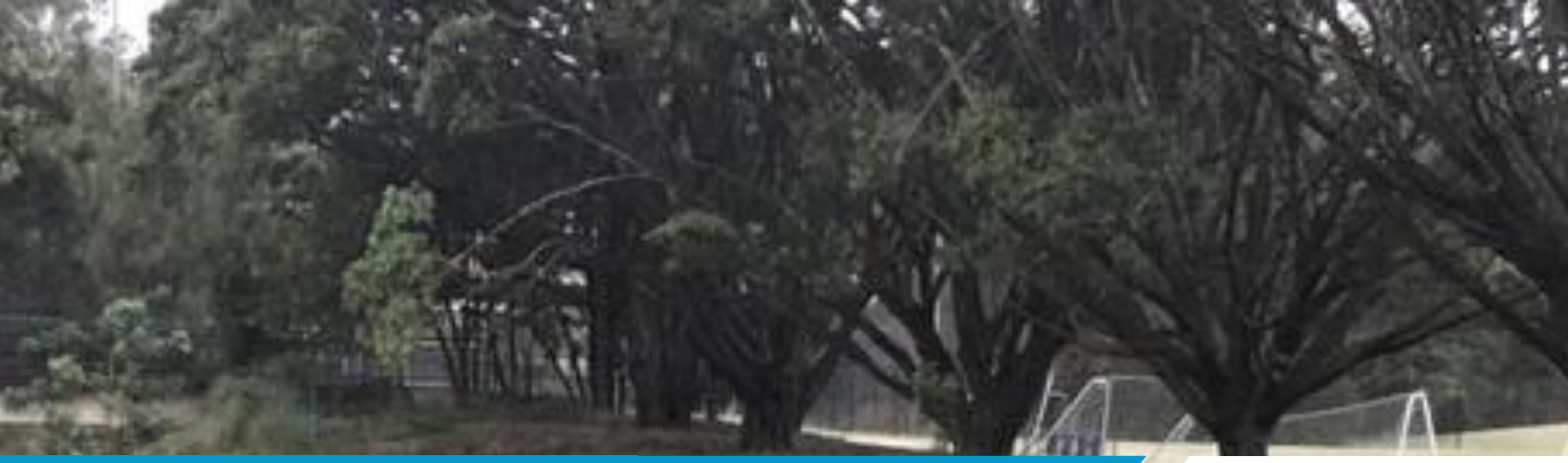

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STORMWATER MANAGEMENT REPORT

Client: CK Brisbane Pty Ltd

Project No: P26-051

REPORT CONTROL SHEET

W.S.A. Ref:	P26-051
Project Name:	50 Bleasby Road, Eight Mile Plains
Report Title:	Stormwater Management Report
Report Author:	Kym Wilkinson

Revision / Checking			
Rev No	**Date**	**Written By**	**Reviewed By**
1.0	06.11.26	KW	SW

Authorised by:  **RPEQ No: 7549**

This document has been approved by the following appropriately qualified and experienced professional civil engineer:

Steven Wilkinson
Registered Professional Engineer of Queensland No. 7549

Downloadable Files:
MUSIC: P26051
P26051 extra lots impervious area

Disclaimer

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1.0 Introduction

Wilkinson Shaw & Associates has prepared this report to support the Development Application for a one into 10 lots subdivision on the parcel of land described below.

Table 1: Property Particulars

Property Address	50 Bleasby Road EIGHT MILE PLAINS QLD 4113
Property Description	Lot 101 on RP37944
Registered Site Area	4,047 m^2
Council	Brisbane City Council

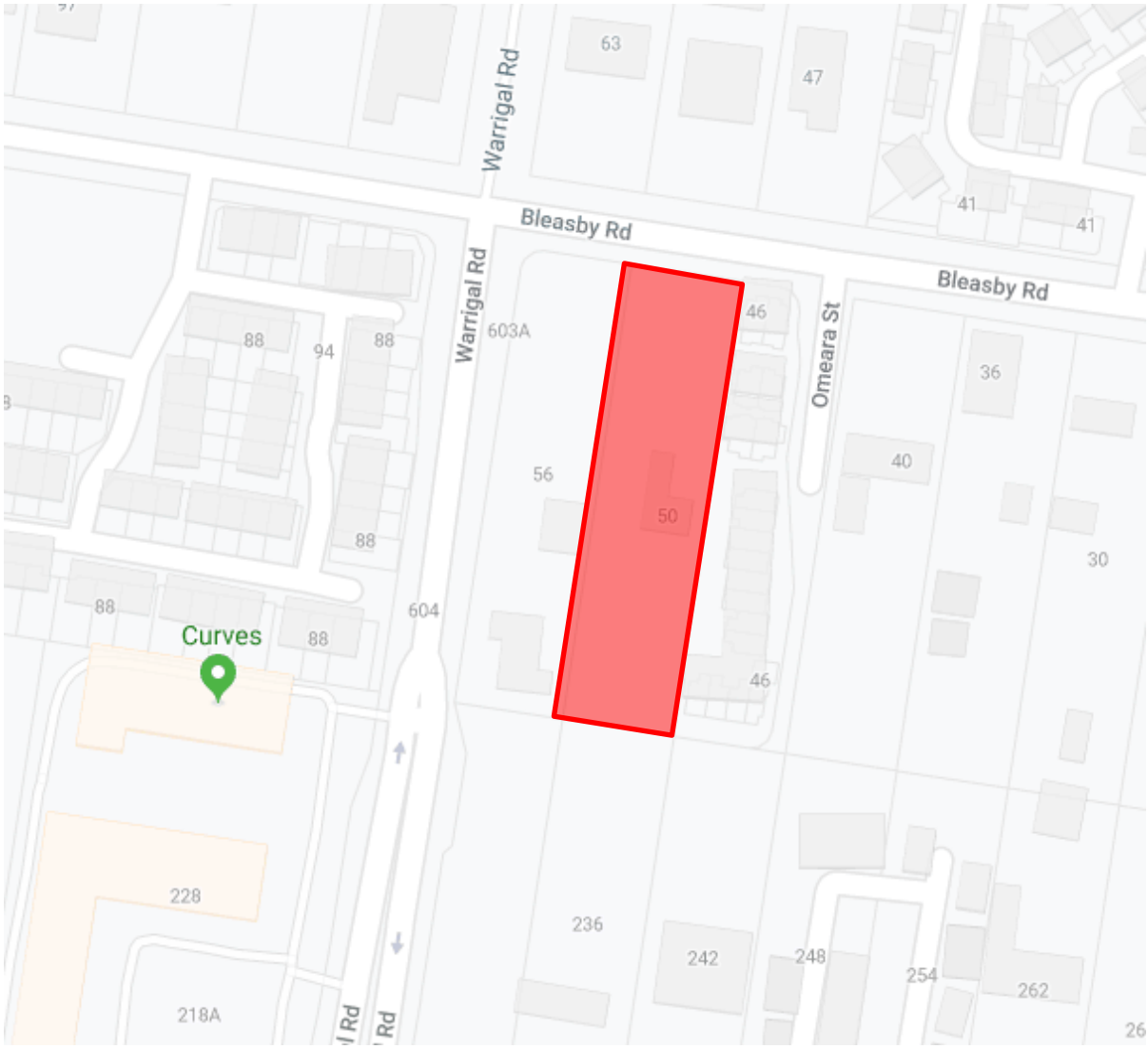

Figure 1: Site Location

1.1 Scope of Report

The purpose of this Stormwater Management Plan is to evaluate the potential risks to stormwater quantity and quality due to the proposed development. An engineering solution that complies with the necessary state and local government policies will be formulated.

2.0 Site Description

2.1 Location

The proposed development is located on an existing emerging community zoned allotment at 50 Bleasby Road Eight Mile Plains and is described as Lot 101 on RP37944. The area of the site is approximately 4,047 m^2 and is located within the boundaries of Brisbane City Council.

2.2 Existing and Proposed Land Use

The site is currently zoned as Emerging Community. The site previously contained a residential dwelling, numerous ancillary structures, a swimming pool, tennis court and a driveway allowing access to Bleasby Road. An aerial image from NearMap prior to the demolition of the existing dwelling can be seen in Figure 2.



Figure 2: Current Land Use (NearMap

The proposed development will ultimately see the construction of an additional 9 residential dwellings and associated infrastructure. The site has a previous approval for 7 lots. Operational works approval A005904375 (stormwater and roofwater drainage, approved by Council in January 2022) contained the roofwater design for that approval, and the stormwater infrastructure shown in Lots 10 to 12 has already been installed under it. The approved drawings show the roofwater drainage extending beyond the installed section. That extension was not approved at the time, and a similar concept will be adopted for this development.

2.3 Topography and Site Drainage

Contours shows that the subject property generally falls towards the Bleasby Road frontage. Levels on the site range between 54.30m and 54.55m (AHD) along the frontage of Bleasby Road and 61.8m and 62.1m (AHD) along the rear boundary. The site drains in a northerly direction at a grade of approximately 6%.

The existing stormwater discharge patterns are unknown although it is assumed that the roofwater from the existing structures discharged directly to the ground.

3.0 Lawful Point of Discharge

With the release of the latest version of QUDM the determination of whether a property has a lawful point of discharge at a particular location has been altered. The criteria for determining a lawful point of discharge are:

(i) Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property?

- If not, then no further steps are required to obtain tenure for a lawful point of discharge (assuming any pervious changes were lawful).
- If there is a reasonable risk of such damage, then consider issue (ii) or (iii).

(ii) Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received? This will include a park, watercourse, drainage or road reserve, stormwater registered drainage easement, or land held by local government (including freehold land).

- If so, then no further steps are required to obtain tenure for a lawful point of discharge.

- If not, then consider issue (iii). A land owner or regulator may require that the developer obtain an authority to discharge as described in (iii) in order for the stormwater to ultimately flow to a location described in (ii).

(iii) An authority to discharge over affected properties will be necessary. In descending order of certainty, an authority may be in the form of:

- Dedication of a drainage reserve or park
- A registered easement for stormwater discharge/works
- Written discharge approval.

With the high degree of impervious surfaces already present on the site the development will not alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property. As such there will not be an actionable nuisance from the proposed development

The lawful point of discharge has been identified as the existing stormwater infrastructure in Bleasby Road. Approval A005904375 established roofwater discharge to the existing Ø375 RCP in Bleasby Road through a new manhole (MH8/1). The approval allows a peak flow of 201 L/s.

4.0 Stormwater Quality Management in the Operational Phase

4.1 State Planning Policy Assessment

An assessment has been undertaken to determine if the State Planning Policy is triggered for the State Interest of Water. Table 2 below is used to determine if a proposed development requires compliance with the State Planning Policy (SPP). If all responses in Table 2 are "No", then compliance with the SPP is not required and best practice may be adopted.

Table 2: State Planning Policy Triggers

	Triggers	Response
1	A material change of use for urban purposes that involves premises 2500 m^2 or greater in size and; a Will result in six or more dwellings; or b Will result in an impervious area greater than 25 per cent of the net developable area; or	No
2	Reconfiguring a lot for urban purposes that involves premises 2500m^2 or greater in size **and** will result in six or more lots; or	Yes
3	Operational works for an urban purpose involve disturbing a land area 2500m^2 or greater in size.	Yes

As this development has triggered a compliance area stormwater quality will need to be addressed.

4.2 Objectives

The pollutants that are likely to be observed during the operation phase are listed below:

- Litter
- Sediment
- Nutrients (N & P)
- Pathogens/Faecal coli forms (bacteria & viruses)
- Hydrocarbons (oil & grease) – (associated with car park facilities)
- Heavy Metals (assoc. with fine sediment)
- Surfactants

To effectively manage stormwater quality treatment devices target the removal of suspended sediments and nutrients. The design objectives for the operational phase of the development are identified in the following Table 3 in accordance with the State Planning Policy.

Table 3: Stormwater Quality Objectives

Minimum Reductions in Mean Annual Loads (%)			
Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants
80	60	45	90

4.3 Modelling of the Development (MUSIC)

Best Management Practice (BMP) was adopted in selecting management alternatives for the construction phase of the project. This was undertaken as the pollutants of concern during the construction phase are not easily modelled due to the site-specific nature of pollutant sources. These pollutant sources vary throughout the construction phase and are largely depended upon site management practices and the activities being undertaken at the time. This approach enabled a quantitative assessment of stormwater runoff quality during construction to be considered.

Modelling of the proposed development has been conducted using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) to access the predicted future discharge of key pollutants from the site. MUSIC provides estimates of stormwater pollution generation and removal rates based on the performance of management devices that are used in parallel or series to form a treatment train.

4.3.1 Meteorological Data

In order to create a MUSIC model, you have to select the relevant time step for the meteorological data. An appropriate time step must have been chosen by taking into consideration the size of catchment and the size of the treatment nodes. The selection of the time step is therefore based on the size of the smallest source node and treatment nodes within the entire catchment using a simple three-step process as outlined by the MUSIC User Guide:

- Calculate or estimate the time of concentration (tc) of the smallest sub-catchment within the model,
- Calculate or estimate the shortest expected detention time of proposed treatment measures,
- Select a time step which is equal to or smaller than the smaller of 1 and 2.

The time step used in the MUSIC modelling program was: Brisbane 6 minutes 1980 – 1989.

4.3.2 Source Nodes

The second step in creating a MUSIC model is to define Source Nodes or sub-catchments. Source nodes for modelling were defined in accordance with Water by Design (2010) MUSIC Modelling Guidelines.

Each MUSIC Source Node requires the definition of Soil Properties within a catchment. These values along with the rainfall data determine the runoff generation from a catchment. The soil parameters shown in the Table 4 have been adopted in accordance with Music Modelling Guidelines Version 1.0.

Table 4: Recommended MUSIC Runoff Generation Parameters

Parameters (SEQ)	Urban Residential
Rainfall Threshold (mm)	1.00
Soil Capacity (mm)	500
Initial Storage (%)	10
Field Capacity (mm)	200
Infiltration Capacity Coefficient a	211
Infiltration Capacity Exponent b	5.0
Initial Depth (mm)	50
Daily Recharge Rate (%)	28
Daily Baseflow Rate (%)	27
Daily Deep Seepage Rate (%)	0

4.3.2.1 Source Node Assumptions

In preparing the model, the following assumptions have been made.

- The average roof area is 200m^2.
- Remaining ground areas are 40 percent impervious.

The breakdown of these catchments is shown in Table 5.

Table 5: Catchment Parameters

Catchment ID	Node Type	Total Area (ha)	Fraction Impervious
10 x 200 (roof)	Residential	0.200	100
Ground (mixed)	Residential	0.205	40

4.3.3 Pollution Concentration

MUSIC generates pollutant concentrations for both the storm flow and base flow components of runoff generated from the rainfall runoff model. The pollutant concentration parameters shown in the Table 6 have been used in the modelling. These have been adopted from Music Modelling Guidelines Version 1.0.

