TO PREVENT SILT INGRESS TO

STORMWATER SYSTEM

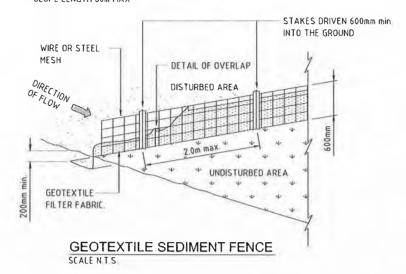
MAINTENANCE PERIOD

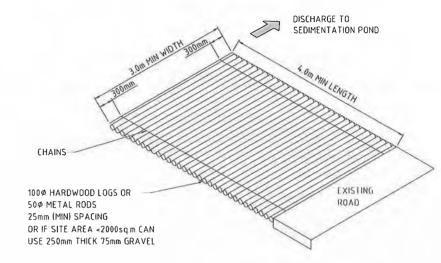
• EROSION CONTROL MEASURES ARE TO BE INSPECTED AFTER MAJOR EVENTS (> 25mm) ANY REPAIRS REQUIRED ARE TO BE EFFECTED IMMEDIATELY

GENERAL NOTES

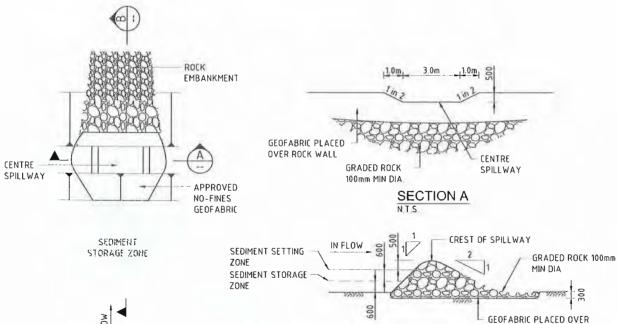
- 1, THE CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION AND DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTION INCLUDING THE MAINTENANCE PERIOD
- 2. ALL SEDIMENT CONTROL DEVICES SHALL BE MONITORED, CLEANED AND/OR REPAIRED WHENEVER THE ACCUMULATED SEDIMENT REDUCES THE CAPACITY BY 50%
- 3. ALL PERIMETER BANK/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET
- 4. THE EXTENT OF GRASSING SHALL BE DETERMINED BY THE SUPERINTENDENT AND SHALL BE SEEDED, AS SPECIFIED, WITHIN SEVEN DAYS OF FINAL TRIMMING
- 5. EXTENT AND POSITION OF SILT FENCE CONTROL MEASURES TO BE DETERMINED ON SITE BY SUPERINTENDENT, MEASURES SHOWN ON THIS DRAWING ARE MINIMUM REQUIREMENTS ONLY.
- 6. SCOUR PROTECTION AND SILT MANAGEMENT MEASURES TO BE PROVIDED AT STORMWATER OUTLET HEADWALLS.
- 7. PROVISION TO BE MADE FOR DIRT/SAND REMOVAL FROM CONSTRUCTION VEHICLES PRIOR TO TRAVEL ON PUBLIC ROADS, METHOD TO BE APPROVED BY SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORK
- 8. ANY SILT OR SEDIMENT CAUSED BY THE MOVEMENT OF CONSTRUCTION TRAFFIC ON EXISTING ROADS IS TO BE REMOVED DAILY
- 9. THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENT CONTROL PROCEDURES DURING CONSTRUCTION AND MAINTENANCE STAGES OF THE DEVELOPMENT AND SHALL TAKE ALL NECESSARY ACTIONS TO COMPLY WITH THE OBJECTIVES OF THE IPSWICH CITY COUNCIL EROSION AND SEDIMENT CONTROL POLICIES
- 10. THE CONTRACTOR IS TO BE RESPONSIBLE FOR THE DAILY REMOVAL OF SILT FOR THE DURATION OF THE CONSTRUCTION AND MAINTENANCE PERIOD, THAT HAS BEEN BLOWN, WASHED OR TRACKED FROM THE SITE ONTO COUNCIL ROADS OR INTO COUNCIL DRAINAGE SYSTEMS, WATERCOURSES AND ANY PRIVATE PROPERTY
- 11 THE CONTRACTOR IS TO BE RESPONSIBLE FOR THE CONTROL OF DUST EMANTING FROM THE SITE AT ALL TIMES, INCLUDING ON WEEKENDS AND PUBLIC HOLIDAYS, FOR THE DURATION OF THE CONSTRUCTION AND MAINTENANCE PERIOD
- 12 ALL RUBBISH, WASTE MATERIALS, OILS AND FUELS ARE TO BE CONTAINED APPROPRIATELY OIL AND FUEL SPILLS ARE NOT TO ENTER ANY DRAINAGE SYSTEM OR WATERCOURSE
- 13. THE CONTRACTOR IS TO ENSURE THAT NO SILT REACHES THE DOWNSTREAM WATER COURSE AND IS TO PROVIDE ADEQUATE PROTECTION TO PREVENT THIS OCCURRING
- 14 WHERE TOPSOIL STOCKPILES ARE TO REMAIN IN PLACE FOR A PERIOD OF MORE THAN 14 DAYS, THE STOCKPILE SHALL BE GRASSED WITH A SUITABLE QUICK STRIKING CEREAL GRASS PROVIDE A DIVERSION DRAIN OR BUND ON THE UPHILL SIDE AND A SEDIMENT FENCE ON THE DOWNHILL SIDE OF ALL STOCKPILES

DRAINAGE AREA 0 6ha MAX SLOPE GRADIENT 1 2 MAX SLOPE LENGTH 60m MAX





METAL GRID SHAKE DOWN (OR APPROVED EQUIVALENT)



ROCK WALL WITH ENDS

COVERED BY ROCK

SAND BAG CHECK DAM

SCALE N.T.S.

PROVIDE SAND BAGS ACROSS FLOW

PATH PROVIDE TURF AROUND SAND

BAGS, TO A MINIMUM OF 1m IN FRONT

AND 2m BEHIND EXTENT TO BE

DETERMINED ON SITE BY

SUPERINTENDENT

SEDIMENT BASIN DETAILS

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RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT

SECTION B



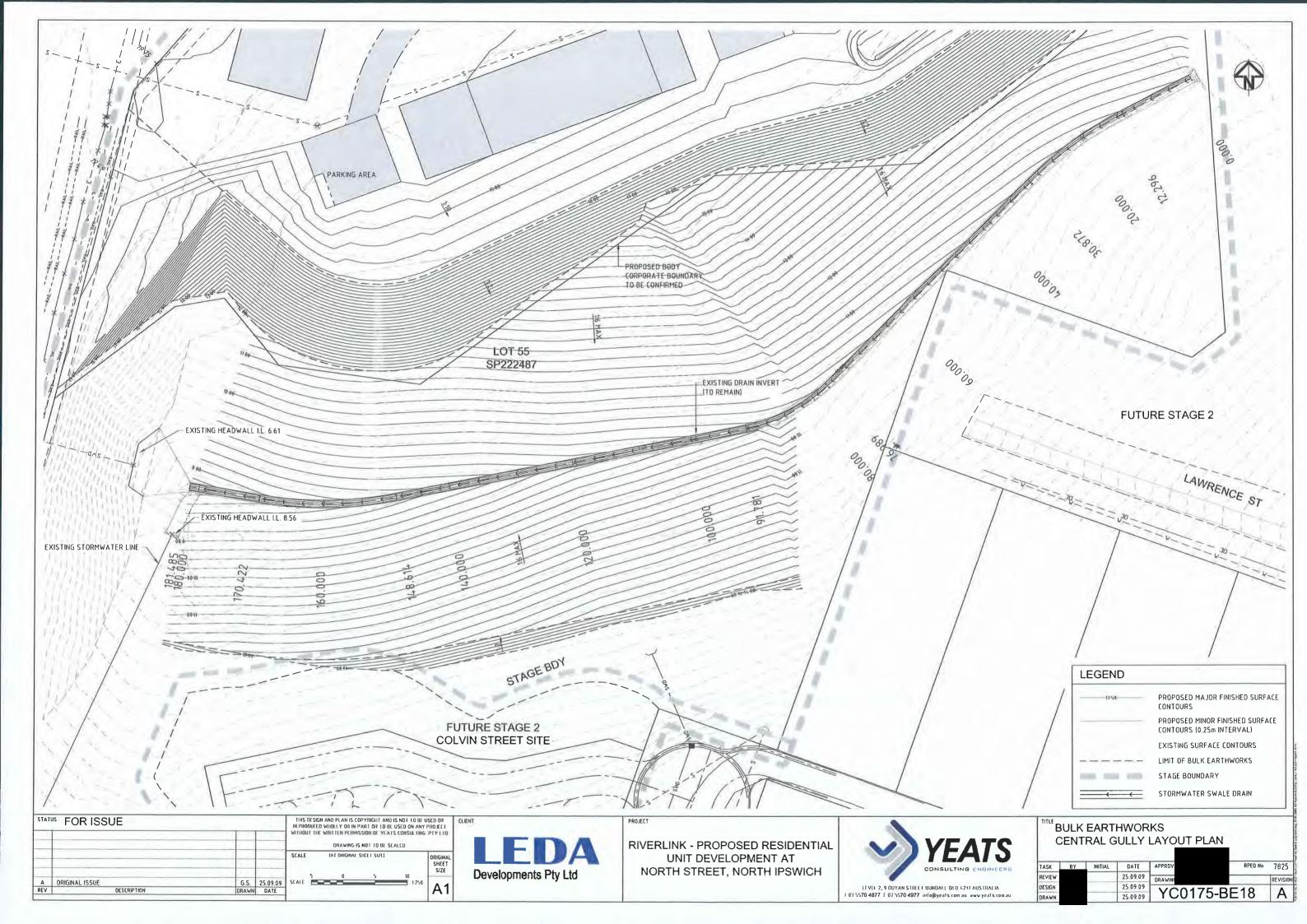
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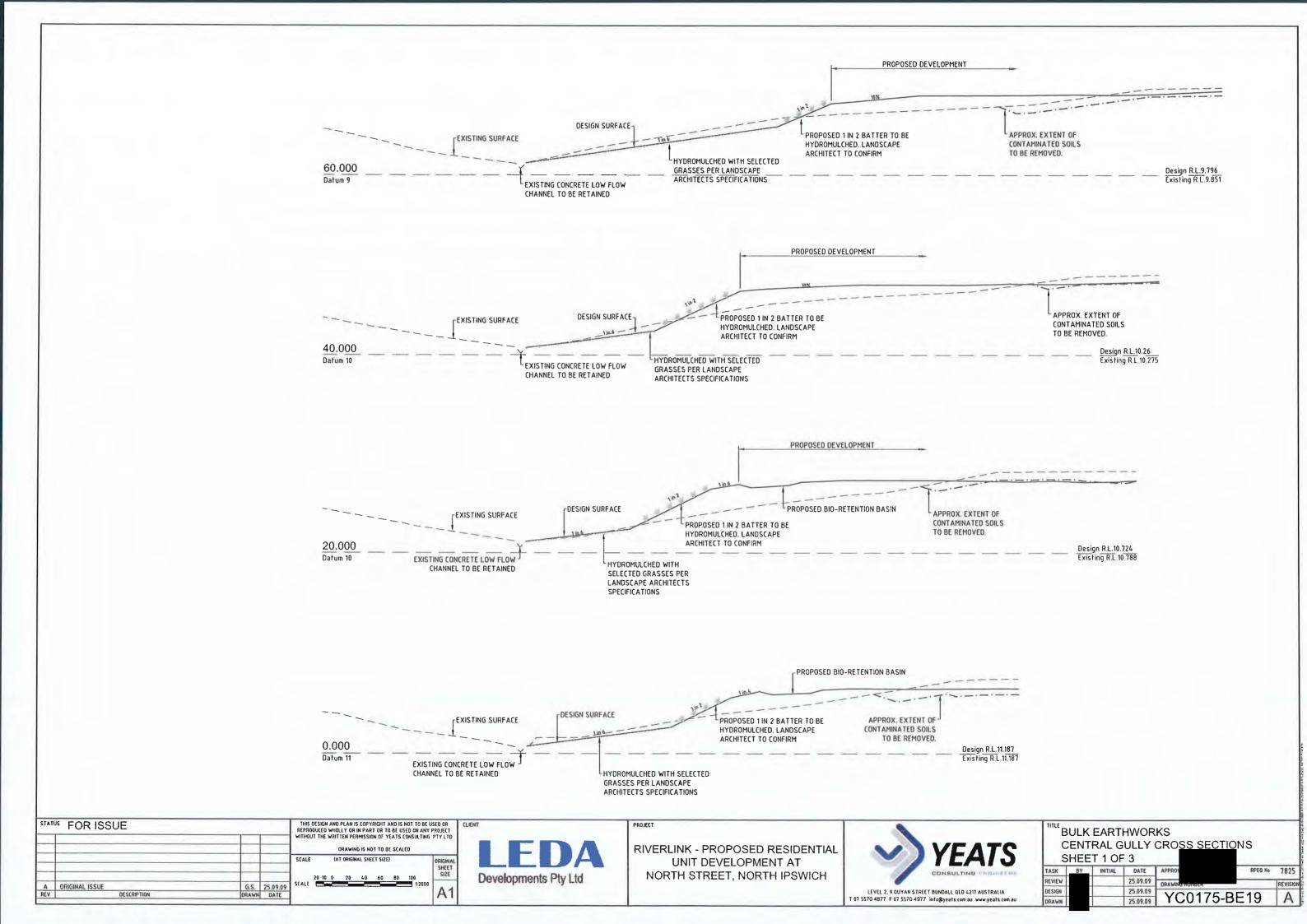
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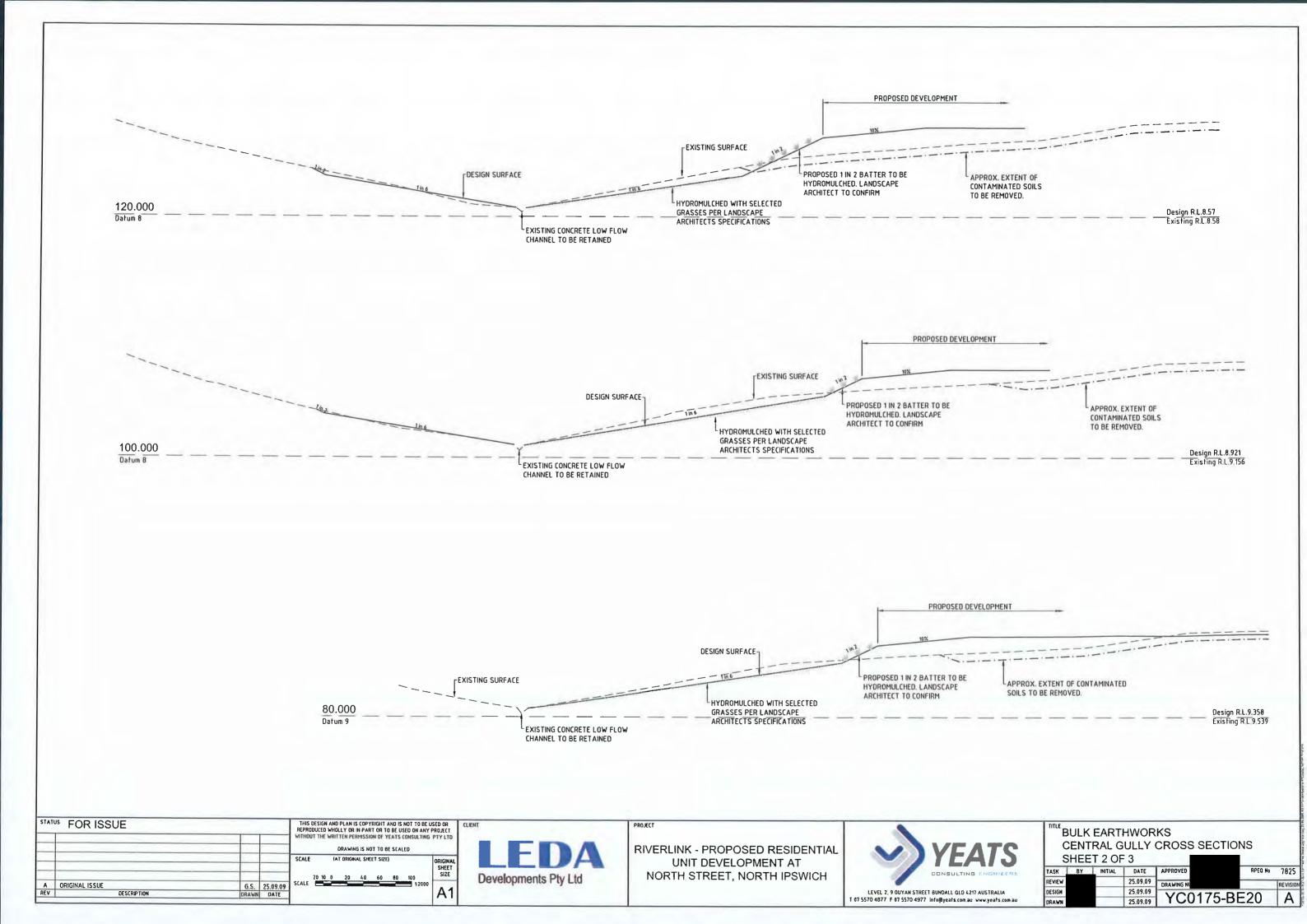
EBULK EARTHWORKS **EROSION & SEDIMENT CONTROL DETAILS**

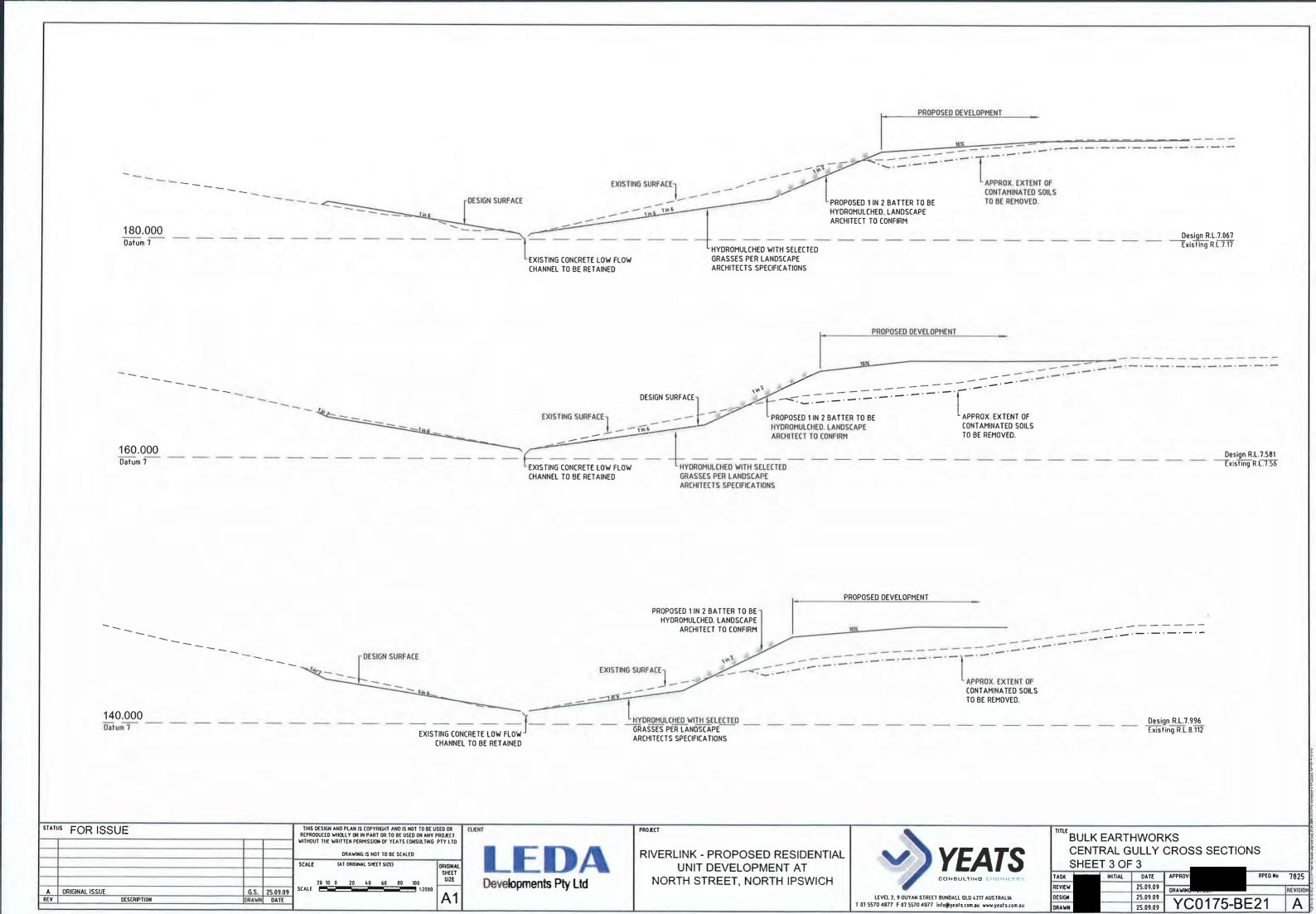
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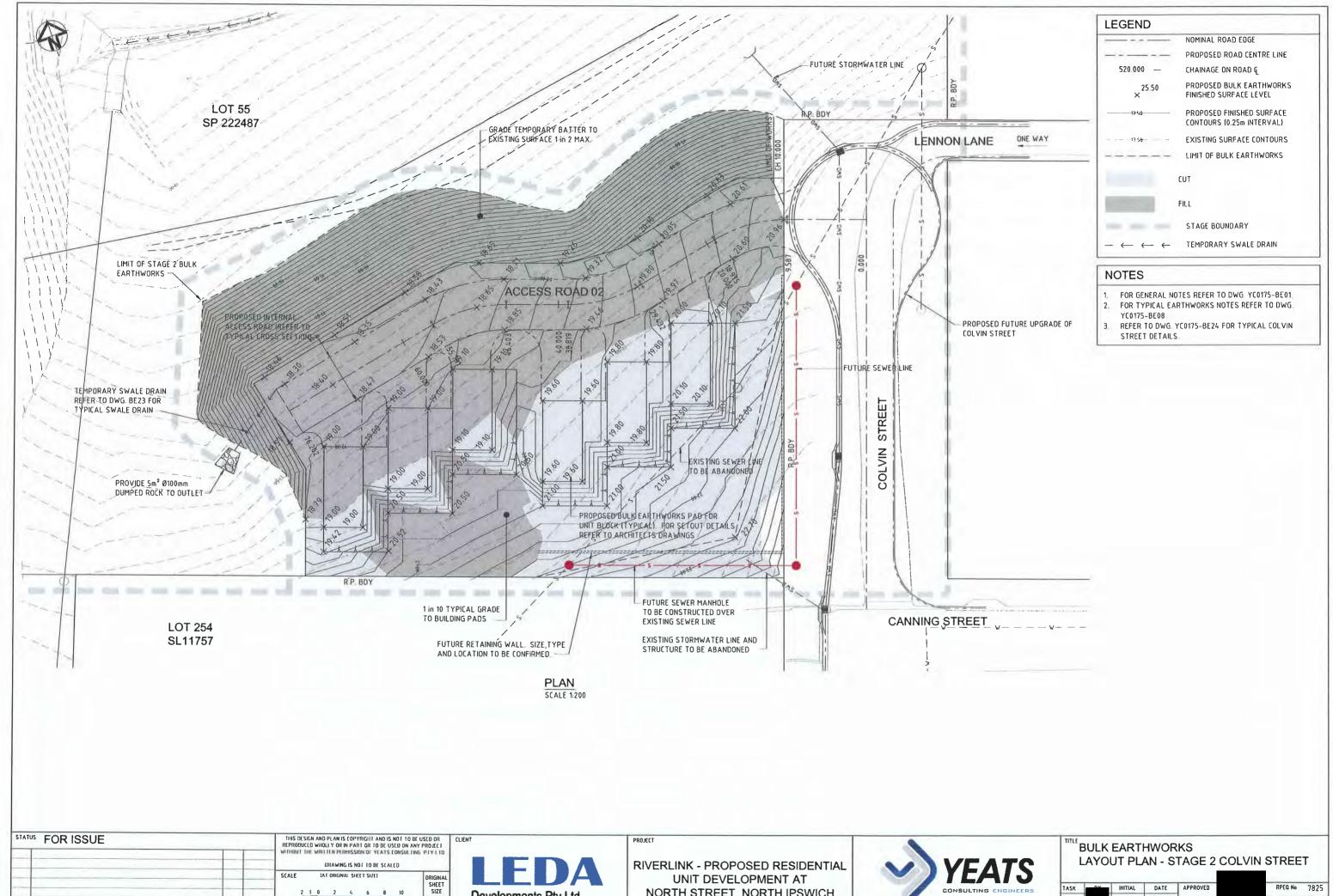
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NORTH STREET, NORTH IPSWICH

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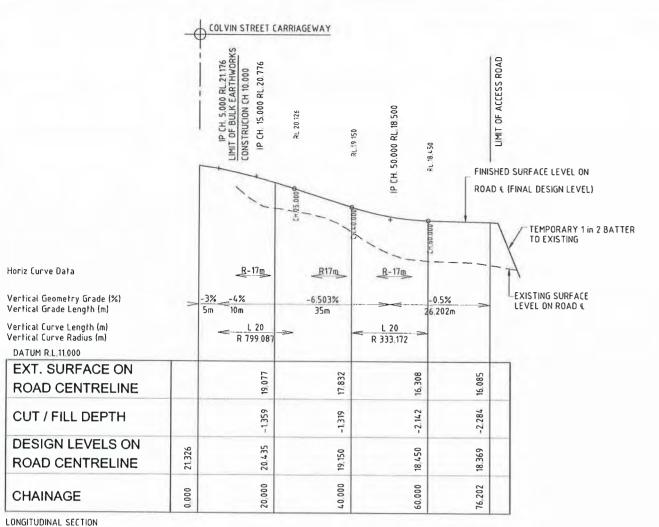
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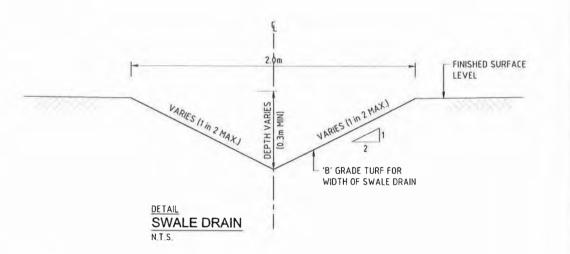
UNIT DEVELOPMENT AT
NORTH STREET, NORTH IPSWICH



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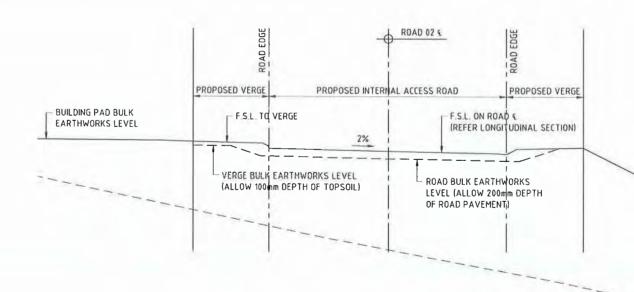


CONTROL LINE GEOMETRY FOR ROAD 02 Pt Chainage Easting Northing Bearing Radius A.Length D Angle Level 476164 141 6946499780 21 126 289*21'57 9 587 476155.096 6946502 959 20 979 289*2157 10 000 476154 705 6946503 092 20 960 287°58-32 31° 38°25" IP2 16. 281 496190 552 694,6504,557 17 000 9 188 257*43132 18 975 476165 865 6946503533 20 4.95 20 000 676166 BLL 6946503 315 70 4 35 257°43"32" 29 6 32 L'16135 628 6946501 310 19 8 18 757°4 1 32 30 000 L76135 070 697.6501 108 19 801 259*38'28-31*38'75" 34 176 476130 921 6946500 286 9 388 38 819 476126 376 6946501883 19_227 289°21'57" 40 000 476125.263 6946502 274 19_150 289°21'57' 46 403 1.76119 222 6946504 198 18 795 289°21'57 50 000 476115 728 6946505 724 18 650 51097 476114 677 6946505 995 9 388 31° 38'75" 55 791 476109 970 6946504 971 18 498 257*43"32" 60 000 476105,858 6946504 076 18 450 257°43'17 70 000 6946501950 18 400



INTERNAL ACCESS ROAD 02

SHOWING - FINISHED SURFACE LEVEL ON ROAD & - EXISTING SURFACE LEVELS



INTERNAL ACCESS ROAD 6.2m WIDE SCALE 1:100

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PROJECT

RIVERLINK - PROPOSED RESIDENTIAL UNIT DEVELOPMENT AT NORTH STREET, NORTH IPSWICH



TEMPORARY 1 in 2 BATTER TO

EXISTING SURFACE LEVEL

BULK EARTHWORKS **DETAILS - STAGE 2 COLVIN STREET**

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RIVERLINKS CENTRAL

Flood Study



Cardno (Qld) Pty Ltd

ABN 57 051 074 992

Level 11 Green Square North Tower

515 St Paul's Terrace

Fortitude Valley Qld 4006

Locked Bag 4006 Fortitude Valley

Queensland 4006 Australia

Telephone: 07 3369 9822

Facsimile: 07 3369 9722

International: +61 7 3369 9822

cardno@cardno.com.au

www.cardno.com.au

Document Control						
Version	Pote	Author		Reviewer		
Version	Date	Name	Initials	Name	Initials	
1	1 October 2009					
2	6 October 2009					
3	7 October 2009					

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RIVERLINKS CENTRAL FLOOD STUDY

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APPENDICES

APPENDIX A 50 Year-2 Year Peak Flood Levels- Local Flooding

APPENDIX B Bremer River Flood Levels



1. INTRODUCTION

The Riverlinks Central residential development is located between North Street and the Bremer River in North Ipswich, as shown on Figure 1. Works proposed on the site include the development of two residential subdivision areas with some slight associated works within the existing gully to the south east of the development.

The proposed development layout is shown on Bristow Architects drawing number 2009.12 DA02A, attached in the reference drawing section of this report.

Runoff from the site and the surrounding catchment drains to the Bremer River via a culvert under the existing railway that forms the south-western boundary of the site. The site is therefore subject to both local flooding and regional flooding from the Bremer River.

This report investigates any hydraulic impact the proposed development may have on local flooding. In addition, a regional flooding assessment has been undertaken to verify that the proposed works will not have an impact on Bremer River flood levels.



2. SITE CHARACTERISTICS

2.1 Existing

The Riverlink Central subdivision is located in North Ipswich adjacent to North Street, as shown on Figure 1. The development site is approximately 5.42 ha and is is bounded by neighbouring lots to the south-east, the Bremer River to the West; and the Queensland Railway Museum site to the north. Access to the existing site is via North Street.

The site is predominately open grassland with native vegetation in the steeper sections of the site.

The ultimate receiving waters for the site are that of the Bremer River via the gully that runs through the site and the culvert under the existing railway. A 1200mm Ipswich City Council stormwater pipeline discharges into the gully approximately 180 metres upstream of the railway culvert. The catchment extents for the existing gully are shown in Figure 2. The catchment that drains to the existing gully is predominately external to the site.

The site varies from relatively flat terrain to the north of the existing gully, to steeper terrain adjacent to and within the existing gully.

2.2 Proposed Development

The proposed development layout has been provided by Leda Holdings. This layout plan indicates that the overall proposed development will consist of two areas of residential development and some slight modification of the open space area containing the gully.

The proposed site plan including the gully redesign is included in the reference section of this report.



3. DATA

The hydraulic assessment has been based on site specific data as follows:

- Topographic Survey (2005), used to delineate the surrounding catchments;
- Contour and stormwater drainage information supplied by Council; and
- Proposed development layout Information supplied by Yeats Consulting and Leda Developments.



4. WATER QUANTITY (HYDROLOGY AND HYDRAULICS)

4.1 General

A hydrologic and hydraulic assessment was undertaken to determine peak flood levels within the gully that runs through the proposed development site. The details and results of the hydrologic and hydraulic assessment are presented below.

4.2 Hydrologic Assessment

The hydrologic analysis was undertaken using the hydrologic module of XP-SWMM Version 2009 in accordance with 'Australian Rainfall and Runoff' (1998) and the 'Queensland Urban Drainage Manual' (2007).

The hydrologic assessment considered the following scenarios:

- Pre-Development Case: The site and external sub-catchment land uses and areas
 are based on the existing survey data, aerial photos and two site visits. This model
 is calibrated to Rational Method Calculations for the site.
- Post-Development Case: The post-development model utilises the calibrated predevelopment case and modifies the percentage of fraction impervious and catchment areas in catchments that includes the site, in accordance with the proposed layout for the entire site.

It can be noted that the post development case considered the full urbanisation of the site without detention basins in place.

The hydrologic model was set up for the existing gully catchment covering an approximate area of 36.14 ha and the extents are shown on Figure 2. The catchment extents were defined based on existing survey and contour data.

The XP-SWMM model was used to generate the local catchment hydrographs for the 100 year Average Recurrence Interval (ARI) and for the full range of storm durations from 10 to 360 minutes.

The initial and continuing losses adopted for the 100 year ARI event in the hydrologic component of the XP-SWMM model are shown in Table 4-1.

Table 4-1 Adopted XP-SWMM Parameters

Per	vious	Impervious		
Initial Loss (mm)	Continuing Loss (mm/hr)	Initial Loss (mm)	Continuing Loss (mm/hr)	
5	2.5	0	0	

The adopted fraction imperviousness for the developed land use is listed in Table 4-2. The fraction impervious values were assumed based on the table of fraction impervious vs. development category provided in QUDM (2007). The existing railway and open space including roadway fraction impervious percentages were estimated based on aerial photos and site visits.



Table 4-2 Fraction Impervious for Site Land Uses

Land Use Category	Fraction Impervious
Commercial	90%
Residential	65%
Railway	10%
Open Space including Roadway	5%
Open Space	0%

4.3 Hydraulic Assessment

The hydraulic assessment was undertaken using the hydrodynamic component of XP-SWMM (v2009). The XP-SWMM model was run for the 100 year ARI flood event, for durations ranging from 10 to 360 minutes.

The intensity-frequency-duration (IFD) data and temporal patterns utilised in the XP-SWMM models were created using AR&R (1998) and AusIFD version 2.0 for Ipswich.

4.3.1 Pre-Development Case Model

The XP-SWMM model cross sections were extracted from the Triangular Interpolated Network (TIN) constructed from the existing topographic survey. A Manning's 'n' of 0.05 was adopted for the gully and main overland flow path, based on a site visit which identified generally grass with some scattered shrubs. A Manning's n of 0.015 was adopted for the culverts and pipework.

The gully, roadside channel and upper reach have been modelled based on the existing survey data. A 1,200 mm diameter stormwater pipe discharges into the gully approximately 180 metres upstream of the railway culvert.

Inflows to the model were adopted from the hydrologic component of the XP-SWMM model. The obvert was adopted as the fixed tail water depth at the downstream boundary condition at cross-section 'OUT'.

4.3.2 Post-Developed Case Model

Yeats Consulting Engineers provided updated cross sections in digital format. The updated cross sections have been integrated into the XP-SWMM model. The developed case has modified the existing cross section from MAIN 11 to MAIN 16. The modification includes some filling in the upper sections of each cross section along the northern edge of the channel down to the stream center line for cross sections MAIN11 to MAIN 14 and includes some modification on the south side of the stream center line for cross sections MAIN 15 and MAIN 16.

Flow boundary conditions are based on post developed flows from the hydrologic component of XP-SWMM as discussed in Section 4.2.

4.3.3 Hydraulic Results

Table 4-3 summarises the predicted existing and development peak 100 year ARI flood levels. Cross-section locations are shown on Figure 3.



