

Procedural Guide

Compliance Notes

Standard Work Method for the Assessment of the Lawfulness of Releases to Waters from Construction Sites – South-East Queensland

This document has been prepared to provide officers with an assessment tool for undertaking erosion and sediment control (ESC) compliance inspections at construction sites in south-east Queensland and to assist in the decision-making process for applying enforcement provisions under the *Environmental Protection Act 1994*.

The Summary Sheet provides a brief reference point for use on inspections and this document expands on key areas with information to assist with decision making.

Table of Contents

Framework	2
Context	2
Purpose	2
Environmental objectives.....	2
Legal requirements	3
Part A – Assessment of actual or potential water contamination	4
1 Sediment build up	4
2 Releases.....	4
Part B – Assessment of lawfulness of depositing prescribed water contaminants or release of stormwater run-off	5
1 Assessment of compliance with a development approval	5
2 Assessment of compliance with the general environmental duty (GED)	5
2.1 Erosion and sediment control plans	6
2.2 Prevention, reduction and treatment of contaminants	6
2.2.1 Minimising soil exposure.....	7
2.2.2 Managing stormwater flows	8
2.2.3 Sediment basins	9
2.2.4 Erosion and sediment controls (other than sediment basins)	11
2.2.5 Disturbances in waterways	13
2.3 Adaptive management	14

Framework

Context

South-east Queensland (SEQ) is one of the most rapidly developing areas in Australia. With an increasing population comes extensive clearing of bushland for urban development, including residential, commercial and public infrastructure projects. Modelling that underpinned the development of the SEQ Healthy Waterways Strategy 2007–2012 showed that the urban diffuse sediment load will increase by approximately 63 per cent by 2026 under a business-as-usual scenario. Further, according to the Healthy Waterways Ecosystem Health Monitoring Program, the ecological health of the regions estuaries and bays, including Moreton Bay, can be severely degraded by stormwater flows carrying large mass loads of sediments. This in turn can adversely impact on Queenslanders' lifestyles and livelihood. Stopping the increased sediment and nutrient loads to the state's waterways and reversing the ecosystem impacts will require progressive improvement in stormwater management, particularly erosion and sediment control measures to meet higher community expectations and government requirements.

Land and infrastructure development (all residential, commercial, industrial and public infrastructure developments on land, such as subdivisions, roads, rail, bulk water distribution and hospitals) are subject to legal requirements for depositing prescribed water contaminants in waters, including water contamination caused by the release of sediments during the construction stage. Compliance actions may be taken where stormwater run-off may impact the environment.

Purpose

This document provides a guide for undertaking inspections of stormwater management and erosion and sediment control during the construction phase of land and infrastructure development in SEQ. When implemented, the practices described in this document will help achieve water quality objectives and management goals which in turn will help protect or enhance environmental values in SEQ waterways. The intention of this document is to provide:

- an objective assessment tool for applying the enforcement provisions of the *Environmental Protection Act 1994* (EP Act) on construction sites
- a key reference point for technical guidelines and training programs.

This document addresses EP Act provisions only. It is recognised that complementary enforcement provisions of other legislation may also be considered during enforcement decisions such as those that exist under the *Sustainable Planning Act 2009* (SP Act). Development assessment conditions under the SP Act may reference the stormwater management design objectives published in the Urban Stormwater Quality Planning Guidelines that support the State Planning Policy for Healthy Waters 2010 (effective February 2011). This must also be considered when making decisions under the EP Act offence provisions.

Environmental objectives

The objective of this document is for development and associated construction activities to be planned and executed so that:

- the environmental values of waters are enhanced or protected
- the water quality objectives and management goals of waters are achieved.

Legal requirements

Stormwater run-off from land development and infrastructure development sites has a high potential to cause water contamination and/or environmental harm. This is regulated under the EP Act.

