

Guideline

Environmental Protection Act 1994

Structures which are dams or levees constructed as part of environmentally relevant activities

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Structures which are dams or levees constructed as part of environmentally relevant activities

1 Scope

This document provides information about the procedures of the administering authority when authorising structures which are dams, or levees that are constructed as part of an activity under an environmentally relevant activity (ERA) pursuant to the *Environmental Protection Act 1994*.

Environmental authorities and development approvals (both referred to hereafter as an 'authority') will include conditions that require holders to have the consequence category of structures (being dams or levees, that are constructed as part of a project) assessed by a 'suitably qualified and experienced person' (called a consequence assessment).

The consequence assessment will determine whether a structure is a 'regulated structure' for the purpose of the authority. Regulated structures will require certified design plans to be submitted¹ to the administering authority, and will be subject to annual inspection and reporting by a suitably qualified and experienced person.

The responsibility for ensuring the accurate consequence assessment, documentation of the design (if applicable), and the adequate performance of regulated structures rests with the holder of the authority and its consultants (i.e. the suitably qualified and experienced person and, if applicable, the relevant Registered Professional Engineer Queensland (RPEQ) for subsidiary issues whose advice the suitably qualified and experienced person has relied).

The administering authority will rely on the certification(s) given by suitably qualified and experienced persons of documentation as submitted by the holder to the administering authority. This places responsibility on both the holder of the authority and the suitably qualified person(s) providing certification(s) to ensure that consequence assessments are rigorously carried out and that regulated structures are designed and operated in accordance with the regulatory requirements.

The administering authority is at liberty to review all relevant documentation and certification(s) in detail for conformance with prevailing engineering and environmental management practices, and the law.

2 Related Manual and laws

This guideline relates to, and should be read in conjunction with, the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933²)* (the Manual) published by the administering authority.

The *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933²)* does not limit or change in any way, any other requirements to be complied with under authority conditions and/or regulations for the design and operation of a dam³. Further, it does not negate any obligations or

¹ Other than existing structures, in accordance with transitional provisions.

² This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

³ Examples of other legislative requirements may include health and safety legislation relevant to the premises. Note that at the date of this guideline, there is an exemption from the Referable Dams Chapter (Chapt 4) in the *Water Supply (Safety and Reliability) Act 2008* for 'hazardous waste dams' and definition of the term 'hazardous waste dams' largely overlaps with 'regulated dams' under this Guideline. It is for this reason that the Manual addresses failure impact assessment requirements that would normally otherwise have been addressed under the *Water Supply (Safety and Reliability) Act 2008*, as if the exemption had not applied.

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requirements of the *Environmental Protection Act 1994*, or other Commonwealth, state or local government laws or requirements under relevant standards or agreements.

3 Background

Protecting human life and the environment requires that the standards used for the design, construction, operation, modification and decommissioning of regulated structures associated with environmentally relevant activities mitigate the consequences arising from potential failure or collapse of those structures.

The administering authority requires that any regulated structure be designed, constructed, operated and maintained to an engineering standard appropriate to the nature of the contents of the structure, the purpose for which it is to be used, and the environment in which it is located and may discharge if authorised to. The administering authority also requires that the condition of regulated structures and their operations will be monitored on a regular basis, and that timely action will be taken to prevent or minimise any actual or potential environmental harm.

4 Essential elements of a design plan and certification for a regulated structure

A '**design plan**' is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure. The design plan process is not applicable for existing dams to which the transitional provisions apply. There may however be a design plan process for any modification under transitional conditions.

The design plan must describe the physical dimensions of the regulated structure, the materials and standards to be used for construction of the regulated structure, and the criteria to be used for operating the regulated structure.

The design plan must include all investigation and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes. It must address all consequence scenarios that are identified by a properly conducted consequence assessment for the regulated structure.

The documentation forming the design plan must be complete and comprehensive enough to enable an objective and independent review to be conducted without any requirement to seek further information from the designer.

