

18 May 2026

Att: Planning Secretary – Major Projects

To Whom It May Concern,

**Re. SSD-65490715 Central Park Bradfield City Centre - Post Approval Document Submission
Condition C51 – Stormwater Quality Assessment Report**

Please find attached the post approval documents relating to the SSD Consent Conditions C51. An extract of the relevant consent condition has been included below for reference:

STORMWATER QUALITY

- C51. Prior to the commencement of construction for drainage works, a stormwater quality assessment report prepared by a suitably qualified practicing civil engineer, demonstrating compliance with approved MUSIC targets and parameters must be submitted to and the Planning Secretary for information. The report must include a response to all stormwater quality improvement devices structural integrity, treatment train and their treatment properties demonstrating compliance with the approved MUSIC report.

The purpose of this submission is to submit a copy of the Stormwater Quality Assessment Report to the Planning Secretary for Information.

Included in this submission are the following documents:

1. Post Approval Lodgement Checklist
2. Stormwater Quality Assessment Report

Yours sincerely,

Alexandra Maher
Project Engineer

FDC Construction (NSW) Pty Ltd

Attachment 1 – Post Approval Lodgement Checklist

POST APPROVAL LODGEMENT CHECKLIST

Development Consent or Project Approval No: SSD-65490715		
Project Name: Central Park Bradfield City Centre		
Applicant Name: Bradfield Development Authority (formerly Western Parkland City Authority)		
Stage: 1 (single stage)		
Item	Comment	Provided (Y/N)
Cover Letter	A covering letter must be provided which includes: - why the matter/management plans are being submitted to the Department - if relevant, the staging to which the management plan/matter applies - the condition/s under which approval is being sought.	Y
Conditions Compliance Table	A conditions compliance table must be provided which references where each relevant condition of consent (including sub-plans) has been addressed in the management plan. The conditions compliance table must be as specific as possible (i.e. Section 2.4.1 not Section 2)	N/A
Evidence of Consultation	Where conditions require evidence of consultation with agencies this must be provided as an Appendix in the management plan. The management plan must include a section on how the agencies concerns have been addressed in the plan. It is important that this consultation is done prior to the management plan being submitted to the Department.	N/A
Best practice management, reasonable and feasible measures	Development consents will often require best practice management and/or all reasonable and feasible measures to prevent and/or minimise material harm to be implemented. The reviewer should be satisfied that the measures proposed meet these standards. All conditions should be considered in the preparation of the management plan. Specific construction and operating conditions must be incorporated into the management plan.	Y
Project Details	Key project description details described in the management plan must be consistent with the details in the environmental assessment and development consent.	Y
Plans/Figures	All figures and plans within the document must be legible and be in accordance with the approved plans.	Y
Management Plan Language	The management plan must be clear, concise and provide measurable outcomes. Terms such as 'may', 'plan to', 'should', 'where possible', 'attempt to implement', 'best endeavours' 'regular monitoring' are not to be used.	Y
Document control	Management plans should include an up-to-date document control register or other means of version control, noting at a minimum the date and version number so that revisions can be tracked.	Y
Reviews	If you are submitting a revised management plan, please ensure it is clear where the changes to the plan have been made, either by highlighting the relevant sections, or tracked changes.	N/A

Signature: *Alexandra Maher*

Date: 18/05/2026

Attachment 2 – Stormwater Quality Assessment Report

**Central Park
Bradfield City Centre
Water Quality Management**

DATE/ 15/05/2026

CODE/ 23-1150

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Document Registration

Document Title	Central Park, Bradfield City Centre – Water Management Plan
Document File Name	REP003-01-23-1150 Consent Condition C51 - Stormwater Quality
Section	Civil
Document Author	Bshara Khouri

Issue	Description	Date	Author	Checked	Approved
1	Issue for Approval	05-05-26	Bshara Khouri	☒	☒

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1. Executive Summary

This report presents the stormwater management strategy for the proposed Bradfield Central Park development, demonstrating compliance with the Western Sydney Aerotropolis Phase 2 Development Control Plan (DCP) and associated water quality and flow objectives.

The development adopts a precinct-scale, integrated approach to stormwater management by primarily relying on the regional stormwater infrastructure established under the Bradfield City Centre Master Plan. This regional system has been designed to meet the Wianamatta–South Creek catchment targets through coordinated hydrological modelling and integrated water cycle management. As such, the project achieves compliance with stormwater performance targets at a regional level, with site drainage connecting directly to the planned trunk drainage network.

