Berry Hill Process Description

Contents

Summary of Site Activities

A summary description of all activities conducted within Berry Hill Bioresources centre is provided below.

- **Sludge import and storage.**
- **Sludge screening**
- **Sludge thickening**
- **Anaerobic digestion of Indigenous & imported sludges >100te/day.**
- **Secondary sludge storage & dewatering**
- **Digested sludge cake to land**
- **Biogas storage, utilisation and flaring.**
- **Liquor treatment >50te/day LTP Boiler**

Overview of activities

Berry Hill Bioresources Centre (BC) treats indigenous sewage sludges arising from sewage treatment processes operated within Holdenhurst Water Recycling Centre (WRC), as well as sewage sludges generated by smaller Wessex Water 'satellite' WRC's. The principal activities undertaken within the installation include:

- Sludge reception and screening.
- Raw sludge thickening
- SAS- thickening.
- Anaerobic digestion.
- Secondary sludge storage
- Treatment of centrate liquors.
- Biogas collection and storage
- Use of biogas (a renewable energy source) to fuel combined heat and power (CHP) and/or boilers, generating electricity and/or heat to support the AD process.
- Flaring of biogas if operationally required
- Digested sludge dewatering.
- Storage and maturation of digested sludge prior to transfer off site for land spreading as an agricultural soil conditioning agent.

- Raw material storage and use.
- Surface water and process liquor collection and transfer to Holdenhurst WRC for treatment

The information below is a non-technical description of the sludge treatment process, including the key assets and associated infrastructure at Berry Hill BC. The following diagrams are included :

- Figure 1 : Process Flow Diagram (PFD) showing the sludge treatment process.
- Figure 2 : Process Flow Diagram (PFD) showing the CHP.
- Figure 3 : Asset aerial view location, showing asset locations There is also an photolog in the original application in Appendix 13.

This information will be used to identify and assess the significance of the main sources of contamination (i.e., locations where sludges and liquors are stored / transferred) at the BC that would have the potential to cause pollution of the ground and / or the local water environment.

Sludge treatment process

The following provides a summary description of the sludge treatment process at Berry Hill BC. In both the description and the diagram the primary routes for processing are shown and described. There are, in some instances, alternatives that exist but due to the complexity of the site and for clarity in the diagram not all of these routes are depicted.

Each asset in the summary description is provided with a corresponding letter which is referenced in the diagrams to show its location within the process and physically within the installation.

- Raw Primary sludge is received via a pumped main from Holdenhurst WRC at SLTH01 Raw Sludge Reception Tank (E) before being screened via two strain presses (J). Additional capacity is provided by SLTH03 Raw Sludge Reception Tank (F), operating in parallel with (E).

- Sludge is then passed to SLTH04 Primary Buffer Tank (H), thickened by two Gravity Belt Thickeners (GBT) (K) operating duty / duty regime, before being passed on to the Sludge Blending/Digester Feed Tank (D).

  Additionally, sludge can be pumped from SLTH04 (H) via two sludge transfer pumps and passed forwards to SLTH02 (G) and mixed with SAS to aid thickening performance and provide an assist thickening stream.

- SAS sludge from Holdenhurst WRC is received into SLTH02 (SAS & Sludge Reception Tank) (G), with additional holding capacity provided by SLTH05 SAS Reception Tank (I), operating in parallel.

  From SLTH02 (G) the sludge is thickened by two GBTs (L) before being pumped to the Sludge Blending Digester Feed Tank (D).

- The liquors from the GBTs are discharged directly to the Return Liquor PS (M) to be sent to Holdenhurst WRC for treatment.

- Sludge imports arriving by tanker import point (X) are received in Howard Tank 2 (B2) or Howard Tank 3 (B3). Under normal operation the sludge imports are received via Howard Tank 3 (B3) and are transferred to Howard Tank 2 (B2) under gravity.

Sludge from Howard Tanks 2 and 3 is screened by two strain presses (X) before being passed on to Howard Tank 1 (B1). From Howard Tank 1 the primary process route is to pass forwards to SLTH04 (H) or SLTH02 (G) and process through either / or Raw GBT (K) and SAS GBT (L) to achieve design loading and consistent feed stock to the digestion process. Alternatively imported sludge from Howard tank 1 (B1) can be passed forwards direct to the Digester Feed Tank (D).

- From the Digester Feed Tank (D) the sludge is pumped to Primary Digesters 1-4 (N1 - N4) before being passed on to Secondary Digesters 4 – 12 (O1 – O9) where it is held for 7 days.

  Alternatively, flow can gravitate from the Primary Digesters to the Secondary Digested Buffer Tank (P) and then on to Secondary Digesters 1 - 3 (A1 - A3) where it is held for 7 days.

  All secondary sludge tanks are filled individually, once full they are closed and held for 7 days as per Berry Hill HACCP plan. Once the sludge has achieved sufficient retention it is passed forwards to the Centrifuge Feed Tank (R).

- From the Centrifuge Feed Tank (R) the secondary digested sludge is pumped to three Centrifuges (S) to be dewatered to sludge cake. The cake from the centrifuges is stored in skips (U) before being transported off site for disposal to land.