A design plan for a regulated structure should address a range of issues including:

- the consequence scenarios that have been used in undertaking a consequence assessment;
- the hydrology/hydraulics used to estimate and deal with flood events, internal and external to the regulated structure, at probabilities appropriate to address identified consequence scenarios, including containment of contaminants;
- seepage and stability issues, including containment of contaminants; and
- any assumptions relating to the design and safety of the regulated structure.

A '**certification**' is required in the form set out in the Manual, from a suitably qualified and experienced person. The certification must be accompanied by a statement of reasons setting out how the facts documented in the design plan support the conclusion that the regulated structure is capable of providing the specific performance required of that structure.

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4.1 Environmental objectives for regulated structures containing contaminants

For those activities which have conditions authorising release from the regulated structure, the Manual and guideline are intended to ensure that any release complies with the relevant conditions of the authority (for example, releasing during particular stream flow events in receiving waters or complying with prescribed circumstances for when irrigation of land may occur).

Flood protection levees may also be classified as regulated structures as they have an important environmental objective of minimising the risk of excessive flood water inflows to a site on which an environmentally relevant activity is being conducted, and the consequent potential for contamination of the flood waters and overloading of containment performance.

Regulated dams must be able to withstand seasonal rainfall events without releasing contaminants from the dam in an unauthorised manner. A minimum available storage, called a **design storage allowance** (DSA), is required to be estimated for regulated dams in accordance with the Manual, in order to accommodate seasonal rainfall to a specified annual probability. On-site water management must allow for and provide the DSA volume in each regulated dam, going into each new wet season (that is, on 1 November each year).

The intent of a DSA volume is to provide reasonable certainty that design performance criteria for containment will be met in any forthcoming wet-season. Failure to operate a regulated dam so that it meets the requirement to provide the DSA volume at the onset of each wet-season (that is, on 1 November each year) should be an alert that the dam is at risk of an unauthorised spillway discharge during the wet-season. If a dam was assessed in the low consequence category for failure to contain – overtopping scenario, the determinations for DSA, **extreme storm surge** (ESS) and **mandatory reporting level** (MRL) are not required.

The intent of an ESS volume is to ensure adequate capacity is maintained in a regulated dam to accommodate a storm event to the probability specified in the Manual. A MRL is a level at which a dam has a remaining volume equivalent to the ESS and is intended to provide a level at which it is mandatory that the holder of an authority communicate to the administering authority that there is a possibility of an unauthorised spillway discharge from a regulated dam.

Even where a regulated dam is designed and operated in compliance with the conditions of an authority and the certification provided, there may still be instances where there is associated spillway discharge during the wet season. If these requirements are met and the discharge meets the water quality conditions in the environmental authority (EA), it will be considered to be authorised. If water quality conditions in the EA are exceeded, but all other requirements are met and there is negligible or short term environmental impacts, then the operator may be able to demonstrate that they have met the general environmental duty which is a defence to a charge of unlawful environmental harm.

4.2 Environmental objectives for regulated dams—people and communities

Environmental harm, is defined in the *Environmental Protection Act 1994* and includes physical and chemical risks to human life. In particular, this may occur where dams may have the potential—as a result of discharges—to chemically interfere with waters that may be used as sources of drinking water, or lives can be at risk due to dwellings or workplaces being in the path of a dam break flood.

Regulated dams must be designed, constructed, operated and decommissioned to mitigate these consequences.

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Consultation with **affected persons** and/or water service providers where discharges would potentially be received by the service provided, should occur prior to the construction of a dam which is assessed as being a high or significant consequence category. In situations where a residual consequence remains, consultation with affected persons must be undertaken by the holder, and emergency action plans, including response procedures, must be in place prior to operation of the regulated dam. For dams that are declared regulated structures after construction, the responsibility for consultation with affected persons rests with the holder. Emergency action plans, including response procedures, must be in place by a timeframe specified by a condition of the authority.

5 Applications for environmental authorities or development approvals that involve dams

Any application for one or more regulated structure must, where the location of the regulated structure is known, include a copy of the most recent consequence assessment undertaken, or, if a hazardous categories assessment was undertaken under the previous version of this Guideline, the most recent hazardous categories assessment, with the accompanying certification.

