Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 18.4: Preliminary Odour Management Plan

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Abbreviations

ASP	Activated Sludge Plant
AWS	Anglian Water Services
BAT	Best Available Technique
CAP	Compliance Action Plan
CWWTPR	Cambridge Waste Water Treatment Plant Relocation
DCO	Development Consent Order
Defra	Department for Environment Food and Rural Affairs
EA	Environment Agency
EU	European Union
FBDA	Fine Bubble Diffused Aeration
FFT	Flow to Full Treatment
FST	Final Settlement Tank
HpH	Heating pasteurisation and Hydrolysis
IAQM	Institute of Air Quality Management
MABR	Membrane Aerated Biological Reactor
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PST	Primary Settlement Tank
RAS	Return Activated Sludge
SAS	Surplus Activated Sludge
STC	Sludge Treatment Centre
tDS	tonnes Dry Solids
TPS	Terminal Pumping Station
WRC	Water Recycling Centre
WWTP	Waste Water Treatment Plant

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Summary

This is a preliminary Odour Management Plan (OMP) for the proposed Cambridge Waste Water Treatment Plant (WWTP). This revision is prepared to accompany the Development Consent Order (DCO) submission. It sets out the framework and principles that will be developed further during the life of the project from detailed design to the proposed assets going into full operation, in compliance with the relevant Environmental Permit for the proposed WWTP. This may include separate discrete OMPs for specific areas of the proposed WWTW which may sit outside the Environmental Permit.

The figure below provides an illustration of the proposed WTWW, which will receive flows from the Cambridge catchment and the Waterbeach transfer pipeline. Flows will reach the proposed WWTP through a 2.4m diameter trunk sewer. The flows will then be treated on site before being discharged to the River Cam in compliance with the limits set within the Water Discharge Activity Environmental Permit. The proposed WWTW is designed to fully treat final effluent flow of up to 2000 litres per second (l/s), and up to an additional 5000 l/s of storm flow. The proposed WWTW also imports sludge from Wastewater Recycling Centres (WRCs) in the region for treatment on the site.

The transfer tunnel provides part of the storm storage capacity. Under various operational scenarios, the air displaced from the tunnel through vents needs to be managed. These scenarios include emptying, filling, storing and pumping of waste water.

The OMP provides an overview of the works and further describes how odour will be managed on the proposed WWTW, in the tunnel and in response to non-normal conditions. The OMP describes the extraction of odorous air and subsequent treatment by the odour control units (OCUs) as required. The OCUs are operated to control and treat air before discharge.

The activities within the proposed WWTP covered by this plan are

- transfer tunnel and Terminal Pumping Station;
- inlet works;
- primary treatment;
- secondary treatment;
- tertiary treatment;
- sludge storage and treatment;
- mesophilic anaerobic digesters;
- digested sludge storage and treatment;
- biomethane storage and utilisation; and
- liquor treatment.

Potential odour sources from these activities are identified and control measures are outlined. The procedure and control measures are described to prevent and minimise the odour release and impact on receptors.

The OMP is a live document which will be revised throughout the design, construction and operational phases of the proposed WWTP. It is be reviewed and audited regularly as part of the wider business audit programme.

1 Introduction

1.1 Anglian Water Services Limited

1.1.1 Anglian Water Services Limited (the 'Applicant') is the largest regulated water and water recycling company in England and Wales by geographic area, supplying water and water recycling services to almost seven million people in the East of England and Hartlepool.

1.1.2 The Applicant is committed to bringing environmental and social prosperity to the region they serve, through their commitment to Love Every Drop. As a purpose-led business, The Applicant seeks to contribute to the environmental and social wellbeing of the communities within which they operate. As one of the largest energy users in the East of England, they are also committed to reaching net zero carbon emissions by 2030.

1.2 Introduction to the relocation project

1.2.1 Anglian Water's Cambridge Waste Water Treatment Plant Relocation project (CWWTPRP) ("the Proposed Development") is funded by Homes England, the Government's housing accelerator which seeks to improve neighbourhoods and grow communities by releasing land for development.

1.2.2 The Proposed Development involves the relocation of the existing Cambridge Waste Water Treatment Plant (WWTP) currently operating at Cowley Road, Cambridge, to a new site between Horningsea, Fen Ditton and Stow cum Quy, adjacent to the A14 in Cambridgeshire.

1.2.3 The relocation would make the site of the existing WWTP available to form part of the development of a new low-carbon city district, known as North East Cambridge. The site at Cowley Road, is Cambridge's last major brownfield site, and the wider North East Cambridge district proposals envisage creating around 8,350 homes and 15,000 jobs over the next 20 years.

1.2.4 North East Cambridge is a highly sustainable location for housing. In addition to the Homes England funding, the area has benefitted from Transport Infrastructure Fund (TIF) funding for Park & Ride, the completion of Cambridge Guided Bus public transport infrastructure, the delivery of the Cambridge North rail station and the Chisholm Trail.

1.2.5 North East Cambridge is one of three key strategic sites which will form "*central building blocks of any future strategy for development*" in the proposed Greater Cambridge Local Plan being jointly prepared by Cambridge City Council and South Cambridgeshire District Council that will be subject to public consultation in Autumn

2023. The North East Cambridge Area Action Plan (AAP), currently in "Proposed Submission" form, will be the planning policy framework which ultimately guides the development of North East Cambridge city district.

1.2.6 The importance of the Proposed Development, both regionally and nationally, was recognised by the Secretary of State for Environment, Food and Rural Affairs (DEFRA) in January 2021, who directed that the Proposed Development is nationally significant and is to be treated as a development for which a Development Consent Order (DCO) is required (see Appendix 1-3 of the Planning Statement, App Doc Ref 7.5).

1.2.7 The policy context of the Proposed Development is described in more detail in the Planning Statement (Application Document Reference 7.5)

1.3 The relocation site

1.3.1 The relocation site was selected following comprehensive study and public consultation. The site selection process and consideration of alternatives is described in more detail in Chapter 3: Alternatives of the Environmental Statement (App Doc Ref 5.2.3).

1.3.2 The current environmental conditions at the existing Cambridge WWTP site and at the relocation site are described in Chapter 2: Project Description of the Environmental Statement (App Doc Ref 5.2.2). The site is located to the north-east of Cambridge and 2km to the east of the existing Cambridge WWTP, as shown on the Works Plans (App Doc Ref 4.3.1). It is situated on arable farmland immediately north of the A14 and east of the B1047 Horningsea Road in the green belt between the villages of Horningsea to the north, Stow cum Quy to the east and Fen Ditton to the south west. Two overhead lines of pylons cross the northern and eastern edges of the main development site and come together with a third line at the north eastern corner of the site. The topography is fairly flat with an approximately 4m fall across the site south west to north east.

1.4 Purpose of the Proposed Development

1.4.1 The Proposed Development for which the DCO is being sought will deliver all the functions of the existing Cambridge WWTP at Cowley Road, treating all waste water from the Cambridge catchment and wet sludge from the wider region.

1.4.2 In addition, it will have an increased capacity, being intended to treat the waste water from the Waterbeach catchment and anticipated housing growth in the combined Cambridge and Waterbeach catchment area.

1.4.3 The infrastructure provided as part of the main works will have a design life to at least 2090, and the supporting infrastructure (i.e. the transfer tunnel, pipelines and outfall) will have a designed capacity sufficient to meet population growth projections plus an allowance for climate change into the 2080s. Furthermore, there is capability for expansion in space that has been provided within the earth bank and by modification, enhancement and optimisation of the design to accommodate anticipated flows into the early 2100s.`

1.5 Outline description of the Proposed Development

1.5.1 The DCO application is seeking approval for the following main elements of the Proposed Development:

- an integrated waste water and sludge treatment plant.
- a shaft to intercept waste water at the existing Cambridge WWTP on Cowley Road and a tunnel/ pipeline to transfer it to the proposed WWTP and terminal pumping station. Temporary intermediate shafts to launch and recover the micro-tunnel boring machine.
- a gravity pipeline transferring treated waste water from the proposed WWTP to a discharge point on the River Cam and a pipeline for storm water overflows.
- a twin pipeline transferring waste water from Waterbeach to the existing Cambridge WWTP, with the option of a connection direct in to the proposed WWTP when the existing works is decommissioned.
- on-site buildings, including - a Gateway Building with incorporated Discovery Centre, substation building, workshop, vehicle parking including electrical vehicle charging points, fencing and lighting.
- environmental mitigation and enhancements including substantial biodiversity net gain, improved habitats for wildlife, extensive landscaping, a landscaped earth bank enclosing the proposed WWTP, climate resilient drainage system and improved recreational access and connectivity.
- renewable energy generation via anaerobic digestion which is part of the sludge treatment process that produces biogas designed to be able to feed directly into the local gas network to heat homes, or as an alternative potential future option burnt in combined heat and power engines.
- renewable energy generation via solar photovoltaic and associated battery energy storage system.
- other ancillary development such as internal site access, utilities, including gas, electricity and communications and connection to the site drainage system.
- a new vehicle access from Horningsea Road including for Heavy Goods Vehicles (HGV's) bringing sludge onto the site for treatment and other site traffic.
- Temporary construction works including compounds, temporary highway controls, accesses and signage, fencing and gates, security and safety measures, lighting, welfare facilities, communication control and telemetry infrastructure.

- Decommissioning works to the existing Cambridge WWTP to cease its existing operational function and to facilitate the surrender of its operational permits including removal of pumps, isolation of plant, electrical connections and pipework, filling and capping of pipework, cleaning of tanks, pipes, screens and other structures, plant and machinery, works to decommission the potable water supply and works to restrict access to walkways, plant and machinery.

1.5.2 Additional elements, together with more information on the above features are provided in Chapter 2: Project Description of the Environmental Statement (App Doc Ref 5.2.2). Principles of Good Design have been used to inform the development of the project, which has been guided by the National Infrastructure Commission's Design Principles, advice from the Design Council and review by the Cambridgeshire Quality Panel, as described in the Design and Access Statement (App Doc Ref 7.6).