To address the staging of infrastructure delivery, the report also outlines a robust interim stormwater management solution to ensure compliance prior to the operation of the regional system. This interim arrangement incorporates a range of on-site water sensitive urban design (WSUD) measures, including wetlands, stormwater harvesting, filtration systems, and passive irrigation. These measures are designed to independently achieve required stormwater quality targets during the interim period while also contributing to urban cooling, landscape functionality, and environmental outcomes.

An alternative interim water quality management strategy is also presented, consisting of a treatment train approach that includes OceanGuard inlet baskets, StormFilter cartridges, wetlands, and a stormwater harvesting pond. These systems collectively improve pollutant removal, reduce runoff volumes, and support water reuse initiatives, ensuring alignment with DCP objectives and broader water cycle management principles.

Stormwater quality modelling using MUSIC X demonstrates that the proposed interim measures meet or exceed the required pollutant reduction targets for total suspended solids (TSS), total phosphorus (TP), total nitrogen (TN), and gross pollutants. Flow volume targets are also effectively managed through the inclusion of stormwater harvesting and reuse systems. [REP003 Sample | Word]

Upon commissioning of the regional stormwater infrastructure, the development will transition from the interim arrangement to the ultimate Master Plan configuration, with the regional system assuming the primary stormwater management function.

Overall, the proposed approach ensures a compliant, resilient, and staged stormwater management framework that prevents adverse downstream impacts, supports ecological outcomes, and aligns with the strategic objectives for the Bradfield City Centre.

2. Background

The proposed Bradfield Central Park development adopts a precinct-integrated approach to stormwater management, whereby compliance with stormwater quality and flow requirements is primarily achieved through connection to the regional stormwater infrastructure established/delivered under the Bradfield City Centre Master Plan.

Central Park is located within the broader Master Plan catchment, which has been subject to detailed hydrological modelling and integrated water cycle planning. The Master Plan incorporates a coordinated, city-wide stormwater system designed to meet the performance outcomes of the Western Sydney Aerotropolis Phase 2 Development Control Plan (DCP), including the Wianamatta–South Creek catchment water quality targets.

Accordingly, the development demonstrates that:

- Stormwater quality and flow performance targets are met at a regional (precinct) scale, consistent with DCP requirements.
- The site's drainage system connects directly to the Master Plan pit-and-pipe and trunk drainage infrastructure, which conveys flows to the broader regional system.
- Compliance with stormwater quality objectives is therefore achieved through the operation of the Master Plan stormwater network, as documented in the Integrated Water Cycle Management framework.

In addition, the proposal incorporates on-site water sensitive urban design (WSUD) measures to support and enhance stormwater performance outcomes. These include wetlands, swales, passive irrigation systems, and stormwater reuse elements, which contribute to water quality treatment, urban cooling, and landscape functionality.

2.1. Consistency with DCP Requirements

The proposal is consistent with the Phase 2 DCP framework, which allows developments to demonstrate compliance with stormwater quality and flow targets through either:

- Connection to the regional stormwater system (ultimate scenario), or
- Provision of interim on-site stormwater management measures where the regional system is not yet operational.

Under the ultimate scenario, Central Park relies on the delivery and operation of the regional stormwater infrastructure to achieve full compliance with the applicable water quality targets.

2.2. Interim Arrangement

Recognising infrastructure staging, the application also provides a robust interim stormwater management strategy to ensure compliance at the time of park opening should the regional system not be operational.

2.2.1. The interim design:

- Is outlined in section 02 of this report in further detail
- Incorporates on-site stormwater quality treatment measures, including wetlands, swales, and surface conveyance systems

- Is designed to independently achieve DCP stormwater quality, quantity, and flow targets
- Provides a compliant and fully functional solution until connection to the regional infrastructure is available
- Once the regional system is commissioned, the development will transition to the ultimate Master Plan arrangement, with the regional infrastructure assuming the primary stormwater management function.

3. Alternative Interim Design Option – Water Quality Management Strategy

This section summarises an alternative proposed water management strategy for the Site for which approval is being sought under SSD-65490715. Outlined below is a description of the alternative proposed stormwater quality management measures that will satisfy the Performance Outcomes described in the Western Sydney Aerotropolis Development Control Plan. This Arrangement is intended to be implemented to satisfy stormwater quality, quantity and flow controls only in the absence of city-wide stormwater infrastructure as proposed in the Bradfield City Centre master plan.

