

**PLANS AND DOCUMENTS
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DEVELOPMENT APPROVAL**

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Section 4 - SPECIALIST REPORTS

Civil Engineering Plan

Prepared by Burchills Engineering





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222 MacArthur Avenue, Hamilton
Civil Engineering Report

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1. Introduction

Zone Planning QLD Pty Ltd on behalf of Reece Group has engaged Burchills Engineering Solutions to prepare a Civil Engineering Report (CER) to be considered part of a Development Application to Brisbane City Council, for the development of a Warehouse (Outdoor Storage). The proposed use is temporary in nature, to be replaced by future development as part of the proposed Olympic Games precinct. The proposed development is located at 222 MacArthur Avenue, Hamilton.

This report determined that the site is suitable for the proposed development, in relation to matters concerning civil engineering design parameters and site constraints. The development can be undertaken in accordance with the current Brisbane City Council guidelines, SEQ Water Supply and Sewerage, Design and Construction Code and best management practices.

1.1 Scope of Report

This report describes the existing physical conditions of the site, and suitability for the proposed development with respect to:

- Project Identification;
- Proposed Development
- Site Earthworks;
- Roadworks, Access and Traffic;
- Stormwater Management;
- Water Supply;
- Sewer Reticulation; and,
- Electricity and Telecommunications Supply.

This report represents an assessment of the facts and circumstances pertaining to these matters, as they are known to the writer at the time of preparation.





2. Project Identification

2.1 Real Property Description

The site is legally described as Lot 848 SL4269. The street address is 222 MacArthur Avenue, Hamilton QLD 4007. The site occupies an area of approximately 3.575 ha.

The site to be developed is shown below and on a Concept Site Plan prepared by Zone Planning QLD Pty Ltd which is included in Appendix A of this report. A detailed site survey has been undertaken by Sonto, which is also included within Appendix B of this report. The location of the subject site is shown on Figure 2.1 Site Locality Plan below.



Figure 2.1 Site Locality Plan





2.2 Physical Description

The site has a road frontage with MacArthur Avenue on its southern boundary. The site grades uniformly from the south to the north, with a height differential of approximately 1.27m. The highest point within the site is at the southeastern boundary at RL 4.38m AHD, and the lowest point is at the northern boundary at approximately RL 3.11m AHD. Currently, the subject site consists of asphalt paved areas throughout with the exception of a concrete hardstand on the southeastern portion of the site.

The site is bounded by the following existing land uses:

North:	Neighbouring property;
South:	MacArthur Avenue;
East:	Cedar Road; and
West:	Neighbouring property.





3. Proposed Development

The subject site is proposed to be developed into a Warehouse (Outdoor Storage). The proposed layout is included in Figure 3.1 below. The proposed development consists of a site office and an amenity building. The construction for this development will consist of site earthworks, provisions for vehicle crossover and water and sewer connections.

The proposed development is shown below in Figure 3.1 Site Plan, prepared by Zone Planning QLD Pty Ltd, which is included in Appendix A.