1.5.3 Construction activities, likely to take 3-4 years, will include the creation of a shaft to intercept waste water at the existing Cambridge WWTP and temporary intermediate shafts between the existing Cambridge WWTP and the proposed WWTP to launch and recover a micro-tunnel boring machine. The sequence and location of construction activities are also detailed in Chapter 2: Project Description of the Environmental Statement (App Doc Ref 5.2.2).

1.5.4 Towards the end of the construction period, commissioning of the Proposed Development will commence, lasting for between 6 months and 1 year.

1.5.5 The Proposed Development will also involve the decommissioning of the existing Cambridge WWTP at Cowley Road. This is secured by the Development Consent Order and the Outline Decommissioning Plan (Appendix 2.3, App Doc Ref 5.4.2.3) and involves activities necessary to take the existing plant out of operational use and to surrender its current operational permits.

1.5.6 Following decommissioning, the site of the existing plant will be made available in accordance with agreements already in place with Homes England and with the master developer appointed to deliver the redevelopment of North East Cambridge

1.5.7 Consent is not sought under the Development Consent Order for the subsequent demolition or redevelopment of the Cowley Road site, which, as described in Chapter 2: Project Description of the Environmental Statement (App Doc Ref 5.2.2) will be consented under a separate and future planning permission, by master developers, U+I and TOWN, appointed under the agreements described above.

1.5.8 The relationship between the Proposed Development, the scope of the proposed DCO and the future demolition and redevelopment of the site at Cowley Road is set out in figure 1.1.

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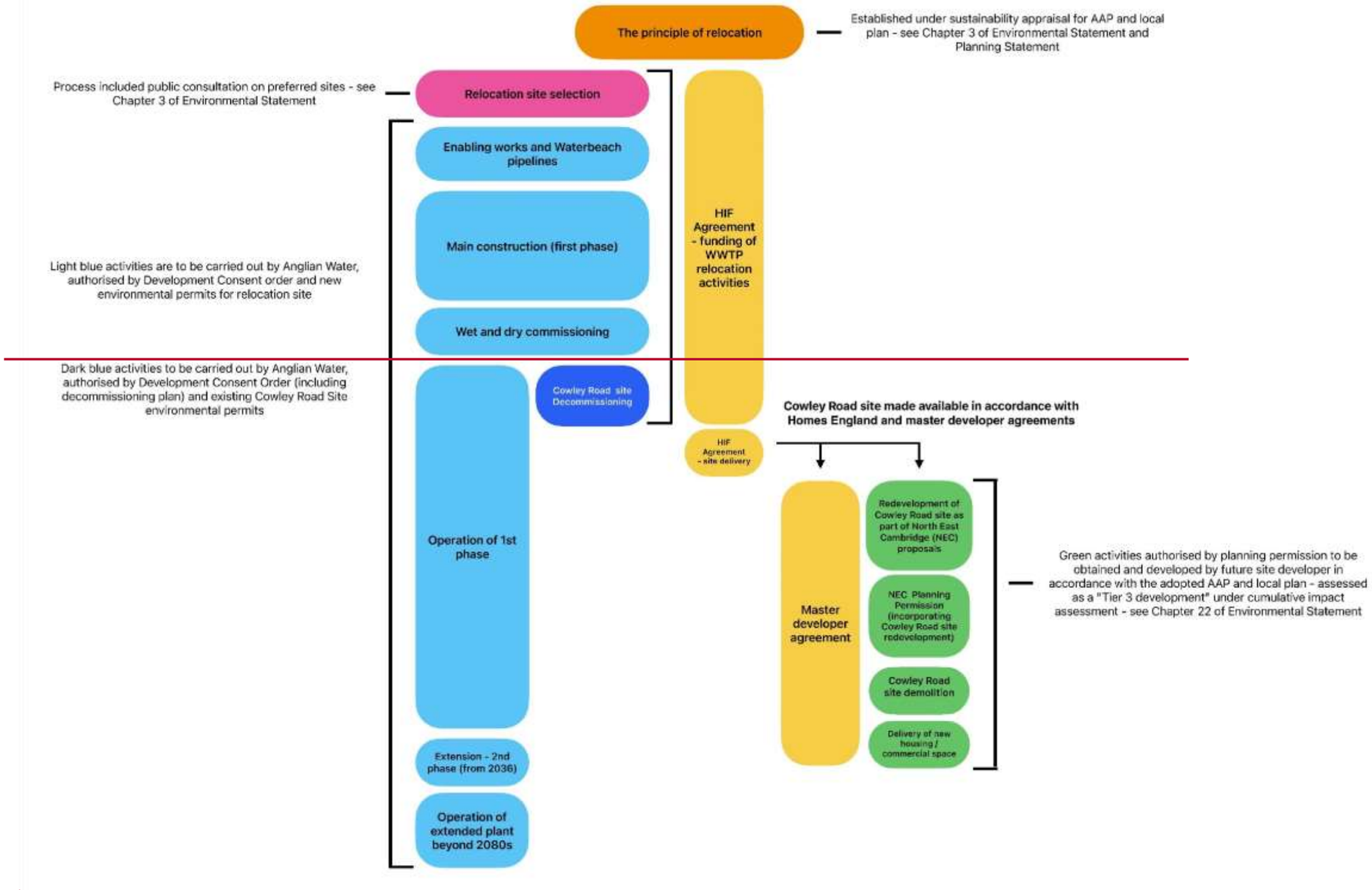
The principle of relocation
Established under sustainability appraisal for AAP and local plan - see Chapter 3 of Environmental Statement and Planning Statement
Process included public consultation on preferred sites - see Chapter 3 of Environmental Statement
Relocation site selection
Enabling works and Waterbeach pipelines
Main construction (first phase)
Wet and dry commissioning
Light blue activities are to be carried out by Anglian Water, authorised by Development Consent order and new environmental permits for relocation site
Dark blue activities to be carried out by Anglian Water, authorised by Development Consent Order (including decommissioning plan) and existing Cowley Road Site environmental permits
Cowley Road site Decommissioning
Operation of 1st phase
Extension - 2nd phase (from 2036)
Operation of extended plant beyond 2080s
HIF Agreement - funding of WWTP relocation activities
HIF Agreement - site delivery
Cowley Road site made available in accordance with Homes England and master developer agreements
Master developer agreement
Redevelopment of Cowley Road site as part of North East Cambridge (NEC) proposals
NEC Planning Permission (incorporating Cowley Road site redevelopment)
Cowley Road site demolition
Delivery of new housing / commercial space
Green activities authorised by planning permission to be obtained and developed by future site developer in accordance with the adopted AAP and local plan - assessed as a "Tier 3 development" under cumulative impact assessment - see Chapter 22 of Environmental Statement

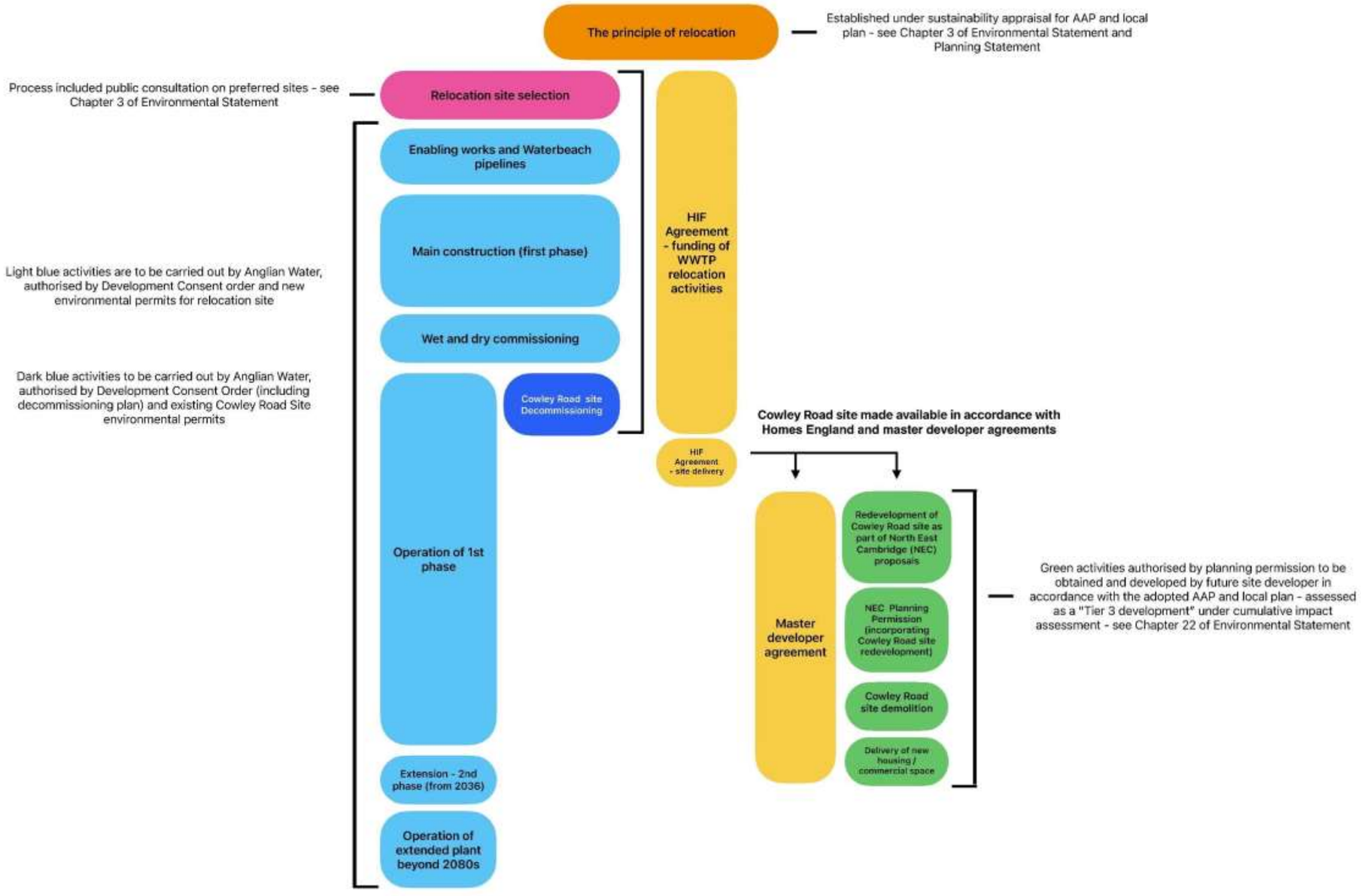

Figure 1.1: the scope of the proposed DCO and the future demolition and redevelopment of the site at Cowley Road

1.6 Environmental mitigation

1.6.1 Through the environmental impact assessment process and community and technical stakeholder engagement the Proposed Development has incorporated comprehensive environmental mitigation, secured through the Development Consent Order.