- Under S440ZG it is an offence to unlawfully deposit a prescribed water contaminant to waters. Prescribed contaminants are listed in Schedule 9 of the *Environmental Protection Regulation 2009* (EP Reg).
- Under S 319 persons in Queensland carrying out activities which may cause environmental harm must comply with the 'general environmental duty' (GED). This requires that all reasonable and practicable measures must be adopted to prevent and minimise environmental harm. Although not being able to demonstrate compliance against GED is not an offence, demonstrating that all reasonable and practicable measures have been adopted is a defence for offences such as water contamination. For instance, under chapter 10, s493A of the EP Act, where a person deposits a prescribed water contaminant to waters or causes unlawful environmental harm, it is a defence to demonstrate compliance with the GED. Demonstrating that all reasonable and practicable measures have been conceived and implemented should encompass:
 - a) thorough and ongoing site assessments
 - b) consideration of, and adaptation for site specific erosion risk factors including topography, soil type, climate and season
 - c) incorporation in the design, installation, operation, management, maintenance and monitoring of control measures which are consistent with the measures set out below.
- Reference must be made to s493A of the EP Act when a decision is made about the unlawfulness of water contamination, for instance where the release is authorised under a development approval.
- The Environmental Protection (Water) Policy (2009) (EPP Water) provides a process for protecting Queensland waters by establishing environmental values and water quality objectives for many waters (see Schedule 1 of the EPP Water). For waters not included in Schedule 1, the EPP Water provides a process for determining the environmental values and water quality objectives.

The EPP Water also establishes a hierarchy of preferred management options for wastes, including water contaminants, which when applied, protects or enhances the environmental values of waters. This document applies the management hierarchy in establishing the environmental performance standards which are necessary to help enhance or protect the environmental values of waters from the impacts of land development and infrastructure development sites.

Part A – Assessment of actual or potential water contamination

1 Sediment build up

Has the activity caused or does it have the potential to cause sediment build up, through act or omission, in the receiving environment?

Notes: Under Section 440ZG of the EP Act it is an offence to unlawfully¹ deposit 'prescribed water contaminants' in waters, roadside gutters, stormwater drainage or to place contaminants where, and in such a way that, they could run into such places. Prescribed water contaminants (a full list of which can be found in Schedule 9 of the EP Reg.) include:

- clay, gravel, sediment (including from building activities) , stones and similar organic and inorganic mater, and
- earth, which the EP Act defines as sand, soil, silt or mud.

Coarse sediment eroded from urban developments often accumulates temporarily in creeks downstream of the works. After roads and housing are completed, the increase in run-off from impervious areas will mobilise this sediment, often causing incising of the natural stream channel. Sediment levels in the receiving environment should be documented before, during and following completion of the development to assess the level of impact, if any, in accordance with development approvals. Simple sediment/erosion pins (or marked wooden stakes) could be used to alert the need for more detailed measurements. If there is, or is likely to be, a build up of sediment in the receiving environment caused by the development, complete Part B assessment.

2 Releases

Has the activity caused or does it have the potential to cause releases, flows or discharges containing prescribed water contaminants to waters, roadside gutters or stormwater drainage?

Notes: If releases, flows or discharges from the site to waters, roadside gutters or stormwater drainage cause, or are likely to cause water contamination, water quality sampling should be undertaken in accordance with the Department of Environment and Resource Management's (DERM) Monitoring and Sampling Manual 2009. For instance, appropriate sampling locations may include downstream, upstream and source point. It is acknowledged that local governments may undertake water quality sampling in accordance with their internal guidelines.

Sediment leaving a construction site on the tyres of vehicles and being deposited where it could reasonably be expected to wash into a roadside gutter or stormwater drain is also likely to constitute a breach of 440ZG.

If releases, flows or discharges are causing, have caused or are likely to cause unlawful water contamination, complete Part B assessment. In dry weather it may be necessary to complete Part B to determine if the activity is likely to cause water contamination in a subsequent rain event.

¹ Refer to s493A under the EP Act for the definition of unlawful acts.

If the answer to either 1 or 2 is yes, proceed to Part B.

If both answers are no, then no further action is required at this time.

Part B – Assessment of lawfulness of depositing prescribed water contaminants or release of stormwater run-off

1 Assessment of compliance with a development approval

Is the release of the prescribed contaminant(s) and/or the build up of sediment expressly permitted by a development condition of a relevant development approval?

