Local Practices to Support Code for Adoption Sewerage Pumping Stations

December 2023

A note on Code for Adoption Sewerage

Under Sewerage Sector Guidance Clause 2.6, we can define two local practices that deviate from Ofwat's Code for Adoption Design and Construction Guidance (DCG).

These specify the additional requirements that you'll need to meet before we adopt new sewerage assets.

You'll need to consider our local practices if,

- You require easements for surface water discharge to watercourses, bodies of water, sewers within third-party land, or sewers that may form part of another feature.
- You require a pumping station adoption on your site.

To comply with the local practice rules within the Code, we're always required to consult with customers like you (both directly and via our website) to outline our Local Practice proposals.

We consulted on the original version of the Local Practice covering pumping station designs during January 2020, and we received several comments and challenges.

In March 2023, we consulted on the latest version of this document following some changes to our internal practices, changes in standards as a result of Brexit and improvements identified both by us and our customers since April 2020.

A summary of the outcome of the consultation, the reasons for our ultimate decision and the way in which the Local Practice meets the principles of the Code can be found in Appendix B.

In addition to the general design principles and layout arrangements in the DCG, we have specific requirements for the following technical areas:

Contents

PART A – GENERAL

INTRODUCTION

From choosing the right Mechanical and Electrical (M&E) components to managing Health and Safety risks, designing pumping stations is a complex process.

With an ever-expanding asset portfolio of pumping stations for us to maintain, managing events in real-time is a continuous challenge. That's why we need to synergise planning and programming maintenance, keep up-to-date asset data on every piece of equipment, and maintain remote visibility of performance for when things break down.

We need a local practice for pumping stations to make sure newly adopted assets:

- are built to appropriate industry standards.
- will fit as seamlessly as possible into our maintenance plans.
- can help us to plan and safely manage events or system failures.
- limit the potential impact of sewage flows arriving at a faulty pumping station, which can result in flooding and pollution incidents.

Please read this document alongside the Design and Construction Guidance (DCG) published by WaterUK as part of Ofwat's Sewerage Code for Adoptions.

A2 APPLICATION

11. To help us process your application for the adoption of a new pumping station, we've created a minimum information list within the application form. This includes all the documents you need to send for us to accurately assess your proposed design. If you don't include this information within your submission, it could delay or hinder your application.

A8 DRAINAGE OF STREETS

5. Highway run-off should not be pumped through the adoptable pumping station wherever possible.

PART B – DESIGN AND CONSTRUCTION OF NEW FOUL SEWERS AND LATERAL DRAINS

B2 SEPARATE SYSTEMS

4. Combined Sewage Pumping Stations will not be considered for adoption.

PART D – PUMPING STATIONS

D1 INTRODUCTION

4. We've set out the design guidance below. This is to substitute or add to the section 'Type D Pumping Stations' within the DCG, and we've added the relative clauses for clarity. Please read these alongside the DCG.

D3 DEFINITIONS

3. Type 4 – Contact the Adoptions team as early as possible to discuss requirements above and beyond the scope of this document.

D4 GENERAL

4. If you're planning a new pumping station that will connect to the network within 100m of our existing sewage treatment works, our day-to-day operations may be affected. We'll need to assess this carefully and consider alternative discharge points.

5. If you propose to use a shared compound for foul and surface water pumping stations, the finish floor level of the surface water side of the compound should be at least 100mm higher than the finish floor levels on the foul side of the compound (see D5.3.13). Each side should be separated by the parking bay.

D5 PROVISION OF PUMPING STATIONS

D5.1 Location

1. Table D1 Minimum distances from habitable buildings Measure the distance from the nearest part of a habitable building to the nearest point of the pumping station compound boundary/fence.

Pumping station type	Minimum distance
Type 1	10m
Type 2	15m
Type 3	20m
Type 4	20m

5. The proposed pumping station should be located where the aesthetic appearance is not unpleasant for future residents.

D5.2 Site Access

2.a. If the only access to the station is via a privately-owned road, track, or access route, you'll need to provide us a legal Right of Way. This confirms that:

- our access won't be hindered in any way at any time.
- the owner must maintain the access route at their expense for as long as the station is operational.
- we won't be charged any fees for accessing or maintaining this road.

