APPENDIX F Civil Engineering Report

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ADG Engineers



Anderson Street Mixed-Use Development

15 Anderson Street,Fortitude Valley, QLD4006

Civil Engineering Report

Site Based Stormwater Management & Engineering Services Report

Property Projects Australia

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APPENDICES

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EXECUTIVE SUMMARY

ADG Engineers (Aust.) Pty Ltd was engaged by Property Projects Australia to prepare a Civil Engineering Report suitable for submission to Economic Development Queensland for a site located at 15 Anderson Street, Fortitude Valley, QLD 4006. The proposed development is for mixed use development across a 24-storey building with ground floor communal retail spaces and 4 levels of carparking.

The purpose of this Civil Engineering Report is to provide advice on the proposed development as detailed in the Telha Clarke architectural drawings. The works described herein are subject to further approvals and cover works required to service the proposed development including earthworks, roadworks, stormwater drainage, sewerage and water supply, electricity, communications, and gas.

The stormwater quantity objective was to demonstrate that there is no increase in peak discharges from the subject site. This considered storm events up to and including the Q100 storm event. The purpose is to ensure that the existing infrastructure and/or downstream properties are not adversely affected. As the post-developed site had a higher proportion of pervious area, there will be no increase in flow volume or rate due to development. As such, no on-site detention is proposed.

In addition to the stormwater quantity results, the report includes a summary of the modelled water quality results. Council Approved Proprietary Water Quality Treatment Products have been included in the design to achieve the water quality objectives for Southeast Queensland specified in the State Planning Policy 2017, namely, the removal of gross pollutants, suspended solids, nitrogen, and phosphorus to target reduction levels. ADG recommends the use of the following devices to meet the water quality objectives identified within the SPP:

- > 3 x 690mm PSorb Stormfilter Cartridges
- Minimum 3 x OceanGuards with 200micron mesh bags

The site appears to be adequately serviced by reticulated water, sewerage, stormwater infrastructure, gas, telecommunications, and electricity. These services will need to be connected during development. Information discussed in this report is inferred from DBYD records and information gathered via site investigation.

All relevant standards and guidelines are addressed in this report including criteria from:

- > BCC Planning Scheme Policy
- > BCC Land Development Guidelines
- State Planning Policy (SPP) 2017
- > Queensland Urban Drainage Manual (QUDM) 2017
- > Plumbing and Drainage Code AS3500.3
- > Australian Rainfall and Runoff Guideline (ARR)



1 INTRODUCTION

1.1 Background

ADG Engineers (Aust.) Pty Ltd was engaged by Property Projects Australia to carry out a Civil Engineering Report suitable for submission to Economic Development Queensland for a site located at 15 Anderson Street, Fortitude Valley, QLD 4006. The proposed development is for mixed use development across a 24-storey building with ground floor communal retail spaces and 4 levels of carparking.

The purpose of this Civil Engineering Report is to provide advice on the proposed development with regard to earthworks, roadworks, stormwater drainage, sewerage and water supply, electricity, communications, gas, stormwater quality and quantity measures, and flooding. The required infrastructure will be subject to the conditions attached to the Development Approval to be provided by Brisbane City Council.

1.2 Property Detail

The details of the property for the proposed development can be seen in **Table 1** below.

| Title | Lot 10 on SP 208752 |
|----------------|--|
| Street Address | 15 Anderson Street, Fortitude Valley, QLD 4006 |
| Site Area | 2896m ² |

Table 1 - Property Detail

The location of the proposed development is demonstrated in Figure 1.



Figure 1 - Site Location (as accessed from Google Maps 08.07.22)



2 EXISTING SITE

2.1 Existing Site Features

The subject site is currently commercial land, being adjoined buildings surrounded by hardstand. The site is bound by:

- Residential and Commercial lots to the Northwest
- > Anderson Street to the Southwest
- Costin Street to the Northeast
- > Water Street to the Southeast

The site slopes from Northwest to Southeast at a grade of approximately 3.02%

The existing site features can be seen in **Figure 2**.



Figure 2 - Site Layout (as accessed from Google Maps 08.07.22)

The existing contours, surface levels and the location of the existing buildings are identified on the survey plan drawing as attached in **Appendix A** of this report.



3 ACID SULFATE SOILS

The subject site may be affected by acid sulfate soil contamination. **Figure 3** indicates that the site is between 5m AHD and 20m AHD and has the potential for acid sulfate contamination. Due to the fact that the site will be excavated to facilitate the construction of an underground basement, it is expected that the site will encounter acid sulfate soils. This contamination will be addressed in accordance with the Potential and Actual Acid Sulfate Soil Planning Scheme Policy by submitting an Acid Sulfate Soils Investigation Report and a full Acid Sulfate Soil Management Plan.

Refer to **Appendix F** for the Potential and Actual Acid Sulfate Soils Overlay Code.



Figure 3 - Acid Sulfate Soils (as accessed from EBiMaps on 08.07.22)



4 EARTHWORKS

4.1 Bulk Earthworks

The subject site will require excavation to facilitate the proposed one (1) basement level. Details of the earthworks quantities will be provided during the detailed design phase of the development. The development may require minor reshaping of the verge.

Refer to **Appendix F** for the BCC Filling and Excavation Code.



5 ROADWORKS

5.1 Existing Infrastructure

The subject site is adjacent to the following roads:

- Anderson Street neighbourhood road with kerb and channel drainage on each side and a twoway crossfall.
- Costin Street neighbourhood road with kerb and channel drainage on each side and a two-way crossfall.
- Water Street neighbourhood road with kerb and channel drainage on each side and a two-way crossfall.

The site is currently accessed via three (3) vehicle crossovers, one (1) fronting Anderson Street and the remaining two (2) fronting Costin Street.

5.2 Proposed Infrastructure

ADG anticipate that new vehicle crossovers and associated access ramps to Costin Street and Anderson Street will be constructed as part of the proposed development. All existing vehicle crossovers are to be made redundant, demolished and removed offsite as part of the construction works, with kerbs to be reinstated to Council standards.

The development may require works for verge regrading, in order to achieve council standards.

Refer to the architectural drawings supplied in support of this report for further information. A copy of infrastructure design code has been completed and is provided in **Appendix F**.



6 FLOODING

A FloodWise Property Report for 15 Anderson Street, Fortitude Valley, QLD 4006 was generated on 12.04.22 from the BCC website. The report states no Defined Flood Levels (DFL) for building and development purposes for this property. The report does however flag overland flow occurring within site boundaries. The BCC FloodWise report is attached within **Appendix G** for further information.

6.1 Overland Flow

BCC Flood Hazard Overlay Maps indicate the subject site is located within an area subject to flooding from overland flow. As can be seen in **Figure 4**, the subject site is located within the Overland Flow Flood Planning Area. The FloodWise Property Reports for the subject site do not identify flood levels resulting from overland flow.

Refer to Appendix G for the FloodWise Reports.



Figure 4 – BCC Overland Flow Flood Hazard Overlay (accessed on 07.08.22 from EbiMaps)

6.2 Flood Assessment Report

A Flood Assessment Report has been completed by Stormflood Engineering. Please refer to this Report, provided as part of the Development Application submission, for further information regarding the Overland Flow impact on the subject site.



7 STORMWATER INFRASTRUCTURE

7.1 Existing Infrastructure

A BCC eBIMAP2 search identified the following stormwater infrastructure within the vicinity of the subject site:

- > A 1275mm main traversing along Water Street;
- > A 300mm main along Anderson Street;
- 5 inlet pits on Anderson Street and at the intersection of Anderson Street and Water Street;
- 2 manholes at the intersection of Anderson and Water Street, with a 450mm connecting pipe;
- > A manhole at the intersection of Water Street and Costin Street; and
- > 7 inlet pits at the intersection of Water Street and Costin Street;

Refer to the eBIMAP2 information in **Appendix L** for further information regarding the existing stormwater infrastructure.

7.2 Lawful Point of Discharge (LPD)

7.2.1 Existing LPD

Based on information gathered via survey and contour data, aerial imagery and site investigation it has been determined that the subject site discharges flows to existing Council infrastructure via the road reserve.

Site flows are directed to Council infrastructure via kerb and channel to nearby gully pits, connected to an existing maintenance hole located within the Anderson Street and Water Street intersection.

7.2.2 Proposed LPD

It is proposed to maintain the Anderson Street and Water Street intersection gully pit as the lawful point of discharge. It is anticipated that the gully connect will require upgrading to facilitate the expected flows.



8 STORMWATER QUANTITY ASSESSMENT

The aim of the stormwater quantity assessment is to ensure that the development shall impose no adverse effects on downstream properties or receiving water bodies and that the conveyance of flows will be in a safe manner with minimal risk of human endangerment as well as the following objectives:

- > Address the need for stormwater quantity control measures.
- > Ensure there is no increase in peak discharges from the subject site for events up to and including the 1% AEP (or 1 in 100-year ARI) event.
- Ensure proposed quantity control measures detain and convey flows in accordance with QUDM (2017) minimum freeboard recommendations.

This section of the report should be read in conjunction with **Appendix I** which shows the values used to calculate the peak flow rate and preliminary detention volumes.

8.1 Proposed Development and Associated Issues

It is essential that there are no increases in volume and flow rate of stormwater runoff, and that any increases are mitigated such that post-developed peak flows do not exceed those for the pre-developed case. In this development, the development leads to an overall decrease in impervious area, which implies there will be no increase in either discharge volume or flow rate.

8.1 Flow Rate Methodology

8.1.1 Design Storm Events

Based on recommendations within QUDM 2017, AS/NZ 3500.3 and Council standards the major and minor storm events were selected as follows:

- Minor Event: 10% AEP (10-year ARI)
 - Captured within pit and pipe drainage infrastructure through to LPD.
- Major Event: 1% AEP (100-year ARI)
 - All flows up to and including a 1% AEP event will surcharge from the junction structure immediately prior to the LPD (Existing gully on the corner of Costin Street and Water Street).
 - Surface drainage overflows will not present a hazard to people or cause significant damage to property.

Pipe sizing will be performed during detailed design and increased as required to ensure a safe depth vs velocity is maintained at all times during the major event.

8.1.2 Rational Method for Peak Flow Rate

Peak flow rates for the site has been obtained using the Rational Method in accordance with ARR 1987 and QUDM. Summaries of the hydrology calculations can be seen in **Sections 8.2** and **8.3** for the pre and post-development scenarios respectively.

$$Q = (2.78 \times 10^{-3}) Cy Iy A$$

Equation 1

Q = Peak flow rate (m^3/s) for average recurrence interval



Cy = Co-efficient of runoff for ARI of y years (dimensionless)

A = Catchment area (ha)

 I_y = Average rainfall intensity (mm/hr) for a design duration of t hours and an ARI of y years

8.1.3 Catchment Area (A)

Catchment areas were measured using AutoCAD, contour surface data and known cadastral boundaries. Catchment boundaries and areas for both the pre-developed and post-developed scenarios can be seen in **Appendix B** and **Appendix C** respectively.

8.1.4 Coefficient of Runoff (C₁₀)

Coefficient of runoff C_{10} values were determined using catchment-specific fraction impervious values, ${}^{1}I_{10}$ rainfall intensity, and QUDM Table 4.5.3 and Table 4.5.4. Corresponding C_{y} values for the remaining coefficients of runoff were derived using the frequency factors presented within QUDM Table 4.5.2.

8.1.5 Time of Concentration (t_c)

The time of concentration (t_c) for each catchment was calculated using a combination of methods, in accordance with QUDM Section 4.6.

Note: BOM 1987 IFDs have been adopted for the Rational Method. This is in accordance with BCC's City Plan 2014, which specifies:

- IFD based on coefficients issued by the Bureau of Meteorology (Ref FN2615) for Latitude 27.475S Longitude 153.025E.
- Calculated in accordance with Australian Rainfall and Runoff (1987 Edition).

Please refer to **Appendix I** for more details.

8.2 Pre-Development Hydrology

The hydrology of the pre-developed catchment has been assessed in accordance with Section 4.0 of QUDM 2017 using the Rational Method. From QUDM Section 4.0, the theoretical calculated peak discharge for storm events ranging from the 1 in 1 year to 1 in 100-year ARIs has been calculated and a summary of the results is presented in **Appendix I**.

The subject site has a total area of $2896m^2$ and currently comprises of multiple adjoined buildings. Each respective building discharges roof flows to the kerb and channel drainage via internal hydraulics. The rest of the site area comprises of hardstand areas which discharge sheet flows to field inlets located within the site, discharging to the street through internal hydraulics. The Coefficient of discharge (C₁₀) value for each catchment was derived from QUDM 2017 Table 4.5.3 and Table 4.5.4. F_y frequency factors were applied to determine runoff coefficients for various average recurrence interval (ARI) storm events in accordance with QUDM 2017 Table 4.5.2.

QUDM 2017 Section 4.6 was applied to determine a total time of concentration of 5 minutes for catchment C1. Rational Method calculations were performed, the results of which can be seen outlined in **Table 2**.

Please refer to **Appendix I** for a summary of the Rational Method calculations and all parameters used.



| Catchment I.D | Area (m²) | % Impervious | C ₁₀ | C ₁₀₀ | Time of Concentration (t _c) | Q ₁₀ (m³/s) | Q ₁₀₀ (m³/s) |
|------------------|--------------|-----------------|-----------------|------------------|---|---------------------------|----------------------------|
| C1 | 2,896 | 100% | 0.90 | 1.00 | 5 | 0.156 | 0.261 |
| Total | 2,896 | 100% | 0.90 | 1.00 | 5 | 0.156 | 0.261 |

Table 2 - Pre-development Catchment Details

8.3 Post-Development Hydrology

The total land area considered for the post-development was $2,896m^2$ due to council land reclamation. A catchment plan for the post-developed site was determined based on preliminary architectural drawings, in which the site remained as a single catchment. The post-development catchment plan is attached within **Appendix C** for further information.

Based on preliminary architectural drawings, the area and fraction impervious of the various catchments were determined. Subsequently, 1 in 10-year coefficients of runoff (C_{10}) values were adopted in accordance with QUDM 2017 Table 4.5.3. F_y frequency factors were applied to determine runoff coefficients for various average recurrence interval (ARI) storm events in accordance with QUDM 2017 Table 4.5.2.

Similar to **Section 8.2**, QUDM 2017 Section 4.6 was applied to determine a total times of concentration 5 minutes for catchment C1. Rational Method calculations were performed, the results of which can be seen in **Table 3**.

Please refer to **Appendix I** for a summary of the Rational Method calculations and all parameters used.

| Catchment I.D | Area (m²) | % Impervious | C ₁₀ | C ₁₀₀ | Time of Concentratio n (t _c) | Q ₁₀ (m³/s) | Q ₁₀₀ (m³/s) |
|------------------|--------------|-----------------|-----------------|------------------|--|---------------------------|----------------------------|
| C1 | 2,896 | 96.1% | 0.855 | 1.00 | 5 | 0.148 | 0.261 |
| Total | 2,896 | 96.1% | 0.855 | 1.00 | 5 | 0.148 | 0.261 |

 Table 3 - Post-development Catchment Details

8.3.1 Recommendation

In reference to **Table 4** below, it is ADG's recommendation that no detention tank is required for the proposed development.

As noted within this table, the developments Minor (Q10) and Major (Q100) discharge flow rates are less than the existing rates. This is attributed to the overall decrease in impervious area from 100% to approximately 96.10%. Therefore, no mitigation of peak discharge flow rates is required.



| Table | 4 - | Decrease | in | Peak | Discharge | |
|-------|-----|----------|----|------|-----------|--|
| | | | | | | |

| Rainfall Event | Pre-Development Peak Discharge (m³/s) | Post-Development Peak Discharge (m³/s) | Decrease in Peak Discharge |
|------------------|---|--|-------------------------------|
| Q ₁ | 0.068 | 0.064 | -5% |
| Q ₂ | Q ₂ 0.093 | | -5% |
| Q_5 | 0.131 | 0.125 | -5% |
| Q ₁₀ | 0.156 | 0.148 | -5% |
| Q ₂₀ | 0.189 | 0.179 | -5% |
| Q ₅₀ | 0.234 | 0.230 | -2% |
| Q ₁₀₀ | 0.261 | 0.261 | 0% |



9 STORMWATER QUALITY ASSESSMENT

9.1 Treatment Objectives

This assessment identifies issues relating to stormwater quality runoff and assesses possible methods of treatment if required. The aim of this section of the report is to determine practical approaches to achieving improvements in the quality of the stormwater run-off from the site that can be readily implemented.

The SPP 2017 proposes criteria which apply to 'high-risk' development for stormwater. The criteria include one or more of the following:

- A Material Change of Use (MCU) for an urban purpose which involves greater than 2,500m² of land that:
 - will result in an impervious area greater than 25% of the net developable area; or
 - will result in six (6) or more dwellings
- A Reconfiguration of a Lot (ROL) for urban purposes that involves a land area greater than 2,500m² and will result in six (6) or more lots; or
- > Operational works for urban purposes that involve disturbing more than 2,500m² of land.

The proposal includes an operational works for urban purposes that involve disturbing more than 2,500m² of land. Hence, the development is classed as 'high risk' for water quality and SPP 2017 applies.

The SPP 2017 suggests the development aims to:

- > Avoid or otherwise minimises adverse impacts on the environmental values of receiving waters, arising from:
- > altered stormwater quality or flows, and
- > wastewater (other than contaminated stormwater and sewage), and
- > the creation or expansion of non-tidal artificial waterways, and
- Demonstrate compliance with the SPP code Water quality (Appendix 3).