Notes: Under S493A of the EP Act, an act which causes serious or material environmental harm, or a breach of S440ZG, is unlawful, unless it is authorised by one of the provisions listed in S493A(2). These provisions include a release of a contaminant to waters under ‘a development condition of a development approval’. If a contaminant release is expressly permitted under a condition of a development approval, the release is considered lawful. If a release is not expressly permitted by a condition of a development approval, or the approval is silent on the matter, the lawfulness of the release needs to be determined by assessing compliance with GED.

S493A also applies to sites where water contamination has been authorised to be done under an environmental protection policy, a transitional environmental program, an environmental protection order, an environmental authority, a standard condition of a code of environmental compliance under Chapter 4 of the EP Act, or an emergency direction.

2 Assessment of compliance with the general environmental duty (GED)

Notes: S319 (GED) of the EP Act requires that ‘all reasonable and practicable’ measures be taken to avoid or minimise environmental harm including water contamination and environmental nuisance. Demonstrating compliance with GED constitutes a defence against those offences.

Part B establishes minimum practices which define what constitutes ‘reasonable and practicable’, which in turn assists with determining whether the requirements under GED have been fulfilled. These practices have been developed in consideration of the management hierarchy of S13 of the EPP Water—to include the principles of preventing or reducing the production of contaminants, ensuring effective treatment of contaminants and ensuring releases, discharges and flows do not adversely affect the environmental values of the receiving environment.

2.1 Erosion and sediment control plans

- (a)** Does a site specific erosion and sediment control plan(s) exist?
- (b)** Does the plan(s) for each phase of the works (including clearing, earthworks, civil construction, services installation and landscaping) detail the type, location, sequence and timing of measures and actions to effectively minimise erosion, manage flows and capture sediment?
- (c)** Is the plan(s) consistent with current best practice standards, taking into account all environmental constraints including erosion hazard, season, climate, soil, and proximity to waterways?
- (d)** Does the plan(s) address all the relevant issues described in part 2.2?
- (e)** Have the ESC Plans been prepared by a suitably qualified professional?
- (f)** Has the erosion and sediment control plan(s) been modified as necessary to address the changing physical conditions of the site?

Notes: The process of designing site specific erosion and sediment controls for a site should include consideration of:

- erosion hazards for different parts of the site
- soil types, particularly dispersive, sodic and saline soils, and the suitability of the soil for establishing the intended vegetation type, as well as amelioration required to improve soil suitability
- high risk construction activities such as works in or near waterways
- the available area required for effective erosion and sediment controls
- risk reduction strategies such as staging of works in manageable portions
- seasonal climatic variations and implications for environmental risk
- local hydrology including groundwater and surface water
- local topography including temporary and surface flow paths
- the need to integrate the erosion and sediment control measures with earthworks, civil construction, services installation and landscape works.

2.2 Prevention, reduction and treatment of contaminants

Notes: Section 13(2)(b) EPP Water requires that the production of contaminants be prevented, or where not feasible, reduced.

In applying these principles to construction sites, the production of contaminated stormwater should be prevented and minimised. Erosion should be minimised and sediment capture maximised with a full suite of control measures as necessary to protect the environmental values, and in consideration of site attributes and risk factors, including antecedent weather conditions. If the production of contaminants cannot be prevented, the contaminated stormwater should be treated to ensure that releases will not affect the environmental values of waters ((S13(2)(c) and (d) EPP Water).

2.2.1 Minimising soil exposure

Is non-essential exposure of soil avoided in terms of:

(a) the extent of clearing is restricted to that necessary for access to, and safe construction of the approved works i.e. vegetation remains intact or is protected in all other areas of the site.

(b) the duration of exposure is minimised by undertaking works so that:

- clearing of vegetation is only undertaken immediately prior to an area being actively worked
- the work is staged to minimise the area of soil exposed at any one time
- if clearing is undertaken in areas which are not intended to be immediately worked, such areas are effectively stabilised immediately following clearing
- areas at finished level are effectively stabilised
- steep areas, such as stockpiles, batters and embankments, which are not being actively worked, are effectively stabilised?

