Asset Management
Asset Standard
Odour Management Plan

Chertsey STW

CHERS1ZZ

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Owner Review Requirements

Document to be reviewed when any changes are made to the site or processes

Local Review Requirements

Site Manager should be informed when handwritten amendments are made to this document

Revision No	Reason for Revision	Prepared by	Approved by	Date
1	OMP updates			April 2007
2	OMP update for H4 compliance			October 2012
3	Conversion and validation of OMP into new standard format and further updates to reflect odour complaints in August/September 2014.	[redacted]		September 2014

4	EA CAR form (Report ID: 100708/0223831), received 11-11-2014	[redacted]	[redacted]	November 2014
5	OMP review and update	[redacted]	[redacted]	October 2018
6	OMP review and update	[redacted]	[redacted]	May 2020
7	Updated alongside IED permit application	[redacted]	[redacted]	March 2021
7.1	Revised Sludge Treatment Centre permit application	[redacted]	[redacted]	July 2022
7.2	Revised sludge treatment centre permit application	[redacted]	[redacted]	December 2023
7.3	Updated Site Plan and PFD	[redacted]	[redacted]	March 2024

0.3 Sign Off

Area Operations Area Manager	[redacted]	Date: March 2024
Performance Manager	[redacted]	Date: March 2024

Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
BNR	Biological Nutrient Removal
CHP	Combined Heat and Power
CSM	Customer and Stakeholder manager
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EHO	Environmental Health Officer
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
FFT	Flow to Full Treatment
H4	Environment Agency - How to comply with your permit – H4 Odour Management, March 2011
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PM	Process Manager
PS	Pumping Station
PST	Primary Settlement Tank
Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been effected by odour
SAP	Thames Water's enterprise resource and planning system
SCADA	Supervisory Control And Data Acquisition
SOM	Site Operating Manual
STC	Sludge Treatment Centre
STW	Sewage Treatment Works
TCM	Technically Competent Manager
THP	Thermal Hydrolysis Plant
TM	Team Manager

TCM	Technically competent Manager
UWWTD	Urban Waste Water Treatment Directive

1 Introduction

This Odour Management Plan (OMP) forms part of Chertsey STW Best Operating Practice and is a constituent part of the Environmental Management System (EMS). A key related document is the Site Operating Manual (SOM) – this document can be found as a hard copy in the Chertsey STW administration building and on Thames Water's database SharePoint, within the EMS pages.

The purpose of this OMP is to define how the potential and actual sources of odour from Chertsey STW are identified, and how, as far as is reasonably practicable, they are controlled and recorded. It is primarily a management guide; detailed operational procedures are contained within the SOM referred to above.

Changes to OMP procedures are captured in the SOM as part of the periodic reviews of this document. The Odour Management Plan is to be used by all personnel involved in site operations.

The OMP will be reviewed at least annually, or sooner, if any of the following occur:

- If the site in question acquires any other permitted activity with the potential to increase the risk of odour off site.
- When significant changes are made to the site which may affect odour, e.g. capital spend, changes to permitted activities.
- As a result of a change in pattern of odour complaints, increase in public concern and as soon as possible after a significant incident.
- When the site Performance Manager changes
- If there is a material change in relevant regulations or guidance.
- If there is an odour release incident.
- If a contingency measure is triggered.

This OMP is an operational document that has been developed following a review of the potential risk areas for odour release. It details operational and control measures appropriate to the reduction or elimination of the impact of odours from wastewater treatment works. It provides detail to allow operators and maintenance staff to understand the operational procedures for both normal and abnormal conditions.

This OMP was updated in 2022 to incorporate appropriate odour control measures for activities that will be newly regulated under an Environmental Permit issued under the Environmental Permitting (England and Wales) Regulations 2016 (EPR), following the principles transposed through the Industrial Emissions Directive. This follows the reinterpretation of the Industrial Emissions Directive in exclusion of UWWTD activities - meaning that anaerobic digestion (AD) on a Sewage Treatment works now needs an Environmental Permit.

The Odour Management plan has been structured to distinguish between the two regulatory regimes, which are fully described in the Site Information chapter. The wastewater treatment process is covered by the Urban Wastewater Treatment Directive (UWWTD). The Environmental Permit for the Sludge Treatment Centre (STC) covers various process including but not limited to, the AD process, combustion of biogas in the CHP plant and the storage of resulting sludge. This OMP responds to odour risks from both UWWTD and STC permitted processes (referred to as the Sludge Treatment Centre Permit).

This OMP is stored electronically on SharePoint within the EMS pages and a hard copy is kept on site within the Site Operating Manual.

1.1 Relevant Guidance

Where this Odour Management Plan relates to STW activities regulated under the UWWTD this OMP may still draw upon elements of best practice taken from H4 but this should not be inferred as H4 being applicable to these activities.

The following guidance has been used to inform the contents of the OMP where it relates to activities regulated under the Sludge Treatment Centre Permit. This guidance does not apply to UWWTD activities.

- Environment Agency – How to comply with your permit – H4 Odour Management', March 2011 (H4)
- Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (Waste Treatment BAT Conclusions)

The OMP format used is in line with that adopted for other Thames Water sites.

2 Site Information

2.1 Location and Receptors

Site Address:

Chertsey STW
Lyne Lane
Chertsey
Surrey
KT16 0BA
What3words ref: reform.towers.leave
EPR Permit number to be included when issued

Chertsey STW is operated by Thames Water Utilities and located off Lyne Lane, Lyne near Chertsey. It lies in the crook of the M3 (south) and M25 at junction 12. The immediate surroundings are mainly farmland and some wooded areas. There is a household waste recycling centre next to the works.

Chertsey STW serves the areas of Chertsey, Egham, Lyne, Addlestone and parts of Weybridge. There are numerous sewage pumping stations which feed the Chertsey STW. All sewage flows reach Chertsey via pumping stations.

Receptors

The nearest receptors are given in Table 2.1 and have been marked on site location map in Figure A of appendix 4

Table 2.1 Location of potentially sensitive odour receptors.

Receptor Number	Receptor Address	Receptor Type	Approximate distance to the nearest site boundary (m)	Direction from the site.	Receptor Sensitivity
1	Chertsey Household Waste Site & Lyne Community Recycling Centre	Industrial	Adjacent	Southeast	Medium
2	Lyne Motocross Track	Recreational	Adjacent	Northwest	High
3	Lyne Lane	Passing traffic	170	West	Low
4	Lyne Farm	Farm / Residential	170	South	High
5	Residential area surrounding Lyne	Residential	270	South	High

	Crossing Road / Farm Close				
6	M3 Motorway	Motorway	120	North / Northwest / West	Low
7	M25 Motorway	Motorway	115	North / Northeast / East / Southeast	Low
8	Chertsey Caravan Park	Residential	600	Southeast	High
9	Rainbow Nursery	Nursery	840	Southeast	High
10	Lyne Manor Lake	Fishing Club - Recreational	820	Southwest	High
11	The Christmas Decorators Berkshire	Commercial	460	Southwest	Medium
12	Residential area surrounding Lyne Close	Residential	930	Southwest	High
13	Hill Top Farm Lodges	Hotel	660	Southwest	High
14	Lyne Place Manor	Residential	1100	Southwest	High
15	Severn Trent Green Power West London AD Facility	Industrial	2000	Southwest	Medium
16	Warren Yard Buisness Centre and surrounding area	Commercial / Residential	1000	Southwest	High
17	Residential area surrounding Almners Road	Residential	1150	South	High
18	The Oaks	Commercial	1400	South	Medium
19	Lyne & Longcross Primary School with Nursery	School	1700	South	High
20	Holy Trinity Church, Lyne & Longcross	Church	1750	South	High
21	Fan Court Grounds	Residential	1750	South	High
22	Area surrounding Hardwick Lane	Residential / Commercial	1200	Southeast	High
23	The Paddocks	Residential	1100	Southwest	High
24	A & S Caravan and Motorhome storage and surrounding area	Commercial	1500	Southwest	Medium

25	Residential area surrounding Trumps Green Road	Residential	1500	West	High
26	Trumps Green Infant School	School	1900	West	High
27	Virginia Water Train Station	Transport	1500	West	Medium
28	St Anns Heath Junior School	School	1000	West	High
29	Eastern area of Virginia Water	Residential	1000 – 2000	West	High
30	St. Ann's Hill Farm	Recreational	900	East	High
31	St. Ann's Hill Park and Nature Trail	National Reserve / open area	970	East	Low
32	Residential area surrounding Ruxbury Road	Residential	630	Southeast	High
33	Pyrcroft Grange Primary School	School	1400	Southeast	High
34	Residential area surrounding Chilsey Green Road	Residential	1700	Southeast	High
35	Chertsey Cricket Club	Recreational	1950	Southeast	High
36	Twynersh Fishing Complex	Recreational	1250	East	High
37	St Anns Well	Historical landmark / Open area	670	East	Low
38	Thorpe Lakes Aqua Park	Recreational	1200	Northeast	High
39	Thorpe Park Resort	Recreational	1500 - 2000	Northeast	High
40	Thorpe	Residential	850 - 1400	North / Northeast	High
41	The Sandars (Eden Retirement Living) – currently under development	Residential	1700	Northeast	High
42	TASIS The American International School in England & TASIS England Middle School	School	1300	Northeast	High

43	Longside Lake Watersports	Recreational	1600	North	High
44	Thorpe Industrial Estate	Industrial	1700	North	Medium
45	Thorpe Green	Residential	420	Northwest	High
46	Cherrycroft Bed & Breakfast	B&B	650	North	High
47	Residential area surrounding Hurst Lane	Residential	1000 - 1500	Northwest	High
48	Stroude	Residential	1700	Northwest	High
49	Great Fosters Hotel	Hotel	2000	North	High
50	Steve Logistics Ltd	Industrial	1600	North	Medium

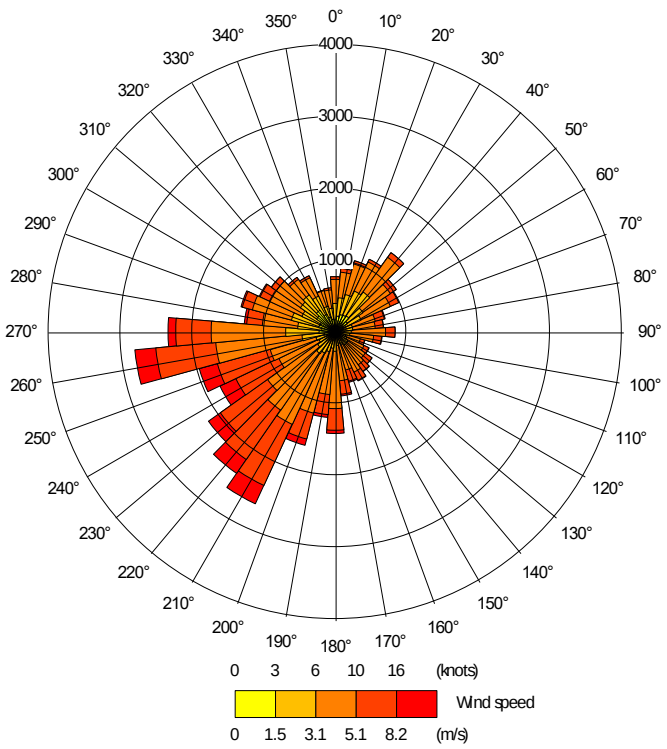
2.2 Off-site sources of odour

There is a recycling centre adjacent to the site to the south east which may have the potential to generate odour. There are also some farming operations in the area which may have the potential to generate odour.

2.3 Wind Rose and Weather Monitoring

Heathrow Airport meteorological station (approximate location NGR E 506952 N 176574) is located approximately 10.7 km north-northeast of the site and is considered the closest most representative meteorological monitoring station to the site. Data is recorded at the meteorological station in hourly measurements and the figure below presents the relationship between the frequency and speed of wind from compass point directions for the combined years 2015 – 2019. The figure illustrates the predominant wind direction to be west-southwesterly / southwesterly, which means receptors northeast of the site would have the highest probability of experiencing potential increases in odour emissions.

Figure 2.31: Heathrow Airport meteorological station 2015-2019



There is no on-site weather station at Chertsey STW. Weather on site can be reviewed if complaints are received or during periods of abnormal operations. The internal 'Weather' SharePoint site provides adverse weather information, and the UK Met Office website can also be used.

2.4 Site Layout and Treatment Processes

For Site Plan and Process Block Diagram see Appendix 4.Further details of the site layout and treatment processes are given in the following sections of the Site Operating Manual and are therefore only given summary attention in this OMP:

Section	Description
1	Governance & Control
2	Location, key layout plans and diagrams. Site services, including power, water, drainage, SCADA and ICA. Consent details, process overview, chemical and waste handling.
3	Detailed description of each treatment process, including sludge and odour control.
4	Maintenance
5	Plant control, monitoring, and logging.

2.5 Process Description

Chertsey sewage treatment works (STW) serves a population equivalent of 100,000

2.5.1 UWWTD activities

Crude sewage is received at the works in two separate places:

The first location is the return liquors pumping station. Crude sewage from Farm Close Pumping Station enters the right well and is transferred to the inlet works with return liquors.

The second location is the inlet works. This is divided into two sides:

The Chertsey side of the inlet (next to the road) receives flow from Hamm moor, Carpenters, St Anne's, Stepgates and Almners Road Pumping Stations. This side also receives the flow from the return liquors pumping station and cess waste from the logger discharge point.

The Egham (near) side of the inlet receives flow from Stoneylands, Devils Lane, Egham Town 11 and 2, Virginia Water storm, Stroud Road and Trumps Green 1 and 2 Pumping Stations.
It also receives the storm tank returns, the contents of the left well of the return liquors pumping station, and any cess discharge which has not been able to go through the logger.

There are two Longwood 6mm screens. Screenings are removed via a launder into the Washpactor and then into an open skip for off-site removal. Flow then proceeds through a Detritor, where a rake transfers grit into an open skip for off-site removal. The inlet flow recorder is interlocked with an actuated penstock valve so that flows in excess of 600 l/sec are diverted to storm. The flow recorder controls Storm tank diversion and drain, plus recirculation.

A metered dose of Ferrous Sulphate is administered to the flow just below the flow recorder, prior to the PSTs, for phosphorus removal.

The flow to treatment is distributed equally over weirs to six circular primary settlement tanks each fitted with rotating half bridge scrapers. The PSTs are automatically desludged through the day. There is one timer controlled desludging pump per tank.

Settled sewage is distributed to each of four Primary Biological filters which are fitted with plastic spall media and low maintenance arms. The flows from these filters gravitate to a Re-lift Pumping station, which feed a bank of three rectangular Intermediate settlement Tanks (ISTs). Secondary sludge is removed from these tanks via timed electrically operated valves. This sludge is then pumped back to the incoming flow prior to the PST's. Filter recirculation is pumped to the outfall of these tanks. There are eighteen Secondary filters, sixteen rock media and two high rate plastic spall media. Each bank of filters is fed from one of the distribution chambers. Rotation is controlled by electric drive systems. The motors are variable speed and rotation times can be increased/decreased.

There are eight circular hopper bottomed humus tanks each with rotating half bridge scrapers. The effluent from each bank of primary/intermediate filters combines in a chamber which distributes the flow between three further distribution chambers. One chamber supplies humus tanks 1 to 3, one supplies HT's 4 and 5 and the other feeds HTs 6 and 8. At present HTs 1 to 3 are automatically desludged by timer, and the other tanks operate on constant draw-off. The humus sludge gravitates to the return liquors pumping station, where it is returned to the inlet works. The humus effluent from all eight tanks combines in a chamber and proceeds to the final effluent outfall to the watercourse. Some of the humus effluent is diverted to the recirculation pump house wet well. There are three humus effluent recirculation pumps which transfer humus effluent to the recirculation chamber to mix

with the Primary settled sewage. The flow recorder at the inlet channel controls the amount of effluent recirculated. A pumping station situated in the Old Microstrainer outfall supplies pressurised effluent to the Inlet works screens and site hydrants.

2.5.2 Sludge Treatment Centre Permit activities

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW, which passes through the aerobic treatment process under the UWWTD. Indigenous sludge is pumped to the Unthickened Indigenous Sludge Tanks and pumped to the Sludge Buffer Tank, via Sludge Screens, where indigenous and imported sludges combine. Alternatively, indigenous sludge can be pumped to Sludge Thickening Plant, thickened and pumped to the Thickened Indigenous Sludge Tanks. From the Thickened Indigenous Sludge Tanks, sludge is then pumped to the Sludge Buffer Tank. Liquor from the Sludge Thickening Plant returns to the works inlet via the site draining and Liquor Return Pumping Station for treatment.

Imports of sludge from other works are delivered to a sludge offloading point and Sludge Import Tank, via Sludge Screens, from tankers and combines with the indigenous sludge in the Sludge Buffer Tank. All such imports are subject to appropriate waste pre-acceptance and acceptance checks, prior to acceptance. The Sludge Import Tank is odour abated via an Odour Control Unit (OCU).

The STC comprises an offloading point for permitted imported waste at the inlet of the STW. The waste arrives at the STC via tanker and is discharged into a chamber and combines with incoming sewer material at the Works Inlet, and is subject to the UWWTD.

All imports will be assessed using the Thames Water standard waste pre-acceptance checks to ensure that they are appropriate for treatment via the UWWTD. Once pre-approved as suitable for treatment via the UWWTD route, the waste carriers are approved. Wastes will be subject to appropriate waste acceptance checks in accordance with Thames Water procedures. Incoming tanker vehicles are directed to the inlet offloading point, which is an impermeable surfaced area, equipped with sealed drainage.

Indigenous sludge and imported sludge from the Sludge Buffer Tank are pumped to Pre THP Dewatering Feed Tank. Sludge is then subject to dewatering in Pre-THP Dewatering Plant and the thickened sludge is then subject to a Thermal Hydrolysis Process (THP), with the application of temperature and pressure, used to enhance the digestion of the sludge. Liquor from the Pre-THP Dewatering Plant are normally pumped to the Liquor Treatment Buffer Tank and Liquor Treatment Plant for treatment before being returned to the Works Inlet by the Liquor Return Pumping Station. The Pre THP Dewatering Feed Tank and Pre-THP Dewatering Plant are odour abated via an OCU. From the THP Process, pre-treated sludge is transferred to one of two Primary Digester Tanks at the site via a THP Cooler. The Primary Digester Tanks are of steel construction with external clad insulation.

Following treatment over an appropriate number of days within the Primary Digester Tanks, digested sludge is transferred to an enclosed and odour abated Digested Sludge Buffer Tank. From here, sludge is dewatered using Digested Sludge Dewatering Plant before it is transferred by conveyor to the Cake Barn, a partially enclosed building for storage prior to removal from site under the Sludge Use in Agriculture Regulations 1989 (SUiAR) and in accordance with the Biosolids Assurance Scheme (BAS). Liquors from Digested Sludge Dewatering is treated within the Liquor Treatment Plant and returned via the site drainage and the Liquor Return Pumping Station to the works inlet. The Digested Sludge Buffer Tank, Digested Sludge Dewatering Plant, Liquor Treatment Buffer Tank and Liquor Return Pumping Station are odour abated via an OCU.

