

Environment Agency, National Permitting Service
Environment Agency Trentside Office,
Scarrington Road,
West Bridgford,
Nottingham, NG2 5BR

21 April 2026

Submitted electronically to sarah.raymond@environment-agency.gov.uk, and cc'd Mark.McAree@jacobs.com

Response to Request for Further Information – Application EPR/MP3097FY/V006 Strongford STF

Dear Sarah,

This correspondence is in response to the Environment Agency request for more supporting information received 07/04/26, regarding the variation application to our sludge treatment installation. This particular submission is in relation to Severn Trent's Sludge Treatment Facility at Strongford Sewage Treatment Works, ST12 9EX, referenced as permit number EPR/MP3097FY/V006. This is to be read in conjunction with Information previously submitted on 30/12/21, 21/06/24, 30/07/25, and 04/02/26, as confirmed via email 26/03/26.

Application payment

The requested payment of £48,619.70 should have landed into the EA account by 17th April, using the below details.

Payment Number:	2000004085					
Payment Date:	13-APR-2026					
Payment Currency:	GBP					
Payment Amount:	48,619.70					
Invoice Number	Invoice Date	Purchase Order	Contract Number	Work Order	Operation	Amount Paid
MP3097FY/V007	13-APR-2026	3500414974				48,619.70
This payment will appear in the above Bank Account 3 working days after the date of this notification.						
In the event of any queries, please email P2P@Severntrent.co.uk quoting the payment reference number 2000004085						

1) Inclusion of the Waste water treatment works (WwTW) process

Update your application to remove reference to the WwTW process that does not form part of your permit application.

See the updated non-technical summary and technical description, in Appendix 1 below, to clarify that the wider UWWTD processes within the wider sewage treatment works sit outside the scope of the permitted activities. Note that other changes have been made within this text to reflect other questions within the RFI.

2) C6 application form

Update form C6 to remove reference to the WwTW treatment processes and ensure that all emissions to water are included for the new processes applied for, this includes the cellulose treatment plant, ammonia plant and new waste to the head of the works.

Updated Form C6 attached.

Form C6 – Question 3f

Q3b – based on the maximum daily digester input of 1,360 wet tonnes, assuming 1 wet tonne = 1 cubic metre. The liquor arisings treated by either the LTP or the ammonia recovery plant must come from the installation inputs as there are limited additional water inputs to the process. Actual liquor discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be additional volumes of liquors inputs including arisings from digested sludge imports for dewatering only; biogas condensate and any OCU related effluents.

Q3c – this is based on $(1,360\text{m}^3 / 86400) \times 1000$. Arisings from sources such as dewatering are constant as the plant runs continuously. This gives a value of 15.7407 litres, rounded up to 15.7 litres per second.

Q3d – based on the maximum daily primary digester input volume (following thickening and THP pretreatment) of 1,360 wet tonnes, assuming 1 wet tonne = 1 cubic metre. The liquor arisings treated by either the LTP or the ammonia recovery plant must come from the installation inputs as there are limited additional water inputs to the process.¹⁵ Actual liquor discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be additional volumes of liquors inputs including arisings from digested sludge imports for dewatering only; biogas condensate and any OCU related effluents.

3) Sludge imports to the THP plant

- a. Confirm the waste codes to be accepted at the THP only.
- b. Provide evidence of the total volume of waste currently accepted at the THP for 2023, 2024 and 2025.

Raw cake:

- c. Confirm the maximum storage to be held on site at any one time.
- d. Confirm the maximum time raw sludge will be held on site
- e. Explain how you will store raw sludge in a contained building or equipment with appropriate abatement or provide an alternative measure that will provide an equivalent level of environmental protection.

a) See the appended list of EWC codes, Table C3-1bi relates to the THP wastes. All wastes accepted for digestion, including indigenous sludges, are subject to pretreatment within the THP process. No wastes are imported directly to the primary digesters, so there is no requirement for a separate table for wastes for digestion.

The appropriate codes in the table are 19 02 06; 19 06 06; 19 08 05; 20 03 04.

Note that 19 06 06 although relating to digested sludge is required due for the potential to have to treat sludge which has failed HACCP testing and therefore, requires retreatment.

b) See the table below for values, taken from the electronic logger data for the last 3 years. The volumes of indigenous sludge are not logged in a compatible manner as the indigenous loggers record data with regard to TDS (tonnes dry solids) rather than wet tonnes or volume.

EWC	19 08 05 Interworks (logger)	19 08 05 Imports (logger)	19 02 06 Imports (logger)	19 02 06 Interworks (logger)	19 08 05 Indigenous (theoretical)
2023	74529	2134	2412	3795.67	1,717,325
2024	53641	11744	10688	9313	1,717,325
2025	91549	112	2471	11,314	1,717,325

Sewage treatment plants require additional contingency volumes for treatment and storage as a result of the Sludge (Use in Agriculture) Regulations (SUIAR) tightening controls on sludge quality, treatment standards, and land application practices. Where regulatory changes restrict spreading during certain periods, impose lower contaminant thresholds, or require enhanced treatment and validation before agricultural use, outlets for digestate can become temporarily constrained. This can create a logistical challenge due to the continuous digestate production arising from the continuous generation of wastewater, and reduced or delayed disposal routes, particularly during wet weather, no-spread windows. To remain compliant, sewage plant operators such as STW may therefore need increased on-site storage capacity for digestate or access to alternative sludge treatment centres for contingency treatment and storage arrangements. This has been raised as a requirement within the Water Industry Environment Programme (WINEP). Contingency treatment and storage outlets provide resilience against regulatory hold-ups, outlet disruption, and seasonal spreading limitations

and climate-related issues (e.g. high rainfall or hard ground), ensuring digestate can be retained while awaiting suitable landbank availability.

The inclusion of increased import capability at Strongford, up to the design maximum of the digestion plant, is therefore, essential for ensuring the resilience of STW's operations.

c) Please note that temporary storage of raw cake on the cake pad is currently undertaken as part of THP operations on an ad-hoc basis, in the event of a short term lack of THP processing. The maximum volume of raw cake storage on the cake pad would be limited to 100m³ at any one time. The rest is imported directly to the THP for treatment.

d) The storage of raw cake is not a routine operation. However, it is currently undertaken at the site at a low level. Storage of raw cake occurs when the THP is unavailable due to scenarios such as breakdown of plant or unplanned maintenance to the THP. As such, storage is limited to under 72 hours, in the event that the incident happened over a weekend. When a problem is identified with the THP which means that raw cake might have to be subject to temporary storage, imports of sludge from satellite works would be diverted to an appropriately permitted alternative site.

In the event the plant were to be down for a longer period, stored material would be moved to a different, suitably permitted, site as soon as practicable.

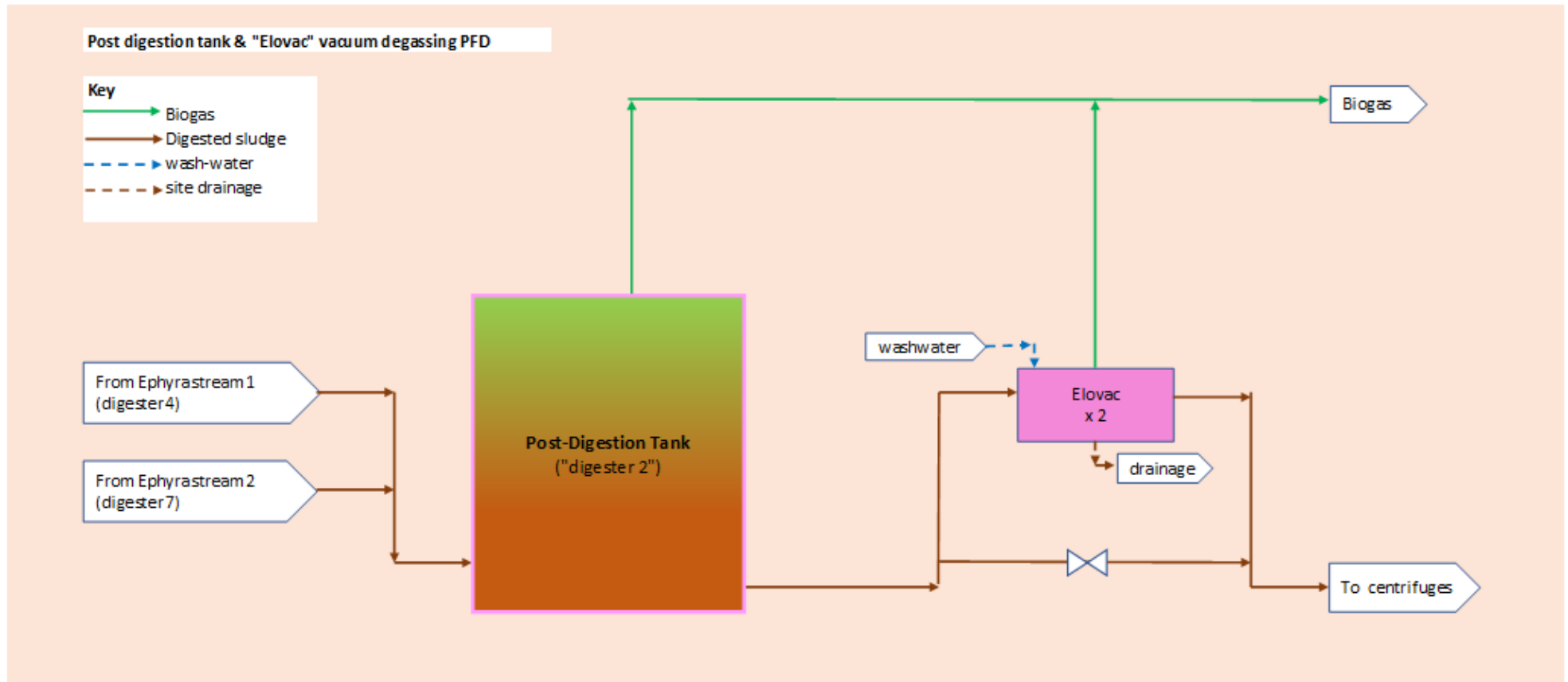
e) Raw cake is currently stored in a dedicated bay within the cake pad. Any run off is captured by the existing pad drainage system, and transferred out of the permit boundary, for treatment through the full UWWTD route at the site. This drainage is dedicated for the raw cake bay to ensure there is no cross contamination with the final digested cake stored elsewhere on the cake pad. The cake pad is over 400 metres from offsite sensitive receptors (the houses to the east and the west are similar distances from the edge of the cake pad). Nb. There is no record of odour or other complaints in relation to this existing temporary storage in this manner.

4) Vacuum methane degassing equipment.

