Document reference:
EP11 Treatment Activities and Flow Diagram

Owner | Enva Plastics

Version | V1_31-01-2020

REPORT SCHEDULE

Project Title: Environmental Permit Variation

Document Title: Treatment Activities and Flow Diagram

Document Reference: EP13

Report Status: Version 1.0

Project Director: Steve Bell

REVISION HISTORY	DATE	COMMENTS	APPROVED
Final Version 1.0	31/01/2020	Submission to the Environmental Agency as part of the installation variation application	Steve Bell

1. INTRODUCTION

1.1. Introduction

1.1.1. This application is in response to the Environment Agency's (EA) letter dated the 26th September 2019, states plastic containing wastes arising from the treatment of display equipment and small mixed WEEE are to be classified as hazardous wastes due to the presence of Persistent Organic Pollutants (POP's) and other hazardous chemicals. The letter states that the applicant must read the advice within the letter and review the activities in respect to the classification and description of the waste, hazardous waste control, management of waste containing POP's and export of the waste.

1.1.2. The Applicant currently processes over 10 tonnes per day of plastic derived from small WEEE and stores over 50 tonnes of plastic derived from small WEEE. These activities will now fall under the IED. Therefore, the Applicant is required to apply for an installation permit that includes the following Schedules to cover their current activities:

- Section 5.3(a)(ii) Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving one or more of the following activities – physico-chemical treatment; and
- Section 5.6(a) Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes pending any activities listed in Section 5.3.

1.2. Flow diagrams

1.2.1. Detailed flow diagrams of the processes undertaken on site are presented as separate documents:

- EP05c Flow Diagram of the Site
- EP05d Flow Diagram of Tiger Line
- EP05e Flow Diagram of Sink Float Line

1.2.2. A simplified Flow Diagrams with R and D codes is presented within Section 2.9.

2. TREATMENT ACTIVITIES

2.1. Inbound plastic wastes

2.1.1. All wastes will be accepted on site in accordance with the document EP_EMS02 Waste Acceptance Procedures and EP_EMS03 Waste Rejection Procedures.

2.1.2. The following procedures are followed:

- Incoming wastes enters the site in bulk load and curtain side vehicles through the main gate;
- Vehicles are weighed on the calibrated weighbridge and waste transfer note or consignment notes are checked against the incoming load; and
- Only after the initial waste acceptance checks are carried out are the vehicles permitted onto site;
- The loads are discharged into the appropriate bay (dependent upon composition) under the supervision of an authorised person, who inspects the waste to ensure that the load is as detailed on the waste transfer note.

2.1.3. The flow diagram *EP05c Flow Diagram of the Site* outlines the procedures undertaken on site.

2.2. Picking Line

2.2.1. Selected incoming waste are sorted using a picking line, the process is as follows:

- Incoming plastic is loaded into a shaker hopper and fed onto the conveyor belt;
- The material then enters a trommel, the <10mm is removed from the system and transferred to the Wash Drum;
- The >10mm material exits the trommel and onto an infeed belt, the material passes through a picking line where cable, metal, waste, stones and ceramics are removed; and
- The processed >50mm material is placed in to the >50mm bay prior to further treatment.

2.3. Tiger Line (See document EP05d Flow Diagram of Tiger Line)

2.3.1. The Tiger Line is a shredding line that produce a uniform size material (which aids the sink float tank process).

2.3.2. Material is loaded into the designated infeed:

- >50mm material is loaded onto the infeed belt and passes over the air knife. The air knife is used to take any heavy material (which could include plastics from plugs) out of the system, as this material may damage the shredder. The material enters the Tiger Shredder and passes through a 50mm sizing grid on the Zigzag infeed;
- <50mm material is loaded into a feed auger, the system bypasses the shredder and air knife and the material drops directly on the Zigzag infeed.

2.3.3. Material passes through the Zigzag which blows out the light fraction such as wood, paper and dust.

2.3.4. The light fraction is diverted onto a belt at the rear of the tiger building and into a bay and is removed from site to an authorised facility.