Biogas from the Primary Digester Tanks is captured and transferred to a double membrane Biogas Storage holder for storage. The biogas transfer pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system

for treatment. The Biogas Storage holder and Primary Digester Tanks are fitted with pressure release valves (PRVs) as a safety precaution in the event of over pressurising the system.

The biogas is taken from the Biogas Storage holder for combustion in one of two CHP engines, generating electricity for use within the site, and heat to maintain THP temperature. This is classified as an 'existing' combustion plant under the Medium Combustion Plant Directive. In the event that additional heating is required for the THP or Primary Digester Tanks, this is provided by an onsite boiler. In the event there is excess biogas, i.e. more than the CHP engines can utilise, or in the event that the CHP engines are unavailable, there is a ground mounted emergency flare. This is utilised under 10% of the year or less than 876 hours per year. The CHP engines are currently operated under an Environmental Permit which will be merged with this permit.

The second listed activity at the site utilises a Liquor Treatment Plant to aerobically treat the dewatering liquor generated by the dewatering of sludge. The liquor is passed to the Liquor Treatment Feed Buffer Tank and then the Liquor Treatment Plant where oxygen is bubbled through it in a batch process to reduce the chemical oxygen demand (COD) and biochemical oxygen demand (BOD) loading and convert some of the ammonia within the liquor to nitrites and nitrates. At the end of the batch, the treated liquor is returned to head of the works via the Liquor Return Pumping Station for treatment through the UWWTD flow.

This OMP includes the import of treated sludge cake from other works, for temporary storage within the cake barn, pending offsite recovery. All such imports will be subject to appropriate waste pre-acceptance and acceptance checks, prior to import, including checking whether the incoming cake complies with the requirements of SUiAR and BAS.

Imported treated sludge cake is offloaded into an area within the cake barn, so as to be stored separately to indigenous sludge cake. The waste stream is the same as that arising from the treatment of sludge within the Chertsey STC with the same characteristics, composition and eventual end use – application to land. As such, the infrastructure which is acceptable for use for site cake is appropriate for the imported material. Cake is stored on an impermeable engineered surface within the cake barn, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

A pre-treatment Network Screening Unit is separately available to screen imports of network cleaning waste from TWUL sewer network and wastewater assets. Wastes are imported via tanker to the Network Screening Unit. Incoming vehicles are directed to the offloading point, on an impermeable surfaced area, equipped with sealed drainage and kerbing to reduce the risk of spillages. Solid wastes are screened, segregated and removed from site with the liquid fraction being pumped to the inlet of the STW discharged via the Liquor Return Pumping Station for treatment via the UWWTD process.

3 Site Management Responsibilities and Procedures

3.1 Site Roles

Figure 3.1 Site Roles

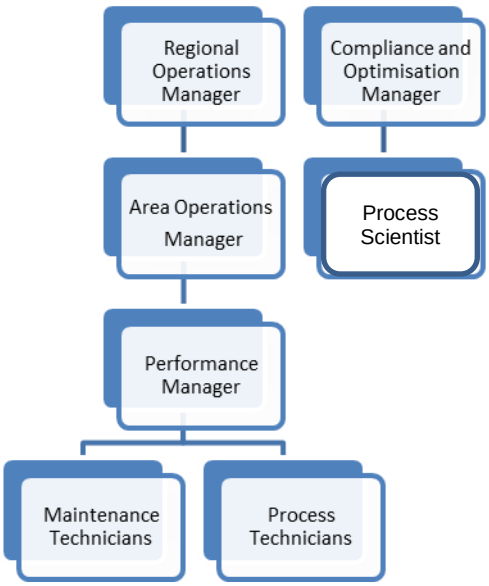


Table 3.2 Tasks and Responsibilities

Role	Tasks and Responsibilities
Regional Operations Manager	Responsible for the overall performance of STW in this region.
Area Operations Manager	Responsible for the overall performance of the STW and catchments areas, , including assessing the scope of, and updating the OMP as it is implemented Coach and develop a management team and provide a strategic approach to short, medium and long term planning.
Performance Manager	Responsible for overall performance of the STW and will be responsible for: • odour control and management at the site • day to day implementation of the OMP • assessing the scope of, and updating, the OMP as it is implemented. • dealing with customer complaints • day-to-day operation of the STW • Ensuring Thames Water staff undergo appropriate training
Technically Competent Manager	Hold the required WAMITAB qualification to support the activities on site under EPR, ensuring permit conditions are complied with.
Maintenance and Process Technicians	Day to day duties include maintaining and operating process equipment.

Role	Tasks and Responsibilities
Customer and Stakeholder Manager (CSM)	Responsible for managing liaison with all external customers and stakeholders in liaison with customer centre, escalation team, local govt. liaison team etc.
Compliance and Optimisation Manager	Responsible for process investigations and technical assistance.
Process Compliance Coordinator	Reports to Process Optimisation Manager. Responsible for process monitoring, improvement and troubleshooting.
Out of Hours Coordinator	Point of escalation for any issues out of hours.
Duty Manager	The duty manager is centrally based (off-site) and is responsible for event management across the business.
Customer Centre	Responsible for receiving all customer calls, logging them and passing them to the appropriate operational departments.

The site is manned during normal working hours.

3.2 Key Contacts

Thames Water Website – www.thameswater.co.uk

Role	Name	Email address	Phone Number
Area Operations Manager	[redacted]	[redacted]	[redacted]
Performance Manager	[redacted]	[redacted]	[redacted]
Technically Competent Manager	[redacted]	[redacted]	[redacted]
Senior Process Scientist	[redacted]	[redacted]	[redacted]
Process Scientist	[redacted]	[redacted]	[redacted]
Customer Centre	Chertsey STW	customer.feedback@thameswater.co.uk	0800 316 9800

3.3 Operator Training

Staff working on site undergo a site induction that is carried out by the Performance Manager. The site induction includes direction to the presence and location of the various operational procedures which include the SOM and the OMP.

All Technicians/Operators undergo a specific programme of training which covers management of activities on site. In addition, the THP Technicians undertake external BOAS training to be either BOAS O (operator) or BOAS M (manager)

The Sludge Treatment Centre permit requires that a Technically Competent Manager holding a relevant WAMITAB qualification is in place at the site and meets a weekly site attendance requirement.

All records of staff training are held on the company HR training database in Learning on Tap or within the local LOAD document.

All training records are currently held on Learning on Tap where they are accessible by the site Performance Manager and individual members of staff.

4 Odour Critical Plant Operation, Monitoring and Management Procedures

Odour prevention and reduction is achieved at Chertsey through at least an annual review of the Odour Risk Assessment, Odour Management plan and Odour improvement plan. In combination with the maintenance and monitoring carried out on site mentioned in sections 4 and 5. Through our Odour Management Plans and maintenance procedures, the primary focus is on effective process control to minimise the risk of off-site odour nuisance. Similarly, our site-based frontline Wastewater Treatment Operations team are focussed on effectively managing the on-site process.

4.1 Odour Sources, Critical Issues and History

As a summary of recent odour complaints for the site: Two complaints received in 2021, one in 2020, one in 2019, one in 2018, none in 2017. There were no complaints formally recorded in 2022.

Odour issues arising from hydrogen sulphide from the inlet are challenging to address since the septicity of the incoming flow reflects the structural configuration and conditions arising from a long, pumped, rising main. The inlet is identified as odour critical plant in Section 4.2.3

An Odour Risk Assessment is included as Appendix 1.

An Odour Improvement Plan is included as Appendix 2.

Critical Odour Issues, Emergency Response and Mitigation Measures are summarised in Tables 4.3 to 4.7.

4.2 Identification of Odour Critical Plant

4.2.1 Odour Risk Assessment

Odour Risk Assessment is not a ‘one-off’ exercise but an on-going process, due to changes, both operational and capital, in the treatment plant. The Odour Risk Assessment should be reviewed whenever the site undergoes an operational or capital change which could affect odour.

It is constructed in the following manner:

- Each part of the treatment process is considered under different operating modes – e.g. normal, failure, abnormal: system overload, summer conditions, maintenance etc.
- The nearest customers to the particular odour source are identified.
- The likely frequency and duration of occurrence for each eventuality is identified.
- A score is assigned to the severity (0 – 5) of odour under each operating mode.
- A score is assigned to the probability (0 – 5) of causing an odour nuisance for each operating mode.
- Multiplying the severity of odour and probability of causing an odour nuisance generates a ‘Current Odour Emission Risk’ score. Between 0 (zero risk) and 25 (maximum risk), this is used to decide where mitigation should be applied in the short term, and determine where in the longer term enhanced improvement measures are required. Where improvements are identified as necessary (i.e., where suitable mitigation measures are not already in place), entries are made onto the Odour Improvement Plan.

- The need for operational mitigation, enhanced measures and customer communication is stated and brief details given.

Items scored in the Odour Risk Assessment with a risk score greater than 10, are classified as Odour Critical Plant, and where existing operational mitigation measures are not sufficiently robust, will have Improvement Plans generated to address the odour issues. The Odour Improvement Plan for Chertsey STW is included in Appendix 2.

4.2.2 Potential Odour sources

The following list of potential UWWTD odour sources been identified during the risk assessment:

- Works inlet incoming sewers
- Cess waste import area
- Site Drainage
- Screens and screenings handling
- Detritus tank
- Grit removal and skips
- Storm Tanks
- Primary Settlement Tanks
- Intermediate settlement tanks
- Filter beds
- Humus Tanks

The following list of potential odour sources under EPR been identified during the risk assessment:

- Cess Waste import area
-
- Sludge Buffer Tanks
- Sludge reception tank and import area
- Sludge screening
- Sludge Thickening
- THP plant
- THP Steam Boiler
- Digester Area
- Digested sludge buffer tank
- Digested sludge contingency tank
- Biogas handling, utilisation and storage
- Sludge dewatering
- Sludge conveyor
- Liquor treatment buffer tank
- Liquor treatment plant
- Liquor return PS
- Cake Barn and vehicle movements
- Pressure release valves
- Network screening unit and skips

4.2.3 Odour Critical Plant

The following list of odour critical plant has been identified during the risk assessment:

- Inlet Works
- Storm Tanks
- Primary Settlement Tanks

- Intermediate settlement tanks

4.2.1 Waste Storage for Sludge Treatment Centre Permit

Waste is not stored on site prior to treatment through the UWWTD or AD process. A list of the main tanks relating to the sludge treatment process and their associated volumes and retention times is shown below.

Table 4.0 Sludge Treatment Centre Permit Tank Inventory

Tank Purpose	Number	Operational Volume (m^3)	Material	Average retention time (where applicable)
Unthickened Indigenous Sludge Tanks	2	86	Concrete	1.3 days
Thickened Indigenous Sludge Tanks	1	86	Concrete	7 hours
Sludge Buffer Tank	1	600	Concrete	3.5 days
Pre THP-Dewatering Feed Tank	1	30	Steel	0.6 hours
THP Feed Silo	1	50	Steel	1 hour
THP Process	1			
THP Process -Tanks Pulper	1	25	Steel	1 hour
THP Process- Tanks Reactor Tanks	1	12	Steel	1 hour
THP Process Tanks- Flash Tank	1	35	Steel	1 hours
Primary Digester Tanks	2	1,562	Steel	13.3 days
Digested Sludge Buffer Tank	1	156	Steel	10 hours
Digested Sludge Contingency Tank	1	156	Concrete	Not a part of normal operation
Liquor Treatment Plant	2	2,166	steel	6 hours
Polymer Tank (for dewatering)	1	28 tonnes	Steel	NA
THP Diesel Tank	1	16,000 litres	Steel	NA

An inventory of potential odorous materials relating to the Sludge Treatment Centre Permit is shown in Table 4.1 below. Air Emission Points are listed, and the locations shown on the site plan in Figure C of Appendix 4.

Table 4.1 Odorous materials for Sludge Treatment Centre Permit

Odorous and potentially odorous material (any solid, liquid or gas)	Location of odorous materials on site	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	EWC Codes	Type of Emission	Odour potential High Risk / Medium Risk / Low Risk
imported sludge	Sludge import tank	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Point Source (see OCU entry)	Medium
Primary Sludge/Surplus Activated Sludge	Thickened/unthickened Indigenous sludge Tanks	Refer to Table 4.0 Site Tank Inventory	Retention times for each stage of the process are detailed in Table 4.0	19 08 05	Diffuse	Medium
Sludge Screenings	Sludge import area	1 skip	One week once full.	19 08 01	Diffuse	Low
Cake (including imports)	Cake Barn	5000 tonnes	Up to 3 months	19 06 06	Diffuse	Low
Biogas	See Air Emission Point Plan; Whessoe Valve; PRV;unburnt methane from CHP engine; gas storage vessel	Gas holder capacity is 1580m3	Continuous operation	N/A	Point source	Medium

Odorous and potentially odorous material (any solid, liquid or gas)	Location of odorous materials on site	Maximum quantity on site at any given day	Maximum time held on site (hours or days)	EWC Codes	Type of Emission	Odour potential High Risk / Medium Risk / Low Risk
Releases from OCUs	For OCUs see detailed consideration in section 4.3.1	Variable throughput is specific to each OCU	Currently not in operation	N/A	Point source *not currently in operation	Medium
Liquor	, Site drainage liquor return pumping station	Refer to Table 4.0 Site Tank Inventory	Continuous pumping of liquors from SBRs and	16 10 02	Diffuse Point Source (see OCU entry)	Low
Network Screenings and Grit	Network Screenings unit and skip	2 skips	once 2/3 full 1 week	19 08 01 19 08 02	Diffuse	Low
Network cleaning waste	Network screening unit	Up to 30m^3	2 hours	20 03 06	Diffuse	Low

Table 4.2 Odorous raw materials for Sludge Treatment Centre Permit

Raw Material	Odorous	Maximum Storage	Mitigation	Odour Risk
Sludge Polymer 1.Flopam FO4800MPM 2.Flopam EM640L 3.Flopam FO4440	1. No odour 2. No odour 3.No odour	1. 28 tonnes bunded silo 2.2,000L in IBCs on portable bunds 3.0.75 tonnes stored in bulk bags	1. Contained with lid 2. Contained with lid 3.Stored within a building	1. Low 2. Low 3.Low
Antifoam 1. Flofoam 681 F 2.Flofoam 139F	1. No odour 2. No odour	1.4,000L in IBCs on portable bunds 2.2,000L in IBCs on portable bunds	1.Contained with lid 2.Contained with lid	1. Low 2. Low
Biogas	N/A	N/A	N/A	N/A
Exxon Mobil Diesel	Petroleum	16,000L in bunded fuel tanks	Contained with lid	Low

Exxon Mobil Diesel	Petroleum	61,400L in bunded fuel tank	Contained with lid	Low
Lubricating Oil – Mobil Pegasus 605 Ultra 40	Not odorous	2.2 tonnes bunded oil tank	Contained with lid	Low
Bisulphites Aqueous Solution (Nalco 77211)	Sulphurous	440L on portable bunds	Contained with lid	Low
Glycol Coolant – Delo XCL antifreeze/coolant premised 40/60	Mild Solvent	2 tonnes in IBCs on portable bunds	Contained with lid	Low
Caustic Soda Liquor	Solvent	30,000L bunded silo	Contained with lid	Low
Salt BWT Sodium Chloride	Odourless		Within a building	Low
Bisulpites aqueous solution (Nalco 7408)	Sulphurous	440L bunded tank	Contained with lid	Low
Sodium hydroxide solution (Nalco 77224)	Odourless	440L bunded tank	Contained with lid	Low
Nex Guard (Nalco NexGuard)	Ammoniacal	440L bunded tank	Contained with lid	Low

Low odour raw materials are chosen for use, as far as practicable.

4.3 Odour Control Measures

The SOM referred to above complies with Thames Water's Asset Standards – Operating Standards. It states the operational procedures to be followed in order to maintain and operate plant to agreed company standards. These standards include, where appropriate, procedures for ensuring that generation of odour is kept to a minimum. Refer to risk assessment in Appendix 1 where these measures are summarised as "Normal Mitigations"

The routine operational tasks carried out at Chertsey STW to specifically mitigate against generation of odour are listed in the above SOM.

Daily site and sludge rounds are carried out to check each part of the site is operating correctly. These are detailed in Appendix 5 and 6.

4.3.1 Odour Control Units

The site has the following odour control plants, which are currently not operational but are described below. An odour improvement plan which includes OCU assessment and refurbishment/replacement is included in Appendix 2, mitigations for odour is listed in Tables 4.3-4.6 and in the odour risk assessment in Appendix 2. Chertsey had 0 formally recorded odour complaints in 2022.

OCU1 (A8) Thermal Hydrolysis Process: AGM Engineering Biofilter 207/p171/MN (1999)

Pre THP dewatering plant, pre THP dewatering feed tank, sludge import tank

A full enclosed two stage biofilter to treat extracted odours under all conditions of load and temperatures, with duty / standby fans and water pumps.

Media 1st Stage Polypropylene Pall Rings

Media 2nd Stage Root and Coarse Woodchip

OCU2 (A9) Sludge Dewatering: GBM Construction 2012

A fully enclosed Biofilter and carbon polishing unit to ensure treatment of extracted odours under all conditions, with duty / standby fans and water pumps.

1st Stage Biofilter

2nd Stage Carbon

This unit serves the Liquor Buffer Tank, Beltpresses 1 & 2 and their conveyors, Digested Sludge buffer Tank and the Liquor Return Pumping Station.

OCU3 Inlet: Hibirea 1999

Fully enclosed biofilter to treat extracted odours under all conditions of load and temperatures, with duty / standby fans and water pumps.

1 stage seaweed bio-filter with duty/standby direct drive extraction fans.

4.3.2 Site Specific Measures and abnormal events

H4 has been used to guide the preparation of this OMP where it relates to activities regulated under the Sludge Treatment Centre Permit. As this guidance does not apply to UWWTD activities, where reference to H4 is made within this document this should not be inferred as H4 being applicable to UWWTD activities. Specific tasks and measures taken in intermittent, abnormal, and emergency events associated with the control of odours at Beddington STW are summarised in the tables below.

