Unitywater

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Pr11446 - Infrastructure Design Development and Review Guide

Sewage Pump Station, Rising Main and Trunk Gravity Main

Pr11446 - Infrastructure Design Development and Review Guide (SPS, SRM, SGM)

Document Owner	Head of Asset Management
Subject Matter Expert	Growth Engineering Manager Infrastructure Standards & Assurance Manager
References	Refer to Appendix B – References of this document

Version review

Revision	Reviewed by	Approved by	Date approved	Revision type/summary
1	IS&PA Committee	Head of Asset Management	10/11/2025	Original
2	Policy & Docs Advisor and A/Infrastructure Standards and Assurance Manager	N/A	N/A	13/11/2025 Minor admin amendment to fix errors identified (50% to 60% for milestones)

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Contents

1. Purpose

The purpose of this document is to specify the requirements for submission and review of documentation related to detailed design of new Sewage Pumping Stations (SPS), Sewer Rising Mains (SRM) and trunk Sewer Gravity Mains (SGM).

The standards, procedures, guidelines, drawings and templates listed are guidance only. The design will comply with relevant legislation, regulation and statutory approvals and design standards and Unitywater technical specifications and templates.

2. Design Review Process

The design review process will align with this Design Requirements document. Unitywater will commence a review period once all documentation has been submitted in a single package in accordance with the relevant milestones activities and outcomes in Table 2 of this document.

Deviations from the design review milestones, activities and outcomes in Table 2 must be agreed on at the Design Pre-start meeting and sufficiently documented in the minutes.

The Designer will submit a program to present to Unitywater the design cycle to meet all the milestones and design phases stipulated in Table 2. The program will include proposed dates for design meetings, review workshops and Safety in Design Workshops. The program will be updated and issued to Unitywater if the milestone dates have changed. Visibility of such changes is necessary for Unitywater to plan and schedule design reviews with the right and relevant internal and, where necessary, external stakeholders.

Such a submission will trigger a 20-business day response time for Unitywater to respond with a consolidated set of comments and if needed, a request for a follow-on meeting.

If the 20-business days response time cannot be met by Unitywater for various reasons (which may include but not be limited to key stakeholders not being available, holiday periods, external factors and stakeholders impacting the review timeline, etc), Unitywater will communicate this to the Designer via email and agree on a revised review period.

Design submissions which are deemed substantially incomplete (e.g. missing key deliverables stipulated in Table 2 under a particular Milestone), will not commence review until a complete design in accordance with the relevant design milestone is received.

Unitywater's reviews will be based on the available information provided, at the specific stage and level of design development.

2.1 Technical Departures

Technical departures from any requirement of a Unitywater Technical Standard or the SEQ Code shall be identified and submitted for review via F10996 - Deviation to Unitywater Technical Specification or Standard.

Unitywater requires enough information to assess dispensation requests and their potential impact. The onus is therefore on the proponent to justify deviation request submissions and provide suitable evidence to support them. The Designer shall not proceed to document/incorporate the non-conforming work before Unitywater has assessed and accepted the proposed action in writing via F10996 - Deviation to Unitywater Technical Specification or Standard regardless of direction or endorsement through the design review process.

3. Design Package Submission

Design packages associated with an accredited Major Certifier may be lodged via an application through the Development Portal.

Design packages associated with an Engineering Consultancy may be lodged via established communication channels with Infrastructure Planning.

Files shall be under 15MB. Where it is not possible to provide a file that is less than 15MB, the Applicant may request access to Unitywater's file sharing platform.

File naming convention shall be in compliance with Pr8843 - Specification for Drawing, Document and Equipment Tag Numbering. Details within the submission should also include the project or application number, revision and the site location.

Reports shall be individual files for each separate report. Civil, structural, mechanical and electrical drawings are to be produced as single files per drawing set. The design review period will commence upon advice that the submission has been received and is substantially complete.

4. Quality Assurance

Design details including drawings, test results, structural calculations, hydraulic calculations, and electrical calculations shall be certified as correct and complying with the requirements of the SEQ Code by a Registered Engineer Queensland (RPEQ), registered for the appropriate professional discipline for each part of the works. For example, an RPEQ (Civil) cannot certify electrical work.

Documents and drawings shall be certified as accurate and complying with the requirements of the SEQ Code either by individual certification on each document or drawing or by a covering letter which must include a list of all drawings (or electronic file names) and their current revision covered by the RPEQ's certification. Certification shall include the name and registration number of the RPEQ. The details of the certifying RPEQ shall be included also in the ADAC XML file.

Specialist technical reports shall be certified as having been checked by a person with the tertiary qualifications and experience appropriate to the subject of the report. The signed certification is to be incorporated into the text of the report by detailing the name, position and qualifications of the Certifier.

Unitywater's review and endorsement of designs does not release the designer's RPEQ engineer from their obligations to provide a design which meets industry standards and acceptable industry practices and does not relieve the certified RPEQ engineer from their duties under the *Professional Engineers Act* (Qld).

5. Acronyms and Definitions

Table 1 lists the acronyms and definitions referenced in this document.

Table 1: Acronyms and Definitions

Acronym	Term
CFD	Computational Fluid Dynamics
CHAIR	Construction Hazard Assessment Implication Review
CHAZOP	Control (systems) Hazard and Operability

Acronym	Term
DETSI	Department of Environment, Tourism, Science and Innovation
Detailed Design	Quality assured, construction issue version engineering design drawings and specifications that have been prepared in accordance with the process prescribed in Section 10 of this document and satisfy the objectives and standards stated in this document.
DSP	Development Services Portal
EP	Equivalent Person
HAZID	Hazard Identification
HAZOP	Hazard and Operability
IPAM	Infrastructure Products and Materials lists The lists are published on the SEQ Code website
ITP	Inspection and Test Plans
KL	Kilolitre
FHD	Final Handover Deliverables
PSA	Power System Analysis
RP	Registered Plan
RPEQ	Registered Professional Engineer of Queensland
RTU	Remote Terminal Unit
RPZD	Reduced Pressure Zone Device
SCADA	Supervisory Control and Data Acquisition (radio telemetry system)
SEQ AIS	SEQ WS&S D&C Code – Asset Information Specification Version 3.03 – March 2025
SEQ Design Criteria	SEQ Water Supply and Sewerage Design Criteria Version 3.0 – May 2025
SEQ WS&S D&C Code Or SEQ Code	SEQ Water Supply and Sewerage Design and Construction Code including: • SEQ Water Supply and Sewerage Design Criteria Version 3.0 – May 2025 • Gravity Sewerage Code of Australia South East Queensland Service Providers Edition V2.1 Sept 2021 and associated drawings • Sewage Pumping Station Code of Australia South East Queensland Service Providers Edition V1.3 Feb 2020 and associated drawings • Asset Information Specification Version 3.03 – March 2025. These codes are available on the SEQ Code website
SEQ-WSA02	Gravity Sewerage Code of Australia South East Queensland Service Providers Edition V2.1 Sept 2021 and associated drawings Also known as SEQ WS&S D&C Gravity Sewage Code of Australia
SEQ-WSA04	Sewage Pumping Station Code of Australia South East Queensland Service Providers Edition V1.3 Feb 2020 and associated drawings Also known as SEQ WS&S D&C Sewage Pumping Station Code of Australia
SGM	Sewer Gravity Main
SPS	Sewage Pump Station
SRM	Sewer Rising Main
WSAA	Water Services Association of Australia

