



AUS-SPEC

Infrastructure Specifications

0012 Waterfront development

0012 WATERFRONT DEVELOPMENT

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) Cessnock City Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and Cessnock City Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL**1.1 INTRODUCTION****Worksection application**

Description: This worksection is applicable to design and documentation requirements for waterway facilities and structures for canal type subdivisions or developments with water frontages to natural waterways.

1.2 RESPONSIBILITIES**General**

Requirement: Provide design and documentation for waterway facilities and structures.

Legislation: *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

1.3 CROSS REFERENCES**General**

Requirement: This is not a self-contained design document, conform to the following worksection(s):

- 0010 *Quality requirements for design*.
- 0022 *Control of erosion and sedimentation (Design)*.
- 0061 *Bridges and related structures*.
- 0074 *Stormwater drainage (Design)*.

1.4 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- NWQMS: National water quality management strategy.

2 PRE-DESIGN PLANNING**2.1 ENVIRONMENTAL INVESTIGATION AND PLANNING****Survey**

Requirement: Carry out detailed hydrographic and terrestrial surveys. Prepare survey reports using the same uniform grid and recognised datum.

Standard: To the recommendations of AS 3962 (2020) clause 2.1 and AS 4997 (2005) clause 2.2.

Qualifications: Registered surveyor.

Geotechnical investigation

Requirement: Carry out a detailed geotechnical investigation and prepare a geotechnical report.

Standard: To the recommendations AS 3962 (2020) clause 2.2 and AS 4997 (2005) clause 2.3.

Qualifications: Professional geotechnical engineer.

Wind, hydrodynamic and sediment movement assessment

Requirement: Carry out detailed site investigations and prepare a report.

Standard: To the recommendations AS 3962 (2020) clause 2.3.

Note: AS 3962 (2020) addresses the collection of data related to wind, waves, tides, storm surge, flood levels, currents, sediment movements, water quality and greenhouse effects.

Qualifications: Professional engineer with experience with wind hydrodynamic and sediment assessment.

Heritage considerations

Requirement: Provide a Heritage Plan of Management to incorporate and protect potential indigenous and non-indigenous heritage items discovered onsite or listed in State or Council Heritage Registers or a Local Environmental Plan.

Protection of existing infrastructure

Existing plans: Obtain drawings of existing adjoining structures.

Dilapidation reports: Carry out inspections of all existing structures adjoining the proposed construction works. Prepare a report on their existing structural condition including photographic records of any defects.

Environmental impact assessment

Requirement: Investigate the surrounding waterways, natural estuary process, water quality and contaminant flows originating from agricultural, industrial or urban run-off. Analyse the environmental impact of the proposed development and any other possible developments in the future, including future increases in road and navigation traffic. Prepare a detailed report.

Qualifications: Professional (degree-qualified engineer, scientist or equivalent) with experience in environmental assessment.

Habitat assessment

Requirement: Investigate the flora and fauna in the surrounding waterways, sand dunes, estuary flats, coastal wetlands, salt marshes, mangrove forests, lagoons, oyster farms, etc. Analyse the impact of the proposed development on the existing flora and fauna. Prepare a detailed report.

Qualifications: Environmental biologist with experience in habitat assessment.

2.2 CONSULTATION

Council and other Authorities

Requirement: Consult with the Council and other relevant Authorities during the preparation of the design. In addition to the requirements of this worksection, identify the specific design requirements of these authorities. Depending on the scope of the proposal such authorities may include (without limitation):

- NSW Department of Planning, Industry and Environment (Water in NSW for Controlled Activity Approval; Environment, Energy and Science; Parks and Wildlife),
- NSW Department of Primary Industries (Fisheries),
- Transport for NSW (Maritime).

Public consultation

Requirement: Undertake public consultation on the design in conformance with Council policy.

Utilities services plans

Existing services: Obtain service plans from all relevant utilities and other organisations whose services exist within the area of the proposed development. Plot these services on the relevant drawings including the plan and cross-sectional views. Check levels of those utilities. **BEFORE YOU DIG Australia** (www.1100.com.au) is a free service to identify underground pipe and cables registered by authorities.