Table 4.3: Summary of routine odour mitigation tasks for assets under UWWTD

Odour Source	Odour Offensiveness L/M/H	Specific Odour Management Tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for Action	Remedial action and Timescale
General		Housekeeping – keep site clean and tidy.	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Clean up as soon as possible, no later than the end of the day
Works Inlet incoming sewers	Septic sewage, sulphide	Clean up any spills ASAP	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Clean up as soon as possible, no later than the end of the day
		Assess and control catchment septicity	Site Tech 1s	Visual Inspection	Daily		
Cess Waste import area Linked tasks specified in Section 2.1 of appendix 5	Septic sewage, sulphide	Clean up any spills.	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Clean up as soon as possible, no later than the end of the day
		Discharged directly to inlet works through close coupled connector with the quantity managed by TW Biorecycling to be within permit limits.	Quantity managed by TW Biorecycling	Discharge logged by tanker driver using swipe card.	As required	Tanker seen discharging in appropriate manner. Coupling method presents clear odour risk from loose/incomplete fitting and/or release of liquid. Stop tanking if risk identified on site.	Stop operation and contact Commercial Waste Team

Site Drainage	Diluted septic (L)	Keep drains clear to enable effective washdown of odorous material.	Site Tech 1s	Visual Inspection	As required	Blockage identified	
Screens and screenings handling Linked tasks specified in section 2.3 and 2.4 of appendix 5	Sewage/Musty(L)	Clean up any spills as soon as practicable (including rag during skip changes and during de-ragging of Washpactor).	Site Tech 1s	Visual Inspection	Daily	Spillage identified	Clean up as soon as possible, no later than the end of the day
		Keep screen covers on units.	Site Tech 1s	Visual Inspection	Daily	Open cover/damaged cover	Confirm each day by visual inspection
		Clean plant internally and externally when taken out for service.	Site Tech 1s	Visual Inspection	As required		
		Check Washpactor covers are closed.	Site Tech 1s	Visual Inspection	Daily	Open cover/damaged cover	Close cover no later than the end of the day
		Clear stones from stone trap.	Site Tech 1s	Visual Inspection	Daily	Build up of stone	Remove stones from trap no later than the end of the day
		No filled uncovered skips to be left on site.	Site Tech 1s	Visual Inspection	Daily	Skips over two thirds full are always prioritised for emptying given potential for odour.	Full skips aim to be removed within 1 week by Biffa.
Grit Removal Linked tasks specified in Section 2.5 of Appendix 5	Sewage (L)	No filled uncovered skips to be left on site.	Site Tech 1s	Visual Inspection	Daily	Skips over two thirds full are always prioritised for emptying given	Removal of grit removal skips follows approach for screenings (although odour potential can be proportionally

						potential for odour.	less). Proactive interventions are also made earlier in the process, such as removal of grit build up in the inlet channels; attention to blockages in the wash water system; rag removal from baffles/mechanical equipment are regular tasks completed weekly.
		If Detritor taken out of service for longer than one week, wash down plant and unit.	Site Tech 1s	Visual Inspection	As required		
Storm Tanks Linked tasks specified in section 2.6 of appendix 5	Sewage/septic (M)	Check automatically emptying storm tanks after storm to ensure that they have emptied correctly and clean as soon as practicable. Storm tank discharge returns to covered area back to full treatment.	Site Tech 1s	Visual Inspection	Daily	Collected debris in storm tanks indicating attention is required.	Arrange via Manager a clean of the storm tanks as and when required
Primary Settlement Tanks Linked tasks specified in section 3 of appendix 5	Sewage/Septic (M/H)	Remove any build-up of scum or rag on tank surface, weirs, or scum traps.	Site Tech 1s	Visual Inspection	As required	Scum board function compromised by excess material.	Removal of accumulated material in scum boards within 3 working days – if mechanical or blockage, a tanker/jetter will be needed and this should be

							done on a weekly basis
		Monitor sludge blankets depths and chart weekly. Sludge blanket levels defined in SOM.	Site Tech 1s	Visual Inspection	Daily	Lifting puts more load on biological process. Need to keep below 0.5m to keep solids feeds to drum thickener between 1 and 2%.	De-sludge affected tank and report to Site Manager. Manually dip on daily basis. After consultation, decision to increase de-sludging or take out of service and drain would be made within 2 weeks.
		During maintenance, drain and clean tank ASAP	Site Tech 1s	Visual Inspection	As required		
		In case of bridge/scraper failure for more than 48 hours, drain and hose down tank.	Site Tech 1s	Visual Inspection	As required	Scraper blade damaged; detached or failed. Fault with PST Scraper Fail Alarm.	If scraper operation impaired remedial action is manually desludge the tank by the Tech 1 within 2 working days. Attention to scraper fail alarm will be addressed within 1 working day and if cannot be resolved a job raised on SAP for M/E to resolve in 1 working day.

							Tanks may require cleaning or emptying which may take up to 3 months to complete. Funding to support scaffolding and cleaning may be required.
		Check and clear blockages in sludge pumps or pipe work.	Site Tech 1s	Visual Inspection	As required		
Intermediate settlement tanks	Sewage/Septic (M/H)	Monitor sludge blankets depths and chart weekly. Sludge blanket levels defined in SOM.	Site Tech 1s	Visual Inspection	Weekly	Lifting puts more load on biological process. Need to keep below 0.5m to keep solids feeds to drum thickener between 1 and 2%.	De-sludge affected tank and report to Site Manager. Manually dip on daily basis. After consultation, decision to increase de-sludging or take out of service and drain would be made within 2 weeks.
		During maintenance, Drain and clean tank ASAP	Site Tech 1s	Visual Inspection	Daily		
		In case of bridge/scraper failure for more than 72 hours, drain and hose down tank.	Site Tech 1s	Visual Inspection	As required	Scraper blade damaged; detached or failed. Fault with PST Scraper Fail Alarm.	If scraper operation impaired remedial action is manually desludge the tank by the Tech 1

							within 3 working days. Attention to scraper fail alarm will be addressed within 1 working day and if cannot be resolved a job raised on SAP for M/E to resolve in 1 working day. Tanks may require cleaning or emptying which may take up to 3 months to complete. Funding to support scaffolding and cleaning may be required.
		Check and clear blockages in sludge pumps or pipe work.	Site Tech 1s	Visual Inspection	As required		
Filter Beds	Earthy (L)	Checks to ensure no loss of rotational arm and alarm functional.	Site Tech 1s	Visual Inspection	Daily		
Humus Tanks Linked tasks specified in section 5 of appendix 5	Earthy (L)	Report to TL tanks with sludge levels/gassing. Sludge blanket levels defined in SOM.	Site Tech 1s	Visual Inspection	Daily		
		In case of bridge/scraper failure for more than 72 hours, pump and hose down tank.	Site Tech 1s	Visual Inspection	As required		

Table 4.4: Summary of routine odour mitigation tasks for assets under Sludge Treatment Centre Permit

Odour Source	Odour Offensiveness L/M/H	Specific Odour Management Tasks	Responsibility	Monitoring	Monitoring Frequency	Trigger for Action	Remedial Action and Timescale (Important: For all issues/incidents, at first point of identification, check the permit conditions to establish if a Schedule 5A Notification is required)	Odour risk if measures fail
Sludge Buffer Tanks Linked tasks specified in Section 8.1 of appendix 5	Sulphur compounds (M)	Manage sludge levels through the Belt thickener if stocks increase arrange on-site tanking to the THP. There is a level senser which can initiate an automatic shut off to prevent overfill. For further details refer to SOM.	Site Tech 1s	Visual Inspection and automatic shut off.	Daily	Level sensor alarm	Technician to attend within the day and investigate and take remedial actions	
		Check that SAMS mixing is operational.	Site Tech 1s	Visual Inspection	Daily	SAMS mixing failure	Technician to attend within the day and investigate and take remedial actions	
		Remove build-up of rag and grit from tanks.	Site Tech 1s	Visual Inspection	As required	Rag and grit visible	Organise wash down and clean within 3 days	
		If a tank is taken out of operation, pump out and clean tank down as soon as practicable.	Site Tech 1s	Visual Inspection	As required			

		Clean up any sludge or Poly spillages.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	
		Clean sludge from undertrays.	Site Tech 1s	Visual Inspection	As required		Technician to attend within the day and clean	
		Plant to be taken out of service – ensure wash cycle is used before cleaning down.	Site Tech 1s	Visual Inspection	As required			
Sludge import tank and Import area Linked tasks specified in section 1 of appendix 6	Sulphur compounds (M)	Check all hatches are closed.	Site Tech 1s	Visual Inspection	Daily	Open hatch	Close hatch	
		Clean any spillages.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	
		Imported Sludge discharged to a covered well through close coupled connector and into the enclosed sludge screens then on to the covered Sludge Reception Tank.	Quantity managed by TW Biorecycling	Discharge logged by tanker driver using swipe card.	As required	Fault with Bauer connection point presenting risk of leaks; spills or accumulated debris	If simple issue such as a spill, clear immediately. Remedial actions/timescales similar to Cess logger. If Bauer connection damaged beyond repair close logger off & immediately alert BioRecycling).	
		Blended sludge transported via underground pipe to Sludge Reception Tank.	TW Operations	ultrasonic level detector which inhibits flow if high	Continuous			

Sludge screening Linked tasks specified in section 2 of appendix 6	Musty (L)	Blockage cleared, Screenings washed before discharge and spillages cleaned.	Site Tech 1s	Visual Inspection	Daily			
		Remove full skips from site and ensure covered.	Managed by Biffa	Visual Inspection	Daily	Skips over two thirds full are always prioritised for emptying given potential for odour.	Full skips aim to be removed within 1 week by Biffa.	
Sludge Thickening Linked tasks specified in section 8.3 of appendix 5	Sulphur compounds (M)	Keep all unit doors and covers closed.	Site Tech 1s	Visual Inspection	Daily	Open or damaged door/covers	Close door. If damaged door put order for new door/repair	
		Clean any spillages as soon as practicable.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	
THP plant	Burnt coffee (M)	Check for gas leaks.	Site Tech 1s	Monitoring equipment	Daily	Gas leak identified	Isolate plant ASAP, investigate and rectify	
		Clean any spillages.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	
		Arrange for inspection of all Pressure Relief Valves.	Site Tech 1s	Visual Inspection	Annually		Annual shut down	
		Hydrolysed sludge enclosed in pressure vessels and pipework.	Site Tech 1s	Visual Inspection	Continuous			
THP Steam Boiler	Sulphur compounds (M)	Check for gas or combustion leaks.	Site Tech 1s	Monitoring equipment	Daily	Gas leak identified	Isolate plant ASAP, investigate and rectify	

		Arrange for calibration of burner and emissions.	Site Tech 1s	As Described	Annually		Annual calibration	
Digester Area	Sulphur compounds (M) and Earthy (L)	Clean any spillages as soon as practicable.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	
		Visually monitor Ground Flare operation. Report any problems to team manager.	Site Tech 1s	Visual Inspection	Daily			
		Visually check for blowing Whessoes or gas leaks in general.	Site Tech 1s	Visual Inspection	Daily	Blowing whessoes or gas leak identified	If release confirmed follow pollution reporting process ASAP	
		Klampresses and conveyors for Digested sludge cake are enclosed and spillages are washed to site drainage which returns to the head of the works.	Site Tech 1s	Visual Inspection	Continuous			
Digested Sludge buffer tank Linked tasks specified in section 3 of appendix 6	Sulphur compounds (M)	Covered.	Continuous	Visual Inspection	Daily			
Gas Compressors	Sulphur compounds (M)	Check for gas leaks via gas detection systems and portable gas monitors.	Site Tech 1s	Monitoring equipment	Daily	Gas leak identified	Isolate plant ASAP, investigate, rectify and report.	
Beltpresses Linked tasks specified in section 13 of appendix 6	Sulphur compounds (M)	Covered and any spillages cleaned ASAP.	Site Tech 1s	Visual Inspection	Daily	Spill identified	Clean up ASAP but no later than end of the day	

Cake Barn(including imports) Linked tasks specified in section 16 and 17 of appendix 6	Sulphur compounds (M)	Load inside barn. Lorries covered and wheelwash, Barn has mesh-sides for fly control. Cake in storage forms a crust after a day or two reducing risk of odour. No additional turning or handling during cake storage. Subject to pre acceptance checks.	Site Tech 1s	As Described	As required	High priority triggers: (i) cake barn door subject to damage and left in open position; (ii) Failure of wheel wash; (iii) silos reaching 70% capacity to avoid risk of stockpiling	(i) Ops Team to investigate temporary covers/additional temporary odour suppression measures (such as use of odorants) for any period where replacement door requires specialist weld or replacement. (ii) Replacement or repaired wheel wash to be supplied in c. 12 weeks during which cake would be stored within the sealed building until repaired. (iii) would be referred to internal BioRecycling Team Managers for review but noting under normal operation there is sufficient capacity. Remedial action	

							would be to transfer cake to nearest available site with sufficient capacity; BioRecycling contingency planning to be followed.	
Network Screening Unit and skips	Sewage (L)	General housekeeping	TWUL	Visual Inspection	Daily	Skips over two thirds full are always prioritised for emptying given potential for odour. Spillage identified	Full skips aim to be removed within 1 week by Biffa. Clean up ASAP, no later than the end of the day.	Low

Table 4.5: Intermittent(Int), abnormal (Ab), and emergency events (E) for assets under UWWTD

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response to odour under Int/Ab/E events	Odour risk after mitigation
Works Inlet incoming sewers	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Cess Waste import area	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Screens and screenings handling	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible (including rag during skip changes and during de-ragging of Washpactor).		Low

Grit Removal	Detritor taken out of service for longer than one week	Ab	Site Tech 1s wash down plant and unit.		Low
Primary Sedimentation Tanks	Bridge/scraper failure	Ab	Site Tech 1s drain and hose down tank	**Ab** operational response from couplings and motor issues within 2 weeks turnaround. **E** operation would be loss of 2 or more of the 6 PSTs. Response would be to manually de-sludge with increased export.; 1 to 2 weeks to empty and then contractor support for up to 4 months if complicated repair with use of crane. Scraper failure referenced in Table 4.2.	Low
Intermediate settlement tanks	Bridge/scraper failure	Ab	Site Tech 1s drain and hose down tank	**Ab** operational response from couplings and motor issues within 2 weeks turnaround. **E** operation would be loss of 2 of the 3 ISTs. Response would be to	Low

				manually de-sludge with increased export.; 1 to 2 weeks to empty and then contractor support for up to 4 months if complicated repair with use of crane. Scraper failure referenced in Table 4.2.	
Humus Tanks	Bridge/scraper failure.	Ab	Site Tech 1s drain and hose down tank		Low

Table 4.6: Intermittent (Int), abnormal (Ab), and emergency events (E) for assets under Sludge Treatment Centre Permit

Process stage	Event	Status	Ops mitigation	Expansion of TWUL operational response to odour under Int/Ab/E events	Odour risk after mitigation
Cess Waste import area	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Sludge Buffer Tanks	Tank is taken out of operation	Ab	Pump out and clean tank down as soon as practicable. Ensure wash cycle is used before cleaning down.		Low
Raw Sludge Belt Thickener (not currently in use)	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Sludge import tank and Import area	Spills.	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Sludge screening	Blockage and Spills.	Ab	Cleaned up by Site Tech 1s as soon as possible.	Blockages dealt with on	Low

				identification. **Ab/E:** Loss of 1 of the two screens would be significant for process operations. As within building, not particularly odorous but potential odour risk from screening handling present on tanker use.	
Sludge Thickening belts	Spills.	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
	Gas leaks.	Ab	Checked by Site Tech 1s on daily basis	E: rupturing of gas pipework and sludge pipework. Isolate plant ASAP and patch repair circa 1 week min	Low
THP plant	Spills.	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
	Pressure Relief Valves (PRVs) venting	Ab	Gas leaks checked by Site Tech 1s on daily basis		Low
THP Steam Boiler	Gas or combustion leaks	Ab	Checked by Site Tech 1s on daily basis		Low
Digester Area	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
	Blowing Whessoes or gas leaks	Ab	Visually checked by Site Tech 1s on daily basis	**Int/Ab:** Impaired availability of engine/boilers. **E:** failure of CHP	Low

				engine &/or ground flare. If repair not possible, response would be recourse to a standby boiler/engine/flare to limit whessoe/PRV releases. Lead in time of c. 4 to 6 weeks. Potential for odour to be present from released biogas.	
	Digested Sludge Holding tank overflow to open chamber	Ab	This is returned ASAP		Low
Digested Sludge contingency tank	in use	Ab	returned ASAP to digested sludge buffer tank		Low
Gas Compressors	Gas leaks.	Ab	Checked by Site Tech 1s on daily basis		Low
Beltpresses	Spills	Ab	Cleaned up by Site Tech 1s as soon as possible.		Low
Cake Barn (including imports)	sludge cake removals	Ab	Temporary operation, possible customer communication needed	Within barn, cake managed by contractor .	Medium

Table 4.7: General Intermittent (Int), abnormal (Ab), and emergency events (E) events

Incidents and emergencies	Event	Status	Ops mitigation	Expansion of TWUL operational response to odour	Odour risk after mitigation

				under Int/Ab/E events	
Incidents and emergencies				**For all entries TWUL's incident management response process would be followed including use of Site Incident (SIC) cards.**	
Fire	Unable to operate sludge treatment process.	E	Use of SHT or PST for minor duration storage of sludge. Stop sludge imports. Tanker from site.		Low / Medium
Severe weather	Transport of sludge from site inhibited resulting in back up of sludge in site resulting in additional odour release from tanks and PSTs	E	Event unlikely as there is provision for 90days storage on site. Reduce or cease processing of sludge.		Low
Flooding	Flooding causing process or equipment problems	E	Not an identified problem at Chertsey. Site incident procedures would be followed.	Pumps/tankering arranged through LMC.	Low
Illness/absence of key staff	Accumulation of sludge/loss of odour control etc.	E	Task allocation is independent of individual staff. Staff from other areas could be called upon to assist.		Low
Power cuts	Loss of power to fans leading to loss of odour control	E	Emergency power generation for critical activities until power restored. These have a PPM regime. Thames Water's incident response planning, arrangements are already in place with a supplier for temporary generators. This agreement has a Service Level Agreement for provision within 24 hours.	Greatest risk in persistent inclement weather where temporary external power outages might constitute the most likely externally generated risk. Recourse to	Low

				temporary generators.	
Other incidents	Transport of sludge to land inhibited for other reasons leading to back up of sludge in site resulting in additional odour release from tanks and PSTs	E	There is provision for 90days storage on site. Temporary Odour mitigation can be installed, and TW Biorecylcing can re-route sludge to other sites on a strategic basis.		Low

4.3.3 Spillages

Spillages significant enough to cause odorous emissions will be cleared as soon as practicable. The person discovering the spillage will inform site management, who will utilise resources as required to clear it.

4.4 Routine Monitoring

Overall plant performance is assessed daily as part of the generic Site and Sludge inspection rounds, which apply to Thames Water large STW sites, and have been included in appendices 5 and 6, respectively.

The objective of these are to ensure that treatment processes, including odour control, are checked for effective operation as per the SOM. Any of the checks that result in performance of the process outside of the limits defined in the SOM or a fault being detected will require an Operator to change the process to bring the plant back into acceptable limits or the fault needs to be logged and reported for follow up maintenance/repair.

Where remedial actions are identified from any source these are listed in Tables 4.3 & 4.4 with expected durations accompanying rectification. The timescales given are indicative or illustrative but are informed directly by operational experience. Repairs requiring capital funding will take longer as they are directly informed by complexity and will be bespoke to the issue(s) identified.

Various process parameters are monitored using a combination of online instruments (to measure flows, temperatures, pressures, levels); samples that are taken to our UKCAS accredited laboratories,or run through sampling tests at the on-site laboratories (%DS, pH, alkalinity, ammonia).

