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CONCEPTUAL SITE-BASED STORMWATER MANAGEMENT PLAN

In Association with the Material Change of Use Application for the Proposed Multi-Residential Development

at

44 Brookes Street, Bowen Hills

Lots 14 & 15 on RP9985

for

BlueSky Private Real Estate Pty Ltd

Ref: 1089-SBSMP-01_Version 1.0
Jan 2014

DOCUMENT INFORMATION

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Commissioned By:	BlueSky Private Real Estate Pty Ltd
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DOCUMENT CONTROL

Version	Date	Author	Reviewer
1.0	23 January, 2014	Cameron Landreth	Tony Shelley

EXECUTIVE SUMMARY

An assessment of the stormwater quality and quantity requirements has been carried out for the abovementioned property in accordance with The Bowen Hills UDA Development Scheme, Brisbane City Council's City Plan-2000 planning scheme, and BCC Subdivision & Development Guidelines.

In review of existing site aerial photos (source: Google Earth, QLD Plugin), it is noted that the site is already fully developed as a commercial premises. The overall fraction impervious of the site will only marginally change as a result of the proposed mixed-use development and so the quantities of stormwater discharge from site would essentially have no-actionable nuisance to upstream, downstream and adjacent properties.

The proposed development site has a total plan footprint of 608m^2. This is less than the 2500m^2 disturbance area (Refer BCC Subdivision & Development Guidelines & table 1.1 of this report) necessitating a site based stormwater quality management plan, therefore best practice stormwater quality management solutions are to be implemented on site. These will address both construction and operational phase of the development. A 4.5m^2 raised bioretention planter at podium level is proposed as the best practice stormwater quality treatment measure for site.

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APPENDIX A - Conceptual Stormwater Management Plan

APPENDIX B - Stormwater Quality Objectives – Construction Phase

1.0 INTRODUCTION

This conceptual site-based stormwater management plan (SBSMP) forms part of a Material Change of Use application to Economic Development Queensland (EDQ) for the multi-residential development at 44 Brookes Street, Bowen Hills. It is based on the *Bowen Hills UDA Development Scheme* and BCC's *'Subdivision and Development Guidelines.*

In accordance with Part C, Chapter 16 - Glossary of the Subdivision & Development Guidelines, the proposed development of the subject site is classified as **'low risk'** as it does not fall into any of the following categories:

Category	Applicable
• *any development (or development proposal) located in a waterway corridor, the Brisbane River corridor, or a wetland area as indicated on Council planning scheme maps; and/or*	✖
• *multi-unit dwellings or commercial uses with an impermeable surface area (not including roof area) in excess of 2500m^2; and/or*	✖
• *subdivisions where a greater than 6 lots are involved; and/or*	✖
• *industrial activities that are not impact assessable (under Council's City Plan) and have at least 1000m^2 in uncovered storage/working space; and/or*	✖
• *industrial activities that are impact assessable (under Council's City Plan); and/or*	✖
• *uncovered car parks with at least 100 spaces.*	✖

Table 1.1: Development risk category

Due to the proposed development categorised as 'low risk', this SBSMP will adopt best management practices for treatment of water quality as discussed in Section 4 of Part C – Water Quality Management Guidelines of Brisbane City Council's *Subdivision and Development Guidelines.* The use of 'Best Management Practices' (BMPs) is consistent with the *Bowen Hills UDA Development Scheme - Section 3.9: Water Management.*

2.0 SITE LOCATION and DESCRIPTION

The site is legally described as Lots 14 & 15 on RP9985 and is located at 44 Brookes Street, Bowen Hills. It lies within the Local Government boundary of Brisbane City Council and is within the Bowen Hills Priority Development Area, under the authority of Economic Development Queensland (EDQ), part of the Department of State Development, Infrastructure and Planning (DSDIP). Refer to Figure 2.1 and 2.2 below.

Figure 2.1: Approximate location of subject site within Bowen Hills
(Source: Google Maps)

Figure 2.2: Approximate property boundary
(Source: Google Maps)

The site has a total area of 608m^2 and is bordered by Mallon Street to the north, Brookes Street to the west and commercial properties to the east and south. Site access is off Mallon Street. The site falls from the north-east corner on Mallon Street to the south-west corner on Brookes Street, with an approximate change in level of 2.7m. The site is already fully developed so there are no natural slopes across the site and existing levels are the result of the current building. Ground surface levels range from 16.67m AHD to 19.35m AHD. Detailed survey of the site, prepared by Bennett & Bennett Surveyor & Town Planners, is attached with the overall development submission.

The site is currently fully developed with a 2-storey (plus basement) concrete building (refer Figure 2.3).

Figure 2.3: Existing building on the site.

The site is located within the Bowen Hills Priority Development Area and approximately 2km (direct line) north-east from the Brisbane CBD.

3.0 PROPOSED DEVELOPMENT

The proposed multi-residential development is a twelve (12) storey (plus roof) tower with a mixture of one and two-bedroom units. The ground floor also includes some commercial/retail space, associated services areas and car parking. Levels 1 & 2 combine car parking areas with a commercial retail space. Level 3 is the podium level with is residential only with private outdoor terrace areas for the units on this floor. Levels 4 to 12 are strictly residential areas. The development layout plans, by WG Architects, are included as part of the overall development submission.

Road access for the proposed development will be provided off Mallon Street only.

Water, sewer and other utility services are readily available to the site and will be connected to the internal infrastructure with the future building applications.

4.0 STORMWATER QUANTITY MANAGEMENT

The site is 608m^2 and is currently fully developed (refer Figure 2.2). The proposed development also incorporates approximately 98% site coverage. In accordance with QUDM Table 4.05.1, the fraction impervious for the existing site is f_i=0.87 and post-developed site is f_i=0.9. The percentages of impervious catchment for the existing case were estimated from site survey. The post developed percentage of impervious catchment was calculated from the proposed development layout.

There is only a minor increase in impervious area between the pre and post developed sites. Using the Rational Method, as presented in QUDM, for calculation of peak stormwater runoff discharge from site, the existing and post developed peak discharge rates were compared for the full range of design storms (1 to 100 year ARI).