6. Background and Design Loads

The Designer must develop a detailed design of prudent and efficient infrastructure to serve the nominated catchment / development as per the Unitywater approved SPS Catchment and Servicing Strategy and in accordance with the SEQ Code.

The design loads associated with this project shall be presented for verification and validation by Unitywater's Infrastructure Planning prior to design commencement.

The works should be presented with ultimate development layouts to assess impacts on existing and future lots, roads and customers and other aspects of existing and future development.

7. Scope

The scope sections below provide indicative requirements but does not provide a conclusive list of requirements. The Designer shall ensure sufficient investigations, design and stakeholder engagement are done to ensure legislative compliance is achieved, relevant approvals are obtained, and the works comply with relevant regulation, while meeting the handover requirements set by Unitywater. The Designer shall also adhere to the SEQ Code, Unitywater technical specifications and procedures to ensure the design is fit for purpose.

7.1 Sewage Pumping Station (SPS)

The new SPS must be designed in accordance with all requirements of the SEQ WS&S D&C Code in particular the SEQ Design Criteria and SEQ WSA04 Part 1: Planning and Design, including but not limited to consideration of the following:

a) Designed and delivered in efficient stages, as practical and economical to do so, to serve the land (catchments) and loads specified in the Servicing Strategy.

b) Have land use designation under relevant Council Planning Scheme to enable lawful construction and safe operation and maintenance of a SPS.

c) Is donated to Unitywater in freehold title without lien, covenant or easement granted in favour of others, unless agreed to in writing by Unitywater's Property and Facilities Manager.

d) Provision of sufficient site area and allowance for structures to facilitate future upgrades, renewals and ongoing maintenance to the site to incorporate (as needed):

- larger pumps
- additional emergency storage volume
- suitable bypass arrangement which will enable the SPS to be taken offline for an extended period of time
- changes to power supply and electrical requirements
- any other works required to upgrade SPS to include higher loading and/or enable maintenance activities.

e) Designed to consider the following:

- existing services in the area
- flood impacts and flood immunity during construction and also for operation and maintenance activities
- geotechnical conditions on the site including consideration of Acid Sulphate Soils, contaminated land, unstable ground, etc.
- sufficient offsets from the property boundary to ensure future stages to be constructed without encroaching on surrounding land and roads
- sufficient frontage and unrestricted access to a paved road controlled and maintained by City of Moreton Bay, Sunshine Coast Council, or Noosa Council
- adopt the requirements of the typical site layout as shown on the latest version of standard drawing SEQ-SPS-1102-2
- potable water connection for construction, commissioning and operation and maintenance activities
- sufficient area to contain the wet well, emergency storage, vent pole, switchboard, switchroom (if required), pumping station building (if required), odour control facility, radio antennae, reduced pressure zone device (RPZD), flow meter pit, overflow chamber, collector maintenance hole, maintenance vehicle manoeuvring and parking area, pump set-down area, permanent emergency generator (if required), set-up and operation of a mobile emergency generator and necessary landscaping
- proximity to fire flow services in accordance with legislation
- connection to the power grid to facilitate power for construction, commissioning, operations, and maintenance
- optimised inlet conditions for the multiple large pump arrangement including arrangement to manage vortexing risk
- compliance with the code of environmental compliance for certain aspects of sewage treatment activities (ERA 63) if the SPS design triggers an ERA63(2) application.

f) Configured with:

- a single wet well, sufficiently designed to cater for groundwater levels and effective mitigation of associated buoyancy risk
- minimum two submersible sewage pumps, ensuring flows can be passed forward when all other pump stations are operating during a wet weather event
- (Depending on the project requirement, dry well pumps proposal to be submitted for approval by Unitywater at design commencement)
- a switchboard connected to mains electricity supply and equipment to enable connection to a mobile generator. If a permanently installed generator is required, an automatic transfer switch shall be enabled
- the design will be compliant with Pr9380 - Electrical Installations at Network Sites and assess the need for lightning protection based on AS 1768 Lightning Protection, and arc fault protection based on Pr10618 - Power System Analysis (PSA) and Arc Flash Studies

- a suitably sized hardstand area to install a mobile generator, capable of running all duty pumps with a staggered start arrangement, OR a permanently installed emergency generator if the criticality of the site warrants.
- odour control facility if required
- chemical dosing facility if required
- SCADA monitoring and control
- emergency storage and associated maintenance access which can be staged and will be easy to clean and maintain
- paved access road, manoeuvring (including turnaround facility) and parking area for an 8.8m medium rigid vehicle with trailer, required for operations and maintenance activities. Driveway shall be designed such that ingress and egress vehicles does not impact the traffic of the external local road
- paved and bunded set-down area for sewage pumps for maintenance of pumps outside of the wet well, designed for suitable crane access for operations and maintenance tasks
- overflow pipe discharging to an approved screened overflow chamber with outlet to lawful discharge point
- safe and practical pedestrian pathways for operations and maintenance personnel
- suitable stormwater drainage
- a secure vandal proof tap connected to potable water for hygiene purposes through a water meter and RPZD
- security fencing
- landscaping
- facility and safety signage
- a connection to the existing infrastructure during the stages of the project lifecycle
- bypass arrangement through consideration of planned network interventions.

g) Alternate/green energy supply sources, such as solar, should be investigated to power the proposed SPS.

7.2 Sewer Rising Mains (SRM)

The new SRMs must be designed and delivered in efficient stages, if practical and economical to do so, to serve the land (catchments) while meeting hydraulic requirements for self-cleansing and pressure limitations on the system.