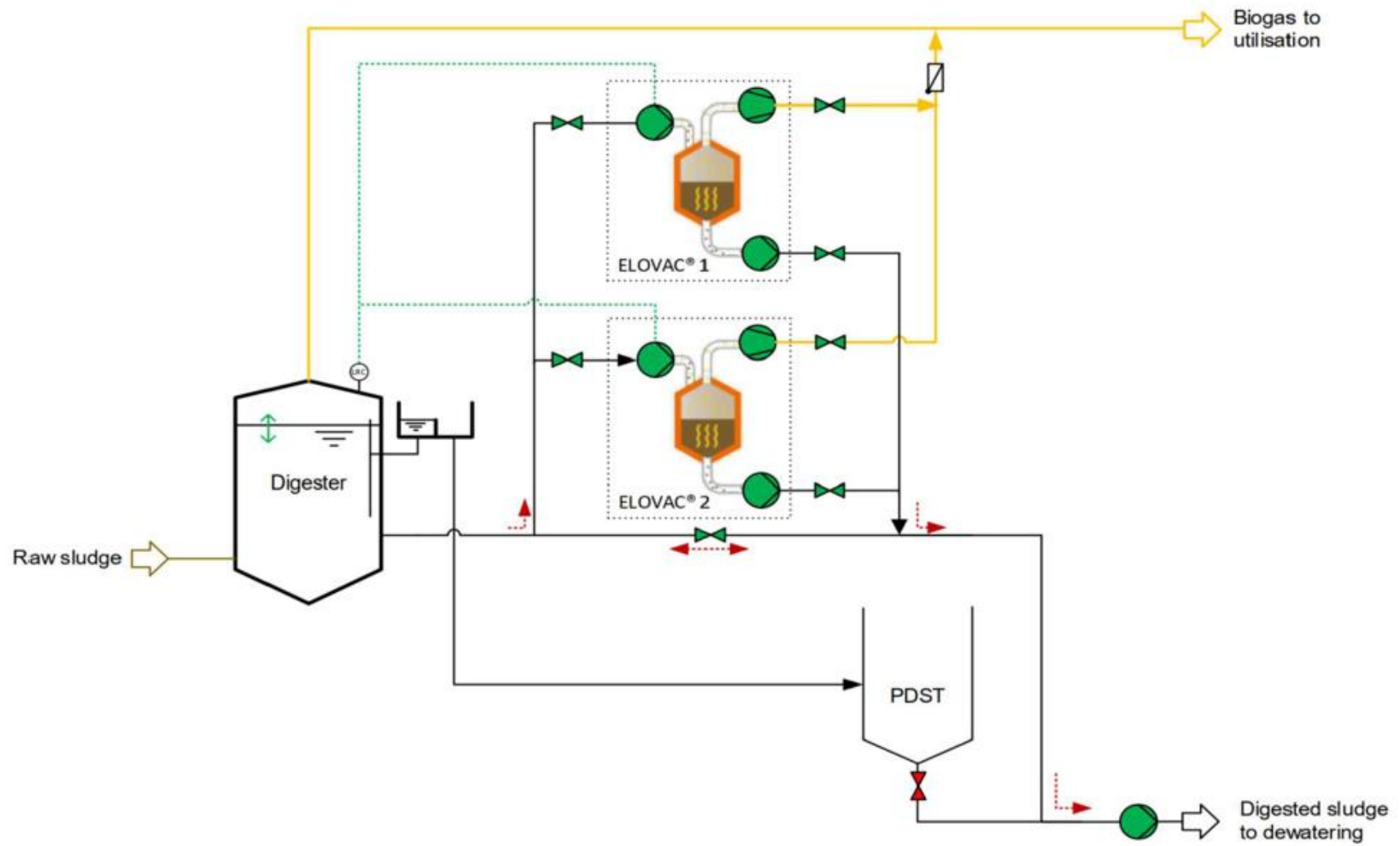
- f. Update your application to include a clear process flow on the vacuum methane degassing equipment.**
- g. Update your application to include a BAT assessment and assessment against Biological waste treatment: appropriate measures for permitted facilities"" for the vacuum methane degassing equipment, paying particular attention to BAT 14.**
- h. Provide a clear explanation of how the vents will operate.**

f) The process flow diagrams for the vacuum degassing process (ELOVAC) are as shown below.

The first diagram shows the location of the process in relation to the post digestion tank (formerly digester 2 at the site). Note that the Ephyra stream is the operation of the primary digesters in series mode, so there are only the two final digesters in each set which feed into the post digestion tank, which is fully enclosed.



The ELOVAC system itself is laid out as below, including the location of the valves and vents (note this is a generic drawing from the manufacturer and does not reflect the tank names etc of the Strongford site):



g) See the appended BAT assessment. Note that this process works as part of the anaerobic digestion process, so has been included within the main site with IED BAT assessment.

h) As can be seen in the two process flow diagrams included above, there are two Elovac vessels within the process, which are both fed by the post digestion tank. These two vessels run at a reduced pressure in order to increase the biogas mobilisation from within the digested sludge.

As such, there are no vents in routine, normal, use within the process. However, there are vents which are designed to be operated in order to carry out maintenance on the Elovac system. These are required to both introduce air safely into the vessel in order to bring it back to normal atmospheric pressure, and then also to allow for the vessel to be purged of any biogas remaining in the system to minimise the risks of biogas in an enclosed volume. This is carried out using automatic three-way valves which are only set to the atmosphere in the event of the plant being switched off. Normally, it is set in such a manner that it links the Elovac vessel and the biogas storage and treatment system.

As these vents are not in routine use, we are not proposing monitoring of them, and these are the points identified in the air emissions table in the application as A25 and A26.

5) Ammonia Recovery Plant

- a. **Update your application to include a BAT assessment and assessment against Biological waste treatment: appropriate measures for permitted facilities’.**
 - b. **Update your application to include a clear process flow that includes all inputs, outputs and assets relating to the ammonia recovery plant.**
 - c. **Provide an assessment in line with guidance ‘Surface water pollution risk assessment for your environmental permit’ of the indirect emission to water from the ammonia recovery plant. Where you do not have actual data use estimated data. (Note: This should be provided in the form of a H1 screening tool, with modelling if required and include a full explanation of how you have completed your assessment in line with the above guidance)**
 - d. **Ensure that your emission point plan includes the sampling and discharge locations for this emission.**
 - f. **In line with our guidance Medium combustion plant: when you need a permit, explain how your boiler will meet the requirements of a mobile boiler, or not be required to assess emissions**
 - g. **Provide an assessment of your emissions from the boiler in line with our guidance Air emissions risk assessment for your environmental permit**
 - h. **Update you emission point plan to include the boiler**
 - i. **Clearly explain in writing and identify within your process flow any emissions to air from diffuse, point source or other means from the ammonia recovery plant.**
 - j. **Explain how the carbon filter will be effective at treating emissions to air from the ammonia plant and ensure that the carbon filter is included in all relevant management plan i.e. OMP and emission point plan.**
- a) See appended BAT spreadsheet specific to the ammonia recovery plant.
- b) See the appended process diagram ‘250110-010601-010 - Ammonia Recovery - PFD - Rev C01’.
- c) See the appended H1 model for the ammonia recovery plant. This is based on proxy data primarily from the operational LTP at the Severn Trent Stoke Bardolph works. Only 3 samples have successfully been analysed for this works at present. As may be noted from the supplied raw data, there are issues with the matrix which has led to several determinants requiring dilution for analysis to be undertaken. This means that detection limits are variable for some substances and work is being undertaken to see how the data quality for these substances can be improved, as, in accordance with Environment Agency guidance, the ‘less than’ values have been entered as concentrations. This means that some of the compounds which appear to fail tests 1 and 2 are likely to be false failures due to elevated detection limit issues. The pH and ammonia data is taken from tests, hence why there are more samples for these parameters.
- d) See the appended updated plan with ammonia recovery plant emissions

e) No question labelled as 'e'

f) The temporary boiler is a temporary boiler plant brought to site while the ammonia recovery unit is under trial. In the longer term, should the ammonia recovery plant be made a permanent plant, as part of the continuing works improvements under AMP8 and WINEP, heat will be supplied through the use of a new permanent boiler plant.

The plant falls outside of the scope of the Medium Combustion Plant Directive due to its size being <1MWth and it is not subject to aggregation due to its size and stack that only serves it.

The Aggreko boiler which has been specified is a mobile unit, placed on the market prior to 2017, the specification sheet for the unit has a certificate of conformity dated 03/05/2011. This states that it is a 125kVA boiler unit, which falls outside the scope of the regulations, according to the first paragraph in the EA guidance on mobile MCPs and mobile boilers.

g) The boiler falls outside the scope of the medium combustion plant directive.

The unit would fit within the scope of standard rules permit 2018 no7, as a diesel / gas oil fuelled boiler unit. The applicable screening distance within the rules for a unit of this type is 800m (table 2.2 in rules set), and the nearest applicable habitats site for an MCPD is 1100m (approx.) from the emission point, the King's and Hargreaves Wood (southern unit) which is to the west of the emission point.

h) See the appended updated plan with boiler emissions

I & j) There is a single air emission point per ByoFlex unit, of which there are four. The ByoFlex unit is the individual reactor for the ammonia recovery operation. There is a single point which is used for the purging of treated air from the process within each operational cycle. The same point is also used for venting air from the reactor in the event of abnormal operation.

Data has been provided by the supplier for average emissions from the plant, as laid out in the table below.

Component	Average Value
SOx	No significant amount expected
NOx	No significant amount expected
NH3	0 ppm
CO2	<25% vol.
H2S	<5ppm

If it is decided that this point needs to be abated, it would be via a carbon filter, which is suitable for the capture of ammonia and H₂S.

6) Existing activity BAT assessment

Update and resubmit Updated BAT Reg61 Response for Strongford' to reflect your current site status and remove reference to the WWTW.

See appended updated BAT spreadsheet, which is also includes the Elovac plant.

7) Cellulose recovery plant

- a. **Update section '9.2 Appropriate Measures Assessment for Cellulose Recovery Plant' to provide detailed explanation of how the plant will meet the requirements of the 'Non-hazardous and inert waste: appropriate measures for permitted facilities'**
- b. **Confirm the EWC code to be accepted into the Cellulose Recovery Plant and explain why this code has been applied.**
- f. **Clearly explain in writing and identify within your process flow any emissions to air from diffuse, point source or other means from the cellulose plant.**
- g. **Explain how the carbon filter will be effective at treating emissions to air from the cellulose treatment plant and ensure that the carbon filter is included in all relevant management plans i.e.**

OMP and emission point plan.

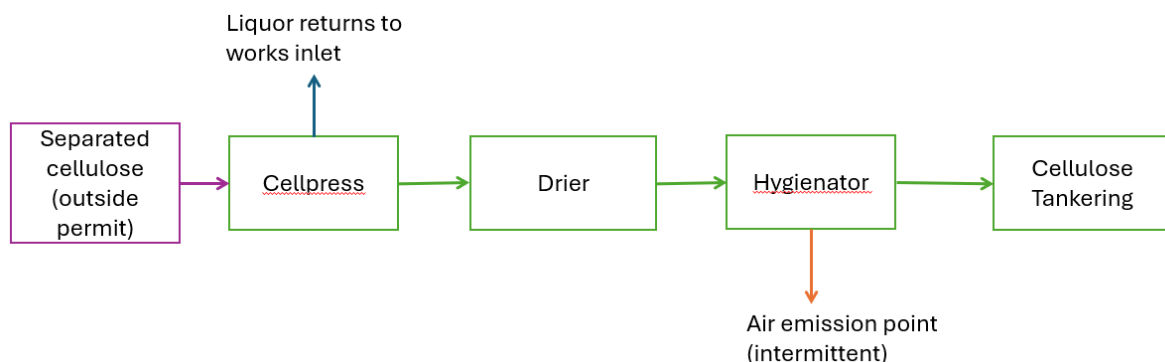
a) See the appended tables assessing the plant against the appropriate measures requirements for non-hazardous and inert waste.

b) We have identified that the correct code as 19 08 05, noting that the incoming urban waste water is not legally waste and so therefore does not fit within the EWC.

