

Form B1ⁱ DRAINAGE DESIGN SUMMARY SUB/DA
No. _____

Project: _____ Location: _____

Designed by: _____ Company: _____ Phone: _____

SITE AREA _____ ha	*See Section 3.4.3 for dual occupancy	[A]
Upstream catchment draining through site	= _____ ha	[AA]
See Section 4.1.3 for assessment of external flows.		
Basic storage volume	470 x [A] _____	= _____ m ³ [B]
Basic discharge	= 0.08 x [A] _____	= _____ m ³ /s [C]
Area of site drained to storage		= _____ ha [D]
(Must be as much as possible and not be less than 85% of the total site without written Council approval).		
[D] / [A] + [_____] / [_____] x 100		= _____ % [E]
Storage per ha. of contributing area = [B] / [D]		= _____ [F]
Enter <i>volume/PSD adjustment chart</i> (Fig 5.1) using [F], and Read new PSD in litres/second/ha (l/s/ha).		= _____ l/s/ha [G]
Determine PSD = [G] x [D] _____ x _____		= _____ l/s [H]
Maximum head to orifice centre		= _____ m [K]
Weir flow to storage $Q^{Weir} = CL(H^{Weir})^{1.5} \therefore H^{Weir}$		= _____ m [I]
Selected orifice diameter: $d = (0.464 \times Q / \sqrt{h})^{0.5} = (0.464 \times [H] / \sqrt{[K]})^{0.5}$		= _____ m [J]
Maximum discharge		= _____ l/s [L]
Head for high early discharge		= _____ m [M]
High early discharge $\{ [L] \times \sqrt{[M] / [K]} \}$ (min 75% of [L])		= _____ l/s [N]
Approximate mean discharge = ([L]) + [N] / 2		= _____ l/s [P]
Average discharge/ha = [P] / [D] = _____ / _____		= _____ l/s/ha [Q]
Enter <i>volume/P.S.D. adjustment chart</i> (Fig 5.1) using [Q] And read off final storage volume per hectare		= _____ m ³ /ha [R]
Determine final SSR = [R] x [D] = _____ x _____		= _____ m ³ [S]
Primary storage proportion = [S] x _____ %		= _____ m ³ [T]
Secondary storage proportion = [S] x _____ %		= _____ m ³ [U]
Tertiary storage proportion [S] x _____ %		= _____ m ³ [V]
Check [T] + [U] + [V] = [S]		= _____ m ³

ⁱ Revised for third edition to include flow from upstream and revised by pass flows

B10. OSD WAE SURVEY AND CERTIFICATION SUBMISSIONⁱⁱ

The following checklists have been provided to assist designers/surveyors to confirm that all necessary information has been provided to confirm the as built OSD facility complies with the design. The first WAE checklist is a shorter version of the second. The first list (B10A) is to be completed by the stormwater consultant and submitted to Council together with the plan/s and any necessary attachments.

The second more comprehensive checklist (B10B) may be used as an aid to ensure that all relevant information has been provided. It may also be submitted to Council instead of the shorter form if desired.

ⁱ Shorter checklist added in third edition

B10A

**OSD WAE SURVEY AND CERTIFICATION
SUBMISSIONⁱⁱ**

This form is to be completed and submitted to Council/Principal Certifying Authority (PCA) together with the plan/s and any necessary attachments.

PROJECT ADDRESS: _____

WAE PLAN DETAILS:

Company

Name: _____

Name of surveyor: _____ **Date of WAE Plan:** _____

Telephone No.: _____ **Fax No:** _____

Items submitted:

- Signed WAE Plans
- Certificate of Hydraulic Compliance (Form B11)
- Certificate of Structural Compliance
- OSD WAE Volume Calculations

Yes No NA

<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	

COUNCIL REVIEW DETAILS:

Reviewer's Name: _____ **Date:** _____

ⁱⁱ Form number changed to reflect new shorter checklist in third edition
Upper Parramatta River Catchment Trust

OSD WAE & CERTIFICATION CHECKLIST			COUNCIL AGREES	
	Yes	No	Yes	No
1. WAE Plans: (Section 4.3.3)				
Are there any major variations from the approved plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If so, is a Section 96 (EP&A Act) modification required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the WAE plan superimposed on an approved design plan in red ink?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has a WAE level boxed in red ink been shown at each design level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have WAE dimensions been shown adjacent to design dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do the WAE plans show the following information:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• finished floor levels of dwellings and garages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• levels of overland flow paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• area and flows from external catchment or reason why its ignoredt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For the Discharge Control Pit (DCP):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• internal pit dimensions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• diameter and centre line of orifice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• location, dimensions, distance from orifice for fitted screen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• levels of top and invert of pit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• levels of maximum water level and water level at HED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Internal diameter of outlet pipe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For each storage:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• type of storage (roof, above ground, below ground, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• sufficient levels and dimensions to verify storage volumes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• calculations of actual volume achieved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• level, dimensions and location of overflow between DCP and storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• site gradings and areas draining to or bypassing the storage(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Certification: (Section 4.3.4 & 4.3.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has revised design summary sheet (Form B1) based on WAE been submitted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have upstream flows been ignored, and if so Why?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are WAE calculations sufficient to show storage & PSD are satisfactory?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the WAE volume agree with design volume for each storage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does OSD system function correctly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have structural certificates been submitted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B10B. OSD WAE SURVEY AND CERTIFICATION SUBMISSIONⁱⁱⁱ