3. For Type 1 and Type 2 pumping stations, make provisions to allow access for an 18,000L tanker.

4. For Type 3 pumping stations, make provisions to allow access for a tanker with sufficient capacity to completely empty the wet well (including any provision for storage above the stop levels) and any resulting upstream in-sewer storage, up to a maximum of 22,000 litres.

7. We won't consider tanker access if it needs to cross a bridge that isn't part of the public highway or owned by the Highway Authority.

8. Access is required 24 hours a day, 365 days a year. The right to remove trees and other obstructions will be clearly set out in the easement. The owner should always approach us early in the adoptions process if they need an easement over private land.

9. Our maintenance vehicles and road tankers must not need special permissions, permits, temporary signals or prior parking restrictions to access the land. They also won't be able to give any notice to landowners.

10. You'll need to provide appropriate visibility splays at junctions/bends for safe access and have a seasonal maintenance regime as appropriate to control the vegetation growing.

11. Ensure that the parking spaces don't straddle and/or restrict any public or private right of way. Design these appropriately so that there's access to the relevant areas at all times.

12. Make sure parking for a second operational vehicle is available within or immediately adjacent to the pumping station compound without the need for traffic management or parking bay suspensions.

13. Design site access from the nearest public highway in accordance with HSG136. Avoid the need for reversing and make sure to follow these guidelines:

a. Vehicles should be able to enter the site facing forward, navigate the site by means of a designated one-way 'traffic route', and leave the site facing forward. If this isn't possible…
b. Vehicles should be able to enter the site facing forward, navigate the site by means of a designated 'traffic route', and turn at either a 'banjo' or 'hammerhead' designed for vehicle manoeuvring. If this isn't possible…
c. Vehicles should be able to enter and exit the site via different gates to remove the need for turning on-site.

In some situations, vehicles may be able reverse into the compound without special traffic management requirements or a banksman and then drive forwards out of the compound. We'll consider this option on a case-by-case basis.

D5.3 Site Layout

5. All Type 2 and 3 pumping stations should have 1.8m high steel palisade fencing and gates, painted green. Fencing must prevent unauthorised access to the works. If there's evidence to suggest it's not effective during construction and/or the maintenance period, you'll need to upgrade it. The designer of the works should assess the risks and suggest the appropriate security equipment. If you're planning to erect new fencing or brick walls, you'll need to consider the location, exposure, ground conditions, and site history for each site.

In high-risk areas, you may need to use higher security-graded fencing, such as galvanized steel welded mesh. If planning or heritage authorities demand it, you can use any durable and effective material to prevent access, such as local stone walls, clay bricks, flint etc.

Please keep fencing free of vegetation and debris.

14.1 M150 penstocks that comply with WIMES 8.10 should be used. These should preferably be on seating and located on the outgoing pipe in the inlet manhole.

17. Any equipment you're storing on site must be tamperproof. This means you'll need tools or keys to open or uncover equipment that could be dangerous to trespassers.

18. Please don't build access chambers to wet wells and valves in highways or trafficked areas, as they may be repeatedly driven or parked on. They should always be located in areas away from traffic.

19. Use galvanised steel covers designed for a minimum uniformly distributed load of 5kN/m2 for both the wet well and valve chamber. The covers should be hinged and capable of being locked in the closed position to prevent unauthorised access.

If covers do not hinge through 180°, you should be able to secure them in an open position to form a partial barrier around the opening.

All electrical, valve chamber, monitoring and wet well covers must be flush-fit, hot-dipped, galvanised and manufactured to LPS 1175: Security Rating 3 at a minimum. Please fit safety stays to prevent falls as well as hidden hinges and turn-catch locks with hidden padlocks to prevent intruders.

20. Where concrete bollards are required to prevent impact, they should be a minimum of 900mm high and securely installed into the ground with a concrete footing.

21. For bollards to provide security and/or to prevent irresponsible parking, any removable/lockable bollards which accept our padlocks will be accepted.