The following codes have been considered, noting that in accordance with recent Environment Agency guidance that '99' codes are not to be used:

- 19 12 12 is wastes from mechanical treatment of sludge, and is mirror non-haz code. It's not specific to sewage treatment and the plant is primarily treating the non-sludge fraction of UWWTD material.
- 19 02 06 is sludges from physico/chemical treatment, and is mirror non-haz. It's also not specific to sewage treatment but has been used in recent RPS's from the EA for sewage sludge from the dewatering of sludge with the use of chemical additives. However, no chemical additives have been used in the permitted process.
- 16 10 02 is liquid effluent, but this is not specific to sewage treatment plants and is mirror non-haz.
- 19 08 05 is sludge from treatment of urban waste water (absolute non-haz), however, the cellulose plant is not treating sludge. This code is probably the closest code in terms of one that sits within chapter 19 08.

f) The flow diagram for the permitted activities in the cellulose recovery plant is as below:



The Cellpress accepts the separated cellulose fibres from the unpermitted process. The Cellpress take the cellulose fibres and uses press plates to remove the bulk of water from the separated fibres (approx. 60% dry solids at this point). These liquors are returned to the works inlet for processing with the remainder of the UWWTD flow at the works. A screw conveyor transfers the fibres to the drier component and the hygienator. These use a combination of waste heat from the existing site boiler system and electrical heating to drive off any remaining entrained water and increase the dry solids content from around 60% to 90% in the cellulose fibres. This heating process operates at approximately 70C which effectively kills off entrained bacteria to sterilise the output and minimise the risk of any odour production. The fibres are then transferred to a sealed skip or tankered from site for offsite recovery or reuse. There is an intermittent release of heated air from the hygienator which would include any moisture generated.

g) The carbon filter is part of the air emission point (A27). This section of the drying process is where the temperature is elevated primarily in order to sterilise the separated cellulose. The air is relatively dry at this point and a carbon filter is industry standard for this type of treatment of hot air.

8) H1 assessment for the Cellulose plant indirect emission to water

- a. Provide the laboratory results for the determinants that are reported as being 'below the limits of detection'
- b. On review upstream sampling points are available, update your assessment to include actual

background data for determinants where available

- c. Update your H1 summary to explain how you have met the requirements in guidance Surface water pollution risk assessment for your environmental permit, this should include but not be limited to the raw data used, evidence of sampling to UKAS standards or an explanation of the standards used, an explanation of how you have determined your limits of detection, an explanation of how the Q95 has been applied, an explanation of how the flow rates have been calculated, operational mode of the discharge, a justification of why your assessment is representative of the discharge, and explanation of the receiving waters and what tests have been applied.**
- d. Explain how you have considered Predicted No Effect Concentration (PNEC) determinants?**
- e. Provide the relevant data in line with our guidance Surface water pollution risk assessment for your environmental permit for the Environment Agency to carry out the required modelling.**

a) Please see the appended raw data sheet – note this is for the updated H1 model to that previously provided which includes those samples lower than the limits of detection.

b) We have not been able to source this data at this point. We will update the model if you can provide a pointer to where it can be found.

c) The data used for the H1 tool is proxy data on samples of primary filtrate from the Stoke Bardolph works, that is data taken from the thickening of primary sludge at that works. This data has been utilised due to its availability and being the closest sampled material to the main UWWTD flow at a works, as there is no chemical inputs into this part of the thickening process.

The supplied H1 model is based on a corrected version of the withdrawn excel based Environment Agency H1 tool. This version has been used to submit H1 models in support of Strategic Reuse Options (SRO) projects to the Environment Agency and previously accepted by the water quality function of the Agency. The tests applied are explained in the various excel sheet tabs and align with the tests in the current guidance on risk assessments for surface water.

The following changes have been made to the withdrawn modelling tool in order to correct errors within it:

- Correction of a number of typographical errors within the list of chemicals of interest
- Correction of EQS values for a number of entries to align with current values
- Checking and correction of calculation errors within the issued document
- Addition of a column and associated calculation for the assessment of sewage reduction factors
- Note that as the spreadsheet was developed for the SRO projects, there are substances within it which are not in the normal risk assessment tool as they were found in specific sampling regimes for the SRO work.

The Q95 flow has been taken from the appropriate monitoring station, Darlaston (28083) for the Strongford site, from the CEH website.

Laboratory data has been collated into a spreadsheet and is supplied. Sampling was undertaken by Severn Trent sampling staff, who are trained in the collection, handling and transfer of samples as part of their day job, although they are not accredited for the sampling of this specific effluent stream, they are suitably accredited for the sampling of final effluent and other effluent samples required to demonstrate environmental permit compliance. The laboratory testing undertaken was by a laboratory who were accredited for the majority of the testing required, however, not all tests were accredited for this suite as the laboratory does not have accreditation for the specific matrix involved. This has led to issues with the sample quality with regards to detection limits. Due to matrix effects for some samples in order to analyse the samples dilution of the samples was required which has the effect of raising the limits of detection for some

substances. These have been entered into the spreadsheet as absolute values rather than 'less than' values in accordance with Environment Agency guidance.

d) Those substances which have PNECs have been modelled in accordance with guidance from the Environment Agency given in relation to the SOR projects, including the choice of determination limits.

e) We are uncertain as to the missing data to undertake this modelling. We have provided the raw data utilised for the H1 model.

9) Process flows

Update your process flows to include all assets and ensure the process that you are applying for is fully represented.

See appended updated process flow diagrams, included for the various activities requested.

10) Emission point plan

Update your emission point plan to include all point source emissions to air and water.

See appended updated plan.

11) Flaring of biogas

For the flare, explain how you will manage your flares so that they are only used for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns)

See answer within **Section 6 Biogas** in the Technical Description below.

12) Tank Inventory

- a. **Update and resubmit this table to include all tanks and ensure consistency in tank naming across your application.**
- b. **Include a column to identify if tanks are enclosed or open, and have diffuse emissions from open vents, limpet boxes or other sources.**
- c. **Provide the final detailed designs for the enclosure of open tanks**

See answer within **Section 18 Tank Inventory** in the Technical Description below.

13) Tonnages

- a. **For the increased waste codes and tonnage provide an assessment of the indirect emission to water in line with our guidance Surface water pollution risk assessment for your environmental permit.**
- Or alternatively**
- b. **Provide evidence of the current EWC codes accepted at site in the form of waste transfer notes.**
 - c. **Provide evidence of the total volume of waste currently accepted to the head of works for 2023, 2024 and 2025.**
 - d. **Confirm the total volume of waste to be accepted per year at the head of works under existing activity AR13**
 - e. **The total volume of digested cake to be accepted per year for temporary storage only.**
 - f. **To demonstrate that this is representative of the process being carried out on site provide evidence of the total volume of digested cake accepted for temporary storage for 2023, 2024 and 2025.**
 - g. **The total volume of digested cake to be accepted per year for dewatering only.**
 - h. **To demonstrate that this is representative of the process being carried out on site provide evidence of the total volume of digested cake accepted for dewatering for 2023, 2024 and 2025.**

a) See below.

b) and c) Our waste acceptance database (CWID) electronic records show the following EWC codes and volumes have been accepted at the head of works during the last 3 years.

Volume Received	Calendar Year
-----------------	---------------

EWC codes	2023	2024	2025
02 02 01	153		
02 02 03	639	29	175
02 02 04		26	25
02 03 01	170		
02 07 03			5
02 07 05		163	673
03 03 11	684		
04 01 07	58	242	110
05 07 02	75	112	120
07 01 12	26		
08 01 20	75	109	
08 03 08	177	975	962
16 10 02 (trade)	6941	7,187	5,419
16 10 02 (domestic)	5946	2822	
19 02 06	2173	10,209	2,471
19 05 01	54	28	894
19 06 03	25	76	1,326
19 06 04	290		
19 07 03	13,989	11,677	15,126
19 08 01	721	652	416
19 08 05 (third party)		14,154	308
19 08 05 (interworks)	73985	95795	45720
19 09 02	395	112	202
19 13 06	2249	830	677
20 03 04	14647	10783	9967
Grand Total	123,472	155,981	84,596

d) We are not intentionally requesting an increase in volume for imports at the head of works, we were attempting to clarify the two separate import routes to site for this varied permit (which are not separately identified in the current permit), and include for the volume of indigenous sludges now brought into scope for the digestion route.

The current permit has an annual import maximum volume of **430,000 (t)pa** (where we take 1 tonne = 1 cubic meter) for non-hazardous imports so we will update our application table to reflect that volume in the varied permit. We no longer accept hazardous wastes to site.

e) For digested cake **10,000 (t)pa** maximum - the previous application had our requested allocation (20,000tpa) as one activity (liquid and cake imports combined), so we have now split this request.

f) Although this activity has happened, we do not have recorded details of volumes or dates.

g) Please note, we would not import digested cake for dewatering. The process we are requesting is for importing digestate liquid to site for mixing with indigenous digested sludge for dewatering into cake, then the resulting mixed cake is stored on the cake pads prior to landspreading elsewhere. We are requesting this volume be clarified on the permit as **10,000 (t)pa** maximum.

h) Volume of digested liquid imported for dewatering: 2023: 0, 2024: 0, 2025: 373 m3.

Strongford capacity is increasing due to upgraded assets and tightened regulatory control, hence the reason

for the increased volume request at this stage. Sewage treatment plants require additional contingency storage for digestate as a result of the Sludge (Use in Agriculture) Regulations (SUIAR) tightening controls on sludge quality, treatment standards, and land application practices. Where regulatory changes restrict spreading during certain periods, impose lower contaminant thresholds, or require enhanced treatment and validation before agricultural use, outlets for digestate can become temporarily constrained. This can create a logistical challenge due to the continuous digestate production arising from the continuous generation of wastewater, and reduced or delayed disposal routes, particularly during wet weather, no-spread windows. To remain compliant, sewage plant operators such as STW may therefore need increased on-site storage capacity or access to alternative storage arrangements. This has been raised as a requirement within the Water Industry Environment Programme (WINEP). Contingency storage provides resilience against regulatory hold-ups, outlet disruption, and seasonal spreading limitations and climate-related issues (e.g. high rainfall or hard ground), ensuring digestate can be retained while awaiting suitable landbank availability.

Updated table	Annual volume
<i>S5.4 A1(b)(i) – anaerobic digestion via THP</i>	<i>7,003,985</i>
<i>S5.4A1(a)(i) – liquor treatment plant</i>	<i>478,720 (included in AD initial volume)</i>
<i>S5.4A1(a)(ii) – ammonia plant</i>	<i>253,440 (included in AD initial volume)</i>
<i>Waste activity Head of works</i>	<i>430,000(t)pa</i>
<i>THP import – covered by first line</i>	<i>0</i>
<i>Receipt of digested sludge for dewatering and temporary storage</i>	<i>20,000(t)pa</i>
<i>Cellulose recovery</i>	<i>1,460(t)pa</i>

14) Waste codes

Update your EWC code tables to clearly identify wastes that will be accepted into the following processes.

