9.4.2 Earthworks, Construction and Water Quality Code

9.4.2.1 Application

This code applies to development identified as requiring assessment against the Earthworks, Construction and Water Quality Code by the tables of assessment in **Part 5 Tables of Assessment**.

9.4.2.2 Purpose

(1) The purpose of the Earthworks, Construction and Water Quality Code is to protect premises, people and the natural environment from adverse impacts associated with excavation, filling and construction activities.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Development involving filling and excavation is safe, protects infrastructure, does not increase hazards and provides for the safety of the community;

(b) Construction activities are undertaken safely and protect the existing amenity of the locality and the natural environment;

(c) Development contributes to protecting or enhancing the environmental values of receiving waters;

(d) Development avoids or minimises disturbance to natural drainage, erosion risk, salinity, and landscape features and mitigates any impacts from disturbance to receiving waters to maintain environmental values;

(e) The water quality of both surface and groundwaters and the ecological and hydrological processes of catchments is protected;

(f) Stormwater is managed to maintain or re-create natural hydrological processes and minimise impacts from altered run-off regimes;

(g) Environmental values of receiving waters are protected from adverse development impacts arising from the creation or expansion of artificial waterways;

(h) Development adopts best practice water-sensitive urban design and integrated water-cycle management approaches to ensure;

(i) Life-cycle costs of water quality infrastructure are considered and minimised; and

(ii) Development facilitates the achievement of water quality objectives for waterways.

Note: *Water quality objectives for waterways are outlined in the Environmental Protection (Water) Policy 2009.*

9.4.2.3 Assessment Benchmarks

Table 9.4.2.3.1—Criteria for Assessable Development

Performance Outcomes	Acceptable Outcomes
Earthworks	
PO1 Earthworks do not result in increased instability of the subject or adjoining lands.	**AO1.1** Retaining walls: (1) are designed and certified by a *suitably qualified person*; and (2) do not include timber products where located or proposed to be: (a) located on public land; or (b) set back form a boundary adjoining public land a distance less than the height of the retaining wall.
	AO1.2 All areas of fill are compacted in accordance with: (1) Australian Standard 3798:1996 - Guidelines on Earthworks for Commercial and Residential Developments; and (2) Australian Standard 2870:1996 - Residential Slabs and Footings - Construction.
PO2 Development undertaken in areas of existing traffic flow provides for traffic to continue to be able to reach its destination without significant delay.	**AO2** Development ensures that where the temporary diversion of traffic is necessary: (1) permission for a temporary road closure is obtainable from the Police, and a detour is provided via existing roads; or (2) a temporary detour is provided within or adjoining the site; or (3) if no detour is available, traffic flows are managed to ensure minimum disturbance to road users.
Damage to Existing Infrastructure	
PO3 Earthworks do not result in an unnecessary disturbance to existing infrastructure.	**AO3** (1) Development is designed to maintain the location of existing infrastructure, including depth of cover to underground infrastructure; or (2) Where disturbance to existing infrastructure is unavoidable: (a) underground infrastructure that is covered to a greater depth is provided with access for maintenance and inspection purposes; or (b) underground infrastructure that is uncovered, or has cover reduced to less than the applicable standard, is relocated or otherwise protected from damage; or (c) above ground infrastructure is repositioned to a location that complies with the applicable standards.

Performance Outcomes	Acceptable Outcomes
Removal of Vegetation, Stumps and Dumped Waste	
PO4 Disposal of waste generated from construction activities: (1) is managed in a manner not to cause *environmental harm*; (2) complies with relevant legislation; and (3) does not to occur on site.	**AO4.1** Vegetation waste involving development sites of more than 5 hectares is chipped or burnt in an approved pit burner. ***Editor's Note*** *- Chipping is the preferred method of vegetation disposal. Chipped vegetation can be used as soil cover for exposed areas to assist sediment control.*
	AO4.2 Small quantities of waste are taken to an appropriate landfill facility.
	AO4.3 Development involving contaminated waste is disposed of in an approved manner under the Environmental Protection Act 1994.
	AO4.4 All unconsolidated fill, builder's rubble, or other waste is removed from the site prior to the completion of works.
Siting and Removal of Dams	
PO5 Existing dams: (1) do not create a safety hazard; (2) are located on a single lot; and (3) where removed, the land is shaped and compacted back to its natural state.	**AO5.1** Development in urban areas results in the removal of all dams.
	AO5.2 Development in the Rural Zone or Rural Residential Zone only retains dams where they are fully contained within one lot.
	AO5.3 The land affected by a dewatered dam shall be returned to its natural state by: (1) shaping the land to its natural form or in accordance with a development approval; and (2) compaction of the soil.
Amenity	
PO6 Earthworks are conducted in a manner which minimises disruption to nearby sensitive receivers having regard to: (1) hours of operation; (2) traffic movement on access roads and within the site; (3) minimising timeframes for earthworks.	**AO6** No acceptable outcome is prescribed.
PO7 Earthworks are conducted in a manner which reduces their visual impact.	**AO7** Earthwork areas are grassed or landscaped immediately upon completion to a standard commensurate with their surrounds.