D5.4 Kiosk Positioning

3. All pumping station **kiosks** must also have intruder alarms. When kiosks are located within the public domain (e.g., in unfenced pumping station compounds), please discuss this with us. We may need you to fit additional vandal-proofing/anti-theft devices such as audible alarms or visible signals.

4. If a kiosk needs an increased security level, it must meet the requirements of LPCB 1175 SR 1, 2, 3, 4, 5 etc. LPCB standards are listed within the relevant elements of the Red Book.

D5.5 Storage

2. The plan area of the wet well below the level of the high-level alarm float switch level should not be increased to form any of this required storage provision. Such storage may be provided in:

c. specifically designed adjacent storage structures, which must be easily ventilated and self-cleansing.

D5.7 Pumping Station Design

2. Buoyancy calculations should be provided for the wet-well, emergency storage and chambers with the groundwater assumed to be at cover level with a factor of safety of 1.1.

D6 RISING MAINS

D6.1 Layout and Marking

9. Where the rising main on any pumping station serves one property curtilage and part of the rising main is a lateral drain, a valve chamber should be provided on the boundary to allow the flow to be shut off and diverted to a take-off point with a Bauer coupling with a diameter of 100 mm. Agreement to adopt the rising main is subject to the design complying with the rising main sizes, velocity and retention times specified elsewhere in the document.

10. Where a rising main serves more than one curtilage, and is therefore deemed a sewer, the pumping station and rising main should be offered for adoption together.

11. Suitable parking should be provided for a tanker near the valve chamber (see D6.1.9).

12. The rising main should not be located beneath the tanker parking area.

D6.2 Reliability

1. The minimum rising main size of 80mm bore stated in D6.2 (1) is limited to locations where all the following conditions apply:

- The station serves a catchment where both foul and surface water public sewerage will exist, serving all the properties contributing to the pumping station (these catchments have a low risk of becoming combined sewers due to unpredicted surface water connections)
- The upstream catchment is topographically limited, reducing the feasibility for further development (this prevents the risk of reasonably foreseeable growth overwhelming the pumping station)
- There are no other pumping stations feeding or planned to feed into the catchment of the pumping station (so they won't pump more into the rising main than can practicably be conveyed out)
- The main is reasonably straight between potential access points (so a CCTV camera can pass along it)
- The access points (hatch boxes, air valves, washouts and ends) are no more than 100m apart (so the camera has traction or can be pushed on rods)

2. We won't adopt pumping stations that use macerator pumps.

D6.3 Hydraulic Design

3. A suitable space should be left in the compound for a chemical dosing unit and the unit should be removed before adoption. I.e., when dosing is needed due to the inflow being too low during the construction/maintenance period. Before the maximum retention time can be achieved, six hours, the developer must ensure that H_2S is not present in the system.

D6.5 Materials of Rising Mains

1. Polyethylene PE100 SDR11 is our preferred rising material and class. If you are unable to use this, then the recommendations of B8 should be met and justification provided for deviating from PE100 SDR11.

D7 DESIGN OF PUMPING STATIONS

D7.2 Hazardous Areas

3. A specific risk assessment should be undertaken for each pumping station as part of the design phase to identify and limit potential risks through the production of a hazardous area classification document/table identifying the potential risks and hazardous area plans showing the predicted zoning for the atmospheres present in the design including any linked atmospheres, e.g., those linked via ducting or drains.

To verify the zoning proposed in the risk assessment, a Verification Document (or Explosive Protection Document) should then be generated post-construction and pre-commissioning of the station to confirm that the installation has been checked and is compliant for use. This is needed to comply with CDM regulations and to verify the ATEX certificates for the items of equipment installed, i.e., to confirm that the item is in a verified zone to validate the certificate adhering to the ATEX directive.

A typical Verification Document/Explosive Protection Document would include the following;

1. Hazardous area classification document.
2. Hazardous area plan (in both plan and elevation) showing the zoning, gas group and temperature class.
3. An Intrinsically Safe Circuit design document (called the Descriptive Systems Document).
4. The ATEX equipment register (a list of the equipment which is explosion protected).
5. The Initial Inspections.
6. Electrical test documentation.
7. ATEX equipment certificate of conformity for each equipment on the ATEX equipment register.
8. A verification statement to stay the installation has been checked and is compliant for use.