Appendix 3 (Table B) of SPP 2017 suggests 'Post Construction Phase – Stormwater Management Design Objectives' as:

| Total Suspended | Total Phosphorus | Total Nitrogen | Gross Pollutants |
|-----------------|------------------|----------------|------------------|
| Solids (TSS) | (TP) | (TN) | >5mm |
| 80% Removal | 60% Removal | 45% Removal | 90% Removal |

Table 5 - Southeast Queensland (SEQ) Targets

The objective is to provide the following:

- Nitrogen and Phosphorous removal
- > Gross Pollutant and Suspended Solids Removal
- > All of the site's impervious areas discharge to suitable treatment device/s
- Treatment device selection criteria are to be in accordance with Industry Best Practice and, WSUD Engineering Guidelines



> Provide engineering diagrams of the stormwater quality treatment of the proposed development

9.2 Erosion and Sediment Control

9.2.1 Erosion Hazard Assessment

The erosion risk has been assessed against the BCC Erosion hazard guidelines and found to be Medium risk. Refer to the Erosion Hazard Form attached in **Appendix H.**

9.2.2 **Pre-Development Phase**

Prior to construction commencing, the following erosion and sediment control measures will need to be installed around the subject site to minimise disturbance and ensure the quality of runoff discharging from the site is of an acceptable standard:

- Sediment barriers to be installed on all entrances to downstream stormwater infrastructure (i.e. gully pits);
- > Designation of transport routes through the site to minimise vegetation disturbance;
- Maximise retention of existing vegetation to reduce soil disturbance and provide filter strip treatment for runoff;
- > Install construction entry and exit shakedown areas;
- > Sediment fences are to be installed on the downstream boundaries of the subject site; and
- > Install dust control measures as required.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

9.2.3 Bulk Earthworks Phase

During the bulk earthworks phase, the following erosion and sediment control measure will need to be installed in addition to the aforementioned measures (Pre-Development Phase) to ensure there is minimal disturbance to downstream receiving water bodies:

- Construction chutes to control runoff over earthworks batters;
- Construction of temporary bunds at the top of all earthworks batters to ensure runoff is directed away from exposed batters;
- Sediment basins to be constructed at low points within each stage of the proposed development;
- Construction of temporary diversion drains to divert water to sediment basins and around any stockpiles;
- > Sediment fences to be installed on the downstream side of any stockpiles; and
- > Stabilisation of all batters upon reaching the finished earthworks levels.



All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

9.2.4 Construction Phase

During the construction phase of the development, there is a risk of sedimentation transport due to large areas of disturbed land. The following erosion and sediment control measure will need to be installed in addition to the aforementioned measures (Pre-Development and Bulk Earthworks Phases) to ensure there is minimal disturbance and the quality of runoff is maintained to an acceptable standard:

- Construction of temporary diversion drains to divert water to sediment basins;
- Construction of temporary diversion drains to divert water to protect bioretention and treatment devices as required;
- Sediment barriers to be installed on all entrances to newly constructed stormwater infrastructure (i.e. gully pits);
- Sediment fences to be installed on the downstream side of any stockpiles and batters; and
- Re-vegetation of all disturbed areas within two (2) weeks of completion.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

9.2.5 Maintenance

All erosion and sediment control devices are to be maintained through the entire phase of the development leading up to the operational phase. Erosion and sediment control devices will need to be monitored closely throughout the entire project to ensure they are operating correctly and efficiently. No erosion and sediment control devices are to be removed unless otherwise authorized by a suitably qualified engineer or the site superintendent.

9.3 Operational Phase Treatment

During the operational phase, it is proposed to have the roof area drain through the proposed treatment train before discharging to Costin Street gulley pit. In addition, several catchments along the ground floor of the building will be captured and conveyed through the proposed treatment train before discharging to the Costin Street gulley pit.

Internal stormwater drainage shall be designed and constructed in accordance with AS3500.3 and all other relevant standards and guidelines.

9.4 Stormwater Quality Improvement Devices (SQIDs)

The proposed stormwater quality treatment measures for the development will consist of:

- > 3 x 690mm PSorb Stormfilter Cartridges
- Minimum 3 x OceanGuards with 200micron mesh bags



9.4.1 StormFilter

The *Stormfilter* consists of rechargeable, media filled cartridges that can be placed within standard manholes and/or tank vaults, to filter pollutants such as Hydrocarbons from stormwater. If the treatable flows generated from the development are greater than 80L/s a by-pass inlet pit shall be placed in front of (and upstream) of the *Stormfilter*.

9.4.2 OceanGuard

The OceanGuard consists of a steel frame and a cage. Within the cage a screening bag is attached to capture litter, debris, sediment, and other pollutants from stormwater flows. The mesh size of the screening bag proposed for each OceanGuard within the site is 200 micro-meters. The mesh size is small enough to capture heavy metals and hydrocarbons associated with solids in the stormwater flows. OceanGuards are effective when utilised as a pre-treatment device upstream of a StormFilter and this system shall be adopted within the site.

For further information on the conceptual layout of the proposed internal drainage network, refer to **Appendix D**.

9.5 MUSIC Model

The sites stormwater run-off was modelled using MUSIC (version 6.3.0) and the water quality objectives for Southeast Queensland specified in the SPP 2017 of 80% TSS reduction, 60% TP reduction, 45% TN reduction, and 90% Gross Pollutants reduction.





The above results meet the percent reduction water quality objectives identified by Brisbane City Council standards and the SPP 2017.

Details of the MUSIC model are attached within **Appendix J** for further information.



9.6 On-site Treatment Lifecycle Costs

A lifecycle cost analysis is not a part of the scope of this report. All the recommended water quality treatment infrastructure lies within the development site, and it shall be maintained and serviced by the owners of the development at <u>no cost to Council.</u>

9.7 Water Quality Monitoring

No water quality monitoring is proposed for this development at this stage due to the nature of the development and the expected pollutant levels. This would not be considered a high-risk source.

9.8 Maintenance

Maintenance of the SQIDs will be the responsibility of the owners of the development. The maintenance should be carried out in accordance with the manufacturer's recommendations and as a minimum shall include the following:

9.8.1 OceanProtect 'Stormfilter'

Maintenance to be carried out by manufacturer's maintenance staff including but not limited to de-silting of cartridges.

9.8.2 OceanProtect 'OceanGuard'

Maintenance to be carried out by manufacturer's maintenance staff including but not limited to inspection of basket and removal and lawful disposal of trapped litter/sediment



10 SEWERAGE & WATER DEMAND

As the subject site is located within the Urban Utilities (UU) service area, sewerage and water demands for the proposed development and their impacts on the current reticulation infrastructure will be calculated by QUU as part of the sewerage and water approval. Thus, no water or sewerage demand calculations have been provided as part of this report.



11 WATER SUPPLY

11.1 Existing Infrastructure

A BCC eBIMAP2 search identified the following water infrastructure relevant to the subject site:

- > A 80mm CICL main in Anderson Street;
- > A 180mm PE main in Water Street adjacent to the development;
- > A 180mm PE main on Costin Street;
- > A hydrant located along Costin Street on the opposite side to the subject site; and
- > Two (2) service connection adjacent to the sites Eastern corner which stems off the 180mm PE mains in Water and Costin Street.

Refer to the eBIMAP2 information in **Appendix L** for further information regarding the existing water infrastructure.

11.2 Point Of Connection

Due to the demand for the proposed development, the site will require a property connection installed in order to meet the expected water supply demands.

ADG Engineers anticipate that the proposed development will be connected to the existing 180mm PE main along Costin Street. Details of the proposed connections will be provided at the detailed design stage.

To understand with greater certainty the requirements from Queensland Urban Utilities (QUU) for this development, a Service Advice Notice Request has been prepared and lodged with UU.

For more information on the proposed connection, refer to the Preliminary Civil Services Layout Plan in Appendix E.





12 SEWERAGE RETICULATION

12.1 Existing Infrastructure

A BCC eBIMAP2 search identified the following sewerage infrastructure relevant to the subject site:

- > A 150mm EW main located beneath Anderson Street;
- > A 150mm EW main located beneath Costin Street
- > A 225mm EW main located beneath Water Street
- > A 500mm Glass reinforced main beneath Water Street on the opposite side to the development;
- > Two (2) manholes at the intersection of Water Street and Anderson Street; and
- Property from the subject site into the abovementioned mains, excluding the 500mm Glass reinforced main.

Refer to the eBIMAP2 information in **Appendix L** for further information regarding the existing sewerage infrastructure.

12.2 Point Of Connection

ADG Engineers anticipate that the proposed development will be connected to the existing maintenance structure at the intersection of Water and Costin Street. Details of the proposed connections will be provided at the detailed design stage.

To understand with greater certainty the requirements from Urban Utilities (UU) for this development, a Service Advice Notice Request has been prepared and lodged with UU.

For more information on the proposed connection, refer to the Preliminary Civil Services Layout Plan in Appendix E.



13 ELECTRICAL SUPPLY

Site inspection reveals that the site is currently serviced by overhead electrical cables. In addition, the DBYD information has identified that the following underground infrastructure is present within the vicinity of the subject site:

The DBYD information has identified that the following infrastructure is present within the vicinity of the subject site:

- Underground electrical cables (less than 33kV) along Anderson Street on opposite side to the subject site, with property connections;
- Underground electrical cables (less than 33kV) along Costin Street adjacent to and on opposite side to the subject site; and
- > Underground electrical cables (less than 33kV) entering Water Street

An electrical consultant will determine the extent of the upgrading and connection works that will be required to facilitate the required electrical reticulation for the proposed development at detailed design stage.

Refer to the DYBD Information in **Appendix M** for further details on the existing electrical infrastructure.



14 COMMUNICATIONS

The DBYD information has identified that the following infrastructure is present within the vicinity of the subject site:

- Underground Optus cabling on opposite side of Water Street, and adjacent to and on opposite side of subject site along Costin Street;
- Underground Telstra conduit with property connections along the perimeter of the site, with size 2,4,5,6 and 8 pits and property connections; and
- > Underground NBN caballing in Telstra conduit.

It is proposed that the telecommunications consultant will negotiate with the relevant carriers regarding the requirements of the proposed development telecommunications connection and the extent of any upgrading and possible relocation works to the system if necessary.

Refer to the DYBD Information in **Appendix M** for further details on the existing communications infrastructure.



15 GAS

The DBYD information has identified the following APA Gas infrastructure within the vicinity of the subject site:

- > Underground 32mm NY11 medium-pressure gas pipeline beneath Anderson Street adjacent to the development;
- Underground 32mm NY11 medium-pressure gas pipeline beneath Water and Costin Street on the opposite side of the development; and
- > Underground 63 PE 0.6c medium-pressure gas pipeline beneath Costin Street opposite to the development.

It is proposed that the gas consultant will negotiate with the relevant carriers regarding the requirements of the proposed development gas connection and the extent of any up grading and possible relocation works to the system if necessary.

Refer to the DYBD Information in **Appendix M** for further details on the existing gas infrastructure.



16 PRIORITY INFRASTRUCTURE UPGRADES



Figure 6 - Priority Infrastructure

The Brisbane City Council Priority Infrastructure Plan Maps indicates that there is the following priority infrastructure within the vicinity of the site:

> A stormwater flood relief pipe located beneath Water Street.

17 CONCLUSION

The site appears to be well serviced by reticulated water, stormwater infrastructure, sewerage, communications, gas, and electricity. These services will need to be connected during development. Information discussed in this report is inferred from DBYD records and information gathered via site investigation.

As outlined in **Section 8** of this report, the proposed development results in a decrease to the total impervious areas. Thus, the post-developed flows are less than the pre-developed flows and consequently no stormwater detention measures have been proposed.

In preparing this report, we have achieved all requirements for Stormwater Management Plans as described in QUDM 2017 standards, as well as a pollutant load reduction as required by the SPP 2017 and Brisbane City Council standards. ADG recommends the use of the following treatment devices to meet the treatment targets specified by the relevant authorities:

- > 3 x 690mm PSorb Stormfilter Cartridges
- Minimum 3 x OceanGuards with 200micron mesh bags

The subject site was identified to be at risk of flooding due to being situated in an overland flow path. Refer to flood report prepared by Stormflood Engineering for further details.

Detailed engineering diagrams and management requirements for the proposed development are to be submitted to Economic Development Queensland for approval prior to any works commencing on site with design certification prepared by a qualified stormwater engineer or scientist.

Appendix A Site Survey Plan

Appendix B Preliminary Pre-Developed Catchment Plan

LEGEND

SITE BOUNDARY CATCHMENT BOUNDARY CATCHMENT LABEL CATCHMENT FLOW DIRECTION

| CATCHMEN | T TABLE (PRE | DEVELOPMENT) |
|----------------|--------------|---------------------|
| CATCHMENT NAME | AREA (ha) | FRACTION IMPERVIOUS |
| C1 | 0.2896Ha | 1.00 |

| 02 | 23.08.22 | PRELIMINARY - ISSUED FOR INFORMATION | JB | CDM |
|---|----------|--------------------------------------|----|-----|
| 01 | 11.07.22 | PRELIMINARY - ISSUED FOR INFORMATION | JB | CDM |
| Rev | Date | Description | Ву | Chk |
| PLOT DATE: 8/22/2022 9:30 AM FILENAME: J:\BNE\25000\25825\CVL\DWG\25825_DA01_PRELIMINARY PRE-DEVELOPED CATCHMENT PLAN.DWG | | | | |

| | Discipline | Discipline | | | 1 |
|-----------------------------|---|---|--|---|-------|
| PROPERTY PROJECTS AUSTRALIA | CIVIL | CIVIL | | PRELIMINARY PRE-DEVELOPED | |
| Project Name | Designed By | Checked By | Approved By | CATCHMENT PLAN | |
| 15 ANDERSON STREET | ER | CDM | GVG | | |
| CO-LIVING | Project No. | Drawn By | Scale at A1 | | |
| | 25825 | JB | 1:200 | | |
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Appendix C Preliminary Post-Developed Catchment Plan

LEGEND

SITE BOUNDARY CATCHMENT BOUNDARY CATCHMENT LABEL CATCHMENT FLOW DIRECTION EXISTING ROAD PROPOSED LANDSCAPING PROPOSED INTERNAL DRIVEWAY PROPOSED DRIVEWAY CROSSOVER

| CATCHMENT TABLE (POST DEVELOPMENT) | | | | | |
|------------------------------------|-----------|---------------------|--|--|--|
| CATCHMENT NAME | AREA (ha) | FRACTION IMPERVIOUS | | | |
| C1 | 0.2552Ha | 0.961 | | | |
| R1 | 0.0344Ha | 0.801 | | | |

| 02 | 23.08.22 | PRELIMINARY - ISSUED FOR INFORMATION | JB | CDM |
|---|----------|--------------------------------------|----|-----|
| 01 | 11.07.22 | PRELIMINARY - ISSUED FOR INFORMATION | JB | CDM |
| Rev | Date | Description | Ву | Chk |
| LOT DATE: 8/22/2022 9:34 AM FILENAME: J:\BNE\25000\25825\CVL\DWG\25825_DA02_PRELIMINARY POST-DEVELOPED CATCHMENT PLAN.DWG | | | | |

| Client PROPERTY PROJECTS AUSTRALIA | Discipline CIVIL | Discipline CIVIL | | PRELIMINARY POST-DEVELOPED | |
|---|--|-------------------------------------|--|---------------------------------------|------------|
| Project Name 15 ANDERSON STREET CO-LIVING | Designed By ER Project No. 25825 | Checked By CDM Drawn By JB | Approved By GVG Scale at A1 1:200 | CATCHMENT PLAN | |
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Appendix D Preliminary Stormwater Drainage Layout

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| - — — dS — — — dS — |
| - — — dW — — — dW - |
| — — — dE — — — dE — |
| OE |
| - — — dG — — — dG — |
| |
| - — — dT — — — dT - |
| SWD |
| |
| |
| |
| |

| SITE BOUNDARY | |
|--|--|
| BUILDING OVERHEAD LINE | |
| EXISTING NOMINAL KERB LINE | |
| EXISTING EDGE OF BUILDING | |
| EXISTING STORMWATER DRAINAGE (RECORDS) | |
| EXISTING SEWER (RECORDS) | |
| EXISTING WATER (RECORDS) | |
| EXISTING UNDERGROUND ELECTRICITY (RECORDS) | |
| EXISTING OVERHEAD ELECTRICITY | |
| EXISTING GAS (RECORDS) | |
| EXISTING NBN (RECORDS) | |
| EXISTING TELECOMMUNICATIONS (RECORDS) | |
| PROPOSED STORMWATER DRAINAGE | |
| EXISTING ROAD | |
| PROPOSED LANDSCAPING | |
| PROPOSED INTERNAL DRIVEWAY | |

PROPOSED DRIVEWAY CROSSOVER

ALL DETAILS SHOWN ARE SUBJECT TO FURTHER DETAILED DESIGN

NOTES

1. FFL'S SHOWN ARE INDICATIVE. REFER TO ARCHITECTURAL LAYOUTS FOR FURTHER DETAILS.



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0 2 4 6 8 10m SCALE 1:200 AT ORIGINAL SIZE (A1)

RP10558

Brisbane Office 596 Milton Road (Cnr Miskin Street), Toowong, Queensland 4066, Australia PO Box 1492, Toowong BC, Queensland 4066 T 1300 657 402 F +617 3871 2266 E info@adgce.com W www.adgce.com BRISBANE / DARWIN / GOLD COAST / MELBOURNE / PERTH / SUNSHINE COAST / SYDNEY / TOOWOOMBA Client Discipline PROPERTY PROJECTS AUSTRALIA CIVIL Project Name Designed 15 ANDERSON STREET ER CO-LIVING Project N 2582 The con Enginee written p Do not

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| | CDM | GVG | | | | | | | | | | |
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Appendix E Preliminary Civil Services Layout Plan

LEGEND

| —————————————————————————————————————— |
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| - — — dS — — — dS — |
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| OE |
| — — — dG — — — dG — |
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| - — — dT — — — dT - |
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SITE BOUNDARY BUILDING OVERHEAD LINE EXISTING NOMINAL KERB LINE EXISTING EDGE OF BUILDING EXISTING STORMWATER DRAINAGE (RECORDS) EXISTING SEWER (RECORDS) EXISTING WATER (RECORDS) EXISTING UNDERGROUND ELECTRICITY (RECORDS) EXISTING OVERHEAD ELECTRICITY EXISTING GAS (RECORDS) EXISTING NBN (RECORDS) EXISTING TELECOMMUNICATIONS (RECORDS) PROPOSED SEWER PROPOSED WATER MAIN EXISTING ROAD PROPOSED LANDSCAPING PROPOSED INTERNAL DRIVEWAY

PROPOSED DRIVEWAY CROSSOVER

ALL DETAILS SHOWN ARE SUBJECT TO FURTHER DETAILED DESIGN

NOTES

1. FFL'S SHOWN ARE INDICATIVE. REFER TO ARCHITECTURAL LAYOUTS FOR FURTHER DETAILS.



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|-----|----------|--------------------------------------|----|-----|
| 01 | 11.07.22 | PRELIMINARY - ISSUED FOR INFORMATION | JB | CDM |
| Rev | Date | Description | Ву | Chk |
| | | | | |

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| PROPERTY PROJECTS AUSTRALIA | Discipline CIVIL | | Status INFORMATION | PRELIMINARY CIVIL | |
|------------------------------------|--|---|--|---------------------------------|-----------|
| Project Name 15 ANDERSON STREET | Designed By ER | Checked By CDM | Approved By GVG | SERVICES LAYOUT PLAN | |
| CO-LIVING | Project No. 25825 | Drawn By JB | Scale at A1 1:200 | | |
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Appendix F BCC Code Response

9.4.4 Infrastructure design code

9.4.4.1 Application

1. This code applies to assessing a material change of use, reconfiguring a lot or building work if:

- a. assessable development where this code is identified as a prescribed secondary code in the assessment benchmarks column of a table of assessment for a material change of use (section 5.5), reconfiguring a lot (section 5.6), operational work (section 5.8), or an overlay (section 5.10); or
- b. impact assessable development, to the extent relevant.
- 2. When using this code, reference should be made to section 1.5 and section 5.3.3.