3 DESIGN CRITERIA

3.1 GENERAL

Design objective

Requirement: See Clause M4. Design waterway facilities and structures for the proposed development/subdivision to support the following objectives:

- To retain and enhance the biological diversity of the local flora and fauna.
- To preserve or improve the local ecosystem.
- To maintain or improve the flood levels in the area.
- To improve public access to the intertidal area of the waterfront.
- To maintain or improve the quality of water, air and land.
- To minimise the disruption of the natural shoreline.
- To minimise future maintenance.
- To integrate the waterfront developments into the natural landscape.
- To conserve the waterfront or offshore items of heritage significance.

Sea level rise: Design for sea level rise due to global warming based on the latest projections of regional sea level rise. Minimum allowance for future sea level rise to AS 4997 (2005) Table 4.1.

3.2 ARTIFICIAL WATERWAYS

Note: State Environmental Planning Policy No 50 – Canal Estate Development currently prohibits further canal estate developments in NSW.

Critical design features

Requirements:

- Multiple entrances connected in a loop to natural bodies of water to allow circulation of fresh water.
- Interconnected channels to produce flow-through currents.
- Bends and meandering channels with low aspect ratio and rounded corners.
- No dead end channels or coves.
- Artificial islands and roughness elements to enhance local circulation.
- Alignment of the artificial waterway in the direction of prevailing summer winds to receive maximum turbulent mixing.
- Shallow depths to allow efficient tidal flushing.

Aquatic ecology

Existing wetland features: Preserve any existing ecosystems including mangrove wetlands, sand dunes, estuary flats, salt marshes, lagoons, oyster farms, migrating bird habitats, fish habitats.

Surrounding waterways: Preserve or improve the ecological condition of surrounding waterways.

Biological diversity: Maintain or improve the local biological diversity.

Water quality

Water quality within canals must not adversely affect the following:

- Swimming and wading.
- Boating.
- Passive recreation.
- Good aesthetics.
- Freedom from excessive plant and algal growth.
- Diversity of marine flora and fauna.
- Tourism.

Note: Refer to NWQMS Document 4, known as the ANZECC guidelines, for guidelines on managing fresh and marine water quality in ambient waterways including rivers, creeks, streams, lakes, estuaries and coastal marine waters; and even some artificial waterways that have value for the community or ecosystems.

Buffer strips: Maintain existing buffer zones of natural vegetation or design new buffer zones to act as a contaminant filter to industrial, agricultural and urban run-off.

Sewerage pump out stations: Allocate suitable locations next to jetties, wharfs and marinas.

Erosion and sedimentation

Note: Altered waterways can cause disturbance of the estuary process and natural sedimentation control.

General: Conform to the 0022 *Control of erosion and sedimentation (Design)* worksection.

Alignment with prevailing winds: Analyse the advantages and disadvantages of increased wind action.

Temporary sedimentation control: Include measures and devices to eliminate sedimentation within the canal system during the construction phase, especially if excavation of acid sulfate soils or large scale earth moving operations are expected.

Note: Acidic contamination has considerable environmental impact and usually results in significant maintenance costs for Council in the future.

Control of fill: If using imported fill on site, specify measures for permanent erosion and sedimentation control.

Note: Imported fill can have adverse effects by causing contamination of the canal water and maintenance issues in the future.

Stormwater outlets: Choose locations which will minimise erosion or local scour. Make allowance in the design for sedimentation of material at stormwater outlets and scour protection.

Stormwater design

General: Conform to the 0074 *Stormwater drainage (Design)* worksection.

Water quality: Demonstrate that the proposed method of stormwater management will not adversely affect water quality within the artificial waterway or lead to problems associated with siltation and erosion.

Stormwater outlets: Locate at points of maximal flushing.

Flood control

Requirement: Prepare a flood study model to show that the proposed works will not cause increased or substantial afflux flood levels upstream of the proposed works.

Note: Altered waterways may cause disturbance to existing rivers and existing floodways.

3.3 GEOMETRIC REQUIREMENTS FOR ARTIFICIAL WATERWAYS

Waterway depths

Central, navigable area: Conform to AS 3962 (2020).

Non-navigable areas: Keep non-navigable areas shallow. Create wetland habitats.

Waterway widths

Navigation width: Guidance for navigable widths can be obtained from AS 3962.

Overall canal width: To be governed by the hydrodynamic site investigation report. The minimum value should be increased where it is considered that such widening is necessary to improve mixing and flushing characteristics.

Vertical mixing: Maximise the width of the water surface in the canals to enhance vertical secondary mixing.