Table 4-3 Peak Flood Levels, 100 Year Event

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)	
Main 3	19.68	19.68	
Main 4	17.78	17.78	
Main 5	17.37	17.37	
Main 6	17.37	17.37	
Main 7	17.36	17.36	
Main 8	17.34	17.34	
Main 9	17.11	17.11	
Main 10	14.89	14.90	
Channel 4	19.86	19.85	
Channel 5	19.85	19.85	
Channel 6	21.15	21.15	
Channel 7	20.93	20.93	
Channel 8	20.85	20.85	
Channel 9	19.81	19.81	
Channel 10	19.53	19.49	
Channel 11	18.04	17.95	
Channel 12	17.50	17.43	
Main 11	11.98	12.04	
Main 12	11.67	11.87	
Main 13	11.03	11.49	
Main 14	9.76	10.11	
Main 15	9.52	10.09	
Main 16	8.76	9.35	
Culvert Inlet	7.98	8.25	

The results presented in Table 4-3 indicate that the proposed development (both in terms of the impact of development upon hydrology and changes to ground levels) will not adversely impact the flood levels upstream of the proposed development. The impacts at Main 11 through Main 16 are all contained within the site and will not significantly impact any adjacent properties. The decrease in peak flood level at Channel 12 reflects the reduction in catchment area discharging to the roadside channel due to the proposed development.

As noted in Section 4.2, the analysis for the developed case did not include a detention basin to ameliorate the impact of development. Although the peak discharge from the site will increase as a result of development, it will occur more rapidly than previously. The peak runoff from the site therefore has the opportunity to drain to the river prior to the peak occurring from the remainder of the catchment.

As part of the analysis, the flood levels produced by lesser events were modelled. The calculated flood levels for the lesser events (2 to 50 years) are shown in Appendix A.



As per the 100 year case, an increase in level was obtained in the open space area upstream of the culvert (i.e. MAIN 16 to MAIN 11). The resultant levels will not result in the flooding of any private property and are considerably lower than the corresponding Bremer River flood level (18.41 mAHD- refer Section 4.4).

It can be noted that an increase in flood level is also predicted at location MAIN10 (located immediately upstream of the open space area) for events less than the 100 year event. Although an increase is predicted, it is important to note that the resultant levels do not impact on any existing properties.

4.4 Hydraulic Sensitivity Assessment

The sensitivity of the calculated flood levels for local catchment flooding was assessed by the consideration of two scenarios.

Tailwater Level Variation and Coincident Bremer River Flooding

As noted in Section 4.3.1, A tailwater level equal to the obvert of the pipe beneath the railway was adopted. This was considered to be reasonable given the relatively short response time of the local catchment compared to that of the Bremer River. At the time that the local catchment peaks, the level in the river would be expected to be relatively low.

As a sensitivity analysis, the flooding in the local catchment produced by the critical storm duration for the flooding of Bremer River (the Bremer River 1,080 minute duration storm) was modelled. The stage hydrograph estimated by the MIKE-11 model of the Bremer River was applied as the tailwater condition for the analysis.

Table 4-4 summarises the flood levels predicted for the 100 year event for this scenario. With reference to the table, the proposed development will have no impact on local flood levels for this scenario.

Blockage

Drainage of the local catchment is achieved by a large culvert beneath the railway. If the culvert were to be blocked, an increase in flood level could occur. Consideration was given to the reasonable extent of blockage that could be foreseen. Given the size of the culvert and the level of development within the catchment, the potential for the culvert to be blocked (for instance by branches) was assessed as relatively low. Certainly, a scenario involving the complete blockage of the culvert was considered to be overly conservative.

As a sensitivity analysis, the impact of 50 percent blockage of the culvert was modelled. The resultant flood levels for the 100 year event are listed in Table 4-4. With reference to the table, it can be noted that a localised increase in flood level occurs within the existing gully. However, the increase and resultant levels occur in a region where flooding is dominated by regional river flooding (18.41 mAHD) and therefore do not affect the reclamation levels applicable to the development. Given this outcome, it can be concluded that no change is required with respect to the flood levels adopted for the development to account for potential blockage effects.



Table 4-4 Peak 1080 Minute Duration and 50 percent blockage Storm Flood Levels

	1,080 Minute (Bremer River) Storm Event		50 Percent Blockage of Downstream Culvert	
Cross Section I.D.	Existing Case Peak Flood Level (mAHD)	Developed Case Peak Flood Level (mAHD)	Developed Case Peak Flood Level, No Blockage (mAHD)	Developed Case Peak Flood Level with 50 Percent Blockage (mAHD)
Main 3	19.60	19.60	19.68	19.68
Main 4	18.41	18.41	17.78	17.78
Main 5	18.41	18.41	17.37	17.37
Main 6	18.41	18.41	17.37	17.37
Main 7	18.41	18.41	17.36	17.36
Main 8	18.41	18.41	17.34	17.34
Main 9	18.41	18.41	17.11	17.11
Main 10	18.41	18.41	14.90	14.90
Channel 4	19.44	19.44	19.85	19.85
Channel 5	19.44	19.44	19.85	19.85
Channel 6	20.97	20.97	21.15	21.15
Channel 7	20.78	20.77	20.93	20.93
Channel 8	20.71	20.71	20.85	20.85
Channel 9	19.36	19.36	19.81	19.81
Channel 10	19.25	19.25	19.49	19.49
Channel 11	18.41	18.41	17.95	17.95
Channel 12	18.41	18.41	17.43	17.43
Main 11	18.41	18.41	12.04	12.04
Main 12	18.41	18.41	11.87	11.87
Main 13	18.41	18.41	11.49	11.49
Main 14	18.41	18.41	10.11	10.14
Main 15	18.41	18.41	10.09	10.13
Main 16	18.41	18.41	9.35	9.94
Culvert Invert	18.41	18.41	8.25	9.96



5. REGIONAL FLOODING IMPACT

Some minor earthworks are proposed within the existing gully area at levels less than the regional Bremer River flood level.

A regional flood assessment was performed to analyse the impact of filling the gully on regional flood levels in the Bremer River. For the analysis, it was conservatively assumed that the entire gully was filled to above flood level. The analysis was completed using the lpswich City Council Ipswich Rivers MIKE-11 Model.

As the gully is not part of the existing case model, the existing case model was modified to reflect the storage available in the gully. The storage differential between existing conditions and post development conditions was established and applied as additional storage at the Mike 11 branch adjacent to the gully in the base case hydraulic model.

For the developed case, the storage was removed from the model. Further, the developed case considered the bank profile modelled as part of the Cardno report *Riverside Central Flood Study* (August 2009).

For the analysis, the following events in the Bremer River were considered:

Bremer River: 2, 5, 10, 20, 50 and 100 year; and

Brisbane: 5, 10, 20, 50 year.

It can be noted that following the revision of rainfall intensities, the 50 year event is considered to have a recurrence interval similar to the 100 year event.

The results of the analysis are presented in Appendix B. With reference to Appendix B, it can be noted that the loss of the entire storage area would not result in an increase in flood level in the Bremer River.



6. CONCLUSION

A detailed flood assessment of the proposed Riverlinks Central residential development has been undertaken.

The assessment considered the following:

- the increase in runoff produced by the development; and
- the proposed earthworks in the open space area adjacent to the development.

The assessment has indicated that the proposed development and associated earthworks will create no adverse impact on peak flood levels in existing developed areas upstream of the development. The analysis has therefore determined that the development can occur without the need for the construction of a detention basin to offset the impact of development.

A regional flooding assessment has also been undertaken. The assessment indicated that the proposed works will have no discernable adverse impact on flood levels in the Bremer and Brisbane Rivers.



7. REFERENCES

Institution of Engineers Australia, 1998, 'Australian Rainfall and Runoff, A guide to Flood Estimation'.

Department of Natural Resources and Water, 2007, "Queensland Urban Drainage Manual".



FIGURES

Figure 1 Site Location

Figure 2 Hydrologic Catchment Extents

Figure 3 XP-SWMM Hydraulic Model





40

80

120

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Rev: Orig. Date: September 2009 YEATS Consulting Engineers CAD FILE: J-35893-70\Figures\Figure_1_2_3.dwg XREF's: 160 200 m 1:4000

Scale 1:4000 (A3) FIGURE 1

SITE LOCATION

Project No.: 3503-70
PRINT DATE: 87 October, 2849 - 188pm

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160 200m 1:4000

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120

Scale 1:4000 (A3)

FIGURE 2

HYDRAULIC CATCHMENT EXTENTS

Desired News 0500 70

Site Boundary

Existing Major Contour

Existing Minor Contour

Catchment Boundary





45 60 75m 1:1500

15 30

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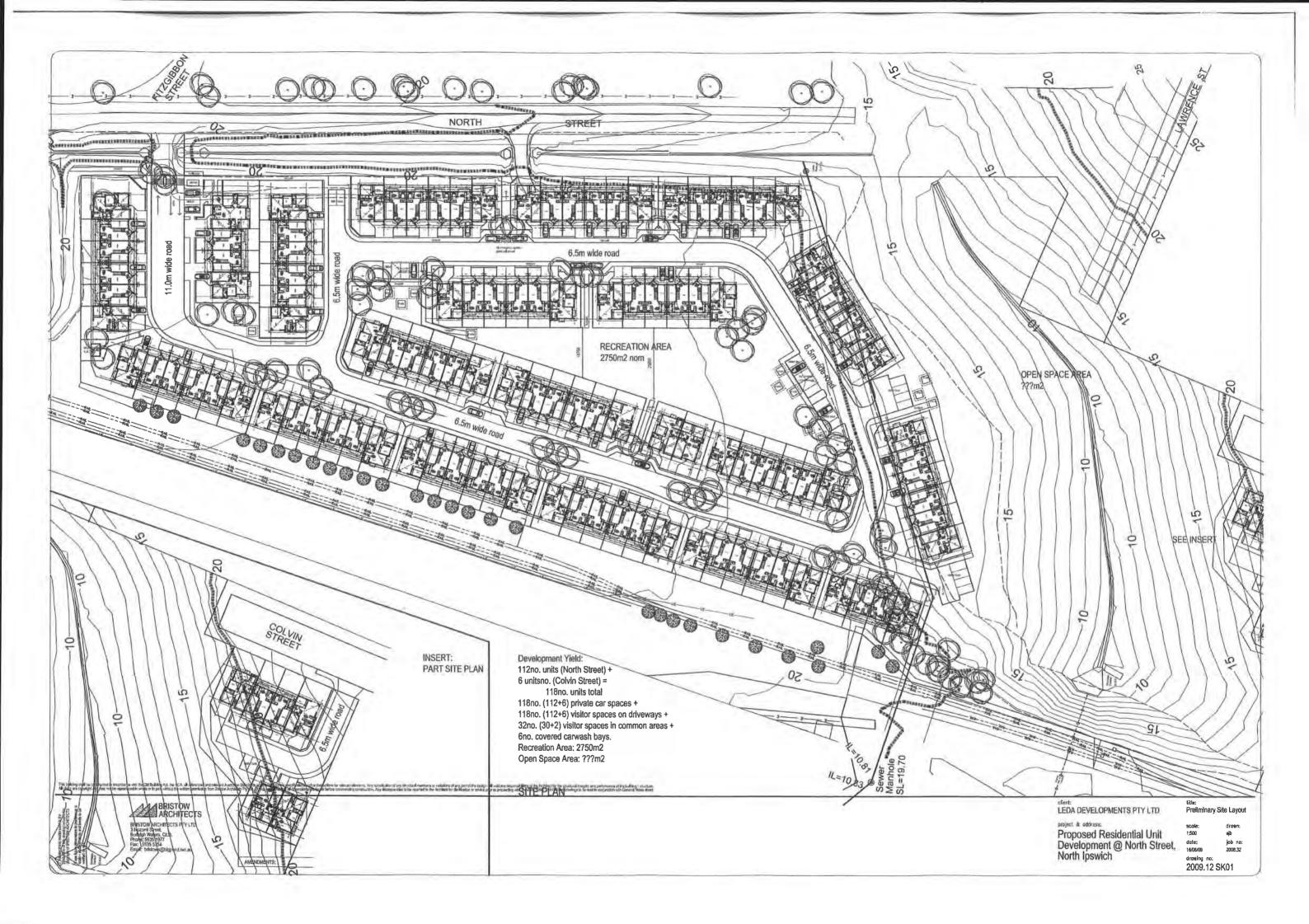
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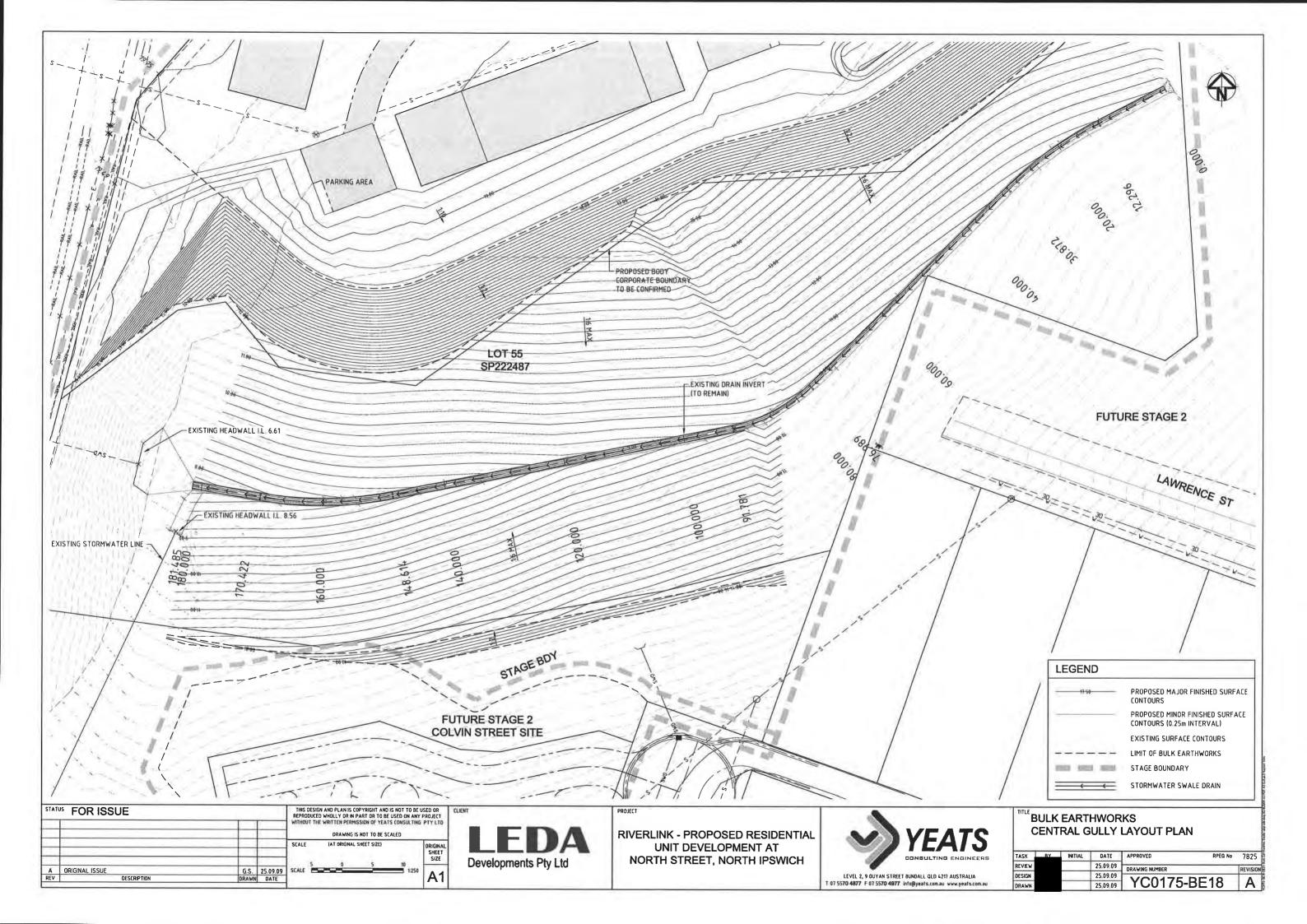
FIGURE 3

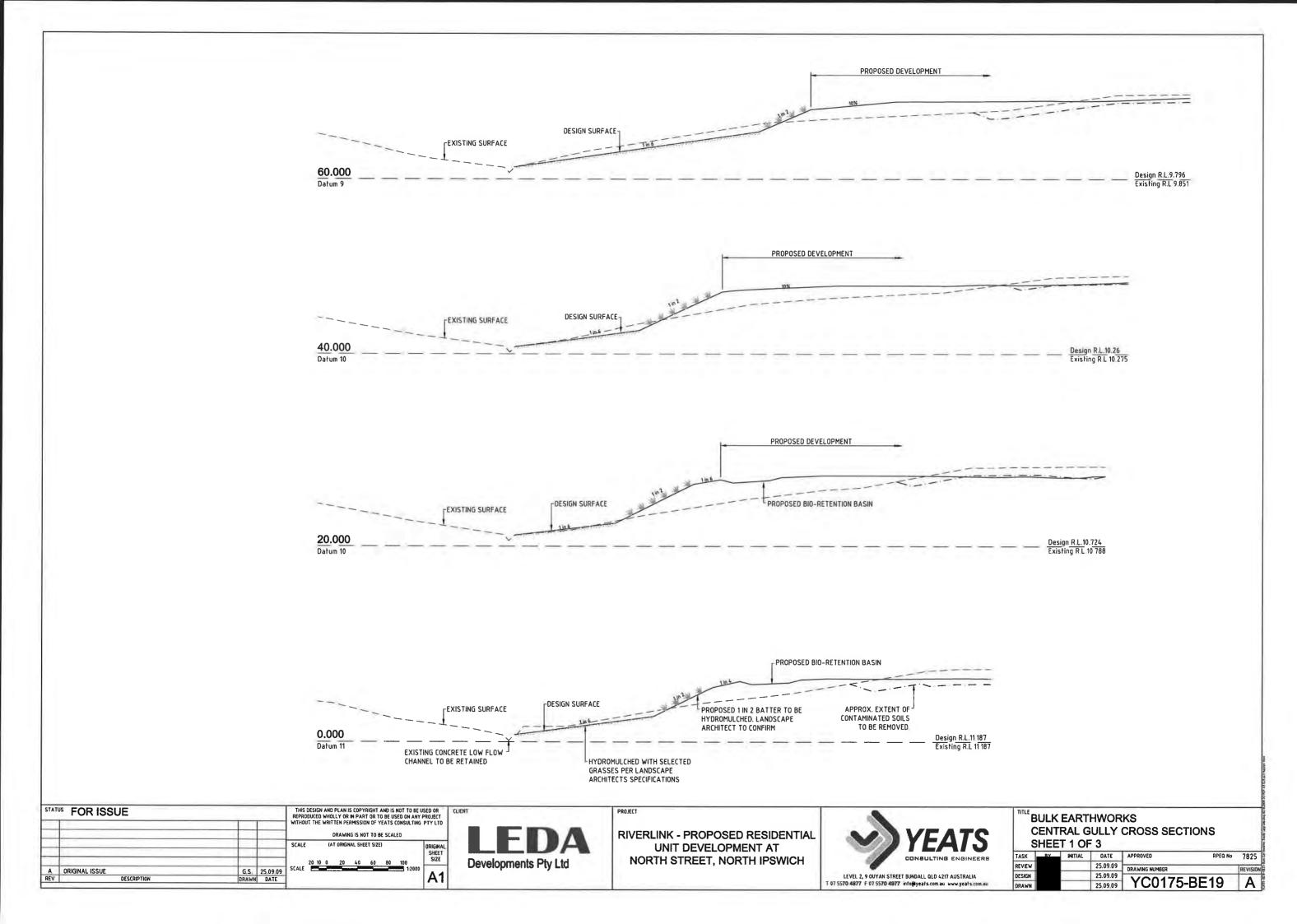
XP-SWMM HYDRAULIC MODEL

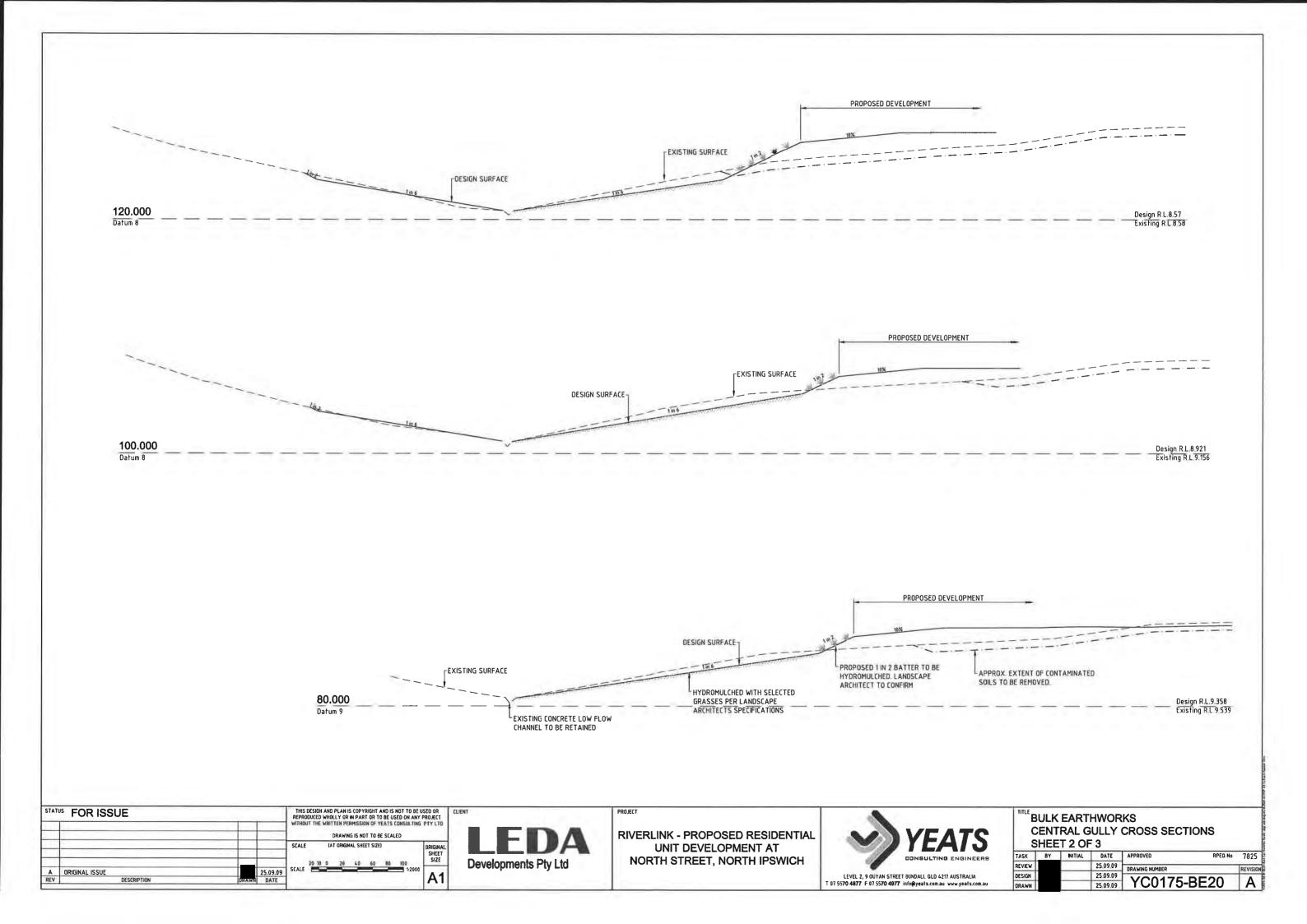


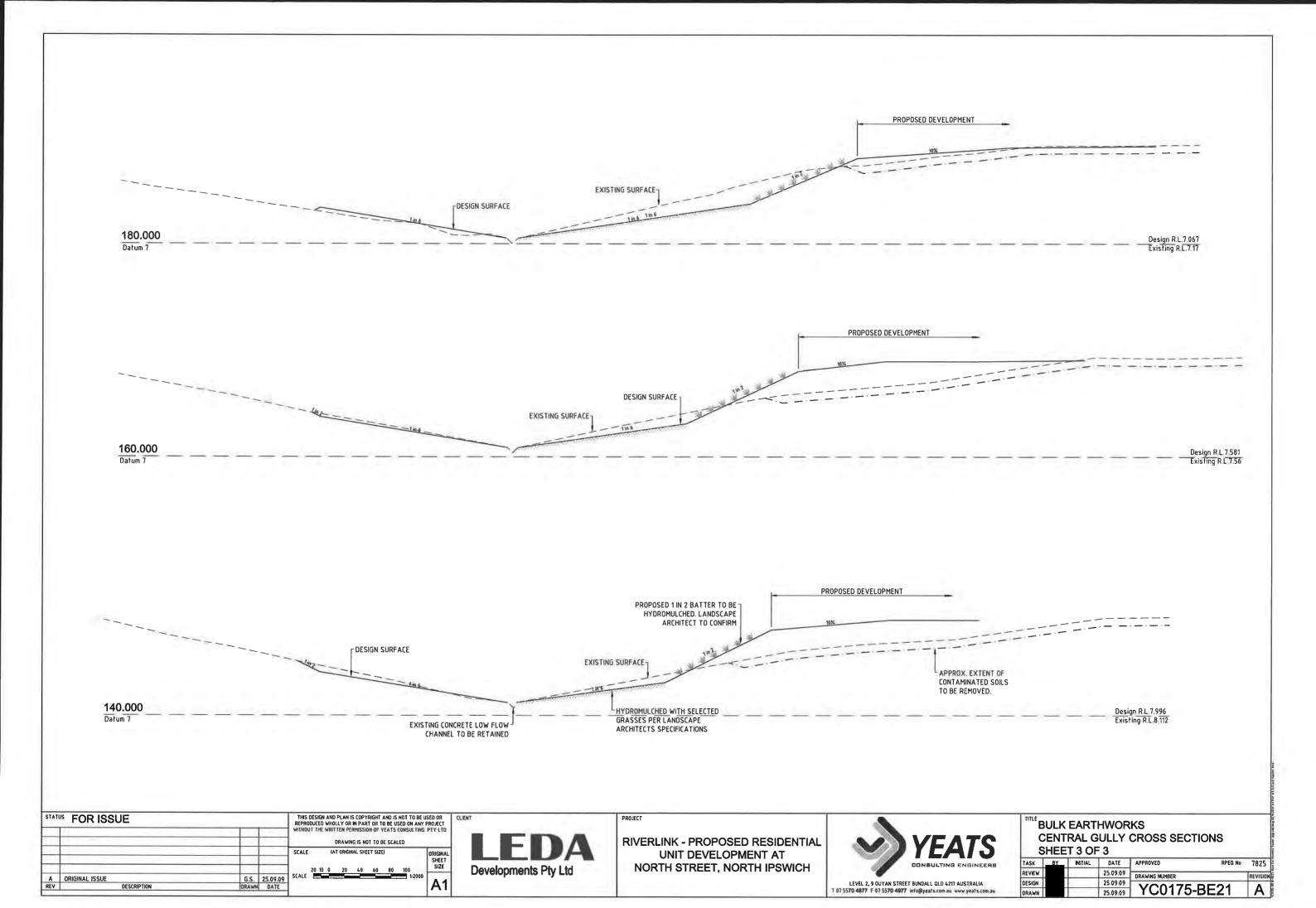
Reference Drawings













APPENDIX A

50 Year-2 Year Peak Flood Levels- Local Flooding



Appendix A - 50 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)	
Main 3	19.67	19.67	
Main 4	17.75	17.75	
Main 5	17.33	17.33	
Main 6	17.33	17.33	
Main 7	17.32	17.32	
Main 8	17.31	17.31	
Main 9	17.09	17.09	
Main 10	14.81	14.85	
Channel 4	19.80	19.79	
Channel 5	19.79	19.79	
Channel 6	21.13	21.13	
Channel 7	20.91	20.91	
Channel 8	20.84	20.84	
Channel 9	19.75	19.74	
Channel 10	19.49	19.45	
Channel 11	17.96	17.89	
Channel 12	17.48	17.42	
Main 11	11.93	11.98	
Main 12	11.62	11.81	
Main 13	10.99	11.45	
Main 14	9.73	10.04	
Main 15	9.46	10.02	
Main 16	8.70	9.27	
Culvert Invert	7.80	8.03	



Appendix A - 20 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peal WSL (mAHD)	
Main 3	19.64	19.64	
Main 4	17.72	17.72	
Main 5	17.27	17.27	
Main 6	17.27	17.27	
Main 7	17.27	17.27	
Main 8	17.26	17.26	
Main 9	17.02	17.02	
Main 10	14.65	14.78	
Channel 4	19.74	19.74	
Channel 5	19.74	19.74	
Channel 6	21.12	21.12	
Channel 7	20.90	20.90	
Channel 8	20.83	20.83	
Channel 9	19.69	19.69	
Channel 10	19.45	19.41	
Channel 11	17.89	17.83	
Channel 12	17.46	17.41	
Main 11	11.87	11.91	
Main 12	11.56	11.74	
Main 13	10.94	11.39	
Main 14	9.70	9.95	
Main 15	9.36	9.92	
Main 16	8.63	9.18	
Culvert Invert	7.58	7.75	



Appendix A - 10 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peal WSL (mAHD)	
Main 3	19.63	19.63	
Main 4	17.69	17.69	
Main 5	17.23	17.23	
Main 6	17.23	17.23	
Main 7	17.22	17.22	
Main 8	17.21	17.21	
Main 9	16.94	16.94	
Main 10	14.17	14.70	
Channel 4	19.68	19.68	
Channel 5	19.68	19.67	
Channel 6	21.10	21.10	
Channel 7	20.88	20.88	
Channel 8	20.81	20.81	
Channel 9	19.62	19.62	
Channel 10	19.41	19.38	
Channel 11	17.82	17.76	
Channel 12	17.43	17.39	
Main 11	11.82	11.85	
Main 12	11.52	11.68	
Main 13	10.91	11.34	
Main 14	9.67	9.88	
Main 15	9.29	9.83	
Main 16	8.59	9.12	
Culvert Invert	7.42	7.55	



Appendix A - 5 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peal WSL (mAHD)	
Main 3	19.61	19.61	
Main 4	17.66	17.66	
Main 5	17.19	17.19	
Main 6	17.19	17.19	
Main 7	17.19	17.19	
Main 8	17.18	17.18	
Main 9	16.89	16.89	
Main 10	13.45	13.94	
Channel 4	19.63	19.63	
Channel 5	19.63	19.63	
Channel 6	21.08	21.08	
Channel 7	20.87	20.87	
Channel 8	20.80	20.80	
Channel 9	19.57	19.56	
Channel 10	19.37	19.34	
Channel 11	17.76	17.71	
Channel 12	17.41	17.37	
Main 11	11.78	11.80	
Main 12	11.47	11.62	
Main 13	10.87	11.31	
Main 14	9.65	9.79	
Main 15	9.21	9.74	
Main 16	8.55	9.09	
Culvert Invert	7.28	7.39	



Appendix A - 2 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)						
Main 3	19.58	19.58						
Main 4	17.61	17.61						
Main 5	17.13	17.13						
Main 6	17.13	17.13						
Main 7	17.13	17.13						
Main 8	17.13	17.13						
Main 9	16.79	16.79						
Main 10	12.76	12.85						
Channel 4	19.54	19.54						
Channel 5	19.54	19.53						
Channel 6	21.05	21.05						
Channel 7	20.84	20.84						
Channel 8	20.77	20.77						
Channel 9	19.46	19.46						
Channel 10	19.30	19.28						
Channel 11	17.65	17.61						
Channel 12	17.36	17.33						
Main 11	11.69	11.71						
Main 12	11.39	11.50						
Main 13	10.77	11.21						
Main 14	9.61	9.70						
Main 15	9.07	9.58						
Main 16	8.50	8.99						
Culvert Invert	7.03	7.16						



APPENDIX B

Bremer River Flood Levels

BREMER RIVER FLOODS - Predicted Impacts to Peak Flood Levels Due to RiverLinks Development combined with Loss of Valley Storage

pool	Afflux	(mm)	0	0	0	0	0	0	0	0	0	o	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BREM 2 year ARI Flood	Dev Af	mAHD (m	22	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51
BREM 2	Exist	mAHD r	7	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51
l Flood	Afflux	(mm)	-46	-49				-54		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BREMS year ARI Flood	Dev	MAHD		8.12	8.02	8.01	7.90	7.85	7.76	7.65		7,65	7.65	7.65	7.65	7,65	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	6	7.63
BREM	Exist	MAHD		8.17	8.07	8.06	7.96	7.91	7.80	7.65		7.65	7.65	7.65		7.65	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64		7	7.63
ARI Flood	Afflux	(mm)	9 -100	3 -105	19- 2	7 -53	-3	6-	5 -2	5	-1	-1	1	1	-1	-1	3 -1	3 -1	3 -1	0	0	0	0	1	-1	0	0	0	0	0	0		0 0	0
BREM 10 year ARI Flood	Dev	MAHD		12.43	3 12.37	12.37	12.36	12.36	12.36	12.35	12.35	12.35	12.34	12.34	12.34	12,33	14		12.33	12,33	12.32	12.32	12.32	12,31	12,30	12,30	12.30	12.30	12.29	12,29			0	12.28
BREM	Exist	mAHD	lű,	12.54	12.43		12,37	12.36	12.36	12.35		12.35	12.34	12.34	12.34	12.34	12.33	12.33	12.33	12,33	12.32	12,32	12.32	12.31	12.30	12,30	12,30	12.30	12.29	12.29				12.28
RI Flood	Afflux	(mm)		3 -105	19-	-53	-3	-3	-5	-1	-1	-1	F 1	[-]	1	-1	F	-1	1-	0	0	0	0	7	-1	0	0	0	0	0		70	0	0
BREM 20 year ARI Flood	Dev	MAHD		12.43	12.37			12.36	12,36	12.35		12,35	12.34		-	12.33				12.33	12,32		12.32	12.31	12,30		12.30	12.30	11) in	Ш		12.28
BREM	Exist	MAHD			Ш	12.42	12.37	12.36	12,36	12.35		12.35	12.34			12.34				12.33	12.32	12,32	12,32	12.31	Ш		12.30	12.30						12.28
ar ARI Flood	Afflux	(mm)				0	-57		-48	-21	8-	-5	9-	9-	8	9	-13	9-	-25	-13	-5	7-	2	-21		-20	0	0	0	0	0	0	0	0
50 year A	Dev	MAHD		17	17.02	17	16.92	16	16	16.65			16,30		16	16	16	16	16	15	15.84		15	15	15	15			15	15	15	14	14	14.74
BREM 50 year	Exist	MAHD	17.17							j.		100	10	16.22	16.16		3	16,10		15.98	15.85	15.69	15.50	15,36	15.31	15.16	15.08	15.13	15.10	15.04	15.01	14.95	14.92	14.74
RI Flood	Afflux	(mm)	-51															-27			-17			-23	-14	-27	0	0	0		0	0	0	O
BREM 100 year ARI Flood		_	M.	(*) (2)						18.53	-0			18.04		-		10					17.28	17.09	17.02	16.86	16.79	16.84	16.82	16.75	16.71		1	16.43
BREM 1	-	_	19.12	19.06	19.00	18.99	18.93	18.87	18.78	18.57	18.60	18.45	18.16	18.06	17.99	17.99	17.98	17.93	17.86	17,81	17.66	17.49	17.26	17.11	17.04	16,88	16.79	16.84	16.82	16.75	16.71	16.66	16.62	16.43
M11 XS		٦	1010020	1010090	1010150	1010250	1010340	1010430	1010510	1010590	1010645	1010700	1010890	1010915	1010950	1010985	1011040	1011090	1011185	1011320	1011465	1011575	1011700	1011790	1011810	1011930	1012045	1012050	1012070	1012200	1012870	1013380	1013700	1014220

BRISBANE RIVER FLOODS - Predicted Impacts to Peak Flood Levels Due to RiverLinks Development combined with Loss of Valley Storage

		1	-51	-53	-42	-39	-42	-44	-37	-22	-21	-20	-21	-20	-18	-17	-21	-20	-21	4	ι'n	ψ	ń	-7	ů	9	0	0	0	0	0	0	0	K
pool	Afflux	(mm)																					À.		ł	į.								
BRIS 5 year ARI Flood	ev mAHD		11.17	11.10	11.05	11.05	10.97	10.95	10.89	10.79	10.77	10.71	10.55	10.49	10.46	10.46	10.43	10.42	10.36	10,31	10.25	10.16	10.04	9.95	9.30	9.79	9.73	9.76	9.68	9.64	9.61	9.55	9.52	N. K.
BRIS	Exist mAHD Dev mAHD Afflux		11.23	11.15	11.09	11.09	11.01	10.99	10.93	10.82	10.79	10.73	10.57	10.51	10.48	10.47	10.45	10.44	10.38	10.32	10.25	10.16	10.05	9.95	16.6	9.78	9.73	9.76	89.6	9.64	9.61	9.55	9.52	
	3		-61	-62	-48	-42	-54	-58	-48	-31	-28	-27	-28	-28	-21	-21	-31	-27	-30	-15	ø-	-11	×ρ	-18	-11	-5	0	0	0	0	0	0	0	I
Flood	Afflux	(mm)																10 A																
DNIS TO YEAR ARI FIOOD	ev mAHD		13.66	13.59	13.56	13.56	13.48	13.45	13.40	13.29	13.28	13.21	13.04	12.98	12.95	12.95	12.92	12.90	12.84	12.80	12.73	12.63	12.50	12.40	12.36	12.25	12.21	12.23	12.15	12.11	12.09	12.03	12.00	
TCINIC	Exist mAHD Dev mAHD Afflux		13.72	13.65	13.61	13.60	13.53	13.51	13.44	13.32	13.30	13.24	13.07	13.01	12.97	12.97	12.95	12.93	12.87	12.82	12.74	12.64	12.51	12.42	12.38	12.26	12.21	12.24	12.15	12.11	12.09	12.03	12.00	
	ш	1	٠	-52	-37	-30	-57	-62	-49	-23	-21	-18	-19	-20	6-	-11	-25	-13	-32	-22	-12	-14	φ	-26	-14	-14	0	0	0	0	0	0	0	I
pool	Afflux	(mm)									Į,		7								Ú					ľ								I
DNIS 20 YEAR ANI FIDOU	ev mAHD		16.34	16.28	16.25	16.25	16.17	16.13	16.07	15.96	15.96	15.88	15.69	15.62	15.59	15.59	15.57	15.54	15.47	15.44	15.35	15.24	15.10	14.98	14.95	14.85	14.81	14.84	14.82	14.78	14.76	14.72	14.69	-
DAIS Z	Exist mAHD Dev mAHD Afflux	0000	16.39	16.33	16.29	16.28	16.23	16.19	16.12	15.99	15.98	15.90	15.71	15.64	15.60	15.60	15.59	15.56	15.51	15.46	15.36	15.25	15.10	15.00	14.97	14.86	14.81	14.84	14.82	14.78	14.76	14.72	14.69	
1	Δ	1	-3/	-37	-23	-15	-52	-61	-47	-23	6-	9-	8 <u>-</u>	6-	33	1	-16	-10	-24	-12	-4	7	18	-12	6-	-16	0	0	0	0	0	0	0	ļ
200	Afflux	mm															8					Ĭ		0										
- 1			18.38	18.33	18.30	18.30	18.21	18.16	18.10	17.97	18.00	17.89	17.68	17.60	17.57	17.57	17.54	17.51	17.44	17.42	17.32	17.21	17.07	16.94	16.90	16.80	16.77	16.80	16.79	16.75	16.73	16.70	16.68	X
Cina	Exist mAHD Dev mAHD	10 40	18.47	18.37	18.32	18.32	18.26	18.22	18.15	17.99	18.01	17.90	17.69	17.61	17.56	17.56	17.56	17.52	17.47	17.43	17.33	17.20	17.05	16.96	16.91	16.82	16.77	16.80	16.79	16.75	16.73	16.70	16.68	- X
M11 XS		1010000	TOTOTO	1010090	1010150	1010250	1010340	1010430	1010510	1010590	1010645	1010700	1010890	1010915	1010950	1010985	1011040	1011090	1011185	1011320	1011465	1011575	1011700	1011790	1011810	1011930	1012045	1012050	1012070	1012200	1012870	1013380	1013700	A NA ARACA

Attachment GE-3



Lipoma Pty Ltd C/- Yeates Consulting Engineers PO Box 9122 GOLD COAST MC QLD 9726

31 May 2010

Dear Sir

Re: Development Application Notice

I wish to advise that in accordance with Section 3.2.12 of the *Integrated Planning Act 1997*, the following application has been deemed to have lapsed:

Application Number: 6291/09/OW **Proposal:** Bulk Earthworks

Property Location: North Street North Ipswich Qld 4305

For your information, Section 3.2.12 states as follows:

- "(1) An application lapses if—
 - (a) the next action to be taken for the application under the IDAS process is to be taken by the applicant; and
 - (b) the period mentioned in subsection (2) has elapsed since the applicant became entitled to take the action; and
 - (c) the applicant has not taken the action.
- (2) For subsection (1), the period mentioned is-
 - (a) if the next action is complying with Section 3.3.3 3 months; or
 - (b) if the next action is complying with Section 3.3.8 12 months; or
 - (c) if the next action is complying with Section 3.4.4 20 business days; or
 - (d) if the next action is complying with Section 3.4.7 3 months.