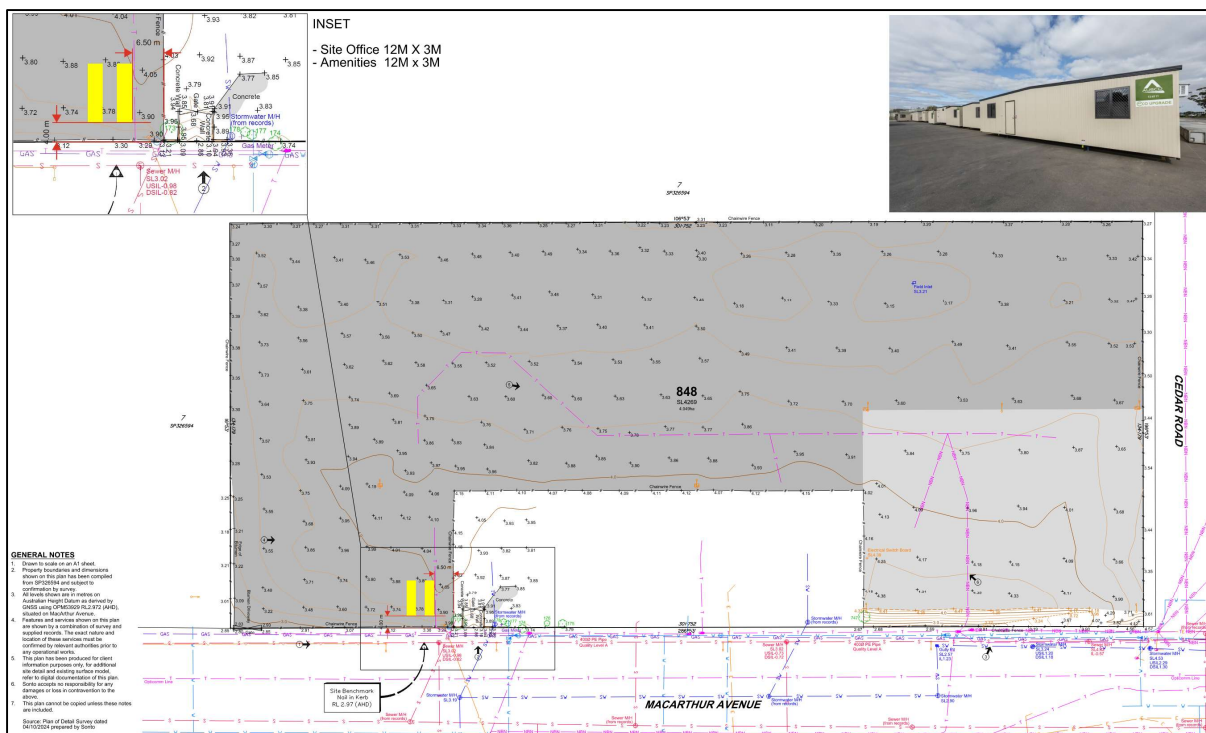


Figure 3.1 Site Plan

Based on the SEQ Water Supply and Sewerage Design & Construction Code, the Equivalent Tenements (ET) and Equivalent Population (EP) for the proposed development is shown in Table 3.1.

Table 3.1 Development Summary

Use	Unit	GFA	ET's/Unit	Total EP
Commercial / Industry Investigation	sq.m	72	0.006 EP/sq.m	0.432
Total				0.432





4. Site Earthworks

It is anticipated that earthworks associated with the proposed development will involve minimal cut and fill in construction of the proposed vehicle crossover, trenching of services.

The Concept Site Plan (Drawing No. BE240525-SK200-A) prepared by Burchills Engineering Solutions illustrates the proposed extent of earthworks required for the development and is included within Appendix C.

4.1 Sediment and Erosion Control

The best management practices will be implemented according to the IECA Best Practice Erosion and Sediment Control (2008) guidelines.

The following is a procedure of water quality controls to be implemented for the construction stage of the development.

4.1.1 Phase 1 – Stripping, Benching and Retaining

- Identify and mark all trees to be retained and erect exclusions zones, if required.
- Prior to any demolition, stripping or bulk earthworks on site, sediment fences, inlet traps, gully protection and entry/exit pad shall be put in place.
- A wash-down area and entry/exit pad will be provided at the construction site entrance to minimise the amount of sediment being tracked off the site.
- The wash down area will be drained to a suitable sediment capture device installed downstream of the construction entry.
- Sediment fences are to be installed along the downstream property boundaries prior to stripping and earthworks commencing.
- Construct an appropriately sized sediment basin for the development.
- If refuelling of machinery is to occur on site, appropriate absorbent products for cleaning oil spills will be provided.
- Provide bins on site for the disposal of waste and building debris.
- All fresh water upstream of disturbed areas and stockpiles is to be diverted around the disturbed area to minimise the amount of sediment mobilization.
- If it is anticipated that stockpiled material will not be used for a period of two weeks or more, a polythene cover (or equivalent) shall be used to prevent sediment transport by rain during wet periods. Conversely during dry spells, a cover shall be used to prevent fine sediments becoming airborne.
- The contractor shall provide on-going maintenance of sediment and erosion control devices around the site.
- The contractor is to stage all works so that disturbed areas remain exposed for a short a period as practicable.