Structures: Allow for any proposed structures, such as jetty and ramp when establishing the overall canal width.

Waterway cross sections

Batters and stability coefficients: To the geotechnical report. **Refer also to Clause M5.**

Edge treatment: Demonstrate that the proposed method of edge treatment will not adversely affect water quality within the artificial waterway or lead to problems associated with siltation and erosion.

Stability analysis: Carry out stability analysis of proposed waterway cross sections for relevant loads as described in AS 3962 (2020) and AS 4997 (2005).

Waterway entrances

Standard: To AS 3962 (2020).

Locations: Avoid areas of naturally occurring sedimentation. Locate entrances in areas sheltered from excessive wave action and strong currents.

Orientation: Consider alignment of the entry with the tide currents and prevailing winds. Consider impact on tidal flushing, water circulation and sedimentation movements.

Multiple entrances: Provide at least one additional entrance, navigable or non-navigable.

Note: Significant circulation and water quality benefits can be derived from construction of more than one entrance to the artificial waterway.

Navigation: Consider the safety of craft likely to use the waterway.

3.4 STRUCTURES

Marinas

Standard: To AS 3962 (2020).

Residential developments: Avoid locating public marina facilities near residential areas to minimise the noise and privacy impacts.

Wharfs, jetties and boardwalks

General: To AS 4997 (2005).

Disabled access: To the NCC cited AS 1428.1 (2009).

Slip resistance: To AS/NZS 3661.2 (1994) and AS 4586 (2013).

Ramp width: To AS 3962 (2020).

Note: AS 3962 (2020) clause 3.6 describes gangway width requirements for marinas and can also be used as a guidance for ramps leading from wharfs, jetties or boardwalks.

Boat ramps

Standard: To AS 4997 (2005).

Note: Boat ramps having their surfaces level with the beach surface are less visually prominent and are therefore preferable to ramps which project above the beach surface.

Scour protection: Design the footings to bear on rock or make allowance in the design for loss of material in conformance with the geotechnical report and wind/hydrodynamic/sediment report.

Floating structures and fenders

Standard: AS 4997 (2005).

Construction materials selection: Consider marine growth.

Access and safety structures

Standard: AS 4997 (2005) and AS 1657 (2018).

Revetment structures

Maximum height of the revetment: Keep the crest level of revetment as low as possible to allow easy access onto the waterway, to optimise mixing wind action and to reduce visual impact.

Minimum height: Locate the crest of the revetment sufficiently high to accommodate design water depth, wind setup, wave run-up, long term changes in mean sea level and local tide levels, without overtopping.

Erosion: Make allowance in the design for loss of material in front of the revetment, in conformance with wind, hydrodynamic and sediment control reports.

Run-off: Provide a kerb and gutter arrangement to the top of revetment.

Seawalls

General: To AS 4997 (2005) and AS 4678 (2002).

Drainage: Design appropriate drainage to relieve the water pressure behind the wall.

Erosion: Make allowance in the design for loss of material from the seaward face in conformance with the wind/hydrodynamic/sediment movement report. Alternatively, design foundations to bear on rock in conformance with geotechnical report.

Bridges and related structures

General: Conform to the *0061 Bridges and related structures* worksection.

Vertical clearance: To the requirements of the relevant waterway and maritime Authorities.

Public access: Maintain continuity of public access along the public foreshore.

Services

Electrical connections: Consider the most adverse water levels when establishing the locations for the electrical services.

3.5 MATERIALS

General

Standards: To AS 4997 (2005) clause 6 and AS 3962 (2020) clause 5.2.

Durability

Maintenance: Document low maintenance materials for construction, finishes and fitments. Consider exposure conditions and appropriate durability requirements.

Protection of materials: Document protection methods for materials to satisfy durability requirements.

Construction

Demolition: Explore possibilities for re-using any demolished material from the site.

Imported fill: Analyse the impact on water quality, sedimentation and erosion.

Noise and light pollution: Analyse the impact onto local wild life patterns.

Construction materials

General: Demonstrate that the proposed construction materials will not have an adverse impact on the local ecosystem. Analyse the impact of construction materials on water quality, sedimentation and erosion. Prepare a report.

4 DOCUMENTATION

4.1 GENERAL

Approvals

Requirement: Document the approval conditions advised by the appropriate authority which contribute to the basis for the design.