1.6.2 This mitigation includes a Landscape, Ecological and Recreational Management Plan ("LERMP", Appendix 8.14, App Doc Ref 5.4.8.14) has been developed to complement regional and local initiatives, including the Wicken Fen Vision and the Cambridge Nature Network. The 22-hectare footprint of the plant is encircled by a landscaped and planted earth bank situated within the broader LERMP area of around 70hectares,

1.7 Additional project benefits

1.7.1 In addition to enabling housing growth and future economic development of the Greater Cambridge area the project will also give rise to a number of additional benefits including:

- significantly reduced carbon emissions compared to the existing Cambridge WWTP, being operationally net zero and energy neutral, contributing to Anglian Water's ambition of being operationally net zero as a business by 2030.
- greater resilience and improved storm management, meaning storm overflows and Combined Sewer Overflows (CSOs) are far less likely to occur. This means that, as Greater Cambridge continues to grow, the facility will be able to treat a greater volume of storm flows to a higher standard than would be the case at today's facility.
- The proposed WWTP is being designed to reduce concentration in final treated effluent discharges of phosphorus, ammonia, total suspended solids and biological oxygen demand (BOD), compared to the existing Cambridge WWTP. This means that when the new facility starts to operate, water quality in the River Cam will improve.

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2 Odour Management

2.1 Introduction

2.1.1 The information contained in this document will support the DCO application by demonstrating how the Applicant will continue to actively manage odour at the CWWTPR through operation, maintenance and the management of ancillary activities (e.g., sludge transport) and abnormal operations (e.g. major plant failure) in line with the Odour Management Plan (OMP) for the proposed waste water treatment plant (WWTP). This document should be read in conjunction with DCO application as document reference 5.2.18 Chapter 18 'Odour', which assesses whether the proposed WWTP supports the Applicant's approach to maintain 'negligible' odour impact through effective active management of operation, maintenance and incidents that may arise.

2.1.2 The legal frameworks and guidance pertaining to odour management are listed and, where appropriate, a brief description of how odour should be approached during design and operation is included. Detailed design will enable a comprehensive OMP to be created with due consideration to the themes described here and the requirements of the Environmental Permit to be obtained from the Environment Agency.

2.1.3 Waste water plants have the potential to create odour emissions during conveyance, treatment, and storage of waste water and sludge. There are several factors which determine the level of the impact on potential sensitive receptors and effective management of onsite activities is covered by this document.

2.1.4 Once the proposed WWTP has been constructed and commissioned, the Site Manager will have overall responsibility for the implementation, application, monitoring and review of the OMP and the activities included therein.

2.1.5 This preliminary OMP details both operational and control measures appropriate to the management and control of odour at the proposed WWTP. It will be further developed during the detailed design stage as part of the detailed OMP for the operation Environmental Permit application to the Environment Agency. That next iteration of the OMP will provide sufficient detail to allow operators and maintenance staff to clearly understand normal and abnormal operational procedures and the roles and responsibilities of staff. The next iteration of the OMP will also allow site management audit by all relevant stakeholders including the site management and Local Authority.

2.1.6 Objective of this preliminary OMP is to:

- Outline potential odour sources associated with the proposed WWTP
- Outline methods of minimising odour generation and release during operation of the proposed WWTP

- Plan for incidents and accidental odour release

2.2 Legislative requirements

2.2.1 The Applicant has committed to negligible impact from odour to the currently known and identified sensitive receptors, as defined in Table 3-2: IAQM (2018) proposed odour descriptors and predicted impact .

2.2.2 The application of the following standards and guidance below will provide a high level of protection from odours that might give rise to a significant loss of amenity or cause a nuisance due to operating the proposed WWTP.

- Industrial Emission Directive 2010/75/EU (Integrated Pollution Prevention and Control) 2018.
- Best Available Techniques (BAT) Reference Document for Waste Treatment Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control (Joint Research Centre (European Commission), 2018).
- The National Policy Statement for Waste Water (NPS) (Defra, 2012) suggests that an odour impact assessment is undertaken. This is to assess the potential for odorous releases and the proposed mitigation measures. It indicates that odour impact should be assessed based on appropriate standards which include the Environment Agency (EA) methodology.
- The Environment Agency H4 odour management guidance (Appendix 3) (EA, 2011) provides odour standards for modelling exposure. The benchmark level for the most offensive odours at the site boundary is taken to be 1.5 odour units per cubic metre (OUE/m3) as an hourly average concentration level which is not to be exceeded for 98 percent of the time in a typical year. This benchmark is the highest standard and is adopted by the CWWTPR project. The standard is applied at sensitive receptors and consideration is given to the impacts and effects of odour on surrounding land uses outside the boundary of the facility.

2.2.3 A graphical representation of the treatment processes can be seen in figure 2.1 below, while the following sections provide a brief description of the different plant and processes for each type of treatment.

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How does a waste water treatment plant work?

Stage 1 - Wastewater from people's homes and businesses flows via sewers to the pumping station.

Stage 2 - The pumping station receives the wastewater and starts the cleaning/ treatment process.

Stage 3 - Stormwater storage and settlement tanks hold any excess water during times of heavy rainfall.

Stage 4 - Any large objects and nondegradable items (such as nappies and face wipes) along with any accumulated grit is removed.

Stage 5 - The solid waste is separated from the water for sludge treatment.

Stage 6 - Once visible sludge has been removed, the wastewater is treated further to remove any harmful bacteria and bugs.

Stage 7 - After secondary treatment, the wastewater is again filtered to remove any remaining sludge, which also goes for sludge treatment.

Stage 8 - Tertiary treatment then removes additional nutrients, ammonia or solids.

Stage 9 - The treated wastewater is sent to a pumping station to be put back into the environment.

Stage 10 - The treated wastewater can then be returned to the River Cam.

Stage 11 - Sludge left as a by-product of the wastewater treatment process and from imports elsewhere, is collected in this tank.

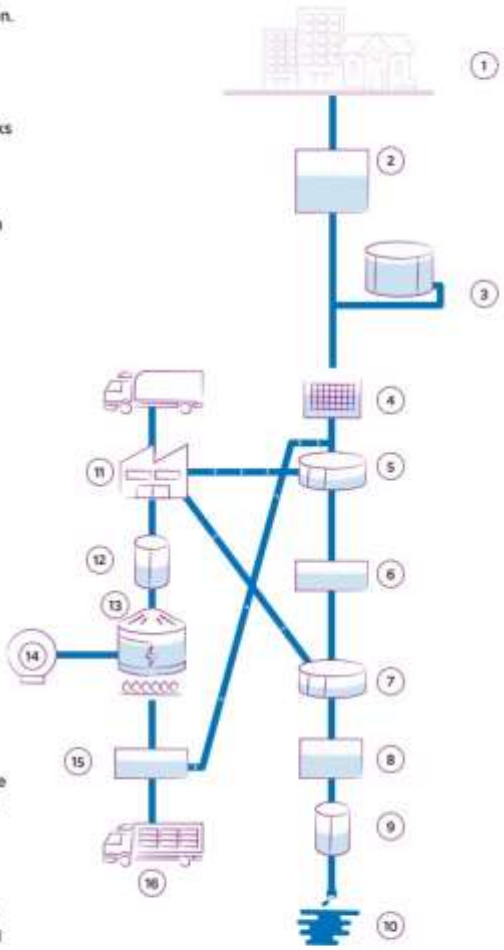
Stage 12 - The pre-digestion treatment readies the sludge to be decomposed into stable substances.

Stage 13 - The sludge now undergoes anaerobic digestion, which involves heating and breaking down the sludge.

Stage 14 - The biogas that is generated as part of the anaerobic digestion process can be harnessed and used as energy.

Stage 15 - At the post-digestion phase, the molecules are broken down and separated further. This includes removing any excess water before final disposal.

Stage 16 - After treatment is complete, the remaining sludge is stored, with part of it being used for biofertilizer to provide soil nutrients.



Fact

We use the biogas produced by anaerobic digestion to power the Cambridge Waste Water Treatment Plant. We can also export power to the grid to provide green energy for others.

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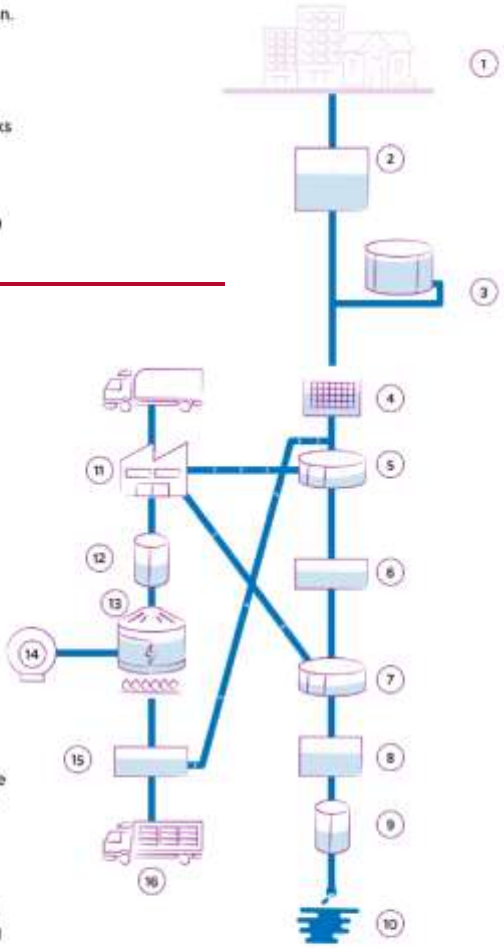

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Figure 2.1: An overview of the CWWTPR main processes

2.3 Waste Water Treatment Plant (WWTP)

Sewer tunnel & terminal pumping station

2.3.1 A new sewer tunnel will convey all waste water flows by gravity from the existing Cambridge WWTP to the proposed WWTP. A new Terminal Pumping Station (TPS) at the proposed WWTP will lift the untreated waste water and storm flows conveyed by the sewer tunnel into the elevated inlet works or the stormwater management system Storm flows will be lifted into the storm tanks once the dedicated in-line sewer tunnel storm storage has been filled.