- Water is abstracted from the Borehole (AD) and used to backwash both GBTs (K and L) and the Centrifuges (S). All liquors from the centrifuges are pumped to Centrate Tank (C) before being treated by a Demon plant (V).

- The biogas produced by the Primary Digesters 1- 4 (N1 – N4) is stored in the Gas holder (Q) before being passed through a Siloxane Carbon Filter (AC). After the Siloxane Carbon Filter (AC) the gas is either passed on to the Combined Heat and Power engine (CHP) (AF), Boilers (Y), the Flare (shrouded) (Z) or Demon Plant Boiler (W). A standby generator (AE) is also available for emergency power back-up.

Figure 1 : Berry Hill Process Flow Diagram

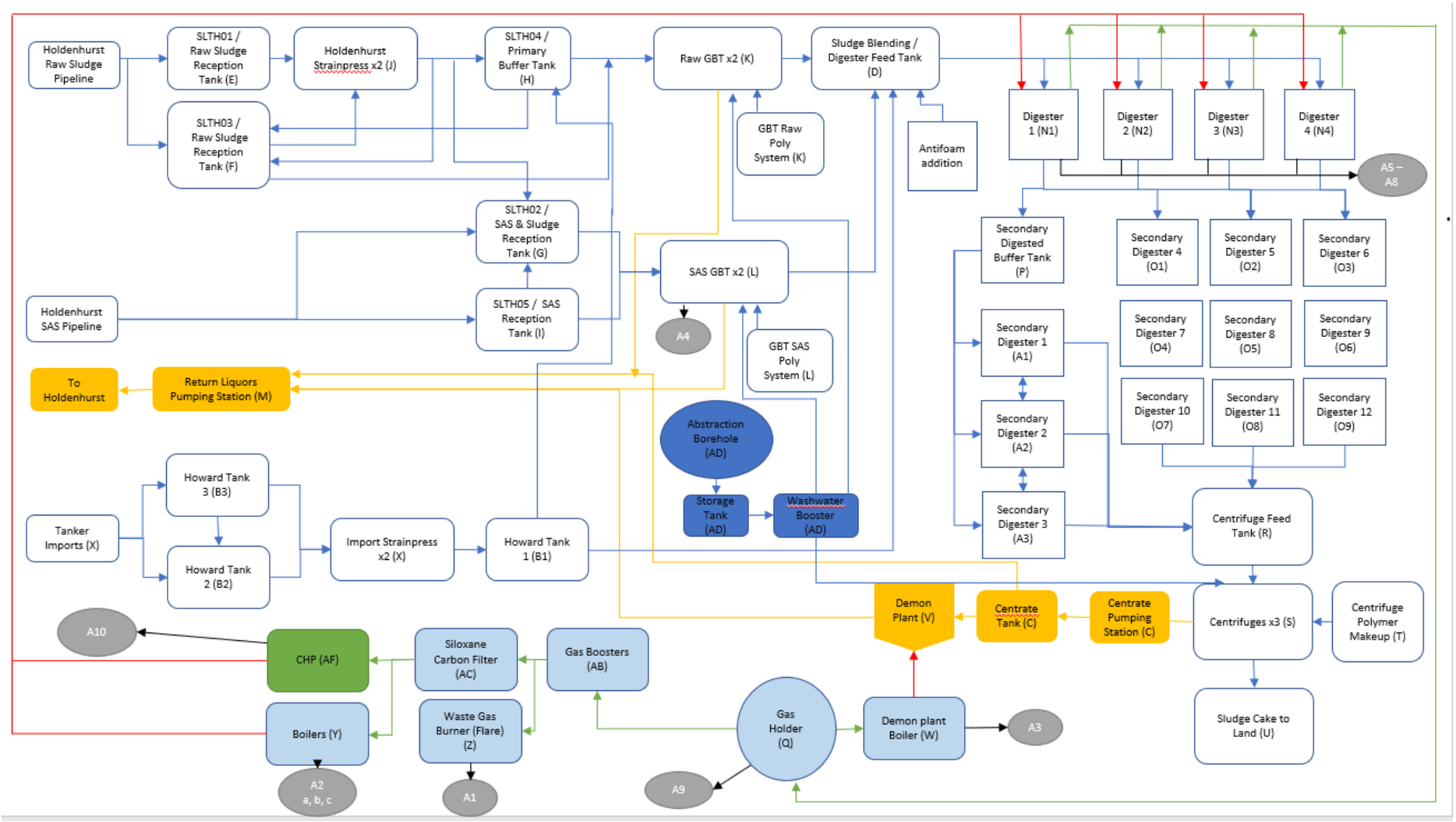

Figure 2 : CHP Process Flow Diagram

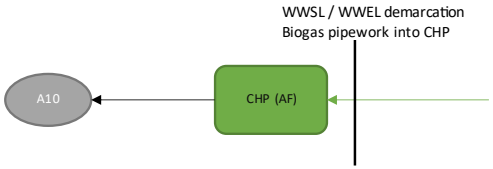

Figure 3 : Asset Locations