Notes: Clearing large areas of land at the one time may deliver some cost benefits due to economies of scale. However, this benefit needs to be considered in terms of the increased risk of causing water contamination and the additional cost of temporary stabilisation. Cleared areas, where the soil is left exposed, pose a high risk of causing water contamination from rainfall and run-off. It is the responsibility of those who create the risk to manage that risk. This could include any or all parties involved in the development.

Clearing of vegetation should be restricted to the construction areas, designated vehicle access area, site shed and storage areas. Other areas should be identified as 'no go' areas and the vegetation left intact and protected from vehicular traffic. Areas at 'finished level' should receive permanent stabilisation (such as turf, seeded mulch, hydromulch) as soon as possible after reaching finished level.

In cleared areas which are not being actively worked, minimising the risk caused by vegetation removal is usually achieved most effectively by applying a temporary erosion control. Stabilisation is most effectively achieved by covering the soil with 'sacrificial' mulch, hydromulch, turf, or a reusable cover such as geotextile, to prevent the erosion caused by raindrop impact and by implementing surface water flow controls (such as clean water cut off drains up slope and dirty water surface drains down slope). In areas where surface water flows concentrate, lining of flow paths with an appropriate material may be required to prevent erosion.

Some guidelines define stabilisation as having achieved 70 per cent vegetation cover, however caution should be applied with generalised standards such as this, because surface cover is only one of several key components for consideration in determining soil stability. If turbid stormwater is flowing from a site with 70 per cent surface cover, then from a water quality perspective, the site has not been effectively stabilised.

Stabilisation methods:

- should not result in water contamination. For example, bark mulch should not be used in concentrated flow paths because it is likely to be washed away
- for areas at finished levels, need to provide effective stabilisation for the short, medium and long term

- for revegetation areas need to consider soil testing, amelioration and preparation to provide optimal conditions for plant establishment.

For the purpose of this document the term 'soil' includes 'subsoil' and an effectively stabilised surface is defined as one that does not have visible evidence of soil loss caused by sheet, rill or gully erosion, or, lead to sedimentation or water contamination.

2.2.2 Managing stormwater flows

(a) Do all areas of the site subject to concentrated stormwater flows (including both 'clean' and 'dirty' stormwater) have concentrated flow paths, including drainage lines, diversion drains, channels and batter chutes which have been designed, constructed and maintained to convey flows for all rain events up to and including the average return interval (ARI) event of:

- 2-year ARI if the disturbed area is open for less than 12 months
- 5-year ARI if the disturbed area is open for between 12 and 24 months, or
- 10-year ARI if the disturbed area is open for more than 24 months.

without causing:

- water contamination
- sheet, rill or gully erosion
- sedimentation
- damage to structures or property.

Notes: The 10-year ARI structural stability objective for temporary drains is based on the need to protect water quality, from a catchment perspective. It is intended to mitigate the potential cumulative impacts from failures caused by more frequent rain events, in catchments undergoing significant urban development. Drains designed for more frequent events may work for the individual site, but not for the catchment.

Inevitably, all the construction sites in a catchment will be subject to a less frequent larger storm event. When structures are only designed to cater for smaller, more frequent events, and they are subjected to the less frequent large event, these structures are far more likely to fail. Failure of temporary drains can affect the functionality of other erosion and sediment controls, which will increase the likelihood of contaminants being released to the environment.

It is important that stormwater releases do not cause erosion. The releases must occur via energy dissipation devices or other control structures to reduce velocity and erosive potential of the flows.

(b) Is clean stormwater diverted around or through the site?

Notes: An example of where clean stormwater diversions may not be needed is a site with no upslope catchment i.e. on the crest of a hill.

(c) If clean stormwater is diverted around or through the site, does it cause;

- an increase in the concentrations of any contaminants in the clean stormwater flows or
- erosion (on-site and/or off-site)?