The design of the SRMs must be designed in accordance with all requirements of the SEQ WS&S D&C Code in particular the SEQ Design Criteria and SEQ WSA04 Part 1: Planning and Design, including but not limited to the consideration of:

- Horizontal alignment:
  - minimise environmental and planning constraints
  - enable access for operations and maintenance works on the pipelines

- provide sufficient clearance between staged pipelines to enable future construction of parallel mains
- enable connection to the downstream network during various pumping phases of the pump station and SRM.

- Vertical alignment:
  - optimise vertical alignment to minimise the requirement of gas release and scour installations. Ideally the discharge point should be the highest point in the system to minimise draining and filling rising mains which can result in odour nuisance issues
  - optimise horizontal alignment to meet gas release and scour requirements
  - optimise location and access points for air and scour valves to enable maintenance access
  - minimise transients, a transient analysis must be completed to support the design if deemed necessary by Unitywater.
- Easements considerations for access during operation and maintenance both to the SPS, SRM; and allowance for vehicle access to fixtures along the SRM.
- Construction methodologies for different sections of the rising mains including consideration of trenchless construction.
- Minimisation of hydraulic detention time for staged developments to reduce odour nuisance and corrosion risks.

7.3 Trunk Sewer Gravity Mains (SGM)

Pipe sizes of >=DN300 shall be considered trunk infrastructure and comply with the following outlined requirements. Sizes below this shall be considered reticulation, and while not considered further within the scope of this document shall still comply with the relevant regulatory and Unitywater design requirements.

The new trunk SGMs must be designed to meet to service the ultimate catchment growth, unless specified otherwise by Unitywater Infrastructure Planning.

The design of the SGMs must be designed in accordance with all requirements of the SEQ WS&S D&C Code in particular the SEQ Design Criteria and SEQ WSA02, including but not limited to the consideration of:

- Hydraulic requirements:
  - design pipe sizes and gradients to accommodate ultimate flow rates from full catchment development.
- Horizontal alignment:
  - minimise environmental and planning constraints
  - enable access for operations and maintenance works on the pipelines
  - provision for maintenance holes at regular intervals, changes in pipe direction, intersection of SGMs and grade changes.

- Vertical alignment:
  - confirm invert levels ensure all planned catchments that are intended to connect to new SGM can be serviced, whilst also ensuring it can connect to the existing sewer network
  - optimise vertical alignment to maintain self-cleansing velocities and avoid sedimentation during present (low flows) and future (higher flows)
  - allow for air gap in dry weather conditions to allow the sewage to breath
  - avoid excessive slopes that could cause uncontrolled flow velocities (>3m/s) or create hydraulic jumps, within the new SGM or in the existing gravity sewer network
  - avoid excessive changes in grade from steep to flat which can result in positive air pressures in the network
  - eliminate or provide means for air relief at any point where air cannot be conveyed downstream, such as the inlet chambers of a syphon.
- Easements considerations for access during operation and maintenance both to the SGM; and allowance for vehicle access to maintenance holes and fixtures along the SGM.
- Construction methodologies for different sections of the sewer gravity main including consideration of trenchless construction.

7.4 Specialist input

The Designer must obtain specialist input for the following and provide mitigations to address issues identified through these assessments as required by the SEQ WS&S D&C Code in particular the SEQ Design Criteria and SEQ WSA04 Part 1: Planning and Design:

a. Odour assessment:

   The Designer shall conduct an odour and septicity study in line with the requirements of the Department of Environment, Tourism, Science, and Innovation (DETSI) Guideline: Odour Impact Assessment from Developments with a particular emphasis of avoidance of nuisance odour discharge at gas release valves and SPS's. The study shall ensure H2S levels at each location are less than 5 parts per billion at the nearest sensitive environment in peak H2S conditions. Where this cannot be achieved, an odour control unit will be required. H2S removal efficiency of odour control units shall be > 99% measured at the outlet of the odour control system. Design of odour management infrastructure are to be in accordance with:

   - Pr10852 - Specification for Design and Construction of MHL Dosing Systems
   - Pr10999 - Specification for Odour Control Unit Design and Construction (Network).

b. Noise assessment.

c. Hydraulic design from a hydraulic design specialist:

   - transient analysis to mitigate surge risk along the pipeline and inform the pipeline design (size, pipe material, etc.)
   - CFD modelling to address pump intake and vortexing risk in the wet well for wet wells with diameter larger than 2.4m, and/or require three (3) or more pumps.

- CFD analysis is recommended as part of the detailed design to assess the risk of vortexing. The analysis is to assess vortexing risks, and review mitigation options if the risk is unacceptable. These may include:
  - revised wet well operating levels
  - benching modifications
  - insertion of splitter plates or transverse beams
  - baffle walls.

d. Constructability review and input from Contractor with relevant experience in:
   - SPS and SRM construction
   - trenched installation.

e. Trenchless construction where required.

8. Compliance with Legislation and Regulation

8.1 Statutory Approvals and Regulatory Compliance

To ensure that the SPS, SRMs and trunk SGMs can be delivered in a timely and efficient manner the scope of the detail design must include identifying and obtaining all necessary statutory approvals. This is essential to ensure that the scope of the detailed design includes all features that are required for compliance with legislation and so that construction can start with minimal risk of delay during construction or variation to the accepted construction tender amount.

Hence, the design scope must include provision for a statutory approvals specialist to identify, apply for and obtain all necessary statutory approvals in compliance with all relevant legislation and regulation (refer to Section 8.2 for ERA63(2) application process). For example, and without limitation, the statutory approvals specialist should consider compliance with the legislation and regulation listed in Appendix A.1.

Without limiting identification of necessary statutory approvals, the statutory requirements that are of critical importance to defining the scope of design, timely delivery of the SPS, SRMs and trunk SGMs, and operation and maintenance of the infrastructure are:

a) the new SPS must have an *Environmental Authority* in compliance with the *Environmental Protection Regulation 2019*

b) the new SPS must have a *Water Connection Approval* under the relevant Water Infrastructure Agreements (if applicable) and relevant Acts.

8.2 ERA 63 (2) Application Process for Sewage Pump Stations

Operating a SPS with a total design capacity of more than 40kL in an hour, is a prescribed environmentally relevant (ERA) activity known as ‘ERA 63’ under schedule 2, part 13, section 63(1)(b) of the EP Regulation. An environmental authority (EA) is required to carry out an environmentally relevant activity under section 426 of the EP Act.

ERA 63 (2) applies to operating a SPS with a total design capacity of more than 40 kL/hr (11.1 L/s), if the operation of the SPS is not an essential part of the operation of a wastewater treatment plant.