The online instruments all have signals that are taken back to the site SCADA system and these ‘alarm’ if the readings are outside pre-set trigger points. Similarly, laboratory analysis samples will have expected ranges, which if outside of these, a notification is sent to the site process controllers.

In all instances that parameters are out of ‘range’, the operational teams will carry out an investigation to understand the cause and initiate corrective actions. If the reasons are not obvious, the process optimisation team is contacted to evaluate further.

Additionally, each week the various recorded parameters are recorded in the site Cockpit reports to look at trends. These are used to establish if there are gradual changes in performance over time so that early intervention can be carried out.

A range of process parameters are subject to routine monitoring or checking to ensure that the digestion process is operating optimally so that the required sewage cake output quality is achieved.

- pH: At a THP digestion site such as Chertsey the processes is maintained around pH 8 but within the range 7.5-8.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Advanced digestion (THP) typically, 5,000 - 10,000mg/litre (target range from 6,000- 8,000 mg/litre) but is dependent on % dry solids and digester load.
- temperature: minimum target of 40°C for advanced digestion. This is maintained within the range 36-45°C for THP AD.

- HRT (hydraulic retention time): minimum target is 15-days, there is no upper limit. Retention times shall not be less than 12-days during plant outages to keep the product pathogen kill efficiency control.
- OLR (organic loading rate): see table below - this is dependent on the primary/SAS ratio. Chertsey fits into the fourth row of the table.
- Dry solids feed: see table below, Chertsey has a target of 10%DS, but this can vary between 8-14%DS and impacts the HRT.

Type of Digestion	0%- 35% SAS[x]	36%- 45% SAS	46%- 50% SAS	51%- 55% SAS	>55% SAS	Max Feed %DS
MAD* in Conventional Digestion	3	2.5	2	1.75	n/a	6
MAD after Pre-pasteurisation	4.5	4	3.5	3	n/a	7
MAD after Acid Hydrolysis	4.5	4	3.5	3	n/a	7
MAD after Thermal Hydrolysis	7	6.5	6	5.5	5.5	14

* mesophilic anaerobic digestion
[x] surplus activated sludge, arising from the UWWTD treatment route.

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to the digester. The typical range for VFAs in a primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.
- Ammonia - Ammonia concentrations of 50 to 1000 mg/L are beneficial, but ammonia levels of 1500 to 3000 mg/L (pH greater than 7.4) could be inhibitory but not always. An ammonia concentration higher than 3000 mg/L for prolonged period is toxic.
- VFA to Alkalinity ratio: Very important parameter to monitor for digestion process. The VFA to alkalinity ratio of below 0.4 is good and above this threshold value means diminishing alkalinity and low pH i.e. sour digester content. As long as this ratio is maintained higher VFA and alkalinity digester content can be acceptable and the digestion process is deemed healthy. Anaerobic digestion process is always controlled based on holistic parameters based but not based on single parameter.

Sniff Testing

Sniff testing has been incorporated into our Odour Improvement Plan (Appendix 2). This is to allow time to ensure that the most effective sniff testing can be carried out using personnel not sensitised to smells on site.

The procedure will be undertaken in response to complaints or if a risk of odour nuisance at sensitive receptors is expected and/or has been substantiated.

- Sniff testing will normally be carried out at by someone not routinely based at site, who are less sensitised to odour produced on site.
- Assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.
- The procedure and recording form which will be used can be found in appendix 7 of the OMP.

Site operatives' complete daily walkovers of site which includes assessing 'If site odour level is acceptable'. This is captured and recorded in the e-log book to ensure steady state monitoring.

Further details of routine monitoring tasks are included in the Site Operating Manual.

4.5 Record Keeping

Records of routine monitoring, site and sludge round inspections, and sludge blanket checks are kept in the Site eLogbook and SAP. Records of skip management, and any spillages and remedial actions are held in the site diary.

Sludge blanket levels are recorded on run charts and electronically via the Cockpit. Records of sludge import quantities are managed by TW bio recycling.

There is a SCADA system on this site.

4.6 Emergency Response and Incident Response Procedures

Emergencies such as fire, flood and severe weather are managed by Thames Water's Incident Management and Business Resilience team. The processes employed can be found on Thames Water's SharePoint site and are entitled: 'Incident Management Arrangements'. This is a company confidential document and therefore, is not included in the Appendices of this document.

Hazard reporting and accidents are all recorded on the Health and Safety software database SpheraCloud (https://sphera.com) and monitored by Thames Water's Safety, Health & Wellbeing team.

In the event of power failure, the site will run on island mode for critical plant. However, as this doesn't include the odour control units there is a potential temporary risk of odour until power is restored.

Absence of key staff should not affect the running of Chertsey STW, as THP Technicians and Tech 1s from other sites can be called upon to cover, if required.

Tables 4.3 to 4.7 respond to the identification of relevant triggers and actions to minimize odour. OCU monitoring is also included. Monitoring of odour release to atmosphere for wider sludge treatment assets is constrained by sludge containment (say versus an open composting operation), the lack of a confined emission point and the episodic nature of odour release and exposure.

Irrespective of such constraints, our Operations Team and odour contractor have recommended consideration of the following techniques either proactively (so accompanying planned or reactive works with known odour risk) and in an investigative capacity attached to an incident:

(a) Targeted use of 'Jerome' hydrogen sulphide analysers
(b) Targeted use of sniff tests ('calibrated nose')
(c)H2S measurements of stored materials where septicity is either present, or the material is at risk of septicity from continued storage especially in the open air, for example, prior to de-watering where measurements of sulphide & dissolved O2 would inform a condition assessment. Quantities and

storage times precipitating a need for such assessments. This recommendation is being raised with the Area Process Scientist.
(d) Inclusion of temporary odour suppressants/misting agents and continued access to process critical spares (odour minimisation by early intervention).
(e) Further expansion of odour risk within site incident planning (this is already referenced in Tables 4.5, 4.6 & 4.7 under relevant Intermittent; Abnormal Operation & Emergency scenarios)
(f) Temperature assessment in secondary digestion tanks on the basis that increased temperatures give greater potential for volatilisation of odours
(g) For PSTs, asset condition (wear/damage) would consider odour risks where assets are taken offline
(h) Telemetry/alarming of whessoe valve releases – there is an existing phased project within TWUL to enhance this at our sludge locations

5 Maintenance and Inspection of Plant and Processes

5.1 Routine Maintenance

5.1.1 General Requirements

Site staff have a schedule to ensure routine maintenance for key mechanical items. In addition, a dedicated maintenance team provide additional support for more specialised equipment, e.g. regular calibration of Dissolved Oxygen probes.

In addition to the routine operational tasks, planned preventative and defect maintenance of plant is carried out. Plant which may have an impact on odour release is assigned an appropriate criticality rating to ensure effective performance is maintained. Plant assessed to be odour critical is listed in Section 4.2.3 above.

All maintenance procedures are detailed in the SOM, and when carried out is captured on the corporate system SAP, which generates work requests for the various activities for the treatment process assets at the appropriate frequency.

5.1.2 OCU selection and performance validation

The OCUs at Chertsey are currently not operational and subject to an odour improvement plan. Once the OCUs are replaced/refurbished this section will contain periodic and continuous performance monitoring and design specification.

5.1.3 Maintenance of Odour Control Units

The site has odour control plants, which are currently not operational. An odour improvement plan which includes OCU assessment and refurbishment/replacement is included in Appendix 2. The monitoring approach describes in this section explains the usual Thames Water monitoring procedure for operational OCUs and what will be implemented once improvements are complete.

Operation and maintenance of OCUs is delivered in accordance with the Company's Asset Standards and Equipment Maintenance Standards. This is either delivered in house by Operations or outsourced to contractors. Refer to the Odour Control Unit Asset Standard and Site Operating Manual for more information. The scope of this table includes anticipated monitoring requirements of emissions to air from the OCU outlets; TWUL's own site round checks as they pertain to OCUs; followed by a further five key performance indicators reflecting discussion with our specialist OCU inspection contractor as of greatest relevance to Chertsey.

Table 5.1.3 Performance Monitoring and Maintenance Checks

Parameter	Monitoring Method	Action if red flag identified and Expected timescales	Frequency	Biofilter	Carbon	Chemical scrubber
Performance monitoring						
Gas inlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks	Monthly	X	X	X
Gas outlet temperature (5-40C)	Temperature probe	Investigate any anomalies relating to temperature, such as individual process checks				
Gas inlet flow rate or velocity (6m/sec)	Calibrated velocity meter	Investigate any anomalies relating to flow rates; velocities and pressure drop across the system by measuring the inlet and outlet pressure. Check fan functionality; presence of obstructions; bring forward contractor service. If fan replacement needed c. 2* months minimum typical duration depending on severity of issue/condition of back up fan (*time of order to mobilisation; assumes second duty fan runs; timescale includes time to install replacement and fabrication). If solely an electrical issue, recourse to TWUL ICA Technician mostly likely within a week. Other root causes are usually blocked media; duct and failure of non-return dampers around fan sets.	Monthly	X	X	X
Gas outlet flow rate or velocity (6m/sec)	Calibrated velocity meter					
Gas inlet humidity (Post biofilter humidification > 90% Carbon units <70%)	Hygrometer	Check any preheaters fitted to system before carbon, or check irrigation is working on biofilter.	Monthly	X	X	-
Back pressure (to assess media thatching or media compaction) Typically systems work around 0.5 kPA	Calibrated digital pressure meters	Values above threshold would be 'RAG' banded in the OCU contractor inspection reports. If pressure gauges are over-pressurised to the extent fouling is or has occurred to be treated as high priority. Check for blockages, poor FFE quality/check if media is of a type susceptible to biodegradation.	Monthly	X	X	X
pH of discharge irrigation water (2-3pH)	pH paper	Less than 2 increase irrigation.	Monthly	X	-	-
pH of scrubber liquor (9.2 pH)	Calibrated pH probe (calibrated with standard solutions)	Recalibrate pH probe and check dosing and chemical availability	Continuous	-	-	X
Redox potential of scrubber liquor (700-730 mV)	Calibrated redox probe (calibrated with standard solutions)	Recalibrate redox probe and check dosing and chemical availability	Continuous	-	-	X
Gas inlet/outlet concentrations for hydrogen sulphide (50ppb used for media change out)	Drager Tubes/CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later	Monthly/ 6 monthly	X	X	X

		entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity				
Gas inlet/outlet concentrations for ammonia (20mg/m3)	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis	Check functionality of odour control unit. If repair or replacement media required raise a job on SAP or APS risk and arrange for contractor repair. Timescale Bespoke to root cause/see later entries. Arrange re-test post remedial work. Major repairs up to 6 months depending on complexity	6 monthly	X	X	X
Gas inlet/outlet concentrations VOCs and RSH	RSH – Drager tubes VOC – PID as isobutylene		Quarterly	x	x	x
Maintenance checks and inspections						
Check integrity of tank covers for damage and ensure access hatches are closed		Close hatches ASAP	Daily	X	X	X
Check building & door integrity for damage or leakage; doors closed (if required)		Closed doors ASAP	Daily	X	X	X
Check damper positions on ductwork are in the correct positions		Correct positioning	Daily	X	X	X
Check irrigation and humidification systems are functioning		Turn on systems or investigate malfunction.	Daily	X	-	-
Check for free discharge of effluent from drain		Investigate blockage	Daily	X	-	-
Check irrigation water supply is working at required rate		Visual check on flow gauge, investigate if required.	Monthly[1]	X	-	-
Check condensate removal points for free flow of liquid		Visual check	Daily/Monthly[1]	X	X	X
Check OCU condition for signs of damage or leaks		Call specialist contractor if identified	Daily / Monthly[1]	X	X	X
Check general ductwork for signs of damage or leaks		Condition of ductwork would be ‘RAG’ banded in the OCU contractor inspection reports. If broken, then odours not being conveyed to OCU and can be indicated by low inlet load. Worst case the ductwork is disconnected (‘sucking air’) such that odour removal is not taking place.	Daily / Monthly[1]	X	X	X
Check spray pattern from irrigation nozzles and clean nozzles as required		Adjust spray pattern, clean the strainer and unblock nozzles or replace as deemed necessary. Timescale durations of c. 2 weeks where just irrigation required.	Daily / Monthly[1]	X	-	X
Check flexi joints between fans and ductwork for leaks		Contractor inspection reports ‘RAG’ band these issues with a level of detail to then inform the maintenance response.	Monthly	X	X	X

	Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)				
Check fans for excessive vibration or noise, belt tension and bearing temperature	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X
Check irrigation water pH	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	-	-
Check irrigation pumps condition and operation	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	-	
Check chemical reagent levels and supply	Order when required. Ensure no low-level alarms.	Weekly	-	-	X
Check chemical dosing and blow down pump condition and operation	If outside pH levels, investigate. Initiates blow down to correct level.	Daily/Monthly	-	-	X
Check blow down rate is within correct range	If outside pH levels, investigate. Initiates blow down to correct level.	Monthly	-	-	X
Check ph and Redox probes are working and in calibration	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	-	-	X
Check recirculating liquor strainer and replace if necessary	Flows recorded on SCADA	Monthly	-	-	X
Check water softener is working correctly (if installed)	Water hardener test papers used to check water quality.	Monthly	-	-	X
Check dampers are operational and in good condition	Swap over duty fan to stand by fan and record flow volumes to identify issue.	Monthly	X	X	X
Inspect electrical control panel and check for faults and alarms	Visual inspection by monhtly contractor and investigation any alarm conditions.	Monthly	X	X	X
Simulate duty / standby fan and pump changeover	Contractor inspection reports 'RAG' band these issues with a level of detail to then inform the maintenance response. Timescale durations of 1 to 2 months typical depending on complexity (time of order to mobilisation)	Monthly	X	X	X
Check H_2S meter is functioning and calibrated (if installed)	Check calibration is still in date during monthly contractor inspection.	Monthly	X	X	X

Condition of the media in the OCU is monitored by performance checks and by additional testing as required.

OCUs at Chertsey will be covered by a service and maintenance contract. They are inspected on a monthly basis and reports are sent to the team manager. Figure 5.1 below highlights the scope of work required from our OCU Maintenance Contractors through their monthly visits. Monitoring during the visits is as follows:

- Monthly – flow (m^3/h), differential pressure(kPa) and hydrogen sulphide(ppm) at both the inlet and outlet. Where applicable, monitoring may also include fan hours run and removal efficiency of hydrogen sulphide.
- Quarterly – VOC(ppm) and mercaptans(ppm) at the inlet and outlet.

>50ppb hydrogen sulphide will be used as a threshold value for media change out. More detailed maintenance procedures are located in the SOM.

The OCUs are specifically designed to minimise the release of odour, bioaerosols and microorganisms.

Optimum flow rates; trigger levels; odorous components/concentrations in the gas stream and associated physical properties are all important to OCU function and are described below:

(i)Optimum flow rate through the system to allow for effective treatment.

A '**Maximum velocity in duct work'**; rather than volume; is the key design aspect informing effective treatment for new/existing OCUs. Not exceeding 10m/second in a piece of ductwork will avoid noise break out; the industry benchmark for new plant being 8m/second. Given velocity is directly related to the volume; the specification is +/- 20% to reflect instrumentation variation; and therefore all OCUs are checked to see ***if they can meet 6m/second*** with escalation in monthly contractor inspection reports where this value is not reached. This is a good indicator of functionality, appropriate sizing, and system health.

ii) The trigger levels/ranges for action if processes monitoring parameters are breached/ outside optimal parameters.

All OCUs, irrespective of media type, *will stipulate a minimum of 30 seconds* ***retention time***, for a biofilter to achieve a minimum of 95% removal efficiency. **Surface area** of the biofilter is the other part of the specification ***where the requirement is to achieve a maximum of 300m^3/hr/per m^2*** (for design purposes). It is surface area, and the ductwork values identified within question (i) above, that are the key informants to an evaluation of OCU performance. If this description of efficiency (across the bed) slips this would be raised for attention in the contractor monthly inspection reports. These values are better described as recognised industry standards rather than trigger points.

H2S readings are reported in the monthly service reports which inform odour equivalents (OEs). The accepted OEs for H2S at 0.5 part per million is equivalent to 1,000 odour units. A "red action" would be raised for any value 3 parts per million on the discharge from a biofilter (before the carbon filter). For the subsequent carbon filter, a 'red action' would be raised for 0.5 parts per million. Where there is a biofilter/carbon filter alone a red flag would be raised for 0.5 parts per million regardless of its removal efficiency.

Trigger levels are more difficult to identify for other parameters, such as mercaptans and ammonia since the design assumptions for OCUs are informed by H2S removal. Removal for these parameters is therefore limited. For Total VOCs, *in respect to methane rather than small chain VOCs*, there is no removal.

From a qualitative value, from visual inspections, 'red flags;' would include if irrigation pipework to the biofilter is broken (no water entry to media); neither extraction fan running; broken ductwork leading to the OCU sucking in atmospheric air.

On identification of such red flags, such that the effective function of the OCU is at risk of being compromised, the following actions would be taken:

(i) For significant issues relating to any aspect of 'condition monitoring' - including effective function of the biofilters - impacting upon parameter reductions at the inlet/out; differential pressures or irrigation volumes – the Performance Manager would urgently contact Head of Maintenance at ERG to book in reactive maintenance attention. Timescales would be of highest priority but response times/duration dependent on the issue identified

(ii) For issues relating to housekeeping (leaks) or issues relating to OCU power supply (electrics) – for example, impacting either fan operation - these would be referred to a TWUL Electrician for assessment and either rectified by the area operational team or escalated to an external contractor where repairs are more complex. Timescale for expectation of resolution would typically be within 24 hours.

For either (i) and (ii) if any significant pollution risk (odour) was identified the Performance Manager would contact TWUL's incident help desk. A supporting risk would be recorded in APS (risk assessment software) to support funding where a need for remedial works was identified.

iii) Odorous components in the gas stream and concentrations of emissions

The monthly contractor inspections of each OCU provide data for H2S; VOC; Mercaptans (RsH). The sampling methodology being Drager (gas analysis) tube for c. 30 seconds to 2 minutes duration.

To achieve an appropriate level of surveillance on OCU performance, outside of the contractor monthly inspections, there is additional oversight from the Operations Management Team through:

- Visibility using local SCADA control panels for OCUs
- Daily site rounds by Thames Water technicians. These are Psion based checks using SAP Plus for escalations including, for example, internal MANDAT tickets or identifying a need for contractor support. The tasks in the daily checks mirror the numbered tasks in the contractor 'Monthly Health Checks'. See Figure 5.1 and section 9 in Appendix 5 in the OMP. There is connectivity between the site rounds and SCADA, for example, if excessive noise is recorded this could relate to an operational fault in OCU, and in turn, is visualised on the local SCADA screens.