Notes: Uncontrolled run-on from up slope adds to the volume of stormwater to be managed on-site and a corresponding increase in the size of the sediment basin. If possible, it should be diverted around or through the site and released in such a way that it doesn't cause erosion, water contamination, flooding or damage to structures.

(d) If clean stormwater has not been diverted around or through the site, have sediment basins been sized to accommodate the additional volume of run-off?

2.2.3 Sediment basins

If no sediment basins go to 2.2.4²

(a) Is each sediment basin sized such that:

- (i) it has the capacity to contain all the stormwater run-off from the 80th percentile 5-day rainfall depth; and
- (ii) the capacity to store two months' sediment from the receiving catchment, as determined using the Revised Universal Soil Loss Equation?

Notes: Hydrologic effectiveness in this context is defined as the percentage of mean annual run-off from the catchment which is able to be treated to the required release criteria by the sediment basin. This can be achieved by adopting the 80th percentile 5-day rainfall depth for the sizing of the sediment basin and augmenting the basin with high-efficiency sediment removal technology and appropriate management.

Poor performance of sediment basins sized on the 80th percentile rainfall depth which were typically operated on a batch treatment basis, was observed during the pilot ESC compliance project on the Sunshine Coast between 2007 and 2008. The observed poor performance of these structures was subsequently supported by modelling which demonstrated that, on the Sunshine Coast during the wet season, as much as 80 per cent of stormwater flows would be likely to pass through or bypass the basins without achieving any significant reduction in the suspended sediment load. However, trials have since shown that the performance of the same size basins can be greatly enhanced (90 per cent suspended sediment removal) by using high efficiency sediment removal technology, much of which can be relocated from site to site.

High efficiency sediment basins, incorporate all the following:

- A rain activated flocculant/coagulant dosing system
- A sediment forebay for primary sediment removal
- A spreader bar between the forebay and the sediment basin to cause laminar flow (ie limit turbulence) from the forebay to the basin
- A sediment basin for secondary sediment removal

² While sediment basins play an essential role in preventing and minimising water contamination from construction sites, it is acknowledged that it may not be practical to direct run-off from all disturbed areas to a sediment basin.

- A staged floating off take which preferentially releases the cleanest water, begins releasing as the pond starts to fill, and increases the release flow rate corresponding to increases in water depth within the basin.

The high efficiency sediment basin is not mandatory but to capture and treat the same volume of run-off using a conventional basin design requires a much larger basin than the 80th percentile 5 day type basin. For instance, modelling and field studies indicates that this translates to 125 mm rainfall depth over five days for Nambour.

Note that the 80th percentile 5-day rainfall depth sizing criteria for sediment basins may be reviewed in the future so that each sediment basin is sized to ensure the hydrologic effectiveness for treating 85 per cent of the annual volume of stormwater run-off. In the interim, where the receiving environment is considered to be sensitive and/or a high value receiving environment, the 85th or 90th percentile 5-day rainfall depth for the sizing of the sediment basin may be applied.

(b) Are sediment basins and associated structures such as inlets, outlets and spillways structurally sound and in accordance with the requirements of the ESC plans?

Notes: Sediment basin inlets, outlets and embankments should be structurally designed and constructed to be capable of withstanding the flows from a:

- for 10-year ARI rainfall event, if the life of the basin is less than 3 months, or
- for a 20-year ARI rainfall event, if the life of the basin is between 3 to 12 months, or
- for a 50-year ARI rainfall event, if the life of the basin is greater than 12 months.

It is the responsibility of the designer to correctly identify and clearly state the design ARI selected for all structures based on an analysis of the consequences of failure. Reference should be made to the Healthy Waterways Water Sensitive Urban Design (WSUD) Guidelines and Queensland Urban Drainage Manual (QUDM) for criteria related to property protection and human safety that are applicable to spillways, basin embankments and freeboards.

(c) Are sediment basins maintained with sufficient storage capacity to capture and treat the run-off from the design rainfall event?

(d) Are sediment basins dewatered as soon as practicable following rainfall events?