We would want to see the DSEAR risk assessment as part of the design submission for the station and the Verification Document/Explosive Protection Document would need to be included in the O&M manuals before we would be able to adopt the station.

D7.5 Valve Chamber

The valve chamber is to be fitted with a 80mm drain back into the wet well with a gate valve. A flap valve is also required on the wet well side of the drain back to prevent flows from the wet well entering the valve chamber in the event the gate valve is left open.

D7.6 Flow Metering

1. Flow meters are not limited to Type 3 pumping stations only and are required on all pumping stations being offered for adoption. Please install a full-bore electromagnetic flow meter so that rising main flows can be measured easily. This must be located on the rising main and not on each pump set.

The flow meter must be suitable for the environment you're installing it in, and therefore must be suitably rated. Please panel-mount the meter transmitter with local display or within the kiosk.

3. Please provide a 25mm tapped boss, plugged, on the crown of the riser pipe of each pump in the valve chamber. This should sit upstream of the isolation valve of each pump riser so that pressure monitoring equipment can be installed in the future.

D7.7 Access into Wet Well, Valve Chambers and Flowmeter Chambers

4. Vent pipes should open at the "high point(s)" of the wet well. Bends in vent pipes should be large radius; elbow bends should not be used. Vent pipes should be installed in such a way to avoid them becoming ineffective due to trapped water (rain, condensation, etc.) and the outlet of the vent stack should be fitted with a grille and a mushroom shield. The external shape and colour of the vent stack should comply with local planning requirements and conform to architectural features of similar local installations.

We recommend you use an air vent, such as a low-level vent with an ironwork grated cowl and an internal carbon filter, to prevent vermin, debris build-up, blockages and accidental damage.

D7.8 Cable Ducts

2. Cables to and from kiosks and equipment should pass through a vented cable draw pit which is to be located away from any moving vehicles. This pit must have a drain down pipe to the wet well.

D7.9 Davit Sockets

2. We've standardised and load-tested our preference is a Reid ADV500 davit for lifting up to 350kg at a 800-1300mm radius, with one or two sockets as appropriate, 65mm diameter and 240mm deep. The sockets will be cast in, bolted, or otherwise securely fixed. The davit must be cast flush into the cover slab. For lifting over 350kg, please provide a fixed gantry – if this creates planning issues, we may consider a portable gantry stored on site. For depths greater than five metres (cover to sump) or weights over 0.5 tonnes, you will need to provide a power lifting system.

You'll need proof load test certificates for all lifting types, including a site test for sockets. All davits or jibs must be labelled with their certified safe working loads.

You will need to provide a jib with separate attachments for the hoist as well as holding chain and hook arrangement. This should help you to lift pumps that have intermediate or snatch and grab rings.

Please make sure the standard of design is safe for the operator, meaning no sharp edges, slots, gaps, holes, or any other configuration that could injure them.

We recommend you manufacture a design from a continuous shaft or pipe that gives a smooth, clean, and professional appearance.

Use stainless steel anchors to secure the davit sockets and a sealant to prevent water from entering the gap between anchor and socket, which could freeze in cold temperatures and damage the sockets.

Design overhead runway beams and gantries to the relevant standards: BS 2853, BS 449, ISO 4301/1 (BS 2573), and ISO 4301/1 (BS 466).

All equipment should be rated to support 1.5 times the weight of the load it will handle. Lifting gantries should be supported with correctly designed gantry bases and not by the walls of any building structure.

Use effective end stops on the runway to prevent the trolley falling from the beam or damaging the structure of the building. These shouldn't operate on the flanges of the trolley wheels.

Don't forget to clearly mark all individual items with their respective safe working loads. You'll also need test certificates for the structure, hoist block and trolley.

Adequate storage needs to be provided for the jib and penstock key in a suitable location away from electrical equipment. We would suggest a compartment on the side of the kiosk suitably sized for all equipment requiring storage.