Comparison of Peak Stormwater Discharge Flows for Existing and Developed Case (Rational Method Calculation – Urban Catchment)			
Design Storm	**Existing (L/sec)**	**Post-Developed (L/sec)**	**Difference**
1 year ARI	14	14	0.0%
2 year ARI	19	19	0.0%
5 year ARI	27	28	3.7%
10 year ARI	32	33	3.1%
20 year ARI	38	39	2.7%
50 year ARI	49	49	0.0%
100 year ARI	55	55	0.0%

Table 4.1: Peak Stormwater Discharge Comparison – Rational Method Calculation

The Q5 design storm peak discharge has the greatest increase of 1L/s or 3.7%, which is an insignificant change to the peak discharge. The Q10 and Q20 design storm peak discharge also increased by 1L/s. The change peak stormwater discharge for these design storm events (being 1L/s for Q5, Q10 and Q20) places no additional critical load on existing drainage infrastructure. This is considered to provide non-actionable nuisance of stormwater discharge to upstream, downstream and adjacent properties in accordance with QUDM. The assessment is conservative in that the nominal extended detention capacity in the bioretention planter has not been accounted for. It is likely that this detention volume (approx. 1.4m^3) would attenuate flows to be non-worsening.

4.1 Lawful Point of Discharge

Lawful point of discharge will be the kerb and channel in Brookes Street which is compliant with Section 3 of QUDM in that it is under the control of the Local Authority and does not cause an “actionable nuisance” as determined above in table 4.1.

5.0 STORMWATER QUALITY MANAGEMENT

The proposed residential development has been categorized as 'low risk' by Council's *Subdivision and Development Guidelines*. The Bowen Hills UDA Development Scheme, EDQ Guideline 14 – Environment and Natural Resources Sustainability, and the BCC Subdivision & Development Guidelines all prescribe Best Management Practices (BMPs) for stormwater discharge quality control. BMPs have been selected for the site in accordance with the guidelines Part C, Chapter 4, and will be implemented for both construction and operational phases.

5.1 Construction Phase

The design objectives for water quality during the construction phase of the development will be in accordance with Table 2.1 of Department of Environment and Resource Management: *Urban Stormwater Quality Planning Guidelines-2010* included as Appendix B. The design objectives will be achieved through appropriate Erosion and Sediment Control procedures during construction.

Typical pollutants generated during construction phase of a development are listed in table 5.1 below.

Pollutant	Potential Source	Priority
Litter	Paper, construction packaging, food packaging, cement bags, off cuts	High
Sediment	Unprotected exposed soils and stockpiles during earthworks and building works	High
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.	High
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, wash waters (e.g. From tile works)	Medium
Alkaline substances	Cement slurry and wash waters	High

Table 5.1: Typical Construction Phase Pollutants

The following are typical treatment measures that will be implemented, as required, before the commencement of any construction works. Detailed erosion and sediment control procedures are to be undertaken in accordance with the IECA Best Practice Sediment & Erosion Control and the Erosion and Sediment Control drawings lodged as part of an Operational Works application.

- sensible site planning
- diversion of up-slope water (where appropriate)
- stabilised site entry/exit point
- minimisation of site disturbance and duration of disturbance
- installation of sediment control along the lower edge of the site
- appropriate location and protection of stockpiles
- early connection of roof water downpipes

- trap on-site runoff from tool, paint and concrete washing and brick, tile and concrete cutting
- continual monitoring and maintenance of all control measures
- compaction of backfilled trenches
- revegetation and stabilisation of the site
- development and implementation of Erosion and Sediment Control Plans when appropriate.

5.2 Operational Phase

The internal drainage system has been designed to include Stormwater Quality Improvement Devices (SQIDs) in the water quality treatment train for the proposed development. Refer to Conceptual Stormwater Management Plan 1076-P05.

5.2.1 Rubbish Bins

A refuse area is provided on the ground floor for collection of litter from the individual units. Collection of the litter will be by Council's waste management services.

5.2.2 Bioretention Basin

Bioretention basins are densely vegetated filtration devices, where runoff (for small/frequent storm events) enters the basin and is filtered through a filter media layer (e.g. sandy loam) as it percolates downwards. Bioretention basins often have an extended detention volume above the filter media which increases the volume of runoff treated through the system. The runoff is treated as it passes through the system through fine filtration, absorption and some biological uptake. Refer to Figure 5.1 below showing a typical cross section of a bioretention basin.

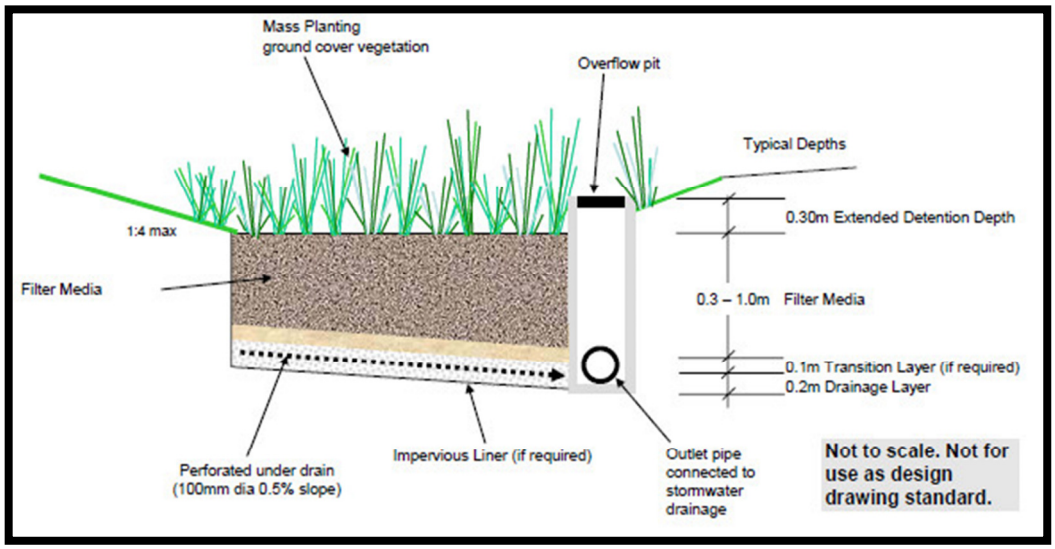


Figure 5.1: Typical cross section of a bioretention basin
(Source: Healthy Waterways WSUD Technical Design Guidelines)

Bioretention provides a number of functions including:

- Reduce the velocity of runoff;
- Trap sediment and associated pollutants;
- Reduce concentrations of nutrients such as Nitrogen and Phosphorous; and
- Nominal stormwater detention capacity.

For this development, a perched bioretention planter will be constructed within a planter box located adjacent to the access driveway on the eastern side. The basin will treat a percentage of surface runoff from the roof and podium level, with flows entering the basin through downpipes, etc.

It is proposed to provide a bioretention basin with a surface area of 4.5m^2 on the podium level. This will treat runoff from the building roof / mechanical plant level (approximately 50% of the site).