Note—The following purpose, overall outcomes, performance outcomes and acceptable outcomes comprise the assessment benchmarks of this code.

Note—Where this code includes performance outcomes or acceptable outcomes that relate to:

- ecological assessment, koala habitat or development design, guidance is provided in the Biodiversity areas planning scheme policy;
- infrastructure design and construction works, guidance is provided in the Infrastructure design planning scheme policy;
- noise and dust impacts during construction and/or demolition, guidance is provided in the Management plans planning scheme policy;
- noise impact assessment, guidance is provided in the Noise impact assessment planning scheme policy;
- refuse and recycling, guidance is provided in the Refuse planning scheme policy;
- parking or servicing management during construction, guidance is provided in the Transport, access, parking and servicing planning scheme policy.

9.4.4.2

Purpose

- 1. The purpose of the Infrastructure design code is to assess the suitability of infrastructure for development.
- 2. The purpose of the code will be achieved through the following overall outcomes:
 - a. Development is provided with a safe, connected and efficient transport network for all modes that has a minimal whole-of-life cost.
 - b. Development provides for public utilities and services to the standards acceptable to the Council and the reasonable expectations of service providers.
 - c. Development involving infrastructure which is intended to become a Council asset is safe, aesthetically pleasing, functional, fit for purpose, durable, minimises environmental impacts and has minimal whole-of-life cost.
 - d. Development provides for a public space to be safe and inviting, allowing high levels of pedestrian activity.
 - e. Development ensures that the community and environment are not unreasonably disrupted or impacted by construction or demolition for the development.
 - f. Development involving infrastructure is designed with consideration of, and to integrate with, other related and interfacing infrastructure components.
 - g. Development accessed by common private title is provided with appropriate fire hydrant infrastructure and has unimpeded access for refuse vehicles and for emergency service vehicles to protect people, property and the environment.
 - h. Development ensures major electricity infrastructure and bulk water supply infrastructure identified on the State Planning Policy Interactive Mapping System is not compromised.
 - i. Development for major electricity infrastructure and bulk water supply infrastructure identified on the State Planning Policy Interactive Mapping System avoids or otherwise minimises adverse impacts on surrounding land uses.

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9.4.4.3 Performance outcomes and acceptable outcomes

Table 9.4.4.3.A—Performance outcomes and acceptable outcomes

| Performance outcomes | Acceptable outcomes | Comments |
|--|---|--|
| PO1 Development provides roads, pavement, edging and landscaping which: a. are designed and constructed in accordance with the road hierarchy; b. provide for safe travel for pedestrians, cyclists and vehicles; c. provide access to properties for all modes; d. provide utilities; e. provide high levels of aesthetics and amenity, improved liveability and future growth; f. provide for the amelioration of noise and other pollution; g. provide a high-quality streetscape; h. provide a low-maintenance asset with a minimal whole-of-life cost. Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy. | AO1 Development provides roads and associated pavement, edging and landscaping which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG ESR for further details. |
| PO2 Development provides road pavement surfaces which: a. are well designed and constructed; b. durable enough to carry the wheel loads of the intended types and numbers of travelling and parked vehicles; c. ensures the safe passage of vehicles, pedestrians and cyclists, the discharge of stormwater run-off and the preservation of all-weather access; | AO2 Development provides road pavement surfaces which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG ESR for further details. |

| d. allows for reasonable travel comfort. | | |
|--|--|--|
| PO3 Development provides a pavement edge which is designed and constructed to: a. control vehicle movements by delineating the carriageway for all users; b. provide for people with disabilities by allowing safe passage of wheelchairs and other mobility aids. | AO3 Development provides pavement edges which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG ESR for further details. |
| PO4 Development provides verges which are designed and constructed to: a. provide safe access for pedestrians clear of obstructions and access areas for vehicles onto properties; b. provide a sufficient area for public utility services; c. be maintainable by the Council. | AO4 Development provides verges which are designed and constructed in compliance with the road corridor design and streetscape locality advice standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG ESR for further details. |
| PO5 Development provides a lane or laneway identified on the Streetscape hierarchy overlay map or in a neighbourhood plan which: a. allows equitable access for all modes; b. is safe and secure; c. has 24-hour access; d. is a low-speed shared zone environment; e. has a high-quality streetscape. | AO5 Development provides a lane or laneway identified on the Streetscape hierarchy overlay map or in a neighbourhood plan which is embellished in compliance with the streetscape locality advice standards in the Infrastructure design planning scheme policy. | N.A |
| PO6 Development of an existing premises provides at the frontage to the site, if not already provided, the following infrastructure to an appropriate urban standard: a. an effective, high-quality paved roadway; b. an effective, high-quality roadway kerb and channel; | AO6 Development of an existing premises provides at the frontage of the site, if not already existing, the following infrastructure to the standard that would have applied if the development involved new premises as stated in the road corridor design standards in the Infrastructure design planning scheme policy: | Satisfies, refer to ADG ESR for further details. |

| c. safe, high-quality vehicle crossings over channels and verges; d. safe, accessible, high-quality verges compatible and integrated with the surrounding environment; e. safe vehicle access to the site that enables ingress and egress in a forward gear; f. provision of and required alterations to public utilities; g. effective drainage; h. appropriate conduits to facilitate the provision of required street-lighting systems and traffic signals. | a. concrete kerb and channel; b. forming and grading to verges; c. crossings over channels and verges; d. a constructed bikeway; e. a constructed verge or reconstruction of any damaged verge; f. construction of the carriageway; g. payment of costs for required alterations to public utility mains, services or installations; h. construction of and required alterations to public utility mains, services or installations; i. drainage works; i. installation of electrical conduits. | |
|---|--|--|
| PO7 Development provides both cycle and walking routes which: a. are located, designed and constructed to their network classification (where applicable); b. provide safe and attractive travel routes for pedestrians and cyclists for commuter and recreational purposes; c. provide safe and comfortable access to properties for pedestrians and cyclists; d. incorporate water sensitive urban design into stormwater drainage; e. provide for utilities; f. provide for a high level of aesthetics and amenity, improved liveability and future growth; g. are a low-maintenance asset with a minimal whole-of-life cost; h. minimise the clearing of significant native vegetation. Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy. | AO7 Development provides cycle and walking routes which are located, designed and constructed in compliance with the road corridor design and off-road pathway design standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG ESR for further details. |

| PO8 Development provides refuse and recycling collection, separation and storage facilities that are located and managed so that adverse impacts on building occupants, neighbouring properties and the public realm are minimised. | AO8.1 Development provides refuse and recycling collection and storage facilities in accordance with the Refuse planning scheme policy. AO8.2 Development ensures that refuse and recycling collection and storage location and design do not have any adverse impact including odour, noise or visual impacts on the amenity of land uses within or adjoining the development. Note—Refer to the Refuse planning scheme policy for further guidance. | Satisfies, refer to ADG ESR for further details. |
|---|--|--|
| PO9 Development ensures that: a. land used for an urban purpose is serviced adequately with regard to water supply and waste disposal; b. the water supply meets the stated standard of service for the intended use and fire-fighting purposes. | AO9.1 Development ensures that the reticulated water and sewerage distribution system for all services is in place before the first use is commenced. AO9.2 Development provides the lot with reticulated water supply and sewerage to a standard acceptable to the distributor-retailer. | Satisfies, refer to ADG ESR for further details. |
| PO10 Development provides public utilities and street lighting which are the best current or alternative technology and facilitate accessibility, easy maintenance, minimal whole- of-life costs, and minimal adverse environmental impacts. | AO10.1 Development provides public utilities and street lighting which are located and aligned to: a. avoid significant native vegetation and areas identified within the Biodiversity areas overlay map; b. minimise earthworks; c. avoid crossing waterways, waterway corridors and wetlands or if a crossing is unavoidable, tunnel- boring techniques are used to minimise disturbance, and a disturbed area is reinstated and restored on completion of the work. Note—Guidance on the restoration of habitat is included in the Biodiversity areas planning scheme policy. | To be confirmed in detailed design phase. |

| | Development provides compatible public utility services and street-lighting services which are co-located in common trenching for underground services. | |
|---|--|--|
| | AO10.3 Development provides public utilities and street lighting which are designed and constructed in compliance with the public utilities standards in the Infrastructure design planning scheme policy. | |
| PO11 Development ensures that land used for urban purposes is serviced adequately with telecommunications and energy supply. | AO11 Development provides land with the following services to the standards of the approved supplier: a. electricity; b. telecommunications services; c. gas service where practicable. | Satisfies, refer to ADG ESR for further details. |
| PO12 Development ensures that major public projects promote the provision of affordable, high-bandwidth telecommunications services throughout the city. | AO12 Development provides conduits which are provided in all major Council and government works projects to enable the future provision of fibre optic cabling, if: a. the additional expense is unlikely to be prohibitive; or b. further major work is unlikely or disruption would be a major concern, such as where there is a limited capacity road; or c. there is a clear gap in the telecommunications network; or d. there is a clear gap in the bandwidth available to the area. Editor's note—An accurate, digital 'as built' three-dimensional location plan is to be supplied for all infrastructure provided in a road. | To be confirmed in detailed design phase. |
| PO13 Development provides public art identified in a neighbourhood plan or park concept plan which: | AO13 Development provides public art identified in a neighbourhood plan or park concept plan which is sited | N.A |

| a. is provided commensurate with the status and scale of the proposed development; b. is sited and designed: as an integrated part of the project design; as conceptually relevant to the context of the location; to reflect and respond to the cultural values of the community; to promote local character in a planned and informed manner. | and designed in compliance with the public art standards in the Infrastructure design planning scheme policy. | |
|--|---|---|
| PO14 Development provides signage of buildings and spaces which promote legibility to help users find their way. | AO14 Development provides public signage: a. at public transport interchanges and stops, key destinations, public spaces, pedestrian linkages and at entries to centre developments; b. which details the location of the key destinations, public spaces and pedestrian linkages in the vicinity, the services available within the development and where they are located. Editor's note—Signage is to be in accordance with Local Law Number 1 (Control of Advertisements Local Law). | To be confirmed in detailed design phase. |
| PO15 Development that provides community facilities which form part of the development is functional, safe, low maintenance, and fit for purpose. | AO15 Development that provides community facilities which form part of the development is designed in compliance with the community facilities standards in the Infrastructure design planning scheme policy. | To be confirmed in detailed design phase. |
| PO16 Development provides public toilets which: a. are required as part of a community facility or park; b. are located, designed and constructed to be: i. safe; ii. durable; iii. resistant to vandalism; | AO16 Development that provides public toilets is designed and constructed in compliance with the public toilets standards in the Infrastructure design planning scheme policy. | N.A |

| iv. able to service expected demand; v. fit for purpose. | | |
|---|--|-----|
| PO17 Development provides bridges, tunnels, elevated structures and water access structures that are designed and constructed using proven methods, materials and technology to provide for: a. safe movement of intended users; b. an attractive appearance appropriate to the general surroundings and any adjacent structures; c. functionality and easy maintenance; d. minimal whole-of-life cost; e. longevity; f. current and future services. Note—All bridges and elevated and associated elements must be designed and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy. | A017 Development that provides bridges, tunnels, elevated structures and water access structures is designed and constructed in compliance with the standards in the Infrastructure design planning scheme policy. | N.A |
| PO18 Development provides culverts which are designed and constructed using proven methods, materials and technology to provide for: a. safety; b. an attractive appearance appropriate to the general surroundings; c. functionality and easy maintenance; d. minimal whole-of-life cost; e. longevity; f. future widening; g. current and future services; h. minimal adverse impacts, such as increase in water levels or flow velocities, and significant change of flood patterns. | AO18 Development that provides culverts is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy. | N.A |

| Note—All culverts and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards. | | |
|--|---|---|
| PO19 Development provides batters, retaining walls, and seawalls and river walls which are designed and constructed using proven methods, materials and technology to provide for: a. safety; b. an attractive appearance appropriate to the surrounding area; c. easy maintenance; d. minimal whole-of-life cost; e. longevity; f. minimal water seepage. Note—All retaining walls and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards. | AO19 Development that provides batters, retaining walls, seawalls and river walls is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy. | N.A |
| If for development with a gross floor area greater than | 1,000m ² | |
| PO20 Development ensures that construction is managed so that use of public spaces and movement on pedestrian, cyclist and other traffic routes is not unreasonably disrupted and existing landscaping is adequately protected from short- and long-term impacts. Note—The preparation of a construction management plan can assist in demonstrating achievement of this performance outcome. Note—The Transport, access, parking and servicing planning scheme policy provides advice on the management of vehicle parking and deliveries during construction. | AO20 Development ensures that during construction: a. the ongoing use of adjoining and surrounding parks and public spaces, such as malls and outdoor dining, is not compromised; b. adjoining and surrounding landscaping is protected from damage; c. safe, legible, efficient and sufficient pedestrian, cyclist and vehicular accessibility and connectivity to the wider network are maintained. | To be confirmed in detailed design phase. |
| PO21 Development ensures that construction and demolition activities are guided by measures that prevent or minimise adverse impacts including sleep disturbance at | AO21.1 Development ensures that demolition and construction: a. only occur between 6:30am and 6:30pm Monday to Saturday, excluding public holidays; | To be confirmed in detailed design phase. |

| a constitue was due to paise and dust including dust | b do not accur ever periods greater than C months | |
|--|--|---|
| from construction vehicles entering and leaving the site. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome. | AO21.2 Development including construction and demolition does not release dust emissions beyond the boundary of the site. | |
| | AO21.3 Development construction and demolition does not involve asbestos-containing materials. | |
| PO22 Development ensures that: a. construction and demolition do not result in damage to surrounding property as a result of vibration; b. vibration levels achieve the vibration criteria in Table 9.4.4.3.B, Table 9.4.4.3.C, Table 9.4.4.3.D and Table 9.4.4.3.E. Note—A vibration impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome. | AO22 Development ensures that the nature and scale of construction and demolition do not generate noticeable levels of vibration. | To be confirmed in detailed design phase. |
| If for a material change of use or reconfiguring a lot in premises that is, or will be, accessed by common priva detached, that are not covered by other legislation ma | an urban area (as defined in the Regulation) involving ate title, where involving buildings, either attached or ndating fire hydrants | |
| PO23 Development ensures that fire hydrants are: a. installed and located to enable fire services to access water safely, effectively and efficiently; b. suitably identified so that fire services can locate them at all hours. | AO23.1 Above or below ground fire hydrants are provided on residential, commercial and industrial streets and private roads, at not more than 90m intervals, and at each street intersection. Note—On residential streets, above ground fire hydrants may be single outlet. On commercial and industrial streets above ground fire hydrants should have dual valved outlets. AO23.2 Fire hydrants are identified by: | To be confirmed in detailed design phase. |

| | a. raised reflectorised pavement markers (RRPM) on sealed roads; b. marker posts at the fence line where on an unsealed road, as road (HR) or path (HP) hydrants. | |
|--|--|--|
| PO24 Development ensures road widths and construction within the development, are adequate for refuse vehicles and for fire emergency vehicles to gain access to a safe working area close to buildings and near water supplies whether or not on-street parking spaces are occupied. | AO24 Internal private roads have a minimum roadway clearance between obstructions of 3.5m wide and 4.8m high in addition to any width required for on-street parking. | To be confirmed in detailed design phase. |
| Development for major electricity infrastructure and b Planning Policy Interactive Mapping System where no purpose zone | ulk water supply infrastructure identified on the State t in the Utility services zone precinct of the Special | |
| PO25 Development avoids or otherwise minimises adverse impacts on surrounding land uses through the use of buffers and setbacks and the appropriate design and location of plant and operational areas within the site. | AO25 No acceptable outcome is prescribed. | To be confirmed in detailed design phase. |
| Development potentially impacting on major electricity identified on the State Planning Policy Interactive Map Utility services zone precinct of the Special purpose z | y infrastructure and bulk water supply infrastructure ping System where the infrastructure is not in the one | |
| PO26 Development is sited and designed to: a. avoid safety risks to people or property; b. minimise noise and visual impacts to people and property; c. ensure the physical integrity and operation, maintenance and expansion of the infrastructure is not compromised. | AO26 No acceptable outcome is prescribed. | Satisfies, refer to ADG ESR for further details. |

Table 9.4.4.3.B—Recommended intermittent vibration levels for cosmetic damage

| Type of building | | Peak particle velocity (mm/s) | | |
|---|----------|-------------------------------|---|--|
| Reinforced or framed structures; industrial and heavy commercial buildings | | 50mm/s at 4Hz and above | | |
| Unreinforced or light-framed structures; residential or light commercial type buildings | Below 4H | Ζ | 4Hz to 15Hz | 15Hz and above |
| | 0.6mm/s | | 15mm/s at 4Hz increasing to 20mm/s at 15Hz | 20mm/s at 15Hz increasing to 50mm/s at 40Hz and above |