2.3.2 The storm tanks contents will be returned to the TPS and transferred to the inlet works once the dedicated storm capacity of the sewer tunnel is emptied and flows to the works are less than Flow to Full Treatment (FFT).

2.3.3 Once all the storm storage capacity is fully utilised, the excess storm water would then be discharged after screening to the storm flow pipe and conveyed to the new outfall on the east bank of the River Cam. **Inlet works**

2.3.4 The inlet works will receive waste water flows from the TPS and tanker imports. The inlet works will include an inlet channel and provide preliminary treatment in the form of screening and grit removal. The inlet channel and screens shall be covered and connected to the Odour Control Unit (OCU) to mitigate the odour impact. The works return flows will be returned downstream of the inlet works.

2.3.5 Tanker imports will be discharged into a pumping station in the tanker reception area. The pumps will lift the flow to the inlet works upstream of the inlet screens. The tanker reception area will be equipped with swipe card and wash-down facilities.

Primary treatment

2.3.6 Primary and secondary chemical dosing will be provided to supplement phosphorus removal in the secondary treatment biological process. The chemical will be dosed into a dosing chamber at both locations and be rapidly mixed to maximise treatment efficiency. The chemical is to be dosed between the inlet works and primary settlement tanks as the primary dosing point. The secondary dosing points will be upstream of the tertiary treatment process.

2.3.7 Primary treatment will be provided by circular settlement tanks. Flow will be distributed evenly to all in service tanks. The tanks will be equipped with full scraper bridges, scum removal, dedicated de-sludge pump per tank and relevant instrumentation as a minimum.

2.3.8 Primary scum pumping station will receive scum from the primary settlement tanks (PSTs). The scum pumping station will be provided with suitable control arrangement

to minimise the volumes transferred to the inlet works and be connected to the odour control system. Primary sludge and top decanted layer of scum from the scum pumping station will be transferred to the STC for storage and treatment.

Secondary treatment

2.3.9 Settled waste water from the primary settlement tanks is combined before being pumped to secondary treatment at the secondary treatment feed pumping station. The flow is mixed with returned activated sludge (RAS) in the mixing and conditioning chamber. The contents of the chamber will be mixed by mechanical mixers.

2.3.10 Secondary treatment comprises of Membrane Aerated Biofilm Reactor (MABR) and nitrifying Activated Sludge Plant (ASP). The MABR will provide a minimum of 15% of ammonia removal capacity with the remainder provided by the nitrifying ASP.

2.3.11 The nitrifying ASP will be of conventional design with an integral anoxic zone followed by aeration zones with Fine Bubble Diffused Aeration (FBDA). FBDA design will include lift out aeration grids for a tapered air capacity across four aeration zones.

2.3.12 The mixed liquor will be settled in Final Settlement Tanks (FSTs). FSTs will be circular raked tanks with allowance for one unit to be taken out of service while treating FFT. Mixed liquor will be distributed evenly to all in service tanks. The tanks include scraper bridges, scum removal, dedicated de-sludge pump per tank and relevant instrumentation. RAS will be pumped to the mixing and condition chamber and SAS to the STC. SAS wastage will be drawn from the common RAS line. **Tertiary treatment**

2.3.13 Tertiary treatment will be required to meet the Total Phosphorus permit limit. It will comprise secondary chemical dosing and solids removal process. Chemically dosed secondary effluent will pass to flocculation tanks to develop flocs prior to the solids removal units. The solids removal process can be enhanced by addition of other chemicals or media as necessary to assist solids separation and to suit the operation of the process.

2.3.14 Final effluent is discharged to a new River Cam outfall via a new connection. The connection will also allow for storm overflow to be transferred to the new outfall.

Sludge Treatment Centre (STC)

2.3.15 The sludge treatment centre will treat indigenous and imported liquid sludge; indigenous sludge is that originating from the waste water treatment process within the proposed WWTP. The facility will produce an enhanced treated biosolids. The biogas generated by the process will either be utilised on site as fuel for steam boilers to provide heat for the process or cleaned and upgraded to biomethane and exported to the national gas grid. **Sludge storage & treatment**

2.3.16 Indigenous primary sludge is pumped to sludge screens feed tanks where it is combined with imported sludge both primary and secondary. The combined indigenous and imported sludge is screened by sludge screens. Screened sludge will be pumped from the feed tanks to Thickening Feed Tanks. Indigenous SAS from

within the proposed WWTP will be pumped to the Thickening Feed Tanks where it is mixed with screened sludge.

2.3.17 Potentially odorous air from these units will be extracted and connected to the odour control units (OCUs) for treatment so that odour levels at the site boundary or nearest receptors are kept within acceptable levels.

2.3.18 The combined raw sludge will be thickened prior to the Heating Pasteurisation and Hydrolysis (HpH) process. Thickening facility comprises of thickeners each with dedicated feed and thickened sludge pumps. Thickened sludge is pumped to the Thickened Sludge Tank providing 12 hours daily average sludge flow. Air from these facilities and thickeners is extracted for treatment.

2.3.19 An HpH plant will be provided as the pre-treatment step to the anaerobic sludge digestion process. The three-stage process will comprise of the following:

- One HpH heating tank with pump mixing and pumped recirculation as well as hot water from the low temperature hot water system
- Two HpH pasteurisation tanks with pump mixing and pumped recirculation as well as steam injection with recirculation
- One HpH hydrolysis tank with pump mixing and pumped recirculation as well as recirculation heat exchanger **Digesters**

2.3.20 The HpH treated sludge is treated in anaerobic digesters operating between 35 to 45°C with design retention time of 14 days. Each digester will have mixing pumps, heating loop and foam suppression system.

2.3.21 The heating for the digestion process is provided by Steam Boilers with biomethane as the primary fuel source and natural gas as the secondary fuel. **Digested sludge storage and treatment**

2.3.22 Digested sludge will be treated by vacuum degassing system to maximise biomethane collection and reduce fugitive greenhouse gas emissions. Degassed digested sludge will be stored in storage tanks. Dewatering of digested sludge will be carried out by dewaterers. The cake will be directly discharged into a cake barn by dedicated conveyors to each dewaterer. The cake will be transferred to lorries for transporting off site.

Biomethane storage and utilisation

2.3.23 Biomethane will be stored in a Gasbag with a retention time of 2 hours. The gas is used as primary fuel for steam boilers with any excess being treated and injected into the gas grid. The biomethane is treated by a proprietary clean up plant prior to injection into the grid. A waste burner will be provided as back up.

Liquor treatment

2.3.24 Liquors from dewatering are treated by a liquor treatment process to reduce ammonia and solids loads returned to the head of the waste water treatment plant. The process will provide as a minimum 85% reduction in ammonia load and 50% reduction in solids load.

3 Odour Sources & Mitigation

3.1 Introduction

3.1.1 Odours from waste water treatment facilities are classified as "moderately offensive" by the Institute of Air Quality Management (IAQM) and the Environment Agency (2011) H4 Odour Management Guidance document, whereas the STC odours are classified as the "most offensive". There are only these two classifications in IAQM guidance for planning, whereas EA H4 also includes "less offensive" odour such as coffee and bread.

3.1.2 An extensive dispersion modelling exercise was carried out to determine the potential odour impact on site and surrounding area and is reported in the DCO application as document reference 5.2.18 Chapter 18 'Odour'.

3.1.3 Chapter 18 'Odour' identifies receptors at risk of adverse effects from potential odours and includes dispersion modelling that shows receptors to the north-east of the site would thus be at higher risk of being impacted by potential odours from the proposed WWTP.

3.1.4 This section outlines the potential sources of, and risks from, odour emissions from the proposed WWTP and controls to be established to minimise the risk of odour emissions affecting sensitive receptors.

3.2 Odour sources

3.2.1 The proposed WWTP design FFT capacity is 171,723 m^3/d at the design horizon of 2041. A total storm storage volume of 20,400 m^3 will be provided comprising 5,186m^3 in the sewer tunnel (in-line storm storage) and the rest in storm tanks onsite (15,214 m3 off-line storm storage). The STC design capacity is 16,000 tDS/annum with potential to 25,000 tDS/annum at the design horizon of 2041 which will be achieved by leaving space on site for future expansion.

3.2.2 All the main process areas associated with the WWTP are presented in Table 3-1. The table also includes an indication of their odour potential in terms of the following:

- Intensity (faint 5 OUE/m3 to strong 10 OUE/m3)
- Characteristics (River water, fishy, earthy, rotten, etc.)
- Hedonic (pleasant +4/neutral 0/unpleasant -4)

3.2.3 The comparison between the existing Cambridge WWTP and proposed WWTP are also included in Table 3-1. If the process is covered then the air would be extracted and treated through OCUs and the treated air released at high level. This not only provides effective treatment, but also improves the odour dissipation.

