

9-11 Bowen Bridge Road, Bowen Hills
Lot 11 & 12 RP9940
Our ref: 130743

SITE BASED STORMWATER MANAGEMENT PLAN
JANUARY 2014

PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

19 MAR 2014

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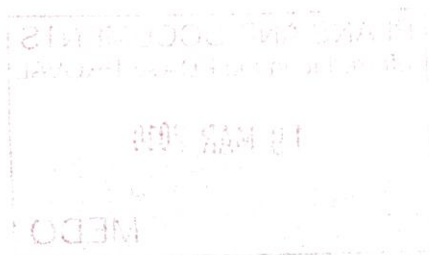


sellick
consultants

structural civil hydraulic engineers

Report Amendment Record

No	Description	Design & Documentation	Reviewed	Date
1	Client Review	Mark Richardson / Alex McLennan	Bernie Cusack	28 January 2014
2	For Development Approval	Mark Richardson / Alex McLennan	Bernie Cusack	29 January 2014



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1. Introduction

1.1. Description of proposed development

The proposed development comprises the relocation of existing building, with the construction of a new multi storey building to occupy the entire site.

1.2. Study team

Study of site completed by Sellick Consultants

1.3. Risk classification for the site ('high' or 'low')

The site is Low risk (based on definition from section 4.3, Stormwater Management Code, Brisbane City Plan 2000 Vol 1)

2. Site characteristics

2.1. Location (including catchment and planning unit)

The site is located at 9-11 Bowen Bridge Road, Bowen Hills, between Bowen Bridge Road and Walden Lane

2.2. Topography

The site falls towards the north east corner (Bowen Bridge Rd) with approx. 2m of fall diagonally 50m across the two lots in a northwestern direction

2.3. Site survey plan to Australian height datum (AHD)

Refer survey drawing provided by PJ Riley Surveyors and Architectural drawing for preliminary design verge levels interface.

2.4. Existing land use (on-site and adjacent properties)

Lot 12 has a single timber building and lot 11 is currently undeveloped

2.5. Proposed land use

The site is intended to be used as a mixed use development, with basement car parking below ground and at ground level, retail space fronting Bowen Bridge Road and residential use on levels 1 - 9

2.6. Soils

Based on information available on Brisbane City Council Website, the site soil is expected to be Shallow Gravelly Soil

2.7. Watercourses (within or adjacent to the site)

There are no known watercourses within the site

A review of the flood flag map indicates that the site is located outside the overland flow paths and flood zones for Enoggera Creek

2.8. Vegetation within the waterway corridor (within or adjacent to the site)

There are no known watercourses within the site

3. Data

3.1. Previous waterway-related studies (regional and local)

None known

3.2. Description of existing stormwater/waterway infrastructure (regional and local)

There is an existing stormwater main on Walden St. while existing records note it as being 100mm diameter a survey identified the outlet of the existing gully as being 300mm diameter. It is expected that the main is 300mm diameter

4. Opportunities and constraints

4.1. Summary of key site characteristics (eg amount of impervious surfaces, increased Runoff from site, potential for stormwater pollution, potential for infiltration of Stormwater, etc)

The developed site is to be fully impervious, and as such there is limited scope for infiltration. Any infiltration below the building would require a detailed design review reviewing the geotechnical and structural issues.

There will be an increase in impervious area, with an associated increase in stormwater flow. Refer to section 5 for further analysis.

4.2. Existing drainage pattern (if retaining) or proposed modification (modification to ensure no adverse flooding impact on adjoining properties)

Given the existing topography, there is no anticipated affect on overland flow paths to / from adjacent land.

Since the proposed development will completely develop the site, all drainage will be roof drainage.

A surcharge pit will be provided along the Walden Lane frontage to permit surcharge to the street in the event of pipe blockage. This is considered possible given the fact that the entirety of the drainage will be roofed and that there will be no levels issues associated with pavement drainage.

4.3. Requirements from previous studies (regional and local)

No requirements known

4.4. Waterway corridor requirements from city plan (where relevant)

No requirements known

4.5. Parkland contributions(where relevant)

No requirements known

4.6. Key stakeholder needs/wants

No requirements known

5. Water quantity (hydrology & hydraulics)

5.1. Methodology adopted

The stormwater quantity analysis and design for this site was conducted using Drains. Rainfall data was taken from Brisbane City Council Subdivision Development Guidelines Part B Chapter 2.