2.3.5. The heavy fraction drops out of the Zigzag onto the eddy current infeed belt. The eddy current system separates non-ferrous metals (Zorba) from ferrous metals and plastics.

2.3.6. The plastic fraction exits the eddy current system and is passed through a trommel, separating the under 10mm from the 10mm to 50mm fraction.

2.3.7. The material runs up two separate conveyors onto outfeed stockpiles:

- 10mm to 50mm is processed within the sink float tank; and
- Under 10mm is processed within the wash drum where the metal residue is removed. The plastic is then processed within the sink float tank.

2.4. Sink Float Tank (see document EP05e Flow Diagram of Sink Float Tank)

2.4.1. The Sink Float Tank uses density separation to produce end of waste plastics.

2.4.2. Material is fed into the feed hopper and passes onto the sink float tank infeed conveyor onto a shaker spreader, this feeds the material evenly into the tank.

2.4.3. The material is pushed along the tank using paddles, potassium carbonate is used to set the density in the tank, the high density low-grade plastics, metals and waste will sink and the low density high-grade plastics will float.

2.4.4. The dense low-grade material sinks onto a large outfeed auger at the bottom of the tank, the material is passed into a centrifuge dryer to remove the water before being fed out of the back of the building into a bay. The material is then processed within the wash drum to separate the dense plastic and the metal.

2.4.5. The high-grade plastics are pushed along the sink float tank via paddles and into an air ducting system prior to being processed within the dryer. The material is dried to remove the water that contains potassium carbonate, the material is then fed into the freshwater tank.

2.4.6. The high-grade plastics are then pushed through the freshwater tank using paddles, any denser plastic sinks and is removed from the system via an auger.

2.4.7. The remaining material floats and is pushed along the tank via the paddles, it then exits into the dryer and is blown into the storage silo passing the cyclones to remove any light fraction.

2.4.8. Filter presses are used to remove sediment from the water.

2.5. Granulators

2.5.1. Material is passed through a cyclone to remove any small particles prior to processing within the granulators.

2.5.2. The material has End-of-Waste status and is stored on site prior to removal from site. The granules are used in the manufacturing industry.

2.6. Wash drum

2.6.1. Magnetite is used within the wash drum to create a heavy media gravity separation process (also known as a sink and float separation process). Magnetite and water are used to make a slurry on which one product will float (the product with a lower density than the slurry) and in which the other product will sink (the product with a higher density than the slurry). Depending on the densities of the products that need separating, the ratio of magnetite and water in the slurry can be varied to achieve the required intermediate density.

2.6.2. The heavy material sinks and runs up a screw on the inside of the drum, the material then enters a shaker to remove the water and magnetite.

2.6.3. Heavy material is then taken via conveyor to the heavy pile. Lighter material will float in the drum and will come out of the opposite end, where it is passed over a shaker to remove the water, and then over a sequence of chain conveyors. The material will be fed out damp or passed through a rotary dryer, depending if it is waste or small plastic for the sink float tank.