Table 3-1: Odour sources and associated characteristics with site comparison

Nr	Structure/Process Area	Intensity	Character	Hedonic	Existing WWTP	Proposed WWTP	Covered for WWTP
Waste Water Treatment							
Reception from the transfer tunnel, plus lifting pumping station to treatment elevation							
1	Terminal pumping station (TPS)	Faint to Strong	River Water to Potentially Septic	-3	Yes	Yes	Yes
Storm storage and handling							
2	Storm Storage (this is only in use after a storm event and is emptied when flow returns to normal flow patterns)	Medium	River Water to Potentially septic if prolonged storage	-1	Yes	Yes In-line + Off-line	No
Preliminary treatment: screening and degritting to remove large particles from flo v							
3	Channel to Screens & Grit Removal	Faint to Strong	River Water to Potentially Septic	-2	Yes	Yes	Yes
4	Fine Screens & Screenings Handling Plant	Faint to Strong	River Water to Potentially Septic	-2	Yes	Yes	Yes
5	Grit Removal Plant & Handling Plant	Faint to Strong	River Water to Potentially Septic	-2	Yes	Yes	Yes

6	Screenings Skips	Faint	Putrescent	-3	Yes	Yes	No
7	Grit Skip	Faint	Putrescent	-3	Yes	Yes	No
Primary treatment: settlement of solids for removal to the STC for further treatment. *(Iron salts are dosed just prior to this, to ensure phosphate bound to sludge for the WWTP)*							
Nr	**Structure/Process Area**	**Intensity**	**Character**	**Hedonic**	**Existing WWTP**	**Proposed WWTP**	**Covered for WWTP**
8	Primary Settlement Tank (PST) Distribution	Medium	Iron/Musty	-1	Yes	Yes Iron salts added here	Yes
9	PST	Medium	Iron/Musty	-1	Yes	Yes	No
Interstage pumping station *(due to layout or site levels, height constraints, etc. flow need to be moved or lifted to aid hydraulics)*							
10	Secondary feed pumping station	Faint	River Water	-1	Yes	Yes	No
Secondary treatment: biological treatment of soluble organic and inorganic fractions							
11	Activated Sludge Plant (ASP) Division/Selector	Medium	Iron/Musty	-1	Yes Iron salts added here	Yes	No
12	ASP Anoxic	Medium	Musty	-1	Yes	Yes	No
13	ASP Aerobic	Faint	Earthy - Aerated	-1	Yes	Yes	No

14	Final Settlement Tanks (FST)		Faint	River Water	0	Yes	Yes	No
Tertiary treatment: further solids removal and phosphorous removal polishing								
15	Sand Filters or other suitable Water	Faint	Clean River	0 proprietary equipment		No	Yes Iron salts added here	No
Discharge of treated effluent and settled storm flows (during storm events) to river								
16	Final Effluent (FE)		Faint	Clean River Water	0	Yes	Yes	No

Nr	Structure/Process Area	Intensity	Character	Hedonic	Existing WWTP	Proposed WWTP	Covered for WWTP
Sludge Treatment							
Import facilities							
17	Liquid Import	Instant at	Septic -3	Yes	Yes delivery		Direct couple between tanker and tank
18	Cake Import	Instant at	Septic -3	No	No delivery		Future, not now
Sludge treatment facility - anaerobic treatment of sludge to achieve enhanced quality for land application							

19	Sludge tanks	Strong	Septic	-3 to -4	Yes	Yes	Yes
20	Post/secondary digesters	Strong	Musty/Earthy	-1 to -3	Yes	Yes	Yes
Treated cake at enhanced quality for land application							
21	Storage	Faint	Earthy	-1	Conveyors to Vehicle Bins	Cake Barn to Vehicle Bins	Yes (open sides, no OCU)
Sludge treatment centre digested cake dewatering liquors treatment							
22	Liquor Treatment Plant anoxic/presettlement	Low	Musty	-1	No	Yes	No
23	Liquor Treatment Plant aerobic reactor	Low	Earthy	-1	No	Yes	No
24	Liquor Treatment Plant FST	Faint	River Water	0	No	Yes	No
Ancillary works							
25	On-site storage of sludge/compost	Faint to Strong	Can be rich compost, to Earthy for Treated	-1 to -3	Yes	No	N/A
26	On-site overnight storage/parking of empty sludge/water tankers	Negligible	Musty/Earthy	0	Yes	Yes	No

3.3 Odour receptors

3.3.1 Table 3-2 lists the 98th percentile annual average estimated odour concentration for key receptors. The odour dispersion modelling results indicate 'negligible' impact on these receptors. Sensitivity testing was carried out for 18 further scenarios all confirming that there will be 'negligible' impact on these receptors thus indicating the robustness of these odour impact assessment modelling results.

3.3.2 Chapter 18 'Odour' of the ES identifies receptors at risk of adverse effects from potential odours and refers to the results of predictive dispersion modelling to identify receptors at risk of being impacted by potential odours from the proposed WWTP. The impact assessment is in line with IAQM (2018)) guidance which is presented in Table 3-2. The odour dispersion modelling included sensitivity testing for multiple scenarios to test the robustness of the predictive modelling results.

3.3.3 The IQAM guidance on sensitivity of receptor to odour is presented in Table 3-3 it provides examples of locations and typical land use where the sensitivity of the receptors may be affected.

Table 3-2: IAQM (2018) proposed odour descriptors and predicted impact

Odour	Receptor Sensitivity Exposure Level Low	Medium	High
	Moderate	Substantial	Substantial
	Slight	Moderate	Moderate
C98 OUE/m3	Negligible	Slight	Moderate
≥ 10			
5 - < 10			
3 - < 5			
1.5 - < 3			
0.5 - <1.5			
	Negligible	Negligible	Slight
	Negligible	Negligible	Negligible
	Negligible	Negligible	

Table 3-3 Receptor sensitivity to odours

Sensitivity Receptors	Surrounding Land Use of
High	Surrounding land where: • users can reasonably expect enjoyment of a high level of amenity; and • people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium	Surrounding land where: • users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or
Sensitivity Receptors	**Surrounding Land Use of**
	• people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and playing/recreation fields.
Low	Surrounding land where: • the enjoyment of amenity would not reasonably be expected; or • there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial use, farms, footpaths and roads.

3.4 Odour treatment plant within the proposed WWTP

3.4.1 The design of the proposed WWTP will seek to minimise the impact on nearby receptors in line with or be an improvement upon the odour impact assessment submitted with the DCO application as document reference 5.2.18 Chapter 18 'Odour'.

3.4.2 OCUs will be provided at the proposed WWTP to treat air extracted from the following locations:

- terminal pumping station;
- inlet works;
- inlet screens;

- liquid import pumping station;
- primary chemical dosing and mixing chamber;
- PST distribution chamber;
- PST scum pumping station;
- PST sludge transfer pumping station;
- return liquor pumping station;
- imported liquid & primary sludge tanks;
- sludge screens;
- sludge thickening feed tanks;
- sludge thickening building;
- sludge thickeners;
- thickener liquors pumping station;
- thickened sludge blend tank before HpH;
- digested sludge tanks;
- dewaterers;
- dewatering liquors wet well; and
- treated dewatering liquors wet well.

3.5 Operational controls

3.5.1 The infrastructure associated with the proposed WWTP includes the existing tunnel system which extends across Cambridge, and the existing sewer network (including associated dosing installations, pumping stations and rising mains).

3.5.2 The design of the new shaft (Shaft 1), located on the existing Cambridge WWTP at the start of the tunnel extension, will require a ventilation facility to allow air to enter (typical operation) and exit (under extreme operating conditions) the shaft (from the tunnel system), and include:

- A vent stack and carbon filter (located at Shaft 1) to reduce odour emission.
- Provision for a chemical dosing facility (located on the existing WWTP upstream of Shaft 1) to prevent septicity and therefore odour formation.

3.5.3 The Waterbeach rising mains are required to forward waste water (from Waterbeach) for treatment within the existing Cambridge WWTP prior to its decommissioning and then to the proposed WWTP. The pipelines are rising mains, which are

pressurised when in service, which effectively eliminates the risk of odour release during normal operation. The design of the Waterbeach rising mains include the following facilities:

- Two continuous transfer pipelines (sealed pressurised systems) with connections and fittings.

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- Air relief valves, located in below ground chambers, that remain closed when the pipeline is pressurised during normal operation (see Note 1).

Note 1: The air valve capabilities will include the following:

- Air release during filling: a self-regulated venting arrangement to allow the controlled release of air from the pipes whilst they are being primed (filled with effluent) prior to being put into service to allow the pumped transfer of effluent.
- Air release during emptying: a self-regulated air admittance facility to allow air to enter the pipelines, should either pipe be required to be drained down and taken out of service for any reason (including during maintenance, inspection, repair or replacement).
- Air release during operation: there will also be a high-pressure relief facility to vent small amounts of air during operation, should there be any air pockets occurring at high points where the valves are located.

~~Structure/Process Area~~	~~Comment~~	~~OMP activity~~
~~1 TPS~~	~~covered and odour controlled~~	~~OCU performance to check, action maintenance if deviate outside of range.~~

~~2~~	~~Storm tanks~~	~~Infrequent use~~	~~Check for debris during rounds~~

3.5.4 Considering that the sludge treatment odours are classified as the most offensive, and taking into consideration the treatment processes utilised, the design includes covering the Sludge Treatment Centre (STC) tanks and equipment before the digestion pre-treatment process. The digestion pre-treatment, digestion and secondary digestion are connected to the biogas collection and utilisation processes. Odour modelling of just the STC odours on their own demonstrated achievement of the tighter requirement for the most offensive odours.

3.5.5 An Odour Management Plan (OMP) is a requirement of the Industrial Emissions Directive 2010/75/EU permit for the proposed WWTP and needs to include information about activities that may present typical odour concerns; for example, all imported sludges and waste water deliveries will be via sealed tankers and pumped into reception areas that will be covered and odour controlled, as detailed above. Treated biosolids would have been treated to comply with the Hazard Analysis and Critical Control Point (HACCP) and biosolids assurance requirements, and hold very little (earthy smell, not septic) odour potential. Treated biosolids to land will be transported in articulated skips with a pull over cover deployed during transit.

3.5.6 Table 3-4: The proposed OMP activity with each process area

3.5.7 lists the proposed OMP activities and controls associated with different areas of the proposed WWTP.