5.2.3 Establishing Bioretention Basins

The establishment period for plant species before the vegetation is mature and fully functional is typically two years. During this period regular site maintenance and monitoring is crucial to the success of the basin as a treatment device.

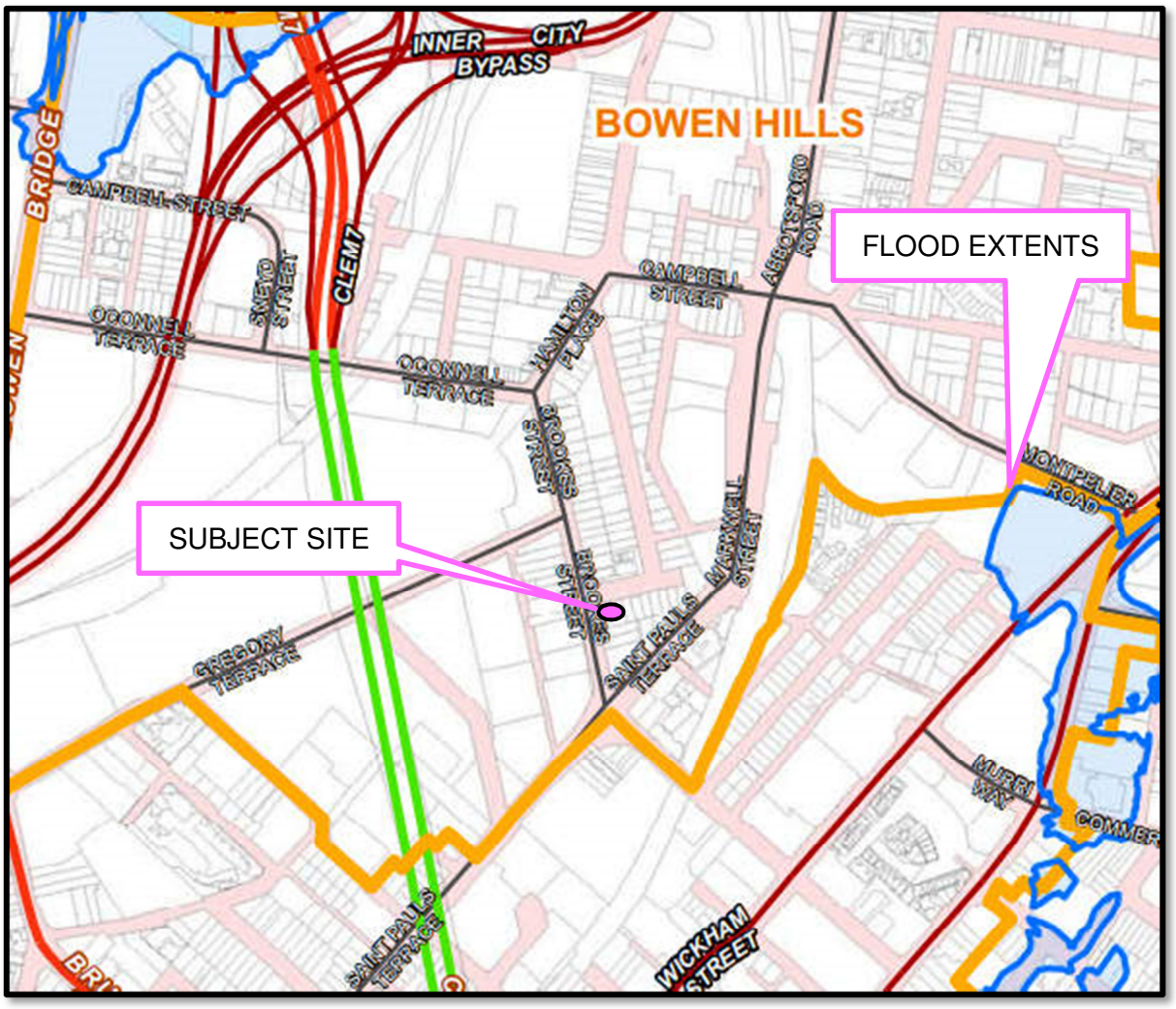
5.2.4 Maintenance of Bioretention Basins

There is a number of regular maintenance tasks required to keep the basins in efficient working order and preserve their amenity. Maintenance should be carried out generally every 3-6 months.

- Minor Erosion is to be treated by reprofiling the basin surface (adding new filter media as required) with hand tools and replanting with replacement vegetation from other parts of the basin.
- Weeds must be controlled in bioretention basins to prevent clogging of the filter media surface and competition with the established macrophyte planting in the basin. Weeds can be physically removed or chemically controlled using herbicides. Care must be taken when selecting herbicides to ensure they are suitable for use in aquatic areas and should only be applied by a competent, experienced person with ChemCert Training.

6.0 FLOOD MANAGEMENT

It is noted from Local Authority Flood Maps that the development site is not affected by flood inundation. The BCC Defined Flood Event (*City Plan 2000,* Chapter 3) does not encroach on the site boundaries. Refer to Figure 6.1 below.



7.0 CONCLUSION

We believe that this Conceptual Site-based Stormwater Management Plan provides EDQ with sufficient information to adequately assess the stormwater requirements for this proposed development. All relevant design parameters and requirements can be met, and compliance with EDQ's and BCC's codes and schemes will be demonstrated in future detailed Compliance Assessment designs.

In our opinion, there are no engineering constraints or impediments for construction of the site as a multi-residential development.

8.0 LIMITATIONS and CLOSURE

This report has been commissioned by BlueSky Private Real Estate Pty Ltd and specifically investigates the subject site as described in this report.

We consider that the study addresses the requirements for development of the subject site at the time the study was undertaken. If these conditions are known to change, the results of this study should be reviewed.

This report is only to be used in full, and may not be used to support objectives other than those set out herein, except where written approval is provided by Barlow Shelley Consulting Engineers.

Barlow Shelley Consulting Engineers accept no responsibility for the accuracy of information supplied to them by second and third parties.

This report has been undertaken by a Registered Professional Engineer of Queensland generally in accordance with the Brisbane City Council *Subdivision and Development Guidelines* and other industry standard guidelines.