The Designer must ensure that the EA is in place before testing and commission of the SPS is undertaken. The following documents are to be prepared for review and approval by Unitywater:

- F11411 - Developer ERA63 Checklist – Sewage Pumping Stations is to be completed by an RPEQ on behalf of the developer for Unitywater's review and approval
- complete Contingency Plan which is reviewed and approved by Unitywater Network Operations
- the form titled "Variation application for a new EA for a prescribed ERA – ESR/2015/1796"
- a Supporting Report which includes (but not limited to):
  - scope of work
  - land use planning and approvals requirements
  - required infrastructure and design criteria
  - variation application request and justification
  - assessment of likely impact on environmental values
  - demonstrated compliance with model operating conditions
  - management practices to mitigate impacts on environmental values, rehabilitation, etc.

Note: a summary of Unitywater's varied conditions and justification is provided in Appendix B.

The variation application and supporting report will be reviewed by Unitywater (Approvals and Regulatory Planning Team, Development Services and Network Operations) and amended by the Designer as required.

Once the final version is approved by Unitywater, the variation application will be signed by Unitywater's Network Operations Manager, and lodged with the Department of Environment, Tourism, Science, and Innovation (DETSI) for review and approval.

9. Design Standards

9.1 Applicable Standards

The design of the new SPS, SRMs and trunk SGMs must be carried out in accordance with the following:

a) requirements of the Statutory Authorities having jurisdiction over all or part of the manufacture, installation or operation of the plant

b) Unitywater Technical Standards, Specifications, Procedures and Guidelines. Pr11231 - Unitywater Technical Specification Reference Guide provides an overview of Unitywater's technical specifications to ensure the project specific technical specifications cover off the minimum requirements of overarching Unitywater frameworks (refer to Appendix A)

c) the South-East Queensland Water Supply and Sewerage Design and Construction Code (SEQ WS&S D&C Code) (refer to SEQ Code)

d) Australian Standards

e) other governing national or Queensland documentation and standards that is deemed relevant and appropriate.

In the absence of relevant SEQ WS&S D&C Code, WSAA or Australian codes or standards, relevant industry, international (ISO), European or British standards shall be followed. International standards shall take precedence over European or British standards. The Contractor shall obtain approval from the Unitywater prior to using any non-Australian standards not nominated in the equipment specifications, schedules, datasheets or associated drawings.

If there is any inconsistency between Unitywater technical specifications and the SEQ WS&S D&C Code, Unitywater's technical specifications shall prevail.

The detailed design of the SPS, SRMs and trunk SGMs shall, to the greatest practical extent, be configured in accordance with Unitywater technical specifications and SEQ WS&S D&C Code standard design drawings.

The SPS site layout shall, to the greatest practical extent, be configured in accordance with the SEQ WSA04 Typical Site Layout drawing (SEQ-SPS-1102-2).

9.2 CAD Drawing Standards

All drawings must be prepared in accordance with the SEQ AIS and submitted on Unitywater drawing templates.

The relevant Unitywater documents are:

- Pr9080 - Specification for CAD/BIM Drafting and Modelling Standards
- Pr8843 - Specification for Drawing, Document and Equipment Tag Numbering
- Pr10360 - Project Information Requirements.

9.3 Approved Equipment and Materials

Materials selected in the design must be in accordance with:

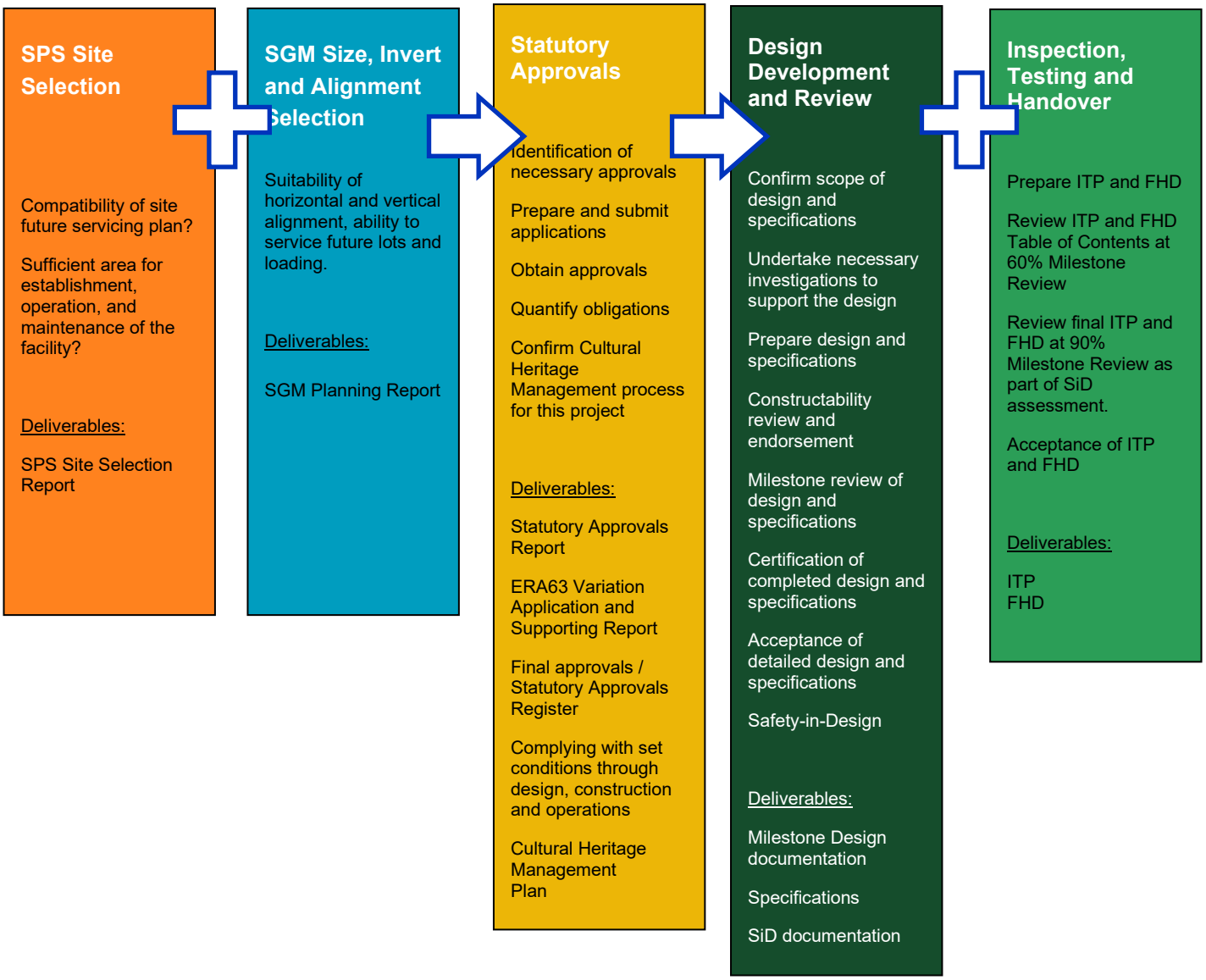
- SEQ Code Accepted Civil and Mechanical Infrastructure Products and Materials Lists (IPAM Lists)
- F10678 - Accepted Electrical Equipment List
- Pr9693 - Specification for Mechanical Installations.