Ipswich City Council Page 2

(3) The period mentioned in subsection (2)(b) may be extended if the entity making the information request agrees with the applicant to extend the period."

Yours faithfully

Aaron Katt SENIOR ENGINEERING OFFICER

Attachment GE-4

Your reference
Our reference 9262/10 AK:SJ
Contact Officer Aaron Katt
Telephone

Lipoma Pty Ltd c/- Michel Group Services PO Box 2695 NERANG BC QLD 4211

15 July 2010



Ipswich City Council

45 Roderick St PO Box 191 Ipswich QLD 4305 Australia

Tel

(07) 38**10 6**666

Fax Email (07) 3810 6731

Web

council@ipswich.qld.gov.au www.ipswich.qld.gov.au

SUSTAINABLE PLANNING ACT 2009

DEVELOPMENT APPLICATION DECISION NOTICE

Application Details

Application No:

3262/10

Real Property Description:

Lot 51, 52, 53, 54 and 55 on SP 222487 Par Chuwar

Property Location:

' M Hughes Street North Ipswich Qld 4305 W M Hughes Street North Ipswich Qld 4305 W M Hughes Street North Ipswich Qld 4305 Vorth Street North Ipswich Qld 4305 North Street North Ipswich Qld 4305

Decision Date:

13 July 2010

Decision:

This application is approved subject to the conditions listed

below.

Deemed Approval Under s.331

This application is not a Deemed Approval under Section 331

of the Sustainable Planning Act 2009.

Decision Authority:

Senior Engineering Officer

Decision Details:

Development	Approval Type	Decision	Relevant Period
Operational Works Bulk Earthworks	Development Permit	Approved subject to the conditions set out in Attachment A — Assessment Manager Conditions	Two (2) years

Approved Plans

- (a) The approved plans for this development approval are:
 - (i) the plans referred to in the table of approved plans (including any amendments that are required to be made to those plans); and
 - (ii) where the amended versions of the plans referred to in the table of approved plans have been approved by the assessment manager, the amended versions of those plans.
- (b) The approved plans are attached to this decision notice.

Table of Approved Plans:

The state of the s	
Plan Number	Revision Number
YC0175-BE00	В
YC0175-BE02 to YC0175-BE06	В
YC0175-BE08 to YC0175-BE12	В
YC0175-BE15	В
YC0175-BE16-1	A
YC0175-BE16-2 to YC0175-BE16-3	В
YC0175-BE17-1 to YC0175-BE17-3	A
YC0175-BE18 to YC0175-BE23	В
YC0176-BE00 to YC0176-BE03	В
YC0176-BE04-1 to YC0176-BE04-3	В
YC0176-BE05-1 to YC0176-BE05-4	Α
YC0176-BE06 to YC0176-BE15	В
QC003754:03-C000	В
C003754:03-SK03 to C003754:03-SK04	G
C003754:03-SK05 to C003754:SK13	F
C003754:03-SK30 to C003754:03-SK31	А
C003754:03-SK32	-
C003754:03-SK092 to C003754:03-SK95	**
C003754:03-SK100 to C003754:03-SK101	А
C003754:03-SK102 to C003754:03-SK105	-
QC003754:04-C000	А
C003754:04-5K03	м
C003754:04-SK021	С
C003754:04-SK022 to C003754:04-SK26	В
C003754:04-SK030	А
C003754:04-SK100 to C003754:04-SK102	~

2. Referral Agencies

Referral Agency	Referral Role	
Transport and Main Roads	Concurrence	
PO Box 70		
SPRING HILL QLD 4004		~~~
Energex	Concurrence	
GPO Box 1461		
BRISBANE QLD 4001		

3. Conditions of Assessment Manager (Ipswich City Council)

Refer to Attachment A.

4. <u>Appeal Rights</u>

Attachment B is an extract from the Sustainable Planning Act 2009 which details the applicant's appeal rights and the appeal rights of any submitters regarding this decision.

Yours faithfully

Aaron Katt SENIOR ENGINEERING OFFICER

cc: Transport and Main Roads
PO Box 70
SPRING HILL QLD 4004

Energex GPO Box 1461 BRISBANE QLD 4001

Enc.

- a. Assessment Manager Conditions (Attachment A)
- b. Sustainable Planning Act 2009 extract on appeal rights (Attachment B)
- c. Approved Plans
- d. Referral Agency Responses

Attachment A <u>Assessment Manager (Ipswich City Council) Conditions</u> Conditions applicable to this approval under Sustainable Planning Act:

1. Basis of Approval

The facts and circumstances set out in the application and all relevant Council Local Laws and Planning Scheme Policies must be adhered to, except as amended in these conditions. Future road alignments, location of bio-retention basin and building layouts as shown on YCO175-BE06 Revision B to YCO175-BE12; YCO175-BE18 Revision B; YCO175-BE22 Revision B and YCO175-BE23 Revision B dated 29 January 2010, prepared by Yeats Consulting Engineers are excluded from this approval.

2. Minor Alterations

Notwithstanding the requirements detailed in this approval, any other minor alterations and/or modifications must be subject to the prior written approval of the Senior Development Engineer.

3. Hours of Construction

Unless otherwise approved in writing by the Engineering and Environment Manager hours of construction must be:

Monday to Saturday 6.30 a.m. to 6.30 p.m.

Work or business must not be conducted from or on the premises outside the above hours or on Sundays or public holidays.

Terms

- (a) RPEQ A Registered Professional Engineer of Queensland, suitably qualified and experienced in the particular area of expertise required. Furthermore, the RPEQ required for the analysis and reporting for mining must be experienced in the analysis of underground and surface mining within the Ipswich area.
- (b) QUDM The Queensland Urban Drainage Manual, produced by the Queensland Department of Primary Industries.
- (c) QDMR Queensland Department of Main Road.
- (d) MUTCD The Manual of Uniform Traffic Control Devices, published by DMR.
- (e) Queensland Urban Utilities Water and Wastewater service provider.

Municipal Works Pre-Start Requirements

(a) The requirements of Council's Planning Scheme Policy 3 - General Works apply to all municipal works.

- (b) The Developer must nominate a suitable date and time for a pre-start meeting to be attended by the Developer or representatives, including the nominated Principal Contractor, Consulting Engineer and Council Officers, in accordance with Planning Scheme Policy 3 Clause 7.2.9.
- (c) The following information is required by Planning Scheme Policy 3 to be submitted prior to or at the pre-start meeting:-
 - (i) Copies of the relevant contract documents for all Municipal Works, including a schedule of quantities and prices;
 - (ii) Business and after hours contact phone numbers of the Developer, Consulting Engineer and Contractor;
 - (iii) Date of commencement of works and expected duration.
- (d) The Developer must submit evidence of possession of the following insurances as required by Planning Scheme Policy 3 Part 7.2.5 prior to the pre-start meeting:
 - (i) Public Liability insurance to a minimum value of \$10M, with a notation nominating the Local Government as an Interested Party; and
 - (ii) Worker's Compensation Insurance
 - No work may commence on the site unless the Developer has the necessary insurances in place.
- (e) Prior to the pre start meeting and the commencement of any construction works the developer must submit to Council, and obtain approval for, amended drawings signed by a RPEQ demonstrating compliance with Council standards and any requirements in the Decision Notice or specified by the Senior Development Engineer.
- (f) The amended drawings must be accompanied by a Certificate of Design signed by a RPEQ, certifying that the design is in accordance with all relevant engineering standards, Council's requirements and standards, relevant development conditions of approval, and sound engineering practice.
- (g) Prior to the Pre-Start meeting, the Developer must submit to Council a Development Performance Bond of not less than 10% of the value of the municipal works (minimum \$5,000.00), as security for the performance of the various construction and certification obligations (including provision of "As Constructed" information).
- (h) Municipal works must be accepted "On Maintenance" prior to commencement of use. Upon formal acceptance of the works "On Maintenance", the Development Performance Bond shall be reduced to an amount not less than 5% of the value of the works or \$1,000.00 whichever is greater, and shall be retained by Council during the maintenance period as a Maintenance Security Bond for the performance of the maintenance obligations. Alternatively the Developer may submit a separate Maintenance Security Bond of equivalent value. This Bond shall be retained by Council in accordance with Planning Scheme Policy 3, until the works are accepted "Off Maintenance" by Council.

- (i) No construction works, including building activities, must commence on the subject sites until such time as all necessary performance and silt and erosion bonds are submitted to Council prior to pre-start meeting.
- (j) Queensland Urban Utilities has implemented a Permit to Work System. The purpose of the Permit to Work System is to reduce risk to Queensland Urban Utilities employees, external contractors, assets and the environment. All planned works conducted on or near Queensland Urban Utilities assets come under the control of the Queensland Urban Utilities and must be authorised. The Developer or representative must contact the Queensland Urban Utilities on telephone 136257 to obtain a Permit to Work form, which must be completed and submitted to Queensland Urban Utilities, prior to the pre-start meeting.
- (k) The Developer must obtain a Water Use Authority (WUA) from Queensland Urban Utilities if, over the approval relevant period, the potable water restriction level at the time of commencement of, and during, construction prohibits potable water use for construction or associated development purposes. The WUA can be obtained by completing a Water Use Declaration and forwarding it to Queensland Urban Utilities for approval. Evidence of possession of a current WUA, where applicable, must be provided to the Senior Development Engineer prior to the pre-start meeting.
- (I) All works required for this development must take due regard of any and all existing services and, if considered necessary by the relevant authority or the Senior Development Engineer, such works must be altered at the cost of the Developer.
- (m) The Developer is responsible to ensure that all kerbside traffic control signs and any other warning signs are protected from obstruction, damage or removal at all times during the works. No kerbside traffic control or warning signs may be removed, permanently or temporarily, during the works without written authority from the Senior Development Engineer. Any signs that are damaged or removed must be replaced within 24 hours of Council notification, at the cost of the Developer.

6. Engineering Certifications

- (a) Engineering drawings must be marked as confirmation that they have been checked and approved by a RPEQ.
- (b) Engineering certification (by RPEQ or other competent person accepted by the Senior Development Engineer) must be submitted to Council for the construction of all civil works associated with the development. This certification must state that all works undertaken on the site are in accordance with the documents as listed in Condition 8(e) below and all conditions of this approval.
- (c) The developer must demonstrate and provide certification from an RPEQ that in the 20 year, 10 year and 5 year ARI Bremer River Flood event, as defined in Section 3.2 of Riverlinks Central Flood Study prepared by Cardno (Qld) Pty Ltd dated 23 July 2008 that the proposed earthworks profile will not increase flood levels on adjacent properties upstream or downstream of the development site.

(d) The certifying authority (or his/her representative) is expected to undertake inspections as necessary to ensure the finished product conforms to the required standards, and is appropriate for its intended use.

7. Water Use Declaration

The use of potable or recycled water on any development site must be approved by Queensland Urban Utilities. The Developer must obtain and maintain current, an approved Water Use Declaration (WUD), by completing a Water Use Declaration form and submitting it to Queensland Urban Utilities for approval. Evidence of possession of an approved WUD must be submitted to the Senior Development Engineer prior to the pre-start meeting.

8. Earthworks

- (a) Retaining walls, including footings and drainage systems, must be constructed entirely within the boundaries of the lot and in accordance with the requirements of the Planning Scheme Policy 3. Should the nature or materials of a retaining wall be such that future maintenance will be required, provision must be made in placement of the wall to ensure that such maintenance can be completed without intrusion onto the adjacent lot.
- (b) The developer must submit for approval detailed design drawings of all proposed retaining walls constructed as part of this approval prior to construction.
- (c) Any allotment or other filling creating a soil depth of 500mm or more must be conducted in accordance with Australian Standard 3798. Test results as required by Australian Standard 3798 at Responsibility Level 1, and a certificate of quality and uniformity of fill must be provided by a RPEQ.
- (d) Where batters resulting from cut and fill on the site produce slopes greater than 1:4, the Developer must provide RPEQ certification that the slopes are stable and properly drained.
- (e) All works to be completed on site must be undertaken in accordance with the following documents:-
 - (i) Assessment of Fill Batter prepared by Morrison Geotechnic Pty Ltd dated 21 November 2007.
 - (ii) Riverlinks Central Flood Study prepared by Cardno (Qld) Pty Ltd dated 7 October 2009.
 - (iii) Environmental Management Plan Ipswich Riverlink Shopping Centre Riverside Stage 2 Earthworks prepared by VDM Consulting dated March 2010.
 - (iv) Remediation Plan for the Riverlink Project North Ipswich prepared by GeoEnvironmental Consultants dated 9 February 2010.
 - (v) Third Party Review of Remediation Plan Ipswich Riverlink prepared by WSP Environmental Pty Ltd dated 9 February 2010.

- (vi) Comprehensive Health and Safety Plan prepared by VDM Consulting.
- (vii) Riverlinks Central Flood Study prepared by Cardno (Qld) Pty Ltd dated 23 July 2008.
- (viii) Riverlinks Central Flood Study Version 1 prepared by Cardno (Qld) Pty Ltd dated 23 July 2008.
- (ix) Riverlinks Central Flood Study Version 1 prepared by Cardno (Qld) Pty Ltd dated 28 August 2009.
- (f) Prior to the prestart meeting a RPEQ must provide certification that the amended drawings have been prepared in accordance with the documents listed in the above condition 8(e).
- (g) Top of batters must be located 0.5m offset to all road and adjacent property boundaries.
- (h) The developer must provide fencing along the road frontage of W.M Hughes Street adjacent to the temporary 1 in 2 batter to prevent pedestrian access to the batter.
- (i) Property owners permission from Lot 35 on SP175172 accepting the concentration of stormwater as a result of the construction of the proposed berm along the common property boundary must be submitted to Council prior to the prestart meeting. If this consent is not forthcoming the berm must be amended so that ponding of stormwater on the adjacent property does not occur.
- (j) Prior to construction commencing the developer must undertake a dilapidation survey via CCTV of the 300mm dia private sewer main. Once the Bulk Earthworks are completed a second CCTV survey of the main must be undertaken. Both surveys (including summary reports) must be submitted to Council. Any additional damage identified as being caused by these development works must be rectified by the developer.
- (k) All disturbed areas must be satisfactorily treated to ensure stability and to eliminate all scour and erosion.

9. Stormwater & Drainage

- (a) Easements must be placed over all stormwater infrastructure with a pipe diameter greater than or equal to 375mm.
- (b) Spacing of access chambers on municipal stormwater infrastructure must not exceed 90.0m. The developer must construct additional access chambers as required.
- (c) Turf must be staked in place 10.0m wide on both sides of the existing concrete low flow channel shown on drawing YCO175-BE18 Revision B.
- (d) The developer must demonstrate prior to construction that stormwater flows from outlets 1/2 and 1/1 are managed satisfactory in relation to limiting erosion from the end of the batter chute to the water line of the Bremer River.
- (e) The developer must construct the rock batter drains to the waterline of the Bremer River. The developer must ensure that all relevant approvals from State Agencies in

relation to this work within the riverbank areas must be obtained prior to the construction commencing. Additionally the developer must demonstrate that the batter drains have the capacity to contain all flows from these outlets.

- (f) Stormwater Lines 4 and 5 must be upgraded to 375mm dia pipes.
- (g) All stormwater headwall structures shall be constructed in accordance with the relevant Main Roads Department's standard drawings for reinforced concrete headwalls and aprons. This construction shall include a cut off wall on each structure.

10. Municipal Works Completion Requirements

- (a) Upon completion of the Municipal Works the Developer must submit RPEQ certification that the work has been constructed in accordance with Council construction standards, and in compliance with the approved plans and specifications. All work must be supervised by a RPEQ competent in the construction of municipal works and must be undertaken by a nominated principal contractor experienced in the construction of municipal works. Council may request evidence of the principal contractor's competency. It is expected that the RPEQ will undertake all the necessary inspections to validate the certification.
- (b) "As Constructed" information for municipal works, including all supporting certifications and test results and the Developer's audits of them, must be submitted to Council for approval prior to any "On Maintenance" inspections.
- (c) Council may, at its sole discretion, backdate "On Maintenance" acceptance to the date of Practical Completion, provided that all necessary "As-Constructed" information and supporting documentation are submitted and have gained approval within twenty (20) business days of the date of Practical Completion.
- (d) Should the Developer fail to supply all the necessary "As Constructed" information and supporting documentation to Council (to the satisfaction of the Senior Development Engineer) within twenty (20) business days of the date of Practical Completion, the acceptance date will revert to the date when all the required inspections, bonds and other documentation have been received by Council.
- (e) Not withstanding the acceptance of the works "Off Maintenance", the certifying RPEQ remains liable for defects in design and construction of all certified work. Council retains the right to call upon the RPEQ to rectify any works which fail to comply with the submitted documentation.

11. <u>Internal Works</u>

- (a) Engineering certification (by RPEQ or other competent person accepted by the Senior Development Engineer) must be submitted to Council for the construction of all internal civil works associated with the development.
- (b) The certifying authority (or his/her representative) is expected to undertake inspections as necessary to ensure the finished product conforms to standards, and is appropriate for its intended use.

(c) If any of the proposed works associated with this development within or adjacent to existing waterway triggers the Department of Natural Resources and Mines (DNRM) concurrence under the Water Resources Act 1989 or Water Act 2000, governing works within a watercourse and or water containment, the Developer shall provide Council with evidence of the DNRM licence or otherwise for these works prior to any construction commencing within the affected areas.

12. Silt Management

- (a) The Developer is responsible for the installation and maintenance of silt management facilities and truck shake down facilities from the time of commencement of construction until the works have been accepted "Off Maintenance". All silt management facilities must be designed, installed and maintained in accordance with "Best Practice Erosion and Sediment Control" published by the International Erosion and Sediment Control. Association Australasia, or equivalent. Silt and erosion control and truck shake down facilities must be installed and available for inspection prior to the pre-start meeting.
- (b) Prior to the prestart meeting the developer must provide RPEQ certification that the sediment and erosion control plans are in accordance with "Best Practice Erosion and Sediment Control" published by the International Erosion and Sediment Control Association Australasia, or equivalent.
- (c) The proposed sedimentation and erosion control plans and all proposed stormwater devices including proposed outlets are accepted subject to performance and may be subject to on-site direction from the Senior Development Engineer to the developer to change the design.
- (d) If the Senior Development Engineer determines that erosion and sediment originating from the site has caused siltation and/or erosion on other property, the Developer shall be responsible to restore any damage. Such restoration works must be completed in the time and to a standard determined by the Senior Development Engineer.
- (e) Should the Developer fail to complete the restoration works determined by the Senior Development Engineer within the specified time or to a satisfactory standard, Council may complete the work and recover all costs from the Developer associated with that work. For this purpose, the Developer must lodge a \$20,000.00 silt and erosion bond with Council, prior to the Pre-Start meeting, which shall only be released by Council at the termination of the maintenance period. Where Council determines that a drawdown of the bond is required, the Developer must restore the bond to its full amount within ten (10) business days of a notice from Council to that effect.
- (f) A 1.8m high chain wire fence must be provided around the perimeter of all sediment basins constructed as part of this approval.
- (g) The rock lined overflow channels from each sediment basin must be constructed to the waterline of the Bremer River. The developer must ensure that all relevant approvals from State Agencies in relation to this work within the riverbank areas must be obtained prior to the construction commencing.
- (h) All proposed swale drains not rock lined must be lined with turf for the full width of the swale drain if velocities of flows contained within the swales are 2.0m/s or less. Swales

with flows greater than 2.0m/s must not be lined with turf however must be suitable protected to limit scour and erosion.

13. Transport of Soil, Fill or Excavated Material

During the transportation of soil and other fill/excavated material:

- (a) All trucks hauling soil, fill or excavated material external to the site must have their loads secure and covered;
- (b) Any spillage that falls from the trucks or their wheels external to the site must be collected and removed from the site and streets along which the trucks travel, on a daily basis; and
- (c) Measures must be taken to remove soil from the wheels of vehicles prior to the vehicles exiting the site, to prevent soil and mud being deposited on public roads.

14. Approved Plans

The following is a list of the plans upon which this determination is forwarded:-

	Revision Number
Plan Number	B
YC0175-BE00	-
YC0175-BE02 to YC0175-BE06	B
YC0175-BE08 to YC0175-BE12	В
YC0175-BE15	В
YC0175-BE16-1	A
YC0175-BE16-2 to YC0175-BE16-3	В .
YC0175-BE17-1 to YC0175-BE17-3	A
YC0175-BE18 to YC0175-BE23	В
YC0176-BE00 to YC0176-BE03	В
YC0176-BE04-1 to YC0176-BE04-3	В
YC0176-BE05-1 to YC0176-BE05-4	A
YC0176-BE06 to YC0176-BE15	В
QC003754:03-C000	В
C003754:03-SK03 to C003754:03-SK04	G
C003754:03-SK05 to C003754:SK13	F
C003754:03-SK30 to C003754:03-SK31	А
C003754:03-SK32	***
C003754:03-SK092 to C003754:03-SK95	~
C003754:03-SK100 to C003754:03-SK101	Α
C003754:03-SK102 to C003754:03-SK105	
QC003754:04-C000	А
C003754:04-SK03	eq.
C003754:04-SK021	C
C003754:04-SK022 to C003754:04-SK26	В
C003754:04-SK030	Α
C003754:04-SK100 to C003754:04-SK102	

15. When Approval Takes Effect

This approval has effect in accordance with the provisions of section 339 of the Sustainable Planning Act 2009 as follows:

- (a) If the Developer does not appeal the decision to the court from the time the decision notice is given (or if a negotiated decision notice is given, from the time the negotiated decision notice is given); or
- (b) If an appeal is made to the court subject to the decision of the court, when the appeal is finally decided.

16. When Approval Lapses

- (a) This approval lapses at the end of the relevant period, unless the development happens before the end of the relevant period. The relevant period for this approval is two (2) calendar years commencing on the day the approval takes effect.
- (b) An extended relevant period may be agreed upon, pursuant to section 380 of the Sustainable Planning Act 2009, provided that a written notice to Council is submitted before the end of the relevant period. Such written notice must be submitted on Council's approved form, accompanied by the owner's consent and the prescribed fee listed in Council's Register of Fees and Charges.

17. Conditions of Concurrence Agencies

- The Department of Transport and Main Roads is a concurrence agency with regard to this development approval. The attached concurrence agency response, dated 7 June 2010, forms part of this Decision Notice.
- 2. Energex Limited is an advice agency with regard to this development approval. The attached advice agency response, dated 7 July 2010, forms part of this Decision Notice

Advice

The following advices are offered for your information only and should not be viewed as mandatory conditions of this approval.

Assessment Manager (Ipswich City Council)

1. Council has reviewed the Operational Works drawings in relation to the proposed works[Date]. A detailed check of the calculations and drawings has not been undertaken, as they must be certified by a RPEQ. Council reserves the right to require further amendments and/or additions at a later date should design errors or omissions become apparent in regard to the works relevant to this Operational Works approval

2. Fire Ants Restricted Area

In accordance with the *Plant Protection Act 1989* and the Plant Protection Regulation 1990, a quarantine notice has been issued for the State of Queensland to prevent the

spread of the Red Imported Fire Ant (ant species Solenopsis invicta) and to eradicate it from the State.

It is the legal obligation of the land owner or any consultant or contractor employed by the land owner to report the presence or suspicion of Fire Ants to the Queensland Department of Primary Industries on 132523 within 24 hours of becoming aware of the presence or suspicion, and to advise in writing within seven days to:

Director General
Department of Primary Industries
GPO Box 46, Brisbane QLD 4001

It should be noted that the movement of Fire Ants is prohibited, unless under the conditions of an Inspectors Approval. More information can be obtained from the Queensland Department of Primary Industries website www.dpi.qld.gov.au.

The land over which you have made a development application is within a suburb known to have Fire Ants and as such is within a "Restricted Area". The presence of Fire Ants on the site may affect the nature, form and extent of works permitted on the site. In view of this it will be necessary for you to contact the Department of Primary Industries to investigate the site and for you to implement any necessary matters required by that Department prior to the commencement of any works.

Attachment B

Appeal Rights

The following is an extract from the Sustainable Planning Act 2009

Chapter 6, Part 8 Division 1

Division 1 Changing decision notices and approvals during applicant's appeal period

360 Application of div 1

This division applies only during the applicant's appeal period.

361 Applicant may make representations about decision

- (1) The applicant may make written representations to the assessment manager about—
 - (a) a matter stated in the decision notice, other than a refusal or a matter about which a concurrence agency told the assessment manager under section 287(1) or (5); or
 - (b) the standard conditions applying to a deemed approval.
- (2) However, the applicant can not make representations under subsection (1)(a) about a condition attached to an approval under the direction of the Minister.

362 Assessment manager to consider representations

The assessment manager must consider any representations made to the assessment manager under section 361.

363 Decision about representations

- (1) If the assessment manager agrees with any of the representations about a decision notice or a deemed approval, the assessment manager must give a new decision notice (the negotiated decision notice) to—
 - (a) the applicant; and
 - (b) each principal submitter; and
 - (c) each referral agency; and
 - (d) if the assessment manager is not the local government and the development is in a local government area—the local government.
- Before the assessment manager agrees to a change under this section, the assessment manager must consider the matters the assessment manager was required to consider in assessing the application, to the extent the matters are relevant.
- (3) Only 1 negotiated decision notice may be given.
- (4) The negotiated decision notice—
 - (a) must be given within 5 business days after the day the assessment manager agrees with the representations; and
 - (b) must comply with section 335; and
 - (c) must state the nature of the changes; and
 - (d) replaces—
 - (i) the decision notice previously given; or
 - if a decision notice was not previously given and the negotiated decision notice relates to a deemed approval—the standard conditions applying to the deemed approval.
- (5) If the assessment manager does not agree with any of the representations, the assessment manager must, within 5 business days after the day the assessment manager decides not to agree with any of the representations, give written notice to the applicant stating the decision about the representations.

366 Applicant may suspend applicant's appeal period

- (1) If the applicant needs more time to make the representations, the applicant may, by written notice given to the assessment manager, suspend the applicant's appeal period.
- (2) The applicant may act under subsection (1) only once.
- (3) If the representations are not made within 20 business days after the day written notice was given to the assessment manager, the balance of the applicant's appeal period restarts.
- (4) If the representations are made within 20 business days after the day written notice was given to the assessment manager—
 - (a) if the applicant gives the assessment manager a notice withdrawing the notice under subsection (1)—the balance of the applicant's appeal period restarts the day after the assessment manager receives the notice of withdrawal; or

- (b) if the assessment manager gives the applicant a notice under section 363(5)—the balance of the applicant's appeal period restarts the day after the applicant receives the notice; or
- (c) if the assessment manager gives the applicant a negotiated decision notice—the applicant's appeal period starts again the day after the applicant receives the negotiated decision notice.

Chapter 7, Part 1, Division 8

Division 8 Appeals to court relating to development applications and approvals

461 Appeals by applicants

- (1) An applicant for a development application may appeal to the court against any of the following—
 - (a) the refusal, or the refusal in part, of the development application;
 - (b) any condition of a development approval, another matter stated in a development approval and the identification or inclusion of a code under section 242;
 - (c) the decision to give a preliminary approval when a development permit was applied for;
 - (d) the length of a period mentioned in section 341;
 - (e) a deemed refusal of the development application.
- (2) An appeal under subsection (1)(a), (b), (c) or (d) must be started within 20 business days (the applicant's appeal period) after—
 - (a) if a decision notice or negotiated decision notice is given—the day the decision notice or negotiated decision notice is given to the applicant; or
 - (b) otherwise—the day a decision notice was required to be given to the applicant.
- (3) An appeal under subsection (1)(e) may be started at any time after the last day a decision on the matter should have been made.

462 Appeals by submitters—general

- (1) A submitter for a development application may appeal to the court only against—
 - (a) the part of the approval relating to the assessment manager's decision about any part of the application requiring impact assessment under section 314; or
 - (b) the part of the approval relating to the assessment manager's decision under section 327.
- (2) To the extent an appeal may be made under subsection (1), the appeal may be against 1 or more of the following—
 - (a) the giving of a development approval;
 - (b) any provision of the approval including-
 - (i) a condition of, or lack of condition for, the approval; or
 - (ii) the length of a period mentioned in section 341 for the approval.
- (3) However, a submitter may not appeal if the submitter—
 - (a) withdraws the submission before the application is decided; or
 - (b) has given the assessment manager a notice under section 339(1)(b)(ii).
- (4) The appeal must be started within 20 business days (the *submitter's appeal period*) after the decision notice or negotiated decision notice is given to the submitter.

463 Additional and extended appeal rights for submitters for particular development applications

- (1) This section applies to a development application to which chapter 9, part 7 applies.
- (2) A submitter of a properly made submission for the application may appeal to the court about a referral agency's response made by a prescribed concurrence agency for the application.
- (3) However, the submitter may only appeal against a referral agency's response to the extent it relates to—
 - (a) if the prescribed concurrence agency is the chief executive (environment)—development for an aquacultural ERA; or
 - (b) If the prescribed concurrence agency is the chief executive (fisheries)—development that is—
 - (i) a material change of use of premises for aquaculture; or
 - (ii) operational work that is the removal, damage or destruction of a marine plant.
- (4) Despite section 462(1), the submitter may appeal against the following matters for the application even if the matters relate to code assessment—
 - (a) a decision about a matter mentioned in section 462(2) if it is a decision of the chief executive (fisheries);
 - (b) a referral agency's response mentioned in subsection (2).

464 Appeals by advice agency submitters

Subsection (2) applies if an advice agency, in its response for an application, told the assessment manager to treat the response as a properly made submission.





- (2) The advice agency may, within the limits of its jurisdiction, appeal to the court about—
 - (a) any part of the approval relating to the assessment manager's decision about any part of the application requiring impact assessment under section 314; or
 - (b) any part of the approval relating to the assessment manager's decision under section 327.
- (3) The appeal must be started within 20 business days after the day the decision notice or negotiated decision notice is given to the advice agency as a submitter.
- (4) However, if the advice agency has given the assessment manager a notice under section 339(1)(b)(ii), the advice agency may not appeal the decision.

465 Appeals about decisions relating to extensions for approvals

- (1) For a development approval given for a development application, a person to whom a notice is given under section 389, other than a notice for a decision under section 386(2), may appeal to the court against the decision in the notice.
- (2) The appeal must be started within 20 business days after the day the notice of the decision is given to the person.
- (3) Also, a person who has made a request under section 383 may appeal to the court against a deemed refusal of the request.
- (4) An appeal under subsection (3) may be started at any time after the last day the decision on the matter should have been made.

466 Appeals about decisions relating to permissible changes

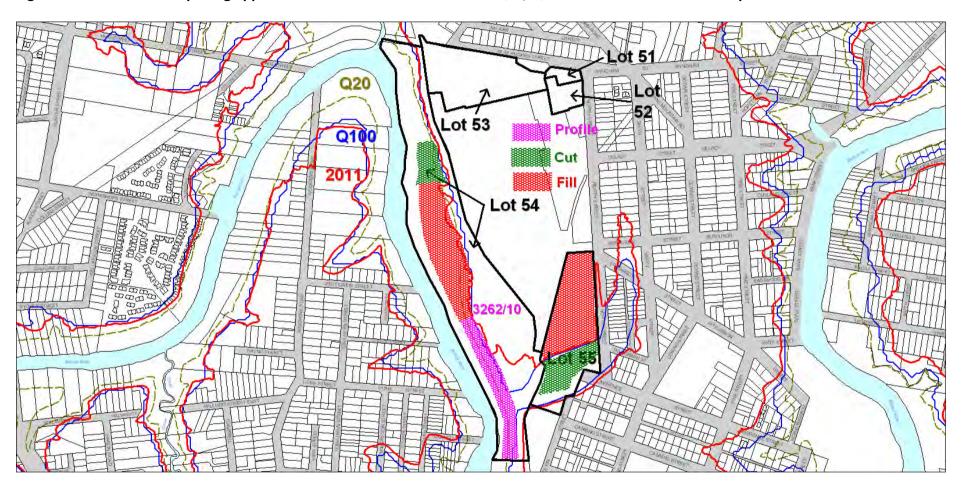
- (1) For a development approval given for a development application, the following persons may appeal to the court against a decision on a request to make a permissible change to the approval—
 - (a) If the responsible entity for making the change is the assessment manager for the application—
 - (i) the person who made the request; or
 - (ii) an entity that gave a notice under section 373 or a pre-request response notice about the request:
 - (b) if the responsible entity for making the change is a concurrence agency for the application—the person who made the request.
- (2) The appeal must be started within 20 business days after the day the person is given notice of the decision on the request under section 376.
- (3) Also, a person who has made a request under section 369 may appeal to the court against a deemed refusal of the request.
- (4) An appeal under subsection (3) may be started at any time after the last day the decision on the matter should have been made.