AUTHORED BY:

CAMERON LANDRETH – ENGINEER
BEng (Hons)
For and on behalf of:
BARLOW SHELLEY CONSULTING ENGINEERS

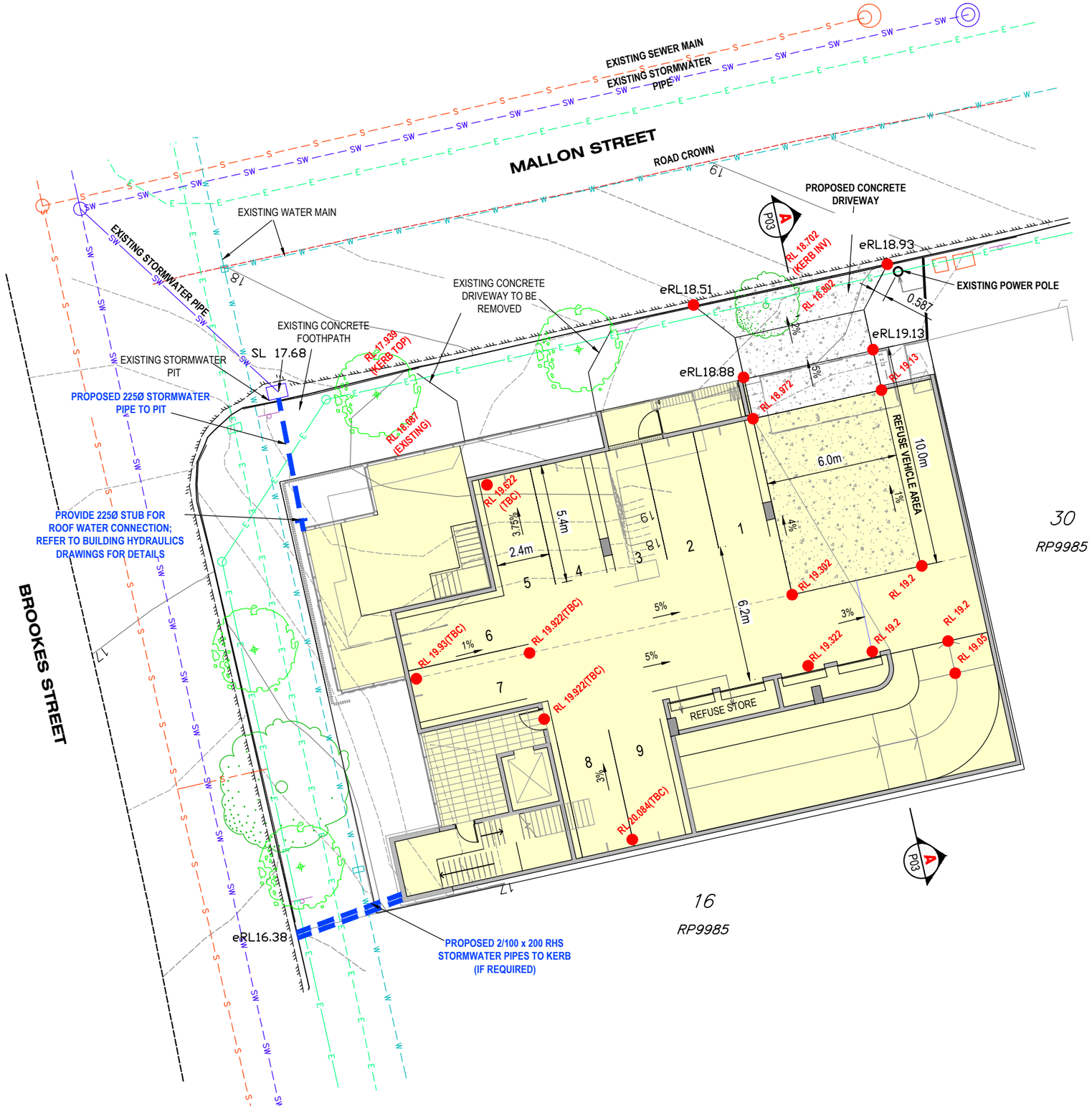
REVIEWED & APPROVED BY:

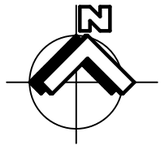
TONY SHELLEY – DIRECTOR (RPEQ 7736)
BEng, ADCE, MIEAust, RPEQ
For and on behalf of:
BARLOW SHELLEY CONSULTING ENGINEERS

Preliminary Stormwater Management Plan

Drawings 1089/P02 & P06

- Prepared by Barlow Shelley Consulting Engineers





LEGEND

- PROPOSED BUILDING
- PROPOSED DRIVEWAY
- PROPOSED STORMWATER
- EXISTING 150Ø GRAVITY SEWER
- EXISTING WATERMAIN
- EXISTING STORMWATER
- EXISTING OVERHEAD POWER LINE
- eRL 16.35 — EXISTING LEVELS
- RL 19.1 — PROPOSED LEVELS

NOTE:
FOR SET OUT CO-ORDINATES AND BUILDING FLOOR LEVELS REFER TO ARCHITECTURAL DRAWINGS

CAUTION -
EXISTING SERVICES THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION OF ALL EXISTING SERVICES IN THE VICINITY OF THE PROPOSED WORKS PRIOR TO THE START OF ANY CONSTRUCTION. THE COST OF ANY RECTIFICATION WORKS DUE TO DAMAGE TO EXISTING SERVICES SHALL BE BORNE BY THE CONTRACTOR.

REV	DATE	DESCRIPTION	BY	CHKD

DRAWING DETAILS

DATUM	AHD
DESIGN	LN
DRAWN	LN
DESIGN CHECK	TS
DATE	10-02-14

SCALE

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SCALE 1:200 A3

APPROVED

.....

Director: TONY SHELLEY
(RPEQ 7736)

DRAWING STATUS
NOT FOR CONSTRUCTION

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CLIENT:
BLUE SKY REAL ESTATE Pty Ltd