The model conditions should be applied to any new resource project or expansion project, where the application is lodged after the guideline is approved. The model conditions should not be applied to an unrelated amendment application where the project has existing regulated structures conditions based on a previous version of this guideline. The exemption to this is when the applicant has sought or agrees to adopt this version of the model conditions.

For amendment applications where the amendment involves altering activities covered in the model conditions, negotiation with the applicant should take place such that the original conditions are amended to reflect the model conditions to the extent of the changed impacts as a result of the alteration to activities. If there is no increase in impacts or only a trivial increase in impacts as a result of the change, this is not an opportunity to impose the model conditions on an existing project, except to the extent that the applicant seeks to adopt the model conditions.

Amendment applications that only adopt the model conditions should be regarded as a minor amendment when making an assessment level decision.

Regulated dams require details to be entered in a Register of Regulated Structures kept by the holder of the authority (the 'holder'), and an electronic certified copy provided annually to the administering authority⁴.

It is the responsibility of the holder of the authority to ensure any Register of Regulated Structures is accurately maintained.

Low consequence dams are included as part of the petroleum infrastructure that can be transferred to landholders, prior to the surrender of the EA. The guideline *Transferring petroleum infrastructure to landholders* (ESR/2020/5403) provides guidance on the requirements to transfer these structures to landholders and includes model conditions that can be used (if applicable).

In order to be eligible for transfer prior to the surrender of the EA, low consequence dams must be:

- assessed as being a low consequence dam (and not a high or significant category);

⁴ A copy of the register template can be obtained by contacting the Department of Environment and Science.

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- adequate for an identified intended on-going use;
- managed appropriately; and
- safe, stable, non-polluting and able to support the post-activity land use at the time of transfer.

EA holders are encouraged to request a pre-lodgement meeting with the administering authority to identify any specific requirements and processes for the transfer of low consequence dams to occur. Lodgement of design plans for regulated structures.

Before operation of a regulated structure can commence, one paper copy and one electronic copy of a design plan (inclusive of the certification and statement of reasons), must be submitted to the administering authority. The design plan process is not applicable however for existing dams to which the transitional provisions apply. There may be a design plan process however for any modification under transitional conditions.

5.1 Lodgement of annual inspection reports for regulated structures

Annual inspection reports on the condition and adequacy of any regulated structure must be made available to the administering authority on written or oral request.

To ensure that the administering authority is aware of the action to be taken by the holder of an authority as a result of the annual inspection report, the holder must, within 20 business days following receipt of the report, notify the administering authority of the findings of the report and the actions that are to be taken to implement the recommendations.

5.2 Form of certification

Any consequence assessment report, design plan or annual inspection report must be certified in accordance with the form of certification referenced in the Manual.

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 the Department of Environment and Science should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

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Version history

Version	Effective date	Description of changes
8.00	5 July 2017	The definition of 'Development approval' in Appendix A updated to reflect the repeal of the <i>Sustainable Planning Act 2009</i> and the commencement of the <i>Planning Act 2016</i> .

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Version	Effective date	Description of changes
8.01	9 July 2018	The document template, header and footer have been updated to reflect current Queensland Government corporate identity requirements and comply with the Policy Register.
9.00	1 April 2019	Conditions updated to reflect the introduction of the <i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i> and the subsequent changes to the <i>Environmental Protection Act 1994</i> .
9.01	27 October 2020	Updated to include information on transferring petroleum infrastructure that is a low consequence dam or excluded structure to a landholder prior to the surrender an environmental authority or petroleum tenure.

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Appendix A—Model conditions schedule 'X' structures

General notes:

Explanatory notes for assessing officer guidance are in green. DELETE prior to issue of an authority.

Insertions required by applicants and/or the administering authority are in blue. DELETE appropriate parts or include relevant information prior to issue of an authority.

Model conditions are in black with defined terms indicated by **bold** text the first time they appear.

1. Preamble

The *Environmental Protection Act 1994* requires that any condition imposed be necessary or desirable to achieve the objects of the Act. In conditioning an authority, delegates should consider whether any condition, (model or otherwise) is necessary or desirable based on the particular facts and circumstances of the application to which the proposed authority relates. These model conditions have been prepared to indicate the administering authority's position on and expectations of authority holders in managing potential environmental risk posed by structures which are dams or levees that are of a high or significant consequence category. They also allow for consistency in conditioning of authorities across the state. The conditions are able to be modified where evidence supplied indicates that such modification, removal or replacement would achieve the same objective and is deemed necessary or desirable by the delegate.