- **iv) Physical properties of the air stream at point of control i.e., humidity, optimum temp, pH for effective odour control**
-
- For **humidity**, *the gas is humidified before being received by a biofilter,* so this parameter has less relevance. Biofilters post humidification standard being > 90%. Carbon units humidity standard should be set at <70%.
-
- For **temperature**, this is fairly constant throughout the year as this is informed by the need to achieve fairly constant temperatures in the digestion process. A range of 20 to 40^{o}C being standard.
-
- **pH** will be slightly variable depending on the H2S that is there from the condensing air stream contributing to SO2 formation. This tends not to be an issue at the biofilter itself since the active component of the biofilter will in itself produce SO2 as a waste product from converting the H2S.
-
- **pH** off a bio-scrubber is checked on the quarterly inspections since it might suggest an issue with the active component of the biofilter being impacted by the accumulation of its waste product thereby making the lower part of the bed inactive. A pH of 2 to 3 would be expected as a theoretical upper limit to liquor discharged from the biofilter but recorded values are significantly less; pH 4 to 5 being typical (reflecting the logarithmic scale). Note if efficiency of the process is being impacted; pH would also be part of the investigative checks (i.e., more than quarterly).
-

Figure 5.1 – Monthly OCU Health Checks

Monthly Health Checks

Biofilter

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check condensate drains are free flowing	
2	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
3	Check the airflow through the system and any anomalies investigated.	
4	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities	
5	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
6	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
7	Examine the irrigation system to ensure correct operation including spray pattern, clean the strainer and unblock nozzles or replace as deemed necessary.	
8	Take a sample of the drainage water and measure the pH value and compare to target pH value (this is not pH 7 for modern biotech)	
9	Check all hatches and doors for integrity and ensure they are closed	

Chemical Scrubber

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check condensate drains are free flowing	
2	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
3	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
4	Check the airflow through the system and any anomalies investigated.	
5	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities	
6	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
7	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
8	Examine the recirculation pumps and distribution pipework to ensure correct operation, clean the strainer and check trough / distributor.	
9	Carry out a functional check of the dosing system ensuring target pH and Redox are achieved, and validate the probe calibration using a handheld unit	
10	Calibrate if necessary	
11	Visually check the seals of all hatches note any leaks.	
12	Visually check the wet scrubber housing, note any significant deterioration	
13	Scrubber dosing cabinet - Check chemical dosing pumps for leaks	
14	Scrubber dosing cabinet - Check that dosing rates are correct	
15	Scrubber dosing cabinet - Check all valves, instruments and pipe-work for leaks	
16	Scrubber dosing cabinet - Check inside of cabinet for chemical residue and dirt and wash if necessary	
17	Scrubber dosing cabinet - After wash down check catch-pot high level alarm is working before draining	

Carbon Adsorber

Please enter any comments you may have in the yellow comments boxes

Number	Task	Comments
1	Examine ductwork for any signs of damage or leaks and check trapped condensate drains are free flowing. If a manual drain valve is provided, operate the valve until the flow of condensate ceases and leave valve in closed position.	
2	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	
3	Visually inspect the Odour control system will be made and any defects or deterioration of the housings will be reported.	
4	Check the airflow through the system and any anomalies investigated.	
5	Measure the pressure drop across the system by measuring the inlet and outlet pressure. Record any abnormalities. Read off Delta-P gauge if fitted or using a portable manometer	
6	Measure the contaminate levels (primarily H2S) at the inlet and at the stack	
7	Check visually all fans, check for excessive noise and report any necessary maintenance to be undertaken as applicable.	

5.1.4 Records

Maintenance history records are kept electronically on SAP or the company's SharePoint system.

5.2 Fault Reporting

Faults identified during routine inspections are reported to the Team Manager who assesses criticality before entering the task into the job scheduling system for allocation to an appropriate person to a timescale appropriate to the criticality.

5.3 Emergency Repairs

24-hour maintenance cover is available at the discretion of the Team Manager or Duty Manager, with planned follow up.

Less urgent repairs are assessed for criticality and dealt with during normal working hours.

6 Customer Communications

6.1 Customer Odour Complaints Process

Customer contacts regarding Chertsey STW will be made via the Customer Services Centre, Operations will investigate and take appropriate action. Complaints may also be received from the local council and Environment Agency.

Customers / residents are encouraged to communicate with local Thames Water Operations via the Customer Centre to report if they are noticing odour from Chertsey STW, to ensure that all contacts are recorded and actioned. Customers have 3 main options to report complaints to Thames Water:

1. Thames Water Website – "Report A Problem" at https://www.thameswater.co.uk/contact-us/report-a-problem/report-a-problem-online
2. Email - customer.feedback@thameswater.co.uk with the subject 'Chertsey Sewage Treatment Works'
3. Telephone - Customer Services 0800 316 9800

If the customer / resident would prefer to contact either Runnymede Borough Council or the Environment Agency instead, their contact details are as follows:

Runnymede BC – Environmental Services
Telephone: 01932 838383

Environment Agency – 0800 80 70 60

Customer contacts regarding Chertsey STW that are received directly on site are responded to by the local Operations team. The Performance Manager, at the earliest opportunity, will inform the Customer and Stakeholder Manager (CSM) of the contact details in order that they can ensure the complaint is captured and recorded by the Customer Services Centre.

Complaints received via Customer Services Centre:

- Complaint information is logged electronically by the Customer Services Centre.
- An action is raised to Waste Operations Control Centre (WOCC) who contact the CSM by telephone and email the complaint information to both the CSM and Performance Manager
- The Performance Manager and CSM will review the complaint and take action to investigate (see section 6.3)
- The CSM is responsible for contacting the customer and updating them on the outcome of the investigation.
- Any problems are noted and remedial work actioned. An update of action taken and feedback given to the customer is emailed to the WOCC by the CSM.
- The WOCC update the electronic complaint report and it is closed down.

Complaints received via email or post:

- Complaint information is logged electronically by Customer Relations and allocated a Case Manager.
- The complaint is emailed to the CSM who reviews the complaint and investigates with the Performance Manager (see section 6.3).
- Actions taken are emailed back to the Case Manager who updates the electronic system and updates the Customer.

Complaints received via Customer Centre out of normal working hours

- For a large number of calls, or serious concerns, the Out of Hours Coordinator will be contacted to respond.
- For all other calls Chertsey STW site management will investigate and respond the next working day.

6.2 Customer Communication Plan

The Customer Communication Plan in Appendix 3 identifies how and when contact will be made with customers and stakeholders in relation to stable, abnormal and emergency site operation.

6.3 Investigating a complaint

Upon receiving a complaint Thames Water have 24 working hours to respond to the customer with an update. Within these 24 hours, the CSM will contact to the Performance Manager who will carry out an investigation to determine whether the odour source is coming from the Thames Water site. If the odour is decided to be from the Thames Water site, then the root cause is investigated.

Should the source of the odour be confirmed as coming from the Thames Water Operations then the Performance Manager will review all activities currently taking place on site, including any maintenance, cleaning, and non-standard activities to identify the root cause, and ensure appropriate mitigation measures are in place.

If the Performance Manager cannot identify the source of the odour, but complaints persist, the CSM will ensure the customer who made the complaint is contacted, and obtain further details. These details include their address in relation to the site location, the time of occurrence and for how long. If odour problems continue to persist, Thames Water may even ask the customer to keep a detailed odour diary to ensure their issue can be fully addressed.

The root cause investigation may include site walkaround checks, which look for irregularities such as spillages / open doors and hatches, ensuring appropriate measures as detailed in table 4.3- 4.6 are in place. It may also include off-site visits to the Customer location.

When the root cause of the odour is found, the Customer will be updated with an explanation and provided with a timescale for its resolution. Furthermore, the situation is assessed for hazards to determine any possibility of health risk to the local community.

To ensure any limitations regarding everyday staff becoming desensitised to the odour, if site odour complaints persist with no result in locating its source, personnel who do not spend prolonged time on a single site, such as the Area Operations Manager, will participate in the walkaround checks.

6.4 Notification of Operations with Potential to Cause an Odour Problem

Where operations may impact on local residents, notification will be made to the Customer Centre who will log the details on their Bulletin Board. This will be used to provide information directly to customers who call with queries. Letter drops may also be used.

The Environmental Health Officer of Runnymede Borough Council will be contacted directly if there are risks of odour generation from the UWWTD process. NOTE: This will only take place on known sensitive sites where Local Authorities and the EHO are already involved.

For assets under STC permit, we will notify the EA in accordance with the permit conditions and notifications procedure, see appendix 3.

If notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, Thames Water shall investigate and carry out a review of the OMP and appropriate measures if deemed necessary.

Appendices

Appendix 1. Odour Risk Assessment

Chertsey STW SERV
Odour Risk Assessme

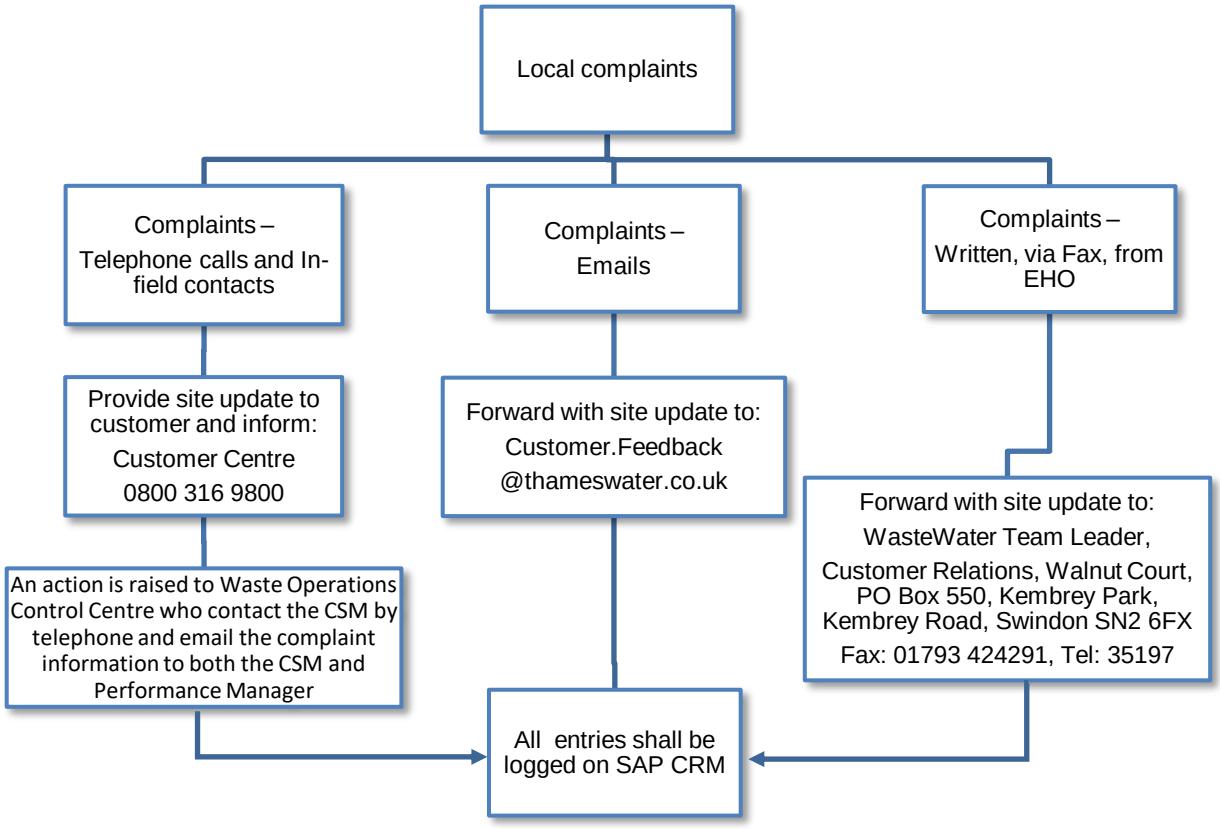
Appendix 2. Odour Improvement Plan

Review Date		Mar-24				
Process Stage	**Owner**	**Plan**	**Action**	**Expected difficulties**	**Measures to mitigate**	**Expected Timeframe**
Inlet works protection and H2S prevention	Zak Atte La Crouche	Improving structure and reducing H2S in the network	Mitigation measures being assessed to dose Nutriox at key pumping stations feeding Chertsey to reduce the incling H2S. Monitoring is complete, awaiting feedback.	Funding		AMP8
OCUs	Zak Atte La Crouche	Effective Operations of OCUs	Inlet works OCU not operational and requires significant refurbishment/replacement, this will be assessed after inlet works work in above line is completed.	Funding requirements curently unknown.		AMP8
OCUs	Zak Atte La Crouche	Effective Operations of OCUs	Initial assessment indicated that Replacement of THP OCU will be required and Rerfurbishment of Cake Barn OCU. Risk at stage ID05 on APS. We will engage with the supply chain to identify suitable parameters and choice of media for the relacement OCU.	Funding		AMP8
Sniff Testing	Odour Specialist	Implement Sniff Testing	Procedure written for sniff testing, in order to achieve effective sniff testing personnel needs to be identified to carry out the procedure who are not acclimatised to smells on site.	Resource	daily site rounds	6 months from permit issue

Appendix 3. Customer Communications Plan

Complaints Process

All locally received complaints are re-directed to the Customer Centre. Please refer to below for details.



IMPORTANT NOTE:
Any communications received from the local Member of Parliament or senior council officers need to be forwarded to the Local/Regional Government Liaison person: Name: Miles Evans Telephone: 07747 647304

Communications

Level 1	Stable operations: Compliant with Operational Asset Standards.			
Communications Approach	Standard regular proactive contact with key stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local council(s) Environmental Health Department	As required but at least quarterly	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Environment Agency	As required	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Local residents associations *(if applicable)*	As required but at least annually	Telephone / email / meeting	Update on operational activity on site	Performance Manager and Customer & Stakeholder Manager
Stakeholders Internal	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager
Customer Centre (Swindon)	As required	Report sent out by operations to the business	Update the business on operational activity on site	Duty Manager

Level 2	Unstable operations: • Non-compliant with Operational Asset Standards on one or more sub-processes leading to increased odour risk.			
Communications Approach	As Level 1 plus: • Use of Contact Centre Bulletin Boards / Briefing Contact Centre agents / Briefing statement with Q&A prepared for the press office (to use reactively). • Monthly discussions with, and quarterly visits from, the EHO. • Commence proactive communications with other stakeholders.			
Stakeholders External	**Frequency of Contact**	**Method & Level of Contact**	**Aim of Contact**	**TW Contact/Level**
Local council(s) Environmental Health Department	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder ManagerSite Manager
Environment Agency	Potential for notification procedure	As required as per notification procedure	As required as per notification procedure	Pollution Desk
Local residents associations *(if applicable)*	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder ManagerSite Manager
Stakeholders Internal	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	Immediately then weekly	Q&A prepared for press office by Operations	To enable the press office to deal with queries from the press (reactive only).	Duty Manager
Customer Centre (Swindon)	Immediately then weekly	Telephone / email	To enable the Customer Centre to deal with queries from the press (reactive only).	Duty Manager
Other areas/stakeholders outside Chertsey STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**

Local businesses	Immediately then monthly	Telephone / email / meeting	Report unstable operation with action plan	Performance Manager and Customer & Stakeholder Manager
Level 3	Emergency • Temporary or transient activities not deemed to be compliant with Operational Asset Standards. High risk of odour emitting plant.			
Communications Approach	As level 2 plus: • Odour event set up internally (including OOH's cover from OMC (Kemble Court)). • Weekly discussions with EHO. • Monthly Stakeholder meetings, (internal and external – include MPs, Councillors, schools, businesses etc.). • Press release may be required.			
Stakeholder External	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local council(s) Environmental Health Department	Immediately then weekly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5 Manager (Operations Manager)
Environment Agency	Immediately then weekly as required as per notification procedure	Telephone / email / meeting as required as per notification procedure	Report emergency event with action plan and update with progress as required as per notification procedure	Level 5 Manager (Operations Manager) / Pollution Desk
Local residents associations (if applicable)	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Performance Manager and Customer & Stakeholder Manager
Councillors / MPs for local areas	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Level 5 Manager (Operations Manager)
Stakeholders Internal	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Press Office	Immediately then daily	Q&A and press release prepared by press office	To enable the press office to deal with reactive queries from the press and prepare a media	Duty Manager

			strategy if required.	
Customer Centre (Swindon)	Immediately then daily	Telephone / email	To enable the Customer Centre to deal with queries from customers (reactive only)	Duty Manager
Other areas/stakeholders outside Chertsey STW potentially impacted				
Stakeholder	**Frequency of Contact**	**Method of Contact**	**Aim of Contact**	**TW Contact/Level**
Local businesses	Immediately then monthly	Telephone / email / meeting	Report emergency event with action plan and update with progress	Performance Manager and Customer & Stakeholder Manager