Table 9.4.4.3.C—Recommended blasting vibration levels for human comfort

| Type of building | Type of blasting operations | Peak component particle velocity (mm/s) |
|--|--|---|
| Residences, educational establishments and places of worship | Operation blasting longer than 12 months or more than 20 blasts | 5mm/s for 95% blasts per year 10mm/s maximum unless agreement is reached with the occupier that a higher limit may apply |
| Residences, educational establishments and places of worship | Operation blasting longer than 12 months or more than 20 blasts | 10mm/s maximum unless agreement is reached with the occupier that a higher limit may apply |
| Industry or commercial premises | All blasting | 25mm/s maximum unless agreement is reached with the occupier that a higher limit may apply. For sites containing |

| | equipment sensitive to vibration, the vibration should be kept below manufacturer's specifications or levels that do not adversely affect the equipment operation. |
|--|--|
|--|--|

Table 9.4.4.3.D—Recommended levels for continuous and impulsive vibration acceleration (m/s²) 1–80Hz for human comfort

| Location | Assessment period ⁽¹⁾ | Preferred values ⁽³⁾ |) | Maximum values ⁽³ |) |
|---|----------------------------------|---------------------------------|-------------------------|------------------------------|-------------------------|
| Continuous vibration | | z-axis | x and y axes | z-axis | x and y axes |
| Critical areas ⁽²⁾ | Day or night | 0.005 m/s ² | 0.0036 m/s ² | 0.01 m/s ² | 0.0072 m/s ² |
| Residences | Day | 0.01 m/s ² | 0.0071 m/s ² | 0.02 m/s ² | 0.014 m/s ² |
| - | Night | 0.007 m/s ² | 0.005 m/s ² | 0.014 m/s ² | 0.01 m/s ² |
| Offices, educational establishments and places of worship | Day or night | 0.02 m/s ² | 0.014 m/s ² | 0.04 m/s ² | 0.028 m/s ² |
| Workshops | Day or night | 0.04 m/s ² | 0.029 m/s ² | 0.08 m/s ² | 0.058 m/s ² |
| Impulsive vibration | | | • | · | · |
| Critical areas | Day or night | 0.005 m/s ² | 0.0036 m/s ² | 0.01 m/s ² | 0.0072 m/s ² |
| Residences | Day | 0.3 m/s ² | 0.21 m/s ² | 0.6 m/s ² | 0.42 m/s ² |
| - | Night | 0.1 m/s ² | 0.071 m/s ² | 0.2 m/s ² | 0.14 m/s ² |
| Offices, educational establishments and places of worship | Day or night | 0.64 m/s ² | 0.46 m/s ² | 1.28 m/s ² | 0.92 m/s ² |
| Workshops | Day or night | 0.64 m/s ² | 0.46 m/s ² | 1.28 m/s ² | 0.92 m/s ² |

Note—

⁽¹⁾ Day is 7am to 10pm and night is 10pm to 7am.

⁽²⁾ Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.

⁽³⁾ Situations exist where vibration above the preferred values can be acceptable, particularly for temporary or short-term events. Further guidance is given in the Noise impact assessment planning scheme policy.

Table 9.4.4.3.E—Recommended vibration dose values for intermittent vibration (m/s^{1.75}) for human comfort

| Location | Daytime ⁽¹⁾ | | Night time ⁽¹⁾ | |
|---|-------------------------|-------------------------|--------------------------------|------------------------------|
| | Preferred value | Maximum value | Preferred value ⁽³⁾ | Maximum value ⁽³⁾ |
| Critical areas ⁽²⁾ | 0.1 m/s ^{1.75} | 0.2 m/s ^{1.75} | 0.1 m/s ^{1.75} | 0.2 m/s ^{1.75} |
| Residences | 0.2 m/s ^{1.75} | 0.4 m/s ^{1.75} | 0.13 m/s ^{1.75} | 0.26 m/s ^{1.75} |
| Offices, educational establishments and places of worship | 0.4 m/s ^{1.75} | 0.8 m/s ^{1.75} | 0.4 m/s ^{1.75} | 0.8 m/s ^{1.75} |
| Workshops | 0.8 m/s ^{1.75} | 1.6 m/s ^{1.75} | 0.8 m/s ^{1.75} | 1.6 m/s ^{1.75} |

Note—

⁽¹⁾ Day is 7am to 10pm and night is 10pm to 7am.

⁽²⁾ Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.

⁽³⁾ Situations exist where vibration above the preferred values can be acceptable, particularly for temporary or short-term events. Further guidance is given in the Noise impact assessment planning scheme policy.

9.4.9 Stormwater code

9.4.9.1

Application

1. This code applies to assessing a material change of use, reconfiguring a lot or operational work if:

- a. assessable development where this code is identified as a prescribed secondary code in the assessment benchmarks column of a table of assessment for a material change of use (section 5.5), reconfiguring a lot (section 5.6) operational work (section 5.8) or an overlay (section 5.10); or
- b. impact assessable development, to the extent relevant.
- 2. When using this code, reference should be made to section 1.5 and section 5.3.3.

Note—The following purpose, overall outcomes, performance outcomes and acceptable outcomes comprise the assessment benchmarks of this code.

Note—Where this code includes performance outcomes or acceptable outcomes that relate to infrastructure design and construction works, guidance is provided in the Infrastructure design planning scheme policy.

9.4.9.2

Purpose

- 1. The purpose of the Stormwater code is to assess the suitability of the stormwater aspects of development.
- 2. The purpose of the code will be achieved through the following overall outcomes:
 - a. Development achieves acceptable levels of stormwater run-off quality and quantity by applying water sensitive urban design principles as part of an integrated stormwater management framework.
 - b. Development protects public health and safety and protects against damage or nuisance caused by stormwater flows.
 - c. Development has a stormwater management system which maintains, recreates or minimises impact to natural catchment hydrological processes.
 - d. Development ensures that the environmental values of the city's waterways are protected or enhanced.
 - e. Development minimises run-off, including peak flows.
 - f. Development maintains or enhances the efficiency and integrity of the stormwater infrastructure network.
 - g. Development minimises the whole of life cycle cost of stormwater infrastructure.

9.4.9.3 Performance outcomes and acceptable outcomes

Table 9.4.9.3.A—Performance outcomes and acceptable outcomes

| Performance outcomes | Acceptable outcomes | Comments |
|--|---------------------|----------|
| Section A—If for a material change of use, reconfiguring a lot, operational work or building work Note—Compliance with the performance outcomes and acceptable outcomes in this section should be demonstrated by the submission of a site- based stormwater management plan for high risk development only. | | |

| PO1 Development provides a stormwater management system which achieves the integrated management of stormwater to: a. minimise flooding; b. protect environmental values of receiving waters; c. maximise the use of water sensitive urban design; d. minimise safety risk to all persons; e. maximise the use of natural waterway corridors and natural channel design principles. Editor's note—The stormwater management system to be developed to address PO1 is not intended to require management of stormwater quality. | AO1 Development provides a stormwater management system designed in compliance with the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
|--|---|--|
| PO2 Development ensures that the stormwater management system and site work does not adversely impact flooding or drainage characteristics of premises which are up slope, down slope or adjacent to the site. | AO2.1 Development does not result in an increase in flood level or flood hazard on up slope, down slope or adjacent premises. AO2.2 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
| PO3 Development ensures that the stormwater management system does not direct stormwater run-off through existing or proposed lots and property where it is likely to adversely affect the safety of, or cause nuisance to properties. | AO3.1 Development ensures that the location of the stormwater drainage system is contained within a road reserve, drainage reserve, public pathway, park or waterway corridor. AO3.2 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy. AO3.3 | Satisfies, refer to ADG SMP for further details. |

| | Development obtains a lawful point of discharge in compliance with the standards in the Infrastructure design planning scheme policy. | |
|---|---|--|
| | AO3.4 Where on private land, all underground stormwater infrastructure is secured by a drainage easement. | |
| PO4 Development provides a stormwater management system which has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments. | AO4.1 Development provides a stormwater conveyance system which is designed to safely convey flows in compliance with the standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
| | AO4.2 Development provides sufficient area to convey run-off which will comply with the standards in the Infrastructure design planning scheme policy. | |
| PO5 Development designs stormwater channels, creek modification works, bridges, culverts and major drains to protect and enhance the value of the waterway corridor or drainage path for fauna movement. | AO5 Development ensures the design of stormwater channels, creek modifications or other infrastructure, permits terrestrial and aquatic fauna movement. | Satisfies, refer to ADG SMP for further details. |
| PO6 Development ensures that location and design of stormwater detention and water quality treatment: a. minimises risk to people and property; b. provides for safe access and maintenance; c. minimises ecological impacts to creeks and waterways. | AO6.1 Development locates stormwater detention and water quality treatment: | Satisfies, refer to ADG SMP for further details. |

| PO7 Development is designed, including any car parking areas and channel works to: a. reduce property damage; b. provide safe access to the site during the defined flood event. | AO7.1 Development (including any ancillary structures and car parking areas) is located above minimum flood immunity levels in Table 9.4.9.3.B, Table 9.4.9.3.C, Table 9.4.9.3.D, Table 9.4.9.3.E and Table 9.4.9.3.F. Note—Compliance with this acceptable outcome can be demonstrated by the submission of a hydraulic and hydrology report identifying flood levels and development design levels (as part of a site-based stormwater management plan). AO7.2 Development including the road network provides a stormwater management system that provides safe pedestrian and vehicle access in accordance with the standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
|---|---|--|
| PO8 Development designs stormwater channels, creek modification works and the drainage network to protect and enhance the environmental values of the waterway corridor or drainage path. | AO8.1 Development ensures natural waterway corridors and drainage paths are retained. AO8.2 Development provides the required hydraulic conveyance of the drainage channel and floodway, while maximising its potential to maximise environmental benefits and minimise scour. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines. | Satisfies, refer to ADG SMP for further details. |
| | AO8.3 Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in compliance with the standards in the Infrastructure design planning scheme policy. | |
| | AO8.4 Development ensures that the design of modifications to the existing design of new stormwater channels, creeks | |

| | and major drains is in compliance with the standards in the Infrastructure design planning scheme policy. | |
|--|---|--|
| PO9 Development is designed to manage run-off and peak flows by minimising large areas of impervious material and maximising opportunities for capture and re-use. | AO9 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
| PO10 Development ensures that there is sufficient site area to accommodate an effective stormwater management system. Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only. | AO10 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
| PO11 Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: a. existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; b. safe management of stormwater discharge from existing and future up-slope development; c. implication for adjacent and down-slope development. | AO11.1 Development with up-slope external catchment areas provides a drainage connection sized for ultimate catchment conditions that is directed to a lawful point of discharge. AO11.2 Development ensures that existing stormwater infrastructure that is undersized is upgraded in compliance with the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
| PO12 Development provides stormwater infrastructure which: a. remains fit for purpose for the life of the development and maintains full functionality in the design flood event; b. can be safely accessed and maintained cost effectively; c. ensures no structural damage to existing stormwater infrastructure. | AO12.1 The stormwater management system is designed in compliance with the Infrastructure design planning scheme policy. AO12.2 Development provides a clear area with a minimum of 2m radius from the centre of an existing manhole cover and with a minimum height clearance of 2.5m. | Satisfies, refer to ADG SMP for further details. |

| PO13 Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site from construction activities, including vegetation clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: a. the environmental values and water quality objectives of waters; b. waterway hydrology; c. the maintenance and serviceability of stormwater infrastructure. Note—The Infrastructure design planning scheme policy outlines the appropriate measures to be taken into account to achieve the performance outcome. | AO13 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
|--|--|--|
| PO14 Development ensures that: a. unnecessary disturbance to soil, waterways or drainage channels is avoided; b. all soil surfaces remain effectively stabilised against erosion in the short and long term. | AO14 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
| PO15 Development does not increase: a. the concentration of total suspended solids or other contaminants in stormwater flows during site construction; b. run-off which causes erosion either on site or off site. | AO15 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
| Section B—Additional performance outcomes and acc development, being one or more of the following: a. a material change of use for an urban purpose which i. will result in an impervious area greater than 25 ii. will result in 6 or more dwellings. | eptable outcomes which apply to high-risk involves greater than 2,500m ² of land that: 5% of the net developable area; or | |

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| b. reconfiguring a lot for an urban purpose that involves greater than 2,500m² of land and will result in 6 or more lots; c. operational work for an urban purpose which involves disturbing greater than 2,500m² of land. | | |
|---|---|--|
| PO16 Development ensures that the entry and transport of contaminants into stormwater is avoided or minimised to protect receiving water environmental values. Note—Prescribed water contaminants are defined in the <i>Environmental</i> <i>Protection Act 1994</i> . Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only. | AO16 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy. | Satisfies, refer to ADG SMP for further details. |
| PO17 Development ensures that: a. the discharge of wastewater to a waterway or external to the site is avoided; or b. if the discharge cannot practicably be avoided, the development minimises wastewater discharge through re-use, recycling, recovery and treatment. Note—The preparation of a wastewater management plan can assist in demonstrating achievement of this performance outcome. Editor's note—This code does not deal with sewerage which is the subject of the Wastewater code. | AO17 No acceptable outcome is prescribed. | Satisfies, refer to ADG SMP for further details. |
| Section C—Additional performance outcomes and acceptable outcomes for assessable development for a material change of use or reconfiguring a lot | | |
| PO18 Development protects stormwater infrastructure to ensure the following are not compromised: a. the long term infrastructure for the stormwater network in the Long term infrastructure plans; b. the existing and planned infrastructure for the stormwater network in the Local government infrastructure plan; | AO18 Development protects stormwater infrastructure in compliance with the following: a. for long term infrastructure for the stormwater network, the Long term infrastructure plans; b. for existing and planned infrastructure for the stormwater network, the Local government infrastructure plan; | Satisfies, refer to ADG SMP for further details. |

| c. the provision of long term, existing and planned infrastructure for the stormwater network which: is required to service the development or an existing and future urban development in the planning scheme area; or is in the interests of rational development or the efficient and orderly planning of the general area in which the site is situated. Editor's note—A condition which requires a proposed development to keep permanent improvements and structures associated with the approved development clear of the area of long term infrastructure, may be imposed. | c. the standards for stormwater drainage in the Infrastructure design planning scheme policy. | |
|---|--|-----|
| PO19 Development provides for the payment of extra trunk infrastructure costs for the following: a. for development completely or partly outside the priority infrastructure area in the Local government infrastructure plan; b. for development completely inside the priority infrastructure area in the Local government infrastructure plan involving: i. trunk infrastructure that is to be provided earlier than planned in the Local government infrastructure plan; ii. long term infrastructure for the stormwater network which is made necessary by development; iii. other infrastructure for the stormwater network associated with development that is not assumed future urban development. Editor's note—The payment of extra trunk infrastructure plan is to be worked out in accordance with the Charges Resolution. | AO19 No acceptable outcome is prescribed. | N.A |

| Editor's note—See section 130 Imposing Development conditions (Conditions for extra trunk infrastructure costs) of the <i>Planning Act</i> | |
|--|--|
| 2016. | |

Table 9.4.9.3.B—Categories of flood planning levels

| Flooding type ⁽¹⁾ | Minimum design floor or pavement levels (m AHD) ⁽²⁾ (refer to Table 9.4.9.3.C for assignment of these categories) | | | | |
|--|---|-------------------------------|--------------------|--------------------|--------------------|
| | Category A | Category B | Category C | Category D | Category E |
| Waterway ^(A) or open channel | 1% AEP flood level + 500mm | 1% AEP flood level + 300mm | 1% AEP flood level | 1% AEP flood level | 5% AEP flood level |
| Overland flow flooding ^(B) | 2% AEP flood level +500mm | 2% AEP flood level +300mm | 2% AEP flood level | 2% AEP flood level | 5% AEP flood level |

Notes-

⁽¹⁾ Where the site is subject to more than one type of flooding that is overland flow flooding, creek or waterway flooding or river flooding, the minimum flood immunity level is the highest level determined from these sources.

⁽²⁾ Where flood levels are not available from Council's Floodwise Property Report such as overland flow flooding, the applicant will need to engage a suitably qualified Registered Professional Engineer Queensland with expertise in undertaking flood studies to estimate the relevant flood level.

Note ^(A) A waterway, including any indicated on the planning scheme maps, is defined as any element of a river, creek, stream, gully or drainage channel, including the bed and banks, typically with a catchment area greater than 30ha.

Note ^(B) Overland flow flooding usually occurs when the capacity of the underground piped drainage system is exceeded and/or when the overland flow path is blocked. Localised overland flow paths generally traverse along roadways, and in the older established areas, through private properties within existing low points and gullies. A localised overland flow path is not characterised by well-defined bed and banks and the contributing catchment is generally less than 30ha.

Note—A flood event with an AEP of 1% is the equivalent of a 100 year ARI flood event.

Note—A flood event with an AEP of 2% is the equivalent of a 50 year ARI flood event.

Note—A flood event with an AEP of 5% is the equivalent of a 20 year ARI flood event.

Note—The flood immunity level in some older inner-city areas is often controlled by local ponding.