D7.10 Kiosk

17. Cabinets and kiosks are often exposed to extreme weather conditions in a damp and corrosive environment. They must be able to withstand these conditions for at least 20 years and incorporate UV inhibition during the manufacturing process.

18. Cabinets and kiosks must provide a dry, temperate, clean, and dust-free environment to store equipment. Please design them to be:

- Weather-proof.
- Corrosion-proof.
- Vandal-proof.
- Vermin-proof.
- Maintenance-free.
- Fire-resistant.
- Thermally insulated to minimise solar heat gain.
- Cooling to accommodate solar gain and power losses from internal electrical apparatus.

19. Doors should open outwards using a mechanism designed to withstand high wind speeds. Please construct them out of the same material as the enclosure and fit them with vandal-proof and self-latching stays to keep the doors fully open. Protect gaps around and between doors internally while leaving enough space to close the doors easily.

20. All doors should be dust and weather-proof to meet IP 54 with a half-hour fire resistance to meet BS476 Part 22. Double doors must not have a central pillar.

21. As specified on the DATASHEET, cabinets need to open with a single or double door that locks with a cylinder night latch. The three-point locking system should use triangular locks at the top and bottom and either a central cylinder lock or a hasp and staple with a suitable padlock.

22. Please let us know if you're building in an area with a high risk of vandalism so that we can tailor our security advice to you.

D7.11 Kiosk Construction

16. The following notices/information plates should, as a minimum, be fitted to the kiosk:

a. A notice for resuscitation is not required.

g. An "EX" sign in durable plastic and having dimensions of not less than 200mm by 150mm mounted on the inside of the kiosk door.

h. A hardwood board mounted on the inside of one door covering at least 80% of the door area for mounting of future Thames Water notices.

D7.12 Kiosk Mounting Arrangements

2. Please incorporate a back-to-front cross fall of 1:250 on your plinth to prevent ponding.

PART F – MECHANICAL AND ELECTRICAL SPECIFICATION FOR SMALL PUMPING STATIONS

F1 GENERAL

F1.1 Hazardous Area Appliances

4. For any equipment installed in or associated with a hazardous area, please include ATEX/UKEX certification in the O&M manual.

F1.2 Operation and Maintenance Documentation

2. Please provide three hard copies and one electronic copy of your O&M manual within your handover pack. The full list required in the handover pack can be found in Appendix A.

F2 PUMP UNIT SPECIFICATION

F2.2 Performance Requirements and Information

5. The pumps shall be capable of operation at snore level every 6 to 8 hours for at least 30 seconds without damage.

F2.3 Design Requirements

F2.3.10 Motors

F2.3.10.5 Enclosure and cooling

3. Where the motor is to be driven by a variable speed drive, it shall be de-rated so that its temperature rise is within Class B limits at its lowest operating speed corresponding to minimum flow rate. It shall not exceed Class B temperature limits when operated at any speed in a dry well or when partially submerged configuration. Where the motor is installed within the zoned area, the variable speed drive shall be type tested with the motor such that the maximum temperature rating of the motor cannot be exceeded.

F2.3.11 Information plate

3. Please mark pump unit equipment with the relevant ATEX/UKEX certification.

F2.3.14.3 Lifting chains

9. Blue ropes are required for lifting the pumps, chains are not accepted where a davit arm is being used.

F3 ELECTRICAL SPECIFICATION (and telemetry requirements)

F3.2.1 Introduction

1.1 If you're proposing soft start or variable speed drive units, please provide evidence to justify their selection before you install them. This should include your technical solution to limit the harmonics and satisfy G5/5 requirements.

1.2 We can only approve soft stop systems if you've justified why you need them and why you've chosen them before you start installing them. You will need to take into account the potential additional demand on the electricity supply.

F3.2.2.3 Safety signs

2.e. The sign should state "Contains intrinsically safe equipment".

3. All safety signs shall be rigid plastic. Self-adhesive vinyl will not be acceptable.

F3.3.3 Assembly construction

F3.3.3.3 Installation and layout of components

3. Please consider the need for circuit segregation when laying out intrinsically safe barriers with outgoing cables/wiring, complying with BS EN 60079-14.