Appendix 4. Site Drawings

Figure A - Site Location Map

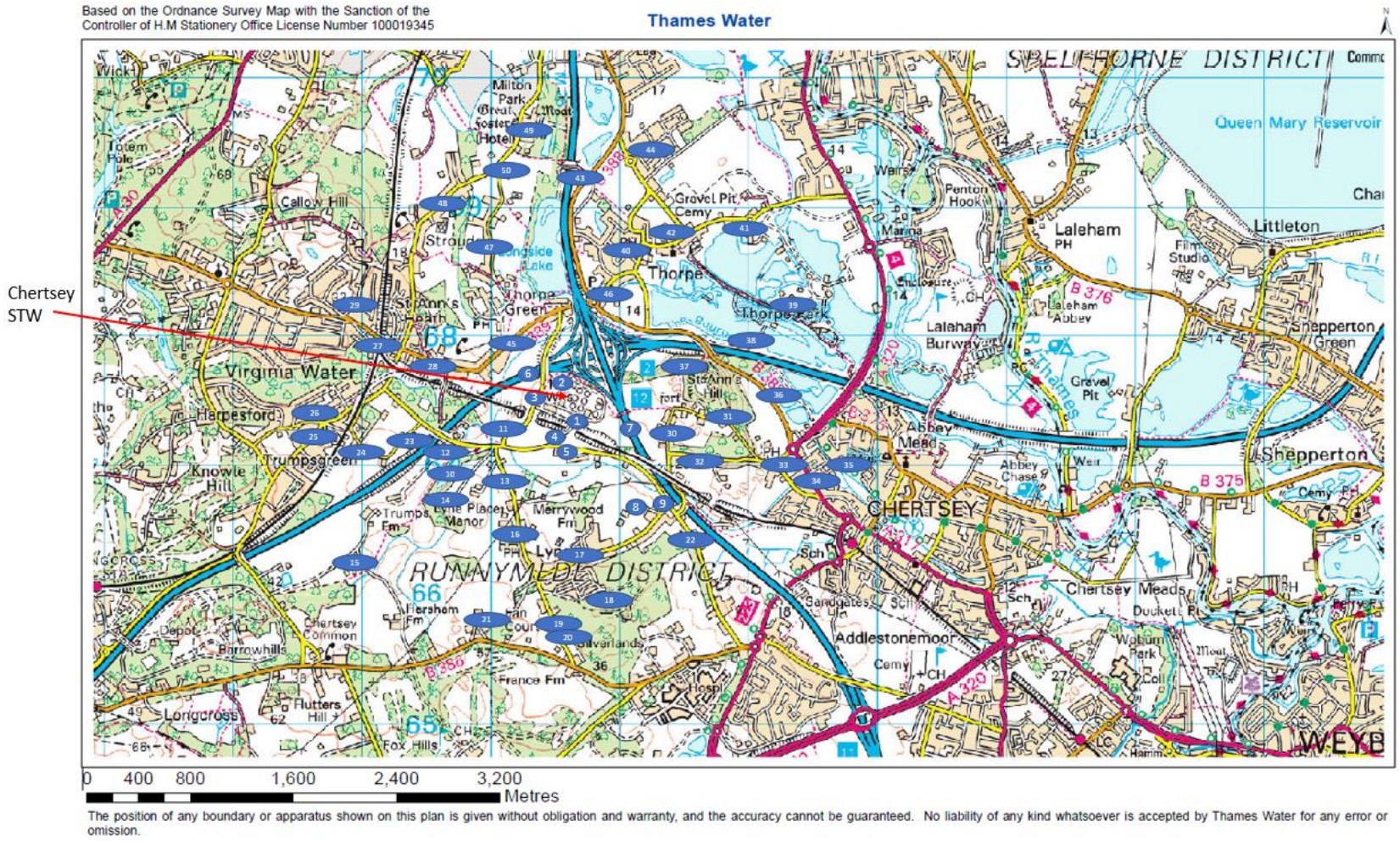


Figure B - Site Plan

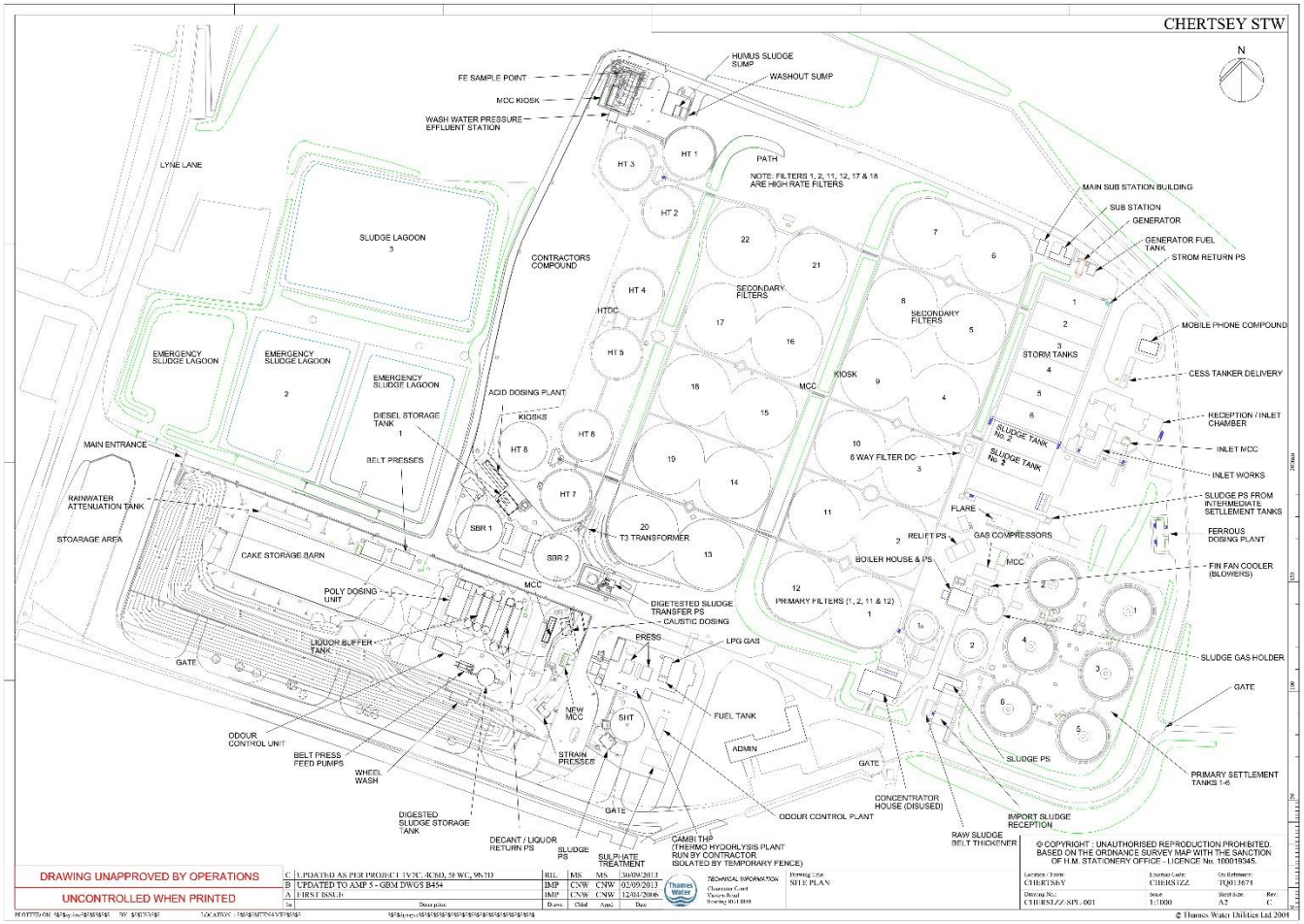


Figure C - Site Plan showing Sludge Treatment Centre Permitted Area

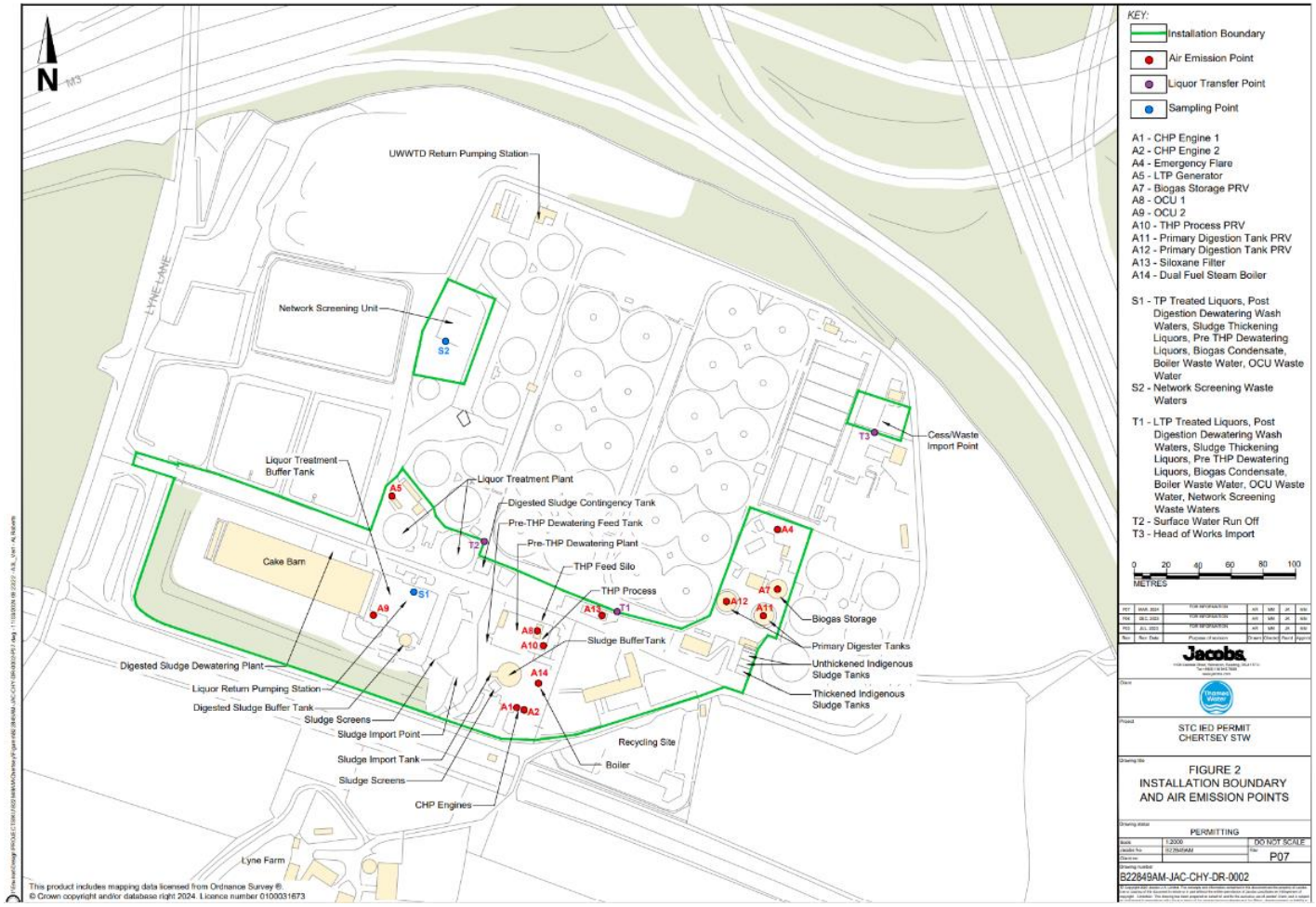


Figure D1 - Process Block Diagram whole site

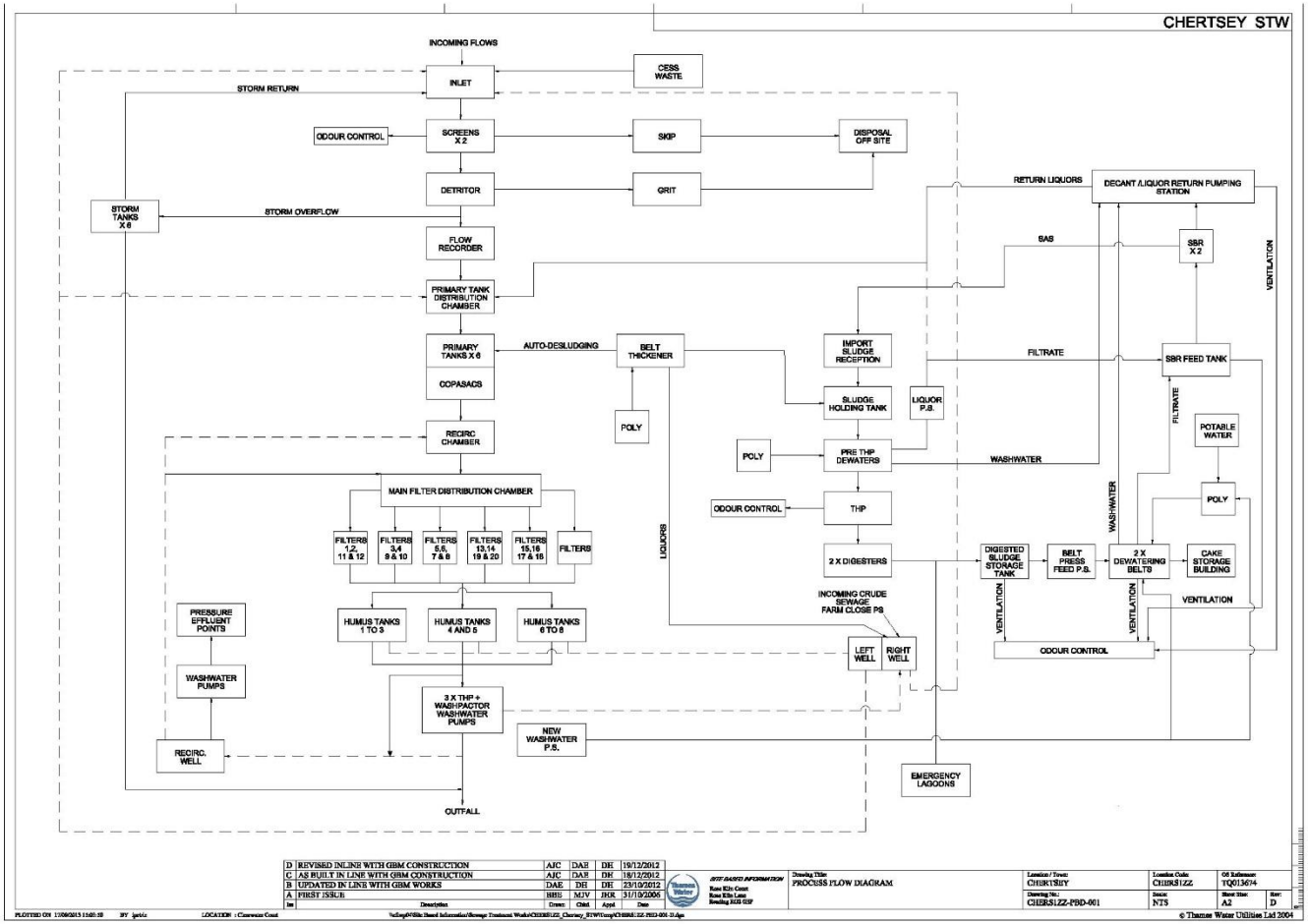
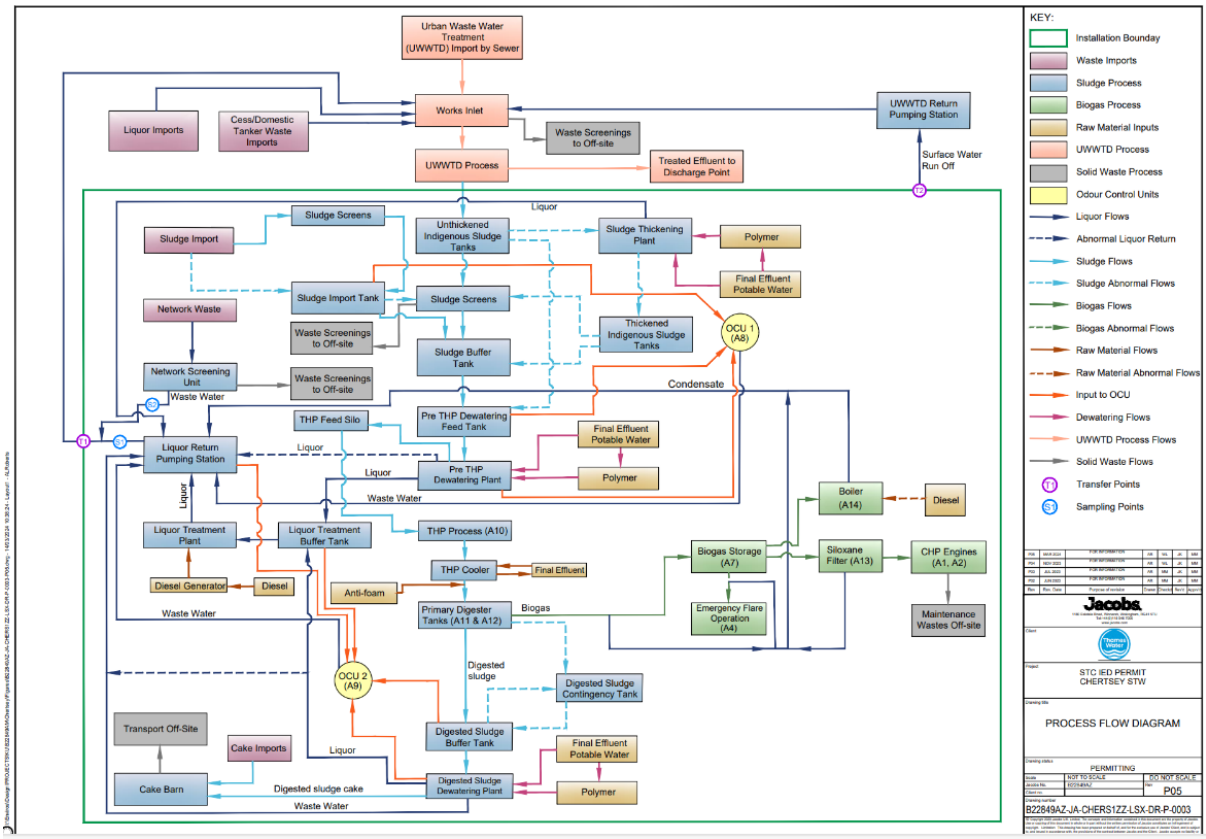


Figure D2 - Process Block Diagram for Sludge Treatment Centre Permit



Appendix 5. Site Rounds

ID	Instruction	Daily	Weekly
1	**Final Effluent**		
a)	Check the effluent quality at the sample point. Sample (ammonia, phosphorus, temperature & turbidity) in accordance with SOM. Record in site log book & via Direct Text.	**X**	
b)	Check final effluent sampling point is accessible. Highlight to manager if need to clean inline monitor, channel/chamber.	**X**	
c)	Check storm sampling point is accessible. Highlight to manager if need to clean inline monitor, channel/chamber.	**X**	
d)	Visual check on point of discharge to the watercourse if accessible. Check operability of outfall flap valve if fitted.	**X**	

ID	Instruction	Daily	Weekly
e)	Check storm discharge point, if shared & if accessible.	**X**	
f)	Compensation water pumps. Check and clear ultrasonic head of cobwebs etc.	**X**	
g)	Check data and operation of inline monitor. Check inline monitor installation for damage, take appropriate action where required.	**X**	
h)	Remove and clean inline monitor probe.		**X**
i)	Check flow meter & flume is clear of debris. Take appropriate action.	**X**	
2	**Preliminary Treatment**	Daily	Weekly
a)	Check Crude sewage appearance. Does it look normal for the site?	**X**	
2.1	**Cess Waste Reception Point**		
a)	Note any suspicious activity or discharges as required	**X**	
b)	Check logger system is operating correctly	**X**	
c)	Check all pipework is in good condition	**X**	
d)	Where a macerator is fitted, check operation and oil reservoir	**X**	
e)	Where a manual stone trap is fitted, clear of accumulated material	**X**	
f)	Check grit bins are available and stocked with grit for winter	**X**	
g)	Carry out general housekeeping, remove litter, clear debris, washdown any spillages, empty bins	**X**	
h)	Ensure all signage is in good condition, clean and legible	**X**	
i)	Check washdown equipment is operating correctly	**X**	
2.2	**Inlet / storm pumping station**	Daily	Weekly
a)	Check Ammeter reading, Too high could indicate a blockage. Too low could indicate an air lock or impeller damage. Where reading is unusual ensure appropriate action is taken.	**X**	
b)	Check the well level is within the normal operating limits taking into account the flow conditions at the time (such as storm conditions & peak flow to site). If level is too low or high, this could indicate control issues or pumping issues.	**X**	
c)	Check condition of the wet well. Does it have more than the usual scum or debris floating on top that will indicate the need for a wet well clean?	**X**	
d)	Check fault light(s) are not on, take appropriate action as required.	**X**	