Table 9.4.9.3.C—Flood planning level categories for development types

| BCA building classification ⁽¹⁾ | Development types and design levels, assigned design floor or pavement levels | Category Refer to Table 8.2.11.3.L |
|--|---|---------------------------------------|
|--|---|---------------------------------------|

| Class 1–4 | Habitable room | Category A |
|------------------------------------|--|--|
| | Non-habitable room including patio and courtyard | Category B |
| | Non-habitable part of a Class 2 or Class 3 building excluding the essential services ⁽²⁾ control room | Category B |
| | Parking located in the building undercroft of a multiple dwelling | Category C |
| | Carport ⁽⁴⁾ , unroofed car park; vehicular manoeuvring area | Category D |
| | Essential electrical services ⁽²⁾ of a Class 2 or Class 3 building only | Category A ⁽⁶⁾ |
| | Basement parking entry ⁽³⁾ | Category C + 300mm |
| Class 5, Class 6, or Class 8 | Building floor level | Category C |
| | Garage or car park located in the building undercroft ⁽³⁾ | Category C |
| | Carport ⁽⁴⁾ or unroofed car park | Category D |
| | Vehicular access and manoeuvring areas | Category D |
| | Basement parking entry ⁽³⁾ | Category C |
| | Essential electrical services ⁽²⁾ | Class 8 – Category C ⁽⁶⁾ Class 5 & 6 – Category A ⁽⁶⁾ |
| Class 7a | Refer to the relevant building class specified in this table | |
| Class 7b | Building floor level | Category C |
| | Vehicular access and manoeuvring area | Category D |
| | Essential electrical services ⁽²⁾ | Category C |
| Class 9 | Building floor level | Category A |

| | Building floor level for habitable rooms in Class 9a or 9c where for a residential care facility | 0.2% AEP flood |
|-----------|--|--|
| | Garage or car park located in the building undercroft (3) | Category C |
| | Carport ⁽⁴⁾ or unroofed car park | Category D |
| | Vehicular access and manoeuvring areas | Category D |
| | Essential electrical services ⁽²⁾ | Category A |
| Class 10a | Car parking facility | Refer to the relevant building class specified in this table |
| | Shed ⁽⁵⁾ or the like | Category D |
| Class 10b | Swimming pool | Category E |
| | Associated mechanical and electrical pool equipment | Category C |
| | Other structures | Flood immunity standard does not apply |

Notes-

⁽¹⁾ Refer to the Building Code of Australia for definitions of building classifications.

⁽²⁾ Essential services include any room used for fire control panel, telephone PABX, sensitive substation equipment including transformers, low voltage switch gear, high-voltage switch gear, battery chargers, protection control and communication equipment, low voltage cables, high-voltage cables and lift controls.

⁽³⁾ Basement car parks must be suitably waterproofed and all air vents, air-conditioning ducts, pedestrian access and entry and exit ramps at the car park entrance have flood immunity in accordance with this table.

⁽⁴⁾ A shelter for a motor vehicle, which has a roof and one or more open sides, and which can be built against the side of a building.

⁽⁵⁾ A slight or rough structure built for shelter and storage; or a large strongly built structure, often open at the sides or end.

⁽⁶⁾ Where essential services are proposed in a basement below the specified flood planning level, the flood immunity of all air vents, air-conditioning ducts, pedestrian access, lift shafts and entry/exit ramps at the basement entrance and any other openings into that basement must conform to Category A for Residential development, and the relevant basement entry level of all other uses. This will require a waterproof basement design to prevent floodwaters entering the basement to ensure flood immunity.

Note—A flood event with an AEP of 2% is the equivalent of a 50 year ARI flood event.

Note—A flood event with an AEP of 0.2% is the equivalent of a 500 year ARI flood event.

Note—Where a building has a combination of uses that includes a component of class 2, 3 or 9, the essential services for that building shall comply with the requirements of the building class with the greatest flood immunity requirement.

Note—Use classes for residential development also include basement storage.

Table 9.4.9.3.D—Flood planning levels for a new road

| Flooding type ⁽¹⁾ | Minimum design levels at the crown of the road (m AHD) ⁽²⁾ | |
|---|---|--------------------------------------|
| | Residential development | Industrial or commercial development |
| Waterway ^(A) or open channel | 1% AEP flood level | 2% AEP flood level |
| Overland flow flooding ^(B) | 2% AEP flood level | 2% AEP flood level |

Notes-

⁽¹⁾ Where the site is subject to more than 1 type of flooding, the minimum flood planning level is the highest level determined from these sources. It should be noted that the flooding planning level in some older areas is often controlled by local ponding.

⁽²⁾ Where flood levels are not available from Council's Floodwise Property Report, such as overland flow flooding, the applicant will need to engage a suitably qualified Registered Professional Engineer Queensland with expertise in undertaking flood studies to estimate the relevant flood level.

Note ^(A) A waterway including any indicated on the planning scheme maps is defined as any element of a river, creek, stream, gully or drainage channel, including the bed and banks typically with a catchment area greater than 30ha.

Note ^(B) Overland flow flooding usually occurs when the capacity of the underground piped drainage system is exceeded and/or when the overland flow path is blocked. Localised overland flow paths generally traverse along roadways, and in the older established areas, through private properties within existing low points and gullies. A localised overland flow path is not characterised by well-defined bed and banks and the contributing catchment is generally less than 30ha.

Note—A flood event with an AEP of 1% is the equivalent of a 100 year ARI flood event.

Note—A flood event with an AEP of 2% is the equivalent of a 50 year ARI flood event.

Note—A flood event with an AEP of 5% is the equivalent of a 20 year ARI flood event.

Table 9.4.9.3.E—Flood planning levels for essential community infrastructure

| Type of essential community infrastructure | Minimum design levels |
|--|-----------------------|
| Emergency services | 0.2% AEP flood |
| Emergency services, where for an emergency shelter | 0.5% AEP flood |
| Emergency services, where for police facilities | 0.5% AEP flood |
| Hospital and health care service, where associated with a hospital | 0.2% AEP flood |

| Community facility where involving storage of valuable records or items of historic or cultural significance (e.g. galleries and libraries) | 0.5% AEP flood |
|--|---|
| State-controlled roads Major or minor electricity infrastructure not otherwise listed in this table Utility installation where for rail transport services Air service Telecommunications facility | No specific recommended level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency. |
| Power stations (as defined in the <i>Electricity Act 1994</i>) or renewable energy facility. | 0.2% AEP flood |
| Major electricity infrastructure where a major switch yard | 0.2% AEP flood |
| Substations | 0.5% AEP flood |
| Utility installation where for a sewage treatment plant | DFE |
| Utility installation where for a water treatment plant | 0.5% AEP flood |

Note—A flood event with an AEP of 0.2% is the equivalent of a 500 year ARI flood event.

Note—A flood event with an AEP of 0.5% is the equivalent of a 200 year ARI flood event.

Table 9.4.9.3.F—Flood planning levels for reconfiguring a lot

| Flooding type ⁽¹⁾ | Minimum lot levels (m AHD) ⁽²⁾ | |
|---|---|------------------------|
| | Residential | Other than residential |
| Waterway ^(A) or open channel | 1% AEP flood level + 300mm | 1% AEP flood level |
| Overland flow flooding ^(B) | 1% AEP flood level + 300mm | 2% AEP flood level |

Notes-

⁽¹⁾ Where the site is subject to more than one type of flooding, the minimum flood immunity level is the highest level determined from these sources.

⁽²⁾ Where flood levels are not available from Council's Floodwise Property Report such as overland flow flooding, the applicant will need to engage a suitably qualified Registered Professional Engineer Queensland with expertise in undertaking flood studies to estimate the relevant flood level.

Note ^(A) A waterway including any indicated on the planning scheme maps is defined as any element of a river, creek, stream, gully or drainage channel, including the bed and banks typically with a catchment area greater than 30ha.

Page 13 of 14 Print Date: 02/06/2021 cityplan.brisbane.qld.gov.au Note ^(B) Overland flow flooding usually occurs when the capacity of the underground piped drainage system is exceeded or when the overland flow path is blocked. Localised overland flow paths generally traverse along roadways, and in the older established areas, through private properties within existing low points and gullies. A localised overland flow path is not characterised by well-defined bed and banks and the contributing catchment is generally less than 30ha.

Note—A flood event with an AEP of 1% is the equivalent of a 100 year ARI flood event.

Note—A flood event with an AEP of 2% is the equivalent of a 50 year ARI flood event.



Appendix G BCC Floodwise Property Report



Brisbane City Council FloodWise Property Report

Report Reference 1649727842795 12/04/2022 11:44:02

Dedicated to a better Brisbane

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address:15 ANDERSON ST, FORTITUDE VALLEY QLD 4006Lot Details:L.10 SP.208752

This property has flags for building or development purposes only

Brisbane City Council has not assigned flood level information for this property for building or development purposes. However, mapping indicates that it is affected by one or more flood or property development flags. Please refer below for details.

For professional advice or detailed assessment of a property contact a Registered Professional Engineer of Queensland.

For general information on your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

FLOOD AND PLANNING DEVELOPMENT FLAGS

DEVELOPMENT FLAG(S) This property may also be affected by one or more flood or property development overlays or flags. These include: OVERLAND FLOW PATH,LARGE ALLOTMENT

Please review the technical summary over page and refer to Council's planning scheme for further information.



Brisbane City Council FloodWise Property Report



Dedicated to a better Brisbane

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address:15 ANDERSON ST, FORTITUDE VALLEY QLD 4006Lot Details:L.10 SP.208752

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

The Flood overlay code of Council's planning scheme uses the following information to provide guidelines when developing properties. The table below summarises the Flood Planning Areas (FPAs) that apply to this property. Development guidelines for the FPAs are explained in Council's planning scheme, which is available from www.brisbane.qld.gov.au/planning-building.

| FLOOD PLANNING AREAS (FPA) | | | |
|-----------------------------|----------------|---------------|--|
| RIVER | CREEK/WATERWAY | OVERLAND FLOW | |
| | | Applicable | |
| COASTAL HAZARD OVERLAY CODE | | | |

There are currently no Coastal Hazard Overlays that apply to this property.

PROPERTY DEVELOPMENT FLAGS

Overland Flow Path - Mapping indicates this property may be located within an overland flow path. Overland flow flooding usually occurs when the capacity of the underground piped drainage system is exceeded and/or when the overland flow path is blocked. It is recommended you consult a Registered Professional Engineer of Queensland to determine this property's habitable floor level and flooding depth. Please refer to Council's planning scheme for further information.

Large Allotment - This property is either a Large Allotment of over 1000 square metres or is located within a Large Allotment. Flood levels may vary significantly across allotments of this size. Further investigations may be warranted in determining the variation in flood levels and the minimum habitable floor level across the site. For more information or advice, it is recommended you engage a Registered Professional Engineer of Queensland.


Brisbane City Council FloodWise Property Report

Report Reference 1649727842795 12/04/2022 11:44:02

Dedicated to a better Brisbane

Useful Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) – The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

Defined Flood Level (DFL) - The DFL for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of $6,800 \text{ m}^3/\text{s}.$

Maximum and Minimum Ground Level – Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level – The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Council's Planning Scheme - The City Plan (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Residential Flood Level (RFL) – Residential flood level (RFL) for the Brisbane River flooding equates to the 1% Annual Exceedance Probability flood level.

Rateable Address - A Lot or Property may have more than one street address. The address shown on this report is the address used by Council for the Lot or property selected.

Property - A property will contain 1 or more lots. The *Multiple Lot Warning* is shown if you have selected a property that contains multiple lots.

Brisbane City Council's Online Flood Tools

Council provides a number of online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Planning and Development Online Flood Tools

Council's online flood tools for planning and development purposes include:

- FloodWise Property Report
- Flood Overlay Code

For more information on Council's planning scheme and online flood tools for planning and development:

- phone 07 3403 8888 to talk to a Development Assessment Customer Liaison Officer
- visit www.brisbane.gld.gov.au/planning-building
- visit a Regional Business Centre.

Helping residents and businesses be prepared for flooding

Council has a range of free tools and information to help residents and businesses understand potential flood risks and how to be prepared. This includes:

- Flood Awareness Map
- Flooding in Brisbane A Guide for Residents
- Flooding in Brisbane A Guide for Businesses
- Early Warning Alert Service. Visit www.brisbane.qld.gov.au/earlywarning to register for email, home phone or SMS severe weather alert updates.

Note: The Flood Awareness Map shows four levels of flood likelihood from high likelihood (flooding is very likely to occur) through to very low likelihood (very rare and extreme flood events).

For more information on Council's online flood tools for residents and business:

- Visit www.brisbane.qld.gov.au/beprepared
- Phone (07) 3403 8888.



Brisbane City Council FloodWise Property Report



Dedicated to a better Brisbane

Disclaimer

- 1. Defined Flood Levels and Residential Flood Levels, and the Minimum Habitable Floor Levels are determined from the best available information to Council at the date of issue. These flood levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating flood levels.
- 2. Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.



Planning to build or renovate?

For information, guidelines, tools and resources to help you track, plan or apply for your development visit **www.brisbane.qld.gov.au/planning-building**

You can also find the Brisbane City Plan 2014 and Neighbourhood Plans as well as other information and training videos to help with your building and development plans.



Appendix H BCC Erosion Hazard Assessment



BRISBANE CITY COUNCIL ABN 72 002 765 795

Erosion Hazard Assessment - June 2014

Brisbane City Council (BCC), *Erosion Hazard Assessment* form must be read in conjunction with the *Erosion Hazard Assessment- Supporting Technical Notes* (June 2014 or later version) for explanatory terms and Certification information.

What is an Erosion Hazard Assessment?

Soil erosion and sediment from urban development, particularly during construction activities, is a significant source of sediment pollution in Brisbane's waterways. The Erosion Hazard Assessment determines whether the risk of soil erosion and sediment pollution to the environment is 'low', 'medium' or 'high'.

When is the EHA required?

An *Erosion Hazard Assessment* form must be completed and lodged with BCC for any Development Application (ie MCU or ROL) that will result in soil disturbance OR Operational Works or Compliance Assessment Application for 'Filling' or Excavation.

Failure to submit this form during lodgement of an application may result in assessment delays or refusal of the application.

Privacy Statement

The personal information collected on this form will be used by Brisbane City Council for the purposes of fulfilling your request and undertaking associated Council functions and services. Your personal information will not be disclosed to any third party without your consent, unless this is required or permitted by law.

Assessment Details

- 1 Please turn over and complete the erosion hazard assessment.
- **2** Based on the erosion hazard assessment overleaf, is the site:

A 'low' risk site

Best practice erosion and sediment control (ESC) must be implemented but no erosion and sediment control plans need to be submitted with the development application. Factsheets outlining best practice ESC can be found at http://www.waterbydesign.com.au/factsheets

A 'medium' risk site

If the development is approved, the applicant will need to engage a Registered Professional Engineer (RPEQ) <u>or</u> Certified Professional in Erosion and Sediment Control (CPESC) to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy.

A 'high' risk site

If the development is approved, the applicant will need to engage a RPEQ <u>and</u> CPESC to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy. The plans and program will need to be certified by a CPESC. 3 Site Information and Certification

Application number (if known)

Site address

| 15 Anderson St, Fortitude Valley | , | |
|----------------------------------|--------|------|
| | | |
| Pos | stcode | 4006 |

I certify that:

- I have made all relevant enquiries and am satisfied no matters of significance have been withheld from the assessment manager.
- I am a person with suitable qualifications and/or experience in erosion and sediment control.
- The Erosion Hazard Assessment was completed in accordance with the Erosion Hazard Assessment Supporting Technical Notes and the BCC Infrastructure Design Planning Scheme Policy.
- The Erosion Hazard Assessment accurately reflects the site's overall risk of soil erosion and sediment pollution to the environment.
- I acknowledge and accept that the BCC, as assessment manager, relies, in good faith, on this certification as part of its development assessment process and the provision of false or misleading information to the BCC constitutes an offence for which BCC may take punitive steps/ action against me/ enforcement action against me.

Certified by Print name

Gregg Van Greuning

Certifier's signature

Date

22 / 08 / 2022

Table 1: Low Risk Test





Appendix I Rational Method Calculations



| Project number | 25864 | Designer | JB | | | | |
|----------------|----------------------|---------------------------------------|----|--|--|--|--|
| Date | 08.07.2022 | Verifier | ER | | | | |
| Client | PROPERTY PROJECTS A | USTRALIA | | | | | |
| Project area | ANDERSON STREET CC | ANDERSON STREET CO-LIVING | | | | | |
| Description | DA Stormwater Design | A Stormwater Design - Rational Method | | | | | |

CALCULATIONS

Rational Method Based on ARR 1987 IFD Data

| Catc | hment | | Fraction I | mpervious | Coeffi Discha | cient of arge, C _Y | | Co | efficient of | Discharge, | C _Y (ARR 19 | 87) | | | | Rainfall (/ | Intensity, ^{tc} l ARR 1987 IF | _Y (mm/h) D) | | | | | Peak Disc (/ | harge Rate ARR 1987 IF | , Q _Y (m³/s) D) | | |
|-----------------|--------------------------|-------------------------------------|---|---|---|----------------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---|---|---|--|--|--|---|--|--|--|--|--|--|--|
| Catchment Label | Catchment Area A (ha) | Time of Concentration t_{c} (min) | Fraction Impervious f _i (decimal) | Rainfall Intensity, ¹ l ₁₀ (mm/h) ARR 1987 | Coefficient of Discharge, C ₁₀ ARR 1987 | Urban or Rural Catchment | ARR 1987 C1 (FY = 0.80) | ARR 1987 C2 (FY = 0.85) | ARR 1987 C5 (FY = 0.95) | ARR 1987 C10 (FY = 1.00) | ARR 1987 C20 (FY = 1.05) | ARR 1987 C50 (FY = 1.15) | ARR 1987 C100 (FY =1.20) | ^{tc} l _y (mm/h) 1 Year ARI | ^{tc} l _γ (mm/h) 2 Year ARI | ^{tc} l _y (mm/h) 5 Year ARI | ^{tc} l _y (mm/h) 10 Year ARI | ^{են} l _γ (mm/h) 20 Year ARI | ^{tc} l _y (mm/h) 50 Year ARI | ^{tc} l _y (mm/h) 100 Year ARI | Q ₁ (m ³ /s) 1 Year ARI | Q ₂ (m ³ /s) 2 Year ARI | Q ₅ (m ³ /s) 5 Year ARI | Q ₁₀ (m ³ /s) 10 Year ARI | Q ₂₀ (m ³ /s) 20 Year ARI | Q ₅₀ (m ³ /s) 50 Year ARI | Q ₁₀₀ (m ³ /s) 100 Year ARI |
| Pre-Dev C1 | 0.2896 | 5 | 1.00 | 70.3 | 0.90 | Urban | 0.720 | 0.765 | 0.855 | 0.900 | 0.945 | 1.000 | 1.000 | 117.0 | 151.0 | 191.0 | 215.0 | 248.0 | 291.0 | 325.0 | 0.068 | 0.093 | 0.131 | 0.156 | 0.189 | 0.234 | 0.261 |
| 0 | 0.0000 | 0 | 0.00 | 70.3 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! |
| Post-Dev C1 | 0.2896 | 5 | 0.96 | 70.3 | 0.86 | Urban | 0.684 | 0.727 | 0.812 | 0.855 | 0.898 | 0.983 | 1.000 | 117.0 | 151.0 | 191.0 | 215.0 | 248.0 | 291.0 | 325.0 | 0.064 | 0.088 | 0.125 | 0.148 | 0.179 | 0.230 | 0.261 |
| 0 | 0.0000 | 0 | 0.00 | 70.3 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! |