Table 6: Music Base and Storm Flow Concentration Parameters

Flow Type	Surface Type	TSS (Log_{10}mg/L)		P(Log_{10}mg/L)		N(Log_{10}mg/L)	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Urban Residential							
Baseflow parameter	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	1.00	0.34	-0.97	0.31	0.20	0.20
	Ground level	1.00	0.34	-0.97	0.31	0.20	0.20
Stormflow parameter	Roof	1.30	0.39	-0.89	0.31	0.26	0.23
	Roads	2.43	0.39	-0.30	0.31	0.26	0.23
	Ground level	2.18	0.39	-0.47	0.31	0.26	0.23

4.3.4 Treatment Nodes

Once base level pollutant concentrations have been modelled this can be compared against the WQOs to select and model the appropriate treatment options. Music models the performance of seven stormwater quality devices in addition to a generic treatment device. The types of devices that can be modelled are:

- Vegetated Swales
- Bioretention Systems
- Buffer Strips

- Constructed Wetlands
- Ponds
- Gross Pollutant Traps
- Sediment Basins
- Infiltration Systems
- Rainwater tanks

The generic node is used for modelling the performance of other treatment measures (including non-structural measures such as community education) that are not included in the default set.

The treatment nodes modelled are designed in accordance with the "MUSIC Modelling Guidelines" and "MUSIC User Guide Version 3" and manufactures specification.

4.4 Proposed Treatment Train

The project is highly constrained by the outlet of the existing stormwater being shallow in addition to any piped connection needing to avoid a clash with the sewer located within the verge. These constraints mean that it is not possible to provide an onsite solution with a standard bioretention basin. As such a performance solution is being proposed that will see the installation of two bioretention street tree pods. These pods will treat stormwater from the existing road reserve to offset pollutants generated by the development. This is a performance modelling solution and is not technically within the State Planning Policy. The treatment is therefore assessed against the additional pollutant load created by the three additional lots, with the minimum reductions in Table 3 applied to that additional load.

4.4.1 Treatment Devices Details

4.4.1.1 Bioretention Street Tree Pods

The fundamental principle behind the bio-retention basin is that the soil properties facilitate the removal of pollutants by passing the water through a fine filter medium therefore reducing the concentrations of TSS, TP and TN.

The bio-retention basin has been designed specifically in accordance with the Bio-retention Technical Design Guidelines (2014). Details of the location and standard design of the proposed treatment devices areas are presented in the Engineering Drawings in Appendix 1 of this report.

The completed copies of the design and summary checklists from the Healthy Waterways Water Sensitive Urban Design Technical Design Guidelines for South East Queensland (WSUD TDG), are provided in Appendix 2 of this report. General parameters for the bio-retention areas have been modelled as per Figure 3.

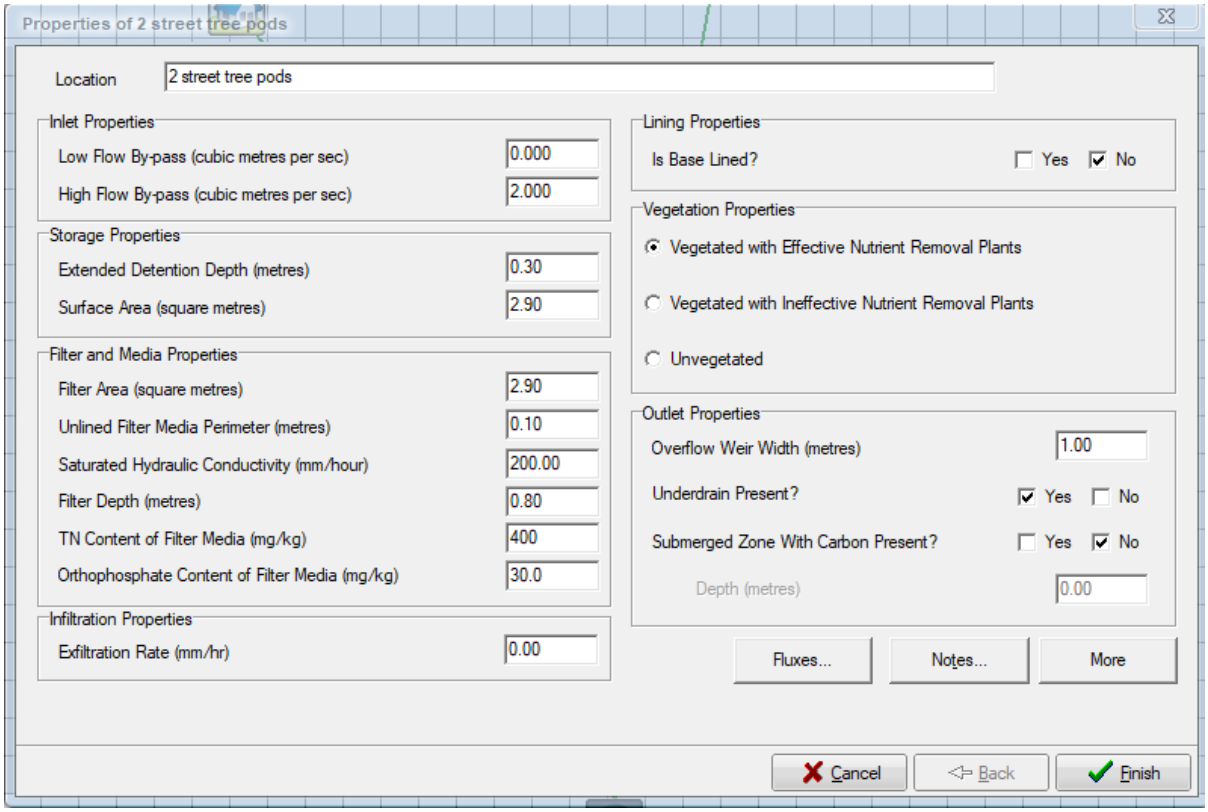

Figure 3: Bioretention Basin Properties

4.5 MUSIC Layout and Results

A diagrammatical view of the model is shown in Figure 4. The expectant loads of pollutants within the stormwater system have been modelled for the developed site without mitigation and with stormwater quality devices based on the model parameter outlined previously in Table 6. As this site was previously approved with 7 lots (A005904375) the comparison of the additional loading created by the creation of three more lots was undertaken. These additional lots created 600m^2 of additional impervious roof area and an additional 30m^2 of impervious ground area. Table 7 shows the reduction in loads from the implementation of the treatment train when compared against the additional loads generated by the intensification of the development approval.The removed load is expressed in Table 7 as a percentage of the additional load. The treatment train removes more than the minimum reduction in Table 3 for every pollutant. For total nitrogen it removes 52% of the additional load against the 45% minimum.

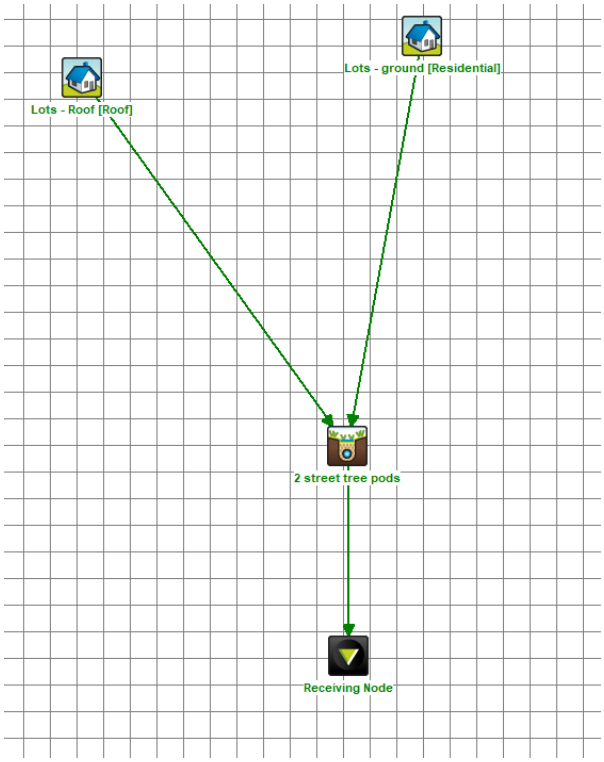

Figure 4: Treatment Train

Table 7: Water Quality Removal Loads

Pollutant	Unmitigated Load in Kg/year	Mitigated Load in Kg/year	Removed Load in Kg/Year	Pollutant Loads in Kg/Year due to the three additional lots	Removed load as % of additional load
Suspended Solids	394	309	85	30.8	275%
Total Phosphorous	1.05	0.864	0.186	0.143	130%
Total Nitrogen	8.48	7.57	0.91	1.74	52%
Gross Pollutants	87	0	87	16.9	515%

5.0 Hydrological Assessment

The following subsections detail the discharges generated from the site in both the current and proposed developed state. It will be shown that during the 50-year storm event that the increase in discharge will not cause an actionable nuisance and that detention is not required.

5.1 Stormwater Runoff

Peak discharges for the site were calculated using the Rational Method in both the current condition and the developed situation. The discharge location for these calculations is the existing stormwater

gully at the development frontage. The Rational Method calculations were undertaken in accordance with the Brisbane City Council Planning Scheme and the Queensland Urban Drainage Manual (QUDM2017) for a range of storm events.

In determining the peak probable runoff from the site a study of the current and proposed allotment conditions were undertaken. The following observations and assumptions were made:

- The impervious area of the existing allotments is 2,550m^2 or a fraction impervious of 0.63(C_{10} of 0.79).
- The future lots will have a fraction impervious of 0.83 (C_{10} of 0.85)
- The external catchments are not considered in these calculations.

As shown in Table 8 the peak discharge from the site increases by less than 20 l/s in the 2% AEP. The calculations for these anticipated runoffs are shown in Appendix 3. This increase is due to addition impervious area as the time of concentration will not be altered based on standard inlet times. Such negligible increases in flow are deemed not to cause an actionable nuisance and therefore stormwater detention is not required.

For a development without detention the major storm is the 2% AEP event. Stormwater from the lots will run towards the Level III cut-off drain provided at the rear of each lot and will be conveyed to Bleasby Road.

Approval A005904375 allows a peak flow of 201 L/s to Bleasby Road. This is above the developed minor storm (10% AEP) peak discharge of 158 L/s shown in Table 8.

Table 8: Expected Stormwater Runoff.

Annual Exceedance Probability	Peak Discharge (m^3/s)		Change in Peak Discharge	
	Existing	Developed	m^3/s	%
1EY	0.065	0.070	0.005	7.6
0.5EY	0.086	0.093	0.007	7.6
0.2EY	0.121	0.130	0.009	7.6
10%	0.147	0.158	0.011	7.6
5%	0.177	0.190	0.013	7.6
2%	0.226	0.243	0.017	7.6

6.0 Conclusion

This report addresses the proposed development of 50 Bleasby Road, Eight Mile Plains, described as Lot 101 on RP37944 into 10 lots. A performance solution has been adopted for stormwater quality as being a small infill project it is difficult to place bioretention within the constrained site. The development will see an increase in flows of less than 8% and will not change the hydrology or hydraulics of the existing stormwater system in a way that will damage a third-party property. As such there will not be an actionable nuisance from the proposed development and detention will ***not*** be required.The performance solution is assessed against the additional pollutant load created by the three additional lots, and it removes more than the minimum reduction for each pollutant.

The stormwater management proposed in this report has demonstrated that the proposed development satisfies the lawful point of discharge as per QUDM. This detailed Site Based Stormwater Management Plan is considered consistent with the Stormwater Code of the Brisbane City Council Planning Scheme.

This report shows that stormwater can be managed effectively for the site analysed without the need to upgrade the stormwater network. It is the opinion Wilkinson Shaw & Associates that the proposed stormwater quantity and quality management proposed are suitable for a development of this scale.

Qualifications

1. In preparing this document, including all relevant calculations, modelling and drawings, Wilkinson Shaw & Associates (WSA) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

2. WSA has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and documents are as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

3. WSA reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:
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   (ii) WSA considers it prudent to revise any aspect of the works in light of any information which becomes known to it after the date of submission.

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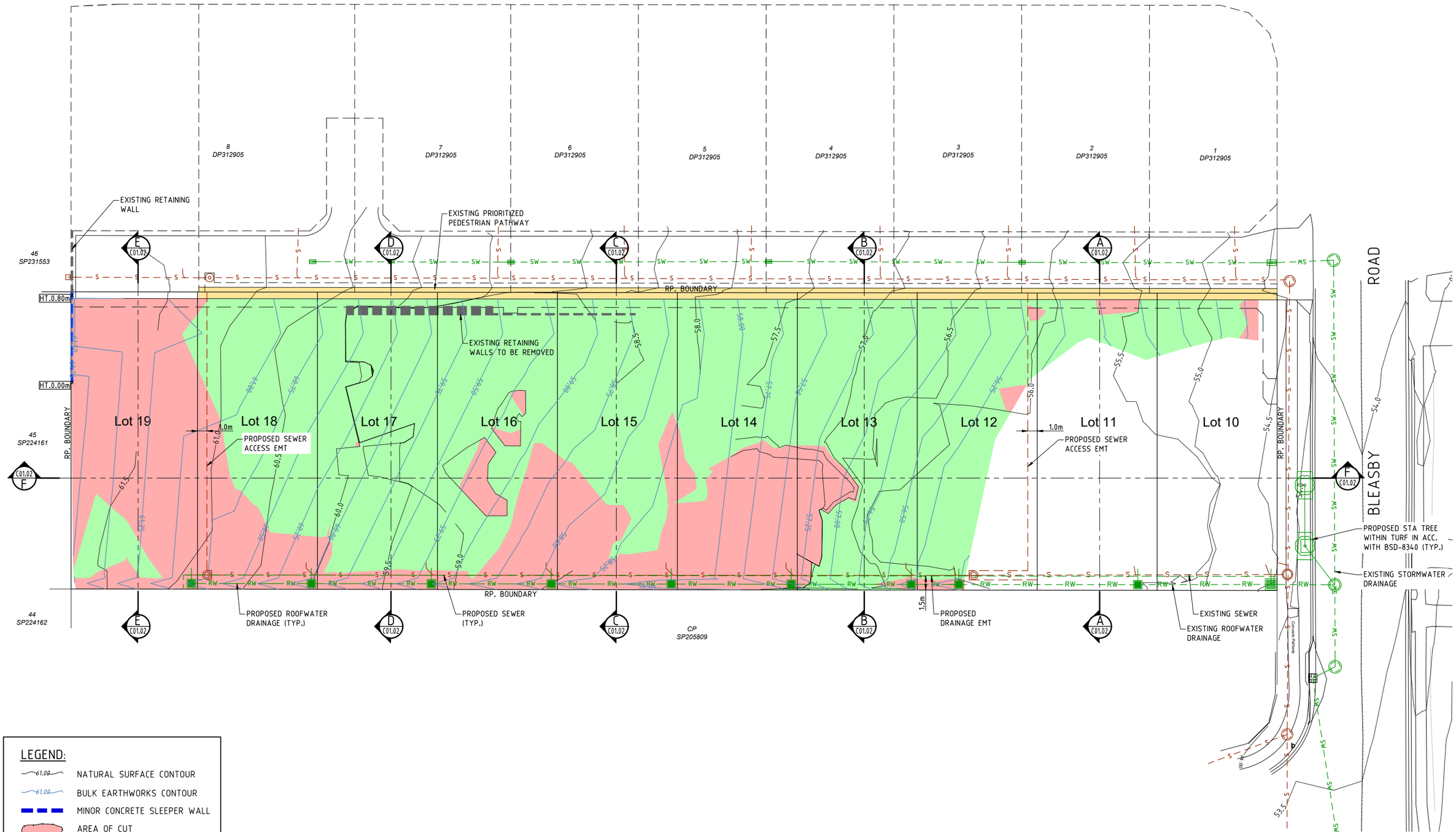
7. This report does not provide legal advice.