Any proposed departure from the IPAM lists, F10678 and Pr9693 must be comprehensively and clearly identified, described, and justified at design milestone workshops. Refer to Section 2.1 Technical Departures.

10. Design Process

Preparation of engineering design drawings and specifications for a SPS and associated infrastructure is complex due to the mix of componentry, legal compliance issues, public and worker safety considerations, environmental health protection, interaction of the pumping station with 'upstream' and 'downstream' network infrastructure and potential impacts on the price of sewerage services and neighbourhood amenity. Accordingly, a structured and methodical design process as depicted in Figure 1 is required to deliver a safe, prudent, and efficient SPS and associated infrastructure.

Figure 1: Design Process



10.1 SPS Site Selection

The site cannot be accepted by Unitywater until a site assessment conducted in accordance with the requirements of Section 5.2 of SEQ WSA04 Part 1, concludes that the site satisfies the selection criteria and there is no other better available site. Such assessment must include consideration of impact of odour on existing and future residents and determination of whether an odour control facility is to be incorporated into the scope of the Detailed Design.

The SPS Site Selection Report will also address the following (but not be limited to):

- existing services through Before You Dig Australia 'BYDA'
- provision of sufficient site area and allowance for structure requirements for staged implementation of pump station and emergency storage with suitable offsets between staged infrastructure and property boundaries
- flood immunity
- wet weather access
- vehicle movements and access from local Council Roads
- overflow location and lawful point of discharge
- electricity supply / Power requirements
- water supply requirements
- odour impacts on nearest receptors
- noise impacts on nearest receptors
- other considerations.

A concise summary of the site selection assessment in the SPS Site Selection Report is required to be prepared by the Designer and reviewed by Unitywater. If the SPS Site Selection Report demonstrates that the proposed site is suitable, Unitywater will accept the proposed site.

The approved SPS Site Selection Report will inform the statutory approvals identification process, including submissions to participating Councils' Planning Authorities.

The site selection assessment process may be conducted in parallel with identification of necessary statutory approvals. However, the site recommended in the Site Selection Report approved by Unitywater must be the subject of identification of necessary statutory approvals.

Following acceptance of the nominated SPS site, a Facility Location Identification (ID) will be established.

10.2 Trunk SGM Size, Invert and Alignment Selection

The trunk SGM (≥DN300) design will be endorsed by Unitywater through an assessment process that is conducted in accordance with the requirements of SEQ WSA 02 and confirms it has sufficient depth and capacity to service the future upstream catchment.

The SGM Planning Report will also address the following (but not be limited to):

- existing services through Before You Dig Australia 'BYDA'
- provision of sufficient site area and allowance for structure requirements for new sewer gravity mains suitable offsets between staged infrastructure and property boundaries.

The approved SGM Planning Report will inform the statutory approvals identification process, including submissions to participating Councils' Planning Authorities.

The SGM Planning Report may be prepared in parallel with identification of necessary statutory approvals. However, the site recommended in the SGM Planning Report approved by Unitywater must be the subject of identification of necessary statutory approvals.

10.3 Constructability Review and Endorsement

The designer shall engage specialised contractors in SPS, SRM and SGM delivery to understand the construction feasibility and accompanying risks and determine suitable equipment including lead time allowance. The constructability review shall be an ongoing activity with design development, and shall be appropriately documented in the design reports, risk registers and safety in design activities / workshops documentation (CHAIR & HAZID). See also Section 10.6 Safety in Design.

10.4 Statutory Approvals

A concise summary of the process to identify necessary statutory approvals, findings, and analysis from implementation of the process and plan to obtain the necessary approvals, permits, licences and compliance with legislative requirements (Statutory Approvals Report) is required. The Statutory Approvals Report (or Approvals Register) is to be prepared by a statutory approvals' specialist.

The scope of the detailed design cannot be finalised until all necessary statutory approvals have been obtained. Hence, progressing with preparation of the detailed design prior to obtaining the necessary statutory approvals escalates the risk that revision of the detailed design may be required to ensure the configuration of the new SPS, SRM and SGM are compliant with legislation, and it can be operated in compliance with legislation.

Unitywater may agree to preparation of the detailed design while statutory approvals are being obtained subject to Unitywater receiving a satisfactory Statutory Approvals Report and in view of the findings of the report, accepting that risk of revision of the detailed design is low.

The approved Statutory Approvals Report and necessary statutory approvals will inform the scope of the detailed design.

10.5 Cultural Heritage

The Designer will confirm with Unitywater if an existing Cultural Heritage Management Plan will apply to these works, and if not, the Designer to consult with the local Aboriginal Cultural Heritage party for the area on what actions are planned to address this component of the design, delivery and operation of the proposed SPS, SRM or trunk SGM.

10.6 Safety in Design

Safety in Design (SiD) is a mandatory requirement and must be carried out in accordance with all relevant legislation and Unitywater's Pr8187 - Safety-in-Design Procedure and relevant templates. All design work shall consider safety in design and be risk assessed without exception. Please note:

- SPS designs require HAZID, HAZOP and CHAIR
- SGM designs will typically only require a HAZID, but a CHAIR workshop will also be required if the gravity sewer is deep and/or installed using trenchless methods.

SiD risk workshops are to be organised and chaired by an independent facilitator nominated by the Designer and accepted by Unitywater. The workshops are to include key Unitywater stakeholders representing operations and maintenance and other functions and shall identify all risks which can impact design or be designed out.

It is anticipated a well-prepared agenda with a stakeholder list will be provided by the Designer at least two (2) weeks prior to the workshop in order to ensure appropriate external and Unitywater stakeholders can attend. On completion of a SiD workshop, a completed Register and minutes prepared by the Designer will be issued to all attendees.