Appendix J MUSIC Model Information



Input Parameters:

PSorb Cartridge Stormfilter:

| Location 5x 69 | 90 PSORB Stormfilter (MCC | Brisbane) | | |
|-----------------------------------|----------------------------------|-----------|-----------------------|--------------|
| Inlet Properties | | | | |
| Low Flow By-pass | s (cubic metres per sec) | 0.00000 | | |
| High Flow By-pase | s (cubic metres per sec) | 0.00450 | | |
| Target Element | | | | |
| Flow (cubic me | etres per sec) | 0 | Total Phosporus (mg/ | ′L) |
| Gross Pollutan | ts (kg/ML) | C | Total Nitrogen (mg/L) | |
| Iotal Suspend | led Solids (mg/L) | | | |
| Flow (cubic metres | s per sec) | | | |
| Concentratio | ns n Based Capture Efficiency | 0 | Flow Based Capture E | ifficiency |
| C Both | | | | |
| Concentration Bas | sed Capture Efficiency | | Flow Based Capture | Efficiency |
| | | | | , |
| Inflow | Outflow | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | | |
| 10.0000 | 10.0000 | | | |
| | | | | |
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| | | | F | Fluxes Notes |



| Location 5x 6 | 90 PSORB Stormfilter (MCC I | Brisbane) | | |
|--|----------------------------------|-----------|-----------------------|-----------|
| nlet Properties | | | | |
| Low Flow By-pase | s (cubic metres per sec) | 0.00000 | | |
| High Flow By-pas | s (cubic metres per sec) | 0.00450 | | |
| Farget Element | | | | |
| Flow (cubic me | etres per sec) | • | Total Phosporus (mg/L |) |
| Gross Pollutan | its (kg/ML) | 0. | Total Nitrogen (mg/L) | |
| Total Suspend | led Solids (mg/L) | | | |
| Transfer Functio Concentratio C Both | ns n Based Capture Efficiency | C F | low Based Capture Eff | ìciency |
| Concentration Ba | sed Capture Efficiency | | Flow Based Capture E | fficiency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 10.0000 | 1.3900 | | 1.0000 | 100.0000 |
| | | | | |
| e . | | | <u></u> | |



| Location 5x 6 | 90 PSORB Stormfilter (MCC | Brisbane) | | | | | |
|--|----------------------------------|-----------|-----------------------|-----------|--|--|--|
| nlet Properties | | | | | | | |
| Low Flow By-pase | s (cubic metres per sec) | 0.00000 | | | | | |
| High Flow By-pas | s (cubic metres per sec) | 0.00450 | | | | | |
| arget Element | | | | | | | |
| C Flow (cubic metres per sec) C Total Phosporus (mg/L) | | | | | | | |
| Gross Pollutan | ts (kg/ML) | 01 | 「otal Nitrogen (mg∕L) | | | | |
| I otal Suspend | led Solids (mg/L) | | | | | | |
| Transfer Functio Concentratio Both | ns n Based Capture Efficiency | C F | low Based Capture Eff | iciency | | | |
| Concentration Based Capture Efficiency Flow Based Capture Efficiency | | | | | | | |
| Input | Output | | Inflow (m^3/s) | % Capture | | | |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 | | | |
| 14.9393 | 0.0000 | | 1.0000 | 100.0000 | | | |
| | | | | | | | |
| 6 | | | | | | | |



| Low Flow By-pass High Flow By-pass Farget Element Flow (cubic met Gross Pollutant | (cubic metres per sec) (cubic metres per sec) tres per sec) s (kg/ML) | 0.00000 0.00450 C T C T | otal Phosporus (mg/L otal Nitrogen (mg/L) |) |
|---|--|----------------------------------|--|-----------|
| Fotal Nitrogen (mg/ −Transfer Function | L) s Based Capture Efficiency | Св | ow Based Capture Eff | iciency |
| Concentration Bas | ed Capture Efficiency | F | low Based Capture Ef | ficiency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 100.0000 | 44.1000 | | 1.0000 | 100.0000 |
| | | | | |



| Location 5x 6 | 90 PSORB Stormfilter (MCC I | Brisbane) | | |
|-----------------------------------|-----------------------------|-----------|----------------------|-----------|
| Inlet Properties | | | | |
| Low Flow By-pass | s (cubic metres per sec) | 0.00000 | | |
| High Flow By-pas | s (cubic metres per sec) | 0.00450 | | |
| Target Element | | | | |
| Flow (cubic me | etres per sec) | ОТ | otal Phosporus (mg/L | .) |
| Gross Pollutan | its (kg/ML) | ОТ | otal Nitrogen (mg/L) | |
| Total Suspend | led Solids (mg/L) | | | |
| Concentratio Both | on Based Capture Efficiency | C Re | ow Based Capture Eff | iciency |
| Concentration Ba | sed Capture Efficiency | • | low Based Capture E | mciency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 1000.0000 | 96.0000 | | 1.0000 | 100.0000 |
| | | | | |
| | - - | | | |



OceanGuard:

| Location 5 x Ocea | nGuard | | | Products >> | | | | |
|---|---|---------|-------------------------|-------------|--|--|--|--|
| Inlet Properties | hic metres per sec) | 0.00000 | | | | | | |
| High Flow By-pass (cu | bic metres per sec) | 0.10000 | | | | | | |
| Target Element | | | | | | | | |
| Gross Pollutants (kg/ML) C Total Phosporus (mg/L) | | | | | | | | |
| C Total Suspended S | C Total Suspended Solids (mg/L) C Total Nitrogen (mg/L) | | | | | | | |
| Gross Pollutants (kg/M | IL) | | | | | | | |
| Concentration Ba Both | sed Capture Efficiency | C | Flow Based Capture Effi | ciency | | | | |
| Concentration Based | Capture Efficiency | | Flow Based Capture Ef | ficiency | | | | |
| Input | Output | | Inflow (m^3/s) | % Capture | | | | |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 | | | | |
| 14.7808 | 0.0000 | | 1.0000 | 100.0000 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | Flu | Ixes Notes | | | | |



| Location 5 x C | DceanGuard | | | 😚 Products > |
|--|---------------------------------|---------|----------------------|--------------|
| nlet Properties | | | | |
| Low Flow By-pass | s (cubic metres per sec) | 0.00000 | | |
| High Flow By-pas | s (cubic metres per sec) | 0.10000 | | |
| Target Element | | | | |
| Gross Pollutan | ts (kg/ML) | • T | otal Phosporus (mg/L |) |
| Total Suspend | led Solids (mg/L) | с т | otal Nitrogen (mg/L) | |
| Fotal Phosporus (r | ng/L) | | | |
| Transfer Functio Concentratio Both | ns n Based Capture Efficienc | y C Flo | ow Based Capture Eff | iciency |
| Concentration Ba | sed Capture Efficiency | F | low Based Capture Ef | ficiency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 10.0000 | 7.0000 | | 1.0000 | 100.0000 |
| | | | | |
| | | | | |
| | | | Flu | uxes Notes |



| Low Flow By-pass High Flow By-pass | (cubic metres per sec) | 0.00000 | | |
|---|--|---------|--|-----------|
| arget Element | | 1 | | |
| Gross Pollutant | s (kg/ML) | C | Total Phosporus (mg/L | .) |
| Total Suspende | ed Solids (mg/L) | С | Total Nitrogen (mg/L) | |
| otal Suspended S | Solids (mg/L) | | | |
| Concentration Both Concentration Base | n Based Capture Efficiency eed Capture Efficiency | 0 | Flow Based Capture Eff Flow Based Capture E | ficiency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 20.8000 | 8.0000 | | 1.0000 | 100.0000 |
| 40.3000 | 14.1000 | | | |
| 60.6000 | 19.3000 | | | |
| 79.3000 | 23.4000 | | | |
| 99.9000 | 26.9000 | | | |
| 121.0000 | 30.0000 | | | |
| | | | | |



| Location 5 x C | DceanGuard | | | Products >> |
|---|---------------------------------|---------|------------------------|---------------------|
| Low Flow By-pass | s (cubic metres per sec) | 0.00000 | | |
| High Flow By-pas | s (cubic metres per sec) | 0.10000 | | |
| Target Element | | | | |
| C Gross Pollutari | ts (kg/ML) | С | Total Phosporus (mg/L | .) |
| C Total Suspend | led Solids (mg/L) | ¢ | Total Nitrogen (mg/L) | |
| Total Nitrogen (mg | ı/L) | | | |
| Transfer Function Concentratio Both | ns n Based Capture Efficienc | y Ci | Flow Based Capture Eff | iciency |
| Concentration Bas | sed Capture Efficiency | | Flow Based Capture E | fficiency |
| Input | Output | | Inflow (m^3/s) | % Capture |
| 0.0000 | 0.0000 | | 0.0000 | 100.0000 |
| 50.0000 | 39.5000 | | 1.0000 | 100.0000 |
| | | | | |
| | | | | |
| | | | Flu | uxes No <u>t</u> es |



MUSIC Model Information

Introduction:

The quality of stormwater runoff and the impact of the proposed stormwater quality improvement measures were analysed using MUSIC Version 6.0 according to the MUSIC Modelling Guidelines Version 1.0, Water by Design 2010. A summary of the modelled catchment is presented in the table below.

| Catchment I.D | Land Use | Area (m²) | % Impervious | |
|---------------|----------|-----------|--------------|--|
| Road | Mixed | 2,380 | 100% | |
| Ground | Mixed | 27 | 100% | |
| Landscape | Mixed | 113 | 0% | |
| Road | Mixed | 12 | 100% | |
| Ground | Mixed | 20 | 100% | |

Meteorological Data:

The MUSIC model was carried out using the following parameters:

- The modelling period should be 10 years with a time step of 6 minutes.
- The nearest available 6-minute time step rainfall series to the subject site is Brisbane.

| | Rainfall/6 Minutes | Evapo-Transpiration | |
|---------------|--------------------|---------------------|--|
| mean | 0.013 | 4.086 | |
| median | 0.000 | 3.700 | |
| maximum | 19.280 | 6.194 | |
| minimum | 0.000 | 2.097 | |
| 10 percentile | 0.000 | 2.100 | |
| 90 percentile | 0.000 | 6.065 | |
| | | | |
| | Rainfall | Evapo-Transpiration | |
| mean annual | 1178 | 1493 | |

| ET Station User-defined monthly PET | |
|-------------------------------------|--|
| | |
| Start Date 1/01/1980 12:00 AM | |
| End Date 31/12/1989 11:54 PM | |
| Modelling Time Step 6 Minutes | |



Source Nodes – Pollutant Exports:

Pollutant export parameters were assigned as per Table 3.8 of the MUSIC Modelling Guidelines.

The pollutant exports parameters adopted in the MUSIC model are summarized in the table below.

| FLOW | SURFACE TYPE | TSS log ¹⁰ values | | TP log ¹⁰ values | | TN log ¹⁰ values | |
|------------------------|-------------------|------------------------------|----------|-----------------------------|----------|-----------------------------|----------|
| TYPE | | Mean | St. dev. | Mean | St. dev. | Mean | St. dev. |
| | Urban residential | | | | | | |
| Baseflow parameters | 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 | Roof | 1.30 | 0.39 | -0.89 | 0.31 | 0.26 | 0.23 |
| parameters | 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 |
| | Industrial | | | | | | |
| Baseflow parameters | Roof | N/A | N/A | N/A | N/A | N/A | N/A |
| | Roads | 0.78 | 0.45 | -1.11 | 0.48 | 0.14 | 0.20 |
| | Ground level | 0.78 | 0.45 | -1.11 | 0.48 | 0.14 | 0.20 |
| Stormflow | Roof | 1.30 | 0.44 | -0.89 | 0.36 | 0.25 | 0.32 |
| parameters | Roads | 2.43 | 0.44 | -0.30 | 0.36 | 0.25 | 0.32 |
| | Ground level | 1.92 | 0.44 | -0.59 | 0.36 | 0.25 | 0.32 |
| | Commercial | | | | | | |
| Baseflow | Roof | N/A | N/A | N/A | N/A | N/A | N/A |
| parameters | Roads | 0.78 | 0.39 | -0.60 | 0.50 | 0.32 | 0.30 |
| | Ground level | 0.78 | 0.39 | -0.60 | 0.50 | 0.32 | 0.30 |
| Stormflow | Roof | 1.30 | 0.38 | -0.89 | 0.34 | 0.37 | 0.34 |
| parameters | Roads | 2.43 | 0.38 | -0.30 | 0.34 | 0.37 | 0.34 |
| | Ground level | 2.16 | 0.38 | -0.39 | 0.34 | 0.37 | 0.34 |

Table 3.8 Pollutant export parameters for split catchment land use (log¹⁰ values)



Appendix K SQID Maintenance



OceanGuard™

Operations & Maintenance Manual

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Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes as recommended by the manufacturer.

The OceanGuard technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of Filtration liners, designed to remove gross pollutants, total suspended solids and attached pollutants as either a standalone technology or as part of a treatment train with our StormFilter or Jellyfish Filtration products. OceanGuard pit baskets are highly effective, easy to install and simple to maintain.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the OceanGuard.

Health and Safety

Access to pits containing an OceanGuard typically requires removing (heavy) access covers/grates, but typically it is not necessary to enter into a confined space. Pollutants collected by the OceanGuard will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or sharp objects such as broken glass and syringes. For these reasons, there should be no primary contact with the waste collect and all aspects of maintaining and cleaning your OceanGuard require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the OceanGuard pit insert, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots,
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

The OceanGuard pit insert is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry.

How does it Work?

OceanGuard is designed to intercept stormwater as it enters the stormwater pits throughout a site. The OceanGuard has diversion panels that sit flush with the pit walls, this ensures that as stormwater enters at the top of the pit it is directed to the middle of the insert where the Filtration bag is situated. The filtration bag allows for screening to occur removing 100% of pollutants greater than the opening of the filtration material (200micron, 1600micron bags available).



During larger rain events the large flows overflow slots in the flow diverter of the OceanGuard ensure that the conveyance of stormwater is not impeded thus eliminating the potential for surface flooding. As the flow subsides, the captured pollutants are held in the OceanGuard Filtration bag dry. The waste then starts to dry which reduces the magnitude of organic material decomposition transitioning between maintenance intervals.

Maintenance Procedures

To ensure that each OceanGuard pit insert achieves optimal performance, it is advisable that regular maintenance is performed. Typically the OceanGuard requires 2-4 minor services annually, pending the outcome of these inspections additional maintenance servicing may be required.

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the OceanGuard.

| | Description of Typical Activities | Frequency |
|---------------|---|--------------------|
| Minor Service | Filter bag inspection and evaluation Removal of capture pollutants Disposal of material | 2-4 Times Annually |
| Major Service | Filter Bag Replacement Support frame rectification | As required |

Ocean Protect | OceanGuard Operations & Maintenance Manual

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to return the OceanGuard device back to optimal operating performance. This type of service can be undertaken either by hand or with the assistance of a Vacuum unit.

Hand Maintenance

- 1. Establish a safe working area around the pit insert
- 2. Remove access cover/grate
- 3. Use two lifting hooks to remove the filtration bag
- 4. Empty the contents of the filtration bag into a disposal container
- 5. Inspect and evaluate the filtration bag
- 6. Inspect and evaluate remaining OceanGuard components (i.e. flow diverter, filtration cage and supporting frame)
- 7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8. Re-install filtration bag and replace access cover/grate

Vacuum Maintenance

- 1. Establish a safe working area around the pit insert
- 2. Remove access cover/grate
- 3. Vacuum captured pollutants from the filtration bag
- 4. Remove filtration bag
- 5. Inspect and evaluate the filtration bag
- 6. Inspect and evaluate remaining OceanGuard components (i.e. flow diverter, filtration cage and supporting frame)
- 7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8. Re-install filtration bag and replace access cover/grate

Major Service (Filter Bag Replacement)

For the OceanGuard system, a major service is a reactionary process based on the outcomes from the minor service.

| Trigger Event from Minor Service | Maintenance Action | |
|--|--|--|
| Filtration bag inspection reveals damage | Replace the filtration $bag^{[1]}$ | |
| Component inspection reveals damage | Perform rectification works and if necessary replace components ^[1] | |

[1] Replacement filtration bags and components are available for purchase from Ocean Protect.

Additional Reasons of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, all OceanGuard pits that potentially received flow should be inspected and cleaned. Specifically all captured pollutants from within the filtration bag should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. All filtration bags should be rejuvenated (replaced if required) and re-installed.

Blockages

The OceanGuards internal high flow bypass functionality is designed to minimise the potential of blockages/flooding. In the unlikely event that flooding occurs around the stormwater pit the following steps should be undertaken to assist in diagnosing the issue and implementing the appropriate response.

- 1. Inspect the OceanGuard flow diverter, ensuring that they are free of debris and pollutants
- 2. Perform a minor service on the OceanGuard
- 3. Remove the OceanGuard insert to access the pit and inspect both the inlet and outlet pipes, ensuring they are free of debris and pollutants

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the OceanGuard pit insert after a major storm event. The inspection should focus on checking for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants disposed.

Disposal of Waste Materials

The accumulated pollutants found in the OceanGuard must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filtration bag has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our OceanGuard system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement filter bags.

For more information please visit www.OceanProtect.com.au



StormFilter

Operations & Maintenance Manual

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Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the StormFilter as recommended by the manufacturer.

The StormFilter is designed and sized to meet stringent regulatory requirements. It removes the most challenging target pollutants (including fine solids, soluble heavy metals, oil, and soluble nutrients) using a variety of media. For more than two decades, StormFilter has helped clients meet their regulatory needs and, through ongoing product enhancements, the design continues to be refined for ease of use and improved performance.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the StormFilter.

Health and Safety

Access to a StormFilter unit requires removing heavy access covers/grates, and it is necessary to enter into a confined space. Pollutants collected by the StormFilter will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your StormFilter require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the StormFilter, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of StormFilter maintenance can be performed from surface level, there will be a need to enter the StormFilter system (confined space) during a major service. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it Work?