3.1. Water management strategy objectives and controls

The main objectives pertaining to the management of stormwater within the proposed development Site are outlined in Section 2.3.2 of the *Western Sydney Aerotropolis Phase 2 Development Control Plan 2022*. The overall objectives relating to stormwater management and water sensitive urban design (WSUD) outlined in the Phase 2 DCP are as follows:

- Manage indirect and ongoing impacts of development on waterways to ensure that Wianamatta - South Creek Catchment water quality and flow objectives in the Aerotropolis Precinct Plan are achieved and maintained.
- Ensure development is integrated with water cycle management to meet the Wianamatta-South Creek Catchment stormwater management targets.
- Utilise stormwater for passive irrigation of street trees to promote healthy trees, optimise canopy cover and contribute to streetscape, urban cooling and amenity.
- Ensure overland flows are conveyed in a safe manner to the trunk drainage system.
- Protect, maintain and restore the ecological condition, hydrology and hydrogeology of aquatic ecosystems (including but not limited to wetlands and riparian lands).

3.2. Water management strategy overview

The *Western Sydney Aerotropolis (Initial Precincts) Stormwater and Water Cycle Management Study* (December 2021) (SWCMS) addresses links between waterway health, hydrology and water quality targets. The stormwater management objectives outlined in the SWCMS Report were developed by applying the *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (NSW OEH, 2017). The effects-based assessment outlined in the SWCMS Report addressed three primary metrics relating to stormwater management for waterway health:

1. Flow volume – mean annual runoff volume (MARV), measured in ML/ha/year. The target adopted in the SWCMS is 2 ML/ha/year.
2. Seasonal pulses – as shown by flow duration curves.
3. Water quality – as indicated by stormwater pollution reduction.

This alternative interim design option Water Management Strategy for the Site has been developed as interim arrangement, for which approval is being sought under SSD-48438209. This Arrangement is intended to be implemented to satisfy stormwater quality controls in the absence of the city-wide Stormwater Infrastructure interventions as proposed in the Bradfield City Centre master plan.

3.3. Proposed stormwater management measures

A series of stormwater quality measures are proposed to be adopted within an alternative interim stormwater design for the site to satisfy the stormwater management strategy objectives is listed below. A general description of the proposed stormwater treatment train components is presented in the following sections.

All interim stormwater management measures described below are purely to achieve interim measures until such time as the city-wide Stormwater Infrastructure is operational. At this time, it is intended that all interim stormwater quality management measures would be decommissioned and replaced with the wetland proposed in the core SSDA submission unless agreed prior with Bradfield Development Authority.

3.3.1. OceanGuard Inlet Basket

OceanGuard pit baskets are specified within the Park for every stormwater pit directly draining surface water from pavements and landscape. Roof catchments of amenities buildings are excluded from this requirement. The OceanGuard pit basket is a SQIDEP approved water quality treatment device which is used in the MUSIC modelling for TN, TP, and TSS, as well as for GPTs. This device greatly assists the pollutant treatment modelling in conjunction with the StormFilter cartridges.

Each pit basket directly filters pollutants into a basket/net, preventing gross pollutants and organic matter such as leaves from entering the drainage system. Additionally, the pollutants are suspended above the base of the pit, reducing pollutant leaching from wet materials. A maintenance plan is required for regularly emptying the baskets and replacing the baskets at regular intervals. The OceanGuard pit baskets are only required as an interim measure, until the ultimate city-wide Stormwater Infrastructure is delivered unless advised otherwise by Waterway Authority

3.3.2. Psorb StormFilter Cartridges

StormFilter cartridges have been proposed in the stormwater pits through the park, to meet the stormwater treatment demands until the city-wide Stormwater Infrastructure is operational. The system comprises of several filter cartridges that work in parallel to meet the treatment targets. Each cartridge siphonically treats 1.26L/s from a buildup of water to 750mm within the chamber.

A maintenance plan with Ocean Protect is required to ensure that the filters are kept operational and functioning during the time that they are required. When the city-wide Stormwater Infrastructure is operational, the filters can simply be removed from the pits, and the Park stormwater network will still be fully operational. The StormFilter Cartridges are SQIDEP approved products and as such can be used for the MUSIC modelling to reduce pollutant loads.