467 Appeals about changing or cancelling conditions imposed by assessment manager or concurrence agency

- (1) A person to whom a notice under section 378(9)(b) giving a decision to change or cancel a condition of a development approval has been given may appeal to the court against the decision in the notice.
- (2) The appeal must be started within 20 business days after the day the notice of the decision is given to the person.

Attachment GE-5

Figure 1: Location Plan depicting approximate extent of earthworks and Q20, Q100 and 2011 Event Flood Map.



Attachment GE-6





RIVERLINKS CENTRAL

Flood Study



Cardno (Qld) Pty Ltd

ABN 57 051 074 992

5 Gardner Close Milton Q 4064

PO Box 388 Toowong

Queensland 4066 Australia

Telephone: 07 3369 9822

Facsimile: 07 3369 9722

International: +61 7 3369 9822

cardno@cardno.com.au

www.cardno.co m.au

Document Control													
Varaian	Data	Author		Reviewer									
Version	Date	Name	Initials	Name	Initials								
1	23 July 2008												

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RIVERLINK CENTRAL FLOOD STUDY

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Figure 1 Locality Plan

Figure 2 Proposed Development and MIKE11 Cross-sections

APPENDICES

APPENDIX A MIKE11 Cross-sections



1. INTRODUCTION

It is propose d to constru ct some units along the Bremer River as p art of the Riverlink's development. The location of the proposed development is shown in Figure 1. As the proposed development is located within the existing extent of flood in undation of the Bremer River, compensatory excavation was required to ensure that the development did not impact on peak flood levels for neighbouring properties.

This flood study details the m odelling that has been undertaken in relation to the proposed development.



2. HYDRAULIC MODEL

2.1 Previous Modelling

To conduct the hyd raulic assessment, Ipswic h City Council (ICC) made a vailable a small section of The Ipswich Rivers MIKE11 h ydraulic model. The extracted portion of the MIKE11 model included the reach of the Brem er River upstream and do wnstream of the proposed development site under existing conditions. The truncated model reach is from cross section BREM1010020 to BREM1014640.

Cardno previously completed an analysis of the Riverlinks development downstream of the proposed units. Further analysis of this area was conducted in June 2008 for the proposed Medical Centre in the northern section of the Riverlinks development. This MIKE11 mode I was used for this analysis as it represents the current plan of development. In the are a of interest (BREM 1011150 to BREM 1010700) cross-sections were located at approximately 100m intervals, so as to provide sufficient detail of the development area.

The "existing case" mod el did not in clude the Ri verlinks development do wnstream of the proposed units. The "developed case" model did include this downstream development.

Earthworks design for the "developed case" was carried out by Burchill VDM for the proposed development area following a preliminary analysis of the site using MIKE11. The MIKE11 cross-sections for the existing and developed cases are shown in Appendix B.

2.2 Design Events

The main de sign case be ing analysed was the Brisbane River 30 hour floo d event, which was previously identified in the SKM Ipswich Rivers Flood Study (IRFS) as being the event that produced the maximum water levels in the area of the Riverlinks development. As the IRFS is currently under review, the 50 year ARI event is assumed to give the 100 year ARI flood levels. The 100 year ARI p eak flood le vel in the proposed de velopment area is therefore 18.30 m AHD. The 50, 20 and 10 and 5 year Brisbane River flood events were examined.

To ensure that the proposed development did not result in affl uxes for local flood events, the Bremer River 18 hour flood was also analysed. The 1 00 and 50 year Bremer River flood events were examined.

2.3 Proposed Development

The extent of filling and excavation for the proposed development are shown in Figure 2.

For the area of fill a buffer of at least 30 me tres along the riverbank was maintained in the proposed development area. The batter profile includes a 1 in 3 batter to a 3 metre wide access track at 12.00 m AHD, and then a 1 in 2 reinforced batter to 19.50m AHD.

It is proposed to excavate an area to the north of the proposed development. A buffer of 30 metres was maintained b etween the extent of the proposed excavation and the rive rbank. The slope of the batters was 1 in 3, and the level of excavation was limited to 9.50 m AHD. The proposed excavation extends approximately 100 metres north from the extent of filling.

The Manning's n roughness value in the proposed development area was 0.08, which was less than the 'existing case' roughness value in the area.



3. MIKE 11 RESULTS

3.1 Brisbane River Flood Events

The peak water level results of MIKE 11 for the Brisbane River flood events are shown in Table 1. The proposed development area is highlighted. As is shown in this table the peak water levels are slightly reduced upstream of the proposed development due to the Riverlinks development.

Table 1 Peak Water Levels – Brisbane River Flood Events

	100 Year ARI Event			> 20	Year ARI Ev	ent/	> 10	Year ARI Ev	ent	> 5 Year ARI Event			
Cross-section	ı	BRIS 50Y30H	I		BRIS 20Y30H	I		BRIS 10Y30H		BRIS 5Y30H			
Closs-section	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	
BREM 1010020.00	18.42	18.38	-37	16.39	16.34	-52	13.68	13.62	-61	11.23	11.18	-51	
BREM 1010090.00	18.37	18.33	-37	16.33	16.28	-52	13.61	13.55	-64	11.15	11.10	-52	
BREM 1010150.00	18.32	18.30	-22	16.29	16.25	-37	13.56	13.51	-48	11.09	11.05	-42	
BREM 1010250.00	18.32	18.30	-16	16.28	16.25	-30	13.56	13.51	-43	11.09	11.05	-40	
BREM 1010340.00	18.26	18.21	-53	16.23	16.17	-58	13.49	13.43	-55	11.01	10.97	-42	
BREM 1010430.00	18.22	18.16	-62	16.19	16.13	-62	13.46	13.40	-58	10.99	10.95	-44	
BREM 1010510.00	18.15	18.10	-47	16.12	16.07	-49	13.40	13.35	-48	10.93	10.89	-37	
BREM 1010590.00	17.99	17.97	-23	15.99	15.96	-29	13.27	13.24	-32	10.82	10.79	-22	
BREM 1010645.00	18.01	18.00	-10	15.99	15.96	-21	13.25	13.23	-28	10.79	10.77	-21	
BREM 1010700.00	17.90	17.89	-6	15.90	15.88	-19	13.19	13.16	-28	10.73	10.71	-20	
BREM 1010890.00	17.69	17.68	-6	15.71	15.70	-19	13.02	12.99	-28	10.57	10.55	-21	
BREM 1010915.00	17.61	17.61	-8	15.64	15.62	-20	12.95	12.92	-28	10.51	10.49	-20	
BREM 1010950.00	17.56	17.57	4	15.60	15.59	-9	12.92	12.89	-22	10.48	10.46	-18	
BREM 1010985.00	17.56	17.57	2	15.60	15.59	-11	12.91	12.89	-22	10.47	10.46	-17	
BREM 1011040.00	17.56	17.55	-15	15.59	15.57	-25	12.90	12.87	-31	10.45	10.43	-21	
BREM 1011090.00	17.52	17.51	-9	15.56	15.54	-19	12.88	12.85	-28	10.44	10.42	-20	
BREM 1011185.00	17.47	17.45	-23	15.51	15.47	-32	12.81	12.78	-30	10.38	10.36	-21	



	100 Year ARI Event			> 20	Year ARI Ev	rent	> 10	Year ARI E	rent	> 5	Year ARI Ev	ent	
Cross-section		BRIS 50Y30H	I		BRIS 20Y30H	l		BRIS 10Y30H	l	BRIS 5Y30H			
Ci O33-Section	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)	
BREM 1011320.00	17.43	17.42	-12	15.46	15.44	-23	12.76	12.74	-15	10.32	10.31	-4	
BREM 1011465.00	17.33	17.32	-5	15.36	15.35	-12	12.68	12.67	-8	10.25	10.25	-3	
BREM 1011575.00	17.21	17.21	7	15.25	15.24	-14	12.58	12.57	-10	10.16	10.16	-3	
BREM 1011700.00	17.05	17.07	18	15.10	15.10	-7	12.45	12.44	-8	10.05	10.04	-5	
BREM 1011790.00	16.96	16.94	-12	15.00	14.98	-26	12.35	12.33	-18	9.95	9.95	-7	
BREM 1011810.00	16.91	16.90	-9	14.97	14.95	-14	12.31	12.30	-12	9.91	9.91	-3	
BREM 1011930.00	16.82	16.80	-16	14.86	14.85	-14	12.19	12.19	-2	9.78	9.79	6	
BREM 1012045.00	16.77	16.77	0	14.81	14.81	0	12.14	12.14	0	9.73	9.73	0	
BREM 1012050.00	16.80	16.80	0	14.84	14.84	0	12.17	12.17	0	9.76	9.76	0	
BREM 1012070.00	16.79	16.79	0	14.82	14.82	0	12.15	12.15	0	9.68	9.68	0	
BREM 1012200.00	16.75	16.75	0	14.78	14.78	0	12.11	12.11	0	9.64	9.64	0	
BREM 1012870.00	16.73	16.73	0	14.76	14.76	0	12.09	12.09	0	9.61	9.61	0	
BREM 1013380.00	16.70	16.70	0	14.72	14.72	0	12.03	12.03	0	9.55	9.55	0	
BREM 1013700.00	16.68	16.68	0	14.69	14.69	0	12.00	12.00	0	9.52	9.52	0	
BREM 1014220.00	16.58	16.58	0	14.56	14.56	0	11.89	11.89	0	9.41	9.41	0	
BREM 1014640.00	16.52	16.52	0	14.50	14.50	0	11.83	11.83	0	9.36	9.36	0	



The peak velocity results of MIKE 11 for the Brisbane River flood events are shown in Table 2. The proposed development area is highlighted. As is shown in this table the impact of the proposed development on peak velocities is minimal.

Table 2 Peak Velocities – Brisbane River Flood Events

	100 Year ARI Event			> 20	Year ARI Ev	ent	> 10	Year ARI Ev	ent	> 5 Year ARI Event			
Cross-section	1	BRIS 50Y30H	l		BRIS 20Y30H	l		BRIS 10Y30H			BRIS 5Y30H		
C1033-3CC11011	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	
BREM 1010020.00	1.72	1.73	0.00	1.55	1.56	0.01	1.40	1.42	0.01	1.33	1.34	0.01	
BREM 1010090.00	1.60	1.61	0.01	1.50	1.51	0.01	1.44	1.45	0.01	1.34	1.35	0.01	
BREM 1010150.00	1.63	1.64	0.01	1.59	1.60	0.01	1.48	1.44	-0.04	1.44	1.45	0.01	
BREM 1010250.00	1.20	1.11	-0.09	1.10	1.03	-0.07	1.04	0.96	-0.08	0.96	0.96	0.00	
BREM 1010340.00	1.51	1.62	0.11	1.47	1.49	0.02	1.40	1.41	0.02	1.30	1.31	0.01	
BREM 1010430.00	1.31	1.58	0.27	1.24	1.41	0.17	1.17	1.26	0.09	1.10	1.12	0.02	
BREM 1010510.00	1.42	1.56	0.14	1.30	1.41	0.11	1.19	1.26	0.07	1.09	1.12	0.03	
BREM 1010590.00	1.84	1.87	0.04	1.67	1.69	0.02	1.53	1.54	0.01	1.36	1.37	0.00	
BREM 1010645.00	1.37	1.38	0.01	1.34	1.34	0.01	1.26	1.27	0.01	1.19	1.19	0.00	
BREM 1010700.00	1.62	1.62	0.00	1.46	1.46	0.00	1.31	1.32	0.00	1.16	1.16	0.00	
BREM 1010890.00	1.68	1.68	0.00	1.50	1.50	0.00	1.35	1.36	0.01	1.21	1.21	0.00	
BREM 1010915.00	1.99	1.99	0.00	1.80	1.81	0.00	1.66	1.66	0.00	1.52	1.51	-0.01	
BREM 1010950.00	2.00	1.93	-0.07	1.79	1.74	-0.05	1.60	1.56	-0.04	1.42	1.40	-0.02	
BREM 1010985.00	1.75	1.71	-0.04	1.56	1.52	-0.04	1.39	1.36	-0.04	1.22	1.19	-0.03	
BREM 1011040.00	1.48	1.56	0.07	1.34	1.41	0.06	1.22	1.25	0.03	1.10	1.11	0.01	
BREM 1011090.00	1.54	1.56	0.02	1.36	1.38	0.01	1.16	1.17	0.01	0.97	0.98	0.00	
BREM 1011185.00	1.46	1.59	0.13	1.35	1.44	0.08	1.28	1.30	0.02	1.15	1.16	0.01	
BREM 1011320.00	1.19	1.20	0.00	1.15	1.08	-0.07	1.07	0.98	-0.08	1.02	0.88	-0.13	
BREM 1011465.00	1.38	1.45	0.07	1.28	1.29	0.01	1.12	1.11	-0.01	0.95	0.93	-0.01	
BREM 1011575.00	1.71	1.82	0.11	1.58	1.64	0.06	1.46	1.47	0.01	1.29	1.29	0.00	
BREM 1011700.00	1.92	1.96	0.04	1.72	1.75	0.03	1.56	1.57	0.02	1.37	1.39	0.01	



	100 Year ARI Event BRIS 50Y30H			> 20) Year ARI Ev	ent	> 10) Year ARI Ev	ent/	> 5	Year ARI Ev	ent
Cross-section				BRIS 20Y30H				BRIS 10Y30H	l	BRIS 5Y30H		
Cross-section	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)
BREM 1011790.00	1.95	2.06	0.11	1.74	1.83	0.09	1.56	1.61	0.05	1.37	1.40	0.03
BREM 1011810.00	1.92	2.04	0.12	1.74	1.82	0.08	1.58	1.62	0.04	1.41	1.41	0.01
BREM 1011930.00	1.72	1.82	0.10	1.63	1.66	0.03	1.51	1.49	-0.02	1.37	1.36	-0.01
BREM 1012045.00	1.64	1.63	0.00	1.57	1.57	0.00	1.39	1.39	0.00	1.29	1.29	0.00
BREM 1012050.00	1.31	1.31	0.00	1.18	1.18	0.00	1.06	1.06	0.00	0.93	0.93	0.00
BREM 1012070.00	1.31	1.32	0.00	1.18	1.18	0.00	1.06	1.06	0.00	0.94	0.94	0.00
BREM 1012200.00	1.61	1.61	0.00	1.49	1.49	0.00	1.35	1.35	0.00	1.23	1.23	0.00
BREM 1012870.00	1.02	1.02	0.00	0.89	0.89	0.00	0.78	0.78	0.00	0.69	0.69	0.00
BREM 1013380.00	1.35	1.35	0.00	1.28	1.28	0.00	1.10	1.10	0.00	1.06	1.06	0.00
BREM 1013700.00	1.31	1.30	0.00	1.27	1.26	0.00	0.95	0.95	0.00	0.99	0.99	0.00
BREM 1014220.00	1.66	1.66	0.00	1.50	1.51	0.00	1.37	1.37	0.00	1.23	1.23	0.00
BREM 1014640.00	1.63	1.63	0.00	1.44	1.45	0.00	1.28	1.28	0.00	1.13	1.13	0.00



3.2 Bremer River Flood Events

The peak w ater level re sults of MIKE 11 for the Bremer River flood eve nts are shown in Table 3. The proposed development area is highlighted. As is shown in this table the peak water le vels are slightly reduced upstream of the prop osed development due to the Riverlinks development.

Table 3 Peak Water Levels – Bremer River Flood Events

	> 10	0 Year ARI E	vent	> 50 Year ARI Event						
Cross-section	В	REM 100Y18	Н	В	REM 50Y18	Н				
Closs-section	Ex Case	Dev Case	Afflux (mm)	Ex Case	Dev Case	Afflux (mm)				
BREM 1010020.00	19.12	19.07	-51	17.17	17.13	-46				
BREM 1010090.00	19.06	19.01	-54	17.11	17.06	-47				
BREM 1010150.00	19.00	18.96	-35	17.05	17.02	-29				
BREM 1010250.00	19.00	18.97	-25	17.05	17.03	-20				
BREM 1010340.00	18.93	18.85	-76	16.98	16.92	-57				
BREM 1010430.00	18.87	18.78	-92	16.93	16.87	-64				
BREM 1010510.00	18.78	18.70	-75	16.84	16.80	-47				
BREM 1010590.00	18.57	18.53	-46	16.67	16.65	-20				
BREM 1010645.00	18.60	18.57	-25	16.67	16.66	-8				
BREM 1010700.00	18.45	18.43	-21	16.56	16.55	-6				
BREM 1010890.00	18.16	18.14	-23	16.31	16.30	-6				
BREM 1010915.00	18.06	18.04	-25	16.22	16.21	-7				
BREM 1010950.00	17.99	17.98	-8	16.16	16.17	8				
BREM 1010985.00	17.99	17.98	-11	16.16	16.17	6				
BREM 1011040.00	17.98	17.95	-35	16.15	16.13	-13				
BREM 1011090.00	17.93	17.90	-27	16.10	16.10	-6				
BREM 1011185.00	17.86	17.81	-45	16.04	16.01	-25				
BREM 1011320.00	17.81	17.78	-29	15.98	15.97	-13				
BREM 1011465.00	17.66	17.65	-17	15.85	15.84	-2				
BREM 1011575.00	17.49	17.49	5	15.70	15.69	-4				
BREM 1011700.00	17.26	17.28	25	15.50	15.50	5				
BREM 1011790.00	17.11	17.09	-22	15.36	15.34	-21				
BREM 1011810.00	17.04	17.02	-13	15.31	15.29	-17				
BREM 1011930.00	16.89	16.86	-28	15.16	15.14	-20				
BREM 1012045.00	16.79	16.79	0	15.08	15.08	-1				
BREM 1012050.00	16.84	16.84	0	15.13	15.13	0				
BREM 1012070.00	16.82	16.82	0	15.10	15.10	0				
BREM 1012200.00	16.75	16.75	0	15.04	15.04	0				
BREM 1012870.00	16.71	16.71	-1	15.01	15.01	0				
BREM 1013380.00	16.66	16.66	0	14.96	14.96	0				
BREM 1013700.00	16.62	16.62	0	14.92	14.92	0				
BREM 1014220.00	16.43	16.43	0	14.74	14.74	0				
BREM 1014640.00	16.30	16.30	0	14.65	14.65	0				



The peak velocity results of MIKE11 for the Bremer River flood events are shown in Table 4. The prop osed development area is highlighted. As is shown in this table the impact of the proposed development on peak velocities is minimal.

Table 4 Peak Velocities – Bremer River Flood Events

	> 100 Year ARI Event			> 50 Year ARI Event		
Cross-section	BREM 100Y18H			BREM 50Y18H		
	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)
BREM 1010020.00	1.96	1.97	0.01	1.76	1.77	0.01
BREM 1010090.00	1.77	1.78	0.01	1.67	1.68	0.01
BREM 1010150.00	1.76	1.68	-0.08	1.65	1.56	-0.09
BREM 1010250.00	1.35	1.26	-0.09	1.25	1.15	-0.10
BREM 1010340.00	1.55	1.81	0.26	1.50	1.69	0.19
BREM 1010430.00	1.48	1.81	0.33	1.36	1.62	0.26
BREM 1010510.00	1.58	1.77	0.19	1.48	1.61	0.14
BREM 1010590.00	2.09	2.15	0.06	1.91	1.94	0.03
BREM 1010645.00	1.46	1.46	0.00	1.43	1.43	0.01
BREM 1010700.00	1.86	1.86	0.00	1.68	1.68	0.00
BREM 1010890.00	1.94	1.94	0.00	1.74	1.74	0.00
BREM 1010915.00	2.28	2.29	0.01	2.08	2.08	0.00
BREM 1010950.00	2.30	2.23	-0.07	2.08	2.02	-0.06
BREM 1010985.00	2.03	1.99	-0.04	1.82	1.77	-0.05
BREM 1011040.00	1.71	1.80	0.10	1.56	1.63	0.08
BREM 1011090.00	1.79	1.82	0.04	1.59	1.61	0.02
BREM 1011185.00	1.67	1.81	0.15	1.54	1.67	0.13
BREM 1011320.00	1.23	1.32	0.10	1.19	1.26	0.07
BREM 1011465.00	1.55	1.62	0.07	1.45	1.52	0.07
BREM 1011575.00	1.96	2.02	0.06	1.80	1.90	0.11
BREM 1011700.00	2.22	2.19	-0.03	2.01	2.05	0.04
BREM 1011790.00	2.22	2.33	0.11	2.05	2.17	0.12
BREM 1011810.00	2.22	2.34	0.12	2.03	2.15	0.12
BREM 1011930.00	1.92	2.03	0.11	1.82	1.93	0.11
BREM 1012045.00	1.89	1.89	0.00	1.72	1.72	0.00
BREM 1012050.00	1.54	1.54	0.00	1.38	1.39	0.00
BREM 1012070.00	1.54	1.54	0.00	1.39	1.39	0.00
BREM 1012200.00	1.83	1.83	0.00	1.70	1.70	0.00
BREM 1012870.00	1.22	1.22	0.00	1.07	1.07	0.00
BREM 1013380.00	1.33	1.33	0.00	1.29	1.30	0.00
BREM 1013700.00	1.24	1.24	-0.01	1.10	1.10	0.00
BREM 1014220.00	1.90	1.90	0.00	1.77	1.77	0.00
BREM 1014640.00	1.95	1.95	0.00	1.74	1.74	0.00



3.3 Results Summary

The results of MIKE11 show that the Riverlinks development, including the proposed units does not increase the flood levels for neighbouring properties. In the proposed location of the units there is generally a decrease in peak water levels of up to 92mm.

The increase to peak ve locities is minimal, the largest increases (0.33 m/s) occur around the propose didevel opment area and do not extend upstream or downstream of the Riverlinks development.

3.4 Defined Flood Level

The platform level pro posed for the units is 19.50m AHD. The 100 year flood level (from the 50 year Brisbane River flood e vent) is 18.30m AHD in the area of development. This will provide the proposed units with 1200mm of freeboard, which is more than sufficient for habitable floor levels. Section 11.4.7 of the Ipswich Planning Scheme specifies 250mm of freeboard be provided above the 100 year ARI flood level.



4. CONCLUSION

MIKE11 modelling has shown that the proposed development, due to compensatory excavation, does not increase flood levels for neighbouring properties. The proposed development does produce slight increases to the peak velocities. However, these increases are constrained to the area of development and are only observed for major flood events, so the impact is considered to be minor.

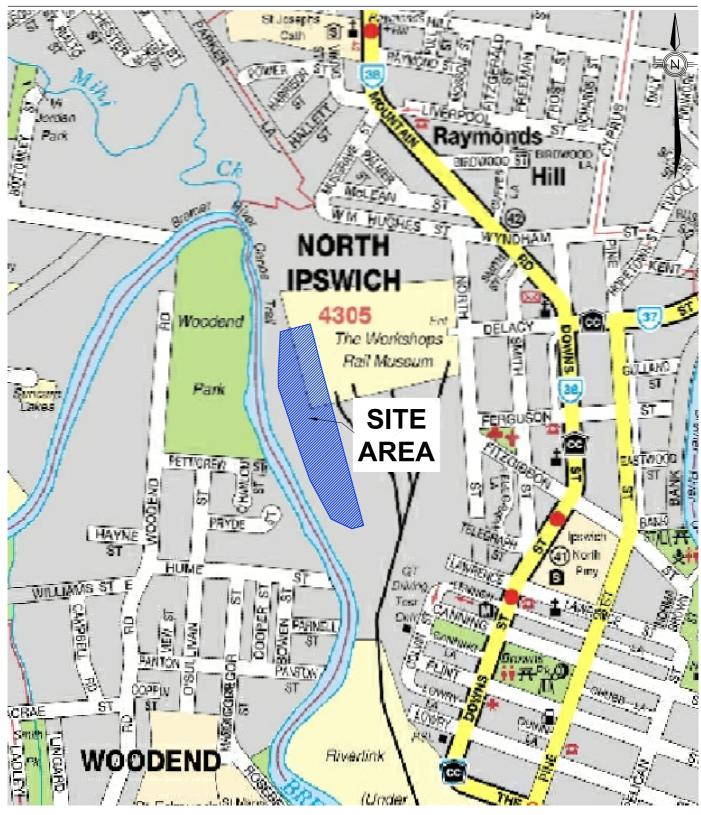


FIGURES

Figure 1 Locality Plan

Figure 2 Proposed Development and MIKE11 Cross-sections





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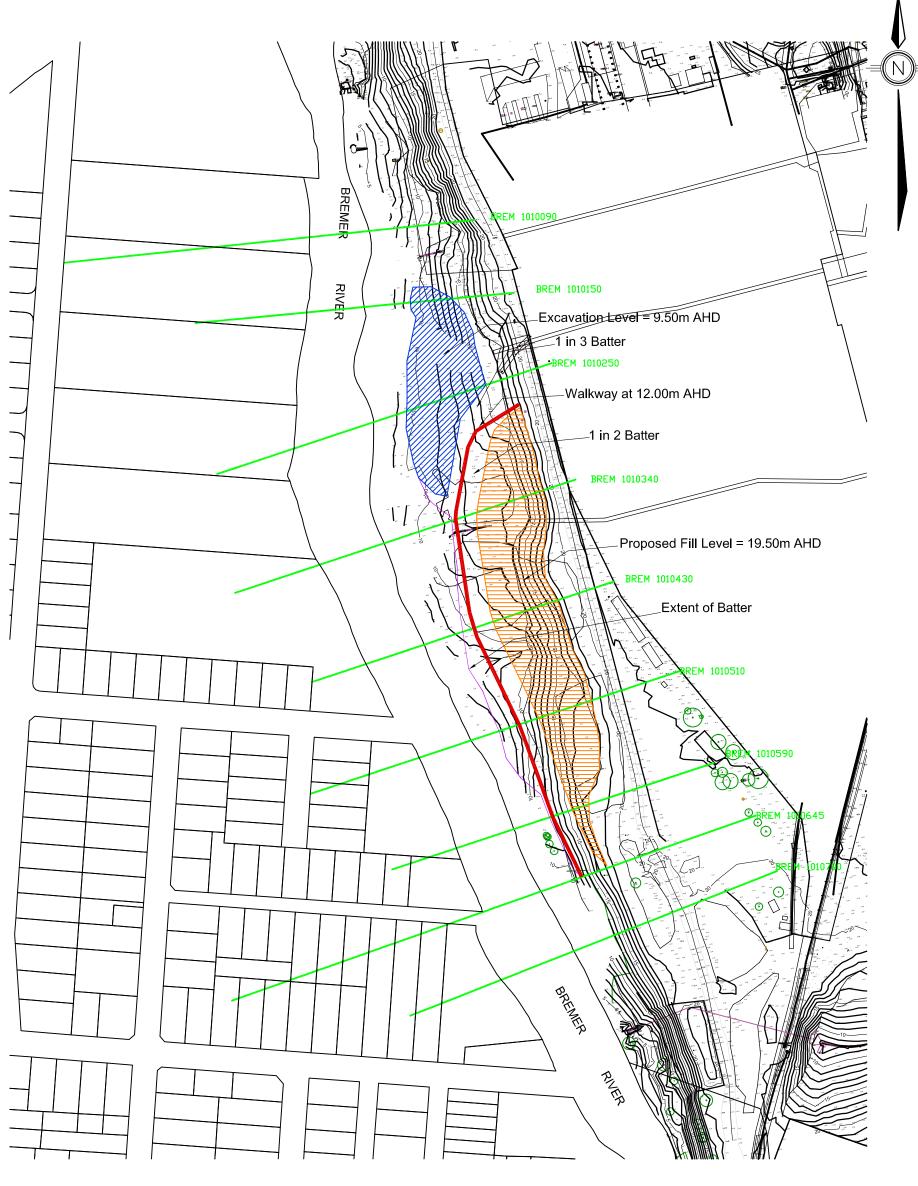
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FIGURE 1
LOCALITY PLAN

Project No. 3502/84/2





LEGEND

MIKE11 Cross-section

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90 120

Scale 1:3000 (A3)

FIGURE 2

PROPOSED DEVELOPMENT AND MIKE11 CROSS_SECTIONS

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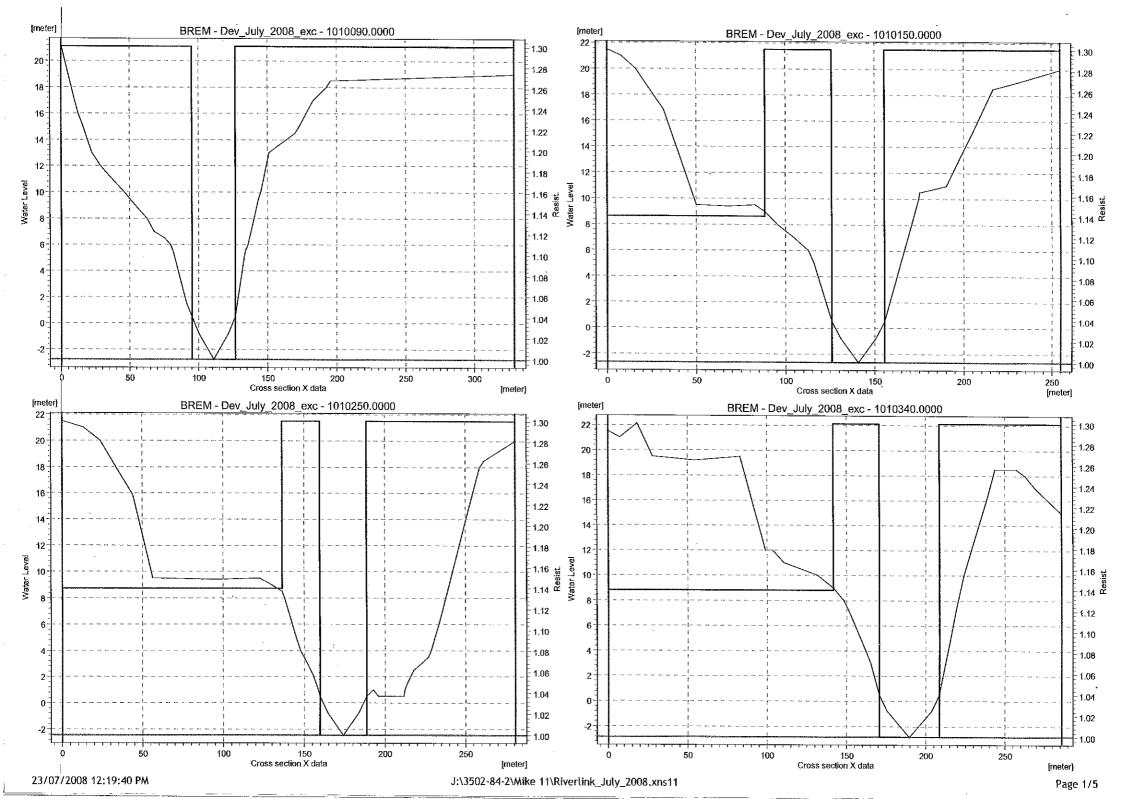
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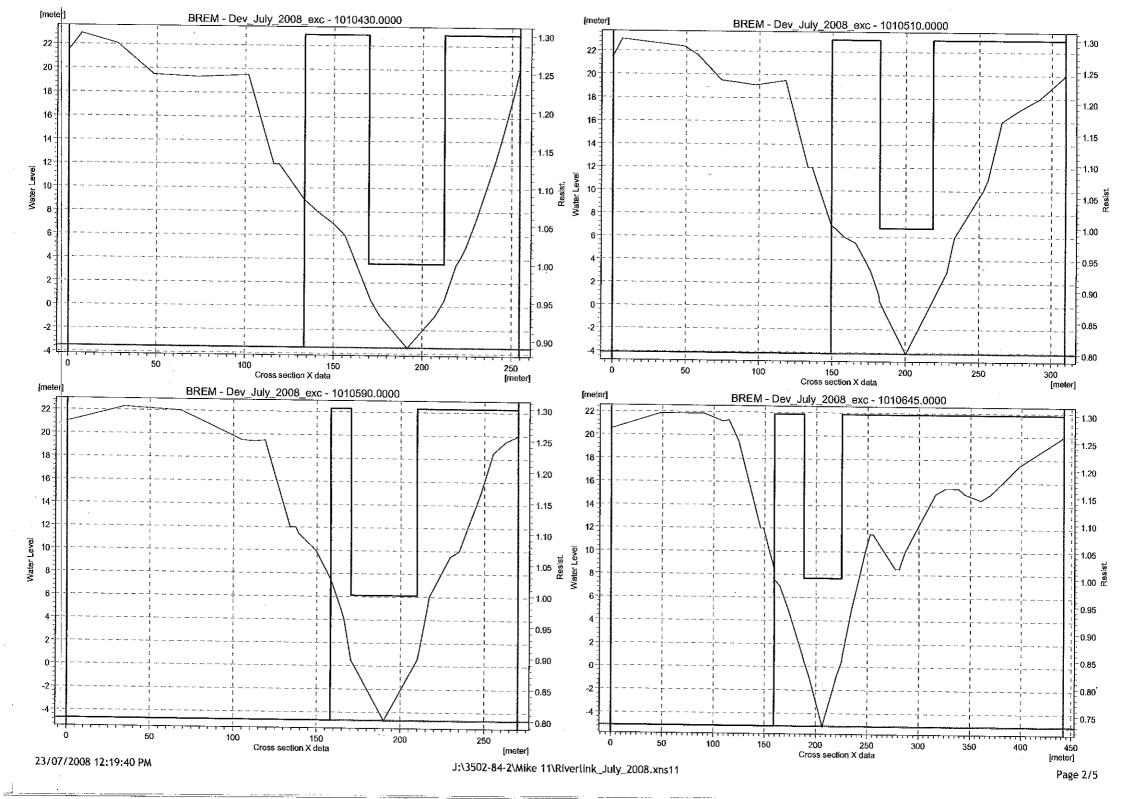
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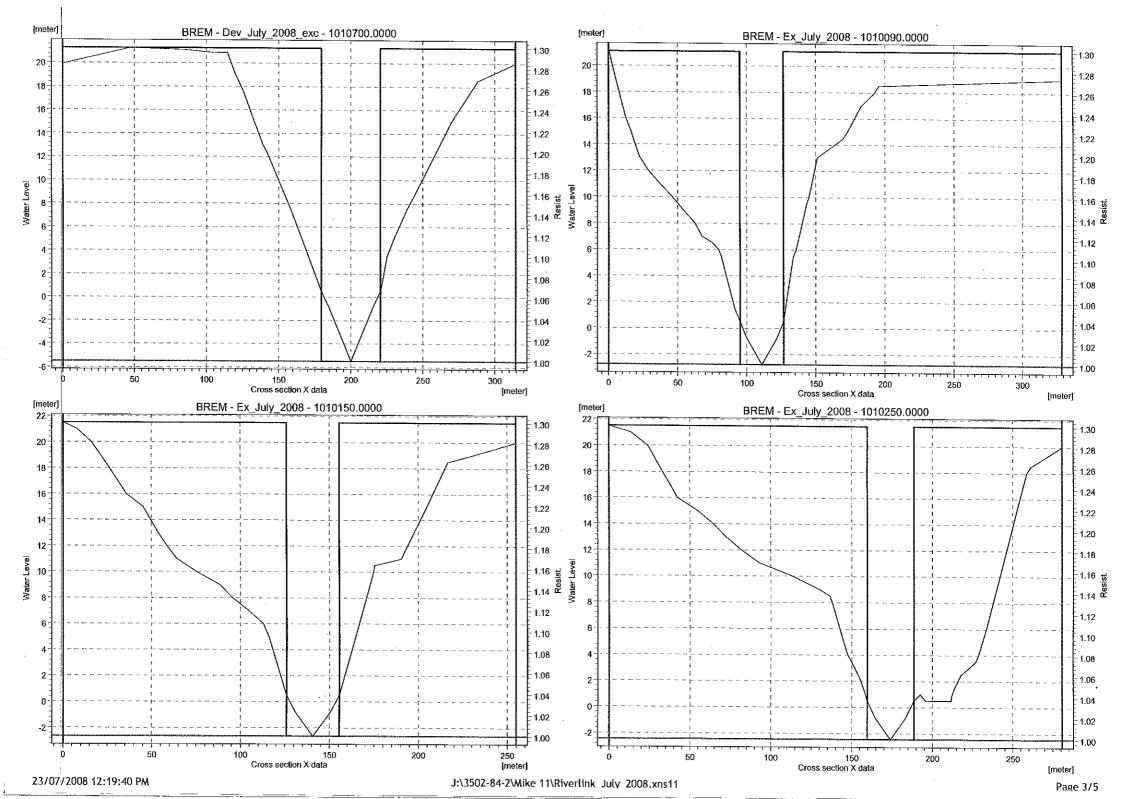