The actions and SiD aspects identified in the Register shall be implemented and closed out during the next design stage.

10.7 Investigations

The Designer shall undertake all investigations to inform the design. The investigations must be procured and managed by the Designer. Investigations may include, but not be limited to:

- field investigations such as:
  - survey
  - services location and potholing
  - geotechnical investigation
  - contaminated land.
- environmental assessments and studies, such as:
  - fauna and flora surveys
  - environmental impact assessment
  - cultural heritage assessment.
- easements and land tenure investigations
- odour impact assessment
- noise impact assessment
- other investigations required to inform the design.

10.8 Design Development and Review

The process of preparing the detailed design will be managed by the Designer.

The designer must conduct a thorough quality assurance procedure prior to submission. The design has to be fully compliant with SEQ Code and all relevant specifications and procedures,

The Designer must include provision in the project schedule for preparation and execution of each review milestone stated in Column 1 of Table 2 below. In addition, the Designer shall be responsible for organisation and conduct of a workshop, nominally of two (2) hours duration, for each milestone review.

Review milestone workshops may be hosted online, such as via MS Teams.

Preparation for each review milestone workshop shall include the Designer compiling the information nominated in Column 2 of Table 2 below and distributing the information to Unitywater's Project Manager a minimum of ten business days (2 weeks) prior to the review milestone workshop. Unitywater will then consolidate comments and send the comments to the designer after the workshop within ten business days (2 weeks) after the workshop, thus the total review period is four (4) weeks.

Table 2 below does not comprise a comprehensive list of deliverables but rather the minimum requirements for each milestone to satisfy Unitywater that progress is tracked, and quality assurance is progressively applied to the design process. The Designer must provide any additional information to support a fully developed design. Refer to the SEQ AIS, in particular the requirements of Appendix A - Checklist Of Typical Design Stage Deliverables.

Table 2: Design Review Milestones, Activities and Outcomes

Review Milestone	**Information to be Provided by Designer** 10 business days (2 weeks) **prior to the milestone (including but not limited to)**:	**Activities and Desired Outcomes**
Pre-Start Meeting (and Pre-Lodgement Meeting with Development Services)	a. Meeting request with Unitywater Project Manager. b. Project team contact details.	a. Introductions and exchange of contact details. b. Roles and responsibilities of team members are nominated and confirmed. c. Scope of the project is confirmed.
Projects Schedule and Risk Register	a. Project Schedule. b. Project Risk Register.	Submit copies to Unitywater through milestone deliverables and progressively as new information is received – Live document.
Statutory Approvals	Statutory Approvals Report or Register	a. Submit copies to Unitywater through milestone deliverables and progressively as new information is received. b. Obtain understanding of the necessary approvals to enable lawful construction, operation, maintenance, and renewal of the new SPS, SRM and trunk SGM. c. Assign responsibilities for preparation, lodgement and follow-up on necessary applications and update the project schedule accordingly. d. Confirmation of Cultural Heritage Management.
Milestone 1 30% Detailed Design (Combined with HAZID)	a. 30% design with draft Project Risk Register. b. Project Schedule. c. Request for Unitywater Operations input and other special input requirements. d. Site Selection Report. e. SGM Planning Report. f. Basis of Design Report and scope requirements. g. Updated Statutory Approvals Register. h. Expected final deliverables list. i. Hydraulic profiles through all elements of the works. j. Proposed staging of SPS and rising mains and the works. k. Emergency storage requirements of the pump station through the various pumping phases of the overall project. l. Odour and Noise assessment reports. m. Process flow diagram. n. Process and Instrument Diagrams (P&ID). o. Draft Functional Description. p. Civil and Structural: • horizontal and vertical alignment of the SRM and trunk SGM including long sections and pipe material selection • calculations to justify trunk SGM pipe size and design grade • SPS site general layout including wet well, vehicular access and manoeuvring area, emergency storage, switchboard, vent pole, reduced pressure zone device, pump set down area, finished surface contours/levels and options for connection of the rising main/s including for the alternate route • SPS and emergency storage elevations showing top of structure levels, flood levels, levels of sewers and wet well operating levels • emergency storage layout showing proposed staging and offsets from property boundary and other structures • overflow discharge arrangements	a. Unitywater to provide feedback on 30% design documents. b. Conduct 30% design review and HAZID workshop and consolidate outcomes of the design review and HAZID workshop to be addressed in next stage of detailed design. c. Review and update Project Risk Register. d. Review and update Project Schedule. e. Review Basis of Design and scope. f. Review 30% design documents with specific focus on: • horizontal and vertical alignments for SGMs and SRMs • configuration of SPS site layout and access • staging of the works • pump selection • measures to eliminate operational and construction hazards Horizontal and vertical alignment of the rising main(s) • need for odour control facility • Table of Contents of ITP • Table of Contents of FHD • confirmation of additional investigations required • easement and access requirements. g. Review and confirm ongoing internal Unitywater and external stakeholder requirements to inform the next design stage and to obtain the necessary approvals and permits. Deliverables 5 days after the Milestone 1 workshop: a. 30% Design Workshop minutes and HAZID registers and report.

Review Milestone	**Information to be Provided by Designer** 10 business days (2 weeks) **prior to the milestone (including but not limited to)**:	Activities and Desired Outcomes
	• structural elements including sectional thicknesses and space proofing • proposed configuration and method for connection of new SPS to existing network • calculations to justify proposed wet well dimensions and emergency storage requirements including buoyancy • horizontal and vertical alignment of the rising main/s including long sections and pipe material selection • indicative easement requirements • high level constructability review • water supply configuration and source including firefighting requirements • draft easement layout plans. q. Mechanical and hydraulic: • pump selection and curves • rising main system resistance curve for various pumping phases of the overall project • pipe and fitment sizing including cut over between various pumping phases of the overall project • parallel operation of rising mains. r. Electrical and controls – Preliminary design with functional requirements only including: • SLD for switchboard • draft Power System Analysis (PSA) • lightning assessment • preliminary load list based on motor load and other loads • major cable requirements and routes identified • switchboard general arrangement and placement on site (building or outside, refer to Pr9380) • key equipment locations • key equipment selection – RTU/PLC, IO, motor starters, VFD etc. s. Table of Contents of ITP and FHD.	
Milestone 2 60% Detailed Design (Combined with CHAIR and HAZOP)	a. 60% design with Project Risk Register. b. Update on status of measures to eliminate operational and construction hazards that were identified and assigned for action at the 30% Detailed Design Review. c. Project Schedule. d. Design Report. e. Updated Statutory Approvals Register. f. Odour report. g. Process flow diagram. h. Process and Instrument Diagrams. i. Draft Functional Description. j. Constructability Review. k. Investigations – factual and interpretive reports. l. Network Interventions. m. Specialist technical reports including surge, CFD. n. Civil and Structural: • 30% deliverables plus, • pavement cross sections, surface drainage and stormwater layout	a. Unitywater to provide feedback on 60% design documents. b. Conduct 60% design review, HAZOP, and CHAIR workshops and consolidate outcomes of the design review, HAZOP, and CHAIR workshops to be addressed in Milestone 3. c. Review and update Project Risk Register. d. Review and update Project Schedule. e. Review 60% design documents with specific focus on: • horizontal and vertical alignments for SGMs and SRMs • any concerns about the structural design of major civil components • pipe work layout • configuration of instrumentation and metering • SCADA communications • power supply arrangements • water supply arrangement • measures to eliminate operational and construction hazards are identified and assigned for action • network intervention arrangements for connection to the existing rising main have been identified • details of connections to the sewerage rising main/s connections are confirmed