It is the departments' position that the requirement for a condition to be 'necessary or desirable' has been met where a demonstrable link exists to achieving the object of the Act or discharging a duty or obligation imposed on the administering authority.

Officers should review the final conditions intended to be applied in a particular authority to ensure there is consistency in numbering, cross referencing and structure of conditions.

START OF CONDITIONS

2. Explanatory notes—all structures:

The model conditions under this section are expected to apply to all structures.

The objective of the following conditions is to ensure that **all** structures are appropriately assessed to determine the applicable consequence category and a certificate provided by the suitably qualified and experienced person who undertook the assessment. Following this, appropriate conditioning can occur based on whether the structure is a regulated structure.

Where a structure is assessed as a low consequence structure, and later assessment results in the structure being determined to be a significant or high consequence category structure, this will require an amendment to the existing EA or the Register of Regulated Structures.

Note that a dam includes all appurtenances that are connected with ensuring preservation of the integrity of the structure (e.g. spillways, catchment diversions). Also, a levee may be subject to regulation, depending on the consequences associated with failure as assessed in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* published by the administering authority.

A consequence assessment report may include details in relation to more than one structure.

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Assessment of consequence category

- (X 1) The **consequence category** of any structure must be **assessed** by a **suitably qualified and experienced person** in accordance with *the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁵)* at the following times:
- a) prior to the design and **construction** of the **structure**, if it is not an **existing structure**; or
 - b) prior to any change in its purpose or the nature of its stored contents.
- (X 2) A **consequence assessment** report and **certification** must be prepared for each **structure assessed** and the report may include a consequence assessment for more than one structure.
- (X 3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁵)*.
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3. Explanatory notes— regulated structures - structures in a high or significant consequence category

Design and construction conditions below are expressed so as not to apply to existing structures, but even for projects which only have existing structures at the time of adopting these conditions, it is still appropriate to include conditions about design and construction in case new regulated structures are proposed to be constructed after the commencement of the conditions.

Regulated structures must not be constructed or operated unless an assessment of the consequence category, and a report and certification of the assessment has been prepared by a suitably qualified and experienced person.

A regulated structure must not be constructed or operated unless a suitably qualified and experienced person has prepared a design plan and certification for the regulated structure and this has been provided to the holder of the authority. Operation of the regulated structure is not permitted unless the holder has provided the administering authority with a copy of the design plan and certification.

The design plan must include certification that it is in accordance with the Manual and should include the following:

- a) A design report which provides:
 - i. a description of all the documents which constitute the design plan;
 - ii. a statement of:
 - a) the applicable standards including engineering criteria, industry guidelines, relevant legislation and regulatory documents, relied upon in preparing the design plan;
 - b) all relevant facts and data used in preparing the design plan, including any efforts made to obtain necessary facts and data, and any limitations or assumptions to facts and data used in preparing the design plan;
 - c) the consequence category of the regulated structure; and
 - d) setting out the reasoning of the suitably qualified and experienced person who has certified the design plan, as to how the design plan provides the necessary required performance;
 - iii. documentation of hydrological analyses and estimates required to determine all elements of the design including volumes and flow capacities;
 - iv. detailed criteria for the design, operation, maintenance and decommissioning of the regulated structure, including any assumptions;
 - v. design, specification and operational rules for any related structures and systems used to prevent failure;
- b) Drawings showing the lines and dimensions, and locations of built structures and land forms associated with the regulated structure;
- c) Consideration of the interaction of the pit design with the levee or regulated dam design;
- d) [Insert only in environmental authorities for dams that are associated with a resource activity - non mining activity] A description of the containment system implemented;
- e) An operational plan that includes:

⁵ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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- i. normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA);
- ii. contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure;
- f) A plan for the decommissioning and rehabilitation of the regulated structure at the end of its operational life;
- g) Details of reports on investigations and studies done in support of the design plan;
- h) Any other matter required by the suitably qualified and experienced person.