Stormwater enters the cartridge chamber, passes through the filtration media and begins filling the cartridge center tube. When water reaches the top of the cartridge the float valve opens and filtered water is allowed to drain at the designed flow rate. Simultaneously, a one-way check valve closes activating a siphon that draws stormwater evenly throughout the filter media and into the center tube. Treated stormwater is then able to discharge out of the system through the underdrain manifold pipework.



As the rain event subsides, the water level outside the cartridge drops and approaches the bottom of the hood, air rushes through the scrubbing regulators releasing the water column and breaking the siphon. The turbulent bubbling action agitates the surface of the cartridge promoting trapped sediment to drop to the chamber floor. After a rain event, the chamber is able to drain dry by way of an imperfect seal at the base of the float valve.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the StormFilter requires an inspection every 6 months with a minor service at 12 months. Additionally, as the StormFilter cartridges capture pollutants the media will eventually become occluded and require replacement (expected media life is 1-3 years).

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the StormFilter.

| | Description of Typical Activities | Frequency |
|---------------|---|-----------------|
| Inspection | Visual Inspection of cartridges & chamber Remove larger gross pollutants Perform minimal rectification works (if required) | Every 6 Months |
| Minor Service | Evaluation of cartridges and media Removal of accumulated sediment (if required) Wash-down of StormFilter chamber (if required) | Every 12 Months |
| Major Service | Replacement of StormFilter cartridge media | As required |

Ocean Protect | StormFilter Operations & Maintenance Manual

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Inspection

The purpose of the inspecting the StormFilter system is to assess the condition of the StormFilter chamber and cartridges. When inspecting the chamber, particular attention should be taken to ensure all cartridges are firmly connected to the connectors. It is also an optimal opportunity to remove larger gross pollutants and inspect the outlet side of the StormFilter weir.

Minor Service

This service is designed to ensure the ongoing operational effectiveness of the StormFilter system, whilst assessing the condition of the cartridge media.

- 1. Establish a safe working area around the access point(s)
- 2. Remove access cover(s)
- 3. Evaluate StormFilter cartridge media (if exhausted schedule major service within 6 months)
- 4. Measure and record the level of accumulated sediment in the chamber (if sediment depth is less than 100 mm skip to step 9)
- 5. Remove StormFilter cartridges from the chamber
- 6. Use vacuum unit to removed accumulated sediment and pollutants in the chamber
- 7. Use high pressure water to clean StormFilter chamber
- 8. Re-install StormFilter cartridges
- 9. Replace access cover(s)

Major Service (Filter Cartridge Replacement)

For the StormFilter system a major service is reactionary process based on the outcomes from the minor service, specifically the evaluation of the cartridge media.

| Trigger Event | Maintenance Action | |
|---|--|--|
| Cartridge media is exhausted ^[1] | Replace StormFilter cartridge media ^[2] | |

Multiple assessment methods are available, contact Ocean Protect for assistance

[2] Replacement filter media and components are available for purchase from Ocean Protect.

This service is designed to return the StormFilter device back to optimal operating performance

- 1. Establish a safe working area around the access point(s)
- 2. Remove access cover(s)
- 3. By first removing the head cap, remove each individual cartridge hood to allow access to the exhausted media.
- 4. Utilise a vacuum unit to remove exhausted media from each cartridge
- 5. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
- 6. Use high pressure water to clean StormFilter chamber
- 7. Inspect each empty StormFilter cartridges for any damage, rectify damage as required
- 8. Re-fill each cartridge with media in line with project specifications
- 9. Re-install replenished StormFilter cartridges
- 10. Replace access cover(s)

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the StormFilter unit should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess them for contamination, depending on the type of spill event it may be necessary to replace the filtration media.

Blockages

In the unlikely event that flooding occurs upstream of the StormFilter system the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

- 1. Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
- 2. Inspect the StormFilter unit checking the underdrain manifold as well as both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the StormFilter after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the StormFilter must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter media has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our StormFilter system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement media for cartridges.

For more information please visit <u>www.OceanProtect.com.au</u>



Appendix L BCC eBIMAP2 Information



Print Date:

Projection:

15/08/2022 - 4:43 PM

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50.0 0 25.0 37.5 50.0 Metres Scale: 1:1,000 Web Mercator Auxiliary Sphere

15 Anderson Street, Fortitude Valley

Dedicated to a better Brisbane

Ν
Legend

Sewer Chamber Sewer Fitting - Main Fittings OUTLET Ħ JOINT JUNCTION J WYE ÷. GIBAULT JOINT OUTLET 6 CONCRETE STOP HEAD WALL Sewer Manholes 0 <all other values> Flume Pit AIR REFLUX VACCUM - OFFLINE X SEWER DOOR X SEWER DOOR - OFFLINE 4 <all other values> **TREATMENT PLANT - OFFLINE** \otimes ODOUR CONTROL O WET WELL - OFFLINE PUMP STATION PS Sewer Vertical Gravity Main Model Link ---Sewer Gravity Main - by Type TRUNK MAIN MODEL LINK ___ **TRUNK MAIN - OFFLINE** MODEL LINK - OFFLINE MODEL LINK VACUUM MAIN **RISING MAIN - OFFLINE** Sewer Drainage Plan Joiner End Structure 1 Pipe End Outlet Manhole

- Foul Water and Roof Water Waterbody
- Lake

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- PRESSURE GAUGE
- PRESSURE GAUGE OFFLINE

CHAMBER C END FLUSHING POINT VACUUM LIFT RODDING JOINT 1 END CAP TEE CROSS <all other values> PIPE BRIDGE PIER MANHOLE 0 Sewer Manhole -All Other Types Sewer Manhole Stub SCOUR • AIR - OFFLINE **REFLUX - OFFLINE** GATE \oplus GATE - OFFLINE Ð Sewer Network Structure -Treatment Plants Sewer Network Structure - All Features \bigcirc WET WELL **ODOUR CONTROL - OFFLINE** PS PUMP STATION - OFFLINE Sewer Vertical Pressure Main Service SYPHON RETICULATION MAIN SYPHON - OFFLINE **RETICULATION MAIN - OFFLINE** <all other values> LOW PRESSURE MAIN MODEL LINK - OFFLINE VACUUM MAIN - OFFLINE Sewer Drainage Plan Extension End cap Gully Drain SQID Artesian Well Water Device - All Other Assets 01 LEVEL SENSOR

OL LEVEL SENSOR - OFFLINE

CHAMBER - OFFLINE C INLINE FLUSHING POINT 0 Sewer Fitting - All Other Fittings PROPERTY CONNECTION BOUNDARY BEND REDUCER T INLET Sewer Structure - by Type ANCHOR BLOCK Sewer Support Structure Boundary MANHOLE - OFFLINE 8 End Sewer Control Valve - by Type VACCUM, AS CONSTRUCTED SCOUR - OFFLINE Sewer System Valve - by Type BUTTERFLY \oplus **BUTTERFLY - OFFLINE** TREATMENT PLANT, AS CONSTRUCTED STORAGE FACILITY STORAGE FACILITY - OFFLINE Sewer Pump Station Sewer Network Structure Boundary Sewer Service <all other values> DISCHARGE OVERFLOW MAIN **DISCHARGE - OFFLINE OVERFLOW MAIN - OFFLINE** Sewer Pressure Main - by Type RISING MAIN LOW PRESSURE MAIN - OFFLINE Sewer Drainage Plan ٠ Culvert Flood Gate Junction Gully Connect Surface Drain Detention Basin FLOW METER F FLOW METER - OFFLINE (F) <all other values>



Appendix M DBYD Information



Date: 12/04/2022

Enquirer Name: Jarrod Bubbert Enquirer Address: 596 Milton Road Email: jbubbert@adgce.com Phone: +611300657402

Dear Jarrod Bubbert

The following is our response on behalf of each of the TPG carriers (listed below) to your Dial Before You Dig enquiry – Sequence 210258876 It is provided to you on a confidential basis under the following conditions and must be shredded or securely disposed of after use.

Assets Affected:

Carriers (each a "TPG carrier") and assets affected:

Location: 15 Anderson Street

According to our records, the underground assets in the vicinity of the location stated in your enquiry are **NOT AFFECTED**. Please read the below information and disclaimers in addition to the any attached plans provided prior to any construction activities.

IMPORTANT INFORMATION

- The information provided is valid for 30 days from the date of this response. If your work site area changes or your construction activity is beyond 30 days please contact Dial Before You Dig on 1100 or www.1100.com.au to re-submit a new enquiry.
- Due to the nature of underground assets and the age of some assets and records, our plans are indicative of the general location only and may not show all assets in the location. You should not solely rely on these plans when undertaking construction works. It is also inaccurate to assume depth or that underground network conduit and cables follow straight lines, and careful on-site investigations are essential to locate an asset's exact position prior to excavation. It is your responsibility to locate and confirm the exact location of our infrastructure using non-destructive techniques. We make no warranty or guarantee that our plans are complete, current or error free, and to the maximum extent permitted by law we exclude all liability to you, your employees, agents and contractors for any loss, damage or claim arising out of or in connection with using our plans.
- Please note that some of our conduits carry electrical cables and gas pipes. Please exercise extreme care when working within the vicinity of these conduit and take into account the minimum clearance distances under Duty Of Care below.
- You (and your employee and contractors) must not open, move, interfere, alter or relocate any of our assets without our prior approval.
- <u>Note</u> It is a criminal offence under the *Criminal Code Act 1995 (Cth)* to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by us as a result of such unauthorised works may be claimed against you.

DAMAGE

• You must report immediately any damage to our network on **1800 786 306** (24hrs). We will hold you liable and seek compensation for any loss or damage to our network, our property and our customers that is caused by or arises out of your activities.

DUTY OF CARE

You have a duty of care to carefully locate, validate and protect our assets when carrying out works near our infrastructure. For construction activities that may impact on or interfere with our network, you will need to call us on **1800 786 306** to discuss a suitable engineering solution, lead time and cost involved. The below precautions must be taken when working in the vicinity of our network:

- Contact us on **1800 786 306** to discuss and obtain relevant information and plans on our infrastructure in a particular location if the information provided in this response is insufficient.
- Physically locate and mark on-site our network infrastructure using non-destructive techniques i.e. pot holing or hand digging every 5 metres prior to commencing any construction activities. Assets located must be marked to AS5488 standard. NO CONSTRUCTION WORK IS ALLOWED UNTIL THIS STEP IS COMPLETED. You must use an approved telecommunications accredited locator, or we can provide a locator for you at your expense. If we provide you with a locator, and this locator attended the site and is proven to be grossly negligent in physically locating and marking our infrastructure, then to the extent any TPG carrier is liable for this locator's negligence, acts and omissions, the total liability aggregated for all TPG carriers is limited, at our option, to attend the site and re-mark the infrastructure or to pay for a third party to re-mark the infrastructure.
- If you require us to locate or monitor our infrastructure, please allow five business days' notice for us to respond.
- Ensure all information, including our network requirements and any associated plans provided by us are kept confidential and remain on-site throughout your construction works.

- Use suitably qualified and supervised professionals, particularly if you are working near assets that contain electricity cables or gas pipes.
- Ensure the below minimum clearance distances between the construction activities and the actual location of our assets are met. If you need clearance
 distances for our above ground assets, or if the below distances cannot be met, call 1800 786 306 to discuss.

Minimum assets clearance distances.

- o 300mm when laying asset inline, horizontal or vertical.
- o 1000mm when operating vibrating equipment. Eg: vibrating plates. No vibrating equipment on top of asset.
- o 1000mm when operating mechanical excavators or jackhammers/pneumatic breakers.
- o 2000mm when performing directional bore in-line, horizontal and vertical.
- No heavy vehicle over 3 tonnes to be driven over asset with less than 600mm of cover.
- Reinstate exposed TPG network infrastructure back to original state.

PRIVACY & CONFIDENTIALITY

- Privacy Notice Your information has been provided to us by Dial Before You Dig to respond to your Dial Before You Dig enquiry. We will keep your personal information in accordance with TPG's privacy policy, see www.tpg.com.au/about/privacy.
- Confidentiality The information we have provided to you is confidential and is to be used only for planning and designing purposes in connection
 with your Dial Before You Dig enquiry. Please dispose of the information by shredding or other secure disposal method after use. We retain all
 intellectual property rights (including copyrights) in all our documents and plans.





TPG Corporation Limited



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| A 1000 5 60 | | | |
|-----------------|--|--|--|
| G elstra | For all Telstra DBYD plan enquiries - | Sequence Number: 210258880 | |
| | For urgent onsite contact only - ph 1800 653 935 (bus hrs) | CAUTION: Fibre optic and/ or major network present | |
| TELSTRA C | ORPORATION LIMITED A.C.N. 051 775 556 | in plot area. Flease read the Duty of Care and | |
| Gene | erated On 12/04/2022 11:39:07 | any assistance. | |

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.



| Ī | Tolstra | For all Telstra DBYD plan enquiries - | Sequence Number: 210258880 | | | | |
|--|--|--|--|--|--|--|--|
| Jeistia | For urgent onsite contact only - ph 1800 653 935 (bus hrs) | CAUTION: Fibre optic and/ or major network present | | | | | |
| TELSTRA CORPORATION LIMITED A.C.N. 051 775 556 | | | in plot area. Flease read the Duty of Care and | | | | |
| | Gene | erated On 12/04/2022 11:39:12 | any assistance. | | | | |

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

LEGEND

IT'S HOW WE CONNECT



For more info contact a Certified Locating Organisation or Telstra Plan Services 1800 653 935

30

20.0

P100

245.0

AA - (cable information)

AB - (cable information)

BA - (cable information)

P50



Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 -Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the assets are protected during construction works. The exact position of Telstra assets can only be validated by physically exposing them. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

Telstra Map Legend v3_5a

TELSTRA CORPORATION ACN 051 775 556

Urban Utilities - Water, Recycled Water and Sewer Infrastructure



Dial Before You Dig - Urban Utilities Water, Recycled Water and Sewer Infrastructure

DBYD Reference No: 210258881

6 **Urban**Utilities

Date DBYD Ref Received: 12/04/2022 Date DBYD Job to Commence: 13/04/2022 Date DBYD Map Produced: 12/04/2022 Produced By: Urban Utilities

This Map is valid for 30 days

Sewer



Infrastructure

Water

- Major Infrastructure
- Network Pipelines
- Network Structures

- - Water Service (Indicative only)

correctness, currency or fitness for purpose. This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority. privacy laws. © State of Queensland Department of Natural Resources and Mines [2020]

www.urbanutilities.com.au

Ν

Map Scale

1:2050

While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Urban Utilities nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms

The plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, completeness

Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans.

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2020]. In consideration of the State permitting the use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the

For further information, please call Urban Utilities on 13 26 57 (8am-6pm weekdays). Faults and emergencies 13 23 64 (24/7).

Urban Utilities - Water, Recycled Water and Sewer Infrastructure



Dial Before You Dig - Urban Utilities Water, Water Sewer Ν **Recycled Water and Sewer Infrastructure** Infrastructure Infrastructure correctness, currency or fitness for purpose. DBYD Reference No: 210258881 6 Major Infrastructure Major Infrastructure ٠ Date DBYD Ref Received: 12/04/2022 Network Pipelines Network Pipelines **Urban**Utilities Map Scale Date DBYD Job to Commence: 13/04/2022 Network Structures $\overline{}$ Network Structures Date DBYD Map Produced: 12/04/2022 1:1000 - - Water Service (Indicative only) This Map is valid for 30 days Produced By: Urban Utilities

Plans generated [12 Apr 2022] by Pelicancorp TicketAccess Software | www.pelicancorp.com

While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Urban Utilities nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms

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Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority.

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2020]. In consideration of the State permitting the use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. © State of Queensland Department of Natural Resources and Mines [2020]

For further information, please call Urban Utilities on 13 26 57 (8am-6pm weekdays). Faults and emergencies 13 23 64 (24/7).

www.urbanutilities.com.au

Urban Utilities - Water, Recycled Water and Sewer Infrastructure



Dial Before You Dig - Urban Utilities Water, Recycled Water and Sewer Infrastructure

DBYD Reference No: 210258881

6 **Urban**Utilities

Date DBYD Ref Received: 12/04/2022 Date DBYD Job to Commence: 13/04/2022 Date DBYD Map Produced: 12/04/2022 Produced By: Urban Utilities

This Map is valid for 30 days

Sewer

- Infrastructure Major Infrastructure
- Network Pipelines Network Structures

Water

- Infrastructure
- Major Infrastructure ٠
- Network Pipelines
- Network Structures
- - Water Service (Indicative only)

correctness, currency or fitness for purpose. This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority. privacy laws. © State of Queensland Department of Natural Resources and Mines [2020]

Ν

Map Scale

1:1000

www.urbanutilities.com.au

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The plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate only and provided without warranties of any kind, express or implied including in relation to accuracy, complete the plans are indicative and approximate on the plans are indicative and approximate on

Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2020]. In consideration of the State permitting the use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the

For further information, please call Urban Utilities on 13 26 57 (8am-6pm weekdays). Faults and emergencies 13 23 64 (24/7).



WARNING: This document is confidential and may also be privileged. Confidentiality nor privilege is not waived or destroyed by virtue of it being transmitted to an incorrect addressee. Unauthorised use of the contents is therefore strictly prohibited. Any information contained in this document that has been extracted from our records is believed to be accurate, but no responsibility is assumed for any error or omission. Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed, please raise a new enquiry.