Refer to the following table for a summary of the relevant return periods and rainfall intensities assessed.

Rainfall Duration (mins)	10 year Intensity (mm/hr)	50 year Intensity (mm/hr)
5	215	291
10	167	227
15	142	194
20	125	172
25	113	155
30	103	142
45	83	115
60	70	97
120	45	62
180	34	47

Table 5.1 – Comparison between Pre and post development stormwater Characteristics

5.2. Selection of analytical approach

Considering the scale of the development, Drains is considered to be an appropriate means for analyzing the stormwater

5.3. Proposed management measures (if any)

A stormwater detention tank is intended to reduce the design flow to predevelopment conditions for 100 year return period storms

5.4. Comparison of existing and proposed conditions in terms of increased runoff and its redistribution and flood levels

Please see Table 5.2 below for a summary of the modified impervious surfaces and associated modification in flow.

	Existing	Proposed	Actual Increase	Percent increase
Impervious Area	171 sqm	857 sqm	686 sqm	-
Overall Area	857 sqm	857 sqm	-	-
Percent Impervious	20%	100%	-	-
10 Year ARI Flow (max from assessed storm durations)	43 L/s	52 L/s	9L/s	21%
50 Year ARI Flow (max from assessed storm durations)	56 L/s	69 L/s	13L/s	23%

Table 5.2 – Modification to Impervious Area and Flow (No Flow Reduction)

Since the existing overland flow path is to Bowen Bridge, and the newly proposed stormwater connection is to Walden Lane, some stormwater flows that were previously directed towards Bowen Bride Rd would now be directed towards Walden Lane

5.5. Detailed drainage plan showing the proposed routes of the drainage networks

All stormwater drainage will be within the building and can be provided at detailed design stage

5.6. Proposed mitigation measures due to development (structural and non-structural)

To mitigate the increased flows from the site and to ensure no flood impacts, it is intended to reduce the 2 and 100 year flows to pre development conditions.

This will be done through the use of a detention tank with A 240mm orifice outlet on a 300mm pipe. The tank will be placed in the void between the lower and upper level ground floor slab.

This design is subject to actual levels on the stormwater main.

Please see below Table 5.3 for summary of assessment results based on the critical storms.

ARI	Pre-Development Inflow (L/s)	Post Development Inflow (L/s)	Required Volume (kL)	Outflow (L/s)
10	44	52	11	44
50	56	69	25	54

Table 5.3 – Overview of Flow Reduction

The site's stormwater will be connected to the existing stormwater main on Walden Lane via a new stormwater pipe and manhole. Details of this can be provided at detailed design stage.

6. Water quality

6.1. Pollutants of concern

There are no specific pollutants of concern, only an increased pervious area. See below for a comparison of the pre and post catchments

- The pre development catchment comprises a mix of landscape, gravel car parking area and a roofed timber building
- The post development catchment will comprise a roofed structure occupying the entire development

6.2. Receiving waters, environmental values and water quality objectives

The stormwater is intended to connect to the existing stormwater main on Walden Lane.

The water quality objectives are as follows:

- 80% reduction in Total Suspended Solids (TSS)

- 45% reduction in Total Nitrogen (TN)
- 60% reduction in Total Phosphorous (TP)
- 90% reduction in Gross Pollutants (GP)

6.3. Model selection

The site has been analysed using MUSIC in accordance with the parameters as outlined above.

6.4. Modelling assumptions

All as per MUSIC software.

6.5. Existing conditions

The pre development catchment comprises a mix of landscape, gravel car parking area and a roofed timber building

6.6. Impact of development (only qualitative assessment for 'low risk' development)

The increase in impervious area will cause an increase in natural stormwater contaminants discharging into the stormwater network

6.7. Potential management strategies/sqbmps (structural and non-structural)

Based on an assessment using MUSIC it is intended to use 3 stormwater 360 proprietary treatment devices. These treatment devices will be placed in the void between the lower and upper level ground floor slab:

A MUSIC model schematic is also shown below.