The administering authority is not an approval body for the consequence category of a structure or design plans for a structure. Accordingly, acceptance by the administering authority of any report and certification (whether relating to the consequence category or design plan) does not indicate the administering authority approves the assessment carried out or the plans. The administering authority has set out requirements for suitably qualified and experienced persons to undertake this activity to ensure that the assessments and engineering works are conducted appropriately and in accordance with applicable standards.

The administering authority has agreed to the use of a Register of Regulated Structures which is managed and maintained by the holder of an authority.

Note that conditions X4 to X9 are not required if the proposal only covers existing structures that are declared regulated structures.

Condition X5 is required if the project contains both new regulated structures and existing structures that are declared to be regulated structures after construction.

Design and construction⁶ of a regulated structure

- (X 4) Conditions X5 to X9 inclusive do not apply to existing structures.
- (X 5) All **regulated structures** must be designed by, and **constructed**⁷ under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁸)*.
- (X 6) Construction of a regulated structure is prohibited unless:
 - a) the **holder** has submitted a **consequence category assessment** report and certification to the administering authority; and
 - b) certification for the **design, design plan** and the associated operating procedures has been **certified** by a suitably qualified and experienced person in compliance with the relevant condition of this **authority**.
- (X 7) Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁸)*, and must be recorded in the Register of Regulated Structures.
- (X 8) **Regulated structures** must:
 - a) be designed and constructed in compliance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁸)*;
 - b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - i) floodwaters from entering the **regulated dam** from any **watercourse** or drainage line; and
 - ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

⁶ Construction of a dam includes modification of an existing dam—refer to the definitions.

⁷ Certification of design and construction may be undertaken by different persons.

⁸ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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- c) [\[Insert only in environmental authorities for regulated dams that are dams associated with a failure to contain - seepage\]](#) have the floor and sides of the **dam** designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- (X 9) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure
 - construction of the regulated structure is in accordance with the design plan.
-

4. Explanatory notes— People and communities

The EA holder must ensure every affected person is made aware that they have been identified as an 'affected person' and may be impacted if a failure of the regulated structure occurs. This awareness provides affected persons with the opportunity to be prepared for a failure event.

Emergency action plans, including response procedures, must be given by the holder to each and every affected person. This notification is to occur prior to operation of the regulated structure and when an emergency action plan is amended.

Notification of affected persons

- (X 10) All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure
- for existing structures that are regulated structures, within 10 business days of this condition taking effect;
 - prior to the operation of the new regulated structure; and
 - if the emergency action plan is amended, within 5 business days of it being amended.
-

5. Explanatory notes— Operation of regulated structure

The holder must take reasonable and practicable control measures to prevent the causing of harm to persons, livestock or wildlife through the construction and operation of a regulated structure. Reasonable and practicable control measures may include, but are not limited to the secure use of fencing, bunding or screening; and escape arrangements for trapped livestock and fauna.

Operation of a regulated structure

- (X 11) Operation of a regulated structure, except for an existing structure, is prohibited unless the holder has submitted to the administering authority in respect of regulated structure, all of the following:
- one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition X6;
 - a set of 'as constructed' drawings and specifications;
 - certification of the 'as constructed drawings and specifications' in accordance with condition X9;
 - where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan;

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- e) the requirements of this authority relating to the **construction** of the regulated structure have been met;
- f) the holder has entered the details required under this **authority**, into a Register of Regulated Structures; and
- g) there is a current operational plan for the regulated structure.

Insert X12 if there are existing regulated structures.

(X 12) For existing structures that are regulated structures:

- a) where the existing structure that is a regulated structure is to be managed as part of an **integrated containment system** for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified **system design plan** including that structure; and
- b) there must be a current operational plan for the existing structures.

(X 13) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

6. Explanatory notes— MRL requirements (Not applicable to structures assessed as 'low consequence' category for 'failure to contain – overtopping')

All regulated dams must have a clearly observable mandatory reporting level (determined in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933⁹)*. The holder must notify the administering authority on becoming aware of the dam contents reaching the MRL and take appropriate action to prevent or minimise the potential for environmental harm.