- a. **S5.4A1(b)(i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment**
- b. **Waste to be accepted at the THP process only**
- c. **Digested cake to be accepted for temporary storage only**
- d. **Digested cake for dewatering only**
- e. **Tankered waste to the head of the works**
- f. **Waste to be accepted at the cellulose recovery plant**

See appended EWC codes tables for each activity. a) As all imports go through the THP prior to digestion, there is no separate list for imports to digestion. d) It is imports of digestate liquid sludges for dewatering, not import of digestate cake for dewatering.

15) Secondary containment

- a. **Update ‘IED Containment Assessment – Risk Identification Report’, ADBA assessment and ‘Strongford Digesters and Sludge Tank IED Containment Assessment - Proposed Options Report’ to include all relevant tanks and assets.**
- b. **Where tanks are provided with self bunding or are to be included in the wider containment system clearly identify this in your tank inventory list,**
- c. **Provide an update in relation to the secondary containment implementation plan timescales identified in your letter dated 31/07/2026**

a) and b) The Risk report has been updated and appended to align tank names and clarify if tanks are in scope or not. See also the technical summary, **section 18 Tank Inventory**, which includes an explanation of which tanks are excluded from the scope of the spill and risk assessment reports.

Tanks which are new to this application, specifically the ammonia recovery plant related chemical tanks and the inlet holding tank, are self bunded so will be BAT compliant from their commissioning.

The Elovac tank is an existing tank located within the digester area, and will be secondary bunded as part of the wider bunding works in this area.

c) CIRIA compliant bunding for existing tanks has been modelled, and designed in principle. The finalised design and schedule will be issued to the EA for approval by the end of July 2026. The delivery of the bunding will be before end of AMP (2030).

The modelled bunding for the area around the THP has already been completed. This was undertaken last year as part of our “no regrets” project.

16) Emissions to air

- a. **For emission point A21 - Ventilation system (SAS belts), and emission point A24 - Ventilation system (Imported Sludge Screenhouse) explain how this meets BAT 14, or an alternative technique will provide an equivalent level of environmental protection.**
- b. **If it does not currently meet BAT or provide an alternative approach that will provide an equivalent level of environmental protection, explain how you intend to meet BAT.**

a) The emission points A21 and A24 are ventilation systems only, and do not include treatment via abatement technology. There is a wider IED compliance project on site “Emissions to Air”, in which assessment of these two vents will be included. We are currently drafting solutions and will submit a planned schedule and dates to the EA when worked up. The solutions will be delivered this AMP (by end of 2030).

17) Changes to your application

Where you have made changes to your application ensure that all relevant documents submitted as part of your application are updated to provide consistency and no contradicting information

Appended documents, as listed below, have been checked and amended for consistency and contradictions.

Summary of additional supporting information to this response:

Updated Non-technical summary and Technical Description (Appendix 1 below)

Updated Form C6

Update List of EWC codes

Updated BAT spreadsheet for site,

Updated BAT spreadsheet for ammonia recovery plant.

Process flow diagram for ammonia recovery plant

H1 model for the ammonia recovery plant

Updated Emission Point Plan

Appropriate Measures assessment for Cellulose Plant

Updated Risks report for Secondary Containment

I hope you find that the attached is sufficient for your review, but any questions regarding this content can be directed to me by email or phone using the details below.

Yours sincerely,



Joanne Chapman

Waste & Installations Permitting Manager, Severn Trent Water

Email: Joanne.Chapman@SevernTrent.co.uk

Mobile: 07850602321

Appendix 1:

Non-Technical Summary

This application is for the substantial variation of the site's existing IED environmental permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended). It relates to the permitting of indigenous sewage sludge and imported sewage sludge and other wastes for treatment by anaerobic digestion for the Strongford Sewage Treatment Works, operated by Severn Trent Water Ltd.

The substantial variation to the permit is to amend an existing listed activity, the biological treatment by anaerobic digestion, of indigenous sewage sludge in a mixture with imported cess and septic tank derived wastes to reflect the treatment of non-hazardous wastes only. It removes an existing listed activity relating to the blending of hazardous waste with indigenous sludge prior to digestion. There is an additional listed activity added, for the operation of an existing liquor treatment plant (LTP) at the site, to aerobically treat process liquors prior to their return to the works inlet for full treatment. There is also the addition of a second listed activity for the recovery of ammonia by chemical stripping from some of the process liquors prior to their return to the works inlet for full treatment. These two additional listed activities operate in parallel, with some returns liquors being treated by each process. The LTP is an existing unit which has been operational for a number of years but was not previously identified within the permit. The ammonia recovery plant is a newly installed piece of equipment, which is being trialled at the works. The returns from these processes to the works inlet are an export to the urban waste water treatment directive (UWWTD) processes on site which sit outside of this permit scope.

This variation retains the operation of biogas and natural gas fuelled boiler units for the generation of heat to the THP plant, in addition to permitted CHP engines at the site. These combustion plant remain as currently permitted. Biogas may also be treated through a biogas upgrading unit (gas to grid plant) which is within the current permit.

The site is currently permitted for a waste operation for the import of suitable liquids and thin sludges to the works inlet; and for a waste operation for the import of treated sewage sludge from other works for dewatering. There is the addition of a self bunded trade import tank to temporarily store tanker imported wastes prior to treatment through the inlet, as well as clarifying that amongst the currently permitted imports, is raw sludge from other works, to the THP process. Following their introduction into the main works flow, the processing of wastes in the UWWTD processes on site sit outside of the scope of this permit.

There is the addition of a new waste treatment process that treats incoming urban waste water delivered by the sewerage network to the site, to recover cellulose in the form of cellulose fibres from part of the incoming UWWTD stream.

Activities

The anaerobic digestion process treats sewage sludge arising from the indigenous treatment of UWWTD derived materials supplied to the site by the sewer network and from tanker imports of waste materials to the works that are similar in composition to UWWTD derived materials. Indigenous sludges are separated from the main UWWTD flows and thickened, at which point they fall within the scope of this permit. The bulk UWWTD flow and associated treatment activities fall outside the scope of this permit.

Indigenous sludge is mixed with imports of waste sludges from other wastewater treatment plants and subject to biological treatment via anaerobic digestion within one of three anaerobic digester tanks located on site. Previously, sewage treatment sites operated by sewerage undertakers importing

sludges and liquids were only regulated for the import and treatment of these materials to the wider site and indigenous sludges arising from the treatment of sewage was not required to be included in a permit. It has now been determined that the treatment of indigenous sludges do need to be permitted as they fall outside of the Urban Waste Water Treatment Directive.

This substantial variation applies to both permitted activities at the site and is for the:

- Removal of the listed activity for the blending of hazardous waste prior to treatment at the site. Note that the infrastructure for this activity remains in use at the site, the removal of the listing is due to there being no equivalent listing relating to non-hazardous waste;
- Biological treatment by anaerobic digestion of non-hazardous wastes only;
- Addition of a new listed activity at the installation, to add an existing liquor treatment plant to treat liquor generated by the dewatering of treated digested sludge at the site, in order to reduce the strength of the liquor returned to the head of the works;
- Addition of a new listed activity at the installation to add a new ammonia recovery plant to treat liquor generated by the dewatering of treated digested sludge at the site, in order to capture ammonia for beneficial reuse in the longer term;
- Clarification of EWC codes for different activities at the site;
- Clarification of process throughputs to include indigenous arisings;
- Export of process related liquors to the UWWTD processes on site for aerobic treatment outside of this permit;

In addition, the waste activity at the site will be varied to include:

- Clarification of the scope of the current directly associated activity to include sludge imports to the THP plant on site from other works;
- Addition of a self bunded, covered, holding tank at the works inlet, to enable imports to be retained prior to release into the main treatment flow;
- Addition of a cellulose recovery plant which recovers cellulose fibres from the incoming urban waste water.

All activities will have clarity provided as to the acceptable waste types for the specific process, and throughputs adjusted to reflect tonnages for each process. There is also an apparent increase in site throughputs through comparison with the current site permit. However, the revised throughputs include indigenous arisings which were excluded from the current permit. Therefore, the increased throughput will not impact on the overall volumes of waste being treated.

There are also associated updates to the permit scope and site plan to reflect changes to air release points, transfer and sampling points.

The installation covers the biological treatment of sewage sludge, both indigenous and imported from other waste water treatment sites, in a mixture with imported cess and septic tank derived wastes, by anaerobic digestion, with a capacity above the relevant threshold. There are a number of currently permitted directly associated activities, including the pretreatment of sludge using a thermal hydrolysis process (THP); operation of a biogas fuelled CHP units for the generation of electricity and heat at the site, which is currently permitted under the Medium Combustion Plant Directive and export of biomethane from a biogas upgrade unit.

The site is located in a semi-rural setting on the south side of the city of Stoke on Trent. The River Trent runs to the west of the site across agricultural land.

The first waste activity comprises an offloading coupling for tankers to discharge through, located at the works inlet into a self bunded, holding tank. The waste permit variation will provide the works with

additional protection from 'higher strength' wastes, that is, wastes with elevated ammonia and BOD/COD levels, which can cause problems for the aerobic treatment which sits outside of this permit scope. These wastes will be discharged into the holding tank and then released into the main flow at a reduced flow rate compared to normal tanker discharge rates. The tank can also be used to hold incoming tanker loads during storm condition periods. All tanker imports are subject to pre-acceptance and acceptance procedures, which include being passed through a logger to record the incoming volume and the company carrying out the import. Once the tanker waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations.

The site is currently permitted for a second waste activity, relating to the imported digested sludge from other works for dewatering at the facility using the plant on site and storage on the cake pad, pending application to land in the same manner as indigenous wastes.

This variation will clarify the scope of the current waste import activity which includes the import of undigested sludges from other wastewater treatment works to the THP plant on site for treatment and digestion. This imported raw sludge may also be subject to temporary storage in a dedicated bay on the cake pad pending transfer to the THP.

There is a new waste activity at the site for the operation of a cellulose recovery plant, which uses physical filtration to separate cellulose fibres from the incoming UWWTD materials delivered to the site by sewer for offsite recovery. This process has the benefit of improving process efficiency in the UWWTD treatment route at the site.

The installation is for the biological treatment of non-hazardous wastes by means of anaerobic digestion.

There is an import point for sludge transfers from other waste water works, for the THP. This material is transferred and blended with the indigenous sludge separated from the main aerobic treatment flow (outside of this permit) and site derived SAS (surplus activated sludge) prior to transfer to the THP. The THP imports may also be imported and stored temporarily on the cake pad within the works prior to transfer to the THP for treatment.

There are four blending tanks (containing a blend of imports, SAS and indigenous sludges) used to ensure that the incoming materials are properly mixed to give a more homogeneous mixture, prior to transfer to the THP process. THP uses a combination of pressure and temperature to enhance the digestion of the sludge, in an enclosed system. From the THP, sludge is transferred to one of the primary anaerobic digesters located at the site. The digesters are above ground tanks and of concrete construction. The digesters operate on a continuous process basis, that is incoming sludge is added to the process as digested sludge is removed from the primary digesters. Removed sludge is transferred to digested sludge storage tanks to ensure that the required level of pathogen kill has been achieved. Following this, fully digested sludge is transferred to site dewatering equipment, where, following the addition of polyelectrolyte based coagulant, it is dewatered by centrifuge and stored on the sites open cake pad. Treated cake is removed from the pad for landspreading under the Sludge Use in Agriculture Regulations 1989, in accordance with the Biosolids Assurance Scheme (BAS). Dewatering centrate is subject to treatment within the LTP as described below prior to its transfer from the permit back to the works inlet for additional treatment under the UWWTD flow outside of the permit scope.