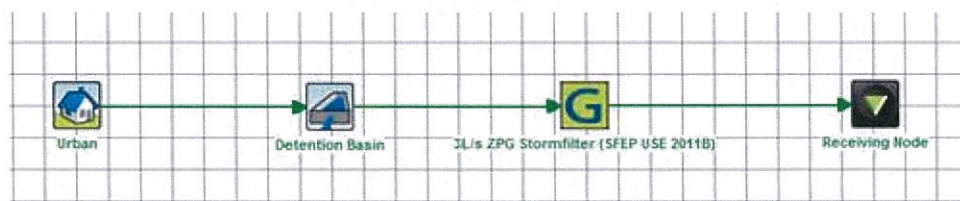


Figure 6.1 – MUSIC Schematic Treatment Train

This design is subject to actual levels on the stormwater main.

7. Stormwater management options

7.1. Selection and assessment of water quantity controls

A stormwater detention tank is proposed to reduce the flows to pre development conditions. Refer section 5.6 above

7.2. Selection and assessment of water quality controls (sqbmps)

Stormwater quality is to be improved by the use of proprietary devices to treat the stormwater. Refer section 6.7 above.

7.3. Integration with waterway corridor

The site is not within a waterway corridor

7.4. Recommended stormwater management strategy (including actions, responsibilities, Deadlines, etc)

Provide a stormwater tank and treatment devices as outlined above.

Any constructed items will be built as part of the development

8. Lifecycle cost assessment

8.1. Capital cost of proposed strategy

The capital cost has to been determined at this stage, however will be borne by the developer

8.2. Maintenance cost of proposed strategy

Cost not available. Refer section 10 for further information on maintenance.

8.3. Asset life of proposed strategy

Not available

8.4. Lifecycle cost of proposed strategy

The lifecycle cost will be a combination of the capital and maintenance costs as outlined above.

9. Water Quality Monitoring Program

None proposed

10. Maintenance Plans

10.1. Inspection forms and plans (for large structural controls)

To be provided at detailed design stage.

10.2. Responsibilities for maintenance of structural controls (eg role of body corporate or Similar)

Any on site stormwater management devices are expected to be retained as owned and maintained by the body corporate for the development.

Any off site stormwater management devices, including kerbs, driveways, as well new stormwater pipework and/or manholes are expected to be maintained by the Council in accordance with their own costing schedule.

Appropriate monitoring during construction of items to be handed over to council should be done to ensure they are constructed in accordance with Council requirements. This should keep maintenance to a minimum.

11. Asset hand-over

11.1. Process and timing for asset hand-over to council (where relevant)

Handover is expected to be done once all relevant works are completed. The handover procedure is expected to be prescribed by Council, in accordance with their own procedures

12. References

12.1. Detailed design and/or policy references

- Brisbane City Council City Plan 2000 (Amt. 1 July 2009) StormwaterCode

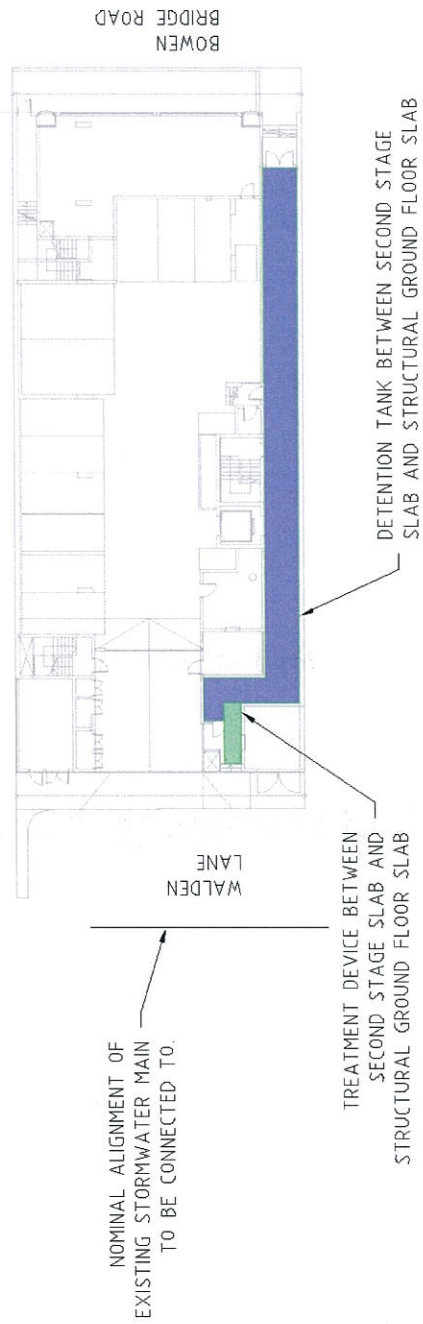


- Brisbane City Council Subdivision & development Guidelines (downloaded January 2014)