Each calendar year, an annual inspection and assessment of any regulated structure must be undertaken by a suitably qualified and experienced person, and a report prepared with recommendations for ensuring the integrity of the regulated structure is maintained. This inspection may indicate that the consequence category of a dam is potentially changed and identifies amongst other things, whether there are any instances of failing to meet the conditions of an authority and the likelihood of insufficient capacity of a dam leading up to a wet season.

The holder of an authority must ensure there is sufficient capacity within the dam on 1 November of every year, to meet the design storage allowance (DSA) determined in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*. This is to minimise the risk of contaminants being released from the dam during a high rainfall wet season.

The intent of a DSA volume is to provide reasonable assurance that design performance criteria for containment will be met in any forthcoming wet-season. Failure to operate a regulated dam so that it meets the requirement to provide the DSA volume at the onset of each wet-season (that is, on the 1 November each year) should be an alert to the holder of an authority that it risks the likelihood that a spillway discharge from a regulated dam during the wet-season may not be authorised.

The intent of a mandatory reporting level (MRL) is to provide a level at which it is mandatory that the holder of an authority communicate to the administering authority that there is a possibility of a spillway discharge from a regulated dam.

If a dam was assessed in the low consequence category for 'failure to contain – overtopping' scenario, the determinations for DSA, ESS and MRL are not required, as explained in the Manual.

Mandatory reporting level

⁹ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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- (X 14) Conditions X15 to X18 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
- (X 15) The **Mandatory Reporting Level** (the **MRL**) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- (X 16) The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- (X 17) The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- (X 18) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- (X 19) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- (X 20) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the **Design Storage Allowance (DSA)** volume for the **dam** (or network of linked containment systems).
- (X 21) The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- (X 22) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

7. Explanatory notes— Annual inspection report

Regulated structures which have been certified as low consequence category for failure to contain – overtopping', an annual inspection report is not needed unless significant changes or modifications have occurred to the regulated structure's operation/construction.

Good compliance performance outlined in Table 1 relates to the hydraulic performance of the applicable existing structure, including its ability to comply with release parameters if applicable. It does not relate to administrative non-compliance such as notification errors or to unrelated conditions such as air quality.

Annual inspection report

- (X 23) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- (X 24) At each annual inspection, the condition and adequacy of all components of the **regulated structure** must be assessed and a suitably qualified and experienced person must prepare an **annual inspection report** containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

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- (X 25) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁰)*.
- (X 26) The holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- The recommendations section of the annual inspection report; and
 - If applicable, any actions being taken in response to those recommendations; and
 - If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days¹¹ of receipt of the request.

Transfer arrangements – Resource activity only

- (X 27) The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

8. Explanatory notes— Rehabilitation requirements

The decommissioning and rehabilitation conditions are not to be used for resource activities. Mining activities should refer to the *Model mining conditions* guideline, *ESR/2016/1936¹⁰*, for requirements on decommissioning and rehabilitation. Similarly, petroleum activities should refer to the *Streamlined model conditions for petroleum activities, ESR/2016/1989¹⁰*, guideline only. All non resource activities should use conditions X28 and X29 where the authority does not contain rehabilitation conditions covering regulated structures and ensure there are no contradictory requirements in the authority.

Additional groundwater monitoring conditions to that provided within the EA may be required for leak detection and/or monitoring to meet the requirements of Table 2. Hydrological design criteria – ‘failure to contain – seepage’ scenario of the manual. For example, groundwater bores may be required to be monitored in the vicinity of some dams (‘failure to contain – seepage’) if the groundwater systems are identified as potentially at risk, or if there is uncertainty about the impacts from seepage from the regulated dam.

A dam is considered to have ceased operating once it no longer actively forms part of the environmentally relevant activity and is no longer contaminated, has water of a quality for its intended use and there is a landholder agreement in place.

Rehabilitation costs are based on the dam’s final form. If a dam is to be removed in its entirety, the rehabilitation cost (which will be used to inform the amount of EPA assurance or scheme assurance required) needs to be calculated such that it incorporates the full amount for decommissioning and rehabilitation. If there is a landholder agreement in place, the rehabilitation cost will be based on the agreed final form of the dam. For example, an agreement may state that dams or access tracks do not need to be removed, and therefore these costs do not need to form part of the rehabilitation cost calculations.