F3.3.3.4 Doors

3. Each door should have at least one lockable handle. All assembly/panel locks should open with the same key.

5. A set of the panel keys must be left on site within the secured kiosk.

F3.3.5.4.2 Layout and identification of terminals

3. Instead of stud type terminals, please mount terminal blocks on a back rail and locate these in the cubicle/compartment relating to the equipment (e.g., pump 1 terminals should be inside the Form 4 compartment for a pump 1 starter). We can't approve common terminal cubicles.

F3.3.6 Indicator lamps, push-buttons and selector switches

4. Please use coloured push buttons as follows:

- RESET – Blue
- OPEN or STOP or EMERGENCY STOP – Red
- CLOSE or START – Green
- ALARM ACCEPT – Yellow
- OTHERS – Blue

Use indicators suitable for 110V supply and incorporate high-intensity LEDs for an extended lamp life. These should have a front removable lamp with a degree of protection to IP2X as well as coloured lenses.

- AVAILABLE – White
- TRIPPED – Yellow
- SUPPLY ON or CLOSED or RUNNING – White
- SUPPLY OFF or Opened or STOPPED – Green
- DANGER – Red
- OTHER - Blue

F3.3.8 Abnormal operation

F3.3.8.1 Failure of the pumping station power supply

3. To stagger pump restart, you must use hard-wired timers in each pump cubicle (if required).

F3.3.8.4 Back-up control mode

7. The backup control shall operate completely independent of the ULC pump control and shall not, where practical, inhibit the ULC control. The backup control shall be initiated by a backup control float switch and shall run a set number of pumps (at a set speed if variable speed) for an adjustable time after the backup control float switch has returned to normal. The pumps to be run shall be rotated every time the backup control is initiated. If a pump is unavailable or has failed, then another pump (if available) shall be called to run in its place. If the level reaches the back-up control high level again, the back-up control shall be instigated again.

F3.3.8.5 High wet well level

2. In hazardous areas, please use a zener type intrinsically safe barrier that can trigger the high wet well level circuit's alarm even with the power off. During normal operation, the high float should use the normally closed contact of the float with an open circuit state to trigger the alarm.

F3.3.9 Telemetry signals

8. We will require live signals for performance monitoring for a minimum of six months prior to vesting/handover. During the monitoring period, the developer will need to routinely check the station and provide a report of the performance.

F3.3.10 Ultrasonic level controller (ULC) specification

F3.3.10.1 Normal operation

5. The display for the ULC should be visible on the outside of the electrical panel. You shouldn't need access to the inside of any electrical panel or cubicle to view it.

F3.3.11 Functional units – Form 4 assemblies

F3.3.11.2 Incomer Compartment

2. The incomer compartment shall, as a minimum, accommodate the following equipment and facilities:

a. Disconnection of the earthing conductor is not required.

e. Standardised generator socket with earth rod installed – can recommend manufacturer upon request.

F3.3.11.4 Motor starter compartments

4. Please use remote reset type overloads.

F3.3.11.5 Common control compartment

2. For intrinsically safe circuits, please use a zener barrier for the high float and a galvanic-type barrier for the back-up control float circuit.

F3.3.11.6 Cable marshalling compartment cable-way

4. Make sure to segregate IS and non-IS circuits to comply with BS EN 60079-11 and 14. Alternatively, IS circuits can exit the electrical assembly at a different point to maintain segregation.

F3.3.12 Functional units – Form 2 assemblies

F3.3.12.6 Common control compartment

2. Please use an intrinsically safe zener barrier for the high float and a galvanic-type intrinsically safe barrier for the back-up control float circuit. The Zener barrier earth is to be connected to the MET via two independent earth wires for maintenance purposes.

6. Make sure to segregate intrinsically safe and non-intrinsically safe circuits to comply with BS EN 60079-14.

F3.4.1.5 Junction boxes

7. Please design these carefully to make sure you've segregated intrinsically safe and non-intrinsically safe circuits to meet BS EN 60079-14.