Biogas is captured from the primary anaerobic digesters and stored within a dual membrane biogas storage holder or two gas storage vessels. The above ground 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 vessels 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 storage vessel for upgrading in a biogas upgrade unit and injected into the National Gas Grid. Biogas is also combusted in one of three CHP engines which are currently permitted under MCPD, generating electricity for use both within the site and for export to the grid, and heat to maintain primary digester temperature. Biogas can also be used in two package boilers. In the event there is excess biogas there are two emergency flares which are utilised under 10% of the year.

The new listed activity for a liquor treatment plant (LTP) at the works is linked to the operation of the listed anaerobic digestion plant for the treatment of sewage sludge and non-hazardous wastes. The treatment of non-hazardous wastes is undertaken in the same physical plant and there is no separation of outputs from the process. As part of the currently permitted activities, the installation includes a directly associated activity plant for the pre-treatment of sludge prior to either listed activity, by thermal hydrolysis (THP). The THP process is impacting on the ammonia concentration of the dewatering liquors produced within the process. Note the LTP is present and operational on the site and was not previously permitted due to a change in interpretation.

The new listed activity for the LTP at the site, which will reduce the ammonia concentration within the liquor by aerobic treatment, prior to the return of treated liquors to the works inlet. As this return is to the inlet as a liquid, it is a disposal operation, as following its transfer from the permit for treatment within the urban waste water treatment directive (UWWTD) processes at the site which sit outside of this permit, it is released to surface water in accordance with the requirements of a separately held discharge Environmental Permit.

In parallel to the LTP there is an ammonia recovery plant, which treats some of the dewatering liquors by chemical scrubbing to produce liquid ammonium sulphate. At present this is classified as a waste and is removed from site for disposal, but as part of the optimisation process for the plant, sampling will be undertaken to underpin an end of waste submission for this output in order to enable its beneficial reuse as a fertiliser.

An increase to the total throughput of the works is also requested due to a review of the Environment Agency understanding of the treatment of indigenous wastes, where additional import volumes are required to reflect these wastes streams within the installation and waste processes throughput. This increase relates purely to the recording of existing throughput.

The existing listed activity for the blending of imported hazardous wastes with indigenous sludges has been removed from the permit, as hazardous wastes will no longer be imported. There is no equivalent listing for the blending of non-hazardous wastes, meaning that the listing is to be removed. However, the physical infrastructure and operation of these blending tanks remains in place, for non-hazardous waste handling only.

This variation does not change the existing permit boundary which is the site fenceline and therefore includes activities which fall outside of the scope of this permit. A future variation is likely to involve reassessment of this boundary.

Technical Description

This application is for the substantial variation of the site's existing IED environmental permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended). It relates to the permitting of indigenous sewage sludge and imported sewage sludge and other wastes for treatment by anaerobic digestion for the Strongford Sewage Treatment Works, operated by Severn Trent Water Ltd.

The substantial variation to the permit is to amend an existing listed activity, the biological treatment by anaerobic digestion, of indigenous sewage sludge in a mixture with imported cess and septic tank derived wastes to reflect the treatment of non-hazardous wastes only. It removes an existing listed activity relating to the blending of hazardous waste with indigenous sludge prior to digestion. There is an additional listed activity added, for the operation of an existing liquor treatment plant (LTP) at the site, to aerobically treat process liquors prior to their transfer from this permit to the works inlet for full treatment outside of the scope of this permit. There is also the addition of a second listed activity for the recovery of ammonia by chemical stripping from some of the process liquors prior to their return to the works inlet for full treatment. These two additional listed activities operate in parallel, with some returns liquors being treated by each process. The LTP is an existing unit which has been operational for a number of years but was not previously identified within the permit. The ammonia recovery plant is a newly installed piece of equipment, which is being trialled at the works.

This variation retains the operation of biogas and natural gas fuelled boiler units for the generation of heat to the THP plant, in addition to permitted CHP engines at the site. These combustion plant remain as currently permitted. Biogas may also be treated through a biogas upgrading unit (gas to grid plant) which is within the current permit.

The site is currently permitted for a waste operation for the import of suitable liquids and thin sludges to the works inlet; and for a waste operation for the import of treated sewage sludge from other works for dewatering. There is the addition of a self bunded import tank to temporarily store tanker imported wastes prior to treatment through the inlet, as well as clarifying that amongst the currently permitted imports, is raw sludge from other works, to the THP process.

There is the addition of a new waste treatment process that treats incoming urban waste water delivered by the sewerage network to the site, to recover cellulose in the form of cellulose fibres from part of the incoming UWWTD stream.

Scope

This application covers the biological treatment of sewage sludge, both indigenous and imported from other waste water treatment sites, in a mixture with imported cess and septic tank derived wastes, by anaerobic digestion for recovery, with a capacity above the relevant thresholds. There is currently a listed activity for a blending tank where imported hazardous wastes, as well as interworks sludge transfers and indigenous sludges are blended; prior to transfer to the anaerobic digestion primary reactors. This activity is to be removed as only non-hazardous wastes are now imported and treated at the site. This means that the primary listed activities at the site will change from s5.3A(1)(a) activities to s5.4A(1)b activities.

Clarity is to be added that this import of non-hazardous waste would include raw sludge from satellite works to the THP. On occasion this raw sludge may be temporarily stored on the cake pad, in a separate, labelled, bay to digested cake. Raw sludge is stored for the minimum possible time period, pending THP availability.

The second existing listed activity for the treatment of hazardous waste by anaerobic digestion is to undergo a substantial variation to the same process but only treating non-hazardous wastes.

There is a new listed activity, for the operation of the existing LTP at the site, which aerobically treats process liquors prior to their transfer from the permitted activities to the works inlet for treatment through the UWWTD route outside of the scope of this permit. This is classified as biological treatment for disposal. This plant has been on site and operational for a number of years and is being added to the permit due to a greater understanding that this operation is a listed activity in its own right.

There is an additional listed activity for the recovery of ammonia from dewatering liquors at the site, which is a new process which is undergoing operational trials. This is a physico-chemical treatment for the purposes of disposal (currently) which means the plant is a separate listing to the LTP. The ammonia recovery plant uses chemical scrubbing to remove ammonia from process liquors and operates in parallel with the LTP, so that process liquors are either treated by the LTP or subject to ammonia recovery. At present, the ammonia is recovered as ammonia sulphate which is stored as a liquid in tanks and transferred offsite by tanker for offsite disposal as it is classified as a waste material. As part of the process, samples will be taken for analysis to underpin a submission for 'end of waste' status for the ammonium sulphate to allow its removal from site as a product and input into agricultural fertilisers.

There are a number of directly associated activities at the site, including the operation of biogas fuelled CHP units for the generation of electricity and heat at the site, and operation of auxiliary boilers which remain as currently permitted. There are also a THP plant operation, clean up of biogas for injection into the gas grid, and storage of biogas undertaken as DAAs to the current permit.

The current permit includes two waste management activities, one for the import of hazardous wastes to the inlet for treatment through the UWWTD route. The permit also allows for the import of digested sludge to the dewatering plant, for dewatering prior to storage of the cake on the cake pad.

There is a change to the first of these waste activities to the import of non-hazardous waste only to the inlet, to include the temporary storage of imported 'high strength' wastes in a self-bunded tank at the inlet. In this context 'high strength' refers to parameters such as COD, BOD and ammonia concentrations, which can cause issues in the aerobic treatment processes on site if introduced at a high flow rate. The holding tank is designed to temporarily store these wastes and release them into the works at a lower flow rate than possible from a tanker, in order to minimise the risk to the aerobic processes on site. Once imported wastes have been released to the inlet, they fall outside of the scope of this permit and are treated within the UWWTD processes on site.

This variation does not change the existing permit boundary which is the same as the wider site fence line. As such, the permit boundary includes activities that sit outside of this permit scope, as they relate to the UWWTD treatment route.

There is a change to one of the existing air emission points at the site to correct its location on the site plan, along with the addition of other air emission points associated with existing odour control units and pressure relief valves previously out of scope.

Site Setting

Strongford sewage treatment works lies on the south side of the city of Stoke on Trent, just south of the settlement of Trentham and north of the settlement of Barlaston. The site is bordered to the immediate north by a golf course, with agricultural land to the east and south, before villages. The River Trent is adjacent to the western site boundary and then farmland. To the east of the site, there is a mixture of open farmland and properties along Barlaston Old Road.

The permitted area has two designated habitats sites within 2km of the site, namely Kings and Hargreaves woods, which has multiple units and is both a SSSI and classified as ancient woodlands, approximately 1 – 1.25km to the west (distance differs between the ancient woodland and SSSI) and another area of ancient woodlands, Newstead Woods, 1.1km to the north east. There are no local

wildlife sites within 2km of the site. There are a number of patches of priority habitats, namely deciduous woodland, including two patches on the site boundary.

The site sits within the boundary of a Local Authority wide Air Quality Management Area (AQMA), which is designated for NO_x (as NO₂).

As the permitted area of the site includes the whole of the site within the fence line, the permitted area is mainly located within Flood Zone 1, that is, it has a less than 0.1% chance of flooding from rivers in any year. Most of the sludge assets are located within this Flood Zone 1, although some parts of the site, including the cake pad are within Flood Zone 3, where there is a higher risk of flooding from rivers (a 1% or more chance of flooding from rivers in any year) while some are within Flood Zone 2.

The site sits outside any source protection zone or surface water safeguard zone. The site is not in a nutrient neutral catchment.

The site operates 24 hours per day with the site being unstaffed overnight. A standby rota picks up process alarms overnight.

1 Application Basis - Waste Activities

The waste activities comprise two existing activities and one varied waste activity.

The first waste activity comprises an offloading coupling for tankers and cess vehicles to discharge through, located at the works inlet into a covered, self bunded, holding tank. The waste permit variation will provide the works with additional protection from higher strength wastes (high COD/BOD), where wastes can be discharged into these tanks and then released into the main flow at a reduced flow rate. The site has installed an above ground self bunded steel tank adjacent to the current offloading area of 150m³ total volume. Tankers offload at a set flow rate. By offloading higher strength wastes into these holding tanks, these wastes can be released into the main works flow at a reduced flow rate, enabling their treatment and reducing the risk to site processes. The tank can also be used to retard incoming tanker loads during storm condition periods, increasing the overall head room of the works during storm events. All tanker imports are subject to waste pre-acceptance and acceptance procedures which include being passed through a logger to record the incoming volume and the company carrying out the import. Once the tanker waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations.

The waste codes for imported waste accepted at head of the works are detailed in Form C3, Table C3-1bii. Once the tanker trade waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations. This activity is currently permitted and the existing permit incorporated into this variation. Note some of the imports are excluded from the scope of the permitted activities by the Controlled Waste Regulations 2012.

The site is currently permitted for a second waste activity, relating to the imported digested sludge from other works for dewatering at the facility using the plant on site and storage on the cake pad, pending application to land in the same manner as indigenous wastes. Imported sludge is kept separate from the indigenous digested sludge as far as practicable on site on an engineered cake pad. The waste codes for imported waste accepted at the installation for dewatering are detailed in Form C3, Table C3-1bii.