The latest version of the *Guidelines: Financial assurance under the Environmental Protection Act 1994 ESR/2015/1758¹⁰* (relevant to non-resource activities), or *Estimated rehabilitation cost under the Environmental Protection Act 1994 ESR/2018/4425* (relevant to resource activities) provide further information on the department’s requirements for financial assurance and estimated rehabilitation cost.

Decommissioning and rehabilitation

- (X 28) Regulated structures must not be abandoned but be either:
- decommissioned and rehabilitated to achieve compliance with condition (X29); or

¹⁰ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

¹¹ Please note that for some model conditions, such as model conditions for dams associated with a resource activity - non mining activity, the notification requirements may be located in a separate part of the conditions of an environmental authority (e.g. under notification requirement conditions).

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- b) be left in-situ for a use by the landholder provided that:
 - i) it no longer contains contaminants that will migrate into the environment; and
 - ii) it contains water of a quality that is demonstrated to be suitable for its intended use(s); and
 - c) the holder of the environmental authority and the landholder agree in writing that the;
 - i) dam will be used by the landholder following the cessation of the environmentally relevant activity(ies); and
 - ii) landholder is responsible for the dam, on and from an agreed date.
- (X 29) Before surrendering this environmental authority the site must be rehabilitated to achieve a safe, stable, non-polluting landform and <INSERT the relevant final land use>.

9. Explanatory notes— Register of Regulated Structures

A Register of Regulated Structures is defined the definitions and outlines the minimum requirements for the register. A departmental approved Regulated structures register has also been developed and is available for download at www.des.qld.gov.au/management/non-mining/csg-water.

The departmental approved Regulated structures register can be used to meet the requirements of condition X31. It has been provided as a guide but its use is not mandated. Other registers will be accepted as long as the register meets the definition of what a Register of regulated structures is.

Register of Regulated Structures

- (X 30) A **Register of Regulated Structures** must be established and maintained by the **holder** for each **regulated structure**:
- (X 31) The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority.
- (X 32) The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition (X11) and (X12) has been achieved.
- (X 33) The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
- (X 34) All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
- (X 35) The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

Explanatory notes— Transitional

These transitional requirements apply to assessment for the 'dam break' scenario, and the 'failure to contain – overtopping scenario' in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Dams. There are no transitional requirements for the failure to contain- seepage' scenario under the Manual.

Good compliance performance outlined in Table 1 relates to the hydraulic performance of the applicable existing structure, including its ability to comply with release parameters if applicable. It does not relate to administrative non-compliance such as notification errors or to unrelated conditions such as air quality.

To calculate the percentage compliance and therefore the transitional period for each particular existing structure outlined in Table 1, use DSA as the measure for percentage non compliance. DSA is better suited than MRL as MRL is a preventative measure.

Transitional arrangements

- (X 36) All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and

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certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

- (X 37) All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional hydraulic performance requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- (X 38) Table 1 ceases to apply for a structure once any of the following events has occurred:
- it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - it has been decommissioned; or
 - it has been certified as no longer being assessed as a regulated structure.
- (X 39) Certification of the transitional assessment required by X36 and X37 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Schedule X – Table 1 (Transitional hydraulic performance requirements for existing structures)

Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i>			
Compliance with criteria	High consequence	Significant consequence	Low consequence
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70%-≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50-≤70%	Within 5 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing).	Within 5 years or as per compliance requirements (e.g. TEP timing).	Review consequence assessment every 5 years.
Regulated levee designed to prevent the ingress of clean flood	Within 5 years unless otherwise agreed with the administering authority.		

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water <100% compliant ¹²	
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Definitions

Affected person is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life or property can be put at risk due to dwellings or workplaces being in the path of a dam break flood.

Annual exceedance probability or AEP the probability that at least one event in excess of a particular magnitude will occur in any given year.