Appendix 1 ~ Engineering Drawings



LEGEND:

- NATURAL SURFACE CONTOUR
- BULK EARTHWORKS CONTOUR
- MINOR CONCRETE SLEEPER WALL
- AREA OF CUT
- AREA OF FILL
- MINOR RETAINING WALL HEIGHT

FOR APPROVAL

SCALE 1:200 AT ORIGINAL A1 SIZE

REV	BY	CKD	DATE	DESCRIPTION
A	DMS	KLW	06.11.26	ISSUED FOR APPROVAL

NOT FOR CONSTRUCTION

WILKINSON SHAW & ASSOCIATES consulting engineers

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40+ YEARS SINCE 1984

PROJECT: PROPOSED SUBDIVISION
50 BLEASBY ROAD
EIGHT MILE PLAINS, QLD 4113

DRAWING SHEET TITLE: CONCEPTUAL EARTHWORKS PLAN

CLIENT: CK BRISBANE PTY LTD

SURVEYOR: ----

LOT DESCRIPTION: Lot 101 on RP 37944

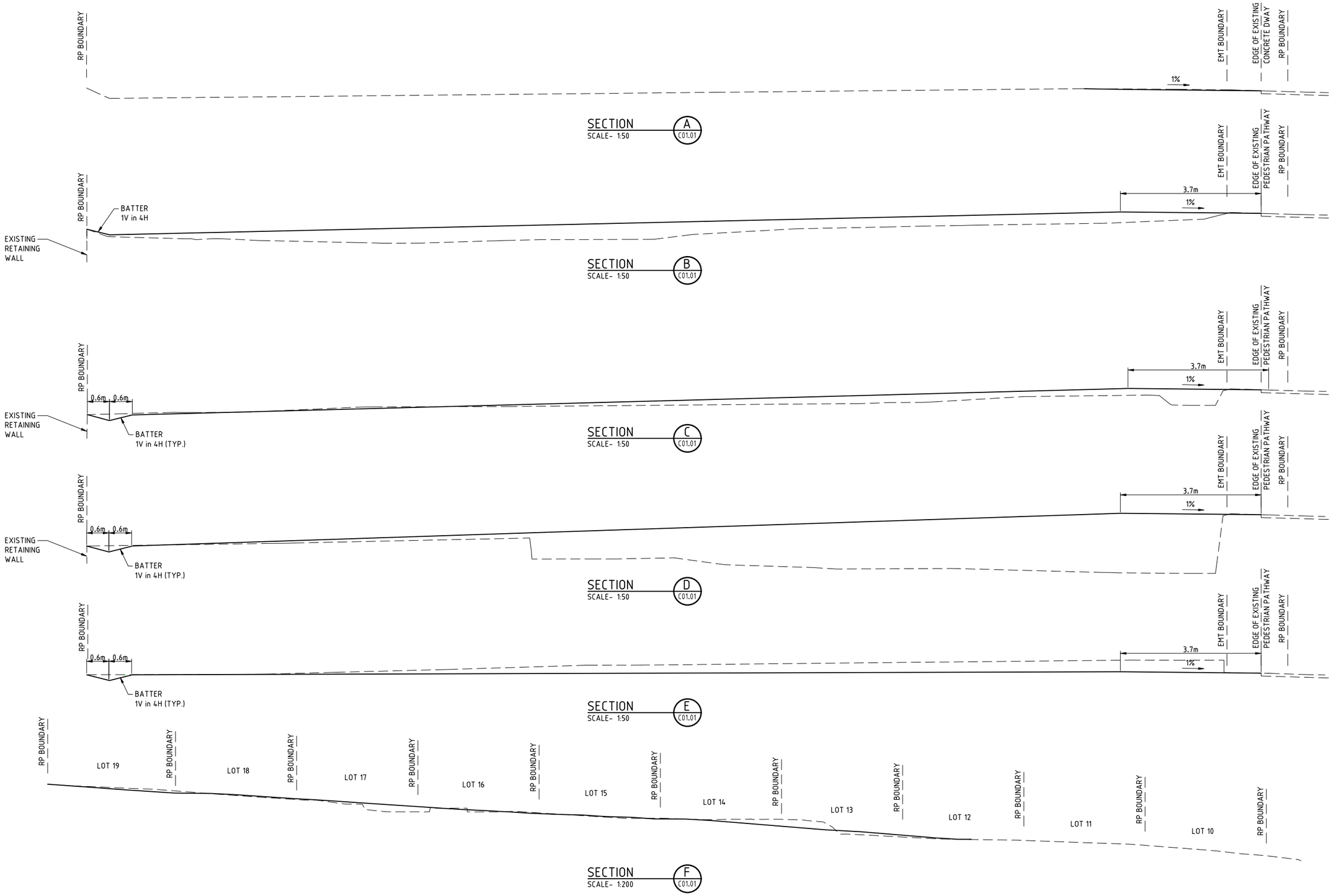
COUNCIL REF: A007082533

DRAWING NO.: P26-051-DA-C01.01

SCALE: AS SHOWN

REVISION: A

DATUM: A.H.D.



FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	DMS	KLW	06.11.26	ISSUED FOR APPROVAL

NOT FOR CONSTRUCTION

ISO 9001 QUALITY

WSA
WILKINSON SHAW & ASSOCIATES
consulting engineers

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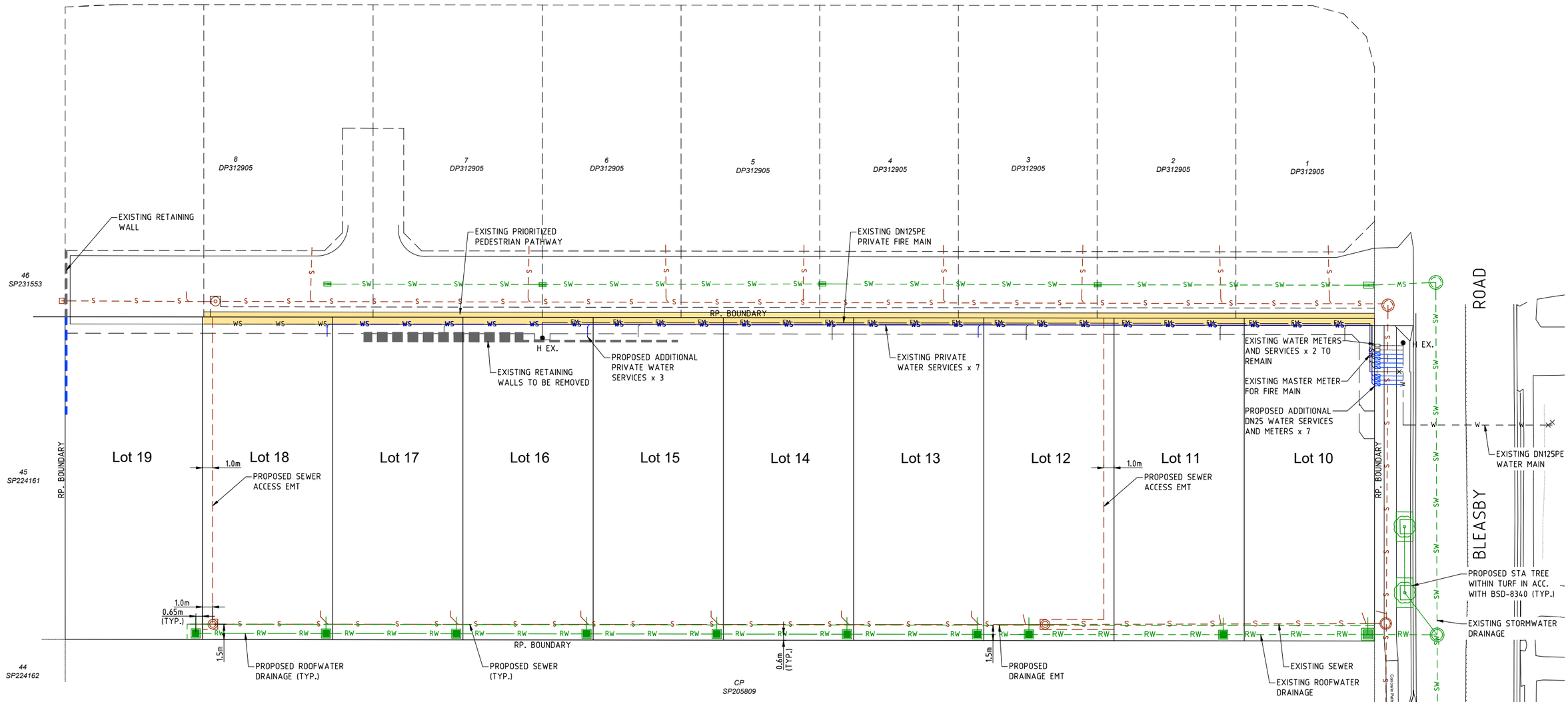
40+ YEARS SINCE 1984

PROJECT	PROPOSED SUBDIVISION 50 BLEASBY ROAD EIGHT MILE PLAINS, QLD 4113
DRAWING SHEET TITLE	CONCEPTUAL EARTHWORKS SECTIONS
CLIENT	CK BRISBANE PTY LTD
SURVEYOR	----
LOT DESCRIPTION:	Lot 101 on RP 37944
COUNCIL REF:	A007082533
DRAWING NO.	P26-051-DA-C01.02
SCALE	AS SHOWN
REVISION	A
DATUM	A.H.D.



SERVICES LEGEND

	NEW	EXISTING
GRAVITY SEWER	S	S
SEWER HOUSE DRAIN	HD	HD
DRINKING WATER MAIN	W	W
STORMWATER DRAINAGE	SW	SW
ROOFWATER DRAINAGE	RW	RW
ELECTRICAL U/G	E	E
ELECTRICAL O/H	OH	OH
TELECOMMUNICATION	T	T
WATER SERVICE	WS	WS

FOR APPROVAL

0 2 6 10m
SCALE 1:200 AT ORIGINAL A1 SIZE

REV	BY	CKD	DATE	DESCRIPTION
A	DMS	KLW	06.11.26	ISSUED FOR APPROVAL

NOT FOR CONSTRUCTION

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WEB: www.wilkinsonshaw.com.au

40+ YEARS SINCE 1984

PROJECT: 1 INTO 10 LOT SUBDIVISION
50 BLEASBY ROAD
EIGHT MILE PLAINS, QLD 4113

DRAWING SHEET TITLE: CONCEPTUAL SERVICES LAYOUT PLAN

CLIENT: CK BRISBANE PTY LTD
SURVEYOR: ----
LOT DESCRIPTION: Lot 101 on RP 37944
COUNCIL REF: A007082533

DRAWING NO.: P26-051-DA-C02.01
SCALE: AS SHOWN
REVISION: A
DATUM: A.H.D.

Appendix 2 ~ MUSIC Report

Full Development

Source nodes
Location,Lots - Roof,Lots - ground
ID,2,3
Node Type,UrbanSourceNode,UrbanSourceNode
Zoning Surface Type,Roof,Residential
Total Area (ha),0.2,0.205
Area Impervious (ha),0.2,0.0813880597014925
Area Pervious (ha),0,0.123611940298507
Field Capacity (mm),200,200
Pervious Area Infiltration Capacity coefficient - a,211,211
Pervious Area Infiltration Capacity exponent - b,5,5
Impervious Area Rainfall Threshold (mm/day),1,1
Pervious Area Soil Storage Capacity (mm),500,500
Pervious Area Soil Initial Storage (% of Capacity),10,10
Groundwater Initial Depth (mm),50,50
Groundwater Daily Recharge Rate (%),28,28
Groundwater Daily Baseflow Rate (%),27,27
Groundwater Daily Deep Seepage Rate (%),0,0
Stormflow Total Suspended Solids Mean (log mg/L),1.3,2.18
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.39,0.39
Stormflow Total Suspended Solids Estimation Method,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0,0
Stormflow Total Phosphorus Mean (log mg/L),-0.89,-0.47
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.31,0.31
Stormflow Total Phosphorus Estimation Method,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0,0
Stormflow Total Nitrogen Mean (log mg/L),0.26,0.26
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.23,0.23
Stormflow Total Nitrogen Estimation Method,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0,0
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.34
Baseflow Total Suspended Solids Estimation Method,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0,0
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.97
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.31
Baseflow Total Phosphorus Estimation Method,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0,0
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.2
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.2
Baseflow Total Nitrogen Estimation Method,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0,0
Flow based constituent generation - enabled,Off,Off
Flow based constituent generation - flow file, ,
Flow based constituent generation - base flow column, ,
Flow based constituent generation - pervious flow column, ,

Flow based constituent generation - impervious flow column, ,
Flow based constituent generation - unit, ,
OUT - Mean Annual Flow (ML/yr),2.54,1.68
OUT - TSS Mean Annual Load (kg/yr),78.4,342
OUT - TP Mean Annual Load (kg/yr),0.437,0.684
OUT - TN Mean Annual Load (kg/yr),5.38,3.50
OUT - Gross Pollutant Mean Annual Load (kg/yr),53.5,33.5
Rain In (ML/yr),2.75851,2.82747
ET Loss (ML/yr),0.22006,1.14722
Deep Seepage Loss (ML/yr),0,0
Baseflow Out (ML/yr),0,0.250279
Imp. Stormflow Out (ML/yr),2.53845,1.04076
Perv. Stormflow Out (ML/yr),0,0.389211
Total Stormflow Out (ML/yr),2.53845,1.42998
Total Outflow (ML/yr),2.53845,1.68025
Change in Soil Storage (ML/yr),0,-1E-6
TSS Baseflow Out (kg/yr),0,3.41757
TSS Total Stormflow Out (kg/yr),78.4472,338.829
TSS Total Outflow (kg/yr),78.4472,342.247
TP Baseflow Out (kg/yr),0,0.034742
TP Total Stormflow Out (kg/yr),0.437261,0.649004
TP Total Outflow (kg/yr),0.437261,0.683746
TN Baseflow Out (kg/yr),0,0.442452
TN Total Stormflow Out (kg/yr),5.37928,3.05618
TN Total Outflow (kg/yr),5.37928,3.49863
GP Total Outflow (kg/yr),53.4992,34.514