PROJECT:
PROPOSED MULTI RESIDENTIAL DEVELOPMENT

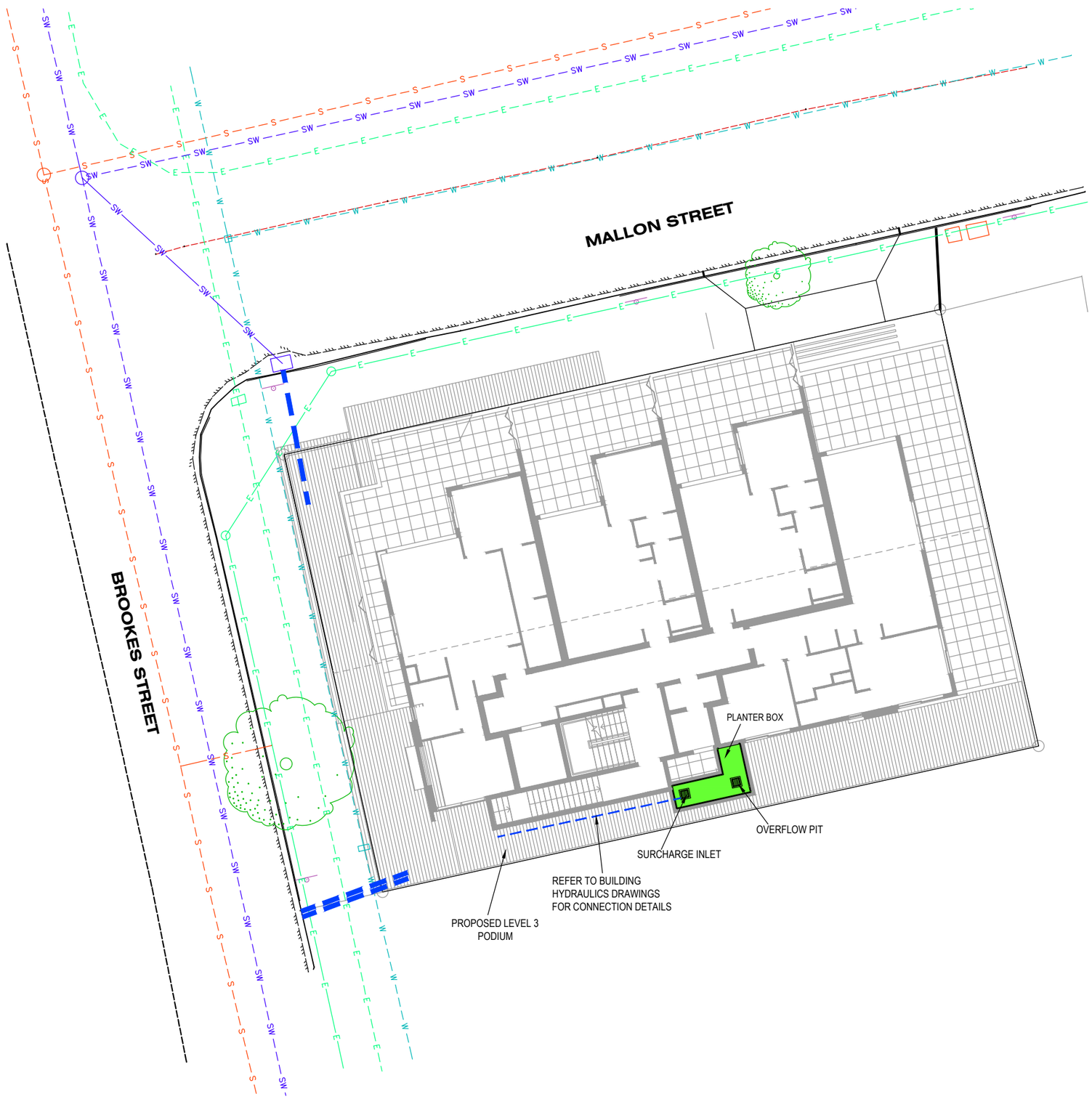
DRAWING TITLE:
PRELIMINARY ACCESS AND DRAINAGE PLAN

JOB NUMBER **1089**

SHEET: **2** OF **6**

DRAWING NUMBER **P02**

REV



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DESIGN	LN
DRAWN	LN
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SCALE

0 2 4 6 8 10m

SCALE 1:200 A3

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CLIENT:
BLUE SKY REAL ESTATE Pty Ltd

PROJECT:
PROPOSED MULTI RESIDENTIAL DEVELOPMENT

DRAWING TITLE:
PRELIMINARY STORMWATER MANAGEMENT PLAN

JOB NUMBER
1089

SHEET: **6** OF **6**

DRAWING NUMBER
P06

REV

Appendix

B

Stormwater Quality Objectives – Construction Phase

- Table 2.1 of Department of Environment and Resource Management, Urban Stormwater Quality Planning Guidelines 2010
-
- Healthy Waterways Guidelines for Building Sites

Table 2.1 Summary of design objectives for management of stormwater quality—construction phase of development

Construction phase stormwater design objectives		Notes
Drainage control	Design life and design storm of temporary drainage works: 1. Disturbed area open for <12 months—1 in 2 ARI 2. Disturbed area open for 12-24 months—1 in 5 ARI 3. Disturbed area open for > 24 months—1 in 10 ARI	ARI = Average Return Interval (see Engineers Australia document Australian Rainfall and Runoff). Design capacity excludes minimum 150 mm freeboard. A higher drainage design objective may be required for temporary drainage structures upslope of occupied properties. A revised drainage design storm may be required if these design objectives are found to be impracticable (e.g. in North Queensland).
Erosion control	1. Minimise exposure of disturbed soils at any time 2. Avoid or minimise large construction activities in the wet season 3. Divert water run-off from undisturbed areas around disturbed areas 4. Use erosion risk ratings to determine appropriate erosion control measures	'Wet season' means the high rainfall months, e.g. the four highest rainfall months. For point 4, determine the erosion risk rating using local rainfall erosivity, rainfall depth, or soil loss rate or other acceptable method. A rating scale such as very low, low, moderate, high, extreme should be applied. Such ratings should reflect the local area. Example ratings may be shown in local council guidelines or detailed in best practice guidelines.
Sediment control	Use soil loss rates to determine appropriate sediment control measures Design storm for sediment control basins should be based on retaining the maximum sediment quantity for the maximum volume of water run-off Site discharge during sediment basin dewatering should not exceed 50 mg/L TSS and pH between 6.5–8.5	For point 1, surrogate determinations may be used such as monthly erosivity or average monthly rainfall. For point 2, a commonly used design storm for basin sizing is 80th% five-day event. Depending on the settling characteristics of local soils, a higher 'operational' design storm can be achieved with chemical dosing operated in flow-through mode in a large storm with rainfall-activated auto-flocculent dosing, and advanced hydraulic efficiency features such as floating off-takes, and a sediment forebay. For example, on the Sunshine Coast operation of the basin can achieve the water quality outcomes in any rainfall event up to 125 mm rainfall depth in any five-day period[2]. For point 3, TSS = total suspended solids. Turbidity measurements (e.g. 60 Nephelometric Turbidity Units (NTU)) could be used; however, for accuracy, a site-specific relationship should be developed between turbidity and total suspended solids.