Appendix A

Schematic of Stormwater Management





Appendix B

Statement against Stormwater Code Performance Criteria

Brisbane City Plan Section 4.1 - General	
P1 The planning of the stormwater management system must provide for the integrated management of stormwater in order to: • Minimise flooding • Protect and enhance environmental values of receiving waters • Maximise the use of water sensitive urban design principles • Maximise the use of natural waterway corridors and natural channel design principles • Maximise community benefit • Minimise safety risk to all persons	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council. There are no natural waterways present on site. There is no intended community benefit from the stormwater measures.
Brisbane City Plan Section 4.2 - Flooding	
P1 The proposed stormwater management system or site works must not adversely impact on flooding or drainage of properties that are upstream, downstream or adjacent to the subject site	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council.
P2 The drainage network must provide capacity to safely convey stormwater run-off resulting from relevant design storm events taking into account increased run-off from roof drainage	The building drainage will be adequately designed to convey runoff in accordance with prescribed requirements by Brisbane City Council
P3 Development design (including any carparking areas) must reduce property damage, provide flood immune access to the property and, where applicable, ensure the safety of all persons by ensuring that the development levels are set above the relevant design flood level or storm surge level	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council.
P4 Any channel works that are part of the development, major drainage works or flood mitigation works must maintain and/or enhance the environmental	None proposed

values of the waterway corridor or drainage corridor	
P5 Erosion treatment works along waterway banks and associated drainage structures must maintain or enhance the environmental values of waterways	None proposed
P6 Bridges and culverts provided for flood immunity to minimise traffic disruption must improve the safety of all people and allow for fauna movement and recreation corridors	None proposed
P7 The design and construction of detention and retention storage features must: • Achieve acceptable impacts on environmental values • Provide for recreational use where possible • Achieve acceptable risk to all persons' safety and property	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council.
Brisbane City Plan Section 4.3 (Low Risk) - Water Quality and Drainage	
P1 Water quality impacts must be minimised using best practice techniques	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council.
P2 Release of sediment laden stormwater is minimised	The stormwater system has been designed in accordance with prescribed requirements by Brisbane City Council.

BULK EARTHWORKS NOTES

- NOTWITHSTANDING THE LIMITS OF CUTTING AND FILLING SHOWN ON THE CROSS SECTIONS, THE ACTUAL LIMITS SHALL BE DETERMINED ON-SITE BY THE SUPERINTENDENT DURING CONSTRUCTION AND SIMILARLY THE FINISHED SURFACE CONTOURS MAY BE ADJUSTED BY WRITTEN DIRECTION OF THE SUPERINTENDENT DURING CONSTRUCTION.
- SUBGRADE TEST RESULTS TO BE FORWARDED TO THE SUPERINTENDENT FOR DETERMINATION OF BOX DEPTHS PRIOR TO EXCAVATION. TESTS SHALL INCLUDE SOAKED CBR AND/OR OTHER TESTS AS REQUESTED BY THE SUPERINTENDENT.
- CONTRACTOR TO LIAISE WITH ALL RELEVANT SERVICE AUTHORITIES TO ASCERTAIN SERVICES PRESENT ON-SITE. ANY ALTERATION WORKS TO SERVICES WILL BE CARRIED OUT BY THAT SERVICE AUTHORITY ONLY.
- THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT PRIOR TO COMMENCING THE DEMOLITION OF ANY EXISTING STRUCTURES WITHIN THE SITE AREA.
- ALL DRAINAGE STRUCTURES TO BE PRESERVED FROM THE EFFECTS OF STRUCTURAL LOADING GENERATED BY THE EARTHWORKS.
- ALL EXCAVATION AND FILLING SHALL BE COMPACTED TO THE LOCAL REQUIREMENTS OF AS3798-2007 IN ACCORDANCE WITH THE LOCAL AUTHORITY REQUIREMENTS. LEVEL 1 SUPERVISION IS REQUIRED.
- ALL CLEARING SHALL BE CARRIED OUT IN STAGES TO ALLOW FOR RELOCATION OF FAUNA, COMMENCING AT THE LOWER AREAS OF THE SITE.