There is also a DAA for undigested sludge imports to the THP plant on site from other works for treatment, or in the event of abnormal operations at the THP, temporary storage at the site on the cake pad in a dedicated storage bay separate to any digested cake, pending further treatment. In the event raw cake is subject to temporary storage, the storage period is minimised as far as practicable and it is treated in preference to incoming sludge from other works. The import is currently permitted as a waste import activity but is included specifically as a point of clarification during the variation of the permit. The waste codes for imported waste accepted at the installation for treatment via the THP are detailed in Form C3, Table C3-1biii.

All imports to the site are subject to waste pre-acceptance and waste acceptance checks by Severn Trent staff.

There is a new waste activity at the site, which processes the incoming UWWTD flow to recover cellulose fibre from the bulk UWWTD. This is a new operation at the site and is not currently in use within England. This plant is described in more detail further on in this section, including a specific process flow diagram in Appendix A.

2 Installation Activities

There is an offloading coupling for tankers to discharge UWWTD derived sludge from other waste treatment sites located at the facility. Sludge is passed through a logger to record the incoming volume of sludge and is transferred to the Import Tank, with the imported sludge being blended with thickened indigenous SAS and indigenous primary sludges separated from the UWWTD flow in one of two blending tanks. The Import tank is abated by a GRP 3000 Peacemaker OCU and ferrous is dosed into the blending tanks as required.

SAS from the UWWTD processes on site is subject to SAS thickening in belt thickeners before it is pumped to the blending tanks and mixes with the imported sludge and indigenous primary sludge. SAS thickening is subject to odour abatement via an OCU consisting of three biofilters followed by a GRP 6000 Peacemaker.

Thickened SAS, Primary Sludge and liquid imports are all brought to the centrifuges on the THP. They are centrifuged here and sent forward to the THP for processing. The centrate from the pre THP centrifuges is sent to liquor treatment plant balancing tank. We also send final dewatering centrate to the balancing tank and mix the two centrates together for processing via the liquor treatment plant. The effluent from the liquor treatment plant can be directed into two places. It can either go to the ASP distribution chamber or to head of the works depending on the quality of the effluent. The head of the works location is just prior to the screw pumps which distribute the flow to the PST's, this is post storm separation and outside of the scope of this permit.

Outside of the permit scope, SAS filtrate from SAS thickening first enters a well, in this well there are two routes, one side goes before the inlet, the valve to this side is kept closed and the other side goes to the same place as LTP returns, the screw pumps prior to PST distribution.

Blended, dewatered sludge from the blending tanks is transferred for pre-treatment in the THP plant to hydrolyse sludges prior to anaerobic digestion. There are two THP streams and each stream is comprised of a pulper, four reactors and a flash tank, plus ancillary units. The pulper receives recycled steam from the flash tank, raises the temperature to 100°C and feeds homogeneous sludge forward into the reactors. Once filled in batch sequencing with sludge and steam, elevating the temperature to 160°C and 6 bar, each reactor is sealed for 20 to 30 minutes to allow for pathogen kill before flashing into an atmospheric pressure tank.

Steam for the THP is generated using two on site boilers, a dual fuel boiler (biogas and natural gas), and a heat recovery steam generation (HRSG) boiler which recovers heat from the exhaust of the CHP engine.

The currently permitted THP process, improves the gas yield from anaerobic digestion, by using increased temperature and pressure to pre-treat sewage sludge, to break down larger organic molecules and structures. Operation of the THP has shown that the dewatering centrate from the treatment of the digested sludge cake has elevated ammonia concentrations. Where ammonia concentrations are too high, they can lead to inhibition of the aerobic processes within the UWWTD treatment route on site.

As part of the import of raw cake to the THP for treatment, there may be occasions where raw cake is imported in wagons and stored on a separate cake pad within the works on a temporary basis, pending transfer to the THP for treatment.

3 Ceased Operations

The site no longer accepts hazardous wastes for treatment. This means that the listed activity for blending hazardous and indigenous wastes is no longer applicable. However, this operation is still undertaken for non-hazardous waste imports being blended with indigenous sludges prior to the THP. This is a DAA rather than a listed activity due to the wording of the regulations.

4 Anaerobic Digestion Process

Following THP treatment, sludge is transferred via pipework to one of six above ground anaerobic digesters which are of concrete construction with steel roofs. These digesters are in two sets of three with regards to volumes. Each of the primary digesters are fitted with two pressure relief valves (PRVs), which operate in an emergency only. The digesters operate on a continual basis with incoming sludge added to the process as digested sludge is transferred to one of the two digested sludge storage tanks at the site prior to dewatering.

The digesters will now be operable in parallel mode, where the feed is equally split to digesters operating independently of each other, or in series mode, where digesters are arranged in sequences to transfer sludge between them for digestion.

Series mode, using a proprietary control scheme called "EPHYRA", amends the filling and transferring process currently utilised in the digesters to a progressive fill and transfer of sludge in the digesters in sequence. The movement of sludge will be controlled by pumps between the digesters.

In two banks of three digesters, feed sludge is fed into the first digester in a sequence by a feed pump. The sludge is then withdrawn from the first digester and pumped to the next digester. This continues until the sequence is complete, dependent on the number of digesters in service. There is a pumped recirculation of sludge from the final digester to the first to maintain digester performance. All digesters can be taken out of service as current for inspection or repairs in this mode.

The two banks operate independently of each other. The sludge is held within each digester sequence for the period specified by the site's HACCP (hazard and critical control point) plan for sludge use in agriculture regulations.

In series mode, the digested sludge will be pumped from the final digester in series to a digested sludge storage tank. The digested sludge will now be stored in what was Digester 2 (covered, concrete tank), as this tank was made redundant as a digester once THP was commissioned at site. This process continues to operate on a continual basis with incoming sludge added to the process as digested sludge is transferred to the dewatering centrifuges. The current two digested sludge storage tanks are becoming contingency storage only. This is required as a safety mitigation for if the pumped withdrawal of sludge is interrupted and the digester level increases without the level control measures responding. Digested sludge can also be imported to the digested sludge storage tanks and mixed with indigenous sludge.

Digested sludge from digested sludge storage tank (former Digester 2) will be progressed to an installation of a vacuum methane degassing equipment. This is installed to recover entrained biogas from the digested sludge with the intention to reduce the emissions released during cake storage and centrifuge operation. This gas will be connected to the digester gas collection line. There are two "ELOVAC" units. These can be bypassed if required based on equipment operation, this bypass is controlled by software. There are vent points from the system in the emergency requirement to release gas from the system to prevent explosions.

The digested sludge is then mixed with a polymer coagulant and dewatered on site. Digested sludge dewatering operations are abated by an OCU which consists of a biofilter followed by a GRP 2000 Peacemaker. The liquor is then subject to treatment within an existing Liquor Treatment Plant (LTP) or the ammonia recovery plant which operate in parallel and the outputs from both are returned to the head of the STW for aerobic treatment via the UWWTD treatment route.

5 Cake Output

The sludge cake is transferred to an open, engineered cake pad following dewatering. The sludge is analysed to check compliance with Sludge Use in Agriculture Regulations (1989) (SUiARs), in accordance with the Biosolids Assurance Scheme (BAS) and once the sludge is confirmed to be compliant it is removed from site for land spreading.

6 Biogas

The site has two separate DAA's for use of captured biogas.

The anaerobic digesters will now be operable in parallel mode, where the feed is equally split to digesters operating independently of each other, or in series mode, where digesters are arranged in sequences to transfer sludge between them for digestion.

Series mode, using a proprietary control scheme called "EPHYRA", amends the filling and transferring process currently utilised in the digesters to a progressive fill and transfer of sludge in the digesters in sequence. This ensures a more consistent and treated digestate output. The movement of sludge will be controlled by pumps between the digesters.

Digested sludge will now be transferred to the repurposed Digester 2, now a digested sludge storage tank, then dewatered using 3 No centrifuges. The 2 former digested sludge storage tanks will be for contingency use only. Residence time for sludge in the digested sludge storage tank is not fixed as they are primarily for balancing flows to the centrifuges.

Digested sludge from digested sludge storage tank (former Digester 2) will be progressed to an installation of a vacuum methane degassing equipment. This is installed to recover entrained biogas from the digested sludge with the intention to reduce the emissions released during cake storage and centrifuge operation. This gas will be connected to the digester biogas collection line. There are two "ELOVAC" units. The two units operate at a reduced pressure to atmospheric pressure in order to extract biogas from the digested sludge in a controlled manner. Digested sludge enters the Elovac vessel from the top and sludge is drawn off from the base of the vessel. There is also a biogas line out of the vessel which links to the wider biogas handling system. There are valves on the lines to allow the vessel to be returned to normal atmospheric pressure, including purging the vessel to remove biogas remaining within the system to allow for maintenance. There is no direct treatment of digestate within the system, it is purely a method removing biogas more rapidly from the bulk digestate through reduced pressure in the vessel.

The Elovac vessels can be bypassed if required based on equipment operation, this bypass is controlled by software. There are vent points from the system in the emergency requirement to release gas from the system to prevent explosions.

Biogas is captured from the primary digesters, the new methane vacuum recovery system (ELOVAC) and transferred for storage in a double membrane gas bag and two gas storage vessels. The biogas transfer lines are equipped with condensate pots to remove entrained water from the biogas. The line from the gas bag is equipped with a siloxane filter to remove siloxanes from the biogas prior to utilisation.

Biogas is preferentially transferred to the biogas upgrading plant on the site for injection into the national gas grid close to the site. This is currently permitted as a DAA to the digestion processes on site.

There is also currently permitted combustion plant for the thermal treatment of biogas at the site, which includes the supply of heat and steam to the THP plant. This comprises 3 Combined Heat and Power (CHP) units and 2 boilers. Electricity can also be exported to the National Grid when there is excess supply above the site needs. The permitted CHP units and auxiliary boilers on site are either "existing" medium combustion plant (MCP) as defined by Schedule 25A of the Environmental Permitting Regulations (EPR) 2018, in that they are less than 20MW thermal and were commissioned prior to 20 December 2018, or they are permitted as medium combustion plant already. The CHP units also fall under the definition of Specified Generators under Schedule 25B of the EPR 2018.

There are also two existing, permitted, emergency flares located at the site for use in emergency situations only. One provides an outlet for excess biogas in the event that there is more biogas than can be combusted in the CHP or other combustion plant at the site; and also than can be processed by the biogas upgrading plant. Due to the higher calorific value of biomethane from the biogas upgrading plant, it has a separate flare. This is used only in the scenario where the remote operating valve on the biomethane export system has been closed by the network operator, Cadent Gas. Biogas within the plant will be returned to the biogas storage at the site, but any biomethane left within the upgrading plant will be combusted using the flare as there is no return line for this to minimise the risk of any biogas bypassing the plant. As soon as the adjustments are made and quality of biomethane returns to within acceptance values, the remotely operated valve opens and the flare stops.

7 Liquor Treatment Plant

The newly listed activity, is for an existing liquor treatment plant (LTP) at the site to treat liquor generated by the dewatering of treated digested sludge at the site, which will reduce the ammonia concentration within the liquor by aerobic treatment, prior to the return of treated liquors to the works inlet. As this transfer out of the permit is to the works inlet as a liquid, it is a disposal operation, as following treatment within the urban waste water treatment directive (UWWTD) processes at the site, it is released to surface water in accordance with the requirements of a separately held discharge consent Environmental Permit.

The LTP is an Amtreat plant, aerobically treats centrate arisings to reduce the ammonia loading, to minimise the risk of process inhibition. This is, therefore, a biological treatment process where the outputs are sent for disposal.