2 WBM Pty Ltd 2009, Sediment Basin Design Assessment Report to Sunshine Coast Regional Council (SCRC) <http://www.sunshinecoast.qld.gov.au/addfiles/documents/environment/erosion/WBM_SedBasinModel.pdf>.

Water quality outcomes	**Stormwater flows from undisturbed and disturbed areas**—manage to help protect environmental values	As far as is reasonable and practicable, all run-off from disturbed areas is collected and drained to a sediment basin—up to the design storm event.
	Coarse sediment—coarse sediment is retained on site **Fine sediment**—Site discharge during sediment basin dewatering has a TSS concentration less than 50 mg/L	Achieve site discharge water quality through, for example, appropriate sediment basin design and operation with flocculation as required.
	Turbidity—Site discharge during sediment basin dewatering has a turbidity (NTU) less than 10% above receiving waters turbidity—measured immediately upstream of the site	A site-specific relationship should be developed between turbidity and suspended solids, prior to the commencement of construction on large and medium scale construction sites.
	Nutrients (N & P)—Nitrogen and phosphorus are managed through sediment control.	
	pH—Site discharge during sediment basin dewatering has a pH range 6.5–8.5	May be further limited to prevent mobilisation of specific elements.
	Litter and other waste—Prevent litter/waste entering the site, the stormwater system or watercourses that discharge from the site. Also minimise or sufficiently contain on-site litter and waste production and regularly clear waste bins	Avoid wind blown litter; remove gross pollutants.
	Hydrocarbons and other contaminants—Hydrocarbons and other contaminants are prevented from entering the stormwater system or internal watercourses that discharge from the site	See the prescribed water contaminants in schedule 9 of the *Environmental Protection Regulation 2008*. Waste containing contaminants must be disposed of at authorised facilities. Store oil and fuel in accordance with Australian Standard AS1940—no visible oil or grease sheen on released waters.
	Wash down water—Wash down water is prevented from entering the stormwater system or internal watercourses that discharge from the site	
	Cations and anions—Cations and anions including aluminium, iron and sulfate are managed as required under an approved acid sulfate soil management plan	
Stormwater drainage/flow management	Hydraulics and hydrology—Take all reasonable and practicable measures to minimise significant changes to the natural waterway hydraulics and hydrology from: • peak flow for the one-year and 100-year ARI event (respectively for aquatic ecosystems and flood protection) • run-off frequency and volumes entering receiving waters • uncontrolled release of contaminated stormwater	Including making best use of constructed sediment basins to attenuate the discharge rate of stormwater from the site.

Controlling stormwater pollution on your building site

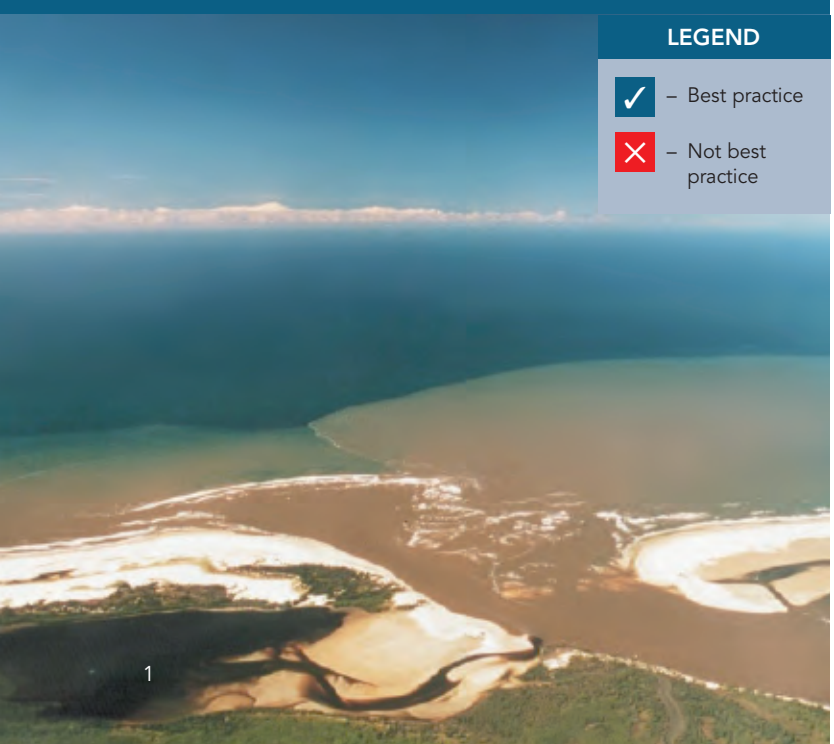
HEALTHY WATERWAYS
Because we're all in the same boat

Contents

Erosion and sediment control daily site check list

An erosion and sediment control check list has been developed to assist builders and site supervisors managing the task of control measure maintenance.

For further information on erosion and sediment control, contact your local council.



LEGEND

✓ – Best practice

✗ – Not best practice

Introduction

These guidelines provide a practical guide to best practice techniques to minimise stormwater pollution from building sites. They are designed to help people involved in the building industry comply with their statutory environmental duties and avoid large fines.

The following fact sheets provide practical examples of recommended control measures. Included is an easy-to-follow daily site checklist to guide site supervisors.

1. Erosion and sediment control daily site check list
2. Erosion and sediment control on residential building sites
3. Erosion control
4. Sediment control
5. Drainage control
6. Building operations
7. Storage of materials on hard surfaces
8. Grouped building lots
9. Erosion and Sediment Control Management Plans

BEST PRACTICE

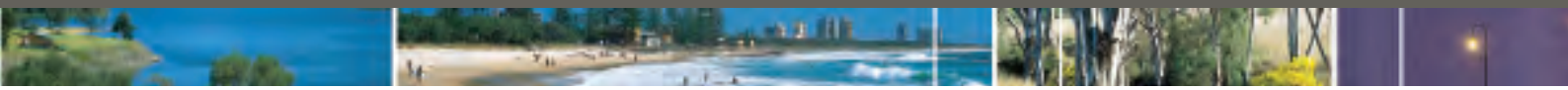
Best practice is the management of an activity to ensure environmental harm is minimised using cost-effective measures. These practices are assessed against national and international standards.

SAVE MONEY TIME AND ENERGY

Some of the benefits to home owners, builders and the building industry include:

- all-weather site access
- improved wet weather working conditions
- sites do not get boggy
- less mud and dust problems
- reduced stockpile losses
- reduced clean-up costs
- a better public image
- more marketable sites
- fewer public complaints
- reduced risk of fines
- better fishing for everyone
- healthier waterways.