Sequence Number: 210258879



For all Optus DBYD plan enquiries – Email: <u>Fibre.Locations@optus.net.au</u> For urgent onsite assistance contact 1800 505 777 Optus Limited ACN 052 833 208 Date Generated: 12 Apr 2022



| То: | Jarrod Bubbert | |
|--------|--------------------|--|
| Phone: | Not Supplied | |
| Fax: | Not Supplied | |
| Email: | jbubbert@adgce.com | |

| Dial before you dig Job #: | 31755578 | |
|----------------------------|---|--|
| Sequence # | 210258878 | |
| Issue Date: | 12/04/2022 | |
| Location: | 15 Anderson Street, Fortitude Valley, QLD, 4006 | |

1

Indicative Plans

| 34 | Parcel and the location | | | | |
|-----------------------------------|--|--|--|--|--|
| 3 | Pit with size "5" | | | | |
| 25 | Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null. | | | | |
| | Manhole | | | | |
| \otimes | Pillar | | | | |
| 2 PO-T-25.0m P40-20.0m 9 | Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart. | | | | |
| -0 10.0m | 2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart. | | | | |
| -0 | Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables. | | | | |
| -0 | Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables. | | | | |
| -0 | Trench containing any INSERVICE/CONSTRUCTED (Power) cables. | | | | |
| BROADWAY ST | Road and the street name "Broadway ST" | | | | |
| Scale | 0 20 40 60 Meters 1:2000 1 cm equals 20 m | | | | |



Emergency Contacts

You must immediately report any damage to the **nbn**[™] network that you are/become aware of. Notification may be by telephone - 1800 626 329.



accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

Paper size A3 Map has been designed to be reproduced in colour



accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.





DBYD

Sequence: 210258877 Date: 12/04/2022 Scale: 1:500 Tile No: 1

> For a full list of Map Symbols, please refer to the supplied **DBYD Symbology** Legend page

AS5488 Category "D" Plan



DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

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This output provides details of the ENERGEX electrical network. As variations map exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

these terms.

Paper size A3 Map has been designed to be reproduced in colour



accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.





DBYD

Sequence: 210258877 Date: 12/04/2022 Scale: 1:500 Tile No: 4

> For a full list of Map Symbols, please refer to the supplied DBYD Symbology Legend page

AS5488 Category "D" Plan



DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.



Cross Bonding Link Box - Critical

- Disconnect Box Critical
 - Ring Main Unit
 - Distribution Pad Substation
 - Earth

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- Remote Earth
- M Cable Marker
- Handhole
- 🛞 Manhole
 - Commercial Industrial Pillar
 - Distribution Cabinet
 - Link Pillar
- Service Pillar
 - Feeder Pillar
 - Pole
 - Streetlight Column
 - Communication Junction Pillar
 - Communication Pit
 - Fibre Patch Panel
 - Pilot Cubicle
 - Underground Asset 33kV and above Underground Asset below 33kV Underground Conduit with or without cable Pit Communication Boundary
 - Reserve (RE)
 - Water Resource (WR)
 - Cadastral Parcels

| Planned Jointing Pit – New/Updated |
|--|
| Planned Jointing Pit - Remove |
| Planned Communication Boundary – New/Updated |
| Planned Communication Boundary - Remove |
| Planned Tunnel/Trench/Bore - New/Updated |
| Planned Tunnel/Trench/Bore - Remove |

Planned Cross Bonding Link Box - New/Updated ÷ Ť Planned Cross Bonding Link Box - Remove $\overline{}$ Planned Disconnect Box - New/Updated Planned Disconnect Box - Remove Planned Distribution Pad Substation - New/Updated Planned Distribution Pad Substation - Remove \land Planned Distribution Ground Substation - New/Updated Planned Distribution Ground Substation - Remove Planned Ring Main Unit - New/Updated Planned Ring Main Unit - Remove Ť Planned Earth - New/Updated Ť Planned Earth - Remove М Planned Cable Marker – New/Updated М Planned Cable Marker - Remove \$ Planned Remote Earth - New/Updated Ŷ Planned Remote Earth - Remove М Planned Underground Warning Post - New/Updated Planned Underground Warning Post - Remove Planned Pilot Cubicle - New/Updated ŝ. Planned Pilot Cubicle - Remove Planned Fibre Patch Panel - New/Updated \$ Planned Fibre Patch Panel - Remove CI Planned Commercial Industrial Pillar - New/Updated GL Planned Commercial Industrial Pillar - Remove Planned Distribution Cabinet - New/Updated Planned Distribution Cabinet – Remove Planned Link Pillar - New/Updated Planned Link Pillar - Remove Planned Service Pillar - New/Updated Planned Service Pillar - Remove Planned Pole - New/Updated Planned Pole – Remove \otimes Planned Manhole - New/Updated Planned Manhole - Remove Planned Streetlight Column - New/Updated Planned Streetlight Column - Remove Planned Handhole - New/Updated Planned Handhole - Remove Planned Communication Junction Pillar - New/Updated Planned Communication Junction Pillar - Remove .

Job # 31755578 Seq # 210258875 Provider: Brisbane City Council Telephone: 07 3403 8888

BRISBANE CITY





Job # 31755578 Seq # 210258875 Provider: Brisbane City Council Telephone: 07 3403 8888

BRISBANE CITY







Job # 31755578 Seq # 210258875 Provider: Brisbane City Council Telephone: 07 3403 8888







Job # 31755578 Seq # 210258883 Provider: Aussie Broadband Limited Telephone: 0448320776









APA Group PO Box 6014 Halifax Street South Australia 5000

For your immediate information THERE IS A CRITICAL GAS PIPELINE AND/OR ASSOCIATED INFRASTRUCTURE in the area of your works.

12/04/2022

Company: ADG Jarrod Bubbert 596 Milton Road Toowong QLD 4066 jbubbert@adgce.com

Dear Jarrod Bubbert

| Sequence Number: | 210258882 | |
|-------------------|--------------------|------|
| Worksite Address: | 15 Anderson Street | |
| | Fortitude Valley | |
| | QLD | 4006 |

Thank you for your Dial Before You Dig enquiry regarding the location of Gas Assets. We can confirm that the APA Group has **Critical Gas Assets** in the vicinity of the above location.

You are hereby notified that **before you commence any works** you are required to complete the attached '**Work In The Vicinity Of Critical Gas Assets**' request form and forward this to APA as soon as practicable.

As laid out in the **Duty of Care** requirements supplied, any activity in the vicinity of Critical Gas Assets operated by APA requires an Authority to Work Permit and potentially attendance on site by an APA representative during any work. Please ensure you read and comply with all the relevant requirements. Should you have any questions with regards to the attached information please contact our Qld Planning & Scheduling Officer - (07) 3215 6644.

Caution - Damage to gas assets could result in possible explosion and fire with the risk of personal injury. For Gas Emergencies please call 1800 GAS LEAK (1800 427 532)

Please find enclosed the following information:-

- APA's Duty of Care, If you are unclear of your obligations under these requirements please contact the APA Representative listed above immediately
- An overview map with your requested area highlighted to assist in locating APA's Gas Assets
- A map(s) showing APA's Gas Assets in the requested area, this information is valid for 30 days from the date of this response, please check this represents the area you requested, if it does not, please contact the APA Representative listed above immediately
- A 'Work In The Vicinity Of Critical Gas Assets' request form, please complete and forward to APA as soon as practicable, via <u>PermitsQld@apa.com.au</u>, or the address above. A minimum of **5 business** days advance notification is required to process Authority To Work Request applications

The outcome of this request may be that a qualified APA Group Representative will be required on site when you undertake your proposed works, if this is the case, this will need to be arranged dependent on their availability. Whilst we will aim to facilitate this within 5 business days from a decision, **this cannot be guaranteed**.

 Mapping information is provided as AS5488-2013 Quality Level D

 APA Group • PO Box 6014 Halifax Street SA 5000 • Email: DBYDNetworksAPA@apa.com.au • Template: QLD Critical Jan 2022

 Page 1 of 8 • 12/04/2022





Please Note: For some DBYD enquiries, you might receive 2 responses from the APA Group. Please read both responses carefully as they will relate to different assets. It is your responsibility to action all requirements set out in APA Group responses.

Please take some time to review the entire response document and check the information supplied and please let us have any feedback by sending an email to <u>DBYDNetworksAPA@apa.com.au</u> or contacting us direct on 1800 085 628.

Duty of Care - Working Around Gas Assets

General Conditions

- This location enquiry is valid for 30 days from the enquiry date
- Expired locations, i.e., over 30 days from the date of this response, require a new Dial Before You Dig request to validate location information
- The location information supplied in this document shall be used as a guide only. APA Group shall not be liable or responsible for the accuracy of any such information supplied pursuant to this request
- It is the responsibility of the excavator to expose all Gas Assets, including Gas Service pipes (see below), **by hand**. Gas Asset depths may vary according to ground conditions
- Gas Services (inlet service) connecting Gas Assets in the street to the gas meter on the property are typically **not** marked on the map
- Some Gas Assets are installed inside of a casing. The locations where a Gas Asset changes from inserted to direct burial are not marked on the map unless otherwise stated
- This information has been generated by an automated system based on the area highlighted in your DBYD request and has not been independently verified. It is your responsibility to ensure that the information supplied in this response matches the dig site you defined when submitting your Dial Before You Dig enquiry. If the information does not match the dig site or you have any question, please contact APA immediately using the details listed on the first page and / or please resubmit your enquiry
- For Gas Emergencies please call 1800 GAS LEAK (1800 427 532)

Critical Gas Assets - Conditions

It is your responsibility to follow these important conditions when working in the vicinity of Critical Gas Assets

- A 'Work In The Vicinity Of Critical Gas Assets" request form must be submitted to APA Group PRIOR to any work commencing, a minimum of **5 business days** are required to arrange attendance by an APA Group representative
- Whilst we will aim to facilitate this within **5 business days** from a decision, **this cannot be guaranteed**. Charges for APA Group supervision may apply
- Any works in the vicinity of Critical Gas Assets requires approval from APA via APA's 'Authority to work" permit and supervision by an APA Group representative unless expressed otherwise on the "Authority to work" permit.
- Penalties apply to excavators commencing work in the vicinity of Critical Gas Assets **prior to receiving an APA Group 'Authority to Work' permit and an APA Group representative is present**.





Rates applicable to APA on-site representation for supervision or location

| Item | Rate |
|-------------------------------------|---|
| Site Watch - Normal Hours | \$143.42 (hr) |
| Site Watch - After Hours | \$175.06 (hr) |
| Electronic Locate – Normal Hours | \$143.42 (hr) |
| Electronic Locate – After Hours | \$175.06 (hr) |
| Cancellation | 2 hrs (where less than 1 business day notice is provided) |
| Mains Proving | As quoted by APA |

Notes:

- All prices are exclusive of GST
- All partial hours will be charged at a full hour rate for the first hour, 1hr minimum charge.
- Cancellations must be received 1 business day prior to the booked supervision otherwise a 2hr charge will be incurred
- Contact us for State specific hours of business.

APA CHANGE NOTIFICATION

The map below may have different symbols to those you are familiar with.

APA recently upgraded the asset mapping software utilised for Dial Before You Dig requests.

To avoid confusion, please carefully review the legend along with the map.

Please direct any questions to <u>DBYDNetworksAPA@apa.com.au</u>







Mapping information is provided as AS5488-2013 Quality Level D APA Group • PO Box 6014 Halifax Street SA 5000 • Email: DBYDNetworksAPA@apa.com.au • Template: QLD Critical Jan 2022 Page 4 of 8 • 12/04/2022







| INTEDIONT I RECOORED | | | ONTE / RECOLMOND | | | |
|--|-----------------------------------|-------------------------|----------------------|--------------|--|--|
| HIGH PRESSURES | P# (e.g. P6) Polyethyler | ne (PE) | GAS SUPPLIED = YES | * | | |
| TRANSMISSION PRESSURES | P6,P7,P9-P12 Medium | Density PE | CP RECTIFIER UNIT | R | | |
| PRIORITY MAIN (BEHIND PIPE) | P2,P4,P8 High Der | nsity PE | CP TEST POINT/ ANODE | 🗩 / 🐥 | | |
| | ST or S# Steel | | syphon | S | | |
| LPG (COLOUR BY PRESSURE) | S6# (e.g. S61) Steel Class | 600 | TRACE WIRE POINT | ⊕ | | |
| ABANDONED | \$3# (e.g. \$33) Steel Class | 300 | PIPELINE MARKER | ф | | |
| IDLE | W2 or GAL Wrought Ge | alv. Iron | NOT TIED IN | n.t.i. 😁 | | |
| SLEEVE - | W3 or PGAL Poly Coat V | Vrought Galv. Iron | COUPLING & END CAP | or | | |
| CASING / SPLIT (BEHIND PIPE) / | Pine diameter in millimetres is | shown before nine | DEPTH OF COVER | С | | |
| UNKNOWN | code | shown before pipe | | | | |
| EASEMENT/ JURISDICTION | inaldiameter | | | | | |
| EXAMPLES 40P6 in 80C2 40mr | n High Pressure Medium Density Po | lyethylene in an 80mm C | Cast Iron Casing | | | |
| 63S8 63mm Medium Pressure Steel | | | | | | |
| Line / Polygon Request This map is created in colour and shall be printed in colour | | | | | | |
| Scale 1:700 | | | 0 0.009km | | | |
| APA Group does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. APA Group is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map. | | | | | | |

 Mapping information is provided as AS5488-2013 Quality Level D

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 Page 5 of 8 • 12/04/2022





WORK IN THE VICINITY OF CRITICAL GAS ASSETS

It is your responsibility to read and complete this request form

- 1. This request form must be received by the APA Group via the options below at least <u>5 business days</u> prior to excavation or site location work commencement
- 2. Excavation / works must not commence on site until you have received a 'Authority to Work Permit' from the APA Group
- 3. This request form must be accompanied by a detailed schedule of works
- 4. Penalties apply to excavators commencing work in the vicinity of Critical Gas Assets **prior to receiving an APA Group 'Authority to Work Permit'**

For further information refer to:-

- NSW Gas Supply Act 1996 Sec 64 C, Requirements in relation to carrying out of certain excavation work
- Victoria: Pipelines Act 2005 Section 118, Digging near pipelines and Section 119, Interference with pipeline
- South Australia: Gas Industry Act 1997 Section 83, Notice of work that may affect gas infrastructure.
- Northern Territory: Energy Pipelines Act as in force at 8 March 2007 Section 66, Threat to pipeline.

Return to: <u>PermitsQld@apa.com.au</u>

Enquiries:

Should you have any questions with regards to the attached information please contact our Qld Planning & Scheduling Officer - (07) 3215 6644.

Work / Excavation Site Details:

| Number: | Street: | | | | |
|---|------------------|--|--|--|--|
| Suburb: | Suburb: State: | | | | |
| Sequence Number: 210258 | 3882 | | | | |
| Requestors Name: | Requestors Name: | | | | |
| Company Name: | Company Name: | | | | |
| Name of Authorised Company Site Representative: | | | | | |
| Email: | | | | | |
| Phone: Mobile: | | | | | |
| Signature: | | | | | |





<u>No</u>

Description of Work / Excavation:

| Activity/Excavation Details: | | | | | |
|---|--|-------------------------|--|--|--|
| | | | | | |
| Tick Applicable Box | | | | | |
| Excavation | | Change to surface level | | | |
| Service crossing | | Boring | | | |
| Proving | | Other (provide details) | | | |
| Earthworks | | | | | |
| Excavator Size, Tooth Type & Tooth Size (provide details) | | | | | |
| | | | | | |

Work / Excavation Drawings Attached (circle):

Proposed Dates and Times:

| From | | | То | | |
|------------|------|-------|------|-------|--|
| Excavation | Date | Time | Date | Time | |
| | / / | am/pm | / / | am/pm | |
| Backfill | Date | Time | Date | Time | |
| | / / | am/pm | / / | am/pm | |

<u>Yes</u>

| Work is as- | Class 1 | Class 2 | Class 3 | |
|-------------|-------------------------------------|---|---|--|
| sessed as: | Works crossing a critical gas asset | Works within 3m of a critical gas asset | Works involving large excavations, vibrations or blasting beyond 3m of the critical gas asset | |

Insurer and Policy Details

| Policy Number | | Policy Expiry Date | |
|--|--|--------------------|--|
| Insurance Cover – Current Level (\$amount) | | | |





Third Party Works Authorisation requested by (mandatory fields required for invoicing):

| Company/Biller Name: | | | | |
|----------------------|-----------------------|--|--|--|
| Billing Address: | | | | |
| Purchase Order: | Billing Email: | | | |
| Biller Phone: | | | | |
| Requestors Name: | Requesters Signature: | | | |

<u>NOTES</u>

- 5. This Authority to Work applies only to work in the vicinity of the Gas Mains. It does not authorise work near or on the Gas Mains itself
- 6. A minimum of 2 business days must be allowed between receipt by APA Group of this Request and a response. However, more time for notification may be necessary
- 7. For any gas leak related work this application must be accompanied by a detailed sequence of events, outlining all aspects of work involved and work is not permitted until an Authority to Work is issued
- 8. For class 1 and 2 Dial Before You Dig, APA Group will arrange for an inspector to be on site as necessary during the work. An inspector must be present at all times for works involving excavation within 1m of the Gas Mains. APA Group will advise the requirement for an inspector for other works within 3m of the Gas Mains
- 9. The applicant is responsible for any damage resulting from the work and all consequential damages and losses arising from such damage and therefore must insure against every liability of the contractor in respect of or arising out of any loss of life, loss of or damage to property of person (both real and personal), arising out of or in any way connected to this permit.
- 10. Rates applicable to APA on-site representation for supervision or location exclude GST.

Brisbane

596 Milton Road, Cnr Sylvan Road Toowong, QLD 4066 PO Box 1492 Toowong BC, QLD 4066 **Phone:** +61 07 3300 8800 **Email:** info@adgce.com

Melbourne

Suite 309, 838 Collins Street, Docklands VIC 3008 Phone: +61 03 9269 6300 Email: info@adgce.com

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Level 3, 2 Emporio Place Maroochydore, QLD 4558 PO Box 5014 Maroochydore BC, QLD 4558 **Phone:** +61 07 5444 0400 **Email:** info@adgce.com

Darwin

ADG

Tenancy 3, Lvl 1, 5 Edmunds St, Darwin NT 0800 GPO Box 2422 Darwin, NT 0801 **Phone:** +61 08 8944 6300 **Email:** info@adgce.com

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Tenancy 8, 158 Margaret Street Toowoomba QLD 4350, Australia **Phone:** +61 07 3300 8800 **Email:** info@adgce.com

Perth

Level 3, Suite 15, 23 Railway Road, Subiaco, WA 6008 PO Box 443 Subiaco, WA 6904 **Phone**: +61 08 9217 0900 **Email:** info@adgce.com