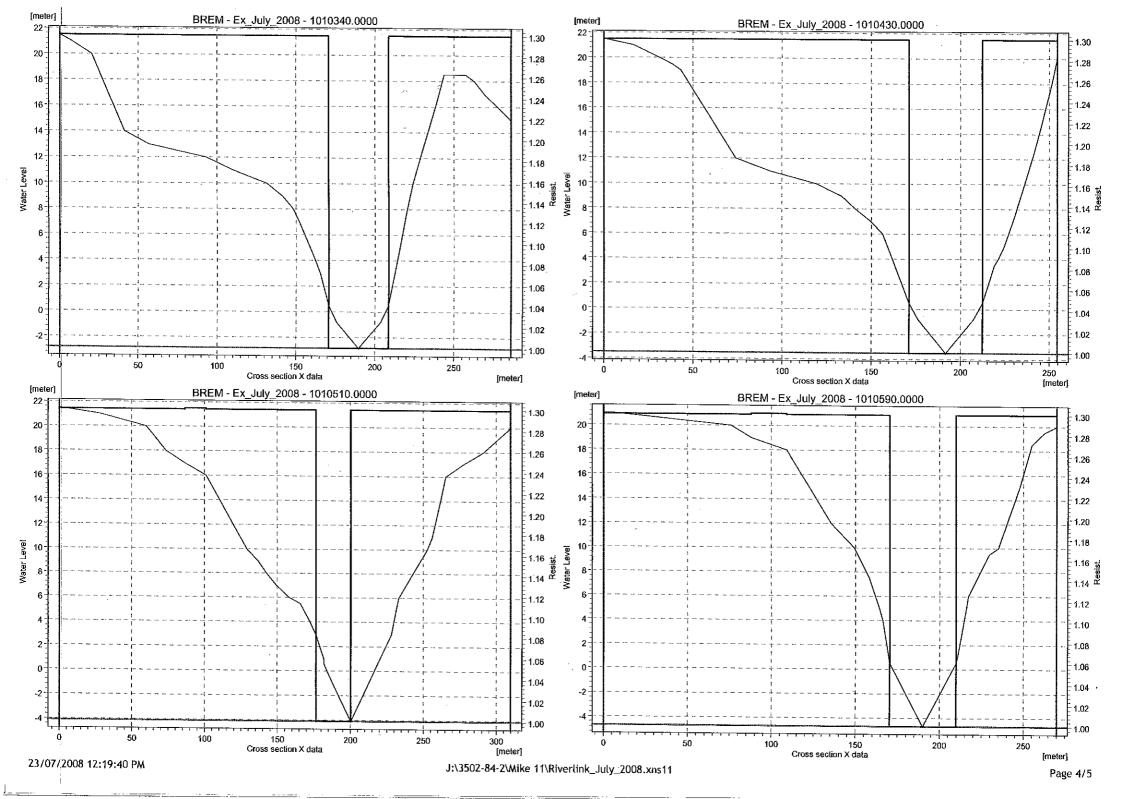
APPENDIX A

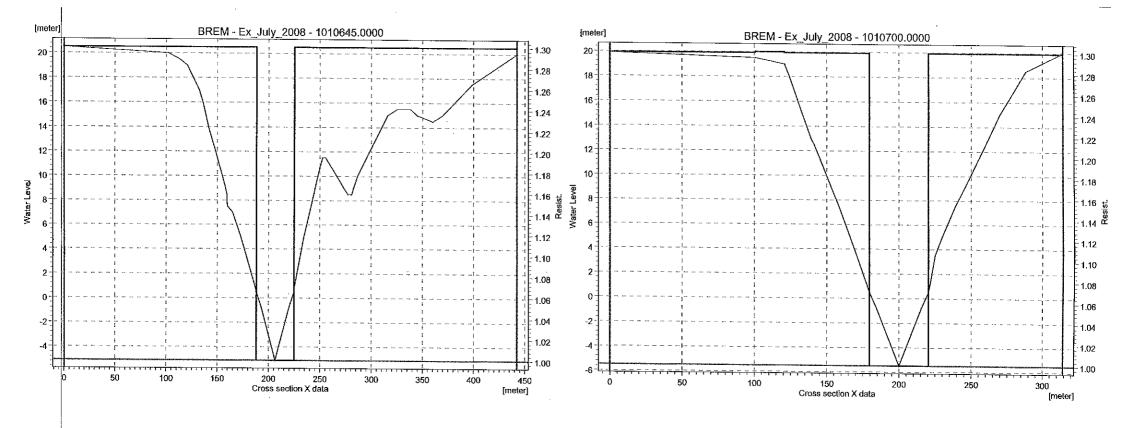
MIKE11 Cross-sections











Attachment GE-7





RIVERSIDE CENTRAL

Flood Study



Cardno (Qld) Pty Ltd

ABN 57 051 074 992

Level 11 Green Square North Tower

515 St Paul's Terrace

Fortitude Valley Qld 4064

Locked Bag 4006 Fortitude Valley

Queensland 4006 Australia

Telephone: 07 3369 9822

Facsimile: 07 3369 9722

International: +61 7 3369 9822

cardno@cardno.com.au

www.cardno.com.au

Document C	ontrol				
Version Dete		Author Revie	wer		
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1	28/08/2009				

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RIVERSIDE CENTRAL FLOOD STUDY

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Figure 1 Locality Plan

Figure 2 Proposed Development and MIKE11 Cross-sections

APPENDICES

APPENDIX A Proposed Development
APPENDIX B M11 Cross Sections



1. INTRODUCTION

The subject site is loca ted adjacent to the Bremer River in No rth Ipswich (refer Figure 1). Works are proposed on the site involving redefinition of the existing profile across the site to incorporate roads and footpaths.

The proposed modification to the site will involve excavation and some fill resulting in a net reduction in the sites pro file. As such, the proposed works are not predicted to increase peak flood levels for neighbouring properties.

This flood study details the m odelling that has been undertaken in relation to the proposed works.



2. HYDRAULIC MODEL

2.1 Previous Modelling

To conduct the hyd raulic assessment, Ipswic h City Council (ICC) made a vailable a small section of The Ipswich Rivers MIKE11 h ydraulic model. The extracted portion of the MIKE11 model included the reach of the Brem er River upstream and do wnstream of the proposed development site under existing conditions. The truncated model reach is from cross section BREM1010020 to BREM1014640.

Cardno previously completed an analysis of the River Links development upstream of the currently proposed works. Further analysis of this area was conducted in June 2008 for the proposed Medical Centre in the northern section of the River Links development.

Two scenarios have been analysed. Scenario A has the River Links Development and the Medical Centre incorporated into the "Existing Case" model for the current study. Scenario B has these areas modelled in their pre-development condition for the current study's base case "B".

In ord er to allow for accurate incorporation of the current proposed works, 2 additional cross sections (BREM 1010764 and BREM 1010839) have been incorporated into the M11 model in the area of interest. Figure 2 show the M11 cross section locations in the vicinity of the site and the extent of proposed works.

2.2 Design Events

The main de sign case be ing analysed was the Brisbane River 30 hour floo d event, which was previously identified in the SKM Ipswich Rivers Flood Study (IRFS) as being the event that produced the maximum water levels in the area of the River Links de velopment. As the IRFS is currently under review, the 50 year ARI event is a ssumed to give the 100 year ARI flood levels. The 100 year ARI p eak flood level in the pro posed development area is therefore 18.30 m AHD. The 50, 20 and 10 and 5 year Brisbane River flood events were examined.

To ensure that the proposed development did not result in affl uxes for local flood events, the Bremer River 18 hour flood was also analysed. The 100 and 50, 20, 10, 5 and 2 year Bremer River flood events were examined.

2.3 Pro posed Development

Earthworks design for the "developed case" was carried out by Burchill VDM for the proposed development area. The MIKE11 cro ss-sections for the existing and developed cases are shown in App endix B. The detail of the proposed works is shown in reference drawings.

The Manning's n roughn ess value in the proposed development area was 0.08, which is lower than the 'e xisting case' roughness value in the area and reflects the lan dscaping expected to occur on the river bank. Figure 2 shows the extent of such modification.



3. MIKE 11 RESULTS

3.1 Scenario A - Brisbane River Flood Events with River Links Development

This section reports on Brisbane River flood MIKE11 results which have the River Links Development incorporated into the "Existing Conditions" model. The peak water I evel results of MIKE 11 for the Brisba ne River flood events are shown in Table 3. The proposed development area is highlighted. As is shown in this table the peak water levels are slightly reduced upstream of the proposed development due to the proposed works.

Table 1 Scenario A - Peak Water Levels - Brisbane River Flood Events

	100	Year ARI Ev	ent	> 20	Year ARI E	/ent	> 10	Year ARI Ev	ent	> 5	Year ARI Ev	ent
Cross-section	E	BRIS 50Y30H	1	E	3RIS 20Y30H	ł	I	BRIS 10Y30H			BRIS 5Y30H	
Closs-section	Ex Case	Dev Case	Afflux (mm)									
BREM 1010020	18.37	18.35	-25	16.33	16.31	-19	13.66	13.64	-15	11.17	11.16	-10
BREM 1010090	18.32	18.29	-25	16.27	16.25	-20	13.58	13.57	-15	11.09	11.08	-10
BREM 1010150	18.29	18.26	-25	16.24	16.22	-20	13.55	13.54	-15	11.04	11.03	-10
BREM 1010250	18.29	18.27	-25	16.24	16.22	-20	13.55	13.54	-15	11.04	11.03	-10
BREM 1010340	18.20	18.17	-26	16.16	16.14	-20	13.47	13.46	-15	10.96	10.95	-11
BREM 1010430	18.15	18.12	-26	16.12	16.10	-20	13.44	13.43	-15	10.94	10.93	-11
BREM 1010510	18.09	18.06	-27	16.06	16.04	-21	13.39	13.37	-16	10.88	10.87	-11
BREM 1010590	17.96	17.93	-27	15.95	15.93	-21	13.28	13.27	-16	10.79	10.78	-11
BREM 1010645	17.99	17.96	-27	15.95	15.93	-21	13.27	13.25	-16	10.76	10.75	-11
BREM 1010700	17.88	17.85	-28	15.87	15.85	-22	13.20	13.19	-17	10.71	10.69	-11
BREM 1010764	17.79	17.77	-21	15.79	15.78	-14	13.13	13.12	-11	10.64	10.63	-6
BREM 1010839	17.70	17.70	-6	15.72	15.72	-7	13.08	13.07	-8	10.60	10.59	-7
BREM 1010890	17.68	17.68	ب 3	15.69	15.69	-1	13.04	13.04	0	10.55	10.55	0
BREM 1010915	17.60	17.61	0	15.62	15.62	0	12.98	12.98	0	10.49	10.49	0
BREM 1010950	17.56	17.56	-1	15.59	15.59	-1	12.95	12.95	-1	10.46	10.46	-1
BREM 1010985	17.57	17.57	0	15.59	15.59	0	12.95	12.95	0	10.46	10.46	0



	100	Year ARI Ev	vent .	> 20	Year ARI Ev	/ent	> 10	Year ARI E	ent/	> 5	Year ARI Ev	ent
Cross-section	E	3RIS 50Y30H	ł	ı	BRIS 20Y30H	ł	ı	BRIS 10Y30H	I		BRIS 5Y30H	
Closs-section	Ex Case	Dev Case	Afflux (mm)									
BREM 1011040	17.55	17.55	0	15.57	15.57	0	12.92	12.92	0	10.43	10.43	0
BREM 1011090	17.51	17.51	0	15.54	15.54	0	12.90	12.90	0	10.42	10.42	0
BREM 1011185	17.44	17.44	0	15.47	15.47	0	12.84	12.84	0	10.36	10.36	0
BREM 1011320	17.42	17.42	0	15.44	15.44	0	12.80	12.80	0	10.31	10.31	0
BREM 1011465	17.32	17.32	0	15.35	15.35	0	12.73	12.73	0	10.25	10.25	0
BREM 1011575	17.21	17.21	0	15.24	15.24	0	12.63	12.63	0	10.16	10.16	0
BREM 1011700	17.07	17.07	0	15.10	15.10	0	12.50	12.50	0	10.04	10.04	0
BREM 1011790	16.94	16.94	0	14.98	14.98	0	12.40	12.40	0	9.95	9.95	0
BREM 1011810	16.90	16.90	0	14.95	14.95	0	12.36	12.36	0	9.90	9.90	0
BREM 1011930	16.80	16.80	0	14.85	14.85	0	12.25	12.25	0	9.79	9.79	0
BREM 1012045	16.77	16.77	0	14.81	14.81	0	12.21	12.21	0	9.73	9.73	0
BREM 1012050	16.80	16.80	0	14.84	14.84	0	12.23	12.23	0	9.76	9.76	0
BREM 1012070	16.79	16.79	0	14.82	14.82	0	12.15	12.15	0	9.68	9.68	0
BREM 1012200	16.75	16.75	0	14.78	14.78	0	12.11	12.11	0	9.64	9.64	0
BREM 1012870	16.73	16.73	0	14.76	14.76	0	12.09	12.09	0	9.61	9.61	0
BREM 1013380	16.70	16.70	0	14.72	14.72	0	12.03	12.03	0	9.55	9.55	0
BREM 1013700	16.68	16.68	0	14.69	14.69	0	12.00	12.00	0	9.52	9.52	0
BREM 1014220	16.58	16.58	0	14.56	14.56	0	11.88	11.88	0	9.41	9.41	0



The peak velocity results of MIKE 11 for the Brisbane River flood events are shown in Table 4. The proposed development area is highlighted. As is shown in this table the impact of the proposed works on peak velocities is minimal.

Table 2 Scenario A - Peak Velocities – Brisbane River Flood Events

	100	Year ARI Ev	ent	> 20	Year ARI Ev	ent	> 10	Year ARI Ev	ent	> 5	Year ARI Ev	ent
Cross-section	ı	BRIS 50Y30H	l	ı	BRIS 20Y30H		ı	3RIS 10Y30H			BRIS 5Y30H	
Cross-section	Ex Case	Dev Case	Afflux (m/s)									
BREM 1010020	1.73	1.73	0.00	1.56	1.56	0.00	1.41	1.41	0.00	1.34	1.34	0.00
BREM 1010090	1.61	1.62	0.00	1.52	1.52	0.00	1.44	1.45	0.00	1.35	1.35	0.00
BREM 1010150	1.64	1.64	0.00	1.60	1.60	0.00	1.43	1.43	0.00	1.45	1.45	0.00
BREM 1010250	1.11	1.12	0.00	1.03	1.03	0.00	0.95	0.95	0.00	0.96	0.96	0.00
BREM 1010340	1.62	1.63	0.00	1.50	1.50	0.00	1.41	1.41	0.00	1.31	1.31	0.00
BREM 1010430	1.58	1.58	0.00	1.41	1.41	0.00	1.26	1.26	0.00	1.12	1.12	0.00
BREM 1010510	1.56	1.56	0.00	1.41	1.41	0.00	1.25	1.26	0.00	1.12	1.12	0.00
BREM 1010590	1.88	1.88	0.00	1.69	1.69	0.00	1.53	1.53	0.00	1.37	1.37	0.00
BREM 1010645	1.38	1.39	0.00	1.34	1.35	0.00	1.26	1.26	0.00	1.19	1.19	0.00
BREM 1010700	1.62	1.63	0.00	1.47	1.47	0.00	1.31	1.32	0.00	1.16	1.16	0.00
BREM 1010764	1.71	1.69	-0.02	1.56	1.52	-0.04	1.40	1.35	-0.04	1.23	1.23	0.00
BREM 1010839	1.79	1.73	-0.06	1.56	1.52	-0.04	1.34	1.31	-0.03	1.13	1.13	0.00
BREM 1010890	1.69	1.64	-0.06	1.52	1.46	-0.05	1.35	1.30	-0.06	1.21	1.21	0.00
BREM 1010915	2.00	1.95	-0.04	1.81	1.78	-0.03	1.66	1.64	-0.02	1.52	1.52	0.00
BREM 1010950	1.96	1.95	-0.01	1.76	1.76	-0.01	1.58	1.58	0.00	1.41	1.41	0.00
BREM 1010985	1.71	1.71	0.00	1.52	1.52	0.00	1.35	1.35	0.00	1.19	1.19	0.00
BREM 1011040	1.56	1.56	0.00	1.41	1.41	0.00	1.25	1.25	0.00	1.11	1.11	0.00
BREM 1011090	1.56	1.56	0.00	1.38	1.38	0.00	1.16	1.16	0.00	0.98	0.98	0.00
BREM 1011185	1.59	1.59	0.00	1.44	1.44	0.00	1.30	1.30	0.00	1.16	1.16	0.00
BREM 1011320	1.20	1.20	0.00	1.08	1.08	0.00	0.98	0.98	0.00	0.88	0.88	0.00
BREM 1011465	1.45	1.45	0.00	1.29	1.29	0.00	1.10	1.10	0.00	0.93	0.93	0.00



	100	Year ARI Ev	ent	> 20	Year ARI Ev	vent	> 10	Year ARI Ev	vent	> 5	Year ARI Ev	ent
Cross-section		BRIS 50Y30H		I	BRIS 20Y30H		I	BRIS 10Y30H			BRIS 5Y30H	
Cross-section	Ex Case	Dev Case	Afflux (m/s)									
BREM 1011575	1.82	1.82	0.00	1.64	1.64	0.00	1.46	1.46	0.00	1.29	1.29	0.00
BREM 1011700	1.96	1.96	0.00	1.75	1.75	0.00	1.56	1.56	0.00	1.39	1.39	0.00
BREM 1011790	2.06	2.06	0.00	1.83	1.83	0.00	1.60	1.60	0.00	1.40	1.40	0.00
BREM 1011810	2.04	2.04	0.00	1.82	1.82	0.00	1.61	1.61	0.00	1.41	1.41	0.00
BREM 1011930	1.82	1.82	0.00	1.66	1.66	0.00	1.48	1.48	0.00	1.36	1.36	0.00
BREM 1012045	1.63	1.63	0.00	1.57	1.57	0.00	1.37	1.37	0.00	1.29	1.29	0.00
BREM 1012050	1.31	1.31	0.00	1.18	1.18	0.00	1.05	1.05	0.00	0.93	0.93	0.00
BREM 1012070	1.32	1.32	0.00	1.18	1.18	0.00	1.06	1.06	0.00	0.94	0.94	0.00
BREM 1012200	1.61	1.61	0.00	1.49	1.49	0.00	1.35	1.35	0.00	1.23	1.23	0.00
BREM 1012870	1.02	1.02	0.00	0.89	0.89	0.00	0.78	0.78	0.00	0.69	0.69	0.00
BREM 1013380	1.35	1.35	0.00	1.28	1.28	0.00	1.10	1.10	0.00	1.05	1.05	0.00
BREM 1013700	1.30	1.30	0.00	1.26	1.26	0.00	0.95	0.95	0.00	0.99	0.99	0.00
BREM 1014220	1.66	1.66	0.00	1.51	1.51	0.00	1.37	1.37	0.00	1.23	1.23	0.00



3.2 Scenario A - Bremer River Flood Events with River Links Development

This section reports on Bremer River flood MIKE11 results which have the River Links Development incorporated into the "Existing Conditions" model. The peak water level results of MIKE 11 for the Bremer River flood events are shown in Table 3. The proposed development area is highlighted. As is shown in this table the peak water levels are slightly reduced upstream of the proposed development due to the proposed works.

Table 3 Scenario A - Peak Water Levels - Bremer River Flood Events

	100 Y	ear ARI	Event	50 Ye	ear ARI E	vent	20 Y	ear ARI I	Event	10 Y	ear ARI I	Event	5 Ye	ar ARI E	vent	2 Ye	ar ARI E	vent
Cross-section	BRE	M 100Y0	H18	BRE	M 50Y0	H18	BRI	EM 20Y1	.8H	BR	EM 10Y1	.8H	BR	EM 5Y1	8H	BR	EM 2Y1	8H
Ci 033-3cction	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff
	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)
1010020	19.05	19.02	-34	17.12	17.09	-26	12.55	12.55	0	10.30	10.29	-7	8.24	8.24	-4	4.52	4.52	0
1010090	19.00	18.96	-35	17.05	17.02	-26	12.39	12.39	0	10.23	10.23	0	8.12	8.11	-4	4.52	4.52	0
1010150	18.95	18.91	-35	17.01	16.98	-27	12.37	12.37	0	10.23	10.23	0	8.01	8.01	-4	4.52	4.52	0
1010250	18.96	18.92	-35	17.02	16.99	-27	12.37	12.37	0	10.23	10.23	0	8.00	8.00	-4	4.52	4.52	0
1010340	18.84	18.80	-36	16.91	16.88	-27	12.36	12.36	0	10.23	10.23	0	7.90	7.89	-5	4.52	4.52	0
1010430	18.76	18.73	-36	16.86	16.83	-28	12.36	12.36	0	10.23	10.23	0	7.85	7.84	-5	4.52	4.52	0
1010510	18.69	18.65	-36	16.78	16.76	-28	12.36	12.36	0	10.23	10.23	0	7.75	7.75	-5	4.52	4.52	0
1010590	18.51	18.47	-38	16.64	16.61	-29	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0
1010645	18.55	18.52	-38	16.65	16.62	-29	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0
1010700	18.41	18.37	-39	16.54	16.51	-30	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0
1010764	18.29	18.26	-29	16.43	16.41	-20	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1010839	18.17	18.16	-8	16.34	16.33	-9	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1010890	18.13	18.13	-4	16.30	16.30	-2	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1010915	18.03	18.03	0	16.21	16.21	0	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1010950	17.98	17.98	-1	16.16	16.16	-1	12.33	12.33	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1010985	17.98	17.98	0	16.16	16.16	0	12.33	12.33	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0
1011040	17.95	17.95	0	16.13	16.13	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0
1011090	17.90	17.90	0	16.10	16.10	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0



	100 Y	ear ARI	Event	50 Ye	ear ARI E	vent	20 Y	ear ARI I	vent	10 Y	ear ARI I	vent	5 Ye	ar ARI E	vent	2 Ye	ear ARI E	vent
Cross-section	BREI	VI 100Y0	H18	BRE	M 50Y0	H18	BRI	EM 20Y1	.8H	BR	EM 10Y1	.8H	BR	EM 5Y1	8H	BR	REM 2Y1	8H
Cross-section	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff
	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)
1011185	17.81	17.81	0	16.01	16.01	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0
1011320	17.78	17.78	0	15.97	15.97	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0
1011465	17.65	17.65	0	15.84	15.84	0	12.32	12.32	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0
1011575	17.49	17.49	0	15.69	15.69	0	12.32	12.32	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0
1011700	17.28	17.28	0	15.50	15.50	0	12.32	12.32	0	10.21	10.21	0	7.64	7.64	0	4.52	4.52	0
1011790	17.09	17.09	0	15.34	15.34	0	12.31	12.31	0	10.21	10.21	0	7.64	7.64	0	4.52	4.52	0
1011810	17.02	17.02	0	15.29	15.29	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1011930	16.86	16.86	0	15.14	15.14	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1012045	16.79	16.79	0	15.08	15.08	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1012050	16.84	16.84	0	15.12	15.12	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1012070	16.82	16.82	0	15.10	15.10	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1012200	16.75	16.75	0	15.04	15.04	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1012870	16.71	16.71	0	15.01	15.01	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0
1013380	16.66	16.66	0	14.95	14.95	0	12.28	12.28	0	10.19	10.19	0	7.64	7.64	0	4.51	4.51	0
1013700	16.62	16.62	0	14.92	14.92	0	12.28	12.28	0	10.19	10.19	0	7.64	7.64	0	4.51	4.51	0
1014220	16.43	16.43	0	14.74	14.74	0	12.28	12.28	0	10.19	10.19	0	7.63	7.63	0	4.51	4.51	0



The peak velocity results of MIKE 11 for the Bremer River flood events are shown in Table 4. The proposed development area is highlighted. As is shown in this table the impact of the proposed works on peak velocities is minimal.

Table 4 Scenario A - Peak Velocities – Bremer River Flood Events

	100 Y	ear ARI	Event	50 Ye	ear ARI E	vent	20 Y	ear ARI I	Event	10 Y	ear ARI I	Event	5 Ye	ar ARI E	vent	2 Ye	ar ARI E	vent
Cross-section	BRE	M 100Y0	H18	BRE	M 50Y0	H18	BRI	EM 20Y1	.8H	BR	EM 10Y1	.8H	BR	EM 5Y1	8H	BR	EM 2Y1	8H
Cross section	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff
	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)
1010020	1.97	1.98	0.01	1.77	1.78	0.00	1.84	1.85	0.01	1.63	1.63	0.00	1.55	1.56	0.00	1.97	1.98	0.01
1010090	1.78	1.79	0.01	1.68	1.69	0.01	1.91	1.92	0.01	1.71	1.72	0.00	1.56	1.56	0.00	1.78	1.79	0.01
1010150	1.68	1.68	0.01	1.56	1.56	0.00	1.82	1.83	0.01	1.78	1.78	0.00	1.69	1.69	0.00	1.68	1.68	0.01
1010250	1.26	1.27	0.00	1.15	1.15	0.00	1.26	1.27	0.01	1.19	1.19	0.00	1.09	1.09	0.00	1.26	1.27	0.00
1010340	1.81	1.82	0.01	1.69	1.70	0.01	1.90	1.91	0.01	1.69	1.70	0.00	1.47	1.47	0.00	1.81	1.82	0.01
1010430	1.81	1.82	0.01	1.62	1.62	0.00	1.69	1.70	0.01	1.44	1.45	0.00	1.27	1.27	0.00	1.81	1.82	0.01
1010510	1.78	1.78	0.01	1.61	1.62	0.00	1.70	1.70	0.01	1.46	1.46	0.00	1.30	1.31	0.00	1.78	1.78	0.01
1010590	2.15	2.16	0.01	1.94	1.95	0.01	2.10	2.11	0.01	1.78	1.78	0.00	1.51	1.51	0.00	2.15	2.16	0.01
1010645	1.46	1.47	0.01	1.43	1.44	0.00	1.77	1.78	0.01	1.58	1.58	0.00	1.38	1.38	0.00	1.46	1.47	0.01
1010700	1.86	1.87	0.01	1.69	1.69	0.01	1.82	1.83	0.01	1.52	1.52	0.00	1.30	1.30	0.00	1.86	1.87	0.01
1010764	1.97	1.95	-0.02	1.78	1.75	-0.04	1.95	1.89	-0.06	1.65	1.63	-0.03	1.41	1.39	-0.01	1.97	1.95	-0.02
1010839	2.09	2.01	-0.08	1.82	1.77	-0.05	1.84	1.82	-0.02	1.49	1.50	0.01	1.24	1.22	-0.03	2.09	2.01	-0.08
1010890	1.96	1.89	-0.06	1.76	1.70	-0.06	1.94	1.86	-0.08	1.64	1.58	-0.06	1.44	1.42	-0.02	1.96	1.89	-0.06
1010915	2.30	2.24	-0.06	2.09	2.05	-0.04	2.43	2.41	-0.02	2.11	2.10	-0.01	1.90	1.90	0.00	2.30	2.24	-0.06
1010950	2.26	2.25	-0.01	2.04	2.04	-0.01	2.30	2.31	0.00	1.94	1.94	0.00	1.68	1.68	0.00	2.26	2.25	-0.01
1010985	1.99	1.99	0.00	1.77	1.77	0.00	1.96	1.96	0.00	1.64	1.64	0.00	1.43	1.43	0.00	1.99	1.99	0.00
1011040	1.80	1.80	0.00	1.63	1.63	0.00	1.83	1.83	0.00	1.55	1.55	0.00	1.32	1.32	0.00	1.80	1.80	0.00
1011090	1.82	1.82	0.00	1.61	1.61	0.00	1.64	1.64	0.00	1.29	1.29	0.00	1.04	1.04	0.00	1.82	1.82	0.00
1011185	1.81	1.81	0.00	1.67	1.67	0.00	1.94	1.94	0.00	1.64	1.64	0.00	1.41	1.41	0.00	1.81	1.81	0.00
1011320	1.32	1.32	0.00	1.26	1.26	0.00	1.49	1.49	0.00	1.27	1.27	0.00	1.11	1.11	0.00	1.32	1.32	0.00
1011465	1.62	1.62	0.00	1.52	1.52	0.00	1.62	1.62	0.00	1.27	1.27	0.00	1.04	1.04	0.00	1.62	1.62	0.00



Cuasa anatinu		ear ARI M 100Y0			ear ARI E M 50Y0I			ear ARI I EM 20Y1			ear ARI I EM 10Y1			ar ARI E			ear ARI E	
Cross-section	Ex Case	Dev Case	Diff (m/s)	Ex Case	Dev Case	Diff (m/s)	Ex Case	Dev Case	Diff (m/s)	Ex Case	Dev Case	Diff (m/s)	Ex Case	Dev Case	Diff (m/s)	Ex Case	Dev Case	Diff (m/s)
1011575	2.02	2.02	0.00	1.90	1.90	0.00	2.29	2.29	0.00	1.87	1.87	0.00	1.60	1.60	0.00	2.02	2.02	0.00
1011700	2.19	2.19	0.00	2.05	2.05	0.00	2.57	2.57	0.00	2.09	2.09	0.00	1.80	1.80	0.00	2.19	2.19	0.00
1011790	2.33	2.33	0.00	2.17	2.17	0.00	2.68	2.68	0.00	2.15	2.15	0.00	1.84	1.84	0.00	2.33	2.33	0.00
1011810	2.34	2.34	0.00	2.15	2.15	0.00	2.81	2.81	0.00	2.30	2.30	0.00	1.93	1.93	0.00	2.34	2.34	0.00
1011930	2.03	2.03	0.00	1.93	1.93	0.00	2.96	2.96	0.00	2.44	2.44	0.00	2.08	2.08	0.00	2.03	2.03	0.00
1012045	1.89	1.89	0.00	1.72	1.72	0.00	3.00	3.00	0.00	2.45	2.45	0.00	2.09	2.09	0.00	1.89	1.89	0.00
1012050	1.53	1.53	0.00	1.39	1.39	0.00	2.07	2.07	0.00	1.65	1.65	0.00	1.39	1.39	0.00	1.53	1.53	0.00
1012070	1.54	1.54	0.00	1.39	1.39	0.00	2.12	2.12	0.00	1.72	1.72	0.00	1.43	1.43	0.00	1.54	1.54	0.00
1012200	1.83	1.83	0.00	1.70	1.70	0.00	2.95	2.95	0.00	2.43	2.43	0.00	2.07	2.07	0.00	1.83	1.83	0.00
1012870	1.22	1.22	0.00	1.07	1.07	0.00	1.73	1.73	0.00	1.44	1.44	0.00	1.25	1.25	0.00	1.22	1.22	0.00
1013380	1.33	1.33	0.00	1.30	1.30	0.00	3.14	3.14	0.00	2.59	2.59	0.00	2.13	2.13	0.00	1.33	1.33	0.00
1013700	1.24	1.24	0.00	1.10	1.10	0.00	3.36	3.36	0.00	2.88	2.88	0.00	2.54	2.54	0.00	1.24	1.24	0.00
1014220	1.90	1.90	0.00	1.77	1.77	0.00	5.50	5.50	0.00	4.30	4.30	0.00	3.71	3.71	0.00	1.90	1.90	0.00



3.3 Scenario B - Brisbane River Flood Events without River Links Development

This section reports on Brisbane River flood results of the Scenario without the River Links Development in the hydraulic model. The peak water level results of MIKE 11 for the Brisbane River flood events are shown in Table 3. The proposed development area is highlighted. As is shown in this table the peak water levels are slightly reduced upstream of the proposed development due to the proposed works.

Table 5 Scenario B - Peak Water Levels - Brisbane River Flood Events

	100	Year ARI Ev	ent	> 20	Year ARI E	/ent	> 10	Year ARI Ev	ent/	> 5	Year ARI Ev	ent
Cross-section	ı	BRIS 50Y30H	I	ı	BRIS 20Y30H	I	ı	BRIS 10Y30H	I		BRIS 5Y30H	
Cross-section	Ex Case	Dev Case	Afflux (mm)									
BREM 1010020	18.40	18.38	-24	16.36	16.35	-19	13.69	13.68	-14	11.20	11.19	-10
BREM 1010090	18.35	18.33	-25	16.31	16.29	-19	13.62	13.61	-15	11.12	11.11	-10
BREM 1010150	18.30	18.28	-25	16.26	16.24	-20	13.58	13.56	-15	11.07	11.06	-10
BREM 1010250	18.30	18.28	-25	16.26	16.24	-20	13.57	13.56	-15	11.06	11.05	-10
BREM 1010340	18.25	18.22	-26	16.20	16.18	-20	13.50	13.49	-15	10.99	10.98	-11
BREM 1010430	18.21	18.18	-26	16.17	16.15	-20	13.47	13.46	-15	10.96	10.95	-11
BREM 1010510	18.13	18.10	-26	16.10	16.08	-21	13.41	13.39	-16	10.90	10.89	-11
BREM 1010590	17.97	17.95	-27	15.96	15.94	-21	13.29	13.27	-16	10.79	10.78	-11
BREM 1010645	17.99	17.96	-27	15.96	15.94	-21	13.27	13.25	-16	10.76	10.75	-11
BREM 1010700	17.88	17.85	-27	15.87	15.85	-22	13.20	13.19	-17	10.71	10.69	-11
BREM 1010764	17.79	17.77	-21	15.79	15.78	-14	13.13	13.12	-11	10.64	10.63	-6
BREM 1010839	17.70	17.70	-6	15.72	15.72	-7	13.08	13.07	-8	10.60	10.59	-7
BREM 1010890	17.68	17.68	-3	15.69	15.69	-1	13.04	13.04	0	10.55	10.55	0
BREM 1010915	17.60	17.61	0	15.62	15.62	0	12.98	12.98	0	10.49	10.49	0
BREM 1010950	17.56	17.56	-1	15.59	15.59	-1	12.95	12.95	-1	10.46	10.46	-1
BREM 1010985	17.57	17.57	0	15.59	15.59	0	12.95	12.95	0	10.46	10.46	0
BREM 1011040	17.55	17.55	0	15.57	15.57	0	12.92	12.92	0	10.43	10.43	0
BREM 1011090	17.51	17.51	0	15.54	15.54	0	12.90	12.90	0	10.42	10.42	0
BREM 1011185	17.44	17.44	0	15.47	15.47	0	12.84	12.84	0	10.36	10.36	0



	100	Year ARI Ev	ent	> 20	Year ARI E	vent .	> 10	Year ARI E	ent/	> 5	Year ARI Ev	ent
Cross-section		BRIS 50Y30H	ł	ı	BRIS 20Y30H	ł		BRIS 10Y30H	I		BRIS 5Y30H	
Closs-section	Ex Case	Dev Case	Afflux (mm)									
BREM 1011320	17.42	17.42	0	15.44	15.44	0	12.80	12.80	0	10.31	10.31	0
BREM 1011465	17.32	17.32	0	15.35	15.35	0	12.73	12.73	0	10.25	10.25	0
BREM 1011575	17.21	17.21	0	15.24	15.24	0	12.63	12.63	0	10.16	10.16	0
BREM 1011700	17.07	17.07	0	15.10	15.10	0	12.50	12.50	0	10.04	10.04	0
BREM 1011790	16.94	16.94	0	14.98	14.98	0	12.40	12.40	0	9.95	9.95	0
BREM 1011810	16.90	16.90	0	14.95	14.95	0	12.36	12.36	0	9.90	9.90	0
BREM 1011930	16.80	16.80	0	14.85	14.85	0	12.25	12.25	0	9.79	9.79	0
BREM 1012045	16.77	16.77	0	14.81	14.81	0	12.21	12.21	0	9.73	9.73	0
BREM 1012050	16.80	16.80	0	14.84	14.84	0	12.24	12.24	0	9.76	9.76	0
BREM 1012070	16.79	16.79	0	14.82	14.82	0	12.15	12.15	0	9.68	9.68	0
BREM 1012200	16.75	16.75	0	14.78	14.78	0	12.11	12.11	0	9.64	9.64	0
BREM 1012870	16.73	16.73	0	14.76	14.76	0	12.09	12.09	0	9.61	9.61	0
BREM 1013380	16.70	16.70	0	14.72	14.72	0	12.03	12.03	0	9.55	9.55	0
BREM 1013700	16.68	16.68	0	14.69	14.69	0	12.00	12.00	0	9.52	9.52	0
BREM 1014220	16.58	16.58	0	14.56	14.56	0	11.88	11.88	0	9.41	9.41	0



The peak velocity results of MIKE 11 for the Brisbane River flood events are shown in Table 4. The proposed development area is highlighted. As is shown in this table the impact of the proposed works on peak velocities is minimal.