3.3.3. Passively Irrigated Street Trees

Advice received from Sydney Water is that passively irrigated street trees are an important component of their city-wide Stormwater Infrastructure. These street trees need to be designed to the Sydney Water Draft Stormwater Scheme Infrastructure and Council's approval.

The Bradfield Central Park project does not propose any roadworks external to the site. As such, passively irrigated street trees are scope that is being delivered under the roadworks package as indicated in the Landscape Architecture drawing package.

3.3.4. Wetlands

As an interim measure to satisfy the stormwater pollutant concentration targets, an interim configuration wetland is proposed to provide an effective means of treating stormwater. Wetlands assist in treating urban stormwater quality to help make it fit for non-potable reuse with the additional function of enhancing evaporative losses.

The wetland has been designed in accordance with *Technical Guidance for achieving Wianamatta-South Creek stormwater management targets (DPIE 2022)*. Key parameters adopted for the wetland are summarised below in Table 2. The wetland will only be required as an interim measure, until the city-wide Stormwater Infrastructure strategy is delivered.

Table 2: Wetland parameters

Parameter	Unit	Value
Basin surface area	m ²	90
Extended detention depth	m	0.1
Permanent Pond Volume	m ³	36
Initial Volume	m ³	36
Vegetation Cover (% of surface area)	%	50
Exfiltration rate	mm/hr	0
Evaporative Loss (% of PET)	%	125
Equivalent Pipe Diameter	mm	8.4
Overflow Weir Width	m	5
Notional Detention Time	hr	48.09

3.3.5. Stormwater Harvesting Pond

As an interim measure to satisfy the stormwater flow volume targets a small-scale pond is proposed to provide an effective means of reducing runoff volume from the Site as water would be lost via irrigation and evaporation over a large area. Ponds can capture and store large quantities of stormwater runoff, while also being relatively easy to maintain.

Under the interim arrangement, a single pond would be required and is proposed to be delivered as a minimum to satisfy the *Wianamatta-South Creek Stormwater* targets.

Key parameters adopted for the pond are summarised below in Table 3 below. This pond will only be required as an interim measure, until the ultimate city-wide Stormwater Infrastructure is delivered.

Table 3: Pond parameters

Parameter	Unit	Value
Surface area	m ²	300
Permanent pool volume	m ³	390
Exfiltration rate	mm/hr	0
Evaporation loss (% of PET)	%	100
Extended detention depth	m	0.1

Outlet (equivalent pipe diameter)	mm	43.5
Reuse Rate	mm/yr	200
Adopted reuse	ML/yr	3.6

The ponds and their associated irrigation systems would need to incorporate a series of measures to demonstrate ongoing compliance with the stormwater flow controls and to mitigate potential risks associated with stormwater harvesting and reuse. The design and operation of these systems will comply with the principles and guidance outlined in the [Australian Guidelines for Water Recycling: Managing Health and Environmental Risks \(Phase 2\); Stormwater harvesting and reuse](#) (Australian Government, 2009). As a minimum it is expected that the system will incorporate the following:

- A pump system to transfer water from the pond to the irrigation area, and potentially a small holding tank to store water upstream of irrigation infrastructure.
- Stormwater treatment measures, which may include further filtration or other means. Any required treatment would be subject to detailed design, as well as consideration of the water reuse type, i.e. irrigation.

Multi-channel irrigation controllers including inputs for flow meters, moisture sensors and weather stations will form part of the irrigation system to control, monitor and record irrigation system operation.

4. Stormwater Quality Modelling

The proposed stormwater treatment train has been modelled using the MUSIC X software package (Version 1.1.0). Modelling has been undertaken in accordance with the *MUSIC Modelling Toolkit – Wianamatta* (NSW DPE, September 2022).

Rainfall and evaporation data

Climate data (rainfall and evapotranspiration) provided in *Technical guidance for achieving Wianamatta–South Creek stormwater management targets* by the Department of Planning and Environment was adopted in the MUSIC model. The meteorological data provided in this guideline (Appendix A of the guideline) includes:

- Pluviometer data (six-minute rainfall intensity) for Penrith Lakes AWS (Station 67113) for the period between 1999 and 2008 inclusive (average annual rainfall over this period = 691mm).
- Monthly potential evapotranspiration (PET) values (January to December) with total 1,336mm.