Measures to minimise airborne pollutants during construction in the form of dust during dry and/or windy weather shall include the following:

- Exposed soils shall be kept damp to prevent particulates becoming airborne; and
- Stockpiles exposed for more than two weeks shall be maintained by the contractor in accordance with their approved management plan to prevent wind erosion.

4.1.2 Phase 2 – Infrastructure, Building & Roadworks

- The site stormwater pipes and pits shall be installed with drop inlets provided to all pits.
- Provide sediment fences, sandbags or fine mesh cover to all gully pits.





- Monitoring of new stormwater pipes and infrastructure (including the storm water quality improvement devices) to ensure they are free of sediment and debris.
- Maintain shake down and wash down area at entry/exit.
- All disturbed areas are to be surfaced or landscaped/grassed (maintained to minimum 70% ground cover) as soon as practicable after completion of localized works.

4.1.3 Phase 3 – Finishing Works & Defects Liability Period

All erosion and sediment control measures, including sediment fences and inlet traps shall be maintained until completion of surface finishes including landscaping and turfing:

- Maintain sediment fences.
- Tend to landscaped areas to maintain ground cover.





5. Roadworks, Access and Traffic

Access into the development is proposed via a vehicle crossover from MacArthur Avenue, this proposed crossing is designed in accordance with IPWEA RSD-102.

All roadworks will be in accordance with relevant Australian Standards (AS2890). Refer to Appendix C of this report which includes the Concept Site Plan (Drawing No. BE240525-SK200-A)





6. Stormwater Management

While it is acknowledged that the development application triggers the requirement for stormwater quality management stipulated in the State Planning Policy July 2017, it is not considered necessary due to the temporary nature of the development. The future use of this site following the use as a temporary storage yard is not known at this stage and any infrastructure constructed for the temporary development would be superfluous and likely cause unnecessary disruption and environmental risk to construct. Once the final use is determined and designed, permanent water quality infrastructure can then be incorporated into the site. Additionally, the proposal will not change the impervious area of the site and therefore will not alter the current runoff pollutant concentrations.

The proposed land use is categorised as a 'warehouse' the development is required to demonstrate compliance with Section B PO2 of the Coastal Hazard Overlay Code. Whereby, the minimum level of any building floors and are above this level, and no change to the ground level is proposed, the development is compliant.

For more information, please refer to the Stormwater Technical Memorandum (BE240525-TM-SW-01) and the Coastal Hazard Overlay Code Response (BE240525-TM-CH-01) prepared by Burchills Engineering Solutions.





7. Water Supply

There is a 150mm diameter water main on the northern verge of MacArthur Avenue. It is anticipated that the development will gain its potable water supply via connection to this main.

The Concept Combined Services Schematic included in Appendix C of this report (Drawing No. BE240525-SK600-A), depicts the development's potable water reticulation.

We note that this internal schematic is intended for preliminary purposes only and is subject to a more detailed assessment, including a detailed sizing of mains during the detailed design phase.

7.1 Water Demand Calculation

To determine suitable pipe sizing for the proposed development, water demands are calculated according to the intended new development. The water criteria and design parameters are based on the following references:

- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code); and
- Water Services Association of Australia – WSA 03-2013 Water Supply Code of Australia, Part 1: Planning and Design.

The service mains internal of each building will be designed and constructed in accordance with AS/NZS 3500.1:2003 Plumbing and Drainage – Water services (Standards Australia, 2003).

The water flow parameters shown in Table 7.1, 7.2 and 7.3 required to meet Council's Standards of Service and have been based on Single Supply (Drinking Water Only) Network parameters shown in SEQ Design Criteria Table 7.1.

Table 7.1 Potable Water Supply Demand and Peaking Factor

Property Type	Average Day Demand L/EP/day	Non-Revenue L/EP/day	Peaking Factors		
			MDMM	PD	PH
Commercial	230	30	1.5	2	2.8

Notes:

MDMM Mean Day Maximum Month Demand

PD Peak Day Demand

AD Average Day Demand

PH Peak Hour Demand





Table 7.2 Potable Water Pressure Parameters

Item	Pressure Parameter
Minimum Service Pressure	22 metres (at the property boundary)
Maximum Service Pressure	Target 55 metres (at the property boundary)

Table 7.3 Fire Fighting Parameters

Item	Pressure Parameter
Minimum Residual Mains Pressure (Emergency Fire operating conditions)	12 metres in the main at the flowing hydrant 6 metres elsewhere in the mains
Fire Flow Commercial	15 L/s for a duration of 2 hrs by up to 2 hydrants
Background Demand	2/3 x Peak Hour demand (not less than Average Day demand)

The calculated water supply demand for the proposed development is shown in Table 7.4.