Table 6 Scenario B - Peak Velocities - Brisbane River Flood Events

	100	Year ARI Ev	ent	> 20	Year ARI Ev	ent ent	> 10	Year ARI Ev	ent	> 5 Year ARI Event				
Cross-section	E	3RIS 50Y30H			3RIS 20Y30H		E	3RIS 10Y30H			BRIS 5Y30H			
Cross-section	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)		
BREM 1010020	1.72	1.73	0.00	1.55	1.56	0.00	1.40	1.41	0.00	1.33	1.33	0.00		
BREM 1010090	1.61	1.61	0.00	1.51	1.51	0.00	1.43	1.44	0.00	1.35	1.35	0.00		
BREM 1010150	1.64	1.64	0.00	1.59	1.59	0.00	1.48	1.48	0.00	1.44	1.44	0.00		
BREM 1010250	1.20	1.20	0.00	1.11	1.11	0.00	1.04	1.04	0.00	0.96	0.96	0.00		
BREM 1010340	1.52	1.52	0.00	1.48	1.48	0.00	1.39	1.40	0.00	1.31	1.31	0.00		
BREM 1010430	1.31	1.32	0.00	1.24	1.24	0.00	1.17	1.17	0.00	1.11	1.11	0.00		
BREM 1010510	1.42	1.43	0.00	1.30	1.30	0.00	1.19	1.19	0.00	1.10	1.10	0.00		
BREM 1010590	1.84	1.84	0.00	1.67	1.68	0.00	1.53	1.53	0.00	1.37	1.37	0.00		
BREM 1010645	1.38	1.39	0.00	1.34	1.35	0.00	1.26	1.26	0.00	1.19	1.19	0.00		
BREM 1010700	1.62	1.63	0.00	1.47	1.47	0.00	1.31	1.32	0.00	1.16	1.16	0.00		
BREM 1010764	1.71	1.69	-0.02	1.56	1.52	-0.04	1.40	1.35	-0.04	1.23	1.21	-0.02		
BREM 1010839	1.79	1.73	-0.06	1.56	1.52	-0.04	1.34	1.31	-0.03	1.13	1.13	-0.01		
BREM 1010890	1.69	1.64	-0.06	1.52	1.46	-0.05	1.35	1.30	-0.06	1.21	1.16	-0.05		
BREM 1010915	2.00	1.95	-0.04	1.81	1.78	-0.03	1.66	1.64	-0.02	1.52	1.52	-0.01		
BREM 1010950	1.96	1.95	-0.01	1.76	1.76	0.00	1.58	1.58	0.00	1.41	1.41	0.00		
BREM 1010985	1.71	1.71	0.00	1.52	1.52	0.00	1.35	1.35	0.00	1.19	1.19	0.00		
BREM 1011040	1.56	1.56	0.00	1.41	1.41	0.00	1.25	1.25	0.00	1.11	1.11	0.00		
BREM 1011090	1.56	1.56	0.00	1.38	1.38	0.00	1.16	1.16	0.00	0.98	0.98	0.00		
BREM 1011185	1.59	1.59	0.00	1.44	1.44	0.00	1.30	1.30	0.00	1.16	1.16	0.00		
BREM 1011320	1.20	1.20	0.00	1.08	1.08	0.00	0.98	0.98	0.00	0.88	0.88	0.00		
BREM 1011465	1.45	1.45	0.00	1.29	1.29	0.00	1.10	1.10	0.00	0.93	0.93	0.00		



	100	Year ARI Ev	ent	> 20	Year ARI Ev	vent	> 10	Year ARI Ev	ent	> 5 Year ARI Event				
Cross-section		BRIS 50Y30H		I	BRIS 20Y30H		I	BRIS 10Y30H		BRIS 5Y30H				
Cioss-section	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)	Ex Case	Dev Case	Afflux (m/s)		
BREM 1011575	1.82	1.82	0.00	1.64	1.64	0.00	1.46	1.46	0.00	1.29	1.29	0.00		
BREM 1011700	1.96	1.96	0.00	1.75	1.75	0.00	1.56	1.56	0.00	1.39	1.39	0.00		
BREM 1011790	2.06	2.06	0.00	1.83	1.83	0.00	1.60	1.60	0.00	1.40	1.40	0.00		
BREM 1011810	2.04	2.04	0.00	1.82	1.82	0.00	1.61	1.61	0.00	1.41	1.41	0.00		
BREM 1011930	1.82	1.82	0.00	1.66	1.66	0.00	1.48	1.48	0.00	1.36	1.36	0.00		
BREM 1012045	1.63	1.63	0.00	1.57	1.57	0.00	1.37	1.37	0.00	1.29	1.29	0.00		
BREM 1012050	1.31	1.31	0.00	1.18	1.18	0.00	1.05	1.05	0.00	0.93	0.93	0.00		
BREM 1012070	1.32	1.32	0.00	1.18	1.18	0.00	1.06	1.06	0.00	0.94	0.94	0.00		
BREM 1012200	1.61	1.61	0.00	1.49	1.49	0.00	1.35	1.35	0.00	1.23	1.23	0.00		
BREM 1012870	1.02	1.02	0.00	0.89	0.89	0.00	0.78	0.78	0.00	0.69	0.69	0.00		
BREM 1013380	1.35	1.35	0.00	1.28	1.28	0.00	1.11	1.11	0.00	1.05	1.05	0.00		
BREM 1013700	1.30	1.30	0.00	1.27	1.27	0.00	0.95	0.95	0.00	0.99	0.99	0.00		
BREM 1014220	1.66	1.66	0.00	1.51	1.51	0.00	1.37	1.37	0.00	1.23	1.23	0.00		



3.4 Scenario B - Bremer River Flood Events without River Links Development

This section reports on Bremer River flood results of the Scenario not incorporating the River Links Development. The peak water level results of MIKE 11 for the Bremer River flood events are shown in Table 3. The proposed development area is highlighted. As is shown in this table the peak water levels are slightly reduced upstream of the proposed development due to the proposed works.

Table 7 Scenario B - Peak Water Levels - Bremer River Flood Events

	100 Year ARI Event			50 Year ARI Event			20 Y	ear ARI I	Event	10 Y	ear ARI I	Event	5 Year ARI Event			2 Year ARI Event			
Cross-section	BRE	M 100Y0	H18	BREM 50Y0H18			BRI	EM 20Y1	.8H	BR	EM 10Y1	.8H	BR	EM 5Y1	8H	BR	EM 2Y1	8H	
Cross-section	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	
	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	
1010020	19.09	19.05	-33	17.16	17.13	-25	12.62	12.62	0	10.34	10.34	0	8.24	8.24	0	4.52	4.52	0	
1010090	19.03	19.00	-34	17.09	17.06	-26	12.47	12.47	0	10.24	10.24	0	8.12	8.12	0	4.52	4.52	0	
1010150	18.97	18.93	-34	17.04	17.01	-26	12.37	12.37	0	10.23	10.23	0	8.01	8.01	0	4.52	4.52	0	
1010250	18.96	18.93	-34	17.03	17.01	-26	12.37	12.37	0	10.23	10.23	0	8.00	8.00	0	4.52	4.52	0	
1010340	18.89	18.86	-35	16.96	16.93	-27	12.36	12.36	0	10.23	10.23	0	7.90	7.90	0	4.52	4.52	0	
1010430	18.84	18.80	-35	16.92	16.89	-27	12.36	12.36	0	10.23	10.23	0	7.85	7.85	0	4.52	4.52	0	
1010510	18.74	18.71	-36	16.83	16.80	-28	12.36	12.36	0	10.23	10.23	0	7.75	7.75	0	4.52	4.52	0	
1010590	18.53	18.50	-37	16.65	16.62	-29	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0	
1010645	18.56	18.52	-38	16.65	16.62	-29	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0	
1010700	18.41	18.37	-39	16.54	16.51	-30	12.35	12.35	0	10.23	10.23	0	7.65	7.65	0	4.52	4.52	0	
1010764	18.29	18.26	-29	16.43	16.41	-20	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1010839	18.17	18.16	-8	16.34	16.33	-9	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1010890	18.13	18.13	-4	16.30	16.30	-2	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1010915	18.03	18.03	0	16.21	16.21	0	12.34	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1010950	17.98	17.98	-1	16.16	16.16	-1	12.33	12.34	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1010985	17.98	17.98	0	16.16	16.16	0	12.33	12.33	0	10.22	10.22	0	7.65	7.65	0	4.52	4.52	0	
1011040	17.95	17.95	0	16.13	16.13	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0	
1011090	17.90	17.90	0	16.10	16.10	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0	
1011185	17.81	17.81	0	16.01	16.01	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0	



	100 Year ARI Event			50 Ye	ear ARI E	vent	20 Y	ear ARI I	Event	10 Y	ear ARI I	vent	5 Ye	ar ARI E	vent	2 Year ARI Event				
Cross-section	BREM 100Y0H18			BREM 50Y0H18			BREM 20Y18H			BREM 10Y18H			BREM 5Y18H			BREM 2Y18H				
Ci O33-3ection	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff		
	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)	Case	Case	(mm)		
1011320	17.78	17.78	0	15.97	15.97	0	12.33	12.33	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0		
1011465	17.65	17.65	0	15.84	15.84	0	12.32	12.32	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0		
1011575	17.49	17.49	0	15.69	15.69	0	12.32	12.32	0	10.22	10.22	0	7.64	7.64	0	4.52	4.52	0		
1011700	17.28	17.28	0	15.50	15.50	0	12.32	12.32	0	10.21	10.21	0	7.64	7.64	0	4.52	4.52	0		
1011790	17.09	17.09	0	15.34	15.34	0	12.31	12.31	0	10.21	10.21	0	7.64	7.64	0	4.52	4.52	0		
1011810	17.02	17.02	0	15.29	15.29	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1011930	16.86	16.86	0	15.14	15.14	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1012045	16.79	16.79	0	15.08	15.08	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1012050	16.84	16.84	0	15.13	15.13	0	12.30	12.30	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1012070	16.82	16.82	0	15.10	15.10	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1012200	16.75	16.75	0	15.04	15.04	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1012870	16.71	16.71	0	15.01	15.01	0	12.29	12.29	0	10.20	10.20	0	7.64	7.64	0	4.51	4.51	0		
1013380	16.66	16.66	0	14.95	14.95	0	12.28	12.28	0	10.19	10.19	0	7.64	7.64	0	4.51	4.51	0		
1013700	16.62	16.62	0	14.92	14.92	0	12.28	12.28	0	10.19	10.19	0	7.64	7.64	0	4.51	4.51	0		
1014220	16.43	16.43	0	14.74	14.74	0	12.28	12.28	0	10.19	10.19	0	7.63	7.63	0	4.51	4.51	0		



The peak velocity results of MIKE 11 for the Bremer River flood events are shown in Table 4. The proposed development area is highlighted. As is shown in this table the impact of the proposed works on peak velocities is minimal.

Table 8 Scenario B - Peak Velocities - Bremer River Flood Events

	100 Year ARI Event			50 Year ARI Event			20 Y	ear ARI I	vent	10 Y	ear ARI I	vent	5 Year ARI Event			2 Year ARI Event		
Cross-section	BREI	M 100Y0	H18	BRE	M 50Y0	H18	BRI	EM 20Y1	.8H	BR	EM 10Y1	.8H	BR	EM 5Y1	8H	BR	EM 2Y1	3H
Cross-section	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff
	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)
1010020	1.96	1.97	0.01	1.77	1.77	0.00	1.83	1.83	0.01	1.62	1.62	0.00	1.55	1.55	-0.01	1.00	1.00	0.00
1010090	1.78	1.78	0.01	1.67	1.68	0.01	1.89	1.90	0.01	1.70	1.70	0.00	1.56	1.55	-0.01	0.87	0.87	0.00
1010150	1.76	1.76	0.01	1.65	1.66	0.00	1.93	1.94	0.01	1.82	1.82	0.00	1.69	1.68	-0.01	0.95	0.96	0.01
1010250	1.35	1.36	0.00	1.25	1.25	0.00	1.38	1.39	0.01	1.23	1.23	0.00	1.09	1.08	0.00	0.66	0.66	0.00
1010340	1.56	1.56	0.00	1.51	1.52	0.01	1.87	1.88	0.01	1.69	1.69	0.00	1.47	1.47	-0.01	0.76	0.76	0.00
1010430	1.49	1.49	0.00	1.37	1.37	0.00	1.57	1.57	0.01	1.43	1.43	0.00	1.27	1.26	-0.01	0.66	0.66	0.00
1010510	1.59	1.59	0.01	1.48	1.48	0.00	1.61	1.62	0.01	1.42	1.42	0.00	1.31	1.30	-0.01	0.71	0.72	0.00
1010590	2.09	2.10	0.01	1.91	1.92	0.01	2.10	2.11	0.01	1.78	1.78	0.00	1.51	1.51	0.00	0.68	0.68	0.00
1010645	1.47	1.47	0.01	1.44	1.44	0.00	1.77	1.78	0.01	1.58	1.58	0.00	1.38	1.38	0.00	0.68	0.68	0.00
1010700	1.86	1.87	0.01	1.69	1.69	0.00	1.82	1.83	0.01	1.52	1.52	0.00	1.30	1.30	0.00	0.61	0.61	0.00
1010764	1.97	1.95	-0.02	1.78	1.75	-0.04	1.95	1.89	-0.06	1.65	1.63	-0.03	1.41	1.39	-0.01	0.69	0.69	0.00
1010839	2.09	2.01	-0.08	1.82	1.77	-0.05	1.84	1.82	-0.02	1.49	1.50	0.01	1.24	1.22	-0.03	0.58	0.59	0.01
1010890	1.96	1.89	-0.06	1.76	1.70	-0.06	1.94	1.86	-0.08	1.64	1.58	-0.05	1.44	1.42	-0.02	0.76	0.76	0.00
1010915	2.30	2.24	-0.06	2.09	2.05	-0.04	2.43	2.41	-0.02	2.11	2.10	-0.01	1.90	1.90	0.00	1.09	1.09	0.00
1010950	2.26	2.25	-0.01	2.04	2.04	-0.01	2.30	2.31	0.00	1.94	1.94	0.00	1.68	1.68	0.00	0.85	0.85	0.00
1010985	1.99	1.99	0.00	1.77	1.77	0.00	1.96	1.96	0.00	1.64	1.64	0.00	1.43	1.43	0.00	0.73	0.73	0.00
1011040	1.80	1.80	0.00	1.63	1.63	0.00	1.83	1.83	0.00	1.55	1.55	0.00	1.32	1.32	0.00	0.60	0.60	0.00
1011090	1.82	1.82	0.00	1.61	1.61	0.00	1.64	1.64	0.00	1.29	1.29	0.00	1.04	1.04	0.00	0.42	0.42	0.00
1011185	1.81	1.81	0.00	1.67	1.67	0.00	1.94	1.94	0.00	1.64	1.64	0.00	1.41	1.41	0.00	0.68	0.68	0.00
1011320	1.32	1.32	0.00	1.26	1.26	0.00	1.49	1.49	0.00	1.27	1.27	0.00	1.11	1.11	0.00	0.59	0.59	0.00
1011465	1.62	1.62	0.00	1.52	1.52	0.00	1.62	1.62	0.00	1.28	1.28	0.00	1.04	1.04	0.00	0.43	0.43	0.00



	100 Year ARI Event BREM 100Y0H18				50 Year ARI Event BREM 50Y0H18			20 Year ARI Event BREM 20Y18H			10 Year ARI Event BREM 10Y18H			5 Year ARI Event BREM 5Y18H			2 Year ARI Event BREM 2Y18H		
Cross-section	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	Ex	Dev	Diff	
	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	Case	Case	(m/s)	
1011575	2.02	2.02	0.00	1.90	1.90	0.00	2.29	2.29	0.00	1.87	1.87	0.00	1.60	1.60	0.00	0.72	0.72	0.00	
1011700	2.19	2.19	0.00	2.05	2.05	0.00	2.57	2.57	0.00	2.09	2.09	0.00	1.80	1.80	0.00	0.82	0.82	0.00	
1011790	2.33	2.33	0.00	2.17	2.17	0.00	2.68	2.68	0.00	2.15	2.15	0.00	1.84	1.84	0.00	0.83	0.83	0.00	
1011810	2.34	2.34	0.00	2.15	2.15	0.00	2.81	2.81	0.00	2.30	2.30	0.00	1.93	1.93	0.00	0.88	0.88	0.00	
1011930	2.03	2.03	0.00	1.93	1.93	0.00	2.96	2.96	0.00	2.44	2.44	0.00	2.08	2.08	0.00	0.92	0.92	0.00	
1012045	1.89	1.89	0.00	1.72	1.72	0.00	3.00	3.00	0.00	2.45	2.45	0.00	2.10	2.10	0.00	0.87	0.87	0.00	
1012050	1.54	1.54	0.00	1.39	1.39	0.00	2.07	2.07	0.00	1.65	1.65	0.00	1.39	1.39	0.00	0.62	0.62	0.00	
1012070	1.54	1.54	0.00	1.39	1.39	0.00	2.12	2.12	0.00	1.72	1.72	0.00	1.43	1.43	0.00	0.64	0.64	0.00	
1012200	1.83	1.83	0.00	1.70	1.70	0.00	2.95	2.95	0.00	2.44	2.44	0.00	2.07	2.07	0.00	0.95	0.95	0.00	
1012870	1.22	1.22	0.00	1.07	1.07	0.00	1.73	1.73	0.00	1.44	1.44	0.00	1.25	1.25	0.00	0.64	0.64	0.00	
1013380	1.33	1.33	0.00	1.30	1.30	0.00	3.14	3.14	0.00	2.59	2.59	0.00	2.13	2.13	0.00	0.90	0.90	0.00	
1013700	1.24	1.24	0.00	1.10	1.10	0.00	3.36	3.36	0.00	2.88	2.88	0.00	2.54	2.54	0.00	1.04	1.04	0.00	
1014220	1.90	1.90	0.00	1.77	1.77	0.00	5.50	5.50	0.00	4.30	4.30	0.00	3.72	3.72	0.00	1.15	1.15	0.00	



3.5 Results Summary

The results of MIKE11 show th at the proposed works do not increase the flood levels for neighbouring properties. Across the area of the proposed works, there are predicted to be small reductions in peak flood levels in both Br isbane River and Bremer River flood events modelled. These reductions extend upstream.

No significant increase to peak flood velocities are predicted to occur and small reductions are predicted in the sites vicinity.



4. CONCLUSION

Hydraulic an alysis in MIKE11, for exis ting and post develo pment conditions, has b een completed. The results of this analysis show that the proposed works are predicted to have no significant adverse impacts to peak flood levels or velocities on neighbouring properties.



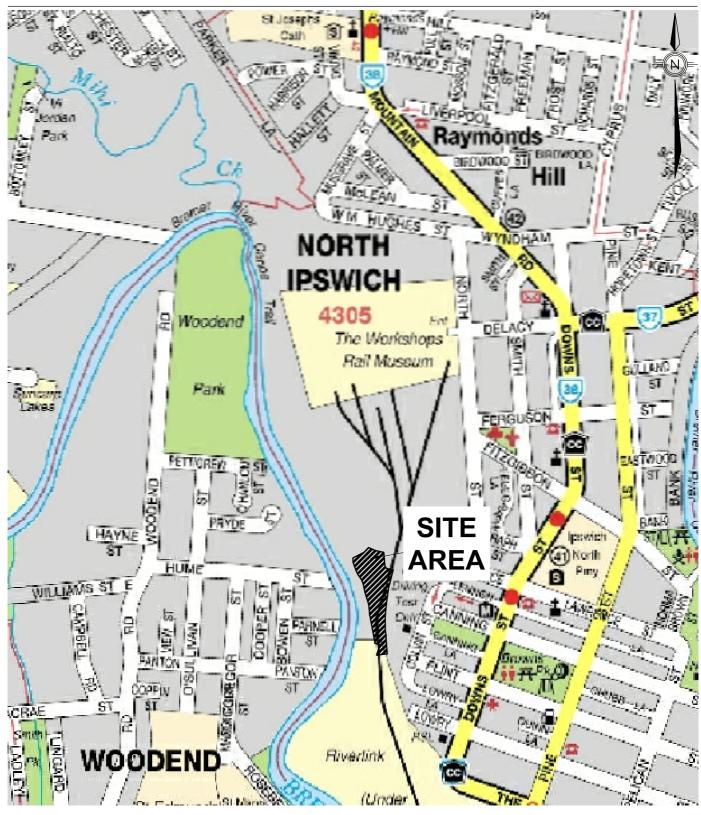
FIGURES

August 2009

Figure 1 Locality Plan

Figure 2 Proposed Development and MIKE11 Cross-sections





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FIGURE 1 LOCALITY PLAN

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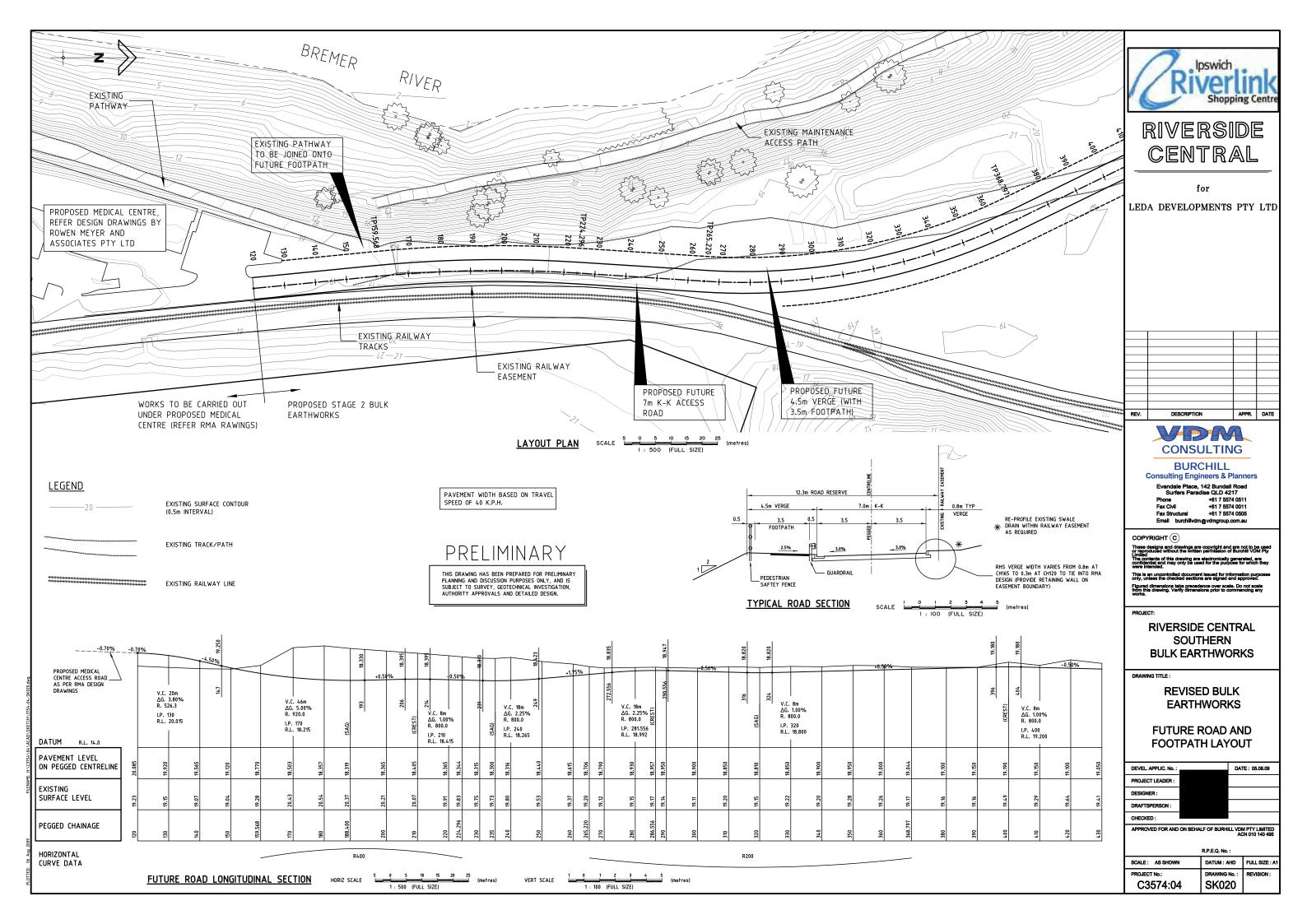
PROPOSED DEVELOPMENT - M11 XS

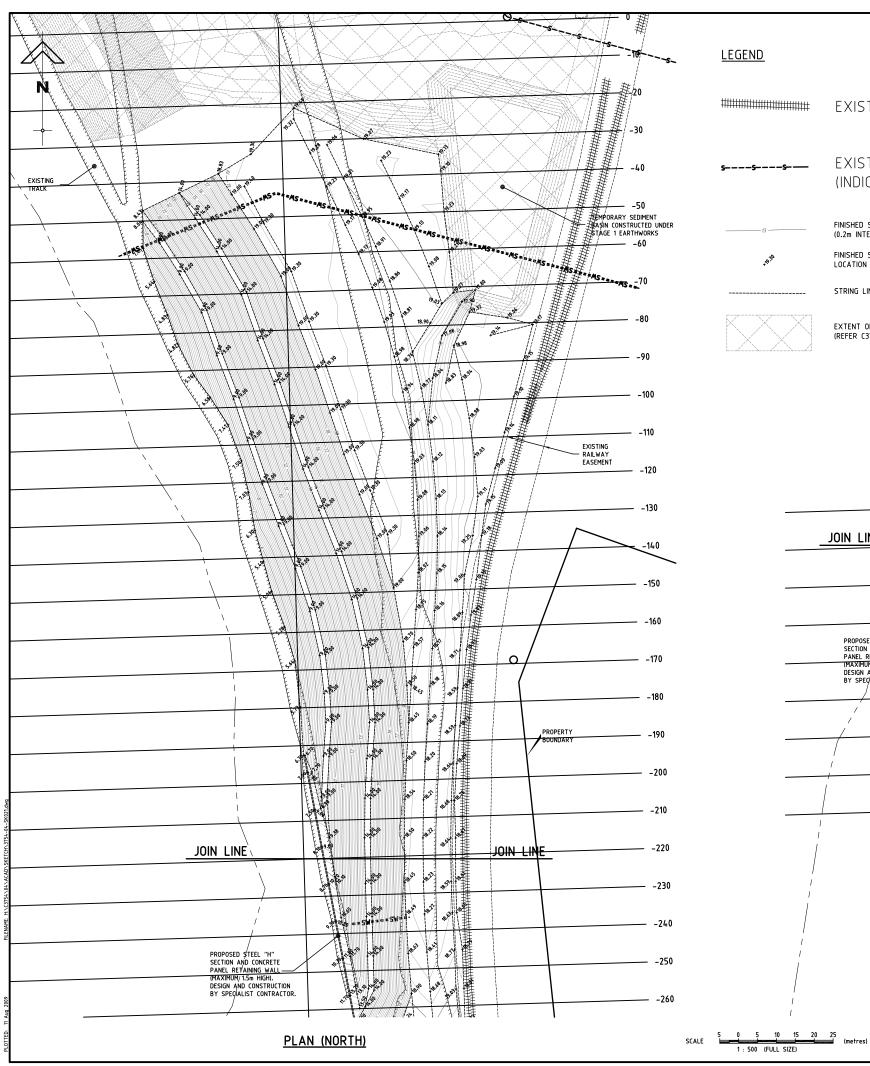
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APPENDIX A

Proposed Development





EARTHWORKS VOLUMES (PROVISIONAL):

STRING LINE

EXTENT OF STAGE 1 EARTHWORKS (REFER C3754:03:SK DRAWINGS)

	FROM STAGE 1:	CLAY	<u>OTHER</u>
EXISTING RAILW.	BALANCE:	SURPLUS 13,840 cu.m. TO STAGE 2 CAPPING	DEFICIT 23,810 cu.m. FROM STAGE 2 EXCAVATION
	STAGE 2:	CLAY	OTHER
EXISTING GRAVITION (INDICATIVE LOC)	SOLID CUT: COMPACTION LOSS:	-	30,320 cu.m. 85%
(GIVING AVAILABLE FILL:	-	25,770 cu.m.
FINISHED SURFACE CONTOUR (0.2m INTERVAL)	TOPOSIL REPLACEMENT: COMPACTED CLAY CAPPING LAYER:	- 13,830 cu.m.	2,000 cu.m. -
FINISHED SURFACE LEVEL AND LOCATION	BALANCE:	13,830 cu.m. FROM STAGE 1	23,770 cu.m. TO STAGE 1
CTDING LINE		BORROW PIT	FILL PLATFORM

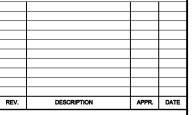




RIVERSIDE CENTRAL

for

LEDA DEVELOPMENTS PTY LTD





BURCHILL Consulting Engineers & Planners

Evandale Place, 142 Bundall Road Surfers Paradise QLD 4217 Phone +61 7 5574 0511 Fax Civil +61 7 5574 0011 Fax Structural +61 7 5574 0505 Fax Structural +61 7 5574 0505
Email burchillvdm@vdmgroup.com.au

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RIVERSIDE CENTRAL SOUTHERN **BULK EARTHWORKS**

REVISED BULK EARTHWORKS

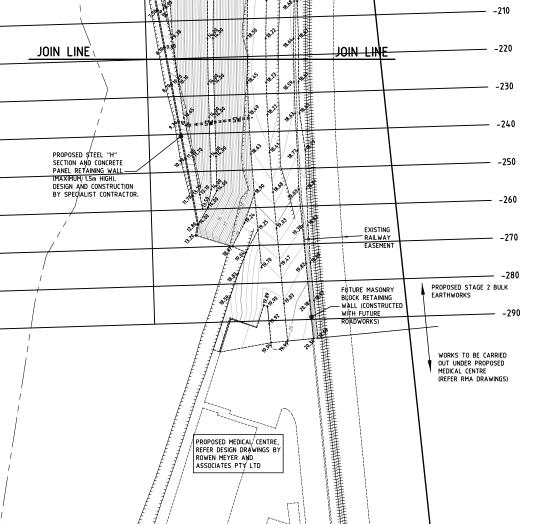
FINISHED SURFACE LEVELS

DEVEL. APPLIC. No. :		DATE: 05.08.09	
PROJECT LEADER:			
DESIGNER:			
DRAFTSPERSON:			
CHECKED:			
APPROVED FOR AND ON BEHALF OF BURHILL VDM PTY LIMITED			

ACN 010 140 495

R.P.E.Q. No. :

SCALE: AS SHOWN	DATUM: AHD	FULL SIZE : A1
PROJECT No.:	DRAWING No. :	REVISION:
C3574:04	SK021	
	PROJECT No.:	PROJECT No.: DRAWING No. :

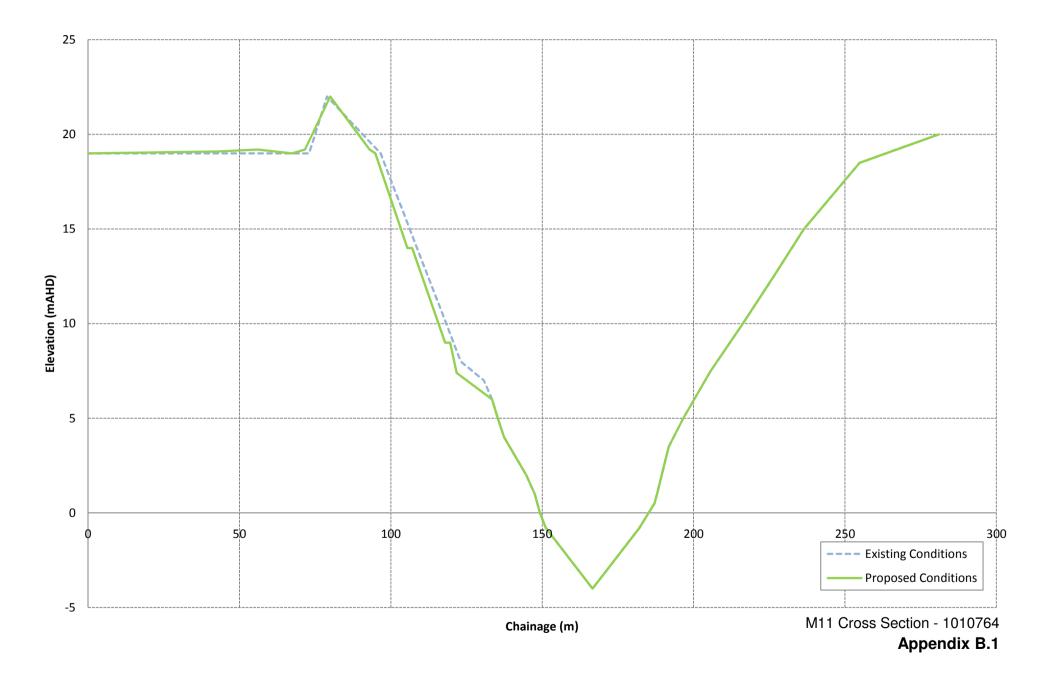


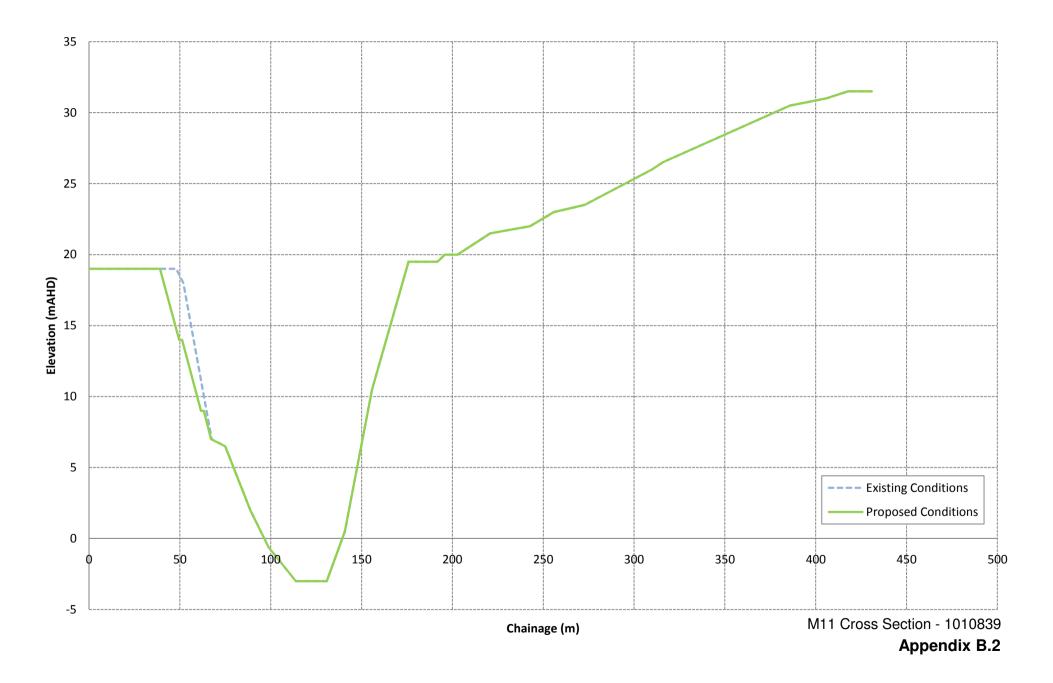
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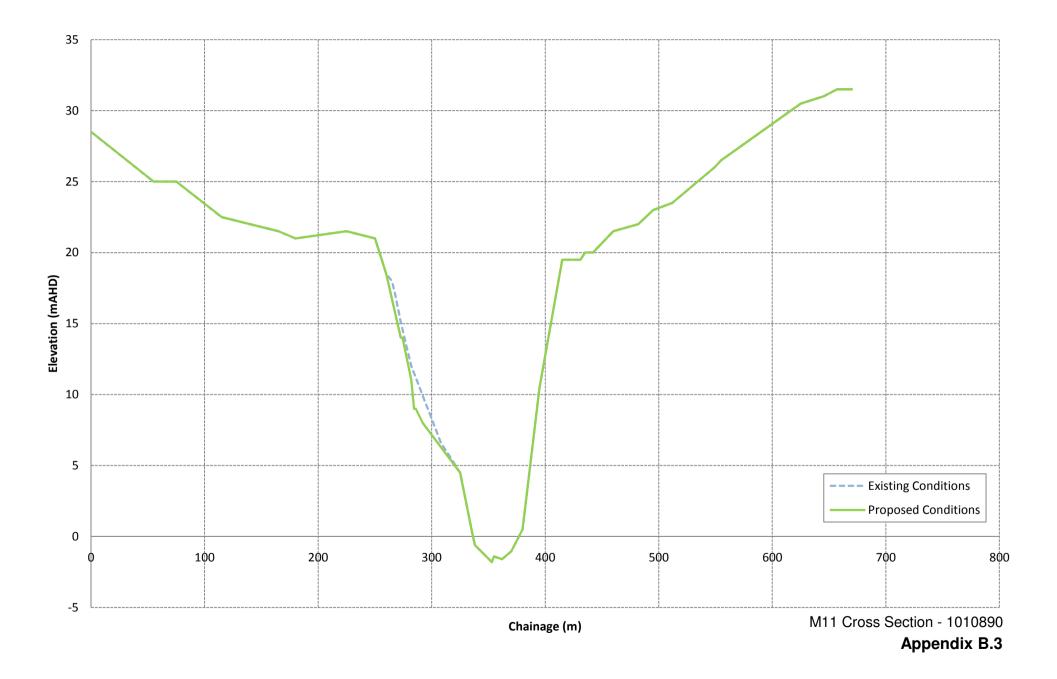