ID	Instruction	Daily	Weekly
e)	Check flow rate (where meter is fitted); is it within the normal operating range?	**X**	
f)	Inspect buildings, kiosks and control/switchgear panels for general condition, damage and that they are securely locked. Clean and tidy the interior of the buildings and/or Kiosks. Remove rubbish from site or if large volume arrange for collection.	x	
g)	Listen for undue pump noise and check for undue vibration by safely touching the lifting chain or guide rail.	**X**	
h)	Check non-return valve is operating correctly Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted is it at the usual angle? If it is low and chattering it could indicate the pump is blocked.	**X**	
i)	Check operation of the ultrasonic level control. Is it reading correctly? Compare the well level with the normal readout from the display. Check hard wired control floats, clean as required. Are floats weighed down with rag or debris preventing them from lifting if the water level rises?	**X**	
j)	Check pumps, pipelines and couplings for leaks where possible.		**X**
k)	Start the cleaning cycle manually where required.	**X**	
l)	Pumps - Log hours run		**X**
m)	Pumps - Log kWhrs		**X**
2.3	**Screen(s) / macerator(s)**	Daily	Weekly
a)	Check inlet channel level is normal taking into account the flow conditions at the time (such as storm conditions & peak flow to site).	**X**	
b)	Check screen operation and check for screenings carryover. Check for blockages and blinding (hairpinning) on screen panels and remove where necessary. Check for rag rolling or rag balls upstream of the screen and remove where necessary. Check for any grit build up in front of screen	**X**	
c)	Inspect debris disposal mechanism for correct operation and verify screenings are being removed. Check & clean any obstructions impeding the operation of screen mechanisms.	**X**	
d)	Check screens bypass is available and clean	**X**	
e)	Clean area around screen. Check & clean screen panels of any obstructions.		x
f)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action to replace them if needed.	**X**	

ID	Instruction	Daily	Weekly
	Inspect grease pots and fill them when level is below the standard. Use grease nipples to lubricate required parts of screen.		
g)	Visually check unit and its associated equipment for the following: Safety & security with all panels locked & guards secure and in good condition. Excessive noise or vibration Overheating External damage, leaks, missing fixings Where applicable, ensure main and brush drives turn and that brushes are spinning	**X**	
h)	Check operation of wash water system for screens Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.	**X**	
i)	Check & clean accumulation of screenings and fat from debris disposal mechanism Check & clean launder chutes and channels for accumulation of grit, sand, rag, fat,	**X**	
j)	Check the lip, labyrinth or other seals between the screen and the channel wall are making an effective seal.	**X**	
k)	Visual check on the screenings removal brushes for blinding and wear. Clean the brushes as required. Ensure the brushes are in correct contact with the screen and that screenings are being removed.	**X**	
l)	Check and clean instrumentation probes, floats and ultrasonic heads (where applicable).	**X**	
2.4	**Screenings handling**	Daily	Weekly
a)	Check control system and amps on panel for normal levels / operation, take appropriate action as required. Jumping amps indicates a blockage.	**X**	
b)	Where installed, visual check for normal operation of macerator. Look for visible blockages/build up on unit, high flows in front of macerator. Listen for unusual noise. Take appropriate action as required.	**X**	
c)	Where installed, check and empty stone trap.	**X**	
d)	Clean area around screenings handling units and skips.		**X**
e)	Check operation of wash water system for screenings handling. Check the inline wash water filter is present, clean and feeding the spray bars (where applicable Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.	**X**	

ID	Instruction	Daily	Weekly
f)	Check screenings product quality and quantity, Check level of screenings in skip and change skip when full.	**X**	
g)	Check operation of auto drain.		**x**
h)	Where installed check operation of the trough desludge system. Check for grit build-up in trough - hose out where required.		**x**
i)	Visual check on condition and operation of brushes (ensure trough is being cleaned). If blinding occurs regularly have wear on screw brushes checked.		**x**
j)	Check screw conveyor and brushes for wear and central running.		**x**
k)	Clean and check mesh for blinding and hairpinning.		**x**
2.5	**Grit removal**	Daily	Weekly
a)	Check mechanical plant is operating correctly. Check equipment– Compressor, Rake, Detritor & Pista grit.	**X**	
b)	Check manually de-gritted constant velocity channels for build-up of grit, take appropriate action as required.	**X**	
c)	Check inflow and outflow for normal rate of flow and correct distribution.	**X**	
d)	Check volume, dryness and quality of grit produced.	**X**	
e)	Remove rag from the areas around baffles and mechanical equipment	**X**	
f)	Log manual de-gritting operations where required.	**X**	
g)	Log abnormal grit volumes.	**X**	
h)	Clean grit channel as required. Check grit build up in inlet channels and clean out if necessary.		**X**
i)	Check operation of wash water system and check the inline filter is present, clean and feeding the spray bars (where applicable)	**X**	
j)	Check aerated grit channels for air flow and bubble pattern (where applicable).	**X**	
2.5	Skips	Daily	Weekly
a)	Check skip capacity is adequate, and inform contractor when skip is full.	**X**	
b)	Rake skip where required.	**X**	
c)	Remove excess water if there is a facility to do so.	**X**	
d)	Ensure only prescribed material is in the skip. Remove any materials not prescribed.	**X**	
2.6	**Storm separation and treatment**	Daily	Weekly
a)	Check Flow To Full Treatment penstock is set at correct level.	**X**	

ID	Instruction	Daily	Weekly
b)	Check storm return system is operational, manually return storm contents where required.	**X**	
c)	Check storm tanks cleaning system, check level sensors, check tanks are clean and empty outside of storm conditions.	**X**	
d)	Check and clear storm screens where required. (automatic clearance and manual clearance linked to safe system of work)	**X**	
e)	Check screens bypass is available and clean	**X**	
f)	Check and clear/replace any outlet screening sacks		**X**
g)	Check separation weirs and clean where required.		**X**
h)	During storm check that the flow to treatment is normal. (Treating Flow To Full Treatment)		**X**
i)	Log abnormal flows. Log storm discharge flows. Log storm flows in dry weather conditions.		**X**
j)	Log storm events.		**X**
k)	Remove any debris in the system.		**X**
l)	Storm LTA – Visually check area is clean and operating within site parameters. Remove any debris.		**X**
m)	Storm LTA – Check for short circuiting during operation. Inspect banks for leakage		**X**
2.7	**Flow measurement**	Daily	Weekly
a)	Check site is within flow permit (treating Flow To Full Treatment before going to storm). Check that flow is going through site as expected.	**X**	
b)	Check flow meter and flume and clean where required	**X**	
c)	MCERTS – Log & record flow meter readings	**X**	
d)	Check EDM (Event Duration Monitor) sensor is clean and weir is free of debris	**X**	
3	**Primary Treatment- Primary Settlement Tanks**	Daily	Weekly
a)	Check and log sludge level by dipping tanks (Mon/Wed/Fri)	**X**	
b)	Check bridge/scraper operation	**X**	
c)	Check de-sludge pump(s) and timer for normal operation	**X**	
d)	Check scum boards for breaks or carry under	**X**	
e)	Check scum trap for normal operation and clean/hose out	**X**	
f)	Check settled sewage quality (visual check only)	**X**	
g)	Check stilling chamber for rag, clear as necessary	**X**	
4	**Secondary Treatment**		

ID	Instruction	Daily	Weekly
4.1	**Secondary Treatment – Activated Sludge**	Daily	Weekly
a)	Check air filters indicators for normal readings. Check blower control panel. Check the blowers for normal operation. Check there are no illuminated fault lights.	**X**	
b)	Check and record dissolved oxygen (D.O) readings, where probes are installed.	**X**	
c)	Sample, measure and record Mixed Liquor Suspended Solids (MLSS) /RASS concentration and sludge settleability (Stirred Specific Volume Index) (SSVI), (Monday/Wednesday/Friday)	**X**	
d)	Vent condensate from air lines		**X**
e)	Check SAS pump(s) are operating correctly	**X**	
f)	Check and record sludge return from the final settlement tanks (RAS rate)	**X**	
g)	Check D.O probe and / or timers are carrying out the correct control functions. Aeration control function.	**X**	
h)	Check flow distribution to aeration lanes if more than one lane present	**X**	
i)	Log changes to RAS rate, Log flows (where meters are fitted), Log KWh, Log SAS Rate.	**X**	
j)	Check and record bubble pattern and size of the bubbles	**X**	
k)	Check mixers for rotation in anoxic (un-aerated) zones	**X**	
l)	Check recycle pumps are running, as required (Biological Nutrient Removal -BNR plants)		**X**
m)	Check redox monitor is operating correctly (BNR plants)		**X**
n)	Check VFA / liquor return (BNR plants)		**X**
o)	Check and record rate and frequency of SAS removal	**X**	
p)	Withdraw the D/O probe from the tank and remove clean		**X**
4.2	**Secondary Treatment – Biological Filters**	Daily	Weekly
a)	Visually check for correct flow distribution across the filter (radial distribution)	**X**	
b)	Keep filter surface clear of all debris and any significant moss or weed growth. Deal with ponding as appropriate.	**X**	
c)	Where recirculation is installed, check for normal operation at the correct flow rate	**X**	
d)	Check all air vents and under drains are clear and not flooded	**X**	
e)	Clear distribution arm orifices and or weir plates of debris	**X**	
f)	Remove end caps and rod/flush arms - clear debris from open channel arms	**X**	

ID	Instruction	Daily	Weekly
g)	Check for appropriate flow distribution between filters to suit filter size	X	
h)	Check operation of distributor arms (uniform speed of rotation)	X	
i)	Check for leakage at the centre column seals and end caps. Short circuiting etc.	X	
j)	Check rotation timer. Check alignment of rotation alarm sensor and target plate	X	
5	**Secondary Settlement – Humus Tanks / Final Settlement Tanks**	Daily	Weekly
a)	Check correct operation of desludging pump(s) or valve(s)	X	
b)	Check scraper/bridge operation where installed	X	
c)	Check and log blanket level with portable blanket meter where detectors not fitted. (Monday, Wednesday, Friday)	X	
d)	Check tank surface for buildup of floating debris. Visually check effluent quality over the weir for solids carry over	X	
e)	Check RAS pump(s) are operating correctly (FSTs only)	X	
f)	Check Bellmouth and de-rag where required	X	
g)	Check effectiveness of weir brushes, chains, “other systems” where fitted	X	
h)	Check scum boards for breaks or carry under	X	
i)	Check scum removal system for correct operation, clear any fouling where necessary	X	
j)	Check flow of recirculation bleed back/constant draw off where used	X	
k)	Check operation of fixed blanket detectors and alarms		X
l)	Check operation of Mallard pump by test running in hand, where installed		X
m)	Clear overflow weirs and launder channels of any build-up that will affect the tanks or effluent performance	X	
6	**Chemical Dosing**	Daily	Weekly
a)	Check that chemical is discharging, rather than dosing pump running dry (any nozzles blocked?)	X	
b)	Check chemical storage tank level - reorder as required. Log level in storage tank, Log discharge rate.		2 days a week
c)	Check for excessive vibration in the dosing pump		2 days a week
d)	Check the level in the internal bund and empty as required. Report any abnormalities.		2 days a week
e)	Visual check for leaks on tanks and visible chemical lines		2 days a week

ID	Instruction	Daily	Weekly
f)	Check the trace heating system		2 days a week
g)	Check external storage tank bund for rainwater and/or chemical. Empty as appropriate.		x
7	Tertiary Treatment		
7.1	Low Head Sand Filter	Daily	Weekly
a)	Check smooth movement of bridge, unusual sounds and vibrations, and abnormal flow patterns	X	
b)	Check water level in each filter, compare with other units and relate to flow rate, and last backwash	X	
c)	Check unit isn't in bypass	X	
d)	Check for evidence of chemical leaks	X	
e)	Check cleanliness of carriage & filter area	X	
f)	Check sodium hypochlorite level in the bridge tanks where fitted and fill from bulk tank	X	
g)	Check sodium hypochlorite bulk tank level	X	
h)	Check the amount of sand in the wash water	X	
i)	Check the colour of the backwash water	X	
j)	Check the correct amount of hypochlorite is being dosed	X	
k)	Check water level in each filter, compare with other units and relate to flow rate, and last backwash	X	
l)	Log backwash timer settings and head loss	X	
m)	Log flows and flow rate, where meters are fitted	X	
n)	Clean the level sensor head		X
o)	Log clarity of feed (compare with final effluent)	X	
7.2	Disc Filter	Daily	Weekly
a)	Log backwash pressure	X	
b)	Check frequency of backwash is within correct range		X
c)	Check bypass is not working during normal operations	X	
d)	Check depth in and out of the drum for normal operation	X	
e)	Check drum is rotating in correct mode and sounds normal	X	
f)	Check all ancillaries are operating normally	X	
g)	Log flows and flow rate where meters are fitted	X	
h)	Sample and record turbidity on feed (compare with final effluent)	X	
i)	Inspect inside filter for large pieces of debris		X
j)	Check for accumulation of weed in backwash trough		X

ID	Instruction	Daily	Weekly
k)	Check and clean backwash water strainer.		**X**
l)	Check for soundness of mesh panels by lifting inspection panels		**X**
m)	Check wash water pressure and nozzles for normal operation		**X**
8	**Raw Sludge Holding & Thickening**		
8.1	**Sludge Holding Tanks**	Daily	Weekly
a)	Check mixing regime is correct	**X**	
b)	Log levels in tank(s)	**X**	
c)	Decant liquors	**X**	
d)	Check tank(s) for ragging and blockages and clear or remove (where safe access is possible)	**X**	
e)	Check that holes on sludge cage(s) are clear where fitted, Clean sludge cage(s) dewatering holes (where safe access is possible)	**X**	
f)	Log tanker movements and compare with schedule	**X**	
g)	Ensure any crust build up does not interfere with any control equipment/alarm floats	**X**	
8.2	**Picket Fence Thickener**	Daily	Weekly
a)	Check fence is rotating & “stop, look, listen,” for mechanical issues.	**X**	
b)	Check weir overflow quality and the surface of the unit. Clear any buildup of debris	**X**	
c)	Log blanket measurements / pump timers	**X**	
d)	Sample from discharge pump (run manually if necessary) and assess product quality. Sample, analyse and record % dry solids entering the PFT. Sample, analyse and record % dry solids out (Monday, Wednesday, Friday)	**X**	
e)	Check control system is operating normally	**X**	
f)	Log any changes to settings or duty	**X**	
g)	Log sludge flows in (where meters fitted) and out	**X**	
h)	Visually assess the dry solids & flow entering the PFT	**X**	
i)	Log hours run meters	**X**	
j)	Remove buildup of debris on the rake	**X**	
8.3	**Belt Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge on the top belt and assess the conditioning of the sludge. Check belt drainage and filtrate quality	**X**	
b)	Check product quality & quantity. Check condition of hopper	**X**	
c)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	

ID	Instruction	Daily	Weekly
d)	Sample, analyse & record % Dry Solids on feed and sludge/cake (Monday, Wednesday, Friday)	**X**	
e)	Check sludge feed rate and log	**X**	
f)	Check poly dosing system. Log polymer usage, note each bag change/delivery. Make adjustments to optimise	**X**	
g)	Ensure wash water pressure is available at a minimum of 6 bar	**X**	
h)	Clean belt steering paddles and check they are functioning correctly	**X**	
i)	Clean hopper level probes and check they are functioning correctly	**X**	
j)	Wash Station - Check formation of spraying fans, rotate internal brush to clean spray nozzles. (Minimum twice daily)	**X**	
k)	Visual Check - Hydraulic Power Pack - Check oil level and top up using clean equipment and fresh oil as required, maintain as close to full level as possible. Oil level must not be allowed to fall below 3/4 as this will cause serious damage	**X**	
l)	Jet wash clean the belt filter.	**X**	
m)	Use low pressure water hose to clean complete machine, frame, rollers and hoppers.	**X**	
n)	Check condition of Belt Filter for blinding / blockages / good filtration	**X**	
o)	High pressure steam clean the belt from underside.		**X**
p)	High pressure steam clean complete machine, frame rollers and hoppers avoiding all electrical and instrumentation equipment		**X**
q)	Check condition of Belt Filter for wear i.e. Creasing / condition of seam to avoid failure / breakage and damage to other components		**X**
8.4	**Drum Thickeners**	Daily	Weekly
a)	Check for good floc formation. Check sludge feed rate. Check product thickness (visually). Check filtrate quality	**X**	
b)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	
c)	Sample for % dry solids analysis and record (Monday, Wednesday, Friday)	**X**	
d)	Check spray bar nozzles to ensure they are clear and spraying correctly. Check spray bar wash water pressure	**X**	
e)	Clean probes in discharge hopper, hose down and carry out cleaning duties	**X**	
f)	Log polyelectrolyte used – each drum/bag change	**X**	
g)	Log sludge inlet flow meter, monitor throughput	**X**	
h)	Check & clean flocculator tanks		**X**

ID	Instruction	Daily	Weekly
i)	Check appearance of mesh, adjust cleaning and cleaning pause intervals if necessary.	**X**	
j)	Clean dry solids monitors sensors		**X**
k)	Clean foot valves on washwater suction lines		**X**
l)	Clean mechanical filter on washwater booster set		**X**
m)	Clean washwater booster secondary screen in channel		**X**
n)	Jet/remove fat deposits from thickened sludge discharge pipework		**X**
o)	Log hours run		**X**
9	**Odour Control**	**Daily**	**Weekly**
	Tasks for all Odour Control Units		
a)	Check covers, hatches and doors are closed	**X**	
b)	Confirm duty fan running and standby fan availability	**X**	
c)	Check damper position to ensure they have not been tampered with	**X**	
d)	Check ductwork for any signs of damage or leaks	**X**	
	Specific tasks for Biofilter OCU		
e)	Check the spray pattern from the irrigation nozzles and clean nozzles where required. (If possible)	**X**	
f)	Check for free discharge of effluent water to drain	**X**	
g)	Check for free discharge on any condensate removal points	**X**	
	Specific tasks for Chemical Scrubber OCU		
h)	Check water softener availability, check salt reservoir level, and top up if required.	**X**	
i)	Check stocks in bulk chemical tanks and reorder if required – tanker delivery	**X**	
j)	Check that the Redox and pH are within the agreed range – on dosing skid	**X**	
k)	Check duty and standby dosing pumps are available for each bulk chemical	**X**	
l)	Check the duty scrubber liquor recirculation pump is running and the standby is available in auto	**X**	
m)	Check that there is free drainage of scrubber blow-down liquor to drain	**X**	
n)	Check differential pressure gauges are within design range (if fitted)	**X**	
o)	General check for leaks in the scrubber liquor recirculation and dosing system – raise follow on work if any defects are identified	**X**	