Table 7.4 Water Supply Demand Calculations

Use	EP	AD Flow	Non-Revenue	AD (kL/day)	PH (L/s)
Commercial	0.432	230	30	112.32	0.0034

Calculations of maximum peak demand and demand multiplier for the residential aspect of the development are based on an allowance of 230 L/EP/day and a peak hour factor of 4 while applying the non-revenue flows of 30 L/EP/day, as follows:

$$\begin{aligned}\text{Maximum Peak Demand} &= \text{PHF} \times \text{Demand Rate} \times \text{EP's} + \text{NR} \\ &= 2.8 \times 230 \times 0.432 + (30 \times 0.432) \\ &= 291.168 \text{ L/day} \\ &= 0.0034 \text{ L/s}\end{aligned}$$

$$\begin{aligned}\text{Demand Multiplier} &= \text{Maximum Demand} / \text{EP's} \\ &= 0.008 \text{ L/sec/EP}\end{aligned}$$





8. Sewer Reticulation

There is an existing 150mm diameter gravity main which traverses the southern verge of MacArthur Avenue, with an existing road crossing connecting to a manhole (Asset ID MH577719) on the northern verge. It is anticipated that wastewater generated by the development will be conveyed to this sewer infrastructure.

The Concept Combined Services Schematic included in Appendix C of this report (Drawing No. BE240525-SK600-A), depicts the development's the external connection point.

8.1 Sewer Demand Calculation

The sewer criteria and design parameters are based on the following references:

- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code);and
- Water Services Association of Australia – WSA 02-2014 Sewerage Code of Australia, Part 1: Planning and Design.

The sewer flow generation, pipe design parameters, minimum sewer pipe grades and maximum capacity are shown below in Table 8.1, 8.2 and 8.3. The following parameters are based on a Urban Utilities NuSewer.

Table 8.1 Sewer Flow Generation Parameters

Flow	Parameter
Average Dry Weather Flow (ADWF)	180 L/EP/d
Peak Dry Weather Flow (PDWF)	$PDWF = d \times SF + GWI$ Where: $PDWF = 0.112 \times 150 \text{ L/EP/d} + 60 \text{ L/EP/d}$
Peak Wet Weather Flow (PWWF)	$PWWF = PDWF + RDF (360/EP/d)$

Table 8.2 Pipe Design Parameters

Flow	Parameter
Mannings 'n'	0.013
Minimum velocity @ PDWF	0.7 m/s
Depth of Flow @ PWWF – Existing system	Up to 1.0 m below MH cover level and no spillage through overflow structures
Depth of Flow @ PWWF – Proposed sewers	Max flow depth shall not exceed $\frac{3}{4}$ pipe full (75% d/D).





Table 8.3 Minimum Pipe Capacity – New Sewers Flowing $\frac{3}{4}$ Full

Pipe Size (mm)	Min Pipe Grade (1 in x)	Capacity (L/s)
150	180	10.4
225	300	23.6
300	400	44.1
525	750	143.0
1200	2400	796.1

The total development yield has been taken into account, not just the increase in equivalent persons on the subject site. The calculated sewer demand generation for the proposed development is shown in Table 8.4.

Table 8.4 Sewer Demand Calculation

Use	EP	ADWF Rate	ADWF (L/d)	PDWF (L/d)	PWWF (L/d)	PWWF (L/s)
Commercial	0.432	180	77.76	33.178	188.697	0.002

The calculations indicate that the total post development demand at PWWF will be approximately 0.002 L/s.





9. Electrical and Telecommunications

A Dial Before You Dig search has been completed and is included in Appendix D of this report. It is envisaged that adequate power supply can be provided to the site from the existing infrastructure. However, a specialist electrical consultant will need to be engaged to provide advice in relation to internal electrical reticulation requirements, to prepare detailed designs and to liaise with the relevant authorities.