Table 3-4: The proposed OMP activity with each process area

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Structure/Process Area		Comment	OMP activity
1	TPS	covered and odour controlled	OCU performance to check, action maintenance if deviate outside of range.
2	Storm tanks	Infrequent use	Check for debris during rounds
Structure/Process Area		**Comment**	**OMP activity**
2a	Storm tanks return PS	Gravity return	Operator manage after storm event
3-5	Inlet works including: • Channel to Screens & Grit Removal • Fine Screens & Screenings Handling Grit Removal Plant &	covered and odour controlled	Operations manage cleanliness in this area that is prone to spillage. OCU performance to check, action maintenance if deviate outside of range. Operator manage inventory of cess imports.

	Handling Plant		
6	Screenings Skips	Open	Operator manage inventory
7	Grit Skip	Open	Operator manage inventory
8	PST dosing, mixing and distribution chamber	covered and odour controlled Iron salts dosed	OCU performance to check, action maintenance if deviate outside of range.
9	PST	Open	Operational checks for debris or performance irregularities to plan interventions, if needed.
9a	PST collection chambers	Open	Visual checks
10	Secondary Feed-forward PS	Open	Visual checks.
11	ASP Division/Selector chamber	Open	Visual checks
12	ASP Anoxic with MABR	Open	Visual checks
13	ASP Aerobic	Open	Visual checks
14a	FST distribution chambers	Open	Visual checks
14	Final settlement tanks	Open	Visual checks
14c	FST collection/tertiary mixing chamber	Open Iron salt dosed.	Visual checks
14d	RAS/SAS PS	direct pumped – no open tanks	Visual checks.
15a	Tertiary distribution chamber	Open	Visual checks
15	Tertiary treatment	Open	Visual checks
15b	Tertiary sludge waste return PS	direct pumped – no open tanks	Visual checks.
16a	Washwater take-off PS	direct pumped – no open tanks	Visual checks.
16b	Flume + FE channel	Open	Visual checks
16c	FE sampling chamber	Open	Visual checks
Structure/Process Area		**Comment**	**OMP activity**

17	Liquid import – Bauer coupling	Infrequent connection emission	Operator manage inventory
19	Sludge tanks	covered and odour controlled	OCU performance to check, action maintenance if deviate outside of range.
20	Post/secondary digesters	covered and odour controlled/gas extract and used	OCU performance to check, action maintenance if deviate outside of range.
21	Storage Cake barn	Covered – low emission as advanced digested	Operator manage inventory
22	LTP anoxic/presettlement	Open	Visual checks
23	LTP aerobic reactor	Open	Visual checks
24	LTP FST	Open	Visual checks
26	On-site overnight storage/parking of empty sludge/water tankers		Operator manage inventory

Procedures for reporting faults

3.5.8 The proposed WWTP will be managed by a Treatment Manager/Assistant Treatment Manager and technicians with 7-day site cover. During out of hours there will be staff on standby supported by a Duty Manager and process scientist on a 24/7 basis. The site will also be covered by a HACCP plan.

Identifying maintenance and inspection needs

3.5.9 Responsibility for the routine operational maintenance and monitoring on site will be allocated to the Technician team as part of a specific rota. Additional maintenance beyond the scope of site staff will be scheduled as part of the maintenance plan and instructions passed to maintenance staff via a scheduling system. The system will deploy work directly to Technicians and record jobs completed.

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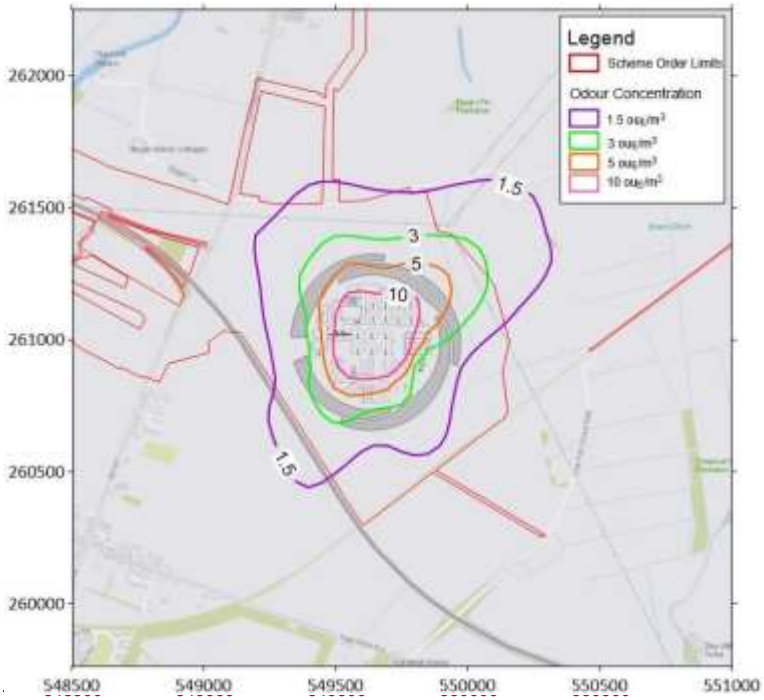
Replenishing consumables

3.5.10 Where appropriate, chemicals will be in use across the proposed WWTP at specific critical dosing points in order to control odour. The responsibility for replenishing supplies will sit with the site operational staff.


Legend
Scheme Order Limits
Odour Concentration
1.5 ou/m³
3 ou/m³
5 ou/m³
10 ou/m³
1.5
3
5
10
1.5
262000
261500
261000
260500
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548500
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549500
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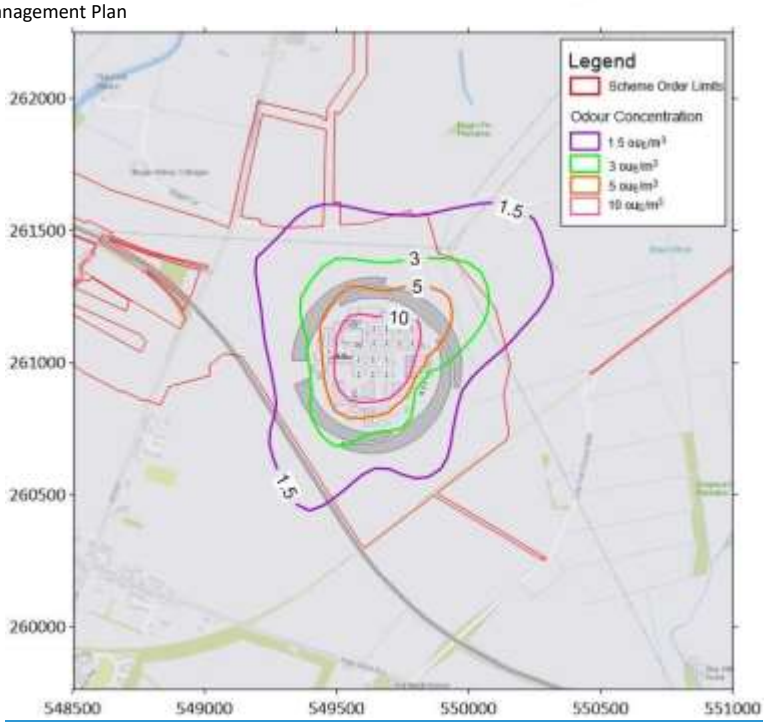

Figure 3.1: Odour Concentration

3.6 Business management systems

3.6.1 There are various documents and processes within the Applicant's business management system that address odour and the management of complaints. The business management system is a central system accessible to all operational staff and the collection of policies, standards and procedures for water recycling are known as 'POSWASTE'. POSWASTE Section 10 – Odour Control holds all the standard documents relating to managing odour, which will be made available on request to the Environment Agency and Local Authority during operation.

3.6.2 As part of the Applicant's best practice the procedures for the site would be regularly reviewed. The OMP will be updated with the operational procedures to be followed to maintain and operate the plant to AWS's standards, which include housekeeping procedures to ensure that any generation of odour is minimised. The operational OMP would set out in detail the control and monitoring systems.

3.6.3 The operation and maintenance of the odour control equipment forms part of the OMP along with other operating practices for the site including the operation and monitoring components such as flow and gas monitors of the OCU.

3.6.4 Relevant data will be included such as records of any complaints received and how these were responded to can be made available to the relevant authority on request.

3.6.5 The operation of the active ventilation systems will be remotely monitored and staff alerted to any fault condition(s).

3.6.6 The equipment will be monitored by telemetry.

3.6.7 The following routine monitoring procedures for the odour control system will be used:

- Monthly assessment of odour abatement performance at each location in terms of generation and capture the odour created by hydrogen sulphide (H2S). The performance will be assessed based on data logged records of H2S concentration upstream and downstream of the odour control system. These records will be analysed to determine how the system is performing and used to determine if any remedial action is required. It is proposed that record inspection and analysis will be conducted for at least three years after start of operation, until reliable trend information has been established. The frequency of monitoring will be reviewed after three years.
- If records indicate good performance at passive filter sites which operate infrequently, the inspection and analysis will be at a reduced frequency. Carbon/other media replacement at such passive filters will be determined by sampling the media or on a regular cycle.
- Continuous recording of H2S levels in air extracted from the covered process areas. It is proposed that H2S monitoring will be maintained for at least three years after start of operation and, if records indicate good performance, such H2S monitoring would continue at a reduced frequency as required to determine when carbon/other filter media is depleted. Good performance is deemed to occur when actual measured emission levels are modelled and show that the 98th percentile does not exceed 1.5ouE/m3 at receptors.
- Quarterly inspection of the active odour control units will be conducted to confirm proper operation. Any actions necessary to maintain the performance of the units and the required frequency of media replacement would be implemented through the maintenance schedule developed for the project.

4 Maintenance and Training

4.1 Plant maintenance

4.1.1 In addition to the routine operational tasks, planned preventative and defect maintenance of all plant will be carried out. Maintenance requirements will be documented and preventative maintenance or defect repair records will be captured in the Applicant's system. Relevant details can be made available to the relevant local authority on request.

4.1.2 An inspection and maintenance regime will be established for the new ventilation and odour control systems to be installed as part of the Proposed Development.