ID	Instruction	Daily	Weekly
	Specific tasks for Carbon OCU		
p)	Examine ductwork for any signs of damage or leaks and check trapped condensate drains are free flowing. If a manual drain valve is provided, operate the valve until the flow of condensate ceases and leave valve in closed position.	**X**	
q)	Check differential pressure gauge for over-pressure (if provided) – indicates media fouling	**X**	
10	**On Site Pumping**	Daily	Weekly
a)	Pumping System(s) (Drainage, Interstage, Washwater, Recirculation, Return Liquors etc.) operating correctly?	**X**	
b)	Check Ammeter reading - too high could indicate a blockage. Too low could indicate an air lock or impeller damage.	**X**	
c)	Check the well level is within the normal operating limits - taking into account the flow conditions at the time. If level is too low or high, this could indicate control issues or pumping issues.		
d)	Check condition of the wet well- does it have more than the usual scum or debris floating on top that will indicate the need for a wet well clean?		
e)	Check fault light(s) are not on	**X**	
f)	Check flow rate (where meter is fitted); is it within the normal operating range?	**X**	
g)	Check for undue pump noise and vibration by safely touching the lifting chain or guide rail.	**X**	
h)	Check non-return valve. Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted, is it at the usual angle? If it is low and chattering it could indicate the pump is blocked	**X**	
i)	Check operation of the ultrasonic level gauge. Is it reading correctly? Compare the well level with the normal readout from the display.	**X**	
j)	Check pumps, pipelines and couplings for leaks. Check for visible leaks.	**X**	
k)	Start the cleaning cycle manually where required	**X**	
l)	Pumps - Log hours run	**X**	
m)	Pumps - Log kWhrs	**X**	
n)	Check hard wired control floats - are floats weighed down with rag or debris preventing them from lifting if the water level rises.	**X**	
o)	**Washwater Pumping** - Check the pipe line pressure from a gauge (where installed) on the pressure vessel or the pipe line manifold. Possible indication of strainer blockage	**X**	

ID	Instruction	Daily	Weekly
p)	**Washwater Pumping** - Check operation of surge vessels (where installed).	**X**	
q)	**Washwater Pumping** - Check the strainers. If necessary, put automatic strainers in manual clean and inspect the manual strainers where local conditions allow.	**X**	
r)	**Washwater Pumping** - Check automatic filters are operating correctly	**X**	
11	**Distribution Chambers**	Daily	Weekly
a)	Inspect all weirs and brush clean. Remove any debris, scum, algal growth, blanket weed, grit, etc. from the chamber. Check flow split is correct.	**X**	
b)	Ensure any rag is removed, especially from around the penstocks, gate valves and their spindles. Ensure none of this passes over the weir.	**X**	
c)	Check that all valve, penstock and weir operating positions are correctly set.	**X**	
d)	Check chamber for any visible leaks	**X**	

Appendix 6. Sludge Rounds

	Instruction	Daily	Weekly
1	**Liquid Sludge Import Facilities**	Daily	Weekly
a)	Check sludge logger device is fully operational	**X**	
b)	Check that the pattern of imports is in line with site requirements/agreement with tanker operators.	**X**	
c)	Check general area is clean and tidy	**X**	
d)	Check reception tank for rag/grit build up		**X**
2	**Sludge Screen**	Daily	Weekly
a)	Check sludge screen operation	**X**	
b)	Check screened sludge quality	**X**	
c)	Check / clean moisture sensor	**X**	
d)	Visually check unit and its associated equipment for the following: Safety & security with all panels locked & guards secure and in good condition. Excessive noise or vibration Overheating External damage, leaks, missing fixings	**X**	
e)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action to replace them if needed. Inspect grease pots and fill them when level is below the standard. Use grease nipples to lubricate required parts of screen.	**X**	
f)	Carry out checks on cold weather operation systems before frost sets in	**X**	
g)	Check screenings quality & quantity		**X**
h)	Check general area is clean and tidy		**X**
i)	Check washwater is operating correctly during period of sludge discharge Ensure wash water pressure of spray bar is correct. Check the inline filter is present, clean and feeding the spray bars (where applicable). Check the spray bar pattern and clean the spray bar nozzles as required.		**X**
j)	Clean steel probes on rotamat screen		**X**

	Instruction	Daily	Weekly
3	**Sludge Buffer & Blending Tanks** "Sludge Blending Tank" refers to a tank, into which more than one type of sludge is fed, requiring mixing: normally immediately prior to sludge digestion or dewatering. It may on some sites be referred to as a sludge holding tank or digester feed tank.	Daily	Weekly
a)	Check that mixer is operating correctly. Mixers are normally inhibited if the sludge level falls below a set level to protect the impellor, pump or blower.	**X**	
b)	Check for signs of stratification or poor mixing and rectify where necessary	**X**	
c)	Check pH and if less than 5 attempt to reduce septicity and freshen sludge	**X**	
d)	Check for ragging and blockages and clear or remove (where safe access is possible)	**X**	
e)	Check amps on mixer motor		**X**
f)	Check tank control system		**X**
4	**Sludge Treatment Inter Process Pumping**	Daily	Weekly
a)	Check Ammeter reading, Too high could indicate a blockage. Too low could indicate an air lock or impeller damage. Where reading is unusual ensure appropriate action is taken.	**X**	
b)	Check flow rate (where meter is fitted); Is it within the normal operating range?	**X**	
c)	Check the well level is within the normal operating limits taking into account the flow conditions at the time. If level is too low or high, this could indicate control issues or pumping issues.	**X**	
d)	Check operation of the ultrasonic level gauge. Is it reading correctly? Compare the well level with the normal readout from the display.	**X**	
e)	Listen for undue pump noise and check for undue vibration by safely touching the lifting chain or guide rail.	**X**	
f)	Check pumps, pipelines and couplings for visible leaks	**X**	
g)	Check non-return valve is operating correctly Non return valves prevent water from flowing back through the pump when it is not in operation. If a weighted arm is fitted is it at the usual angle? If it is low and chattering it could indicate the pump is blocked.	**X**	

	Instruction	Daily	Weekly
5	**Pasteurisation**	Daily	Weekly
a)	Check batch rates according to sludge levels	**X**	
b)	Check digester temperatures in relation to pasteurisation plant	**X**	
c)	Check hmi panel	**X**	
d)	Check operation of biotherm reactor aeration blower package.	**X**	
e)	Check heat exchanger performance	**X**	
f)	Check digested sludge buffer tanks	**X**	
g)	Check blended sludge buffer tanks	**X**	
h)	Check operation of biotherm reactor mixer	**X**	
i)	Check operation of heat exchanger mixer	**X**	
j)	Check operation of scum cutter	**X**	
k)	Check pump and valve operation	**X**	
l)	Log and record flows, pressures and temperatures	**X**	
m)	Check % ds of feed sludge to pasteurisation plant (Monday, Wednesday, Friday)	**X**	
n)	Check, remove and clean temperature probe		**X**
6	**Primary Sludge Digestion**	Daily	Weekly
a)	Check sludge discharge to limpet chambers, where installed. Clear any blockages	**X**	
b)	Check digester feed system is working Clear any blockages	**X**	
c)	Check digester heating system is working & temperatures are within HACCP range.	**X**	
d)	Check digester mixing system is operating correctly	**X**	
e)	Log digester temperatures (HACCP) Log inlet and outlet temperatures of each boiler Log inlet and outlet temperatures of sludge and water in heat exchangers	**X**	
f)	Log sludge feed volumes into each digester and establish the retention time (HACCP)	**X**	
g)	Check operation of sludge and water recirculation pumps Check pumps, pipelines and couplings for leaks where possible.	**X**	
h)	Monitor water supply where glycol is not used to heat exchanges that are exposed to elements,	**X**	

	Instruction	Daily	Weekly
	Ensure water is drained when heat exchanges are not in use.		
i)	Log use of secondary fuel within boilers.	**X**	
j)	Sample sludge into and out of digester. Analyse and record % dry solids. (Monday, Wednesday, Friday.) Analyse and record % volatile matter. (3 times a week Monday – Thursday)	**X**	
k)	Check digesters for foaming on the top.		**X**
l)	Remove grit from base of digester if facility is provided. **Do not** leave grit removal operation unattended and ensure valve is fully closed before leaving task.		**X**
m)	Sample, measure and record pH of digested sludge		**X**
7	**Secondary Sludge Digestion**	Daily	Weekly
a)	Check mixing system, for short-circuiting or separation, Mix before transfer to the next process, where facilities exist	**X**	
b)	Decant supernatant liquor when required	**X**	
c)	Log status of each tank	**X**	
d)	Record number of day's storage	**X**	
8	**Biogas Handling, Storage, & Utilisation.**	Daily	Weekly
a)	Check all condensate traps manually and drain or top up if necessary. This check is required **twice daily** in prolonged periods of warm weather. Check automatic u-tubes visually, to ensure that there are no gas leaks or freezing Check automatic drain traps working correctly. Use manual drains if automatic drains not working, report defects	**X**	
b)	Check glycol pressure relief valve and ensure liquid level visible in sight glass	**X**	
c)	Check pressure/vacuum relief (whessoe) valves are not passing biogas. Listen for gas passing, note any unusual smell, visual check of valve.	**X**	
d)	Check for genuine operation of flare stack / waste gas burner, e.g. chp is at full power and there is excessive gas make	**X**	
e)	Check and record dehumidifier temperature	**X**	
f)	Log gas volumes: produced, flared, to chp, to boilers	**X**	
g)	Sample, monitor & record methane composition of biogas	**X**	
h)	Manually check gas isolation valve handle operation by closing & opening valve.		**X**

	Instruction	Daily	Weekly
9	**CHP & Biogas Power Management**	Daily	Weekly
a)	Check automatic drain traps working correctly. Use manual drains if automatic drains not working, report defects	**X**	
b)	Check for genuine operation of flare stack / waste gas burner, e.g. CHP is at full power and there is excessive gas make	**X**	
c)	Check glycol pressure relief valve and ensure liquid level visible in sight glass	**X**	
d)	Check & log hours run	**X**	
e)	Check & log kwh exported (where relevant)	**X**	
f)	Check & log kwh generated	**X**	
g)	Check & log kwh used on site	**X**	
h)	Check & log use of secondary fuel	**X**	
i)	Check & log gas used	**X**	
j)	Check & log heat liberated from engine, heat dumped, heat liberated from boilers	**X**	
k)	Check & log engine temperatures and pressures, by exception	**X**	
l)	Check & log gas stream for methane composition		**X**
m)	Check automatic u-tubes to ensure that there are no gas leaks or freezing		**X**
n)	Check pressure/vacuum relief (whessoe) valves are not passing biogas. Listen for gas passing, note any unusual smell, visual check of valve.	**X**	
10	**Liquor Treatment**	Daily	Weekly
a)	Check return liquors and return rate	**X**	
11	**Chemical Dosing**	Daily	Weekly
a)	Check that chemical is discharging, not just dosing pump running (any nozzles blocked?)	**X**	
b)	Check chemical storage tank level - reorder as required	**X**	
c)	Check for excessive vibration in the dosing pump	**X**	
d)	Check the level in the internal bund and empty as required	**X**	
e)	Check for leaks on visible chemical lines	**X**	
f)	Check the trace heating system	**X**	
g)	Check external storage tank bund for rainwater and/or chemical. Empty as appropriate.		**X**

	Instruction	Daily	Weekly
h)	Check the correct amount of chemical is being delivered for the conditions		**X**
i)	Check storage tank can take delivery before delivering		**X**
12	**Sludge Dewatering – Belt Press**	Daily	Weekly
a)	Check poly dosing system, Log polymer usage, note each bag change/delivery, Make adjustments to optimize	**X**	**-**
b)	Check sludge feed rate and log	**X**	
c)	Check sludge on the top belt and assess the conditioning of the sludge, Check belt drainage and filtrate quality	**X**	
d)	Check product quality & quantity, Check condition of stockpile	**X**	
e)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	
f)	Ensure wash water pressure is available at a minimum of 6 bar	**X**	
g)	Clean belt steering paddles and check they are functioning correctly	**X**	
h)	Clean hopper level probes and check they are functioning correctly	**X**	
i)	Wash station - check formation of spraying fans, rotate internal brush to clean spray nozzles. (minimum twice daily)	**X**	
j)	Visual Check - Hydraulic power pack - check oil level top up using clean equipment and fresh oil as required, maintain as close to full level as possible. Oil level must not be allowed to fall below 3/4 as this will cause serious damage	**X**	
k)	Jet wash clean the belt filter.	**X**	
l)	Use low pressure water hose to clean complete machine, frame, rollers and hoppers.	**X**	
m)	Check condition of belt filter for blinding / blockages / good filtration	**X**	
n)	Steering flaps - check condition and correct operation for activation of the hydraulic steering mechanism and check for wear and replace as required	**X**	
o)	Sample, analyse & record % dry solids on feed and cake, (Monday, Wednesday, Friday)	**X**	
p)	High pressure steam clean the belt from underside.		**X**
q)	High pressure steam clean complete machine, frame rollers and hoppers avoiding all electrical and instrumentation equipment		**X**
r)	Check condition of belt filter for wear i.e. Creasing / condition of seam to avoid failure / breakage and damage to other components		**X**

	Instruction	Daily	Weekly
13	**Sludge Dewatering – Centrifuge**	Daily	Weekly
a)	Check condition of stockpile, Check quality of product	**X**	
b)	Check kwh, amps and hours run	**X**	
c)	Check poly dosing system	**X**	
d)	Check quality of centrate	**X**	
e)	Check sludge feed rate, Check quality of product in feed	**X**	
f)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	
g)	Log hours run	**X**	
h)	Log kwh hours run	**X**	
i)	Log polymer usage, note each bag change/delivery	**X**	
j)	Log sludge flow rate	**X**	
k)	Log volume of cake produced	**X**	
l)	Make adjustments to get optimum throughput, product quality and poly dosing	**X**	
m)	Sample, analyse & record % dry solids on feed and cake (Monday, Wednesday, Friday)	**X**	
14	**Poly Make Up, Storage, & Dosing – Liquid**	Daily	Weekly
a)	Poly make up storage & dosing – liquid - check supply of polymer held in IBC; Top up, replace, order as appropriate	**X**	
b)	Liquid - check dosing pumps & settings	**X**	
c)	Liquid - check dilution water is available	**X**	
d)	Liquid - clean up any spillages of liquid	**X**	
e)	Liquid - log usage of polymer i.e. IBCs level	**X**	
f)	Liquid - log settings of dosing pumps	**X**	
g)	Liquid - log type of polymer	**X**	
h)	Liquid - check polymer flowmeter pressure – if above 3 bar clean filter and mixer		**X**
i)	Liquid - check made up solution appears ok	**X**	
j)	Liquid - check bunded area for spillages	**X**	
15	**Poly Make Up, Storage, & Dosing – Powder**	Daily	Weekly
a)	Dry powder - check dosing pumps & settings	**X**	

	Instruction	Daily	Weekly
b)	Dry powder - check supply of polymer held in silo; Top up, replace, order as appropriate	**X**	
c)	Dry powder - check bunded area for spillages	**X**	
d)	Dry powder - check dilution water	**X**	
e)	Dry powder - check dry room / silo is heated, dry and doors are closed	**X**	
f)	Dry powder - check made up solution appears ok	**X**	
g)	Dry powder - check polymer is dry and flowing, look at screw drive and discharge to wetted head – "JETWET"	**X**	
h)	Dry powder - clean up any spillages	**X**	
i)	Dry powder - log settings of dosing pumps	**X**	
j)	Dry powder - log type of polymer, check using correct polymer.	**X**	
k)	Dry powder - log usage of polymer i.e. bags used	**X**	
l)	Dry powder - check polymer flowmeter pressure – if above 3 bar clean filter and mixer		**X**
16	**Sludge Cake Transfer**	Daily	Weekly
a)	Visually check auto lubrication systems (grease pot) are functioning correctly, take appropriate action.	**X**	
b)	Check conveyor rollers & keep clear	**X**	
c)	Check drive bearings for wear & operation	**X**	
d)	Check electric trip wire emergency stop wire	**X**	
e)	Keep general area clean. Clear up any spillages	**X**	
f)	Check belt condition	**X**	
17	**Sludge Cake Storage**	Daily	Weekly
a)	Ensure silo not filled above 70% capacity. Inform Bio-recycling of any changes to sludge production.	**X**	
b)	Keep general area clean to minimise odour	**X**	
c)	Log & record each storage pad bay activity and status if applicable	**X**	
d)	Check wheel wash is operational	**X**	

Appendix 7 Sniff Testing Procedure

Purpose

Sniff testing is conducted to assist in managing odours to prevent or minimise the risk of adverse odour impact offsite.

Frequency

The procedure is to be undertaken in response to complaints or if a risk of odour nuisance at sensitive receptors is expected and/or has been substantiated.

Pre-requisites for the assessor

The assessment is undertaken by a member of staff trained in the procedure. The assessment in response to complaints will normally be carried out by someone not based on site. The member of staff will normally be office based rather than operations based. This means that their senses are less likely to become affected by any site odours.

Assessors must comply with the following:

- They should not consume strongly flavoured food or drink (this includes coffee) at least half an hour before conducting the assessment.
- They should not smoke at least half an hour before conducting the assessment.
- They should not consume confectionary or soft drinks must be avoided for the duration of the assessment.
- Scented toiletries including perfume, deodorant or aftershave should not be applied less than an hour before conducting the assessment.
- If the assessment requires travelling between locations in a vehicle, this vehicle must not contain deodorises / air fresheners.
- If the assessor has a cold, sore throat, or sinus trouble they should not conduct the assessment.

Prior to the commencement of the inspection, the operator shall check the weather data including the wind direction, wind speed, temperature and rainfall.

Odour complaint investigation

Where possible, odour complaints will be actively investigated by an assessor. Timely receipt of a complaint is essential if such investigations are to have any value.

At each location the following procedure is undertaken:

a. The assessor will stand facing the wind and breathe deeply, for a period of 3-5 minutes.

b. The following information is recorded using the odour monitoring form.
    i. Time, wind speed and direction, temperature, precipitation.
    ii. The type of any odour(s) detected.
    iii. The intensity of any odours detected on a scale of 0 to 6.
    iv. The persistence of the any odours detected i.e. constant or intermittent.
    v. The likely source of any odours detected (e.g. a specified onsite IED source, a specified non IED sources, offsite odour source, etc).
    vi. Any abnormal conditions on site that may account for the odour e.g. broken duct, open door, unusual operation, spillage etc.

The pre-requisites for assessors and monitoring approach are as defined in the sniff testing procedure with the following exceptions:

- The first assessment should be conducted at the complainant's location.
- If site odours are detected, the assessor shall move back towards the site, assessing potential odour sources within the Urban Waste Water Treatment (UWWT) and Sludge Treatment Centre (STC) processes and attempt to trace the odour to its source.
- On site operations shall also be reviewed to identify any abnormal site operations or activities that could be responsible for elevated odour levels.
- The sensitivity of the offsite location to odours should be recorded as a comment.

The findings of the investigation should be reported back to the Thames Customer Services Centre so that feed-back can be provided to the complainant.

Odour monitoring form

Date: _____ Assessor name: _____

Time	Location	Receptor sensitivity (off site locations only)	Wind speed & direction	Temperature (degrees)	Rainfall (y/n)	Odours detected (description)	Intensity (0 – 6)	Persistence (intermittent / constant)	Perceived source	Other comments

Intensity			**Receptor Sensitivity**
1 Very faint odour	3 Distinct odour	5 Very strong odour	Low (e.g. footpath, road)
2 Faint odour	4 Strong odour	6 Extremely strong odour	Medium (e.g. industrial or commercial workplace)
			High (e.g. housing, pub/hotel etc.)

---- End of OMP ---