National and international experience shows that the cost of effective pollution management on building sites is greatly reduced within the first few years as builders become experienced with the various techniques.



What are the impacts? SEE FACT SHEET 2

Soil, sediment and litter from building sites can be major sources of stormwater pollution, and can cause:

- negative impacts on recreational fishing and the seafood industry
- sediment build-up within waterways which can lead to weed growth
- loss of valuable topsoil
- significant public safety problems when washed onto roads and intersections
- blocked drains and water sensitive urban design features leading to flooding and increased maintenance costs to the community
- significant harm to the environment of freshwater and marine systems through the loss of valuable seagrass habitat for marine creatures
- public health issues from increased algal blooms
- reduced recreational opportunities due to increased turbidity

Mud and dirt on road after rain due to poor on-site erosion and sediment control

Sediment moving out of Moreton Bay into the ocean through Jumpinpin

Erosion and sediment control on residential building sites SEE FACT SHEET 2

Principles of effective stormwater pollution control include:

- sensible site planning
- diversion of up-slope water (where appropriate)
- stabilised site entry/exit point
- minimisation of site disturbance and duration of disturbance
- installation of sediment controls along the lower edge of the site
- appropriate location and protection of stockpiles
- early connection of roofwater downpipes
- trap on-site run-off from tool, paint and concrete washing and brick, tile and concrete cutting
- continual monitoring and maintenance of all control measures
- compaction of backfilled trenches
- revegetation and stabilisation of the site
- development and implementation of Erosion and Sediment Control Management Plans when appropriate.

Control measures in place on a residential building site

SITE PLANNING

When planning the site layout, building location and earthworks, it is possible to minimise the number of control devices needed for the sediment control zone, and their interference with the building process, with a little forward thinking. Suggestions are to:

- minimise the reshaping of the land
- direct stormwater to flow around the building area and any unstable batters
- allow room for a sediment barrier, eg. sediment fence, to be located along the lower side of the disturbance
- design the home to suit the property type, eg. construct pole homes on steep properties
- avoid the permanent use of long, steep and unstable driveways
- avoid the use of exposed aggregate concrete surfaces in areas where the wash-off cannot be contained.

Good site planning

Poor site planning – stockpile over sediment fence, materials and toilet stored outside building site

Sediment Control Zone

The sediment control zone is any area of land disturbance which has potential for the erosion of sediments. This area should be protected by a downslope sediment control measure or device.

Environmental law

SEE FACT SHEET 2

The *Environmental Protection Act 1994*, *Environmental Protection (Water) Policy 1997* and the *Integrated Planning Act 1997* are important pieces of legislation that control the way in which soil erosion and sediment are required to be dealt with on building and development sites.

PENALTIES

Breaches of the *Environmental Protection (Water) Policy 1997* may result in:

- on-the-spot fines under the *Environmental Protection (Water) Policy 1997* (ranging from $300 to $600)
- prosecutions under the *Integrated Planning Act 1997* or the *Environmental Protection Act 1994* (fines of thousands of dollars or prison sentences for serious offences)
- the prosecution of individuals and/or companies.

Council officer explaining the *Environmental Protection (Water) Policy 1997*

Erosion controls

SEE FACT SHEET 3

MINIMISE DISTURBANCE

- Earthworks should be kept to a minimum, and should only be commenced immediately prior to building works.
- Maintain as much soil coverage as possible with the use of grass, leaf litter and mulch, gravel or erosion control blanket (ECB) or matting.
- Vegetation located down-slope of the work site assists in filtering out sediment. Where practicable, maintain kerb vegetation such as grass and turf strips in a healthy state during the building process.

Stockpiles without protection

STOCKPILES

- Stockpiles and building materials should not be stored on the footpath or within the road reserve. Permission must be obtained from your Council to store materials in these areas otherwise fines may be imposed.
- Minimise stockpile losses with the use of covers.
- All stockpiles and building materials should be located within the sediment control zone, for example up-slope of a sediment fence.
- Stockpiles must not be located within an overland flow path.

SERVICE TRENCHES

Backfill service trenches, cap with topsoil, and compact to a level at least 75-100 mm above the adjoining ground level (either manually or with a small machine). This allows for some subsidence of the fill material, and ensures the fill is sufficiently compacted to avoid erosion at a later time. (Note that trenches must be backfilled in accordance with AS3500).

EROSION CONTROL BLANKETS OR MATTING

Erosion control blankets or matting can be used to minimise soil erosion and stormwater pollution from sites by:

- containing high erosion risk soils
- stabilising steep slopes.

SITE REHABILITATION

All areas disturbed by building activities should be promptly and progressively stabilised, using techniques such as revegetation and landscaping, so they no longer act as sources of sediment.

Rehabilitate the site promptly to reduce the chances of further erosion

MULCHING AND GARDEN BEDS

To minimise soil loss, mulch should be applied to open garden beds at a depth of 75-100 mm.

This will assist in plant establishment, minimise water loss and help to control weeds.

Ensure that mulch is stabilised on unstable slopes (e.g. batters and riparian areas) to avoid it washing away and ultimately entering waterways.

Sediment control

SEE FACT SHEET 4

STABILISED ENTRY/EXIT POINT (RUMBLE PAD)

Stabilised gravel entry/exit point (rumble pad)

- Manage entry/exit point (rumble pad) so that sediment is not tracked off the site.
- Restrict site access to one stabilised location.
- Recommended construction method for stabilising access points is a 150-200 mm deep pad of minimum 40 mm crushed rock.
- The pad should be at least 2 metres wide and extend from the kerb to the building slab.
- Where the entry/exit pad slopes towards the road, a 200 mm high bund (hump) should be installed across the pad to deflect stormwater run-off to the side where it can be filtered by a sediment fence.

Note: The location of the permanent driveway may not be an appropriate location for the construction entrance.

SEDIMENT BARRIERS/FENCES

Sediment fence

- Install sediment barriers along the lower side of the soil disturbance.
- The most efficient sediment barrier for building sites is specially-manufactured geotextile sediment fencing.
- Sediment fences on building sites are usually wire-tied to steel or hardwood posts (wire-tied sediment fences have the advantage of being more readily unhooked from their support posts).
- The support posts are spaced no greater than 2 metres apart and the sediment fence buried to a depth of 200 mm.
- For public safety and sediment control efficiency, sediment barriers should not be located outside property boundaries without Council approval.
- Sediment barriers should only be placed on the road as a last resort.
- Sediment barriers placed in front of roadside stormwater inlets are rarely as effective as onsite controls and at best usually result in the sediment being washed down the street and into the nearest open gully inlet.
- Only use proper geotextile sediment fence fabric. Don't use filter cloth or shade cloth.