No Imported Data Source nodes

USTM treatment nodes
Location,2 street tree pods
ID,4
Node Type,BioRetentionNodeV4
Lo-flow bypass rate (cum/sec),0
Hi-flow bypass rate (cum/sec),2
Inlet pond volume,
Area (sqm),2.9
Initial Volume (m^3),
Extended detention depth (m),0.3
Number of Rainwater tanks,
Permanent Pool Volume (cubic metres),
Proportion vegetated,
Equivalent Pipe Diameter (mm),
Overflow weir width (m),1
Notional Detention Time (hrs),
Orifice Discharge Coefficient,
Weir Coefficient,1.7
Number of CSTR Cells,3
Total Suspended Solids - k (m/yr),8000
Total Suspended Solids - C* (mg/L),20

Total Suspended Solids - C** (mg/L),
Total Phosphorus - k (m/yr),6000
Total Phosphorus - C* (mg/L),0.13
Total Phosphorus - C** (mg/L),
Total Nitrogen - k (m/yr),500
Total Nitrogen - C* (mg/L),1.4
Total Nitrogen - C** (mg/L),
Threshold Hydraulic Loading for C** (m/yr),
Horizontal Flow Coefficient,3
Reuse Enabled,Off
Max drawdown height (m),
Annual Demand Enabled,Off
Annual Demand Value (ML/year),
Annual Demand Distribution,
Annual Demand Monthly Distribution: Jan,
Annual Demand Monthly Distribution: Feb,
Annual Demand Monthly Distribution: Mar,
Annual Demand Monthly Distribution: Apr,
Annual Demand Monthly Distribution: May,
Annual Demand Monthly Distribution: Jun,
Annual Demand Monthly Distribution: Jul,
Annual Demand Monthly Distribution: Aug,
Annual Demand Monthly Distribution: Sep,
Annual Demand Monthly Distribution: Oct,
Annual Demand Monthly Distribution: Nov,
Annual Demand Monthly Distribution: Dec,
Daily Demand Enabled,Off
Daily Demand Value (ML/day),
Custom Demand Enabled,Off
Custom Demand Time Series File,
Custom Demand Time Series Units,
Filter area (sqm),2.9
Filter perimeter (m),0.1
Filter depth (m),0.8
Filter Median Particle Diameter (mm),
Saturated Hydraulic Conductivity (mm/hr),200
Infiltration Media Porosity,0.35
Length (m),
Bed slope,
Base Width (m),
Top width (m),
Vegetation height (m),
Vegetation Type,Vegetated with Effective Nutrient Removal Plants
Total Nitrogen Content in Filter (mg/kg),400
Orthophosphate Content in Filter (mg/kg),30
Is Base Lined?,No
Is Underdrain Present?,Yes
Is Submerged Zone Present?,No
Submerged Zone Depth (m),
B for Media Soil Texture,13

Proportion of upstream impervious area treated,
Exfiltration Rate (mm/hr),0
Evaporative Loss as % of PET,100
Depth in metres below the drain pipe,
TSS A Coefficient,
TSS B Coefficient,
TP A Coefficient,
TP B Coefficient,
TN A Coefficient,
TN B Coefficient,
Sfc,0.37
S*,0.22
Sw,0.11
Sh,0.05
Emax (m/day),0.008
Ew (m/day),0.001
IN - Mean Annual Flow (ML/yr),4.22
IN - TSS Mean Annual Load (kg/yr),421
IN - TP Mean Annual Load (kg/yr),1.12
IN - TN Mean Annual Load (kg/yr),8.88
IN - Gross Pollutant Mean Annual Load (kg/yr),87.0
OUT - Mean Annual Flow (ML/yr),4.21
OUT - TSS Mean Annual Load (kg/yr),332
OUT - TP Mean Annual Load (kg/yr),0.920
OUT - TN Mean Annual Load (kg/yr),7.93
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00
Flow In (ML/yr),4.21833
ET Loss (ML/yr),0.008844
Infiltration Loss (ML/yr),0
Low Flow Bypass Out (ML/yr),0
High Flow Bypass Out (ML/yr),0
Orifice / Filter Out (ML/yr),0.666914
Weir Out (ML/yr),3.54232
Transfer Function Out (ML/yr),0
Reuse Supplied (ML/yr),0
Reuse Requested (ML/yr),0
% Reuse Demand Met,0
% Load Reduction,0.215583
TSS Flow In (kg/yr),420.674
TSS ET Loss (kg/yr),0
TSS Infiltration Loss (kg/yr),0
TSS Low Flow Bypass Out (kg/yr),0
TSS High Flow Bypass Out (kg/yr),0
TSS Orifice / Filter Out (kg/yr),1.27653
TSS Weir Out (kg/yr),330.906
TSS Transfer Function Out (kg/yr),0
TSS Reuse Supplied (kg/yr),0
TSS Reuse Requested (kg/yr),0
TSS % Reuse Demand Met,0
TSS % Load Reduction,21.0356

TP Flow In (kg/yr),1.12097
TP ET Loss (kg/yr),0
TP Infiltration Loss (kg/yr),0
TP Low Flow Bypass Out (kg/yr),0
TP High Flow Bypass Out (kg/yr),0
TP Orifice / Filter Out (kg/yr),0.013823
TP Weir Out (kg/yr),0.905708
TP Transfer Function Out (kg/yr),0
TP Reuse Supplied (kg/yr),0
TP Reuse Requested (kg/yr),0
TP % Reuse Demand Met,0
TP % Load Reduction,17.9701
TN Flow In (kg/yr),8.87765
TN ET Loss (kg/yr),0
TN Infiltration Loss (kg/yr),0
TN Low Flow Bypass Out (kg/yr),0
TN High Flow Bypass Out (kg/yr),0
TN Orifice / Filter Out (kg/yr),0.407138
TN Weir Out (kg/yr),7.52382
TN Transfer Function Out (kg/yr),0
TN Reuse Supplied (kg/yr),0
TN Reuse Requested (kg/yr),0
TN % Reuse Demand Met,0
TN % Load Reduction,10.6638
GP Flow In (kg/yr),86.9926
GP ET Loss (kg/yr),0
GP Infiltration Loss (kg/yr),0
GP Low Flow Bypass Out (kg/yr),0
GP High Flow Bypass Out (kg/yr),0
GP Orifice / Filter Out (kg/yr),0
GP Weir Out (kg/yr),0
GP Transfer Function Out (kg/yr),0
GP Reuse Supplied (kg/yr),0
GP Reuse Requested (kg/yr),0
GP % Reuse Demand Met,0
GP % Load Reduction,100
PET Scaling Factor,2.1

No Generic treatment nodes

Other nodes
Location,Receiving Node
ID,1
Node Type,ReceivingNode
IN - Mean Annual Flow (ML/yr),4.21
IN - TSS Mean Annual Load (kg/yr),332
IN - TP Mean Annual Load (kg/yr),0.920
IN - TN Mean Annual Load (kg/yr),7.93
IN - Gross Pollutant Mean Annual Load (kg/yr),0.00
OUT - Mean Annual Flow (ML/yr),4.21

OUT - TSS Mean Annual Load (kg/yr),332
OUT - TP Mean Annual Load (kg/yr),0.920
OUT - TN Mean Annual Load (kg/yr),7.93
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00
% Load Reduction,0.222
TSS % Load Reduction,21.0
TN % Load Reduction,10.7
TP % Load Reduction,18.0
GP % Load Reduction,100

Links
Location,Drainage Link,Drainage Link,Drainage Link
Source node ID,4,2,3
Target node ID,1,4,4
Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed
Muskingum K, , ,
Muskingum theta, , ,
IN - Mean Annual Flow (ML/yr),4.21,2.54,1.68
IN - TSS Mean Annual Load (kg/yr),332,78.4,342
IN - TP Mean Annual Load (kg/yr),0.920,0.437,0.684
IN - TN Mean Annual Load (kg/yr),7.93,5.38,3.50
IN - Gross Pollutant Mean Annual Load (kg/yr),0.00,53.5,33.5
OUT - Mean Annual Flow (ML/yr),4.21,2.54,1.68
OUT - TSS Mean Annual Load (kg/yr),332,78.4,342
OUT - TP Mean Annual Load (kg/yr),0.920,0.437,0.684
OUT - TN Mean Annual Load (kg/yr),7.93,5.38,3.50
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,53.5,33.5

Catchment Details
Catchment Name,P26051
Timestep,6 Minutes
Start Date,1/01/1990
End Date,31/12/1990 11:54:00 PM
Rainfall Station, 40223 BRISBANE
ET Station,Monthly User Defined
Mean Annual Rainfall (mm), 1380
Mean Annual ET (mm), 1537

Additional Impervious Area due to this development

Source nodes
Location,Lots - Roof,Lots - ground
ID,2,3
Node Type,UrbanSourceNode,UrbanSourceNode
Zoning Surface Type,Roof,Residential
Total Area (ha),0.06,0.003
Area Impervious (ha),0.06,0.003
Area Pervious (ha),0,0
Field Capacity (mm),200,200
Pervious Area Infiltration Capacity coefficient - a,211,211
Pervious Area Infiltration Capacity exponent - b,5,5
Impervious Area Rainfall Threshold (mm/day),1,1
Pervious Area Soil Storage Capacity (mm),500,500
Pervious Area Soil Initial Storage (% of Capacity),10,10
Groundwater Initial Depth (mm),50,50
Groundwater Daily Recharge Rate (%),28,28
Groundwater Daily Baseflow Rate (%),27,27
Groundwater Daily Deep Seepage Rate (%),0,0
Stormflow Total Suspended Solids Mean (log mg/L),1.3,2.18
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.39,0.39
Stormflow Total Suspended Solids Estimation Method,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0,0
Stormflow Total Phosphorus Mean (log mg/L),-0.89,-0.47
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.31,0.31
Stormflow Total Phosphorus Estimation Method,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0,0
Stormflow Total Nitrogen Mean (log mg/L),0.26,0.26
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.23,0.23
Stormflow Total Nitrogen Estimation Method,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0,0
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.34
Baseflow Total Suspended Solids Estimation Method,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0,0
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.97
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.31
Baseflow Total Phosphorus Estimation Method,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0,0
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.2
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.2
Baseflow Total Nitrogen Estimation Method,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0,0
Flow based constituent generation - enabled,Off,Off
Flow based constituent generation - flow file, ,
Flow based constituent generation - base flow column, ,
Flow based constituent generation - pervious flow column, ,
Flow based constituent generation - impervious flow column, ,
Flow based constituent generation - unit, ,

OUT - Mean Annual Flow (ML/yr),0.762,38.1E-3
OUT - TSS Mean Annual Load (kg/yr),22.2,8.58
OUT - TP Mean Annual Load (kg/yr),0.125,17.7E-3
OUT - TN Mean Annual Load (kg/yr),1.66,77.6E-3
OUT - Gross Pollutant Mean Annual Load (kg/yr),16.0,0.802
Rain In (ML/yr),0.827554,0.041378
ET Loss (ML/yr),0.066018,0.003301
Deep Seepage Loss (ML/yr),0,0
Baseflow Out (ML/yr),0,0
Imp. Stormflow Out (ML/yr),0.761536,0.038077
Perv. Stormflow Out (ML/yr),0,0
Total Stormflow Out (ML/yr),0.761536,0.038077
Total Outflow (ML/yr),0.761536,0.038077
Change in Soil Storage (ML/yr),0,0
TSS Baseflow Out (kg/yr),0,0
TSS Total Stormflow Out (kg/yr),22.2086,8.57682
TSS Total Outflow (kg/yr),22.2086,8.57682
TP Baseflow Out (kg/yr),0,0
TP Total Stormflow Out (kg/yr),0.124933,0.01774
TP Total Outflow (kg/yr),0.124933,0.01774
TN Baseflow Out (kg/yr),0,0
TN Total Stormflow Out (kg/yr),1.65876,0.077612
TN Total Outflow (kg/yr),1.65876,0.077612
GP Total Outflow (kg/yr),16.0498,0.802488

No Imported Data Source nodes

No USTM treatment nodes

No Generic treatment nodes

Other nodes
Location,Receiving Node
ID,1
Node Type,ReceivingNode
IN - Mean Annual Flow (ML/yr),0.800
IN - TSS Mean Annual Load (kg/yr),30.8
IN - TP Mean Annual Load (kg/yr),0.143
IN - TN Mean Annual Load (kg/yr),1.74
IN - Gross Pollutant Mean Annual Load (kg/yr),16.9
OUT - Mean Annual Flow (ML/yr),0.800
OUT - TSS Mean Annual Load (kg/yr),30.8
OUT - TP Mean Annual Load (kg/yr),0.143
OUT - TN Mean Annual Load (kg/yr),1.74
OUT - Gross Pollutant Mean Annual Load (kg/yr),16.9
% Load Reduction,-3.00E-12
TSS % Load Reduction,-92.3E-15
TN % Load Reduction,-780E-15
TP % Load Reduction,58.4E-15
GP % Load Reduction,-569E-15

Links
Location,Drainage Link,Drainage Link
Source node ID,2,3
Target node ID,1,1
Muskingum-Cunge Routing,Not Routed,Not Routed
Muskingum K, ,
Muskingum theta, ,
IN - Mean Annual Flow (ML/yr),0.762,38.1E-3
IN - TSS Mean Annual Load (kg/yr),22.2,8.58
IN - TP Mean Annual Load (kg/yr),0.125,17.7E-3
IN - TN Mean Annual Load (kg/yr),1.66,77.6E-3
IN - Gross Pollutant Mean Annual Load (kg/yr),16.0,0.802
OUT - Mean Annual Flow (ML/yr),0.762,38.1E-3
OUT - TSS Mean Annual Load (kg/yr),22.2,8.58
OUT - TP Mean Annual Load (kg/yr),0.125,17.7E-3
OUT - TN Mean Annual Load (kg/yr),1.66,77.6E-3
OUT - Gross Pollutant Mean Annual Load (kg/yr),16.0,0.802

Catchment Details
Catchment Name,P26051 extra lots
Timestep,6 Minutes
Start Date,1/01/1990
End Date,31/12/1990 11:54:00 PM
Rainfall Station, 40223 BRISBANE
ET Station,Monthly User Defined
Mean Annual Rainfall (mm), 1380
Mean Annual ET (mm), 1537

Appendix 3 ~ Rational Method Calculations

Rational Method Peak Flow Calculation

Job No: **P26-051**
Job Type: **RoL**
Address: **50 Bleasby Road**
Council: **Brisbane**

WSA Wilkinson Shaw & Associates consulting engineers
Experience. Precision. Excellence.