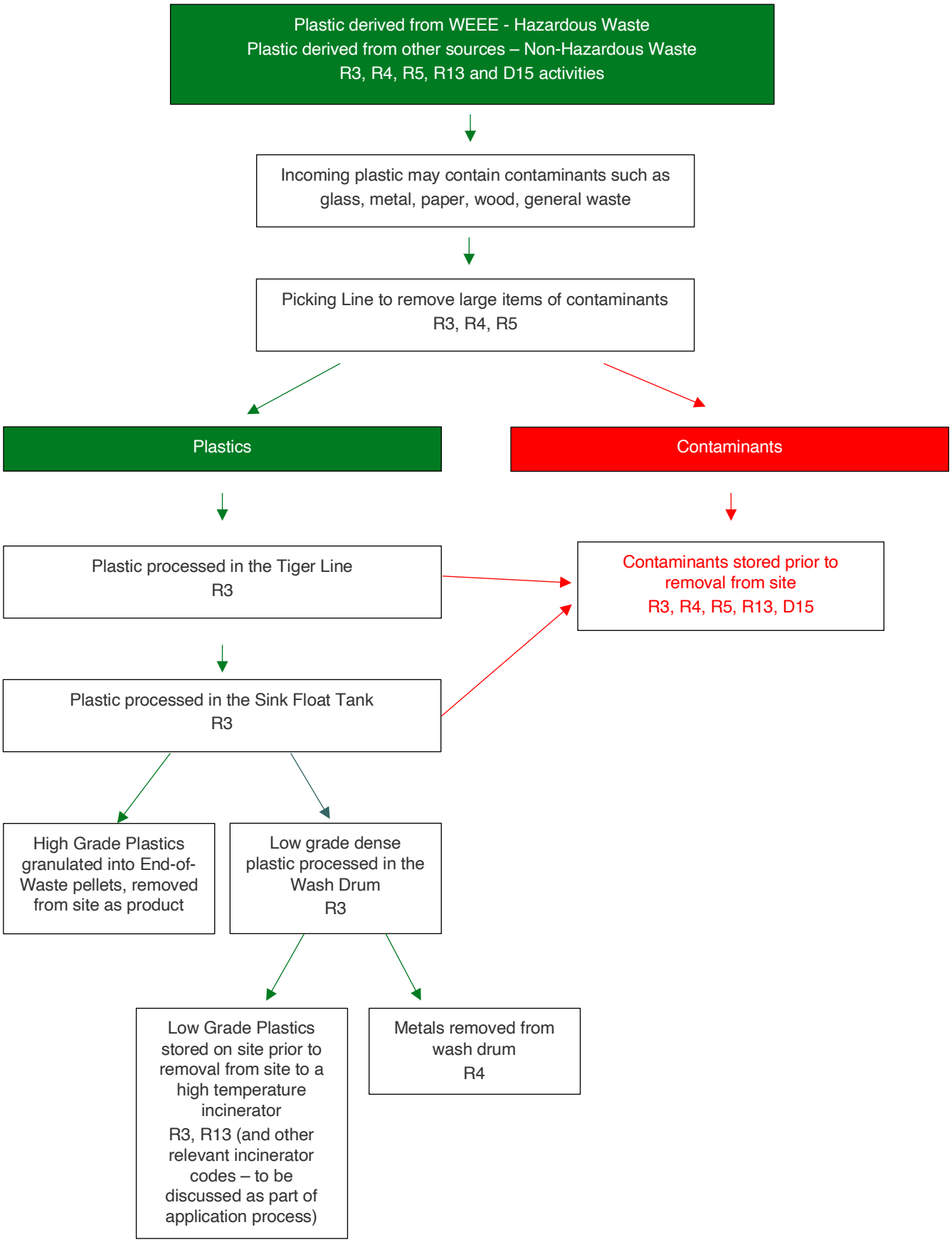
2.6.4. The are several water filtrations tanks and belts at the side of the wash drum used to remove magnetite and sediment from the water so that it can be reused.

2.7. Storage of waste

All waste is stored within specific bays, areas or containers as outlined within the approved Fire Prevention Plan.

2.8. Simplified Flow Diagrams with R and D codes

2.8.1. A simplified flow diagrams are shown below:


Plastic derived from WEEE - Hazardous Waste
Plastic derived from other sources – Non-Hazardous Waste
R3, R4, R5, R13 and D15 activities
Incoming plastic may contain contaminants such as glass, metal, paper, wood, general waste
Picking Line to remove large items of contaminants
R3, R4, R5
Plastics
Contaminants
Plastic processed in the Tiger Line
R3
Contaminants stored prior to removal from site
R3, R4, R5, R13, D15
Plastic processed in the Sink Float Tank
R3
High Grade Plastics granulated into End-of-Waste pellets, removed from site as product
Low grade dense plastic processed in the Wash Drum
R3
Low Grade Plastics stored on site prior to removal from site to a high temperature incinerator
R3, R13 (and other relevant incinerator codes – to be discussed as part of application process)
Metals removed from wash drum
R4