This form may to be completed by the stormwater designer and submitted to Council/Principal Certifying Authority (PCA) if Form B10A is not used.

PROJECT ADDRESS: _____

DEVELOPER: _____

OSD DESIGNER DETAILS:

Company Name: _____

Address:

Telephone No.: _____ **Fax No:** _____

Accreditation Organisation: _____

Accreditation Reference: _____

Name and signature of designer: _____

(Print Name)

Date: _____

(Signature)

Items submitted: **

- | | |
|---|---------------|
| • WAE Plan/s | Yes / No |
| • Certificate of Hydraulic Compliance | Yes / No |
| • Certificate of Structural Compliance | Yes / No / NA |
| • WAE Survey and Certification Checklist | Yes / No |
| -- Attachment A: OSD Volume Calculations | Yes / No |
| -- Attachment B: OSD WAE Dimensions, etc. | Yes / No |

COUNCIL REVIEW DETAILS:

Council Review Officer's Name: _____

Review officer's comments: _____

Signature of Review Officer: _____ **Date:** _____

** The above items are to be submitted in a single bound form — a 'loose leaf' format is unacceptable.

ⁱⁱⁱ Form altered to reflect shorter checklist in third edition

OSD WAE &

CERTIFICATION

CHECKLIST

ITEM	DESIGNER		COUNCIL REVIEW	
	YES	NO	YES	NO
1. The WAE plan/s has/have been prepared				
If YES, see Plan No/Nos prepared by and dated				
1(a) The WAE plan or Attachment B provides the following information about each discharge control pit, DCP (refer Section 4.3.3)				
- internal pit dimensions				
- diameter of fitted orifice plate				
- location, dimensions, distance from orifice for fitted screen				
- levels of top and invert of pit				
- Internal diameter of outlet pipe				
1(b) The WAE survey provides the following information about each storage (ref Section 4.3.3)				
- type of storage (roof, above ground, below ground, etc.)				
- sufficient levels and dimensions to verify storage volumes				
- calculations of actual volume achieved, see Attachment A				
- level, dimensions and location of overflow structure between - DCP and storage				
1(c) The WAE plans provide the following information on internal drainage (ref Section 4.3.3)				
- pit lid types and surface levels				
- invert levels and diameters of pipes				
- location, dimensions and levels of any floodways and/or overland flowpaths				
- sufficient spot levels to show site gradings and extent of areas draining and not draining to the storage(s)				
1(d) The WAE plan provides finished floor levels of dwellings and garages (refer Section 4.3.3)				
2. The following drainage-related structural elements have been constructed in accordance with the design (refer Section 4.3.5)				
2(a) Free standing walls (see certificate of structural compliance)				
2(b) Retaining walls (see certificate of structural compliance)				
2(c) Underground storages (see certificate of structural compliance)				

Final site inspection details: By.....Date:.....

ITEM	DESIGNER		COUNCIL REVIEW	
	YES	NO	YES	NO
3(a) Each discharge control pit complies with the following requirements (refer Section 4.3.4). See also Attachment B				
- DCP dimensions and levels comply with design parameters				
- material, thickness, diameter and sharp edge of fitted orifice plate				
- the orifice plate is securely fitted				
- the orifice is screened and the screen is properly fixed, located and able to be easily removed				
- outlet pipe is the correct diameter, level and grade (to ensure there is free discharge through the orifice)				
- the levels of the top water surface, storage invert and DCP are such that the design discharge from the storage is achieved				
- in design cases of 'high early discharge', runoff from sufficient areas of the site is directed to the DCP				
- the specified flap valve is fitted correctly				
3(b) Each storage complies with the following requirements (refer Section 4.3.4), see also Attachment B				
- the actual volume achieved is adequate				
- the actual top water level will not result in either unintended surcharge of the internal drainage system and/or inundation or inadequate freeboard to finished floor levels				
- the base of the storage is well graded and drains to the DCP				
- Spillways and overflow paths are constructed to the correct levels and are free from obstructions				
3(c) The internal drainage complies with the following requirements (refer Section 4.3.4)				
- site gradings are in accordance with the design expectation (regarding areas to be commanded by each storage)				
- the internal drainage lines are of a sufficient size, level and grade to convey the flows to the storage				
- storages cannot be by-passed by overflows from the internal system or by overflows from any surface area designed to drain to the storages				
- floodways and/or overland flowpaths designed to divert flows around the basin have been properly constructed and will function as designed				
- general workmanship is adequate to prevent long-term failure of the system				
3(d) The finished levels of structures (e.g. dwellings, garages) are sufficiently above the as-constructed maximum water surface levels in the storage and flowpaths (refer Section 4.3.4)				
3(e) An emergency spillway or overflow path has been provided so that surcharge will not cause stormwater to enter buildings where significant damage would occur				
3(f) All drainage pits, pipes, storages are in a clean condition and free of building materials,				