IFD Data: Latitude -27.5731 | Longitude 153.0886 | Data Obtained 5-Nov-26 | Soil info for Zero C_{10}: Light cover low permeability

Minor Storm: 10% AEP
$^{1}I_{10}$ 64 mm/hr | Major Storm: 2% AEP

Notes: This caluations sheet examines the change in flow due to the proposed development to the kerb and channel

Pre-Development

Time of Concentration

Standard Inlet Time
Standard Inlet Time 10 mins

Sheet Flow (Friends Equation)
Sheet Flow length (L) m
Ground Cover Type Average Grassed Surface
roughness (n) 0.045
Fall of NSL 5.2 m
Slope o Surface 0 %
total **0.0** mins

Concentrated Flow
Flow distance m
Fall of NSL m
mins
Surface type miltiplier
Total **0** mins

Pipe Flow
Flow distance m
velocity m/s
mins **0** min

Total t_c **10.0** mins

Runoff Volume Calculations

Name	Area (m2)	t_c	f_i	C_{10}
Site	4047		0.63	0.789
				0
				0
				0
				0
				0
				0
Total	4047	10.0		0.789

AEP	Frequency factor (F_y)	C_y ($F^y.C_{10}$)	I_y	Q_y (m^3/s)
3 mth				0.032
1EY	0.8	0.631	91	0.065
0.5EY	0.85	0.671	115	0.086
0.2EY	0.95	0.750	144	0.121
10%	1	0.789	166	0.147
5%	1.05	0.828	190	0.177
2%	1.15	0.907	221	0.226

Post-Development

Time of Concentration

Standard Inlet Time
Standard Inlet Time 10 mins

Sheet Flow (Friends Equation)
Sheet Flow length (L) m
Ground Cover Type Densely Grassed Surface
roughness (n) 0.06
Fall of NSL m
Slope o Surface 0 %
total **0.0** mins

Concentrated Flow
Flow distance
velocity
mins
Surface type miltiplier
Total **0** mins

Pipe Flow
Flow distance m
velocity m/s
mins **0** min

Total t_c **10.0** mins

Runoff Volume Calculations

Name	Area (m2)	t_c	f_i	C_{10}
Site	4047		0.83	0.849
				0
				0
				0
				0
				0
				0
Total	4047	10.0		0.849

AEP	Frequency factor (F_y)	C_y ($F^y.C_{10}$)	I_y	Q_y (m^3/s)
3 mth				0.035
1EY	0.8	0.679	91	0.070
0.5EY	0.85	0.722	115	0.093
0.2EY	0.95	0.807	144	0.130
10%	1	0.849	166	0.158
5%	1.05	0.891	190	0.190
2%	1.15	0.976	221	0.243

Appendix 4 ~ Previous Stormwater Drainage Approval

PROPOSED SUBDIVISION STAGE 1A & 1B
50 & 56 BLEASBY ROAD, EIGHT MILE PLAINS

OPERATIONAL WORKS - CIVILWORKS
BRISBANE CITY COUNCIL

WSA

B.C.C. STORMWATER/ROOFWATER APPROVAL SET

DRAWING INDEX

P19-187-OW-C00.01	COVER SHEET
P19-187-OW-C00.02	STANDARD NOTES AND LEGENDS
P19-187-OW-C00.03	COMBINED SERVICES PLAN SHEET 1 OF 2
P19-187-OW-C00.04	COMBINED SERVICES PLAN SHEET 2 OF 2
~~P19-187-OW-C01.01~~	~~PROPOSED EARTHWORKS / SEDIMENT AND EROSION CONTROL PLAN~~
~~P19-187-OW-C01.02~~	~~EARTHWORKS CROSS SECTIONS SHEET 1 of 3~~
~~P19-187-OW-C01.03~~	~~EARTHWORKS CROSS SECTIONS SHEET 2 of 3~~
~~P19-187-OW-C01.04~~	~~EARTHWORKS CROSS SECTIONS SHEET 3 of 3~~
P19-187-OW-C02.01	PAVEMENT AND ROOFWA
~~P19-187-OW-C02.02~~	~~ACCESS LEG LONGITUDI~~
P19-187-OW-C03.01	ROOFWATER DRAINAGE
P19-187-OW-C03.02	ROOFWATER DRAINAGE
~~P19-187-OW-C04.01~~	~~WATER TYPICAL NOTES,~~
~~P19-187-OW-C04.02~~	~~WATER LAYOUT PLAN~~
~~P19-187-OW-C04.03~~	~~HYDRAULIC SERVICES NO~~
~~P19-187-OW-C04.04~~	~~COMBINED DOMESTIC W~~
~~P19-187-OW-C05.01~~	~~SEWERAGE TYPICAL NOT~~
~~P19-187-OW-C05.02~~	~~SEWERAGE LAYOUT PLA~~
~~P19-187-OW-C05.03~~	~~SEWERAGE LONGITUDIN~~
~~P19-187-OW-C06.01~~	~~SEDIMENT AND EROSION~~
~~P19-187-OW-C06.02~~	~~SEDIMENT AND EROSION~~
~~P19-187-OW-C07.01~~	~~EASEMENT PLAN~~

BRISBANE CITY COUNCIL

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- ☐ Earthworks
- ☑ Stormwater
- ☐ Roadworks
- ☐ Traffic Functional Layout
- ☐ Traffic Signals
- ☐ Construction Management Plan
- ☐ WSUD Device(s)
- ☐ Signs and Linemarking

Other: NIL

BRISBANE CITY COUNCIL

REPAIR DAMAGE TO COUNCIL INFRASTRUCTURE

If at any time during the construction phase of the approved development, damage to the existing kerb and channel, footpath or roadway creates unsafe, unreasonable and/or not fit for purpose conditions as assessed by Council, the contractor is to carry out repairs as directed by Asset Services.

BRISBANE CITY COUNCIL

ADDITIONAL BCC PERMITS

Obtain all relevant BCC Permits or Certificates of Assessment as may be required by the conditions of the Development Permit or BCC Local Laws, including:
Temporary Lane / Road Closures
Permit to Occupy Road (Work Zones)
Permit to Work on Council Property

BRISBANE CITY COUNCIL

ON-MAINTENANCE REQUIREMENTS

RPEQ Engineer to ensure all works meet Councils standards for safety prior to On-Maintenance by Council. All rectification works that may be necessary for On-Maintenance are to be in accordance with Councils guidelines and standards.



LOCALITY PLAN
NTS

BCC DS
LODGED
13/12/2021
APPLICATION REF
A005904375

ISSUED FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUED FOR APPROVAL

DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WSA
WILKINSON SHAW & ASSOCIATES
consulting engineers

WILKINSON SHAW & ASSOCIATES PTY LTD
ABN: 29 104 860 497
OFFICE: 182 PINE ROAD (WEST), RICHLANDS QLD 4077
MAIL: PO BOX 583 INALA QLD 4077
PHONE: (07) 3555 9888
EMAIL: office@wilkinsonshaw.com.au
WEB: www.wilkinsonshaw.com.au

35+ YEARS SINCE 1984

PROJECT	PROPOSED SUBDIVISION STAGE 1A and 1B 50 AND 56 BLEASBY ROAD EIGHT MILE PLAINS QLD 4113
DRAWING SHEET TITLE	COVER SHEET
CLIENT	CK BRISBANE PTY. LTD.
SURVEYOR	DTS URBAN PLANNING
LOT DESCRIPTION:	LOT 100 & 101 ON RP37911
COUNCIL REF:	A005327341
DRAWING NO.	P19-187-OW-C00.01
SCALE	N/A
REVISION	A
DATUM	A.H.D.

BULK EARTHWORKS:

1. IN CASE OF DOUBT - ASK!
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS UNO.
3. ALL LIAISON WITH LOCAL, STATE & STATUTORY AUTHORITIES IS THE CONTRACTOR'S RESPONSIBILITY.
4. THE LOCATION OF EXISTING SERVICES IS FOR THE CONTRACTOR'S INFORMATION ONLY, THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
5. ANY DAMAGE CAUSED TO THE EXISTING SERVICES WILL BE MADE GOOD AT THE CONTRACTORS EXPENSE.
6. THE LOCATION OF TEMPORARY DRAINS, DAMS AND SUMPS ARE TO BE AGREED WITH THE SUPERINTENDENT.
7. EARTHWORK PROCEDURES ARE TO BE CARRIED OUT IN ACCORDANCE WITH AS 3798 - 2007 "GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS".
8. CONSTRUCTION WORK UNDERTAKEN BY THE CONTRACTOR IS TO COMPLY WITH THE REQUIREMENTS OF THE WORKPLACE, HEALTH AND SAFETY ACT-2011 AND IN PARTICULAR PART 13 OF THE WORKPLACE, HEALTH AND SAFETY REGULATIONS - EXCAVATIONS, TRENCHES, CAISSONS, COFFERDAMS AND TUNNELS (REGULATIONS 125 TO 131 INCLUSIVE).
9. ALL WORKS SHALL BE IN ACCORDANCE WITH THE LOCAL AUTHORITIES STANDARD DRAWINGS AND SPECIFICATIONS U.N.O..
10. THE CONTRACTOR IS TO ALLOW FOR ALL FEES AND HAULAGE COSTS ASSOCIATED WITH DISPOSAL OF MATERIAL FROM THE SITE.
11. ALL COSTS ASSOCIATED WITH NOISE AND DUST SUPPRESSION FOR SITE WORKS ARE DEEMED THE CONTRACTOR'S RESPONSIBILITY.
12. COMPACTION STANDARDS
    - 'MODIFIED' TO AS 1289 TEST 5.2.1.
    - 'STANDARD' TO AS 1289 TEST 5.1.1.
13. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL PROVIDE SEDIMENT AND EROSION PROTECTION INCLUDING PROVISION OF SEDIMENT TRAPS AND FENCES TO MINIMISE DEPOSITION OF MATERIAL DOWNSTREAM OF THE PROPERTY.
14. NO BLASTING WILL BE PERMITTED.
15. THE LOCATION OF SITE SHEDS, SITE OFFICE AND AMENITIES BUILDING WILL BE LOCATED TO SUIT TEMPORARY UTILITY SERVICES AND AS AGREED WITH THE PRINCIPAL.
16. ALL SCREENING OF TOPSOIL STOCKPILED ON SITE WILL BE CONFINED TO THE SITE.
17. ANY MATERIAL ON SITE DETERMINED AS SUITABLE FOR COMMON STRUCTURAL FILL WILL BE STOCKPILED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
18. THE LOCATION OF TEMPORARY STOCKPILES DURING CONSTRUCTION IS TO BE AGREED WITH THE SUPERINTENDENT.
19. TEMPORARY AND PERMANENT BATTER SLOPES SUBJECT TO ALTERATIONS ON SITE AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER.
20. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY DRAINAGE DURING CONSTRUCTION OF BULK EARTHWORKS. THE LOCATION OF TEMPORARY DRAINS IS TO BE AGREED WITH THE SUPERINTENDENT.
21. CONSTRUCTION TOLERANCES TO FINISHED BULK EARTHWORKS LEVELS ARE +25 AND -0mm IN BOTH CUT AND FILL LOCATIONS.
22. THE SITE IS TO BE LEFT NEAT AND TIDY AT THE COMPLETION OF THE WORKS. ALL RUBBISH AND DEBRIS SHALL BE REMOVED AND DISPOSED OF TO THE LOCAL AUTHORITY REQUIREMENTS AND SATISFACTION.
23. COMPACTION
    RESIDENTIAL HOUSE SITES - 95% STD AS 1289.5.1.1-2017
    ROAD AND STRUCTURAL FILL >300mm BELOW SUBGRADE LEVEL - 98% STD.
    ROAD AND STRUCTURAL FILL ≤300mm BELOW SUBGRADE LEVEL - 100% STD.
24. EARTHWORKS SHALL BE ASSESSED AND INSPECTED IN ACCORDANCE WITH AS 3798 SECTION 8.1 TO THE FOLLOWING STANDARD:
    - LEVEL 1 INSPECTION AND TESTING (SECTION 8.2).
25. A SUITABLY EXPERIENCED AND QUALIFIED GEOTECHNICAL INSPECTION AND TESTING AUTHORITY (GITA) COMPLYING WITH AS 3798 SECTION 8.4 SHALL BE ENGAGED BY THE CONTRACTOR TO PERFORM THE LEVEL 1 INSPECTION AND TESTING. THE GITA SHALL ENSURE THAT ALL EARTHWORKS OPERATIONS ARE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF AS 3798 AND THE ENGINEERING SPECIFICATIONS AND DRAWINGS.
26. THE GITA SHALL PRODUCE AN INSPECTION AND TESTING PLAN DETAILING HOW THE LEVEL 1 SUPERVISION IS TO BE CARRIED OUT, INCLUDING TYPE AND FREQUENCY OF TESTING. PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS, THE GITA SHALL PROVIDE A COPY OF THE INSPECTION AND TESTING PLAN TO THE SUPERINTENDENT, FOR APPROVAL.
27. THE FREQUENCY AND LOCATION OF COMPACTION TESTS SHALL BE AT THE DISCRETION OF THE GITA, BUT UNDER NO CIRCUMSTANCES SHALL THE EXTENT OF TESTING BE LESS THAN THAT SPECIFIED IN AS 3798 TABLE 8.1.
28. ALL EARTHWORKS SHALL BE COMPACTED IN ACCORDANCE WITH AS 3798 USING EQUIPMENT DEEMED APPROPRIATE TO THE TASK. SUGGESTED EQUIPMENT HAS BEEN TABULATED IN AS 3798 APPENDIX D.
29. ALL FILL SHALL BE PLACED AT A MOISTURE CONTENT WITHIN + - 2% OF THE OPTIMUM MOISTURE CONTENT (OMC) AND SHALL ACHIEVE THE FOLLOWING MINIMUM COMPACTION STANDARDS:
    - COHESIVE SOILS - 97% DENSITY RATIO (STANDARD COMPACTIVE EFFORT)
    - COHESIONLESS SOILS - 70% DENSITY INDEX.
30. ALL TOPSOIL AND ANY EXISTING FILL MATERIAL DEEMED TO BE UNACCEPTABLE SHALL BE STRIPPED AT LEAST TO THE LEVELS REQUIRED ON THE DRAWINGS. ALL OTHER DELETERIOUS MATERIAL SUCH AS RUBBISH AND ORGANICS SHALL ALSO BE REMOVED. ANY SPOIL MATERIAL WHICH HAS BEEN APPROVED FOR RE-USE IN THE GEOTECHNICAL REPORT OR BY THE GITA SHALL BE SET ASIDE IN A DESIGNATED AREA.
31. WHEN ALL UNACCEPTABLE MATERIAL HAS BEEN REMOVED TO THE APPROVAL OF THE GITA, THE SITE SHALL THEN BE FILLED TO THE REQUIRED LEVELS. NO LAYER SHALL BE COVERED UP WITH SUBSEQUENT FILL WITHOUT THE APPROVAL OF THE GITA.
32. ON COMPLETION OF THE EARTHWORKS, THE GITA SHALL PROVIDE A REPORT TO THE SUPERINTENDENT, SETTING OUT THE INSPECTIONS, SAMPLING, TESTING AND LOCATION AND RESULTS THEREOF. THE REPORT SHALL ALSO INCLUDE STATEMENTS OF OPINION CERTIFYING THAT THE WORKS COMPLY WITH THE ENGINEERING SPECIFICATIONS AND DRAWINGS.