The Amtreat plant uses aerobic treatment processes to reduce the ammonia loading by reduction to nitrates and nitrites, which are returned to the works inlet for further treatment. The plant is located within the existing permit boundary. Due to the nature of the aerobic process, the tanks are covered by a breathable membrane 'ActiLayer' which minimises the emissions to air of nitrous oxides, while allowing sufficient oxygen to pass through for operational efficiency. The plant has two reactor tanks, each of above ground steel construction and approx. 1500m³ capacity. There are a number of raw materials utilised within the process which have been added to the site inventory.

8 Ammonia Recovery Plant

There is a new listed activity for the operation of an ammonia recovery plant. This plant is operated in parallel with the LTP, at the site. Dewatering liquors are split between the two plants, and both treat ammonia in a different manner, transferring outside of the permit their process outputs to the works inlet for further treatment through the UWWTD processes on site. The ammonia recovery plant is a

chemical scrubber based system and is therefore, a separate listed activity to the LTP which is a biological treatment process.

The ammonia recovery plant is designed to remove ammonia from the incoming dewatering liquors, using chemical scrubbing to produce an output of ammonia sulphate. Currently this is to be removed from site as a waste material. However, as part of the optimisation process, the ammonium sulphate will be analysed in order to provide data to underpin an 'end of waste' submission. Once this material is deemed a non-waste, it will be removed from site for use as a liquid fertiliser. At this point, the permitting status of the plant will be changed.

The plant is a ByoFlex unit manufactured by Nijhuis. It is designed to reduce the ammonia concentration in dewatering liquors by approximately 75-85% using a mixture of minimal heating (thermal stripping) and chemical scrubbing to produce liquid ammonium sulphate. The plant installed is designed to process approximately 30m³ per hour (approximately 720m³ per day; initially 240m³ per day – see later for operational hours)

The plant comprises three columns, which operate in series. In the first column, the incoming effluent is subject to air stripping including the application of heat to help volatilise the ammonia from the liquid to the gaseous phase. The liquors are introduced from the top of the column and the air is introduced from the base, with the ammonia enriched air being captured from the top of the stripping column. This ammonia enriched air is then passed through two chemical scrubbers, where it is treated with sulphuric acid and water, to form ammonium sulphate. The sulphuric acid is transferred by pipeline from an adjacent bunded tank, which has been designed and manufactured for the purpose as acid proof. The concrete surfacing by the plant has been suitably treated with acid resistant paint to minimise the risk of concrete damage in the event of any drips or spills during tank filling operations.

The air from the scrubbing process is recirculated back into the first air stripping column with additional air input as required due to any process losses due to air absorption into the bulk liquors passing through the columns. The liquid ammonium sulphate produced in the plant is captured from the base of the scrubbers and transferred to an adjacent bunded tank, by pipeline from where it is removed from site by tanker.

The plant is currently being trialled and optimised at the site as this is a new process within sewage treatment works in the UK. As such, process heat is currently being supplied from a small (approx. 0.6MWth) diesel powered hire boiler. It is intended to fuel this unit with HVO during the trial. In the event the trial is successful and moves to full implementation, a permanent heat source will be provided. At present, no air emissions modelling has been undertaken on this plant, due to its temporary nature. The existing air dispersion model included all 3 existing CHP units and the 2 boilers which are permitted at the site, with all units operating at 100% load, 100% of the year. A technical note has been provided by an air quality specialist around how operational loads are lower and therefore this plant will be accommodated within the existing total emissions from the site on a site emissions envelope basis.

Although the plant is designed to operate 24-7, as this plant is in the trials and optimisation phase, it will be operated 8-4 Monday – Friday initially to ensure that operations can be fully monitored.

9 Cellulose Recovery Plant – New Waste Activity

Materials delivered to a sewage treatment works by the sewer network, are defined as urban waste water and therefore, covered by the urban waste water treatment directive (UWWTD) (91/271/EEC). Materials falling within the scope of the UWWTD are excluded from the legal definition of waste, as defined by the Waste Framework Directive (EC/2008/98) and the scope of the Environmental Permitting regulations 2016.

Urban waste water contains entrained cellulose from paper based products including toilet paper. Under normal operational conditions at sewage works, some cellulose is removed from the UWWTD

stream within the primary settlement tanks (PST's) which is treated onwards through the anaerobic digestion process, the majority is treated within the activated sludge process (ASP) at the site outside of the scope of the permit.

Due to celluloses chemical structure, which is effectively a long linear organic chain, it is difficult for biological process to break it down under either aerobic or anaerobic conditions and this leads to either cellulose remaining within the sludge cake from the anaerobic process, or additional energy requirements in the ASPs in order to reduce the total suspended solids (TSS) and Chemical Oxygen Demand (COD) at the works, in accordance with the sites final discharge permit.

By removing the cellulose fibres from the bulk UWWTD influent, it is hoped to reduce energy requirements at the site as part of Severn Trent's Net Zero Hub demonstrator project for emissions reduced wastewater treatment through a reduction in biological treatment related emissions.

A percentage of the total UWWTD works flow is conveyed to a bank of 'CELLCAPs®' which undertake the cellulose separation. The site has a total of 10 CELLCAPs®, which operate in pairs, in parallel, with the available flow determining how many pairs of CELLCAPs® are online at one time. CELLCAPs® may only be operated as pairs, although waste water is only processed in a single unit. Should the works flow exceed the optimal flow for the CELLCAPs®, there is a bypass line present to allow waste water to be handled as at present without entering the CELLCAPs®.

Each CELLCAP® comprises a drum screen, (CellWash), which uses rotating fine mesh drums to separate larger contraries that cannot be treated in the process, such as hair, leaves, and fragments of plastic from the cellulose and bulk waste water mixture. These contraries are transferred back into the main UWWTD flow for treatment primarily through the sludge stream at the works. The cellulose and waste water mixture is passed to the 'INTENSIEVE®' which is an angled washed screen arrangement. The waste water, including most of the sewage related solids, are passed through the screens and transferred back into the main works flow, where they are treated as at present. The longer cellulose fibres are captured on the moving screens which are equipped with a mesh of long thin holes, to capture cellulose while smaller organic molecules can pass through this mesh. The screens are subject to cold washing with soap enrichment followed by hot water washing, to remove as much easily degradable organic material as possible. Compressed air is applied to the screen to remove cellulose from the screens, where it is transferred to a screw conveyor.

Once cellulose has been transferred to the screw conveyor, it is handled in a bulk mixture with the outputs from all of the other currently operational CELLCAPs®. The screw conveyors transfer the separated cellulose to plate presses called CELLPRESS®, which results in a cellulose output with approximately 35-40% dry solids. All removed liquids are returned to the works for treatment through the aerobic treatment processes.

The pressed, partially dried cellulose is passed to the drier and hygienater, which both use heat to remove additional water from the separated cellulose, to give a dry solids content of up to 90%. The hygienater uses heat at approximately 70°C to pasteurise the cellulose and kill entrained bacteria. Following this additional drying, the cellulose is transferred to a skip or covered container prior to offsite recovery.

There are no new thermal processes required for the process to operate. Hot water is supplied from the existing site boilers and the drier and hygienater thermal inputs come from heat exchangers and electrical heating.

9.1 Capacity

The full scale installation at Strongford will produce 4T/day of dried cellulose. The skips to store the cellulose will be collected daily by the carrier. Annually this would equate to $365 \times 4 = 1460$ T a year.

9.2 Appropriate Measures Assessment for Cellulose Recovery Plant

The operation on site (cellulose recovery) falls outside of the scope of Schedule 1 of the Environmental Permitting Regulations 2016 and therefore sits within the waste management level of environmental permitting. Although the majority of sewage processes fall within '*Biological waste treatment: Appropriate measures for permitted facilities*', no biological treatment of the waste is undertaken under this permitted activity.

The treatment process undertaken, comprises physical treatment, through sieving, separation and compression. Although soap is used in the washing stage for cleaning the sieves, this is not chemical treatment of the waste. Therefore, it has been assessed that the relevant Environment Agency guidance document is '*Non-hazardous and inert waste: appropriate measures for permitted facilities*', updated 1st August 2023. This was in consultation with the Waste Permitting section of the Environment Agency's national permitting service.

The site is fully compliant with the requirements of Section 2 on General Management, it operates under a CMS (certified management system) and the organisation holds ISO14001 certification at the location. This includes commitment from senior managers, a tie-in to the organisation's environmental policy and proper resource/procedure/objective establishment; typical of a ISO14001 certified Environment Management System (EMS). The EMS provides the framework for the implementation of environmental performance procedures, performance checks and any corrective actions needed (including monitoring, applying lessons learned, record maintenance and auditing). The EMS also allows for the ongoing review of processes in an effort to make sure cleaner technologies, safer procedures and less impactful plant/equipment can be introduced where it is practicable and cost effective to do so. The site has an accident plan and associated contingency plans, including those designed into the plant. The potential impacts of climate change are also included in the EMS, as are references to relevant sector guidance, to ensure that site plans and procedures are resilient and complaint.

The site extends to more than just the cellulose recovery plant. Overall the site, operating under the ISO14001 certified EMS, is required to ensure staff have appropriate training and qualifications of competence to allow for the safe operation of the site and proper identification/classification of wastes within the facility. Sophisticated alarm systems are fitted across the site to allow staff to appropriately respond to any incidents as they happen.

The EMS requires the site has an accident management plan that identifies and assesses the health and environmental risks within the site. Risks on site are properly assessed and against waste types, potential emission volumes, likelihood consequences, significance and preventative measures. In particular, the risk of uncontrolled emissions resulting from an accident (including but not limited to: overflows, tank failures, leaks and spills). The assessment includes aspects of environmental influence such as flooding events as well as human influences such as arson or theft. In the event that the cellulose plant is not performing correctly or required maintenance, the flow to the plant will be closed off and there is no separation of fibres within the main urban waste water flow. Any separated material within the system will be returned back to the main urban waste water flow.

Section 3 is not applicable for the site due to the nature of the waste inputs. The site is treating material that is delivered to site within the urban waste water flow, covered by the urban waste water treatment directive (UWWTD) (91/271/EEC). Materials falling within the scope of the UWWTD are excluded from the legal definition of waste, as defined by the Waste Framework Directive (EC/2008/98) and the scope of the Environmental Permitting regulations 2016. Therefore the input to the cellulose recovery plant is not subject to waste pre-acceptance or acceptance checking beyond the routine monitoring of the inlet quality.

Section 4 is not applicable to the cellulose recovery plant as there is no waste storage within the cellulose recovery process. Additionally, the urban waste water flow treated on the wider site is not legally defined as a waste. However, it is worth noting there are storage facilities on site for a variety of substances, including large containment units for the urban waste water at its different stages of treatment on site (not relating to cellulose recovery). The recovered cellulose is output from the plant

as up to 90% dry solids, at a rate of approximately 4 tonnes per day. Skips storing the recovered cellulose will be collected daily.

Section 5 on waste treatment, is met in full for the general points. There is a benefit to removing the cellulose from the urban waste water flow. There are mechanisms within the recovery plant to ensure all unwanted effluent is returned to the urban waste water flow. As detailed above, there is a procedure for abnormal operating conditions (such as during maintenance). However, the section does not apply because subsections 5.1; 5.2 and 5.3 are not applicable to the waste under treatment (cellulose recovery).