Review Milestone	**Information to be Provided by Designer** 10 business days (2 weeks) **prior to the milestone (including but not limited to)**:	**Activities and Desired Outcomes**
	• turning circles and vehicle paths for construction and operations vehicles including consideration of access requirements for operation and maintenance • sections and details of concrete works, metal works • diagrammatic reinforcement layout, additional details and sections • supports for pipe works and mechanical equipment • pipework layout and thrust restraint • layout of the connection of the sewerage rising main/s to the new downstream infrastructure including venting of the discharge maintenance hole • easement plans. o. Mechanical and hydraulic: • mechanical equipment finalised • final pump selection and curves • odour control details and selection • pump intake design. p. Electrical and controls: • lighting requirements • switchboard general arrangement design • schematics for balance of the site • control system network drawings • results of SCADA communications survey (radio survey) • confirmation of supply availability (Energex application). q. Draft ITP and FHD.	• cutover between various pumping phases of the overall project • parallel operation • ITP and FHD • ERA 63(2) Variation Application and Supporting Report, if required. f. Review and confirm ongoing internal Unitywater and external stakeholder requirements to inform the next design stage and to obtain the necessary approvals and permits. Deliverables 5 days after the Milestone 2 workshop: g. 60% Design Workshop minutes and HAZOP and CHAIR registers and report
Milestone 3 90% Detailed Design (Draft Final Design)	a. Draft Final Detailed Design Deliverables including design drawings and specifications (certified by RPEQ). b. Update on status of measures to eliminate operational and construction hazards that were identified and assigned for action at the 60% Detailed Design Review. c. Draft Final Design Report. d. Draft Final Project Risk Register. e. Draft Final construction issue of the ITP and FHD. f. Statutory Approvals Report or Register. g. Draft Final ERA 63 Variation Application and Supporting Report. h. Final Constructability Review. i. Power System Analysis with all assumptions confirmed and all known site data included ready for IFC revision. j. Final Easement plans.	a. Acceptance of the Draft Final Detailed Design (90%) a. Confirm the engineering drawings, specifications: i. Satisfy the requirements of the agreed design scope. ii. Address the outcomes of the HAZID for all projects, and HAZOP, CHAIR assessments for SPS. iii. Satisfy the requirements of Statutory Approvals. iv. Confirm that ITP and FHD will satisfy Unitywater's asset management requirements. v. Measures to eliminate operational and construction hazards are identified and assigned for action.
Milestone 4 100% Detailed Design Issued for Approval (IFA) (Final Design)	Submit digital copy of all drawings, specifications, and ITP and FHD to Unitywater within 10 business days of the 90% Detailed Design review (Milestone 3 workshop) occurring. a. Final Detailed Design Deliverables including IFA design drawings and specifications (certified by RPEQ). b. Final Design Report. c. Final project Risk Register. d. Final ITP and FHD. e. Final ERA Variation Application and Supporting Report. f. Statutory Approvals Register.	Acceptance of the Final Detailed Design Deliverables (IFA). Unitywater will submit the Variation application to DETSI for review and approval of the new environmental authority for a prescribed ERA63(2).

10.9 Design Endorsement

Unitywater will endeavour to acknowledge, endorse or comment as necessary to each deliverable within twenty (20) business days of receipt subject to:

a) certification by the Design Engineer(s) that the deliverable is compliant with the standards stated in this document

b) Unitywater's reasonable satisfaction that the deliverable pursues the objectives stated and achieves the desired outcomes stated in this document.

Unitywater may refuse to accept or approve the deliverable. In such instances Unitywater will state the required remedial action in written notification to the Designer within ten (10) business days of receipt of the deliverable.

10.10 Inspection and Test Plans and Final Handover Deliverables

It is important that the inspection testing and handover stage of the project is conducted efficiently and without delay. The contents and quality of Inspection Test Plans (ITP) and Final Handover Deliverables (FHD) is fundamental to ensuring that the constructed asset can be tested, proven, and handed over to Unitywater shortly after practical completion of construction. Specifically, the format and content of as-constructed information and the testing and proving regime including inspection records, test certificates, equipment calibrations, welding logs and laboratory testing records must comply with standards and guidelines nominated in this document, refer to and comply with the requirements stipulated in Pr11211 - Specification for Commissioning and Handover of Active and Passive Assets and the SEQ AIS (in particular Appendix B Checklist Of Typical Final Handover Deliverables).

It is intended that the ITP and FHD form part of the construction tender documents, and that the construction contract includes conditions requiring compliance with the ITP and FHD. Hence, the ITP and FHD should be developed in conjunction with the detailed design.

The Designer is responsible for preparing an ITP and FHD, suitable for inclusion in construction tender documents, which will determine if:

- the As-constructed configuration (spatial location, layout, levels, and dimensions) of the SPS is compliant with the approved detailed design
- the SPS performs at the average dry weather and peak wet weather design duty points within power and efficiency ranges specified in the SEQ Code
- all civil, mechanical, electrical, SCADA and instrumentation components of the SPS can be safely and efficiently utilised and maintained for their intended purpose
- the materials and equipment comprising and quality of installation of all civil, mechanical, electrical, SCADA and instrumentation components of the sewage pumping station are compliant with the detailed design and performance criteria specified in technical standards.

11. Roles and Responsibilities

The principal roles and responsibilities for delivery of the Detailed Design are set out in Table 3 below.