STORMWATER DRAINAGE

1. IN CASE OF DOUBT - ASK
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS UNO.
3. ALL LIAISON WITH LOCAL, STATE AND STATUTORY AUTHORITIES IS THE CONTRACTORS RESPONSIBILITY
4. WORKS NOT SPECIFICALLY REFERRED TO, ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD DRAWINGS AND SPECIFICATIONS OF THE LOCAL AUTHORITY.
5. THE LOCATION OF EXISTING SERVICES IS FOR THE CONTRACTORS INFORMATION ONLY.
6. THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
7. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL PROVIDE SEDIMENT AND EROSION PROTECTION INCLUDING PROVISION OF SILT TRAPS AND FENCES TO MINIMISE DEPOSITION OF MATERIAL DOWNSTREAM OF THE PROPERTY.
8. AT COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL ARRANGE FOR AN INDEPENDENT LICENSED SURVEYOR TO CARRY OUT A "WORKS AS CONSTRUCTED" SURVEY AND SUBMIT THE DETAIL PLAN TO THE SUPERINTENDENT.
9. ANY DAMAGE CAUSED TO THE EXISTING SERVICES WILL BE MADE GOOD AT THE CONTRACTORS EXPENSE.
10. THE LOCATION OF TEMPORARY DRAINS, DAMS AND SUMPS ARE TO BE AGREED WITH THE SUPERINTENDENT.
11. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY DRAINAGE DURING CONSTRUCTION OF BULK EARTHWORKS.
12. THE SITE IS TO BE LEFT NEAT AND TIDY AT THE COMPLETION OF THE WORKS, ALL RUBBISH AND DEBRIS SHALL BE REMOVED AND DISPOSED OF TO THE LOCAL AUTHORITY REQUIREMENTS AND SATISFACTION.
13. CONSTRUCTION WORK UNDERTAKEN BY THE CONTRACTOR IS TO COMPLY WITH THE REQUIREMENTS OF THE WORKPLACE, HEALTH AND SAFETY ACT - 2011 AND IN PARTICULAR PART 13 OF THE WORKPLACE, HEALTH AND SAFETY REGULATIONS - EXCAVATIONS, TRENCHES, CAISSONS, COFFERDAMS AND TUNNELS (REGULATIONS 125 TO 131 INCLUSIVE).
14. ALL STORMWATER DRAINAGE PIPES SHALL BE RUBBER RING JOINTED CLASS "2" REINFORCED CONCRETE (RCP) PIPES U.N.O.
15. ALL TRENCHES UNDER THE ROAD SHALL BE BACKFILLED IN LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS.COMPACT TO NOT LESS THAN 95% MAXIMUM DRY DENSITY BY MODIFIED COMPACTION TEST (AS 1289). ELSEWHERE 95% MAXIMUM DRY DENSITY STANDARD COMPACTION TEST.
16. ALL STORMWATER MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH B.C.C. STANDARD DETAILS Ø1050 TO Ø1500 DRG. NO. BSD-8021 TO BSD-8024.
17. ALL STORMWATER DRAINAGE GULLIES SHALL BE 'KERB INLET - LIP IN LINE' ACCORDANCE WITH B.C.C. STANDARD DRAWING No. BSD-8051 TO BSD-8055.
18. ALL STORMWATER DRAINAGE FIELD INLETS SHALL BE IN ACCORDANCE WITH BCC STD DRG BSD-8091.
19. ALL INLETS AND OUTLETS SHALL BE CONSTRUCTED IN ACCORDANCE WITH B.C.C. STANDARD DRAWING No. BSD-8101 & BSD-8102.
20. ROOFWATER KERB ADAPTORS AND PIPE TO BE INSTALLED IN ACCORDANCE WITH BCC STD DRG BSD-8114. IN LOCATIONS ADJACENT TO PATHWAYS THE PIPE SHALL EXTEND FROM THE KERB ADAPTOR UNDER THE PATHWAY TO 0.5m FROM THE PATHWAY EDGE.
21. EXCAVATION BEDDING AND BACKFILL SHALL BE COMPLETED IN ACCORDANCE WITH BCC STD DRG BSD-8011.
22. EXISTING PAVEMENT TRENCH RESTORATION TO BE IN ACCORDANCE WITH STANDARD BCC. DRG BSD-2042.

ROOFWATER DRAINAGE

1. IN CASE OF DOUBT - ASK
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS UNO.
3. ALL LIAISON WITH LOCAL, STATE AND STATUTORY AUTHORITIES IS THE CONTRACTORS RESPONSIBILITY
4. WORKS NOT SPECIFICALLY REFERRED TO, ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD DRAWINGS AND SPECIFICATIONS OF THE LOCAL AUTHORITY.
5. THE LOCATION OF EXISTING SERVICES IS FOR THE CONTRACTORS INFORMATION ONLY.
6. THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
7. ALL ROOFWATER DRAINAGE PIPES TO BE UPVC CLASS SN8 WITH RUBBER RING JOINTS. ROOFWATER PIPES TO BE LOCATED 600mm FROM BOUNDARY, AND MINIMUM COVER TO BE 500mm (UNLESS SHOWN OTHERWISE).
8. KERB ADAPTORS TO BE PROVIDED IN KERB & CHANNEL AT LOW SIDE OF PROPERTIES WHICH DRAIN TO ROADWAY IN ACCORDANCE WITH B.C.C. STD DRG BSD-8114.
9. ROOFWATER INSPECTION PITS AS PER BCC STD DWG NO. BSD-8112, AND OF THE FOLLOWING DIAMETERS:
    DEPTH TO INVERT UP TO 600mm MAX - 300 DIA MIN.
    DEPTH TO INVERT 600mm TO 750mm - 550 DIA
    DEPTH TO INVERT GREATER THAN 750mm TO 1500mm - 900 DIA
10. PIT FINISHED SURFACE LEVELS SHOWN ARE INDICATIVE ONLY-ALL PIT TOPS SHALL BE COMPLETED AFTER FINAL TRIMMING OF SURROUNDING EARTHWORKS AND SHALL BE 25 - 50mm ABOVE FINISHED SURFACE LEVEL.
11. ROOFWATER PITS TO BE 600mm FROM SIDE, FRONT OR REAR BOUNDARIES UNLESS SHOWN OTHERWISE.
12. ALL ROOFWATER HOUSE CONNECTIONS TO BE 100mm uPVC CLASS SN10 WITH AN I.O. AND CAP.
13. ENSURE ROOFWATER PIPE IS EXTENDED UNDER FOOTPATH TO KERB ADAPTOR.

PAVEMENT GRADING:

1. IN CASE OF DOUBT - ASK
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS UNO.
3. ALL LIAISON WITH LOCAL, STATE AND STATUTORY AUTHORITIES IS THE CONTRACTORS RESPONSIBILITY.
4. WORKS NOT SPECIFICALLY REFERRED TO, ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD DRAWINGS AND SPECIFICATIONS OF THE LOCAL AUTHORITY.
5. THE LOCATION OF EXISTING SERVICES IS FOR THE CONTRACTORS INFORMATION ONLY.
6. THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
7. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL PROVIDE SEDIMENT AND EROSION PROTECTION INCLUDING PROVISION OF SILT TRAPS AND FENCES TO MINIMISE DEPOSITION OF MATERIAL DOWNSTREAM OF THE PROPERTY TO LOCAL AUTHORITIES GUIDELINES.
8. AT COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL ARRANGE FOR AN INDEPENDENT LICENSED SURVEYOR TO CARRY OUT A "WORKS AS CONSTRUCTED" SURVEY AND SUBMIT THE DETAIL PLAN TO THE SUPERINTENDENT.
9. ANY DAMAGE CAUSED TO THE EXISTING SERVICES WILL BE MADE GOOD AT THE CONTRACTORS EXPENSE.
10. THE LOCATION OF TEMPORARY DRAINS, DAMS AND SUMPS ARE TO BE AGREED WITH THE SUPERINTENDENT.
11. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY DRAINAGE DURING CONSTRUCTION OF BULK EARTHWORKS.
12. CONSTRUCTION TOLERANCES TO FINISHED SUBGRADE LEVELS ARE +25 AND -0mm IN BOTH CUT AND FILL LOCATIONS.
13. THE SITE IS TO BE LEFT NEAT AND TIDY AT THE COMPLETION OF THE WORKS, ALL RUBBISH AND DEBRIS SHALL BE REMOVED AND DISPOSED OF TO THE LOCAL AUTHORITY REQUIREMENTS AND SATISFACTION.
14. CONSTRUCTION WORK UNDERTAKEN BY THE CONTRACTOR IS TO COMPLY WITH THE REQUIREMENTS OF THE WORKPLACE, HEALTH AND SAFETY ACT- 2011 AND IN PARTICULAR PART 13 OF THE WORKPLACE, HEALTH AND SAFETY REGULATIONS - EXCAVATIONS, TRENCHES, CAISSONS, COFFERDAMS AND TUNNELS (REGULATIONS 125 TO 131 INCLUSIVE).
15. ALL TRENCHES UNDER THE ROAD SHALL BE BACKFILLED IN LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS.COMPACT TO NOT LESS THAN 98% MAXIMUM DRY DENSITY BY MODIFIED COMPACTION TEST (AS 1289). ELSEWHERE 95% MAXIMUM DRY DENSITY STANDARD COMPACTION TEST.
16. COMPACTION OF ROAD PAVEMENTS:
    - ROAD SUBGRADE - 100% STD. (<300mm FROM SUBGRADE)
    - ALL PAVEMENT GRAVELS - 95% MODIFIED
17. KERB AND CHANNEL SHALL BE IN ACCORDANCE WITH BCC STD BSD-2001.
18. KERB ONLY SHALL BE IN ACCORDANCE WITH BCC STD BSD-2001.
19. KERB RAMPS SHALL BE IN ACCORDANCE WITH BCC STD DRG BSD-5231.
20. SUBSOIL DRAINS INCLUDING OUTLETS TO THE NEAREST STORMWATER PIT SHALL BE IN ACCORDANCE WITH BCC STD DRG BSD-2041.

CONCRETE PAVEMENT:

1. THE CONCRETE PAVEMENT HAS BEEN DESIGNED BASED ON A CBR 5 AND IS SUBJECT TO CONFIRMATION UPON RECIEPT OF CBR TEST RESULTS AT TIME OF CONSTRUCTION.
2. CONCRETE PAVEMENT SPECIFICATION.

COMPRESSIVE STRENGTH:	32 MPa @ 28 DAYS
FLEXURAL STRENGTH:	3.5 MPa @ 28 DAYS
MAXIMUM AGGREGATE SIZE:	20mm
SLUMP	80mm + 15mm
MESH	REFER DRAWING LEGEND
BEDDING:	150mm TYPE 2.3 BASE COURSE
FINISH	TO LANDSCAPE ARCHITECTS DETAILS

3. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH AS1379, AS2600 AND AS3610.
4. PROJECT ASSESSMENT OF STRENGTH IN ACCORDANCE WITH AS3600 SHALL BE ADOPTED FOR SAMPLING AND TESTING. THE CONTRACTOR SHALL PAY ALL TESTING COSTS.
5. CONSTRUCTION JOINTS SHALL BE AT 4.0m MAX CENTR
   JOINTS ON ROAD RESERVE BOUNDARY AND AT 16.0m
   EXPANSION JOINTS TO TO BE FULL DEPTH AND 10mm
   EXPANSION AND CONTRACTION JOINT DETAILS.
6. ALL JOINTS ARE TO BE SEALED JUST PRIOR TO HAND
   CORNING '888' SEALANT INSTALLED IN ACCORDANCE W
   MANUFACTURERS SPECIFICATIONS.
7. JOINTS ARE TO BE INSPECTED AND SEALANT REGULAR
   REQUIRED.
8. DIMENSIONAL TOLERANCES OF AS3600, MODIFIED BY A
   UNLESS OTHERWISE NOTED. SLAB SURFACE FLATNESS
   5mm MAXIMUM DEVIATION FOR A 3m STRAIGHT EDGE.
9. SLAB THICKNESS NOTED ARE EXCLUSIVE OF APPLIED
10. CURE ALL CONCRETE BY AN APPROVED METHOD FOR
    HARDENING, PVA AND RESIN BASED CURING COMPOUND
11. STANDARD FOOTPATH CROSSOVER TO BE CONSTRUCTE
    REFER TO B.C.C. STD. DRAWINGS BSD-2022

BRISBANE CITY COUNCIL

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- ☐ Earthworks
- ☑ Stormwater
- ☐ Roadworks
- ☐ Traffic Functional Layout
- ☐ Traffic Signals
- ☐ Construction Management Plan
- ☐ WSUD Device(s)
- ☐ Signs and Linemarking

Other: NIL

SERVICES LEGEND

	NEW	EXISTING
GRAVITY SEWER	S	S
SEWER RISING MAIN	RM	RM
SEWER VACUUM MAIN	VM	VM
LOW PRESSURE SEWER	LSP	LSP
DRINKING WATER MAIN	W	W
NON-DRINKING WATER MAIN	NDW	NDW
VENT MAIN	V	V
WATER MAIN TO BE SUBSTITUTED	SUB	
WATER SERVICE CONDUIT (WITH SERVICE SIZE SHOWN)	DN32 PE	
ENCASING/ ENVELOPER PIPE	V	
STORMWATER DRAINAGE	SW	SW
ROOFWATER DRAINAGE	RW	
GAS MAIN	G	G
ELECTRICAL U/G	E	E
ELECTRICAL O/H	O/H	O/H
TELECOMMUNICATION	T	T
OPTIC FIBRE	OF	OF
UNIDENTIFIED SERVICE	US	US
OIL PIPELINE	OIL	OIL
LIGHT POLE	E LP	E LP
ELECTRICITY/ POWER POLE	O/H EP	O/H EP
STORMWATER GULLY		SW
PIT (TELECOM/ELEC)	T E	T E
NOMINAL KERB FACE		
EDGE OF BITUMEN		
FENCE LINE		
EASEMENT		
CONTROL LEVEL	4.150 +	4.150 +
CONTOUR LABEL	4.0	4.0
WATER SERVICE	X	
STRUCTURE NUMBER	1/2	
DESIGN SPOT LEVEL	5.100	
FIRE HYDRANT	FH W	EXFH W
KERB ADAPTOR Ø90 UPVC CLASS SN10	KA	
PROPOSED CATCH DRAIN		
PROPOSED SILT FENCE	SF	
MOUNTABLE KERB ONLY (B.C.C. TYPE 'D')		
BARRIER KERB AND CHANNEL (B.C.C. TYPE 'E')		
MOUNTABLE KERB AND CHANNEL (B.C.C. TYPE 'D')		
RETAINING WALL (TIMBER)		
RETAINING WALL (CONCRETE SLEEPER)		

ISSUED FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUED FOR APPROVAL

DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WILKINSON SHAW & ASSOCIATES consulting engineers
WILKINSON SHAW & ASSOCIATES PTY LTD
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OFFICE: 182 PINE ROAD (WEST), RICHLANDS QLD 4077
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35+ YEARS SINCE 1984

PROJECT: PROPOSED SUBDIVISION STAGE 1A and 1B
50 AND 56 BLEASBY ROAD
EIGHT MILE PLAINS QLD 4113

DRAWING SHEET TITLE: STANDARD NOTES AND LEGENDS

CLIENT: CK BRISBANE PTY. LTD.
SURVEYOR: DTS URBAN PLANNING
LOT DESCRIPTION: LOT 100 & 101 ON RP37911
COUNCIL REF: A005327341

DRAWING NO. P19-187-OW-C00.02
SCALE N/A
REVISION A
DATUM A.H.D.