4.1.3 The ventilation and OCUs at each site will receive the following inspection, as a minimum:

- Check of duty/standby fans and motors (Quarterly)
- Check on residual lifetime of OCU media (Quarterly)
- Retention of critical spares for each OCU (required spares to be confirmed with the supplier).

4.1.4 The condition of the media in the OCU will be monitored by performance checks and by additional testing as required. The life of the carbon/other filters will depend upon the H_2S loading of the extracted air, the capacity of the filter and the volume of extracted air that the carbon/other filter treats.

4.1.5 The active ventilation plant sites will be visited at least on a weekly basis as a matter of course. Active ventilation plant sites and the passive filter sites will be visited quarterly for a more thorough general inspection and maintenance. The vent stack and possible OCU located on the transfer tunnel at its western limit, within the existing WWTP, will receive a yearly routine maintenance check as required by the Applicant's Sewer Vent Column maintenance standard. Access for maintenance is to be agreed with the future developer of the existing WRC site.

4.1.6 Faults affecting the normal operation mode will be rectified within 48 hours, whilst faults associated with the abnormal mode will be rectified within one week depending on the availability of spare parts.

4.1.7 Maintenance of plant retained at the existing WWTP site will include:

- Dosing Arrangement:
  - The dosing tank facility will be inspected regularly in compliance with the Applicant's documented maintenance procedures.
- Vent stack and carbon filter:
  - The carbon filter and associated equipment will be inspected regularly in compliance with the Applicant's documented maintenance procedure.

4.2 Staff training

4.2.1 All technicians/operators involved in maintenance and monitoring will receive appropriate training in the odour control systems and response to odour issues whether notified or identified. Records of staff training will be held on a central training database.

4.2.2 The role and importance of the site odour management plan will be covered in briefing and training that all operational staff receive.

4.2.3 The Applicant's Customer Services team, who handle calls from the public, will be trained to be aware of the proposed WWTP and the reporting system enables any incidents to be recorded with priority.

4.3 Non-normal and emergency conditions

4.3.1 For an emergency condition, 24-hour maintenance cover will be available under the control and discretion of Site management personnel in hours and out of hours under the Operational Management Centre (OMC). Less urgent repairs are assessed for criticality and dealt with during normal working hours.

4.3.2 An emergency would involve the complete failure of the majority of the ventilation facilities throughout the site.

4.3.3 Significant spills of odorous material are to be cleared up as soon as possible and, if an external impact is possible, the Environment Agency, local authority and any other relevant external parties would be informed (e.g. Local Parish council, Community Liaison groups).

4.3.4 With regard to emergency fault/breakdown and incident response procedures, responses to failures of the ventilation sites will be covered in the response plan. The following are examples of fault conditions:

- failure of control: failure of telemetry, sensor, or control systems
- electrical failure: failure of grid supply
- prolonged non-access to site due to event at site or local to the site (e.g. bomb scare, fire, flood or emergency services-controlled incident).

4.3.5 Possible risk factors (e.g. adverse weather conditions) and reasonably foreseeable odour-related incidents and accidents may include abnormal situations, spillages, power failure, breakdown of doors, equipment or abatement. Under any of these situations a response plan will be drawn up and approved by the Site Manager.

4.3.6 All Works Technicians at the proposed WWTP will have a responsibility to maintain good housekeeping and clear spillages at the earliest opportunity to prevent unnecessary odour. The Applicant has a purchase agreement with local tankering companies who can provide additional clean up services at short notice. The technicians on duty will liaise with the OMC Duty Manager for out of hours issues & for authorisation of essential remedial work requirements.

4.3.7 Key areas at risk from spillage and control measures:

- Inlet works - spillages around the inlet area must be cleaned up immediately after spillage.
- Sludge import area - tanker drivers instructed to clean up spillages after every load.
- Liquor return pumping station well - foaming controlled with antifoam dosing to prevent escape from well.
- Entire site - routine site inspections of the operational area within the proposed WWTP by the Treatment Manager.

4.3.8 Additional measures during maintenance to the import reception area could include diverting odorous waste loads to alternative facilities.

4.3.9 If measures implemented during abnormal operation or maintenance are shown not to be sufficient, these will be reviewed and tightened further or else additional containment and odour control will be investigated, or possibly ceasing/reducing odorous operations.

4.4 Triggers for additional controls and checks on effectiveness

4.4.1 Further action/additional measures may be triggered by the following:

- the results of planned routine checks/inspections/surveys on site;
- the results of on-site measurements of process parameters and surrogate measurements for odour (e.g. pH, temperature, oxygen, etc) exceeding defined trigger levels;
- other metrics, such as particular meteorological conditions (e.g. temperature above a certain value, wind blowing in a particular direction, or calm and stable conditions); and
- odour monitoring on and/or off-site, including:
  - odour complaints monitoring;
  - monitoring carried out on-site, showing non-compliance with any emission limit values (ELVs) set for controlled point source releases; and
  - monitoring carried out off-site (e.g. by sniff testing, odour diary surveys, etc), indicating non-compliance with any action levels for ambient odour levels.

4.4.2 Figure 4.1 below sets out the procedure for responding to odour-related incidents and any elevated odour levels from the aforementioned checks/inspections/surveys, monitoring, or on receipt of complaints of odour nuisance; including carrying out investigations and taking appropriate remedial action to prevent recurrence.

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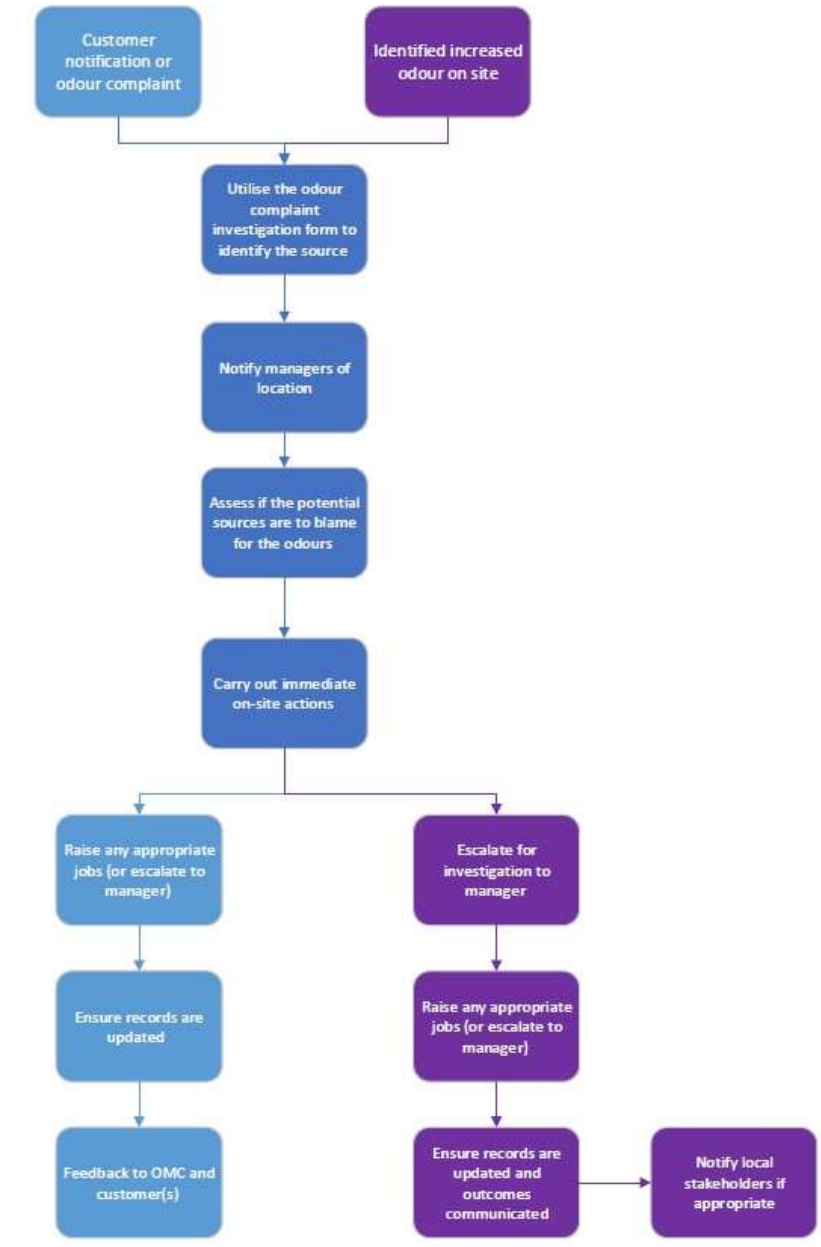
Customer notification or odour complaint
Identified increased odour on site
Utilise the odour complaint investigation form to identify the source
Notify managers of location
Assess if the potential sources are to blame for the odours
Carry out immediate on-site actions
Raise any appropriate jobs (or escalate to manager)
Escalate for investigation to manager
Ensure records are updated
Raise any appropriate jobs (or escalate to manager)
Feedback to OMC and customer(s)
Ensure records are updated and outcomes communicated
Notify local stakeholders if appropriate