F3.4.4 Installation of cables

13. Please seal ducts at the kiosk end and not in the wet well. Use a gas-tight certified sealant system such as RISE or FILOFOAM.

16. Please make sure cable pits meet WIMES standards. They should be located at least 2m away from wet wells and open away from well chambers. Install cable support socks on adoptable pump stations and hang pump cables from the same hook as the pump lift chain. Make sure cable ties are made from plastic-coated metal.

17. Dual ducting is required as a minimum for cable segregation.

18. The ultrasonic level sensor and float cables can only share a duct if:

- the ultrasonic level sensor is of an intrinsically safe type.
- all cables in the duct are intrinsically safe circuits. If you're using a non-IS ultrasonic level sensor, the ultrasonic cable should run in a separate duct.

19. Any support for level floats should be by a proprietary bracket accessible from ground level outside of the wet well. The position of this bracket shall not compromise the removal of the pumps from the wet well.

20. As far as reasonably practical, cable ducts should align with the cable entry on the panel to minimise cable crossing and enable circuit segregation to be achieved.

21. Cable duct position must take into consideration the ease of pulling cabling through the ducting on removal of a pump, ultrasonic head, or level float.

F3.4.6 Earthing and bonding

F3.4.6.1 General

5. A changeover contactor is not required to switch the earth connection. Connect the generator socket earth pin and the local earth electrode(s) to the panel's Main Earth Terminal (MET). Provide an earth link to disconnect the panel's main earth from the DNO's main earth terminal. Make sure all terminals, links and cabling are adequately sized and rated to withstand the short circuit current. You must also properly and securely mount and protect them.

F3.4.6.2.2 Earth electrode

8. To meet the requirements of BS EN 7671, your earth electrode should achieve the necessary earth resistance needed to comply with the required protection disconnection times.

F3.5 Instrumentation

F3.5.2 Installation of instrumentation

5. All instrumentation must be accessible from outside of the wet well without a tool and with any fall restraint system in place. Covers should be open and man trap/safety grids in place with instruments positioned to be accessible from ground level.

F3.6 Telemetry Outstation

2. The telemetry outstation shall comply with the following requirements:

a. The telemetry outstation shall communicate with Thames Water's Regional SCADA over dual telecoms, as a minimum VDSL or SOGEA with 4G backup.
b. The telemetry outstation shall communicate with Thames Water's Regional SCADA using WITS DNP3 protocol. The outstation shall as a minimum be WITS 'self-certified' compliant with WITS-DNP3 version 1.3. and capable of being upgraded to WITS DNP3 version 3.0 without the need to replace any hardware.
c. The telemetry outstation shall have available a tested, proven standard configuration template to simplify and standardise the configuration of the outstation.
d. The telemetry outstation shall be provided with configuration and diagnostic software, along with comprehensive documentation to enable the future modification and repair of the outstation.
e. The telemetry outstation shall have available a tested, proven standard ClearSCADA template to simplify and standardise the configuration of Thames Water's Regional SCADA.
f. The telemetry outstation modems and dual telecoms shall be tested and proven to communicate with Thames Water's Regional SCADA and seamlessly integrate with Thames Water's Operational Technology systems and estate. The telemetry outstation modems shall have available a tested, proven standard configuration template to simplify and standardise the configuration of the outstation.

On request Thames Water can provide a list of telemetry outstations, modems and dual telecoms which are known to satisfy the above requirements. However, we are unable to make recommendations and the list is in no way an endorsement of the products or manufacturer.

3. The developer is responsible for keeping up to date with current firmware and software requirements until vested.

If your site only has a fibreoptic network, please contact us at an early stage so we can advise on how best to connect the telemetry.