Table 3: Summary of Roles and Responsibilities

Term	Role and Responsibilities
Designer	An entity engaged by the Developer to prepare the detailed design and supervise the construction, testing, commissioning, and handover of the works as specified in a water infrastructure agreement approved in a statutory connections approvals issued by Unitywater. The Designer is a Consulting Engineer or Major Certifier engaged by the Developer and may engage third parties to undertake design and construction processes under their RPEQ certification. The Designer shall support the Design Engineer(s) in their role with suitable professional indemnity insurance cover, electronic documents and records management system, project management system and necessary design tools.
Design Engineer	A person engaged by the Designer who is responsible for the engineering design and specification of all or part of the componentry of the new sewage pumping station and connection to the existing rising main who has professional accreditation in compliance with the *Professional Engineers Act 2002* (Qld).
Unitywater's Project Manager	A person appointed and given delegations of authorities by Unitywater to support timely and efficient preparation of the detailed design by the Designer and manage the assessment of statutory connections applications for approval of the Detailed Design and timely issuance of decision notices pursuant to the requirements of the *SEQ Water (Distribution and Retail Restructuring) Act 2009*.

Appendix A – References

A.1 Applicable Legislation and Regulation

At least the following legislation and related regulation shall apply:

- *Work Health and Safety Act 2011* (Qld)
- *Work Health and Safety Regulation 2011* (Qld)
- *Water Supply (Safety and Reliability) Act 2008* (Qld)
- *Environmental Protection Act 1994* (Qld)
- *Queensland Building and Construction Commission Act 1991* (Qld)
- *Professional Engineers Act 2002* (Qld)
- *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009* (Qld)
- *Electrical Safety Act 2002*
- *Electrical Safety Regulation 2013*
- *Electrical Safety and Other Legislation Amendment Act 2024 (ESOLA Act)*
- *Building Act 1975*
- *Building Fire Safety Regulation 2019*
- *Planning Act 2016*
- *Planning Regulation 2017*
- Local government and/or Council's Planning Scheme or any relevant Temporary Local Planning Instrument
- *Plumbing and Drainage Act 2018*
- *Aboriginal Cultural Heritage Act 2003*
- *Native Title Act 1993*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Regulation 2019*
- *Environmental Protection (Air) Policy 2019*
- *Environmental Protection (Noise) Policy 2019*
- *Nature Conservation Act 1992*
- *Building and Construction Industry (Portable Long Service Leave) Act 1991*
- *Plumbing and Drainage Act 2018*
- *Local Government Act 2009*
- *Land Act 1994*
- *Land Title Act 1994*
- *Queensland Heritage Act 1992*
- *Fire and Emergency Services Act 1990*
- *Surveyors Act 2003*
- *Fisheries Act 1994*
- *Vegetation Management Act 1999.*

A.2 Codes of Practice (ratified by Legislation)

SEQ Water Supply and Sewerage Design and Construction Code

The SEQ Water Supply and Sewerage Design and Construction Code is available via the SEQ Code website: www.seqcode.com.au. It includes:

- SEQ Water Supply and Sewerage Design Criteria
- Gravity Sewerage Code of Australia South East Queensland Service Providers Edition V2.1 Sept 2021 (SEQ-WSA02) and associated drawings
- Sewage Pumping Station Code of Australia South East Queensland Service Providers Edition V1.3 Feb 2020 (SEQ-WSA04) and associated drawings
- Asset Information Specification Version 3.03 – Mar 2025.

A.3 Unitywater documents referenced in this document

Pr11231 - Unitywater Technical Specification Reference Guide list all technical specifications and technical notes as well as other relevant technical documents.

Other relevant resources include:

- DETSI Guideline: Odour Impact Assessment from Developments
- AS 1768 Lightning Protection.

Appendix B - Unitywater's Varied Conditions

Proposed varied conditions and justification for proposed changes

Variations to the standard conditions replace standard conditions 4, 5, 6, 7, 10, 11 and 12 with varied conditions G1-G4. The varied conditions are:

Agency interest: General	
Condition number	**Condition**
G1	The activity must be undertaken in accordance with written procedures that: a) identify potential risks to the environment from the activity during routine operations and emergencies including flooding; b) establish control measures that minimise the potential for environmental harm; c) ensure that staff are trained and aware of their obligations under the *Environmental Protection Act 1994*; and d) ensure that reviews of environmental performance are undertaken at least annually.
G2	The operator must take all reasonable and practicable measures to ensure that contaminants are not released to land or waters as a result of the activity.
G3	The operator must notify the administering authority via the 24 hour pollution hotline or the district office as soon as practicable, but no later than 24 hours after becoming aware of a sewage release that: a) poses a threat to public health (for example, contamination of waters with primary recreational values); or b) results in an observable environmental impact (for example, fish kill, distress to wildlife, marine plants or other aquatic life); or c) discharges to, or is likely to impact a sensitive environment (for example, Ramsar wetland, marine park, or area designated as a conservation zone under a relevant planning scheme); or d) is 10,000L or more during dry weather
G4	Within 24 hours after becoming aware of a notifiable release in accordance with condition G3, email or written notification of the release must be submitted to the administering authority outlining the event, its nature, and the circumstances in which it happened.

Justification for proposed changes:

The proposed variations are requested based on the following justification:

- G1: Replaces Standard Environmental Conditions 4, 5 ,6 and 7. Unitywater have in place a comprehensive set of written procedures which are applied to the significant number of SPS sites located within their respective service area. These procedures are proposed to be applied to the new SPS site to ensure management is undertaken consistently across all Unitywater sites.
- G2: Proposed revision to Standard Environmental Condition 10 to include the additional text *'take all reasonable and practicable measures to'* reflects the advice provided in the Code of Environmental Compliance that *'overflows may occur in wet weather when the design capacity of the sewerage system is exceeded'*. Despite this, the implementation of Unitywater's written procedures will ensure any overflow is effectively managed to ensure environmental impacts are minimised.
- G3: Proposed revision to Standard Environmental Condition 11. The proposed revision is intended to reflect the practical constraints which exist for Unitywater when seeking to respond as quickly as possible to a notifiable release to minimise environmental impacts. The amended timeframe for notification of the administering authority to *'as soon as practicable, but no later than 24 hours after becoming aware of the sewage release'* is intended to reflect that.
- G4: Proposed revision to Standard Environmental Condition 12 which references Condition 11, is proposed to be replaced by varied condition G3. The proposed revision therefore amends this reference to 'in accordance with condition G3'.