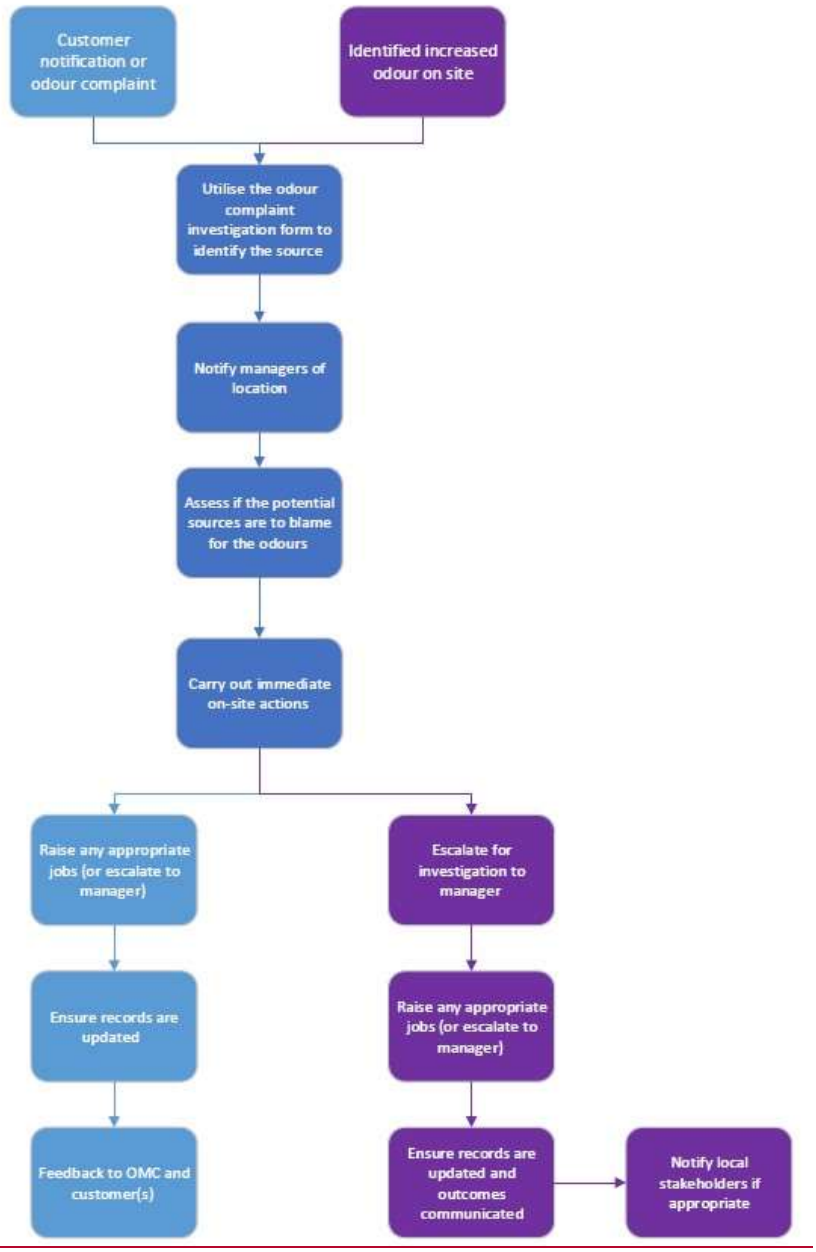

Figure 4.1: Response to notified or identified odour

5 Monitoring

5.1.1 The active OCUs will have sufficient instrumentation and telemetry to allow faults to be detected remotely at a central operations control station. Signals which will be recorded include:

- logging of OCU hours of operation
- pressure loss across the unit
- probes logging the H2S levels in the inlet and exhaust air
- fail/healthy signal for the fan motors
- status of the fan motors and operational hours
- position indication of the pressure relief dampers

5.1.2 Telemetry alarms will be in place to indicate a 'fault' to one or more of the components of the air management system. This fault indication will then be further interrogated to determine which component is at fault. This monitoring will be undertaken continuously. The data is required for scheduling maintenance and replacement works.

5.1.3 Regular daily 'walk arounds' by site staff will be carried out. Any unusual odours detected will be noted, investigated and recorded. Any remedial actions will be taken. Site staff will also be checking for any unusual odours as they carry out their routine activities. All site staff will carry gas detectors (Blackline safety G7c or similar monitors) as part of their personal protective equipment. The staff will also use their senses to detect unusual odours. Routine activities will be carried out to ensure that all processes on site are operating within their expected parameters, including, for example, sludge blankets maintained at an appropriate level and optimising aeration plant.

5.1.4 The detailed OMP will prescribe a walking route around the site boundary to ascertain potential pathways and or sources of odour. Site staff will also check OCU performance as part of a planned response. Site staff can utilise a mobile 'Jerome' H_2S detector which can identify point sources of odour and inform an investigation of the relevant source(s). Any remedial action will be taken and reported back to the site manager and OMC for feedback to the complainant as appropriate.

5.1.5 Monitoring measurements proposed at the site of the existing Cambridge WWTP will include:

- Dosing Arrangement:
  - Monitoring equipment will be installed to comply with Applicant's, and the suppliers', documented standards for dosing facilities.
- Vent stack and carbon filter:

- Monitoring equipment will be installed to comply with Applicant's, and the suppliers', documented standards for dosing facilities.

- The monitoring facilities are expected to include odour measurements (in the vent stack) and air pressure measurement (in the shaft).

5.2 Record keeping

5.2.1 Records of OCU monitoring, maintenance and media replacement will be kept at a central location and, when appropriate, for operation and maintenance on site at active control sites. Such records will be made available to the relevant local authority on request. Routine maintenance and operational tasks are scheduled, deployed and recorded on the Applicant's records systems.

5.3 Sources of odour on site

5.3.1 As an operational site dealing with an inherently odorous material, it is to be expected that fluctuating odour levels will be detected when changes to the operational activities, or other disturbances in the treatment process occur.

5.3.2 Potential odour sources, causes, responses, and controls for all areas of potential odour source(s) will be developed during detailed design. An example of such log is presented as Table 5-1.

Table 5-1: Typical site log entry

	Potential Odour source	Causes to Consider	Control Steps to take immediately
1	Inlet channels	OCU failure, Nature of incoming flow, turbulence caused by partial blockage	Check performance, take action as necessary

5.3.3 Works operation will identify areas, based on operational experience with local and scientific knowledge, that should be checked in order of priory, together with an explanation for the management control and considerations in each case. This is not an exhaustive list, and, in some cases, further investigation will be required.

5.4 Management of the proposed WWTP

5.4.1 The proposed WWTP will be operated to maximise efficiency and to ensure compliance with various operational and regulatory limits. Some of the operations on site may, inadvertently, result in odour escaping.

5.4.2 When investigating odour levels on the site, it may be established that the odour arising is due to an off-site asset, for instance if there is a septicity issue in the sewerage network. This can occasionally be caused by a change in the dosing operations within the network. If it can be identified as a network septicity issue this would be passed to the relevant network team within the business and would be

removed from the operational control of the proposed WWTP. The solution to this could be to review the dosing levels. There are a number of factors involved in this assessment and it may be beyond the operational control of the proposed WWTP, in which case it will be referred to and investigated via the OMC. Operational staff with the proposed WWTP will be notified of any issues found and how the issues will be managed to a satisfactory resolution.

5.4.3 This section of the OMP will be continually reviewed to address any longer-term management changes that may impact the odour profile of the proposed WWTP.

5.5 Waste water and sludge treatment mitigation on site

5.5.1 In the event of major equipment or operational changes, the odour model developed for the odour impact assessment to support the DCO application as document reference 5.2.18 Chapter 18 'Odour' will be used to simulate the associated scenario to ensure that any impact on odour is not unforeseen and appropriate mitigation will be included. However, it may not be practical to run the model for all minor operational changes.

5.5.2 It is acknowledged that at times it is difficult for operational staff to detect odour changes, however when detection does occur, a routine investigation highlights an issue or a complaint is received, the site personnel will use the same Jerome H_2S detection equipment and their senses to assess the odours around the site as well as off-site and at the area in which the odour occurs. The intention of this approach is to establish that there is a recordable odour present in the area of concern and back track the source to the proposed WWTP. This will also involve the wind direction being considered (using metrological forecasts and site weather station recordings, including of wind direction and strength and other factors such as temperature). All operational staff will be briefed on this procedure by the Treatment Manager, and it will be routinely followed, and outcomes discussed.

6 Complaints management

6.1.1 On receiving a customer complaint, the Applicant will follow the procedure detailed in Figure 4.1. In addition, emergency breakdown and incident response planning will be developed in detailed design which will cover call outs and actions.

6.2 Action taken to resolve complaint

6.2.1 The complaint is logged in the Applicant's database that records of all customer jobs/complaints received by the company and allows a history of actions taken. The Customer Response Manager takes on the complaint and passes this to the Treatment and/or Collection Manager. The Applicant will respond to the complaint in writing within 10 working days as defined in the levels of service set by the Water Services Regulation Authority, known as Ofwat.

6.2.2 Complaints are regularly monitored by the Treatment Manager and compared to actions being undertaken on the site or in the local sewerage network. Planned activities with the potential to cause odours, and any other identified issues on-site, will be communicated to the parties in the table below.

Table 6-1: Relevant contacts in the event of odour complaint

	Name	Contact Details
Environmental Health Officer South Cambridgeshire District Council/Cambridgeshire County Council	TBC	TBC
Relevant community group(s)	TBC	TBC
Environment Agency	TBC	TBC
Anglian Water customer service	General Enquires	*03457 145145 email*
Anglian Water Customer Service	Customer Issues	CustService@anglianwater.co.uk

7 References

- **Defra (2012)** *National Policy Statement for Waste Water*. Available at: https://www.gov.uk/government/publications/national-policy-statement-forwaste-water
- **Environment Agency (2011)** *The Environment Agency H4 Odour Management Guidance (Appendix 3).* Available at: https://www.gov.uk/government/publications/environmental-permitting-h4odour-management
- **European Environment Agency (2018)** *Industrial Emission Directive 2010/75/EU (Integrated Pollution Prevention and Control) 2018.* Available at: https://www.eea.europa.eu/policy-documents/directive-2010-75-ec-on
- **Institute of Air Quality Management (IAQM) (2018)** *Guidance on the assessment of odour for planning, v1.1* Available at: http://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf)
- **Joint Research Centre (European Commission) (2018)** B*est Available Techniques (BAT) Reference Document for Waste Treatment Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control*. Available at: https://op.europa.eu/en/publication-detail/-/publication/782f0042-d66f-11e8-9424-01aa75ed71a1/language-en

Get in touch

You can contact us by:

Emailing at **info@cwwtpr.com**

Calling our Freephone information line on **0808 196 1661**

Writing to us at **Freepost: CWWTPR**

~~Visiting our website~~ DCO application documents and updates on the application on The Planning Inspectorate website:

https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/