Appendix A

HANDOVER PACK (Electronic):

- O&M Manual.
- As-built drawings.
- CDM H&S File including the principal designer's risk register.
- NICEIC Certificate (BS 7671 - Electrical Installation Certificate).
- Initial Inspection (BS EN 60079-14).
- ATEX/UKEX Certificate of Conformity for all mechanical, electrical, instrumentation and control equipment.
- Descriptive Systems Documents (DSD) for Intrinsically Safe Circuits including loop drawings.
- LOLER Certificates (Manufacturers / Suppliers Declaration of Conformity, Proof Load Certificate and all subsequent periodic examinations).
- Rising Main Pressure Test Certificate.
- Telemetry Configuration Certificate.
- DSEAR Explosion Protection Document.
- Equipment Collection Sheet (if not provided upon request pre-maintenance period).
- Final electricity bill.
- Final telecoms bill.

Appendix B

SUMMARY OF THE OUTCOME OF THE CONSULTATION

This section sets out the summary of responses received in respect of the consultation.

The general tone of the consultation was constructive and helpful with respondents making detailed comments on various parts of the local practices, challenging, and stating why they were unable to achieve some requirements and proposing alterations/amendments.

Following the consultation, we reviewed our requirements under the local practices and made concessions and amendments where possible.

The main clauses that received comments, challenges and responses from the consultees are summarised in the table below together with our responses/justification.

Local Practice clause	Stakeholder comments/objections	Thames Water Responses
D5.1: Location	The additional 5m offset requirement measured from the nearest part of a habitable building to the nearest part of the pumping station compound renders a significant portion around the pumping station unusable.	Thames Water receives a considerable number of odour and noise complaints (resulting from snore cycle of pumps, tankers, and maintenance vehicles etc) from residents of properties within 20m of pumping stations. Larger offsets are therefore required to prevent/reduce the impacts of the odour and noise on residents.
D5.2.3: Site access	What is the minimum area that must be kept clear on Type 1 and 2 pumping stations for offloading and temporarily storing a mobile generator	For Type 1 and Type 2 pumping stations, make provisions to allow access for an 18,000L tanker which can be used for offloading mobile generator. We require a minimum 2.5m L x 1.5m W close to the kiosk for temporarily storing a generator. Local practice updated accordingly.
D5.2.4: Dimensions for a 18000l tanker are approximately 11.6m L x 2.8m W x 3.8m H.	The dimensions of a 18000l tanker vary depending on the vehicle manufacturer. The specified dimensions within the local practice is larger than most tankers.	The average dimension of the 18000l tanker is 9.54m L x 2.56m W x 3.5m H. The local practice has been amended accordingly.
D5.4.3: Intruder alarms on pumping station pumps	Do the kiosk alarms need to be linked to our SCADA systems or are these localised alarms that sound out when there is an intruder	Intruder alarms should be configured with telemetry so we receive the alert via our SCADA systems and take the necessary actions in good time.

D6.1.11: Rising main under tanker parking area.	Requirement is excessive and is common practice for rising main to be routed within tanker parking area.	We would not like the rising main to be located under the tanker hardstanding as any repair work needed to it at that location would prevent a tanker from parking adjacent to the wet well to tanker away flows during the repair work.
D7.2: Hazardous areas and DSEAR requirement	Default zones should be set for pumping stations	All pumping station designs are different, so we are unable to set default zoning. D7.2 has been updated.
D7.6: Flow metering and Pressure Monitoring	Historically pressure monitors have been fitted should be fitted downstream of the flap on the non-return valves and not upstream of the isolation valve.	Installing the pressure monitoring upstream of the isolation valve of each pump riser provides more accurate pressure readings. When the non-return valves are slightly blocked, the pressure readings are affected if the pressure monitoring is fitted downstream of the flap on the non-return valves.
D7.9: Davit Sockets	Are dedicated davit arms required for each site?	Davit arms should be supplied for all sites
F2.3.14.3: Lifting chains	Clarification required on when to use lifting chains or blue ropes.	Blue ropes are required for lifting the pumps. Chains are not accepted where a davit arm is used. Local practice updated to provide consistency.
F3.6: Telemetry Outstation	The type of Telemetry outstation seems to change regularly. Please indicate the current preference	Due to frequent changes and advancements in communication technology and competition laws, we cannot state a preference of the outstation. We can only state that the proposed outstation adheres to the standards as per clause F3.6 of the local practice.


Thames
Water