Design reports

Requirement: Provide a design report including the following:

- Design criteria.
- Site investigation reports supporting the design.
- Detailed design calculations (civil, structural and hydraulic).
- Hydraulic design models (drainage, flood control, tidal movements, sedimentation).
- Flood study report, including flood control measures.

Environmental management report for construction

Requirement: Provide environmental management plan as part of overall construction management plan. Include the following if applicable:

- Water quality management and monitoring program.
- Air quality management and monitoring program.
- Noise control program.
- Acid sulfate soils management plan.
- Erosion and sedimentation management plan.
- Plan for management and protection of marine flora and fauna.

Calculations

Requirements: Provide a design report incorporating, calculations and references supporting the design.

Design certification

Requirement: Provide a signed and dated design certificate.

Final certification of completed works

Requirements: Provide a signed and dated conformance certificate.

4.2 DRAWINGS

General

Requirement: Provide drawings defining the works and assumed operating and maintenance procedures.

Drawing content

Requirements: Provide design drawings to include the following:

- Locality plan.
- Site plan showing relevant building restriction lines, relevant flood level lines and waterway regulation lines.
- Waterway profiles: Typical sections showing depths, relevant high and low water lines and flood lines.
- Structures: General arrangement plans and typical sections.
- Site works: General arrangement plan and typical details.
- Bulk earthworks plans.
- Landscape plan showing riparian vegetation and soft foreshore treatments.
- Design loads/design life information.
- Earth/water works such dredging, land reclamation works, entrance works: plan layouts, sections and details.
- Site works such as roads, pavements and retaining walls.

- Waterways: Plans, sections and details.
- Flood and sedimentation control devices.
- Drainage and stormwater harvesting: Plans, sections and details.
- Services: Plans, sections and details.
- Landscaping: Plans, sections and details.
- Structures: General arrangement plans, sections, elevations and structural details.
- Foundations: Plans, details and geotechnical information.
- Construction sequence and temporary works.

Work-as-executed drawings

General: Provide additional set of final construction drawings for the purpose of recording the work-as-executed by the Contractor.

4.3 SPECIFICATIONS

Construction documentation

Requirement: Prepare technical specifications using the AUS-SPEC Construction worksection *Templates* from the National Classification System workgroups 02, 03, 11, 13.

5 ANNEXURE A

5.1 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1428		Design for access and mobility
AS 1428.1	2009	General requirements for access - New building work
AS 1657	2018	Fixed platforms, walkways, stairways and ladders - Design, construction and installation
AS/NZS 3661		Slip resistance of pedestrian surfaces
AS/NZS 3661.2	1994	Guide to the reduction of slip hazards
AS 3962	2020	Marina design
AS 4586	2013	Slip resistance classification of new pedestrian surface materials
AS 4678	2002	Earth-retaining structures
AS 4997	2005	Guidelines for the design of maritime structures
AUS Gov Act No. 91	1999	Environment Protection and Biodiversity Conservation Act 1999
AUSROADS AGRD06A	2019	Guide to Road Design Part 6A: Pedestrian Cyclist Paths
Cessnock City Council		AUS SPEC Infrastructure Specifications
NSW Gov Waterways	2006	Local Planning for Healthy Waterways (Office of Environment and Heritage)
NWQMS	2000	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (National Water Quality Management Strategy)
Cessnock City Council		Development Engineering Handbook

6 ANNEXURE M – CESSNOCK CITY COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: <ul style="list-style-type: none"> a) an authorised representative of Council's Director of Infrastructure and Engineering Services. 	Variation procedure
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	DA Conditions

M3.	Refer to the Cessnock City Council Development Engineering Handbook for final inspection, works-as-executed and handover requirements.	Completion
M4.	(See Clause 3.1) Designs for waterfront developments shall also meet the objectives set out in Council's Local Environmental Plan and Development Control Plan that apply to the site.	Waterfront design objectives
M5.	(See Clause 3.3) For safety and maintainability, batter slopes adjacent to waterways should desirably not exceed 1:6 (16.7%) and generally are not to exceed 1:4 (25%). Provide areas such as ramps and landings for safe access and egress by the public and workers. Shorelines and batters in particular are likely to require revetment or rock armouring to protect from scour as a result of storm, wind and wave actions. This is to be assessed in the hydrodynamic study.	Batter slopes

7 AMENDMENT HISTORY

0	15/01/2024	First Published
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