Rainfall-runoff parameters

The rainfall-runoff parameters adopted in the MUSIC model are consistent with the parameters adopted in *MUSIC Modelling Toolkit – Wianamatta*, refer to Table 4 below.

Table 4: Rainfall-runoff parameters adopted in MUSIC X

Parameter	Unit	Value
<i>Impervious area parameters</i>		
Rainfall Threshold	mm/day	1.0
<i>Pervious area parameter</i>		
Soil Storage Capacity	mm	150
Initial Storage	% of Capacity	30
Field Capacity	mm	130
Infiltration Capacity Coefficient α	-	175
Infiltration Capacity Coefficient β	-	2.5
<i>Groundwater properties</i>		
Initial Depth (groundwater)	mm	10
Daily Recharge Rate	%	25
Daily Baseflow Rate	%	1.4
Daily Seepage Rate	%	0.0

Source nodes and pollutant generation

Consistent with the requirements of the MUSIC Modelling Toolkit – Wianamatta, pollutant events mean concentrations (EMCs) for base flow and storm flow scenarios have been adopted from Table 6 of Blacktown City Council’s WSUD developer handbook. The EMC values are applied to source nodes in the MUSIC model to estimate annual pollutant loads exported from the site under the proposed ultimate development scenario. The adopted pollutant EMCs for various catchment types are summarised in Table 5 below.

The proposed land use breakdown of the park under the post development scenario is presented in Table 6 below.

Table 6: Post development scenario land use breakdown under the interim arrangement

Total Area (ha)	Roof area – amenities buildings (ha)	Paved/Concreted area (ha)	Landscape area (ha)
1.809	-	0.803	1.006

The total area used (Table 6) in determining the water quality treatment measures does not take into account Innovation South Interface Zone. The stormwater for this area has been incorporated as part of the road works catchment which is confirmed in the design drawings for Innovation South roadworks (Figure 2 below). This catchment is proposed to be captured by the pit and pipe network found in the road, which directs water to a proposed basin downstream.

It is assumed that stormwater generated in Innovation South Interface zone catchment will be treated in the basin downstream to comply with the DCP quality targets in accordance with the approved REF No. P5-2024-93, determination date 03/07/2024.