USE OF SIGNS

Public signs that warn of the need for proper sediment control devices and maintenance are becoming more widely used. Contact your council for further information.

Sediment control information signage

MAINTENANCE OF CONTROL MEASURES

All erosion, sediment and drainage control measures need to be regularly checked and maintained in good working order. Best practice includes anticipation of potential risks and being prepared for abnormal circumstances and emergencies. These measures include:

- Stockpile extra sediment fence fabric and posts on-site to facilitate emergency repairs.
- Reapply crushed rock to the entry/exit pad (rumble pad) when sediment build-up occurs.
- Repair eroded drainage channels with rock, turf or erosion control blankets or matting.
- Ensure built-up sediment is removed at regular intervals from sediment barriers.
- Check and replace/repair sediment barriers daily if they are ripped, damaged or no longer anchored.

All measures require regular inspection

Excessive sediment deposits must be removed from entry/exit point (rumble pad) and additional crushed rock applied

Drainage control

SEE FACT SHEET 5

DIVERSION OF UP-SLOPE WATER

- Where practicable, divert up-slope water around the disturbed area.
- Stormwater can be diverted with the use of small turf or geotextile lined catch drains, or with the use of diversion banks.
- Diverted stormwater should be discharged onto stable ground (for example turfed areas) and should not be diverted into neighbouring properties unless written permission is obtained from the land owner(s).

Temporary roof water connection

EARLY ROOF WATER CONNECTION

- Temporary or permanent downpipes should be installed as soon as practicable after the roof is laid.
- Early connection of roof water to the stormwater system will reduce site wetness and the generation of on-site mud. This has been shown to reduce downtime following storm events and decrease the average building construction time.

Building operations

SEE FACT SHEET 6

Prior to commencing building work

- Obtain all necessary permits, licences and approvals.
- Prepare a site specific Erosion and Sediment Control (ESC) Management Plan and have all necessary ESC materials available.
- Avoid clearing vegetation and excavating until ready to build.
- Where necessary in new estates, temporary revegetation may be required.

Points to consider as part of building operations

- Tool and paint washing, brick, tile or masonry cutting and water-cooled cutting activities should be done within the property boundaries.
- All waste water should be contained on-site where possible.
- Activities should be carried out on a permeable surface or up-slope of an infiltration trench.
- Vehicles should not be parked on the footpath area or verge where they can damage essential vegetation and transport dirt onto the road.
- Contain waste concrete washed from trucks, mixers and barrows on site; do not wash out into stormwater systems as this can clog drains and cause flooding during storm events.

LITTER AND BUILDING WASTE

All hard waste should be stored on-site in a way that prevents material loss caused by wind or water. Smaller materials such as litter should be contained in covered bins or litter traps formed on three sides by a geotextile wind break or similar device.

When travelling to and from the site, secure load to prevent wind blown litter polluting our waterways and roadsides.

One way to properly store building waste

Poor litter and building waste storage

SITE CLEAN-UP

Remove accidental spills of soil or other materials from the road, gutter or any location outside the control of the primary sediment barrier:

- immediately if it is raining or likely to rain during the day
- at least upon completion of the day's work (even if rainfall is unlikely during the night)
- use a broom and shovel instead of hosing to clean hard surfaces.
- clean up food packaging after meal breaks as this litter can enter stormwater systems and waterways.

Following storms, the road reserve and sediment barriers should be inspected and excess sediment residue removed.

Undertake regular site clean-ups

CONCRETE MIXER CLEAN-UP

Fully contain concrete waste washed from trucks and mixer units on-site and store where it cannot be washed from the site, harming the environment.

EXPOSED AGGREGATE CONCRETE SURFACES

- Builders need to demonstrate how they intend to prepare exposed aggregate surfaces without allowing cement residue to flow into stormwater drains or waterways.
- Where practicable, wash cement residue onto pervious surfaces or fully contain it within temporary sediment dams created from tightly stacked sand bags.
- When suitably dry, shovel cement residue into a waste disposal bin.
- At no time should cement residue or wastewater run-off enter the roadside gutter.

This may make it impractical on some sites for exposed aggregate driveways to be constructed. In such cases, an alternative driveway finish must be used.

Storage of materials on hard surfaces

SEE FACT SHEET 7

Whenever possible, materials should be stockpiled within the sediment control zone and, where necessary, covered with waterproof sheeting to minimise the potential for transport of sediments in stormwater.

Materials may be temporarily stored on hard surfaces only where it is necessary to place erodible material on hard surfaces to undertake work and no other reasonable options are available.

Don't store stockpiles on hard surfaces without suitable protection

Grouped building lots

SEE FACT SHEET 8

When one builder controls more than one building lot, combined-lot sediment control structures may be placed down-slope if:

- the combined sediment control measures provide a level of protection at least equal to that provided by individual lot protection
- The builder accepts responsibility for the ongoing monitoring and maintenance of sediment control devices
- suitable drainage and erosion control measures are applied to each building lot
- a suitable sign is placed in a prominent location outside each lot and/or at the entrance of the estate indicating such controls are in place.

Erosion and Sediment Control Management Plans

SEE FACT SHEET 9

Where appropriate, discuss the submission of a management plan with the appropriate building control body. These plans need to communicate to all - builders, subcontractors, private certifiers, home owners and regulators involved in the building – how stormwater pollution will be controlled on the site.

EROSION AND SEDIMENT CONTROL INSTALLATION SEQUENCE

1. Establish a single stabilised entry/exit point (rumble pad).
2. Install sediment fence(s) along the low side of the site.
3. Divert up-slope water around the work site and appropriately stabilise any drainage channels.
4. Clear only the areas necessary (maintaining vegetation on footpath).
5. Stockpile topsoil within the sediment control zone.
6. Stabilise exposed earth banks (for example, with vegetation or erosion control blankets).
7. Install on-site waste receptacles (mini-skips, bins, wind-proof litter receptors).
8. Install roof downpipes as soon as practicable after the roof is laid.
9. Ensure that all control measures are maintained in good working order.
10. Revegetate or otherwise stabilise the site.

- *Stockpile is located behind the sediment fence*
- *Good site planning*
- *Turf strip well maintained*
- *Sediment fence well constructed and in correct location*

- *Stockpile has not been placed behind the sediment fence*
- *Building waste and litter has not been placed in the skip*
- *Poor site planning and management*

Note: Diagrams and selected photos courtesy of Catchments & Creeks Pty Ltd.

SUPPORTED BY

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