Notes: Sediment basins should be kept empty in readiness to capture the next rainfall event. Basin design usually allows for an accumulation of two months' of sediment in the overall capacity of the basin design (or an additional 50 per cent of the design volume). If captured water is intended to be reused, say for example for dust suppression or road construction, the basin needs to be sized to accommodate the additional capacity. Refer to 2.2.3 for basin design criteria.

(e) Is accumulated sediment from sediment basins and other controls removed and disposed of properly?

Notes: Sediment basin design usually allows for two-month accumulated sediment capture to be stored in the sediment basin. It is important that this volume is not exceeded because that causes a corresponding reduction in the basin's stormwater capture capacity. When sediment is removed from a sediment basin it should be disposed of appropriately (such as by on-site burial) without causing, or potentially causing, water contamination.

(f) Does the concentration of total suspended sediments released from sediment basins as a result of dewatering exceed 50 mg/L?

2.2.4 Erosion and sediment controls (other than sediment basins)

For all areas that are not effectively stabilised:

(a) Are erosion and sediment controls installed in accordance with an appropriate ESC Plan?

(i) Where erosion and sediment controls are not in accordance with the ESC Plan, is this due to deficiencies or errors in the plan?

(ii) Are inconsistencies between ESC and the ESC Plan due to the area being actively worked?

(b) Does the run-off from all areas which are not effectively stabilised, drain to a sediment basin?

Notes: Run-off containing suspended sediment almost always needs to be captured in a sediment basin, and treated to remove suspended sediment prior to release. Operators who fail to provide for stormwater treatment run a high risk of not meeting the release criteria. The exception is when erosion control is so effectively implemented that run-off complies with the release criteria. This is usually only achievable in relatively small areas and is typically implemented where installing a sediment basin is impracticable (although the principle could be applied to an area of any size, providing the operator can demonstrate GED).

(c) Are compensatory erosion and sediment controls implemented to minimise erosion and maximise sediment capture in areas of the site where it is not feasible to direct run-off to a sediment basin(s)?

Notes: Compensatory ESC are erosion controls, flow controls and sediment controls which compensate for the lack of sediment basin and are applied so that the type, timing, placement and management of controls minimise the potential for water contamination and environmental harm. This is primarily achieved by reducing the risk of erosion and subsequent sediment release, for example by stabilising concentrated flow paths and stabilising exposed areas with an effective surface cover such as mulch, hydromulch or turf.

(d) Are erosion controls applied to steep areas, (such as stockpiles, batters and embankments) which are currently being worked or are not effectively stabilised to effectively protect them from erosion (including sheet, rill and gully erosion)?

(e) Are flows from the upslope catchment conveyed down steep slopes without causing erosion (for example via a stable drain, chute, flume or pipe)?

Notes: Uncontrolled sheet flows can cause erosion as velocity of the flow increases. Stabilisation of areas not subjected to concentrated flows can usually be achieved with a protective layer such as vegetation, mulch or geotextile. Sediment barriers such as sediment fences provide a secondary protection, but are usually insufficient to use without erosion controls, because they do not control suspended sediment. 'Effective' slope length should be regulated by the use of banks, bunds, drains or batter steps constructed parallel to the contour and at intervals sufficient to keep flows at non-erosive velocities.

(f) Are sediment controls applied to effectively capture sediment eroded from steep areas, (such as stockpiles, batters and embankments) which are currently being worked or not effectively stabilised (for example a sediment fence immediately down slope of such steep areas)?

Notes: For stockpiles, batters and embankments being actively worked, it is incumbent on the operator to manage these areas so that, in the event of rain, these areas do not impact on receiving waters. It is important to protect stockpiles, batters and embankments from erosion because:

- this is part of a 'treatment train' approach, which seeks to minimise erosion in the first place
- through the process of erosion by stormwater, soil is usually separated into its constituent parts, which in terms of ESC are:
 - coarse and medium sediment – unless captured on site it is likely to cause sedimentation off-site. If captured it needs to be disposed of appropriately.
 - fine sediment – will usually become suspended in stormwater flows and unless captured and removed from released stormwater, is likely to impact on receiving waters. Once captured it needs to be disposed of appropriately.
 - topsoil – greatly assists in the timely re-establishment of vegetation, which can significantly reduce the duration of soil exposure and the consequent potential for water contamination.