EXISTING DN160 SEWER MAIN

RP. BOUNDARY

ELECTRICAL CONDUIT

WATER SERVICES

Ø100 uPVC FIRE MAIN

COMMS CONDUIT

A
C02.07

SERVICES AND METER BOXES

FIRE SERVICE METER

FUTURE SERVICES AND METER BOXES

PROPOSED ELECTRICAL PILLARS

EXISTING WATER METER

FH

ROAD

Ø150 AC

BLEASBY

Lot 2
600m²

Lot 1
449m²

RP. BOUNDARY

RP. BOUNDARY

EXISTING NBN

EXISTING Ø150 AC SEWER MAIN

PROPOSED DN160 SEWER

RP. BOUNDARY

ROOFWATER CONNECTION

FUTURE ROOFWATER CONNECTION

Concrete Pathway

Benchmark
Screw in Concrete
RL:54.02

EXISTING UNDERGROUND ELECTRICAL MAIN

SERVICES LEGEND

	NEW	EXISTING
GRAVITY SEWER	S	S
DRINKING WATER MAIN	W	W
WATER MAIN TO BE SUBSTITUTED	SUB	
WATER SERVICE CONDUIT (WITH SERVICE SIZE SHOWN)	DN32 PE	
ENCASING/ ENVELOPER PIPE	E	
STORMWATER DRAINAGE	SW	SW
ROOFWATER DRAINAGE	RW	
GAS MAIN	G	G
ELECTRICAL U/G		
ELECTRICAL O/H		
TELECOMMUNICATION		
OPTIC FIBRE		
UNIDENTIFIED SERVICE		
OIL PIPELINE		
LIGHT POLE		
ELECTRICITY/ POWER POLE		
STORMWATER GULLY		
PIT (TELECOM/ELEC)	T E	T E
PRIVATE FIRE MAIN	FM	
PRIVATE WATER SERVICES	WS	
COMMS CONDUITS	CC	
ELECTRICAL CONDUITS	EC	

BRISBANE CITY COUNCIL

NOTE:
THIS OPERATIONAL WORKS APPROVAL IS LIMITED TO THE STORMWATER DRAIANGE DETAILS ONLY.

ALL OTHER ENGINEERING DETAILS SHOWN ON THIS PLAN ARE NOT PART OF THIS APPROVAL.

NOTE:
THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS CONSTRUCTED INFORMATION. LIMITED POT HOLING HAS BEEN UNDERTAKEN IN CRITICAL LOCATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE POT HOLING TO VERIFY ALL EXISTING SERVICE LOCATIONS AND DEPTHS.
THE CONTRACTOR SHALL, PRIOR TO COMMENCEMENT OF CONSTRUCTION, NOTIFY THE SUPERINTENDENT OF ANY DISCREPANCIES OF SERVICE LOCATIONS AND DEPTHS.

DIAL BEFORE YOU DIG www.1100.com.au

0 1 3 5m
SCALE 1:100 AT ORIGINAL A1 SIZE

ISSUED FOR APPROVAL

BRISBANE CITY COUNCIL
AMENDED IN RED
10 Jan 2022

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- ☐ Earthworks
- ☑ Stormwater
- ☐ Roadworks
- ☐ Traffic Functional Layout
- ☐ Traffic Signals
- ☐ Construction Management Plan
- ☐ WSUD Device(s)
- ☐ Signs and Linemarking

Other: NIL

BRISBANE CITY COUNCIL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUE FOR APPROVAL

DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WILKINSON SHAW & ASSOCIATES
consulting engineers
WILKINSON SHAW & ASSOCIATES PTY LTD
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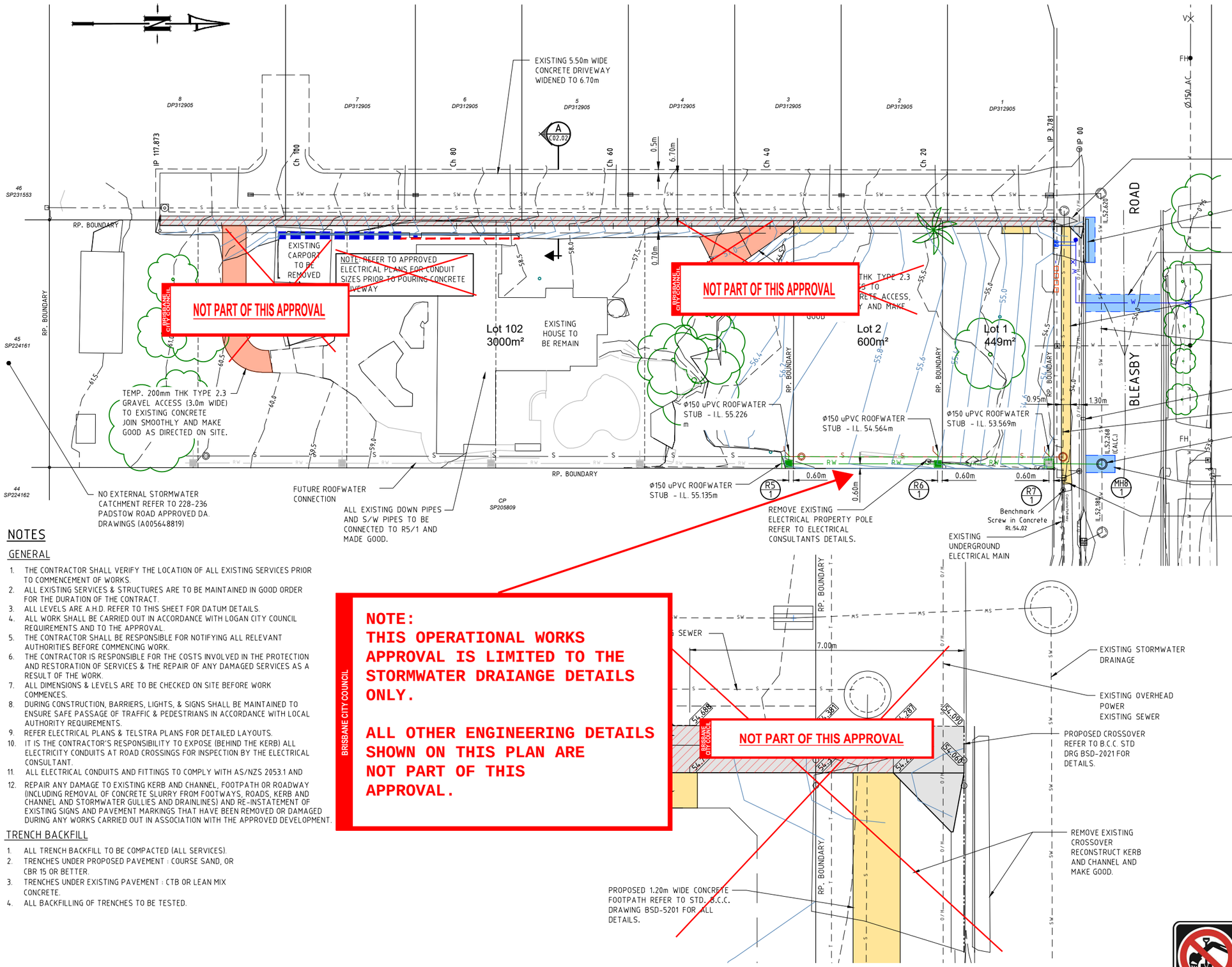
35+ YEARS SINCE 1984

PROJECT: PROPOSED SUBDIVISION STAGE 1A and 1B
50 AND 56 BLEASBY ROAD
EIGHT MILE PLAINS QLD 4113

DRAWING SHEET TITLE: COMBINED SERVICES PLAN
SHEET 1 OF 2

CLIENT: CK BRISBANE PTY. LTD.
SURVEYOR: DTS URBAN PLANNING
LOT DESCRIPTION: LOT 100 & 101 ON RP37911
COUNCIL REF: A005327341

DRAWING NO. P19-187-OW-C00.03
SCALE 1:100
REVISION A
DATUM A.H.D.



NOTES

GENERAL

1. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. ALL EXISTING SERVICES & STRUCTURES ARE TO BE MAINTAINED IN GOOD ORDER FOR THE DURATION OF THE CONTRACT.
3. ALL LEVELS ARE A.H.D. REFER TO THIS SHEET FOR DATUM DETAILS.
4. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH LOGAN CITY COUNCIL REQUIREMENTS AND TO THE APPROVAL.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL RELEVANT AUTHORITIES BEFORE COMMENCING WORK.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE COSTS INVOLVED IN THE PROTECTION AND RESTORATION OF SERVICES & THE REPAIR OF ANY DAMAGED SERVICES AS A RESULT OF THE WORK.
7. ALL DIMENSIONS & LEVELS ARE TO BE CHECKED ON SITE BEFORE WORK COMMENCES.
8. DURING CONSTRUCTION, BARRIERS, LIGHTS, & SIGNS SHALL BE MAINTAINED TO ENSURE SAFE PASSAGE OF TRAFFIC & PEDESTRIANS IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
9. REFER ELECTRICAL PLANS & TELSTRA PLANS FOR DETAILED LAYOUTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE (BEHIND THE KERB) ALL ELECTRICITY CONDUITS AT ROAD CROSSINGS FOR INSPECTION BY THE ELECTRICAL CONSULTANT.
11. ALL ELECTRICAL CONDUITS AND FITTINGS TO COMPLY WITH AS/NZS 2053.1 AND
12. REPAIR ANY DAMAGE TO EXISTING KERB AND CHANNEL, FOOTPATH OR ROADWAY (INCLUDING REMOVAL OF CONCRETE SLURRY FROM FOOTWAYS, ROADS, KERB AND CHANNEL AND STORMWATER GULLIES AND DRAINLINES) AND RE-INSTATEMENT OF EXISTING SIGNS AND PAVEMENT MARKINGS THAT HAVE BEEN REMOVED OR DAMAGED DURING ANY WORKS CARRIED OUT IN ASSOCIATION WITH THE APPROVED DEVELOPMENT.

TRENCH BACKFILL

1. ALL TRENCH BACKFILL TO BE COMPACTED (ALL SERVICES).
2. TRENCHES UNDER PROPOSED PAVEMENT : COURSE SAND, OR CBR 15 OR BETTER.
3. TRENCHES UNDER EXISTING PAVEMENT : CTB OR LEAN MIX CONCRETE.
4. ALL BACKFILLING OF TRENCHES TO BE TESTED.

NOTE:
THIS OPERATIONAL WORKS APPROVAL IS LIMITED TO THE STORMWATER DRAIANGE DETAILS ONLY.

ALL OTHER ENGINEERING DETAILS SHOWN ON THIS PLAN ARE NOT PART OF THIS APPROVAL.

BRISBANE CITY COUNCIL

NOT PART OF THIS APPROVAL

CROSSOVER DETAIL
SCALE 1:50

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- [ ] Earthworks
- [x] Stormwater
- [ ] Roadworks
- [ ] Traffic Functional Layout
- [ ] Traffic Signals
- [ ] Construction Management Plan
- [ ] WSUD Device(s)
- [ ] Signs and Linemarking

Other: NIL

BRISBANE CITY COUNCIL

AMENDED IN RED
10 Jan 2022

NOTE:
THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS CONSTRUCTED INFORMATION. LIMITED POT HOLING HAS BEEN UNDERTAKEN IN CRITICAL LOCATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE POT HOLING TO VERIFY ALL EXISTING SERVICE LOCATIONS AND DEPTHS.
THE CONTRACTOR SHALL, PRIOR TO COMMENCEMENT OF CONSTRUCTION, NOTIFY THE SUPERINTENDENT OF ANY DISCREPANCIES OF SERVICE LOCATIONS AND DEPTHS.

0 2.5 7.5 12.5 m
SCALE 1:250 AT ORIGINAL A1 SIZE

0 500 1500 2500mm
SCALE 1:50 AT ORIGINAL A1 SIZE

DIAL BEFORE YOU DIG www.1100.com.au

ISSUED FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUE FOR APPROVAL

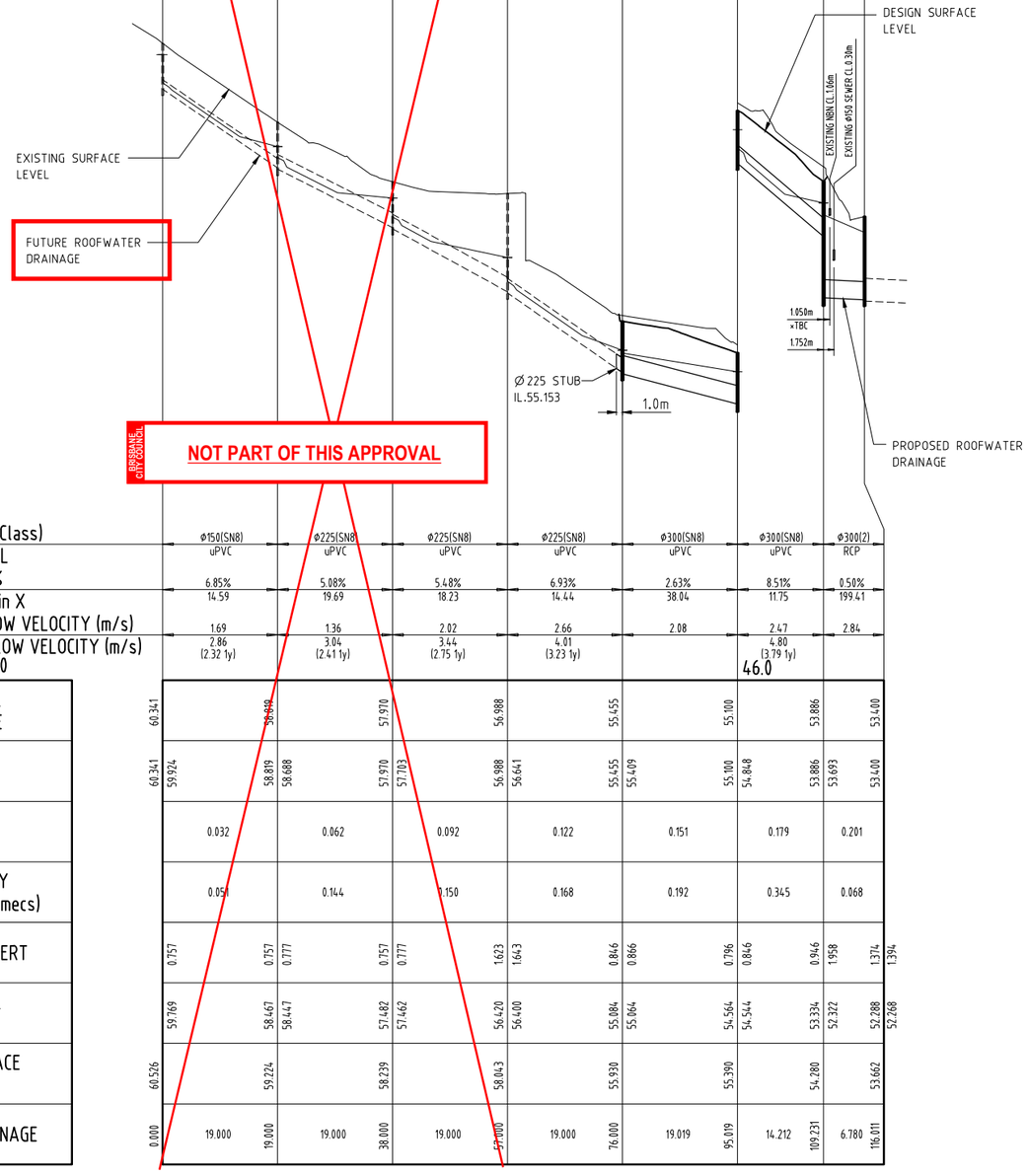
DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WILKINSON SHAW & ASSOCIATES consulting engineers
WILKINSON SHAW & ASSOCIATES PTY LTD
ABN: 29 104 860 497
OFFICE: 182 PINE ROAD (WEST), RICHLANDS QLD 4077
MAIL: PO BOX 583 INALA QLD 4077
PHONE: (07) 3555 9888
EMAIL: office@wilkinsonshaw.com.au
WEB: www.wilkinsonshaw.com.au