Section 6 is met as far as applicable to the process. The CELLCAP® units are enclosed, as are the screw conveyors and heating processes, with a controlled vent to air; this satisfies section 6.1. There are no fugitive emissions to air, land or water; therefore sections 6.2, 6.3 and 6.5 do not apply. Section 6.6 is met as there is no changed risk of pests or vermin associated with the process. There is a direct emission to sewer of urban waste water from which cellulose has been removed, which is treated within the wider sewage treatment works. This satisfies section 6.4.

Emissions are managed and monitored in accordance with the relevant aspects of section 7. Section 7.2 is not applicable as there are no medium combustion plant associated with this permitted activity. Section 7.1 focuses on dust emissions, which are not produced by the process due to the nature of the waste treated. Section 7.3 is monitored as part of routine monitoring of the works inlet, which falls outside of the scope of the cellulose recovery plant. As no chemical changes are made within the recovery process, the inlet data remains relevant as effluent from the recovery plant is returned to the urban waste water flow.

Section 8 is not applicable to waste environmental permits. However, the energy use within the process is monitored and its impact on the site wide energy use is also reviewed as part of the 'net zero' hub.

Section 9 is complied with and under constant review. An assessment is underway to review data as part of an 'end of waste' submission for the separated cellulose. By the very nature of engaging in cellulose recovery there is already an element of waste minimisation built into the process itself. The separated and dried cellulose can be removed from site on a daily basis.

The site is subject to Odour Management Plan, which has been updated to reflect this activity. The relevant activities managed under this permit are highlighted within the document.

9.3 Technically Competent Management

After commissioning of the plant, it will be operated and maintained by internal staff at Severn Trent who's competence is captured by our current CMS under EU Skills accreditation. Strongford site team are already trained to the current scope of the CMS, but the additional activity will be brought into scope within 12 months of the permit being issued (as per EA guidance 'Legal operator and competence requirements: environmental permits').

9.4 Noise and Odour

See the updated appended OMP in Appendix F which applies to the whole site.

The facility has the potential to generate noise as a result of the permitted activities. Potentially noisy activities are subject to a number of process controls and noise management is a key operational objective, as summarised in the risk assessment table below. The EA Noise Advisory Tool has been undertaken, the results of this showed that no noise impact assessment or noise management plan was required.

9.5 Point Source Emissions

There is only one exhaust point of the air. The air emission point from the drier is shown as point A27 on the revised site plan. This is located at point SJ 88051 39405. The discharge point from the

cellpress back to the wastewater flow is at grid reference SJ 88032 39399, shown by point T3 on the revised site plan.

The drier circulates about 30000 m³/h of air, the max emission is 10% of that (3000 m³/hr). The saturated air within the drier, flows through a condenser, where it is cooled, resulting in moisture condensation and heat recovery. Subsequently, the dehumidified air is reheated. If too much heat (energy) is generated in this process, up to 10% of the air is refreshed (i.e. released and fresh air drawn in). Therefore, process air is not exhausted continuously, especially when heat losses are minimal (e.g. during summer). When air is released, is passed through an activated carbon filter to remove any odours.

9.6 Returns Data

Water emissions are to be returned back to the works inlet for processing through the UWWTD route at the site. Note that due to the nature of the UWWTD derived materials being classed as non-source segregated, it is not possible for Severn Trent to determine the potential contaminants present in the returns prior to the cellulose plant becoming operational.

At present, Severn Trent Water is working with commercial laboratories to identify the best way to carry out this sampling to obtain the necessary determination limits set within the appropriate Environment Agency guidance. This work is being undertaken to respond to improvement conditions within the IED permits for Severn Trent's IED permitted works, which have similar process returns back to the inlet for treatment through the works. A H1 model has been prepared based on available data from a proxy site, but a full 12 months of data has yet to be gathered.

Severn Trent would like to propose a similar improvement condition is used in this case.

9.7 Recovery routes

At present, there are no firm, contractual routes for the recovery of the cellulose in place, due to a lack of material to take to market. Proposed end markets will also be dependent upon an end of waste agreement being made for the output.

Potential options, based on outputs from European plants, include inclusion as fibres in asphalt to enhance flexibility; as a carbon source for the manufacture of PLA (polyactic acid); and as a feedstock for biopolymers.

10 Permitted Works Throughput

An increase to the total throughput of the works is also requested due to a review of the Environment Agency understanding of the treatment of indigenous wastes, where additional import volumes are required to reflect the waste streams within the installation and waste processes throughput. Note that although the treatment volume has increased due to the inclusion of the throughput of the LTP, this liquor is currently within the volume being handled by the installation. This increase relates purely to the recording of existing throughput.

The ammonia recovery plant throughput stated sits within the total throughput of the LTP as the two processes are in parallel, with dewatering liquors being diverted from the LTP to the ammonia recovery plant.

Although values are given for the cellulose recovery plant, this treats UWWTD material delivered by sewer which sits outside the volumes within the wider permit.

11 Process Monitoring

Anaerobic digester operations are monitored automatically from the control centre at the site and outside of normal operational hours, from the regional control centre. Checks include digester health,

temperature and operation, including for the presence of foaming, which is treated with anti-foam as appropriate. All tanks are equipped with appropriate high-level alarms and automatic cut off valves to minimise the risk of overtopping. Site operations are covered by Severn Trent's ISO14001 accreditation for all operations, and technical competence is provided by the organisations CMS and training program.

12 BAT Assessment

A full assessment of the relevant sections of the Waste Treatment BRef are supplied as Appendix D for the listed activities at the site.

13 Containment

The existing site infrastructure is not currently fully compliant with the requirements of BAT, specifically with regards to containment and surfacing. A spill risk assessment and proposed outline containment solution, in accordance with CIRIA 736 is supplied as Appendix E.

The outline containment solution for the two containment areas features flood gates for both areas. However, as part of the refinement of the design towards design implementation it is hoped to eliminate these gates.

14 Open Topped Tanks

There are a number of open top tanks within the permit boundary at Strongford, primarily the digested sludge storage tanks. It is acknowledged that there may be emissions of biomethane and/or odour from some of these tanks, and Severn Trent as part of its agreed IED compliance plan, has committed to cover open topped tanks at the site and either transfer captured biogas to the biogas system, or to an appropriately designed and sized OCU. In the case of the digested sludge storage tanks, this will depend on the effectiveness of the Elovac system, which will determine if there is sufficient biogas present to warrant transfer to the biogas system.

15 Liquor Returns Monitoring

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge dewatering and thickening liquors and surface waters, which are transferred from the permit scope to the wastewater treatment works for aerobic treatment under Urban Wastewater Treatment regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water.

Site drainage from operational areas is captured within the site wide drainage system and returned to the head of the works for treatment within the UWWTD treatment route. Site drainage plans are included within Appendix A. The liquor returns to the wider works, are treated through the UWWTD route. This comprises primary treatment via screening and settlement; secondary treatment in an activated sludge process and tertiary treatment by sand filtration if required.

No specific substances have been added to the effluent based on a review of the chemical safety data sheets for the chemicals used within the processes on site.

However, there is a likelihood that specified substances are present within the effluents handled, which include both tanker trade imports to the inlet and UWWTD materials delivered by sewer, which may include specified substances from households, trade effluent discharges into the sewerage network, road and hard standing runoff and unconsented releases from commercial and industrial premises.

At present, Severn Trent are starting to collect effluent data from works in order to undertake appropriate H1 screening and modelling, if necessary, based upon the outcome of the H1 screening

tool. There is currently a backlog in receiving data from UKAS accredited commercial laboratories and therefore, no site currently has a full 12months of data available. In addition, some processes on site at Strongford are not currently in operation within the UK and therefore, detailed effluent analysis is not available even from a proxy site, as plants within mainland Europe will handle a different effluent composition.

Indicative H1 modelling has been undertaken on limited proxy data from similar Severn Trent sites as far as possible, i.e. data is from a site equipped with a THP rather than conventional anaerobic digestion.

16 Liquor Returns

Site drainage from operational areas is captured within the site wide drainage system and transferred outside the permit scope to the head of the works for treatment within the UWWTD treatment route. These returns enter the inlet after the storm offtake and therefore, cannot bypass onsite treatment via the UWWTD route. Site drainage plans are included within Appendix A.

17 Other Considerations

The site has an odour management plan which is supplied as Appendix F.

The cake pad at the site is over 250m from the nearest offsite receptor.

All electricity generating plant on site is currently permitted and not subject to any revisions as part of this application. Therefore, there is no requirement to undertake a decarbonisation assessment.

There is no requirement for a fire prevention plan at the site, due to the nature of the wastes treated and the processes utilised, in accordance with Environment Agency guidance.

18 Tank Inventory

Tank Type	Number	Volume (each) (m ³)	Construction	Enclosed Y / N?	Considered in Spill Assessment Y / N?
Digesters	3	2900	Concrete	Y	Y
	3	2540	Concrete	Y	Y
Digested Sludge Storage Tanks (existing – to be contingency only)	2	3500	Concrete	N	Y
New digested Sludge Storage Tank (formally Digester 2)	1	2500	Concrete	Y	Y
Blending Tanks (SAS; indigenous and	4	540	Concrete	Y	Y

imports combined)					
ELOVAC units	2	8	Steel	Y	Y
Import Tank	1	150	Concrete	N	N (Subsurface)
SAS buffer tank (not included – unthickened)	1	130	Steel	Y	N (Not permitted)
LTP Tanks	2	1,500	Steel	Y	N (Subsurface)
Sulphuric Acid Tank	1	30	Steel	Y	N (Self bunded)
Ammonium Sulphate Tank	1	50	Steel	Y	N (Self bunded)
Inlet Holding Tank	1	150	Steel	Y	N (Self bunded)

Note that of the tanks above, not all are considered within the spill risk assessment and outline containment assessment applicable for the works.

The inlet holding tank; sulphuric acid and ammonium sulphate tank are all deemed as new assets and as such have been specified to be appropriately bunded to 110% of their volume.

The import tank is a predominately subsurface asset, which due to the working depth being at ground level, would not contribute to a spill.

The LTP is a predominately subsurface asset, which would not contribute to a spill.

All 6 digesters are equipped with limpet boxes as detailed in the following table

WONDERFUL ON TAP



Site name	AD tank reference	Limpet box (Y/N)	Tank volume (m3) (volume of max content)	Hydraulic retention time (per AD tank)	Methane production per AD tank (m3/hour)	Limpet riser pipe dimensions (length and diameter) (m)	
						Dimensions of spill pipe	Dimensions of overflow pipe
Strongford STC, Stoke on Trent	1	Y	2500	currently offline	139	5330mm x 200mm	Overflow now has UPRV fitted.
Strongford STC, Stoke on Trent	3	Y	2495	20	139	Length unknown until refurb x 200mm	Length unknown until refurb x 300mm
Strongford STC, Stoke on Trent	4	Y	2516	19.5	139	Length unknown until refurb x 200mm	Length unknown until refurb x 300mm
Strongford STC, Stoke on Trent	5	Y	3005	25.7	139	6197mm x 200mm	3114mm x 300mm
Strongford STC, Stoke on Trent	6	Y	3024	25.8	139	Length unknown x 200mm	Length unknown x 300mm
Strongford STC, Stoke on Trent	7	Y	3028	41	139	6050mm x 200mm	3240mm x 300mm