LEGEND

- PROPOSED FINISHED SURFACE LEVEL
- DESIGN SURFACE CONTOUR (0.5m INTERVAL)
- EXISTING SURFACE CONTOUR (0.5m INTERVAL)
- EXISTING STAGE F1 SURFACE CONTOUR (10.1m INTERVAL)
- AREA OF CUT
- AREA OF FILL
- BATTER BETWEEN LOTS REFER DETAIL
- ZERO LOT BOUNDARY
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- INDICATIVE DRIVEWAY LOCATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION

NOTE:
SETBACK TO PADS
ARE 3.0m U.N.O.

LEVELS AS SHOWN
ON LAYOUT PLAN
- LOW SIDE - HIGH SIDE -
ON LAYOUT PLAN
- HIGH SIDE - LOW SIDE -

TYPICAL BATTER DETAIL BETWEEN LOTS

N.T.S

ALLOTMENT -
LEVELS AS SHOWN
ON LAYOUT PLAN
- VERGE -
2.0%
6 (MAX)
N.T.S

TYPICAL PAD SETBACK

N.T.S

REFER DRG. B12185-511
FOR INTERACTING WITH
EXISTING ALLOTMENTS

AS CONSTRUCTED
SIGNED
ANDREW WOO
JEFF GRIFFITHS
FOR AND ON BEHALF OF
BROWN CONSULTING QLD PTY LTD

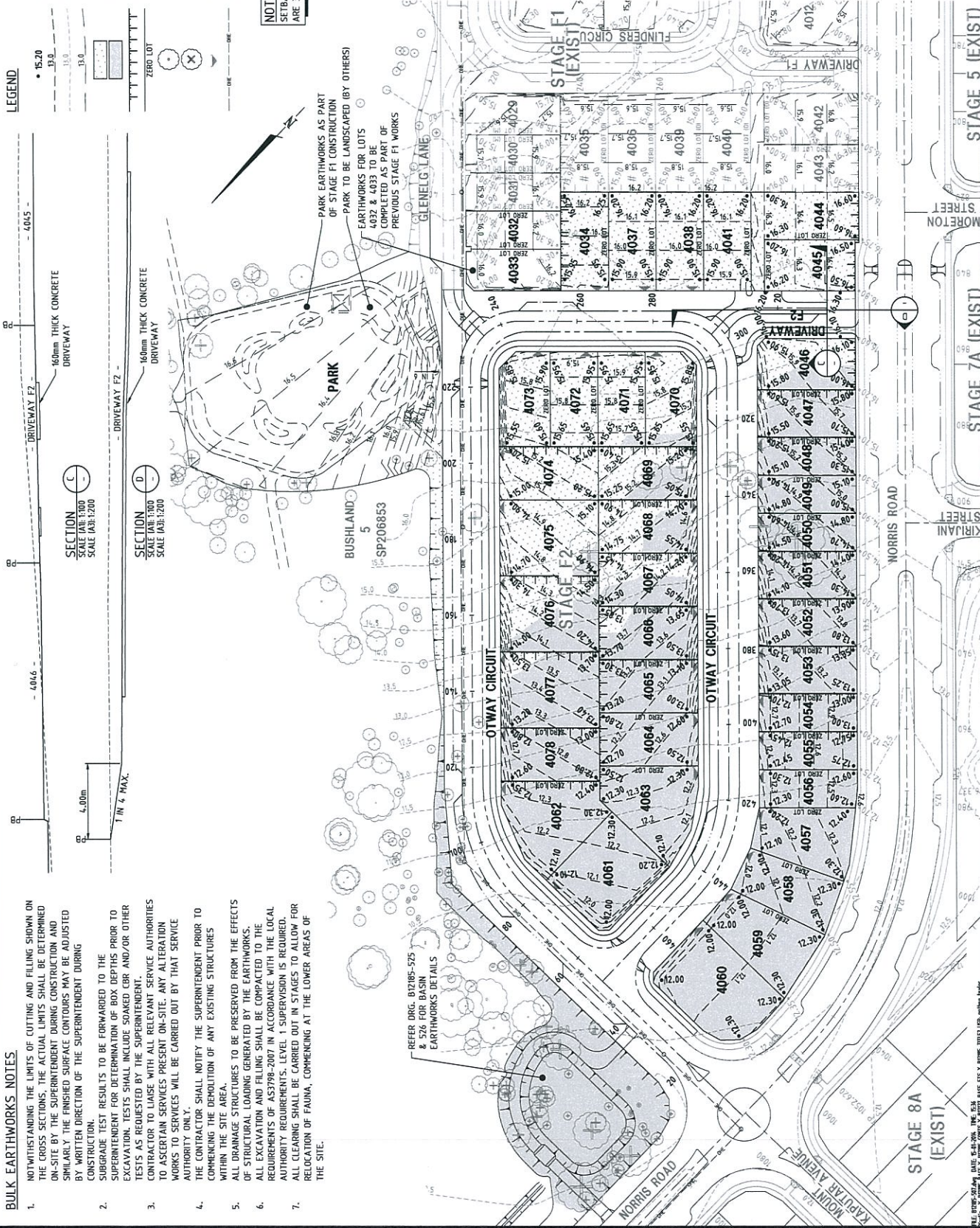
E.D.O. REF No. DEV2012/358

BULK EARTHWORKS LAYOUT PLAN

DATE: 12/01/2012

B12185-507

B



DATE: 12/01/2012

BROWN Smart Consulting

DSUP - ECONOMIC DEVELOPMENT QLD
FITZGIBBON CHASE
STAGE F2
NORRIS ROAD, FITZGIBBON

PROJECT
FITZGIBBON CHASE
STAGE F2
NORRIS ROAD, FITZGIBBON

PROJECT No.
B12185

DATE: 12/01/2012

SCALE: 1:1000

DATE: 12/01/2012

DATE: 12/01/2012

DATE: 12/01/2012

DATE: 12/01/2012

DATE: 12/01/2012

DATE: 12/01/2012

11/03/2014

Nicky Crane
Department of State Development, Infrastructure and Planning
63 George St
Brisbane 4000

Dear Nicky,

RE: Significant Vegetation – Fitzgibbon Chase (Area F)

In response to your request to assess the ecological values of a number of trees proposed to be cleared within Areas F1 and F2 at Fitzgibbon Chase, the following documents the information collected during a site inspection by Julie Zyzniewski on the 5th March, 2014.