Annual inspection report means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

- (a) against recommendations contained in previous annual inspections reports;
- (b) against recognised dam safety deficiency indicators;
- (c) for changes in circumstances potentially leading to a change in consequence category;
- (d) for conformance with the conditions of this authority;
- (e) for conformance with the 'as constructed' drawings;
- (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the **dam** (or network of linked containment systems);
- (g) for evidence of conformance with the current operational plan.

Assessed or assessment by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

- (a) exactly what has been assessed and the precise nature of that determination;
- (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

Associated works in relation to a dam, means:

- (a) operations of any kind and all things constructed, erected or installed for that dam; and
- (b) any land used for those operations.

Authority means an environmental authority or a development approval.

Certification means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as

¹² Levees designed for the diversion of contaminated waters or protection of the structural integrity of a dam are not to be considered as part of this provision. These levees are considered a key design element of the relevant dam and transitional periods should as such align to that relevant compliance criteria and consequence category.

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constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).

Certifying, certify or certified have a corresponding meaning as 'certification'.

Construction or constructed in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.

Consequence in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.

Consequence category means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933*¹³).

Dam means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and **associated works**.

Dam crest volume means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).

Design plan is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

Design storage allowance or DSA means an available volume, estimated in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933*¹³) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an **annual exceedance probability** (AEP) specified in that Manual.

Designer for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.

Development approval means a development approval under the *Planning Act 2016* (or under the repealed *Sustainable Planning Act 2009* or *Integrated Planning Act 1997*) in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

Emergency action plan means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to affected persons and the implementation of protection measures. The plan must require dam owners to annually review and update contact information where required.

Existing structure means a structure that prior to <<insert date when EA is issued with new dam manual conditions>> meets any or both of the following, a structure:

- (a) with a design that is in accordance with the <date and version> Manual for Assessing Consequence Categories and Hydraulic Performance of Structures and that is considerably in progress;
- (b) that is under considerable construction or that is constructed.

¹³ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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Extreme Storm Storage – means a storm storage allowance determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁴)* published by the administering authority.

Flare pit means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted. The flare pit is only used during the drilling and work over process on a petroleum well.

Flowable substance means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

Holder means:

- (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or
- (b) where this document is a development approval, any person who is the registered operator for that development approval.

Hydraulic performance means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁴)*.

Levee means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of **water** or **flowable substances** at any other times.

Low consequence dam means any dam that is not a high or significant consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁴)*.

Mandatory reporting level or MRL means a warning and reporting level determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁴)* published by the administering authority.

Manual means the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁴)* published by the administering authority, as amended from time to time.

Modification or modifying (see definition of 'construction')

Operational plan includes:

- (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA);
- (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

Register of Regulated Structures includes:

- (a) Date of entry in the register;
- (b) Name of the structure, its purpose and intended/actual contents;

¹⁴ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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- (c) The consequence category of the dam as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁵)*;
- (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
- (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;
- (f) For the regulated dam, other than in relation to any levees –
 - i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
 - ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area
 - iii. Dam crest volume (megalitres);
 - iv. Spillway crest level (metres AHD).
 - v. Maximum operating level (metres AHD);
 - vi. Storage rating table of stored volume versus level (metres AHD);
 - vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);
 - viii. Mandatory reporting level (metres AHD);
- (g) The design plan title and reference relevant to the dam;
- (h) The date construction was certified as compliant with the design plan;
- (i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
- (j) Details of the composition and construction of any liner;
- (k) The system for the detection of any leakage through the floor and sides of the dam;
- (l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
- (m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
- (n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

Regulated structure means any structure in the significant or high consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933¹⁵)* published by the administering authority. A regulated structure does not include:

- a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container;
- a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities;
- a flare pit.

¹⁵ This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

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Residual drilling material means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

Spillway means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

Structure means dam or levee.

Suitably qualified and experienced person in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience:

- for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design
- for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.

System design plan means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

Void means any constructed, open excavation in the ground.

Watercourse has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means:

1) a river, creek or stream in which water flows permanently or intermittently—

- (a) in a natural channel, whether artificially improved or not; or
- (b) in an artificial channel that has changed the course of the watercourse.

2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

Waters includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

Water year means the 12-month period from 1 July to 30 June.

Wet season means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.