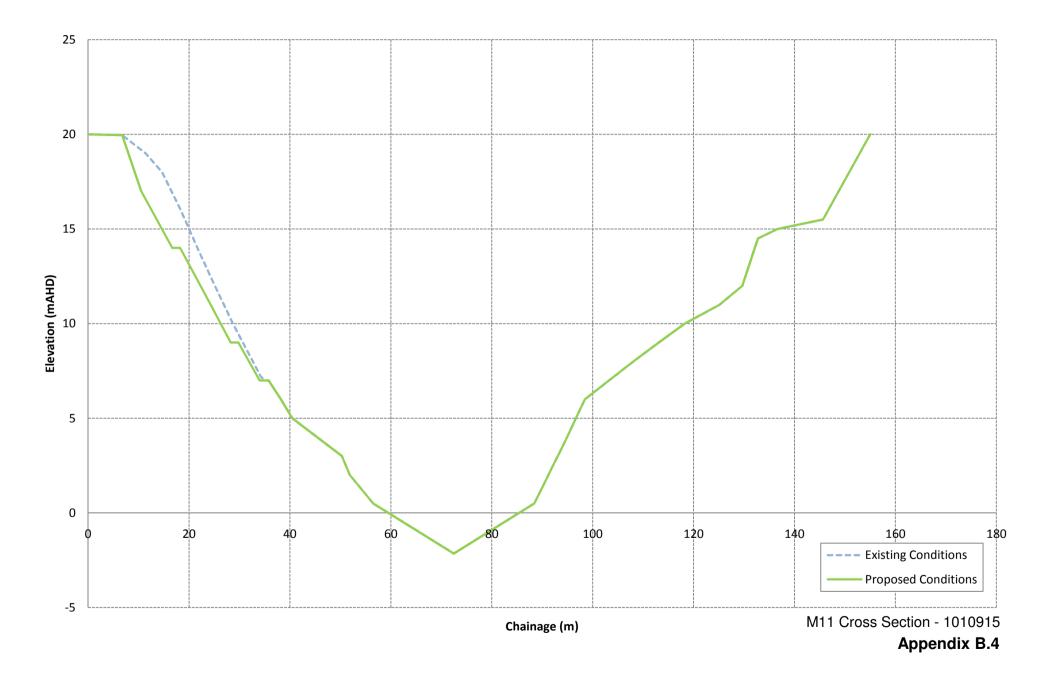
APPENDIX B

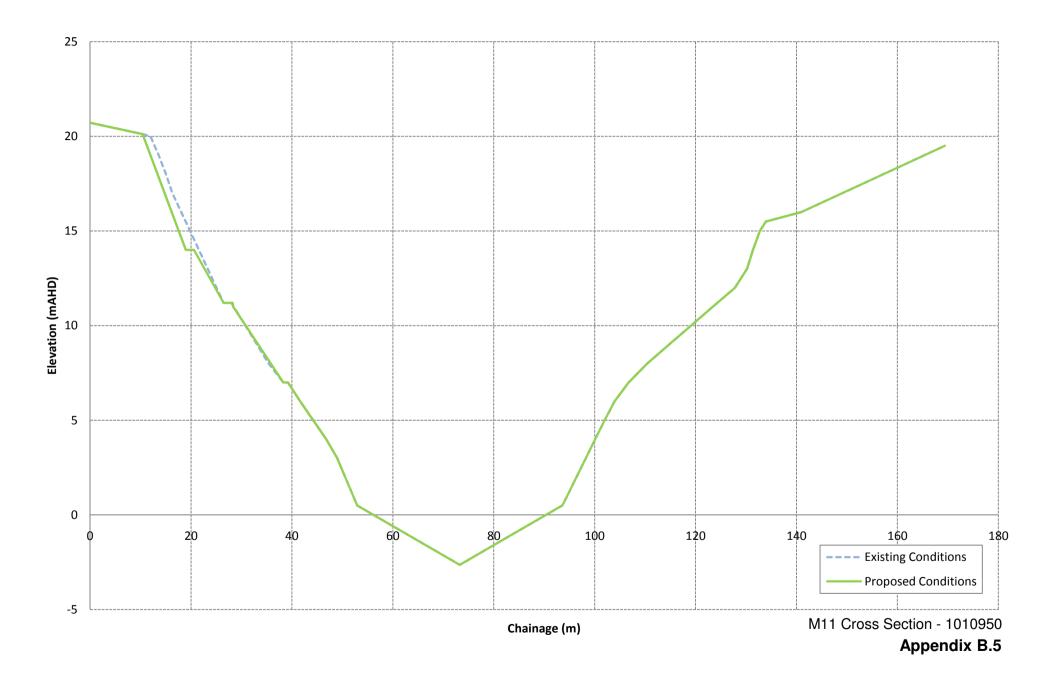
M11 Cross Sections

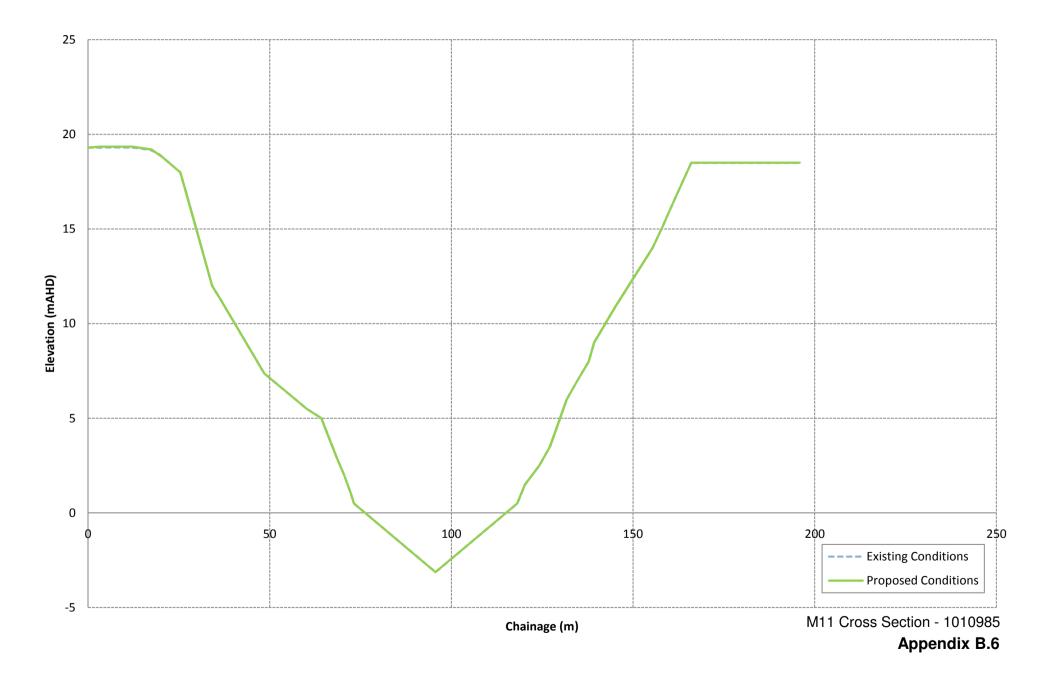












Attachment GE-8

Appendix 5

Flood Report prepared by Cardno.







RIVERLINKS CENTRAL

Flood Study

7 October 2009 Job No. 3503/70

Leda Developments



Cardno (Qld) Pty Ltd

ABN 57 051 074 992

Level 11 Green Square North Tower

515 St Paul's Terrace

Fortitude Valley Qld 4006

Locked Bag 4006 Fortitude Valley

Queensland 4006 Australia

Telephone: 07 3369 9822

Facsimile: 07 3369 9722

International: +61 7 3369 9822

cardno@cardno.com.au

www.cardno.com.au

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Manalan	D-4-	Author		Reviewer	
Version	Date	Name	Initials	Name	Initials
1	1 October 2009				
2	6 October 2009				
3	7 October 2009				

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RIVERLINKS CENTRAL FLOOD STUDY

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1. INTRODUCTION

The Riverlinks Central residential development is located between North Street and the Bremer River in North Ipswich, as shown on Figure 1. Works proposed on the site include the development of two residential subdivision areas with some slight associated works within the existing gully to the south east of the development.

The proposed development layout is shown on Bristow Architects drawing number 2009.12 DA02A, attached in the reference drawing section of this report.

Runoff from the site and the surrounding catchment drains to the Bremer River via a culvert under the existing railway that forms the south-western boundary of the site. The site is therefore subject to both local flooding and regional flooding from the Bremer River.

This report investigates any hydraulic impact the proposed development may have on local flooding. In addition, a regional flooding assessment has been undertaken to verify that the proposed works will not have an impact on Bremer River flood levels.



2. SITE CHARACTERISTICS

2.1 Existing

The Riverlink Central subdivision is located in North Ipswich adjacent to North Street, as shown on Figure 1. The development site is approximately 5.42 ha and is is bounded by neighbouring lots to the south-east, the Bremer River to the West; and the Queensland Railway Museum site to the north. Access to the existing site is via North Street.

The site is predominately open grassland with native vegetation in the steeper sections of the site.

The ultimate receiving waters for the site are that of the Bremer River via the gully that runs through the site and the culvert under the existing railway. A 1200mm Ipswich City Council stormwater pipeline discharges into the gully approximately 180 metres upstream of the railway culvert. The catchment extents for the existing gully are shown in Figure 2. The catchment that drains to the existing gully is predominately external to the site.

The site varies from relatively flat terrain to the north of the existing gully, to steeper terrain adjacent to and within the existing gully.

2.2 Proposed Development

The proposed development layout has been provided by Leda Holdings. This layout plan indicates that the overall proposed development will consist of two areas of residential development and some slight modification of the open space area containing the gully.

The proposed site plan including the gully redesign is included in the reference section of this report.



3. DATA

The hydraulic assessment has been based on site specific data as follows:

- Topographic Survey (2005), used to delineate the surrounding catchments;
- Contour and stormwater drainage information supplied by Council; and
- Proposed development layout Information supplied by Yeats Consulting and Leda Developments.



4. WATER QUANTITY (HYDROLOGY AND HYDRAULICS)

4.1 General

A hydrologic and hydraulic assessment was undertaken to determine peak flood levels within the gully that runs through the proposed development site. The details and results of the hydrologic and hydraulic assessment are presented below.

4.2 Hydrologic Assessment

The hydrologic analysis was undertaken using the hydrologic module of XP-SWMM Version 2009 in accordance with 'Australian Rainfall and Runoff' (1998) and the 'Queensland Urban Drainage Manual' (2007).

The hydrologic assessment considered the following scenarios:

- Pre-Development Case: The site and external sub-catchment land uses and areas are based on the existing survey data, aerial photos and two site visits. This model is calibrated to Rational Method Calculations for the site.
- Post-Development Case: The post-development model utilises the calibrated predevelopment case and modifies the percentage of fraction impervious and catchment areas in catchments that includes the site, in accordance with the proposed layout for the entire site.

It can be noted that the post development case considered the full urbanisation of the site without detention basins in place.

The hydrologic model was set up for the existing gully catchment covering an approximate area of 36.14 ha and the extents are shown on Figure 2. The catchment extents were defined based on existing survey and contour data.

The XP-SWMM model was used to generate the local catchment hydrographs for the 100 year Average Recurrence Interval (ARI) and for the full range of storm durations from 10 to 360 minutes.

The initial and continuing losses adopted for the 100 year ARI event in the hydrologic component of the XP-SWMM model are shown in Table 4-1.

Table 4-1 Adopted XP-SWMM Parameters

Pervious		Impervious	
Initial Loss (mm)	Continuing li Loss (mm/hr)	Initial Loss Continuing (mm) Loss (mm/r	
5	2.5	0	0

The adopted fraction imperviousness for the developed land use is listed in Table 4-2. The fraction impervious values were assumed based on the table of fraction impervious vs. development category provided in QUDM (2007). The existing railway and open space including roadway fraction impervious percentages were estimated based on aerial photos and site visits.



Table 4-2 Fraction Impervious for Site Land Uses

Land Use Category	Fraction Impervious	
Commercial	90%	
Residential	65%	
Railway	10%	
Open Space including Roadway	5%	
Open Space	0%	

4.3 Hydraulic Assessment

The hydraulic assessment was undertaken using the hydrodynamic component of XP-SWMM (v2009). The XP-SWMM model was run for the 100 year ARI flood event, for durations ranging from 10 to 360 minutes.

The intensity-frequency-duration (IFD) data and temporal patterns utilised in the XP-SWMM models were created using AR&R (1998) and AusIFD version 2.0 for Ipswich.

4.3.1 Pre-Development Case Model

The XP-SWMM model cross sections were extracted from the Triangular Interpolated Network (TIN) constructed from the existing topographic survey. A Manning's 'n' of 0.05 was adopted for the gully and main overland flow path, based on a site visit which identified generally grass with some scattered shrubs. A Manning's n of 0.015 was adopted for the culverts and pipework.

The gully, roadside channel and upper reach have been modelled based on the existing survey data. A 1,200 mm diameter stormwater pipe discharges into the gully approximately 180 metres upstream of the railway culvert.

Inflows to the model were adopted from the hydrologic component of the XP-SWMM model. The obvert was adopted as the fixed tail water depth at the downstream boundary condition at cross-section 'OUT'.

4.3.2 Post-Developed Case Model

Yeats Consulting Engineers provided updated cross sections in digital format. The updated cross sections have been integrated into the XP-SWMM model. The developed case has modified the existing cross section from MAIN 11 to MAIN 16. The modification includes some filling in the upper sections of each cross section along the northern edge of the channel down to the stream center line for cross sections MAIN11 to MAIN 14 and includes some modification on the south side of the stream center line for cross sections MAIN 15 and MAIN 16.

Flow boundary conditions are based on post developed flows from the hydrologic component of XP-SWMM as discussed in Section 4.2.

4.3.3 Hydraulic Results

Table 4-3 summarises the predicted existing and development peak 100 year ARI flood levels. Cross-section locations are shown on Figure 3.



Table 4-3 Peak Flood Levels, 100 Year Event

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)
Main 3	19.68	19.68
Main 4	17.78	17.78
Main 5	17.37	17.37
Main 6	17.37	17.37
Main 7	17.36	17.36
Main 8	17.34	17.34
Main 9	17.11	17.11
Main 10	14.89	14.90
Channel 4	19.86	19.85
Channel 5	19.85	19.85
Channel 6	21.15	21.15
Channel 7	20.93	20.93
Channel 8	20.85	20.85
Channel 9	19.81	19.81
Channel 10	19.53	19.49
Channel 11	18.04	17.95
Channel 12	17.50	17.43
Main 11	11.98	12.04
Main 12	11.67	11.87
Main 13	11.03	11.49
Main 14	9.76	10.11
Main 15	9.52	10.09
Main 16	8.76	9.35
Culvert Inlet	7.98	8.25

The results presented in Table 4-3 indicate that the proposed development (both in terms of the impact of development upon hydrology and changes to ground levels) will not adversely impact the flood levels upstream of the proposed development. The impacts at Main 11 through Main 16 are all contained within the site and will not significantly impact any adjacent properties. The decrease in peak flood level at Channel 12 reflects the reduction in catchment area discharging to the roadside channel due to the proposed development.

As noted in Section 4.2, the analysis for the developed case did not include a detention basin to ameliorate the impact of development. Although the peak discharge from the site will increase as a result of development, it will occur more rapidly than previously. The peak runoff from the site therefore has the opportunity to drain to the river prior to the peak occurring from the remainder of the catchment.

As part of the analysis, the flood levels produced by lesser events were modelled. The calculated flood levels for the lesser events (2 to 50 years) are shown in Appendix A.



As per the 100 year case, an increase in level was obtained in the open space area upstream of the culvert (i.e. MAIN 16 to MAIN 11). The resultant levels will not result in the flooding of any private property and are considerably lower than the corresponding Bremer River flood level (18.41 mAHD- refer Section 4.4).

It can be noted that an increase in flood level is also predicted at location MAIN10 (located immediately upstream of the open space area) for events less than the 100 year event. Although an increase is predicted, it is important to note that the resultant levels do not impact on any existing properties.

4.4 Hydraulic Sensitivity Assessment

The sensitivity of the calculated flood levels for local catchment flooding was assessed by the consideration of two scenarios.

• Tailwater Level Variation and Coincident Bremer River Flooding

As noted in Section 4.3.1, A tailwater level equal to the obvert of the pipe beneath the railway was adopted. This was considered to be reasonable given the relatively short response time of the local catchment compared to that of the Bremer River. At the time that the local catchment peaks, the level in the river would be expected to be relatively low.

As a sensitivity analysis, the flooding in the local catchment produced by the critical storm duration for the flooding of Bremer River (the Bremer River 1,080 minute duration storm) was modelled. The stage hydrograph estimated by the MIKE-11 model of the Bremer River was applied as the tailwater condition for the analysis.

Table 4-4 summarises the flood levels predicted for the 100 year event for this scenario. With reference to the table, the proposed development will have no impact on local flood levels for this scenario.

Blockage

Drainage of the local catchment is achieved by a large culvert beneath the railway. If the culvert were to be blocked, an increase in flood level could occur. Consideration was given to the reasonable extent of blockage that could be foreseen. Given the size of the culvert and the level of development within the catchment, the potential for the culvert to be blocked (for instance by branches) was assessed as relatively low. Certainly, a scenario involving the complete blockage of the culvert was considered to be overly conservative.

As a sensitivity analysis, the impact of 50 percent blockage of the culvert was modelled. The resultant flood levels for the 100 year event are listed in Table 4-4. With reference to the table, it can be noted that a localised increase in flood level occurs within the existing gully. However, the increase and resultant levels occur in a region where flooding is dominated by regional river flooding (18.41 mAHD) and therefore do not affect the reclamation levels applicable to the development. Given this outcome, it can be concluded that no change is required with respect to the flood levels adopted for the development to account for potential blockage effects.



Table 4-4 Peak 1080 Minute Duration and 50 percent blockage Storm Flood Levels

		(Bremer River) n Event		ckage of Downstream Culvert
Cross Section I.D.	Existing Case Peak Flood Level (mAHD)	Developed Case Peak Flood Level (mAHD)	Developed Case Peak Flood Level, No Blockage (mAHD)	Developed Case Peak Flood Level with 50 Percent Blockage (mAHD)
Main 3	19.60	19.60	19.68	19.68
Main 4	18.41	18.41	17.78	17.78
Main 5	18.41	18.41	17.37	17.37
Main 6	18.41	18.41	17.37	17.37
Main 7	18.41	18.41	17.36	17.36
Main 8	18.41	18.41	17.34	17.34
Main 9	18.41	18.41	17.11	17.11
Main 10	18.41	18.41	14.90	14.90
Channel 4	19.44	19.44	19.85	19.85
Channel 5	19.44	19.44	19.85	19.85
Channel 6	20.97	20.97	21.15	21.15
Channel 7	20.78	20.77	20.93	20.93
Channel 8	20.71	20.71	20.85	20.85
Channel 9	19.36	19.36	19.81	19.81
Channel 10	19.25	19.25	19.49	19.49
Channel 11	18.41	18.41	17.95	17.95
Channel 12	18.41	18.41	17.43	17.43
Main 11	18.41	18.41	12.04	12.04
Main 12	18.41	18.41	11.87	11.87
Main 13	18.41	18.41	11.49	11.49
Main 14	18.41	18.41	10.11	10.14
Main 15	18.41	18.41	10.09	10.13
Main 16	18.41	18.41	9.35	9.94
Culvert Invert	18.41	18.41	8.25	9.96



5. REGIONAL FLOODING IMPACT

Some minor earthworks are proposed within the existing gully area at levels less than the regional Bremer River flood level.

A regional flood assessment was performed to analyse the impact of filling the gully on regional flood levels in the Bremer River. For the analysis, it was conservatively assumed that the entire gully was filled to above flood level. The analysis was completed using the Ipswich City Council Ipswich Rivers MIKE-11 Model.

As the gully is not part of the existing case model, the existing case model was modified to reflect the storage available in the gully. The storage differential between existing conditions and post development conditions was established and applied as additional storage at the Mike 11 branch adjacent to the gully in the base case hydraulic model.

For the developed case, the storage was removed from the model. Further, the developed case considered the bank profile modelled as part of the Cardno report *Riverside Central Flood Study* (August 2009).

For the analysis, the following events in the Bremer River were considered:

• Bremer River: 2, 5, 10, 20, 50 and 100 year; and

Brisbane: 5, 10, 20, 50 year.

It can be noted that following the revision of rainfall intensities, the 50 year event is considered to have a recurrence interval similar to the 100 year event.

The results of the analysis are presented in Appendix B. With reference to Appendix B, it can be noted that the loss of the entire storage area would not result in an increase in flood level in the Bremer River.



6. CONCLUSION

A detailed flood assessment of the proposed Riverlinks Central residential development has been undertaken.

The assessment considered the following:

- the increase in runoff produced by the development; and
- the proposed earthworks in the open space area adjacent to the development.

The assessment has indicated that the proposed development and associated earthworks will create no adverse impact on peak flood levels in existing developed areas upstream of the development. The analysis has therefore determined that the development can occur without the need for the construction of a detention basin to offset the impact of development.

A regional flooding assessment has also been undertaken. The assessment indicated that the proposed works will have no discernable adverse impact on flood levels in the Bremer and Brisbane Rivers.



7. REFERENCES

Institution of Engineers Australia, 1998, 'Australian Rainfall and Runoff, A guide to Flood Estimation'.

Department of Natural Resources and Water, 2007, "Queensland Urban Drainage Manual".



FIGURES

Figure 1 Site Location

Figure 2 Hydrologic Catchment Extents

Figure 3 XP-SWMM Hydraulic Model





40 0 40 80 120 160 200m

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Scale 1:4000 (A3)

FIGURE 1 SITE LOCATION

Project No.: 3503-70

Cardno Lawson Treloar iverlink Central lood Study (N) DELACY STREET FERGUSON STREET LEGEND Site Boundary Catchment Boundary Existing Major Contour Existing Minor Contour Scale 1:4000 (A3) 200m 1:4000 FIGURE 2

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EATS Consulting Engineers
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HYDRAULIC CATCHMENT EXTENTS

Scale 1:1500 (A3)

Existing Inundation Extents

Existing Major Contour

Existing Minor Contour

Site Boundary Cross Section and Label

FIGURE 3
XP-SWMM HYDRAULIC MODEL

Project No.: 3503-70

LEGEND

MAIN 1

15.0

Developed Channel

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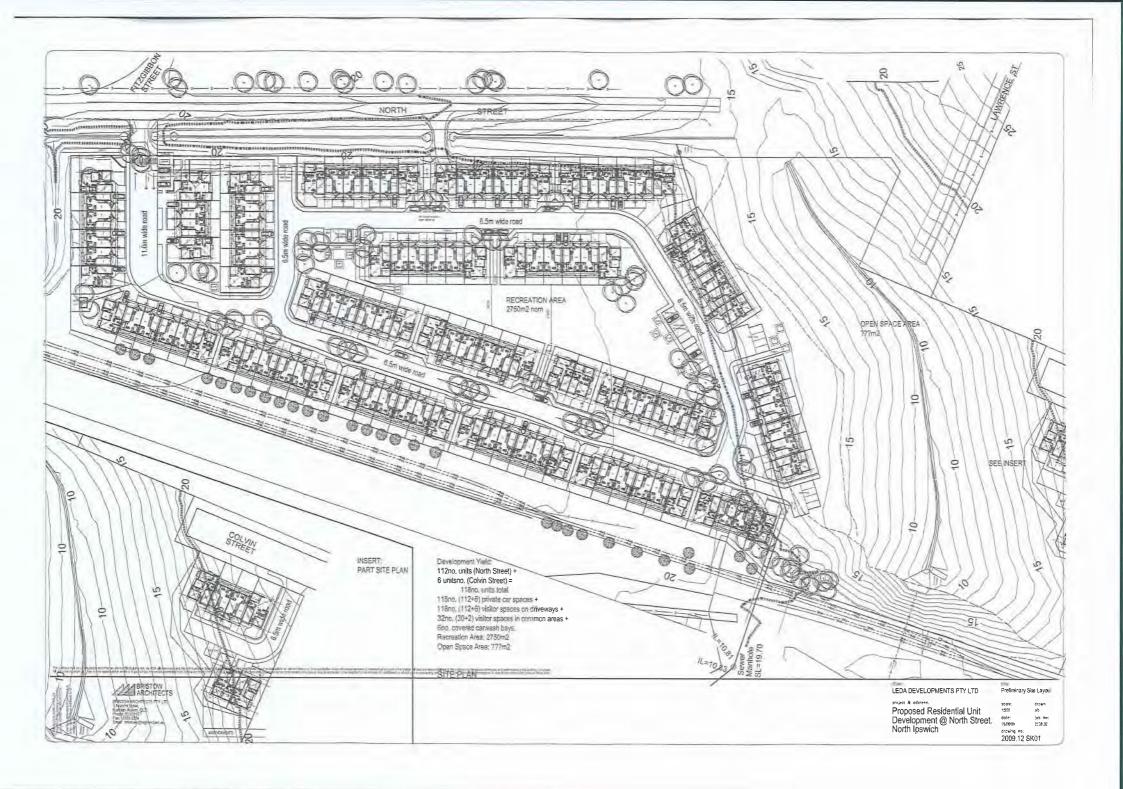
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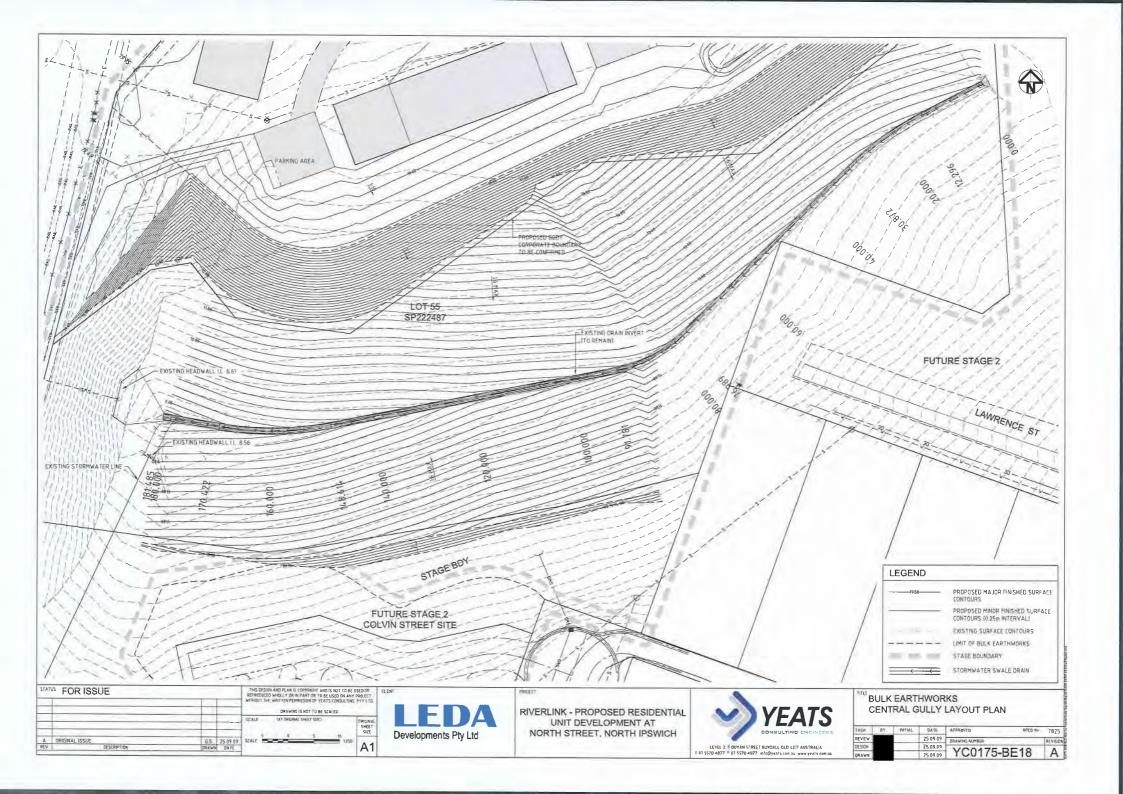
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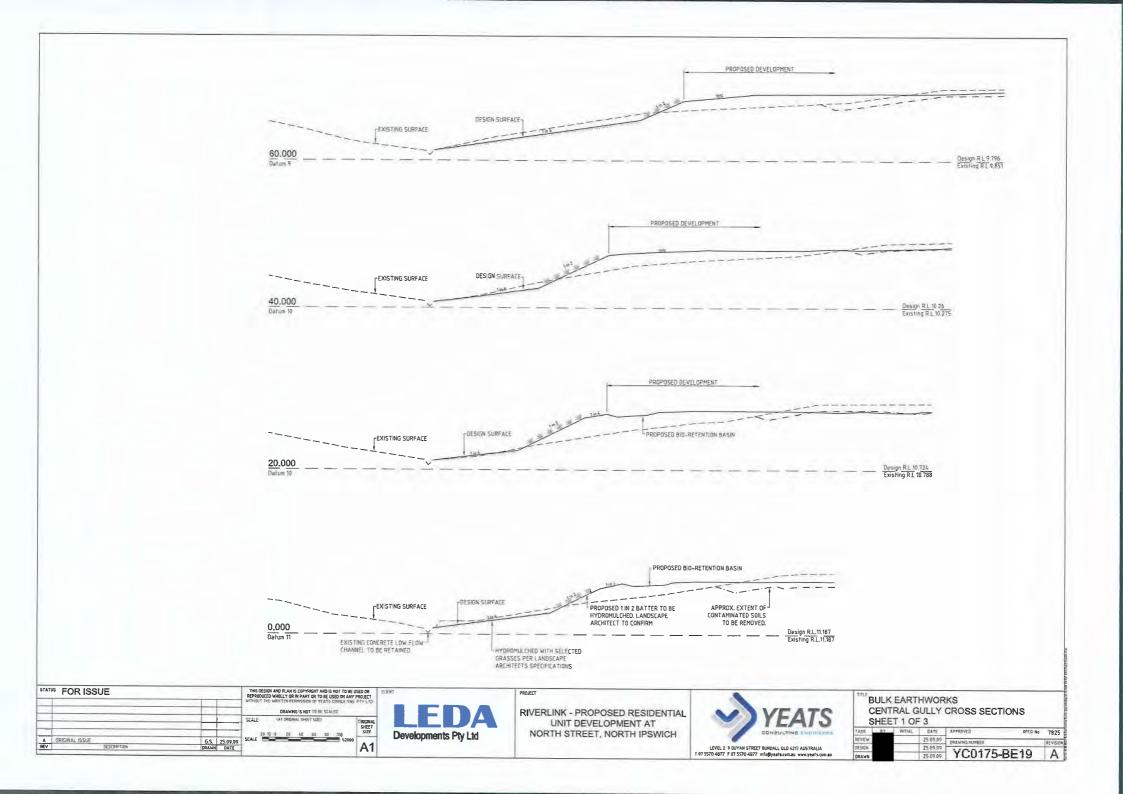