Performance Outcomes	Acceptable Outcomes
Dust Management	
PO8 Dust from development does not create environmental harm and minimises impacts on sensitive receivers.	**AO8.1** Development provides for the suppression of dust during construction or earthworks.
	AO8.2 Haul routes for bulk earthworks are located as far as practical from *sensitive receivers*.
PO9 Spoil piles, stockpiles and borrow pits are located and managed to not create a dust nuisance and to minimise impacts on *sensitive receivers*.	**AO9.1** Spoil piles, stockpiles and borrow pits are located as far as practical from *sensitive receivers*.
	AO9.2 Spoil piles, stockpiles and borrow pits, operating for greater than one week, are covered.
Stormwater Management – Protecting Water Quality and Hydrological Processes	
PO10 Development is planned and designed considering site land-use constraints to allow the provision of stormwater management systems that avoid or minimise adverse impacts on environmental values of receiving waters. ***Editor's Note:*** *A site stormwater quality management plan prepared by a suitably qualified person is required to inform the layout of the development and to demonstrate compliance with the requirement*	**AO10.1** Development demonstrates it has minimised disturbance to: (1) natural drainage; (2) areas with erosive, dispersive, sodic and/or saline soils; (3) acid sulfate soils; (4) groundwater levels; and (5) landscape features and vegetation.
	AO10.2 A stormwater management system has sufficient site area to service the requirements of the development.
	AO10.3 Stormwater management systems: (1) are located outside of wetlands, waterways and riparian areas; and (2) prevent increased channel bed and bank erosion. ***Editor's Note:*** *The approximate location of wetlands and waterways can be found on* ***Environmental Significance Overlay Map – Wetlands and Waterways OM-04-D*** *and* ***Environmental Significance Overlay Map – Local Watercourses OM-04-E***
PO11 Construction activities for the development avoid or minimise adverse impacts on sediment mobilisation, stormwater quality and hydrological processes.	**AO11.1** An erosion and sediment control program (ESCP) demonstrates that release of sediment-laden stormwater is avoided or minimised by achieving the design objectives listed in **Table 9.4.2.3.2 - Construction Phase – Stormwater Management Design Objectives.** **OR** **AO11.2** The ESCP demonstrates how stormwater quality will be managed so that target contaminants are treated to a design objective at least equivalent to **Table 9.4.2.3.2 - Construction Phase – Stormwater Management**

Performance Outcomes	Acceptable Outcomes
	Design Objectives.
PO12 Development manages stormwater to avoid or minimise the environmental impacts of stormwater discharge on the quality and waterway hydrology of receiving waters. ***Editor's Note:*** *A site stormwater management plan prepared by a suitably qualified person is provided that demonstrates development can be managed to achieve compliance with the stormwater management design objectives.*	**AO12** Development is managed so that it meets the objectives in **Table 9.4.2.3.4 - Post Construction Phase – Stormwater Management Design Objectives.**
PO13 Development prevents increased bed and bank erosion in receiving waterways by limiting changes in run-off volume and peak flows.	**AO13** The development is designed to: (1) minimise impervious areas; (2) maximise opportunities for capture and reuse of stormwater; (3) incorporate natural channel design principles; and (4) achieve the waterway stability objectives listed in **Table 9.4.2.3.4 - Post Construction Phase – Stormwater Management Design Objectives.** ***Note:*** *The waterway stability objective listed in* ***Table 9.4.2.3.4*** *applies if development drains to an unlined waterway within or downstream of the site where there is an increased risk of erosion due to changes in hydrology.*
PO14 Development protects in-stream ecology by maintaining pre-development low-flow discharge regimes.	**AO14** No acceptable outcome is prescribed.
PO15 Development ensures that the entry and transport of contaminants into stormwater is avoided. ***Note:*** *Prescribed water contaminants are defined in the Environmental Protection Act 1994.*	**AO15** No acceptable outcome is prescribed.
Point Source Wastewater Management (Other than Contaminated Stormwater and Sewage)	
PO16 Development involving wastewater discharge (other than contaminated stormwater and sewage) to a waterway avoids or minimises adverse impacts to ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	**AO16.1** Where the development involves the discharge of wastewater (other than contaminated stormwater and sewage), a wastewater management plan (WWMP) is prepared by a *suitably qualified person* and addresses: (1) wastewater type; (2) climatic conditions; (3) water quality objectives; (4) soil conditions and natural hydrology; and (5) best practice environmental management. ***Note*** *- Development is designed to achieve the prescribed water quality objectives for Waterways in accordance with the Environmental Protection (Water) Policy 2009.*
	AO16.2 The WWMP prepared in **AO16.1** provides that