Area F1 is adjacent to an existing car park and includes an area proposed for the construction of a 2.5 m wide walking path along the edge of existing bushland (refer Bulk Earthworks Layout Plan B12185-507). Trees identified in this area were one Broad-leaved Paperbark *Melaleuca quinquenervia* and a double trunked Forest Red Gum *Eucalyptus tereticornis*.

Area F2 is located at the north-western end of area F1 and includes an area proposed for the construction of a bio-basin (refer Bulk Earthworks Layout Plan B12185-507). Trees identified in this area were six Forest Red Gum, two Narrow-leaved Ironbark *Eucalyptus crebra* and one Broad-leaved Paperbark.

All of the identified trees have a diameter at 1 m above the ground of >60 cm, and would therefore be considered significant vegetation as defined within the Fitzgibbon Bushland Management Plan.

None of the trees would be considered old growth and no hollows were present. All trees displayed a fairly sparse canopy.

Evidence of fauna usage of the identified trees was restricted to possum scratches (probably Common Ringtail Possum *Pseudocheirus peregrinus*) and a small bird's nest in one tree within Area F1.

Photographs representative of the identified trees are provided in **Attachment 1**.

We trust this information is suitable for your purposes. Please do not hesitate to contact us on 3286 7788 if you have any queries.

Yours sincerely



Jedd Appleton
Project Delivery Manager
Biodiversity Assessment and Management Pty Ltd

Attachment 1 – Representative Photographs



Typical *Eucalyptus tereticornis* located within Fitzgibbon Chase.



Typical *Melaleuca quinquenervia* located within Fitzgibbon Chase