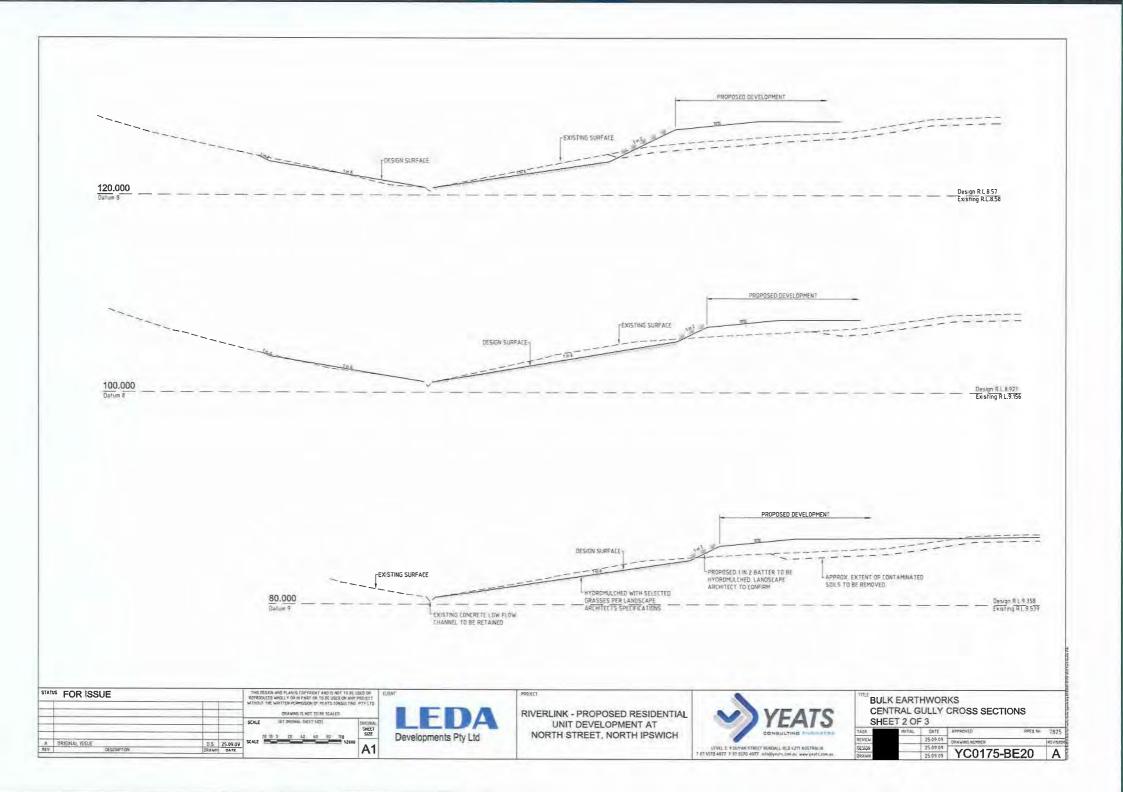


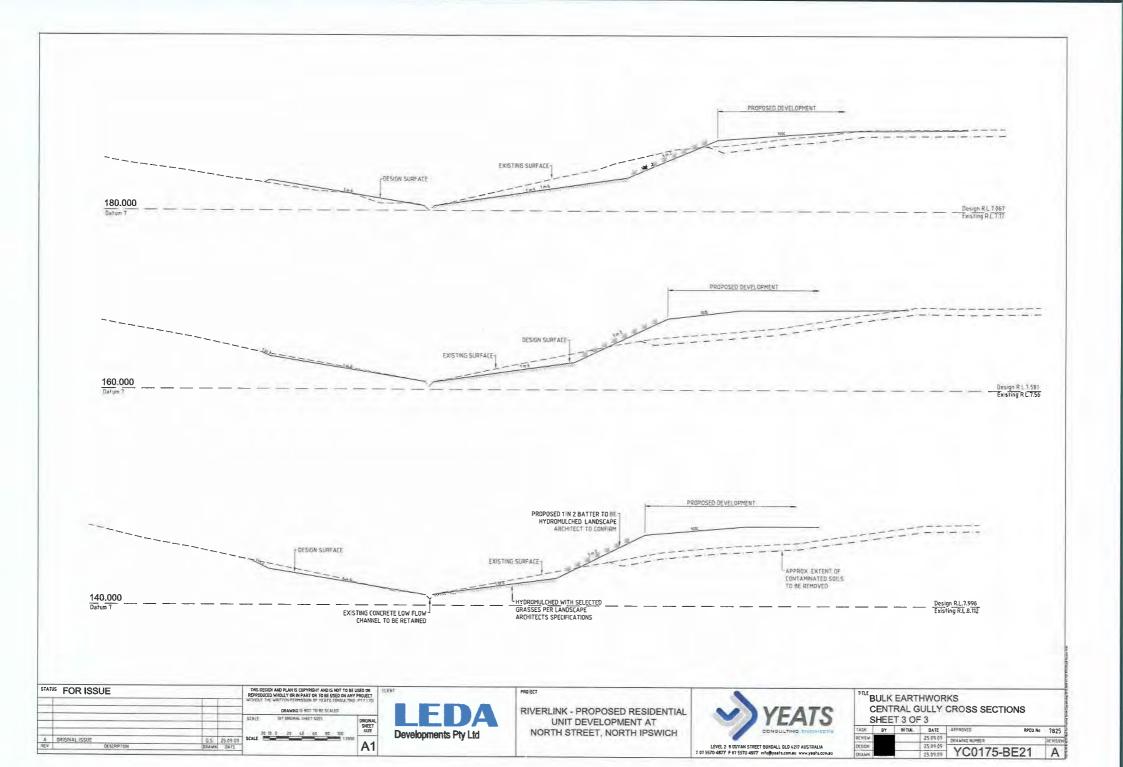
Reference Drawings













APPENDIX A

50 Year-2 Year Peak Flood Levels- Local Flooding



Appendix A - 50 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)			
Main 3	19.67	19.67			
Main 4	17.75	17.75			
Main 5	17.33	17.33			
Main 6	17.33	17.33			
Main 7	17.32	17.32			
Main 8	17.31	17.31			
Main 9	17.09	17.09			
Main 10	14.81	14.85			
Channel 4	19.80	19.79			
Channel 5	19.79	19.79			
Channel 6	21.13	21.13			
Channel 7	20.91	20.91			
Channel 8	20.84	20.84			
Channel 9	19.75	19.74			
Channel 10	19.49	19.45			
Channel 11	17.96	17.89			
Channel 12	17.48	17.42			
Main 11	11.93	11.98			
Main 12	11.62	11.81			
Main 13	10.99	11.45			
Main 14	9.73	10.04			
Main 15	9.46	10.02			
Main 16	8.70	9.27			
Culvert Invert	7.80	8.03			



Appendix A - 20 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD) 19.64				
Main 3	19.64					
Main 4	17.72	17.72				
Main 5	17.27	17.27				
Main 6	17.27	17.27				
Main 7	17.27	17.27				
Main 8	17.26	17.26				
Main 9	17.02	17.02				
Main 10	14.65	14.78				
Channel 4	19.74	19.74				
Channel 5	19.74	19.74				
Channel 6	21.12	21.12				
Channel 7	20.90	20.90				
Channel 8	20.83	20.83				
Channel 9	19.69	19.69				
Channel 10	19.45	19.41				
Channel 11	17.89	17.83				
Channel 12	17.46	17.41				
Main 11	11.87	11.91				
Main 12	11.56	11.74				
Main 13	10.94	11.39				
Main 14	9.70	9.95				
Main 15	9.36	9.92				
Main 16	8.63	9.18				
Culvert Invert	7.58	7.75				



Appendix A - 10 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD) 19.63			
Main 3	19.63				
Main 4	17.69	17.69			
Main 5	17.23	17.23			
Main 6	17.23	17.23			
Main 7	17.22	17.22			
Main 8	17.21	17.21			
Main 9	16.94	16.94			
Main 10	14.17	14.70			
Channel 4	19.68	19.68			
Channel 5	19.68	19.67			
Channel 6	21.10	21.10			
Channel 7	20.88	20.88			
Channel 8	20.81	20.81			
Channel 9	19.62	19.62			
Channel 10	19.41	19.38			
Channel 11	17.82	17.76			
Channel 12	17.43	17.39			
Main 11	11.82	11.85			
Main 12	11.52	11.68			
Main 13	10.91	11.34			
Main 14	9.67	9.88			
Main 15	9.29	9.83			
Main 16	8.59	9.12			
Culvert Invert	7.42	7.55			



Appendix A - 5 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD)				
Main 3	19.61	19.61				
Main 4	17.66	17.66				
Main 5	17.19	17.19				
Main 6	17.19	17.19				
Main 7	17.19	17.19				
Main 8	17.18	17.18				
Main 9	16.89	16.89				
Main 10	13.45	13.94				
Channel 4	19.63	19.63				
Channel 5	19.63	19.63				
Channel 6	21.08	21.08				
Channel 7	20.87	20.87				
Channel 8	20.80	20.80				
Channel 9	19.57	19.56 19.34 17.71				
Channel 10	19.37					
Channel 11	17.76					
Channel 12	17.41	17.37				
Main 11	11.78	11.80				
Main 12	11.47	11.62				
Main 13	10.87	11.31				
Main 14	9.65	9.79				
Main 15	9.21	9.74				
Main 16	8.55	9.09				
Culvert Invert	7.28	7.39				



Appendix A - 2 Year ARI Peak Flood Level

Cross Section I.D.	Existing Peak WSL (mAHD)	Developed Peak WSL (mAHD) 19.58				
Main 3	19.58					
Main 4	17.61	17.61				
Main 5	17.13	17.13				
Main 6	17.13	17.13				
Main 7	17.13	17.13				
Main 8	17.13	17.13				
Main 9	16.79	16.79				
Main 10	12.76	12.85				
Channel 4	19.54	19.54				
Channel 5	19.54	19.53				
Channel 6	21.05	21.05				
Channel 7	20.84	20.84				
Channel 8	20.77	20.77				
Channel 9	19.46	19.46				
Channel 10	19.30	19.28				
Channel 11	17.65	17.61				
Channel 12	17.36	17.33				
Main 11	11.69	11.71				
Main 12	11.39	11.50				
Main 13	10.77	11.21				
Main 14	9.61	9.70				
Main 15	9.07	9.58				
Main 16	8.50	8.99				
Culvert Invert	7.03	7.16				



APPENDIX B

Bremer River Flood Levels

BREMER RIVER FLOODS - Predicted Impacts to Peak Flood Levels Due to RiverLinks Development combined with Loss of Valley Storage

M11 XS	BREM 1	1 100 year ARI Flood BREM 50 year ARI Flood				BREM 20 year ARI Flood BREM 10 year ARI Flood							5 year AR	I Flood	BREM 2 year ARI Flood			
BREM	Exist	Dev	Afflux	Exist	Dev	Afflux	Exist	Dev	Afflux	Exist	Dev	Afflux	Exist	Dev	Afflux	Exist	Dev	Afflux
	mAHD	mAHD	(mm)	mAHD	mAHD	(mm)	mAHD	mAHD	(mm)	mAHD	mAHD	(mm)	mAHD	mAHD	(mm)	mAHD	mAHD	(mm)
1010020		19.07	-51	17.17	17.13	-46	12.68	12.59	-100	12.68		-100	8,29	8,25				
1010090			-53		17.06	-47	12.54	12.43	-105	12.54	12.43	-105	8.17	8.12	-49	4,52	4.52	
1010150	1				17.02	-29	12.43	12.37	-67	12.43	12.37	-67	8.07	8.02	-51	4.52	4.52	
1010250			-25		17.03	-20	12.42	12,37	-53	12.42	12,37	-53	8.06	8,01	-51	4.52	4.52	
1010340		18.85	-76		16.92	-57	12.37	12.36	-3	12.37	12.36	-3	7.96	7,90	-53	4.52	4.52	
1010430	18,87	18.78		16.93	16.87	-64	12.36	12.36	-3	12.36	12.36	-3	7.91	7.85	-54	4.52	4.52	
1010510					16.80	-48	12.36	12.36	-2	12,36	12.36	-2	7.80	7,76	-45	4.52	4.52	
1010590		18.53	-45		16.65	-21	12.35	12,35	-1	12.35	12.35	-1	7.65	7.65	0	4.52	4.52	
1010645		18.57	-25		16.66	-8	12.35			12.35	12.35	-1	7.65	7.65	0	4.52	4.52	
1010700	18,45	18.43	-21	16.55	16.55	-5				12.35	12,35	-1	7.65	7.65	0	4.52	4.52	
1010890	18.16			16.31	16.30	-6				12.34	12.34	-1	7.65	7.65	0	4.52	4,52	
1010915		18.04	-25		16.21	-6		12.34	W 95	12.34	12.34	-1	7.65	7,65	0	4.52	4,52	11
1010950		100			16.17	8	5-1-1	12.34	-1	12.34	12.34	-1	7.65	7.65	0	4.52	4.52	
1010985		17.98	-11	16.16	16.16	6	12.34	12.33		12.34	12.33	-1	7.65	7.65	0	4.52	4.52	1
1011040		17.95	-35	16.15		-13	12.33	12.33		12.33	12.33	-1	7.64	7.64	0	4.52	4.52	
1011090	17.93	17.90	-27	16.10		-6	12.33	12.33		12.33	12.33	-1	7.64	7.64	0	4.52	4.52	
1011185		17.81	-46		16.01	-25	12.33	12.33		12.33	12.33	-1	7.64	7,64	0	4.52	4.52	
1011320		17.78	-29	15.98	15.97	-13	12.33	12.33	0	12.33	12.33	0	7.64	7.64	0	4.52	4,52	
1011465		the second second	-17	15.85	15.84	-2	12.32	12.32	0	12.32	12.32	0	7,64	7.64	0	4.52	4.52	
1011575		17.49		15.69	15.69	-4	12.32	12.32	0	12.32	12,32	0	7.64	7.64	0	4.52	4.52	
1011700		17.28	25	15.50	15.50	5	12.32	12.32	0	12.32	12.32	0	7.64	7.64	0	4.52	4.52	
1011790		17.09	-23	15.36	15.34	-21	12.31	12.31	-1	12.31	12.31	-1	7.64	7.64	0	4.52	4.52	
1011810		17.02	-14	15.31	15.29	-18	12.30	12.30		12.30	12.30	-1	7.64	7.64	0	4.51	4.51	
1011930	ž	16.86	-27	15.16	15.14	-20	12.30	12.30		12.30	12.30	0	7.64	7.64	0		4.51	
1012045	16.79	16.79	0	15.08	15.08	0	12.30			12.30	12.30	0	7.64	7.64	0	4.51	4.51	
1012050		16.84	0	15.13	15.12	0	12.30		0	12.30	12.30	0	7.64	7.64	0	4.51	4.51	
1012070	16.82	16.82	0	15.10	15.10	0	12.29	12.29	0	12.29	12.29	0	7.64	7.64	0	4.51	4.51	
1012200		16.75	0	15.04	15.04	0	12.29	12.29	0	12.29	12.29	0	7.64	7.64	0	4.51	4.51	
1012870	16.71	16.71	0	15.01	15.01	0	12.29	12.29	0	12.29	12.29	0	7.64	7.64	0	4.51	4.51	
1013380		16.66	0	14.95	14.95	0	12.28	12.28	0	12.28	12.28	- 0	7.64	7.64	0	4.51	4.51	
1013700		16.62	0	14.92	14.92	0	12.28	12.28	0	12.28	12.28	0	7.64	7.64	0		4.51	3
1014220	16.43	16.43	0	14.74	14.74	0	12.28	12.28	0	12.28	12.28	0	7.63	7.63	0	4.51	4.51	-

BRISBANE RIVER FLOODS - Predicted Impacts to Peak Flood Levels Due to RiverLinks Development combined with Loss of Valley Storage

M11 XS	BRIS	50 year ARI	Flood	BRIS	20 year ARI	Flood	BRIS	10 year ARI	Flood	BRIS 5 year ARI Flood			
BREM		Dev mAHD	Afflux (mm)	Exist mAHD	Dev mAHD	Afflux (mm)	Exist mAHD	Dev mAHD	Afflux (mm)	Exist mAHD	Dev mAHD	Afflux (mm)	
1010020		18.38	-37	16.39	16.34	-51	13,72	13.66		11.23	11.17	-5	
1010090		18.33	-37	16.33	16.28	-52	13.65	13.59	-62	11.15	11,10	-5	
1010150		18.30		120,000	16.25	-37	13.61	13.56	-48	11.09	11.05		
1010250		18.30			16.25	-30	13.60	13,56	-42	11.09	11.05	-3	
1010340		18.21	-52	16.23	16.17	-57	13.53	13.48	-54	11.01	10.97	-4	
1010430	18.22	18.16	-61	16.19	16.13	-62	13.51	13,45	-58	10.99	10.95	-4	
1010510		18.10	-47	16.12	16.07	-49	13.44	13.40	-48	10.93	10.89	-3	
1010590		17.97	-23	15.99	15.96	-29	13.32	13.29	-31	10.82	10.79	-2	
1010645	18.01	18.00	-9	15.98	15.96	-21	13,30	13.28	-28	10.79	10.77	-2	
1010700			-6	15,90	15.88	-18	13.24	13.21	-27	10.73	10.71	-2	
1010890			-8	15.71	15.69	-19	13.07	13.04	-28	10.57	10.55	-2	
1010915	17.61	17.60	-9	15.64	15.62	-20	13.01	12,98	-28	10.51	10.49	-2	
1010950			3	15.60	15.59	-9	12.97	12.95	-21	10.48	10.46		
1010985	17.56	17.57	1	15.60	15.59	-11	12.97	12.95	-21	10.47	10.46	-1	
1011040		17.54	-16	15.59	15.57	-25	12.95	12.92	-31	10.45	10.43	-2	
1011090		17.51	-10	15.56	15.54	-19	12.93	12.90	-27	10.44	10.42	-2	
1011185	17.47	17.44	-24	15.51	15.47	-32	12.87	12.84	-30	10.38	10,36	-2	
1011320	17.43	17.42	-12	15.46	15.44	-22	12.82	12.80	-15	10.32	10.31	- 0	
1011465	17.33	17.32	-4	15.36	15.35	-12	12.74	12.73	-8	10.25	10.25		
1011575	17.20	17.21	7	15.25	15.24	-14	12.64	12.63	-11	10.16	10.16		
1011700	17.05	17.07	18	15.10	15.10	-8	12.51	12.50	-8	10.05	10.04	- 3	
1011790	16.96	16.94	-12	15.00	14.98	-26	12.42	12.40	-18	9.95	9.95	- 1	
1011810	16.91	16.90	-9	14.97	14.95	-14	12.38	12.36	-11	9.91	9.90	1	
1011930	16.82	16.80	-16	14.86	14.85	-14	12.26	12.25	-2	9.78	9.79		
1012045	16.77	16.77	0	14.81	14.81	0	12.21	12.21	0	9.73	9.73		
1012050	16.80	16.80	0	14.84	14.84	0	12.24	12.23	0	9.76	9.76		
1012070	16.79	16.79	0	14.82	14.82	0	12.15	12.15	0	9.68	9.68		
1012200	16.75	16.75	0	14.78	14.78	0	12.11	12.11	0	9.64	9.64	-	
1012870	16.73	16.73	0	14.76	14.76	0	12.09	12.09	0	9.61	9.61		
1013380	16.70	16.70	0	14.72	14.72	0	12.03	12.03	0	9.55	9.55		
1013700	16.68	16.68			14.69	0	12.00	12.00	0	9.52	9.52		
1014220	16.58	16.58	0	14.56	14.56	0	11.88	11.88	0	9.41	9.41	-	

Attachment GE-9

Your reference
Our reference 3262/10 MLP:AKK
Contact Officer Aaron Katt
Telephone

Contaminated Land Unit
Department of Environment and Resource
Management
PO Box 2771

26 May 2010

Brisbane QLD 4001

Dear Sir/Madam

Re: Application Number: 3262/10

Application (author): 5202/10

Address: W M Hughes Street North Ipswich

North Street North Ipswich

W M Hughes Street North Ipswich W M Hughes Street North ipswich

A North Street North Ipswich

Application Type: Operational Works (Bulk Earthworks)

Council is in receipt of a development application for the above described land for the remediation of Contaminated Land and Bulk Earthworks.

The Application materials associated with this proposal are available on Councils PDOnline website http://pdonline.ipswich.qld.gov.au/pdonline/user/home/default.aspx and searching using application number 3262/10.

It would be appreciated if your comments could be forwarded by 11 June 2010, to allow Council to consider this application within the *Sustainable Planning Act 2009* timeframes. Should Council not receive a response from the Department of Environment and Resource by this date, it shall be assumed that the Department has no comments in respect to the matter and Council will finalise its assessment of the application. If this timeframe does not provide adequate time to assess the material and provide comments, please contact Council to discuss an alternative timeframe.



lpswich City Council

45 Roderick St PO Box 191 Ipswich QLD 4305 Australia

Tel

(07) 3810 6666

Fax

(07) 3810 6731

Email

council@ipswich.qld.gov.au

Web

www.ipswich.qld.gov.au

Should you require further information in relation to this matter, please do not hesitate to contact myself on the telephone number listed above or via email on

Yours faithfully

Aaron Katt SENIOR ENGINEERING OFFICER

Attachment GE-10

Nick J White & E Tilbrook 28 Hume St

Woodend Qld 4305 Ph: (07) 3202 1577

22 October 2010

Chief Executive Officer Ipswich City Council PO Box 191 Ipswich Qld 4305

Dear Sir,

Re: Proposed Development of Lots

North Ipswich owned by Lipoma

2.5 OCT 2010

We refer to the properties on Lots Pty Ltd (hereafter referred to as 'The Site') and state our concern about the unsuitability of earthworks relating to Development Applications lodged for The Site that include the proposed construction of Riverlinks Central.

The Site earthworks plans have a high probability of adversely impacting properties on the opposite bank of the river in rain and/or flood events. The design of the earthworks planned and commenced:

- alters the local flood plain by substantially steepening and narrowing the riverbank profile
- builds up The Site above 1:100 flood level through leveling of dumped spoil mounds
- increases peak storm water volumes from The Site to Bremer River

This is likely to cause any flood event to have significantly increased adverse impact on our property at Hume St, Woodend due to:

- changed hydrological flows resulting from changed riverbank profile on The Site causing scouring on opposite bank
- acknowledged increased velocity and volume of stormwater outflows from The Site causing scouring on opposite bank
- instability of earthworks where consolidated fill overlays unconsolidated fill

We have previously advised in writing via formal submission to development applications and other letters and emails to Ipswich City Council (ICC) Planning Department our concern about the threat posed by the earthworks design on The Site. ICC has not enforced its directives to stop adding to stockpiles and to remove stockpiles.

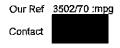
We have now been left with no alternative other than to put both you and ICC on notice that we will hold ICC culpable and liable for damages in any event of loss or damage (including but not limited to bank slumping, bank erosion, infrastructure and vegetation damage, exposure to smoke and/or toxic fumes) that we suffer that could be attributable to activities on this site.

This notice of your liability will only be withdrawn if The Site development plans and works are amended to restore the riverbank profile of The Site between 0.0m AHD and 19.5m AHD to profile that existed in 1975; ensure verifiably that stormwater runoff from entire site is not increased on 1975 levels; and ensure that the risk of subterranean fires has been eliminated.

Vours sincerely.

N.I White and EN Indrova

Attachment GE-11



12 November 2010

Ipswich City Council PO Box 191 IPSWICH QLD 4305

Attention: Mr Aaron Katt

Dear Sir



Cardno (Qld) Pty Ltd ABN 57 051 074 992

Level 11 515 St Paul's Terrace Fortitude Valley QLD 4006 Australia

Locked Bag 4006 Fortifude Valley QLD 4006 Australia

Phone: 61 7 3369 9822 Fax: 61 7 3369 9722

www.cardno.com.au



We refer to the request received from Council in relation to the preparation of a response to queries raised by an adjacent landowner regarding the above flood study. As requested, we have prepared a response to the queries raised.

Each query and the response to the query is provided below.

'1. The Flood Study states it uses '50 year ARI event' levels in its calculations. I (the property owner) believes that failure to include the 100 year ARI event levels is a serious omission. The calculations should be redone to include 100 year ARI event modelling.'

The use of the 50 year ARI event is based on the work undertaken for the Ipswich Rivers Flood Study and subsequent work undertaken in relation to the rainfall intensities applicable to the catchment. The Ipswich Rivers Flood Study was completed by consultants Sinclair Knight Merz in 2000 for Ipswich City Council. Following the completion of the flood study, a major review was undertaken in relation to the rainfall intensities applicable to design events in the catchment. The review indicated that the rainfall intensities adopted for the previous study were overly conservative. Although it is understood that the Ipswich Rivers Flood Study is currently under review, advice from Council when the flood study was completed was that the modelled 50 year average recurrence interval 30 hour Brisbane River event is now considered to be equivalent to an event with a recurrence interval of 100 years.

Based on the revision of rainfall intensities, the 100 year 18 hour Bremer River event is also considered to have a recurrence interval greater than 100 years. The 100 year 18 hour Bremer River event (revised recurrence interval greater than 100 years) and the 50 year 30 hour Brisbane River event (equivalent to a 100 year average recurrence interval event) were both used to analyse the development. The impact on flood levels and velocities for neighbouring properties in both cases was found to be acceptable.

'2. The Flood Study is based on modelling a 'missmatch of data' — recent contour maps (2008), historical flood level and velocity data. The bank profile on the site has changed significantly since 1974. If there has been considerable reprofiling of the entire river bank on the bank and this has not been taken into account, then you would get the same result as the Cardno Report — ie, a relocation of existing fill results in little net change between 'existing' and 'developed' cases in a flood event. The modelling does not take into account the significant narrowing of the stream profile since the 1974 flood.



The modelling needs to be redone using actual 1974 river bank profiles in order to assess the effect of proposed development profile with a 50 and 100 year ARI event.'

As noted in response to the first query, the Cardno flood study was based on the Mike-11 hydraulic model established for the Ipswich Rivers Flood Study by consultants Sinclair Knight Merz in 2000 for Ipswich City Council. The model and the report produced by the consultants has been adopted by Council and is used to provide calculated flood levels in response to flood search applications. The model therefore represents the base case against which the impact of proposed development is assessed.

The model developed for Council in 2000 was set up and calibrated to the 1974 event (among others), and then design storms (calculated in accordance with the procedures identified in the Institution of Engineers Australia publication Australian Rainfall and Runoff, A Guide to Flood Estimation) were input to the model to determine the flood levels for events with various recurrence intervals. Therefore the adopted flood level used is not based on "historical flood level and velocity data" but design events using a model calibrated to previous historic events. It is considered that the modelling approach adopted by Council's consultants represents standard engineering practice and is acceptable.

In any case, the modelling of conditions that would have been present in 1974 is not possible. The calibration conducted in the 2000 study for the 1974 event noted the following "Due to extensive dredging and shifting of the river bed in the Brisbane and Bremer Rivers it was appropriate to compare surveyed cross sections taken directly after the 1974 flood with more recent survey and contour plans. A number of cross-sections were compared at various locations and although each set of the compared sections were not at an exact location, the general trend suggested that the river system had a lower bed level (up to 1.5m)." Modelling for the Council flood study and the Cardno flood study was therefore necessarily based on the cross sections surveyed for the flood study ultimately adopted by Council.

In the case of the flood study, a section of the original Council model was provided to Cardno by Council. To provide additional detail in the area being considered, additional cross-sections were added to the existing case model. The channel widths for the new cross-sections were comparable to the channel widths used in the 2000 flood study (which were surveyed in 1995).

As the analysis was relative in nature (to confirm that the earthworks would not produce an adverse impact compared to existing conditions), the use of additional cross sections in the manner used for the flood study is considered to be entirely reasonable. The flood study determined that the proposed development would not have an adverse impact compared to the flood levels calculated for the adopted flood model of the Bremer River.

'3. The instability of the proposed Site Area referred to in the Flood Study is of great concern. For example, the planned earthworks to build a 19.5m platform requires up to eight metres of fill to be contained with a 1 in 2 reinforced batter. And this is on top of a substrate of railway fill (fly ash, etc) and loose sandy loams. The 2008 Cardno Flood Study has not adequately addressed likely flood scenarios. The report falls to consider the stability of various levels of site substrate. (Also, there have been several past instances of subterranean fires in ash fill on this site – this is another threat to the stability of the site that has not been addressed in any earthworks plan). If the Site Area were to collapse in the future due to a flood or fire event, it would be catastrophic for the site, for us (the property owner) and other properties downstream and the Bremer River.'

Cardno completed a flood study of the Bremer River. The scope of the flood study did not include a geotechnical investigation in relation to the stability of the proposed bank slope as this is necessarily work appropriate to qualified geotechnical enineers.



The property owner is referred to the detailed geotechnical investigation that was undertaken in relation to the proposed earthworks. Further, the flood study did not include consideration of subterranean fires in ash fill.

'4. The Flood Study does not take into consideration the swirling nature of flood events and lateral flows.'

The Cardno flood study was conducted using the one-dimensional Mike-11 hydraulic model to be consistent with the modelling software used by Council. While it is acknowledged that the model is one-dimensional in nature, as the site is located on a relatively straight stretch of the Bremer River it is considered that eddy flows will be minimal and do not need to be modelled in this case.

'5. The Flood Study does not take into consideration increased erosion of properties on the western bank as a result of flood waters being directed from the proposed steep reinforced 1:2 or 1:3 walls.

Since the dumping of spoil on the Riverlink North Site there has been considerable erosion and bank slumping on the western (Woodend) side of the river. The characteristics of a minor flood changed markedly since 2007 causing increased velocities and eddying across the river. In the minor flood event of 2008 some properties on the western side lost many cubic metres of their land as a result.'

The impact of the development on peak velocities for a minor flood event (10 year ARI event) was shown to be from -0.08 to 0.09 m/s in the area of development, with negligible impact upstream or downstream. This change in velocity is not considered sufficient to result in changes to the natural bank erosion and deposition behaviour. The proposed development will widen the flow width in the northern part of the development which will result in reduced velocities in this area.

'6. The report suggests Manning roughness coefficient for the developed site is 0.08 (Cardno Flood Study 2008, p2). However, this is approximately half the targeted value in the Council's 2008 Riparian Corridor Rehabilitation Guideline which is aimed at reducing flood velocities, sediment loads and streambank erosion. The development plans should be revised to ensure Manning roughness coefficient is more in line with Council's targets.'

In order to satisfy common law requirements, it is necessary to demonstrate as part of a development application, that a proposed development will not adversely impact on flooding and cause an actionable nuisance. The basis for the determination of this impact is relative to the current condition of the site. While Council may have a desire to increase the level of vegetation within the corridor, such an increase in vegetation will impact on flood levels to some degree. This increase would impact both the existing and developed cases and is the responsibility of Council.



We trust that this response is of assistance. If you have any queries in relation to this leter, please do not hesitate to contact us.

Yours faithfully



for Cardno

Attachment GE-12

GeoEnvironmental Consultants

ACN 079 083 640

Specialising in the Earth and what's built on it

Pty Ltd

129 Outlook Crescent Bardon Qld. 4065	E-mail:	Phone: (07) 3367 2266 Fax: (07) 3367 2377 Mobile
6 th January 2011		Ref: 6062/01

Leda Developments Pty Ltd PO Box 1914 Surfers Paradise, QLD 4217

Re: SITE INSPECTION – 5th JANUARY 2011 RIVERLINK DEVELOPMENT, NORTH IPSWICH, QLD

Dear ,

of **GeoEnvironmental Consultants Pty Ltd** inspected the **Leda** Riverlink development site on 5th January 2011 to assess contaminated soil status after recent heavy rainfall and flooding along the Bremer River. Comments based on our inspection include:

- 1. Overall, installed control measures appear to have affectively handled stormwater and sediment runoff;
- 2. In the North Street and Hughes Street areas stormwater runoff had been controlled through built drain, bund and pond structures with no evidence of uncontrolled contaminated soil migration to sensitive receptors;
- 3. In the Riverbank Area there was evidence that peak floodwaters had temporarily encroached several metres onto the former Borrow Pit that had been previously backfilled with low level contaminated soil and gravelly material sourced from the North Street area excavations. There was no evidence of scouring or removal of large quantities of contaminated soil from the flood affected area. Thin surface fines had been removed by floodwater. The downslope silt fence had been damaged at some locations. The floodwater had not reached the toe of any contaminated soil batters or platforms being constructed as part of the current earthworks program. Additional control measures including clean clay bunding and repaired silt fencing are being instigated;
- 4. There was no evidence of significant scouring or removal of the original contaminated fill material located along sections of the riverbank not subject to bulk earthworks. There was some minor erosion along the access track leading to the water truck filling area at the north end of the site.

It is considered that minor repairs, maintenance and bunding will reinstate the site to an acceptable standard and provide capacity to withstand further, similar rainfall events.

Please contact me on or at or at if you have any questions or require further information.

Yours sincerely

for GeoEnvironmental Consultants Pty Ltd

Attachment GE-13



Our Ref:

QC00-3754/1606/25.01.2011

Enquiries to:

25 January 2011

Ipswich City council P.O. Box 191 Ipswich QLD 4305

Attention: Mr Aaron Katt

27 JAN 2011

Doo. No.
Applie. No. 3262/10

Action Off. A. Katt

CC.

Div 6

Level 8 Australia Fair Tower 42 Marine Parade SOUTHPORT QLD 4215 Mail: PO Box 3766 Australia Fair Southport Qld 4215

P: +61 7 5509 6400 F: +61 7 5509 6411

E: goldcoast@vdmgroup.com.au W: www.vdmconsulting.com.au

Dear Sir

Re: Council Ref: 3262/10 Ipswich Riverlink

WM Hughes and North Streets, North Ipswich

As a result of severe flooding of the Bremer River that peaked on Thursday evening 13 January 2011, an inspection was held on Friday 21 January 2011 attended by and from Leda Developments from GeoEnvironmental Consultants and myself.

The sites at WM Hughes Street and North Street was inundated by the flood waters. The Riverside site platform level.

The sediment ponds and associated earth drains and sediment fences for the WM Hughes site, the North Street and the upper platform of the Riverside site were operating generally as designed including the earth berm along the edge of the upper platform of the Riverside site adjacent to the River.

The lower portion of the Riverside site where the sediment ponds are located within the borrow areas were completely submerged as was the middle platform area. The attached report from details the extent of fine materials removed from the existing stockpiles and embankment construction.

There is evidence of two batter slips that have occurred and a small piping failure at the southern end towards the medical centre. The batter slips have occurred following the drawing down effect from the lowering of the flood waters which has resulted in no material being washed into the Bremer River. The small piping failure at the southern end resulted in the removal of a small amount of existing material being removed from the site.

Overall the site inspection confirmed that the areas not inundated generally performed as intended without loss of contaminated material into the Bremer River from the two land slips, where the material has been contained within the site.

CONSULTING ENGINEERS AND SCIENTISTS

AUSTRALIA
Western Australia

Western Australia Victoria New South Wales Queensland Northern Territory INTERNATIONAL

Abu Dhabi, UAE Dubai, UAE Hanoi, Vietnam QUEENSLAND
Gold Coast
Brisbane
Sunshine Coast
Hervey Bay
Bundabero

Gladstone Mackay Airlie Beach Caims





The Environmental Management Plan did not envisage that a flood of the magnitude experienced would occur as is normal experience for temporary works within the construction industry.

Work has recommenced on site rehabilitating the sediment and control measures and as soon as practical full earthworks operations will commence when the site is sufficiently dried to allow trafficking of construction machinery and compaction can proceed including the repair of the land slip areas by removal of the loose material from the lower flood plain area.

Please contact should further information be required.

Yours faithfully

Manager – Civil Principal Engineer

Enc:

cc: Leda Developments

- GeoEnvironmental Consultants





GeoEnvironmental Consultants

ACN 079 083 640

Specialising in the Earth and what's built on it

Pty Ltd

129 Outlook Crescent Bardon Qld. 4065

E-mail:

Phone: (07) 3367 2266 Fax: (07) 3367 2377 Mobile:

25th January 2011

Ref: 6062/01

Leda Developments Pty Ltd PO Box 1914 Surfers Paradise, QLD 4217

Re: SITE INSPECTION – 21st JANUARY 2011 RIVERLINK DEVELOPMENT, NORTH IPSWICH, QLD

Dear

of **GeoEnvironmental Consultants Pty Ltd** inspected the **Leda** Riverlink development site on 21st January 2011 to assess contaminated soil status after the peak flood event on 13th January 2011. Comments based on our inspection include:

- 1. Overall, the site was not extensively disturbed despite the size of the flood event that reached approximately RL 19.4m and covered areas of compacted contaminated fill and the toes of some clay and concrete stockpiles;
- 2. Flood waters did not inundate the North Street and Hughes Street areas and stormwater runoff in these two areas had been controlled through built drain, bund and pond structures with no evidence of uncontrolled contaminated soil migration to sensitive receptors;
- 3. In the Riverbank Area the peak floodwaters had covered the compacted, underconstruction platform of contaminated fill to a depth of between approximately 1.0m and 1.5m. There was evidence that surface fines had been removed by floodwater leaving coarser fill material that had helped to bind the surface and prevent deep scouring and erosion:
- 4. The submerged contaminated soil batters held up well considering the volume of floodwater passing over the area. Fines had been removed and coarse materials helped keep the batters intact. There was evidence in one place of a post flood collapse of the platform batter with collapsed material retained onsite on the lower riverbank. Downslope silt fences and earth bunds had been completely submerged and damaged and have mostly been repaired since the flood event;
- 5. The clean clay and concrete stockpiles at the north end of the site that were partly within floodwater were mostly intact with no major erosion;
- 6. One of the stormwater drains at the northern end of the earthworks area showed some erosion of old QR fill. Grass along the drainage line remained and prevented extensive erosion;
- 7. There was evidence of minor scouring and removal of the original contaminated fill material located along sections of the riverbank not subject to bulk earthworks. Grass and established trees remained to help retain soil along the old fill riverbank areas. At the south end of the site there was evidence in one place of a post flood collapse of the upper bank with old QR fill washing downslope to the lower riverbank.

The attached photographs taken on 21st January 2011 show areas of the site that are subject to the current bulk earthworks program and how they have been affected by the floodwaters.

It is considered that stabilization of affected areas and continuation of the current earthworks program will reinstate the site to an acceptable standard.

Please contact me on if you have any questions or require further information.

Yours sincerely

for GeoEnvironmental Consultants Pty Ltd

RIVERLINK PROJECT, NORTH IPSWICH, QLD Photographs taken 21st January 2011 Page 1 of 2 1. Top of compacted platform. 2. View N over platform batter. 3. View S along platform batter. 4. View N along platform to filled borrow area.

6. Collapsed material retained onsite.

5. Post flood collapse of batter.

RIVERLINK PROJECT, NORTH IPSWICH, QLD Photographs taken 21st January 2011



Page 2 of 2



7. View N of SW drain and stockpiles.







9. View S over clay stockpile & old fill excavation.

10. View N over excavations to platform area.



11. View N over main platform area.

12. View E to North Street area.