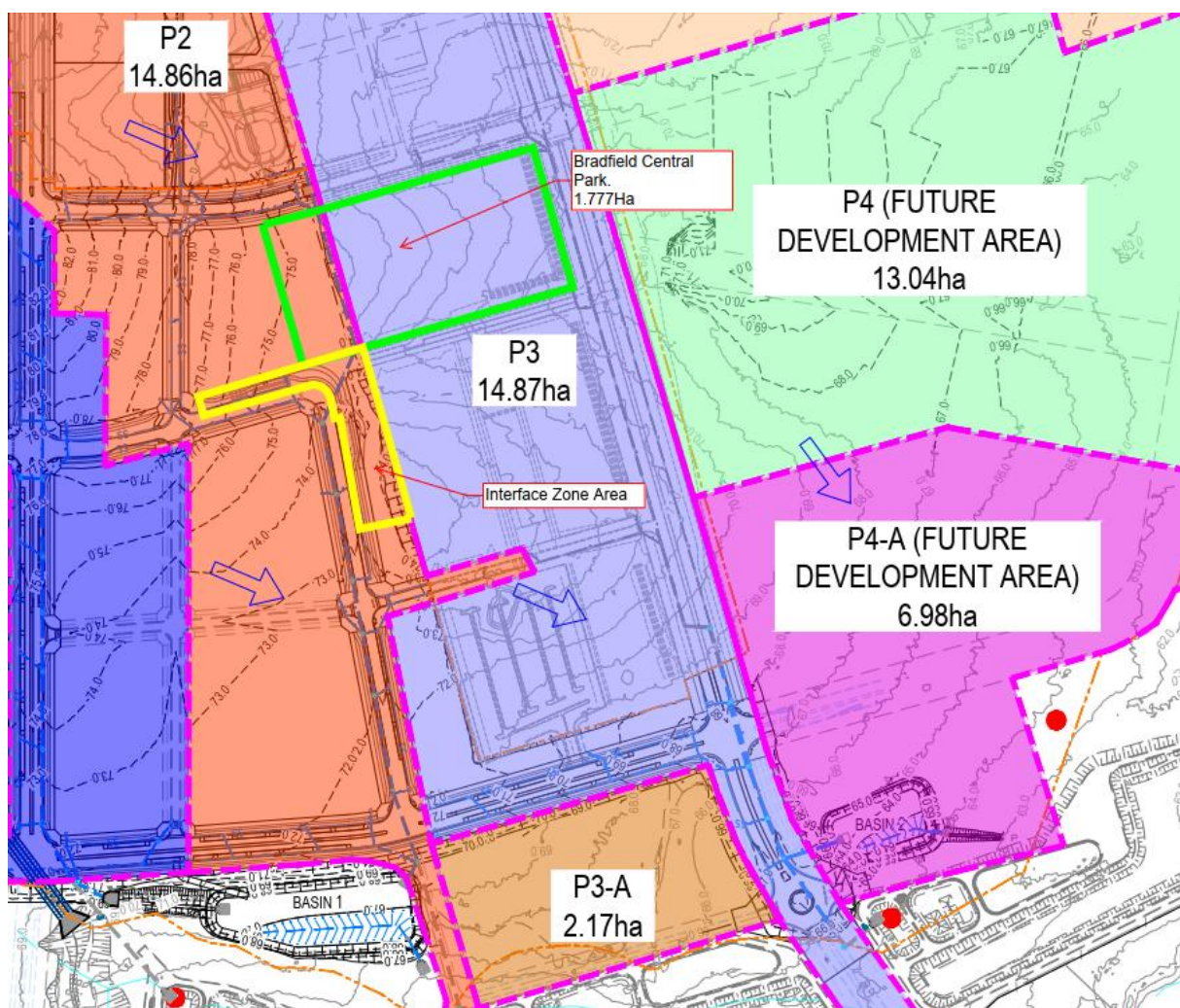


Figure 2: Roadworks ultimate post development catchment plan (Design Drawing No 30013454.2A.IFC.502)

The post-development scenario model under the Interim Arrangement incorporates the following stormwater management measures:

- OceanGuard Inlet baskets, as per the parameters described in Section 3.3.1
- Psorb StormFilter Cartridges, as per parameters described in Section 3.3.2
- Wetland systems, as per the parameters presented in Section 3.3.4
- Evaporation pond, as per the parameters presented in Table 3.3.5.

The attributes for each of the proposed stormwater management measures have been determined such that they will satisfy the stormwater quality targets outlined in Section 3.1.

4.2. Performance against stormwater quality targets

MUSIC X modelling results presented as mean annual allowable loads at the receiving node indicate that the adopted stormwater quality target reductions are achieved, as shown in Table 7 below.

Table 7: Summary of MUSIC modelling results against stormwater quality targets

Parameter	Sources – post-development	Allowable Loads (kg/ha/yr)	Residual Load Post-Development	Target Allowable Load (kg/yr (1.809 Ha site))	Complies with Option 2 (Y/N)
Flow (ML/yr)	3.01	<2 ML/ha/yr	1.76	3.618 ML/yr	Refer to Section 3.2
TSS (kg/yr)	1012	< 80	112.3	144.72	Yes
TP (kg/yr)	1.7	< 0.3	0.54	0.543	Yes
TN (kg/yr)	7.1	< 3.5	2.88	6.33	Yes
Gross Pollutants (kg/yr)	113.4	< 16	0.03	28.94	Yes

The MUSICX model results presenting treatment train effectiveness (load reduction as a comparison to allowable pollutant loads) demonstrate the proposed stormwater management measures under the Interim Arrangement will satisfy the stormwater quality controls.

Under the Ultimate stormwater infrastructure arrangement, stormwater quality management measures would be incorporated into the city-wide Stormwater Infrastructure to be designed and delivered by the Bradfield Development Authority

5. Conclusion

The proposed development demonstrates a compliant and resilient approach to stormwater management, ensuring that:

- Stormwater quality targets are achieved through integration with the Bradfield City Centre regional infrastructure, and
- A contingency interim solution is in place to maintain full compliance in advance of regional infrastructure delivery.

This staged approach is consistent with the intent of the Phase 2 DCP and ensures that no adverse impacts to downstream waterways occur at any stage of development, while supporting the broader integrated water cycle management strategy for the Bradfield City Centre.



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