35+ YEARS SINCE 1984

PROJECT	PROPOSED SUBDIVISION STAGE 1A and 1B 50 AND 56 BLEASBY ROAD EIGHT MILE PLAINS QLD 4113
DRAWING SHEET TITLE	~~PAVEMENT~~ AND ROOFWATER PLAN
CLIENT	CK BRISBANE PTY. LTD.
SURVEYOR	DTS URBAN PLANNING
LOT DESCRIPTION:	LOT 100 & 101 ON RP37911
COUNCIL REF:	A005327341
DRAWING NO.	P19-187-OW-C02.01
SCALE	1:250
REVISION	A
DATUM	A.H.D.

STRUCTURE NAME	R1/1	R2/1	R3/1	R4/1	R5/1	R6/1	R7/1	MH8/1
STRUCTURE DISCRIPTION	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	600 x 600 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	900 x 900 FIELD INLET TYPE 2, CLASS 'B' GRATE REFER TO BSD-8091	CONSTRUCT Ø1050 STD. BCC MANHOLE OVER EXISTING Ø375 RCP - CLSS 'D' COVER



PIPE SIZEmm (Class)	Ø150(SN8)	Ø225(SN8)	Ø225(SN8)	Ø225(SN8)	Ø300(SN8)	Ø300(SN8)	Ø300(2)	
PIPE MATERIAL	uPVC	uPVC	uPVC	uPVC	uPVC	uPVC	RCP	
PIPE GRADE %	6.85%	5.08%	5.48%	6.93%	2.63%	8.51%	0.50%	
PIPE SLOPE 1 in X	14.59	19.69	18.23	14.44	38.04	11.75	199.41	
FULL PIPE FLOW VELOCITY (m/s)	1.69	1.36	2.02	2.66	2.08	2.47	2.84	
PART FULL FLOW VELOCITY (m/s) DATUM RL 50.0	2.86 (2.32 1y)	3.04 (2.41 1y)	3.44 (2.75 1y)	4.01 (3.23 1y)		4.80 (3.79 1y) 46.0		
WATER LEVEL IN STRUCTURE	60.341 / 58.819	57.970 / 56.988	55.455 / 55.100	53.886 / 53.400				
HYDRAULIC GRADE LEVEL	60.341 / 59.924 / 58.819 / 58.688	57.970 / 57.703 / 56.988 / 56.641	55.455 / 55.409 / 55.100 / 54.848	53.886 / 53.693 / 53.400				
PIPE FLOW (Cumecs)	0.032	0.062	0.092	0.122	0.151	0.179	0.201	
PIPE CAPACITY AT GRADE (Cumecs)	0.051	0.144	0.150	0.168	0.192	0.345	0.068	
DEPTH TO INVERT	0.757 / 0.757	0.777 / 0.757	0.777 / 1.623	1.643 / 0.846	0.866 / 0.796	0.846 / 0.946	1.958 / 1.374	1.394
INVERT LEVEL OF DRAIN	59.769 / 58.467	58.447 / 57.482	57.462 / 56.420	56.400 / 55.084	55.064 / 54.564	54.544 / 53.334	52.322 / 52.288	52.268
DESIGN SURFACE LEVEL	60.526 / 59.224	58.239 / 58.043	55.930 / 55.390	54.280 / 53.662				
RUNNING CHAINAGE	0.000 / 19.000	19.000 / 38.000	19.000 / 57.000	19.000 / 76.000	19.019 / 95.019	14.212 / 109.231	6.780 / 116.011	

LINE 1

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- ☐ Earthworks
- ☑ Stormwater
- ☐ Roadworks
- ☐ Traffic Functional Layout
- ☐ Traffic Signals
- ☐ Construction Management Plan
- ☐ WSUD Device(s)
- ☐ Signs and Linemarking

Other: NIL

BRISBANE CITY COUNCIL

AMENDED IN RED
10 Jan 2022

0 5 15 25m HORIZ SCALE 1:500
AT ORIGINAL A1 SIZE
0 500 1500 2500mm VERT SCALE 1:50

ISSUED FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUED FOR APPROVAL

DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WILKINSON SHAW & ASSOCIATES
consulting engineers
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35+ YEARS SINCE 1984

PROJECT: PROPOSED SUBDIVISION STAGE 1A and 1B
50 AND 56 BLEASBY ROAD
EIGHT MILE PLAINS QLD 4113

DRAWING SHEET TITLE: ROOFWATER DRAINAGE LONGITUDINAL SECTION

CLIENT: CK BRISBANE PTY. LTD.
SURVEYOR: DTS URBAN PLANNING
LOT DESCRIPTION: LOT 100 & 101 ON RP37911
COUNCIL REF: A005327341

DRAWING NO. P19-187-OW-C03.01
SCALE H1:500, V1:50
REVISION A
DATUM A.H.D.

LOCATION					TIME			SUB-CATCHMENT RUNOFF						INLET DESIGN								DRAIN DESIGN															HEADLOSSES									PART FULL		DESIGN LEVELS							
						tc	I	C10	C	A	C×A	+CA	Q					Qg	Qb			tc	I	+CA	Qt	Qm	Qs	Qp	L	S			V	T			V2/2g	Ku	hu	Kl	hl	Kw	hw	Sf	hf		Vp							
DESIGN ARI	STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENTS CONTRIBUTING	LAND USE	SLOPE OF CATCHMENT	SUB-CATCHMENT TIME OF CONC.	RAINFALL INTENSITY	10yr RUNOFF CO-EFFICIENT	CO-EFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUM OF (C x A)	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	ROAD GRADE AT INLET	MINOR FLOW ROAD CAPACITY	INLET TYPE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONC.	RAINFALL INTENSITY	TOTAL (C x A)	MAJOR TOTAL FLOW	MAJOR SURFACE FLOW CAPACITY	MAJOR SURFACE FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE / BOX DIMENSIONS (CLASS)	FLOW VELOCITY FULL (PIPE GRADE VELOCITY)	TIME OF FLOW IN REACH	STRUCTURE CHART No.	STRUCTURE RATIOS FOR 'K' VALUE CALCULATIONS	VELOCITY HEAD	U/S HEADLOSS COEFFICIENT	U/S PIPE STRUCT. HEADLOSS	LAT. HEADLOSS CO-EFFICIENT	LAT. PIPE STRUCT. HEADLOSS	W.S.E. CO-EFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEADLOSS (L x Sf)	DEPTH	VELOCITY	OBVERT LEVELS	DRAIN SECTION H.G.L	UPSTREAM H.G.L	LAT. H.G.L	W.S.E.	SURFACE OR K&C INVERT LEVEL	STRUCTURE No.
yrs					%	min	mm/h			ha	ha	ha	l/s	l/s	%	l/s		l/s	l/s		min	mm/h	ha	l/s	l/s	l/s	l/s	m	%	mm	m/s	min			m		m		m		m	%	m	m	m/s	m	m	m	m	m	m	
10 50	R1/1	R1/1 to R2/1	A			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R2/1		5.00 5.00	215 291	0.053 0.060	4.9			32 (Pipe flow=	19.000 Grate flow)	6.85	150(U)	1.69 (2.72)	0.19		Qg 0.032 Qo 0.032 Do 150 CHRT 32: Vo2/2gDo 0.94 H/Do 0.00 Kg side flow 2.87 end flow 2.65	0.146	2.87	0.417			2.87	0.417	2.65	0.503	0.088 (0.056 1y)	2.86 (2.32 1y)	59.924 58.622	59.924 58.819	60.341		60.341	60.526	R1/1
10 50	R2/1	R2/1 to R3/1	A;B			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R3/1		5.19 5.19	212 287	0.106 0.120	9.6			62 (Pipe flow=	19.000 Sum upstr atten flows)	5.08	225(U)	1.36 (3.15)	0.23		Qg 0.031 Qo 0.062 Do 225 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.67 Qg/Qo 0.50 K 0.88 S/Do 1.54 cor 0.51 Ku 1.39 Kw 1.39	0.094	1.39	0.131			1.39	0.131	0.95	0.181	0.111 (0.071 1y)	3.04 (2.41 1y)	58.688 57.723	58.688 57.970	58.819		58.819	59.224	R2/1
10 50	R3/1	R3/1 to R4/1	A;B;C			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R4/1		5.42 5.42	209 283	0.159 0.180	14.2			92 (Pipe flow=	19.000 Sum upstr atten flows)	5.48	225(U)	2.02 (3.27)	0.16		Qg 0.031 Qo 0.092 Do 225 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.33 K 1.17 S/Do 2.10 cor 0.11 Ku 1.28 Kw 1.28	0.208	1.28	0.267			1.28	0.267	2.08	0.396	0.137 (0.084 1y)	3.44 (2.75 1y)	57.703 56.661	57.703 56.988	57.970		57.970	58.239	R3/1
10 50	R4/1	R4/1 to R5/1	A;B;C;D			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R5/1		5.58 5.58	207 280	0.212 0.240	18.7			122 (Pipe flow=	19.000 Sum upstr atten flows)	6.93	225(U)	2.66 (3.68)	0.12		Qg 0.030 Qo 0.122 Do 225 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.25 K 0.95 S/Do 2.43 cor 0.01 Ku 0.96 Kw 0.96	0.361	0.96	0.347			0.96	0.347	3.63	0.690	0.152 (0.091 1y)	4.01 (3.23 1y)	56.641 55.325	56.641 55.455	56.988		56.988	58.043	R4/1
10 50	R5/1	R5/1 to R6/1	A;B;C;D;E			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R6/1		5.70 5.70	205 278	0.265 0.300	23.2			151 (Pipe flow=	19.019 Sum upstr atten flows)	2.63	300(U)	2.08 (2.64)	0.15		Qg 0.030 Qo 0.151 Do 300 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.75 Qg/Qo 0.20 K -0.07 S/Do 1.29 cor 0.28 Ku 0.21 Kw 0.21	0.221	0.21	0.046			0.21	0.046	1.62	0.309			55.368 54.868	55.409 55.100	55.455		55.455	55.930	R5/1
10 50	R6/1	R6/1 to R7/1	A;B;C;D;E;F			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.060 0.060	0.053 0.060	0.053 0.060	32 49	32 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L1.8A0.36 m	32 (UNLOCKED	0 0)	R7/1		5.85 5.85	203 275	0.318 0.360	27.5			179 (Pipe flow=	14.212 Sum upstr atten flows)	8.51	300(U)	2.47 (4.76)	0.10		Qg 0.030 Qo 0.179 Do 300 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.17 K 0.71 S/Do 1.83 cor 0.10 Ku 0.81 Kw 0.81	0.311	0.81	0.252			0.81	0.252	2.29	0.326	0.156 (0.096 1y)	4.80 (3.79 1y)	54.848 53.638	54.848 53.886	55.100		55.100	55.410	R6/1
10 50	R7/1	R7/1 to MH8/1	A;B;C;D;E;F;G			5.00 5.00	215 291	0.88 0.88	0.88 1.00	0.045 0.045	0.040 0.045	0.040 0.045	24 36	24 FLOW	0.00 WIDTH/DEPTH	200 0.000	#D0.05L2.7A0.81 m	24 (UNLOCKED	0 0)			5.95 5.95	202 273	0.358 0.405	30.7			201 (Pipe flow=	6.780 Sum upstr atten flows)	0.50	300(2)	2.84 (0.97)	0.04		Qg 0.022 Qo 0.201 Do 300 Flow R6/1 made eqv grate flow CHRT 32: Vo2/2gDo 1.37 H/Do 3.57 Kg side flow 1.81 end flow 1.75 K vals above for stepped pipes as grate flow grate flow decreased by 0.178 from R6/1	0.411	0.47	0.193	CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.11 K 0.55 S/Do 5.21 cor -0.08 Ku 0.47 Kw 0.47 K vals step pipes as		0.47 pipe flow	0.193 Ku 0.47 Kw	4.32 0.47	0.293			52.622 52.588	53.693 53.400	53.886		53.886	54.248	R7/1

CALCULATIONS TABLE

APPROVED PLAN
Brisbane City Council
12 Jan 2022

APPROVED PLAN ONLY REFERS TO:

- ☐ Earthworks
- ☑ Stormwater
- ☐ Roadworks
- ☐ Traffic Functional Layout
- ☐ Traffic Signals
- ☐ Construction Management Plan
- ☐ WSUD Device(s)
- ☐ Signs and Linemarking

Other: NIL

BRISBANE CITY COUNCIL

ISSUED FOR APPROVAL

REV	BY	CKD	DATE	DESCRIPTION
A	PBK	KLW	18.11.21	ISSUED FOR APPROVAL

DESIGN	PBK
DRAWN	PBK
CHECKED	KLW
APPROVED	
RPEQ:	7549
DATE:	18.11.21

WSA WILKINSON SHAW & ASSOCIATES consulting engineers

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35+ YEARS SINCE 1984

PROJECT	PROPOSED SUBDIVISION STAGE 1A and 1B 50 AND 56 BLEASBY ROAD EIGHT MILE PLAINS QLD 4113
DRAWING SHEET TITLE	ROOFWATER DRAINAGE CALCULATIONS SHEET
CLIENT	CK BRISBANE PTY. LTD.
SURVEYOR	DTS URBAN PLANNING
LOT DESCRIPTION:	LOT 100 & 101 ON RP37911
COUNCIL REF:	A005327341
DRAWING NO.	P19-187-OW-C03.02
SCALE	N/S
DATUM	A.H.D.
REVISION	A