ATTACHMENT B: OSD WAE DIMENSIONS, ETC.

DESCRIPTION	APPROVED	WAE	CERTIFIER'S COMMENTS
DISCHARGE CONTROL PIT:			
(a) Orifice diameter (mm)			
(b) Orifice plate material			
(c) Pit width (m)			
(d) Pit breadth (m)			
WEIR:			
(a) Reduced level			
(b) Width			
(c) Height (mm)			
DCP invert level			
Access grate dimensions			
STORAGE:			
(a) Top water level			
(b) Storage volume (m ³)			
(c) Freeboard to F.F.L. (mm)			
(i) Habitable area			
(ii) Garage			
Maximum depth of water (mm)			

CERTIFIER'S NAME:

SIGNATURE:

DATE:

**FORM B.11
 UPPER PARRAMATTA RIVER CATCHMENT TRUST
 ON-SITE STORMWATER DETENTION SYSTEM
 CERTIFICATE OF HYDRAULIC COMPLIANCE**

**BAULKHAM HILLS/BLACKTOWN CITY/HOLROYD CITY/PARRAMATTA CITY
 COUNCIL**
(delete not applicable)

JOB NO: _____ **DA NO:** _____ **BA NO:** _____

PROJECT: _____

LOCATION: _____

DESIGNED BY: _____

CONSTRUCTION

CERTIFIED BY: _____

QUALIFICATIONS: _____

TELEPHONE: _____

1.0 WORKS CONSTRUCTED IN ACCORDANCE WITH DESIGN. (Delete if not applicable)

I _____ of _____ (accredited professional being competent to practice in the field of stormwater drainage design) have inspected the above on-site stormwater detention system and certify that the works have been constructed and can be maintainedⁱ in accordance with the approved design details for the above mentioned project.

Signature: _____ **Date:** _____

2.0 CONSTRUCTION VARIATIONS NOT AFFECTING DESIGN PERFORMANCE. (Delete if not applicable)

I _____ of _____ (accredited professional being competent to practice in the field of stormwater drainage design) have inspected the above on-site stormwater detention system and certify that the works have been constructed and can be maintained in accordance with the approved design details for the above mentioned project, except for the variations listed below which do not affect the performance of the system, subject to satisfactory maintenance.

Variations:

Signature: _____ **Date:** _____

3.0 AUTHORITY TO RELEASE PLANS TO FUTURE OWNERS OF THE PROPERTY

As the copyright owner of the drainage plans, I hereby authorise release of the approved plans/attached sketch plan to future owners of the property to assist in the maintenance of the On-site Stormwater Detention system.

Signature: _____ **Date:** _____

Name: _____ (Print)

ⁱ Maintainability added for third edition

- a. **Structural Engineer's Certificate for the OSD tank structure/
Basement pump-out tank structure/ OSD basin retaining wall
etc.**

The Structural Certificate should provide statement of Structural stability and soundness of the OSD basin retaining wall, which requires withholding ponding water within the respective OSD basins (see sample wordings below).

***Sample statement in the STRUCTURAL CERTIFICATE
FOR OSD BASIN WALLS/ TANK STRUCTURE***

..... The depth and bearing of the piers, pads and footings of the OSD tank structure/ OSD basin retaining wall are such that the safe allowable bearing pressure shown in table B 1.101 of the Building Code of Australia (Current edition) will not be exceeded by the loads of the proposed structure.

The preparations and reinforcement in the footings have been assessed and complies with the approved details.

We hereby certify that the completed construction at the above-mentioned project is structurally adequate to support all loads as specified in AS1170.1 & 2 (Loading Code). All works were found to be generally in accordance with the BCA requirements, AS 2870 (Residential Slabs & Footings) and AS 3600 (Concrete Structure)

Please include the following text at the end

"We also certify that the completed structure is water-tight and water does not leak into neighbouring properties through the underneath of the structure footing."