(g) Are erosion and sediment controls installed correctly?

(h) Are erosion and sediment controls maintained in effective working order:

- prior to each rainfall event, and
- at the end of each work day?

(i) Are contingency measures available on site, which can be deployed to such areas, prior to rain, to minimise erosion and maximise sediment capture and/or implement the designed control measures?

Notes: Contingencies for areas being actively worked should include the rapid deployment of cut off or diversion drains, sediment controls and surface cover.

Risk management

It is acknowledged that erosion and sediment controls perform no function in dry weather and that some operators may choose to take a risk management approach to implementing some erosion and sediment controls. For example in a bulk earthworks phase, a contractor may decide that a dirty water diversion drain shown on the ESC plan impedes the movement of machinery; and they may elect to not construct the drain until rain is forecast, on the basis that the drain can be quickly constructed and lined, and the required machinery and material are on hand. The operator assumes responsibility for this action and is responsible for releases that occur in the event of an unpredicted rain event or a forecast rain event for which the contractor is unable to install the drain in time. Major ESC such as sediment basins should be constructed at the beginning of the project and remain in place until the site is fully and effectively stabilised.

(j) Have controls been implemented to prevent or minimise sediment from leaving the site on the tyres of vehicles?

Notes: Sediment deposited on roads from vehicles exiting a construction site is likely to constitute a breach of 440ZG of the EP Act. From the roadway it is highly likely to enter the (unprotected) stormwater system during a subsequent rain event.

2.2.5 Disturbances in waterways

If works or other disturbances in waterways are planned or have occurred:

(a) Does prior written approval from the relevant consent authority exist, if required (for example, permits under the *Sustainable Planning Act 2010*, *Coastal Protection and Management Act 1995*, *Vegetation Management Act 1999*, *Water Act 2000* (Water Act), etc)?

(b) Where approval is not necessary for certain entities under the Water Act, has reference been made to DERM Guideline – Activities in watercourse, lake or spring carried out by an entity? (refer to: <www.derm.qld.gov.au>).

(c) Are temporary flow diversions in place?

(d) Has the work been:

- scheduled to occur during dry weather
- done expeditiously, and
- done in accordance with a current best practice environmental management guideline?

(e) If temporary vehicle waterway crossings are required to construct the approved works, has the number of temporary vehicular crossings been minimised?

Notes: Construction work in waterways can have devastating effects on stream health. Planning for works in waterways should include consideration of alternatives such as tunnel boring instead of trenching. Work within waterways should be planned and executed so that minimal erosion, sedimentation and turbidity results. This can be achieved by scheduling works to occur during low flow or no flow seasons. At the completion of works, the waterway should be rehabilitated to pre-existing conditions. Temporary vehicular crossings through creeks and drainage lines should be designed to remain stable in the 10 year ARI event of critical duration. When carrying out channel or bridging works install a temporary stream bypass channel where practical. Consider the upstream catchment size in the design of causeways.

2.3 Adaptive management

(a) Is there an effective monitoring and assessment program implemented on site to identify, measure, record and report on the effectiveness of the erosion and sediment controls and the lawfulness of releases?

Notes: A water quality monitoring program should be implemented by those responsible for the site. The program should monitor all event-based releases from the site including controlled releases and releases caused by rain events.

(b) Are non-compliances reported to the administering authority within 48 hours?

(c) Have additional measures been implemented to achieve compliance when non-compliances have been detected?

Notes: Typical erosion and sediment controls may produce different results on different sites, due to variations in soils, rainfall and slope etc. In satisfying their legal requirements, those responsible for the site need to ensure that releases meet the release criteria, or where the release criteria is exceeded, that all EPS have been met. This includes reviewing monitoring data and where exceedences are found, implementing additional and or alternative erosion and sediment controls to achieve the environmental outcomes.

Further information

For copies of DERM supporting information, visit the website at <www.derm.qld.gov.au>.

Disclaimer

While this document has been prepared with care, it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to DERM should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.