Performance Outcomes	Acceptable Outcomes
	wastewater is managed in accordance with a waste-management hierarchy that: (1) avoids wastewater discharges to waterways; or (2) if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by reuse, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.
Non-tidal artificial waterways	
PO17 The location of artificial waterways: (1) avoids groundwater-recharge areas; (2) incorporates low lying areas of a catchment connected to an existing waterway; (3) does not disturb natural wetlands and any associated buffer areas; (4) minimises disturbing soils or sediments; and (5) avoids altering the natural hydrologic regime in nutrient hazardous areas.	**AO17** No acceptable outcome is prescribed.
PO18 Stormwater is treated before discharge into a non-tidal artificial waterway.	**AO18** Before being discharged into an artificial waterway, stormwater is treated to achieve the applicable stormwater management design objectives outlined in: (1) **Table 9.4.2.3.2- Construction Phase – Stormwater Management Design Objectives;** (2) **Table 9.4.2.3.3 - Construction phase – Stormwater Management Design Objectives for Temporary Drainage Works;** and (3) **Table 9.4.2.3.4 - Post Construction Phase – Stormwater Management Design Objectives.**
PO19 Any artificial waterway is designed, constructed and managed in a way that avoids or minimises adverse impacts on ecological processes, water quality, flood capacity, waterway integrity, and ecosystem and human health. ***Editor's Note:*** *A suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing artificial waterways is required to demonstrate compliance with the requirement.*	**AO19** No acceptable outcome is prescribed.

Table 9.4.2.3.2- Construction Phase – Stormwater Management Design Objectives

Issue	Desired Outcomes
Drainage control ***Note*** *- Refer to IECA 2008 Best Practice Erosion and Sediment Control (as amended) for details on the application of the Construction Phase requirements.*	(1) Manage stormwater flows around or through areas of exposed soil to avoid contamination. (2) Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. (3) Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works as specified in

Issue	Desired Outcomes
	Table 9.4.2.3.2 - Construction phase – stormwater management design objectives for temporary drainage works. (4) Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives of: (a) 10% AEP where the design life is less than 3 months; (b) 5% AEP where the design life is 3-12 months; (c) 2% AEP where the design life is greater than 12 months.
Erosion control ***Note** - Refer to IECA 2008 Best Practice Erosion and Sediment Control (as amended) for details on the application of the Construction Phase requirements.*	(1) Stage clearing and construction works to minimise the area of exposed soil at any one time. (2) Effectively cover or stabilise exposed soils prior to predicted rainfall. (3) Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised[1] using methods which will achieve effective short-term stabilisation.
Sediment control	(1) Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. (2) All exposed areas greater than 2500 metres[2] must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, hydrocarbons and other contaminants	(1) Remove gross pollutants and litter. (2) Avoid the release of oil or visible sheen to released waters. (3) Dispose of waste containing contaminants at authorised facilities.
Waterway stability and flood flow management	(1) Measures are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. (2) Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction.

***Note** - Drainage, erosion and sediment controls should be appropriate to the risk posed by the activity for the relevant climatic region e.g. considering the potential soil loss rate, monthly erosivity or average monthly rainfall.*

***Note** - An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation water contamination.*

Table 9.4.2.3.3 - Construction phase – Stormwater Management Design Objectives for Temporary Drainage Works

Temporary drainage works	Anticipated operation design life and minimum design storm event		
	< 12 months	12–24 months	> 24 months
Drainage structure	1 in 2 year ARI 39% AEP	1 in 5 year ARI 18% AEP	1 in 10 year ARI 10% AEP
Where located immediately up-slope of an occupied property that would be adversely affected by the failure or overtopping of the structure	1 in 10 year ARI 10% AEP		
Culvert crossing	1 in 1 year ARI 63% AEP		

Table 9.4.2.3.4 - Post Construction Phase – Stormwater Management Design Objectives

Reductions in mean annual load from unmitigated development (%)				
Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants >5mm	Waterway Stability Management
80	60	45	90	Limit the 63% AEP event discharge within the receiving waterway to the pre-development 63% AEP event discharge