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NEATH PORT TALBOT (RECYCLING) LTD
ODOUR MANAGEMENT PLAN

Revision 3.1
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Contents

Foreword

The facility is designed to receive and treat the municipal solid waste (MSW) risings from the Neath Port Talbot and Bridgend County Borough Council refuse collection and a percentage of contracted non-hazardous 'Trade' waste. Additionally all doorstep recyclate collections from Neath Port Talbot are taken to the Kerbside building at the rear of the site and pre-sorted prior to sell on the material.

On entering the site, refuse collection vehicles, bulk waste carrying HGVs and trade vehicles carrying blackbag or MRF waste will travel via the one-way system to the reception hall and the fast acting roller shutter door will enter and deposit the waste on the reception hall floor.

On entering the site the recyclate vehicles will travel via the one way system to the rear of the site and enter the Kerbside building.

Inside the reception hall a mechanical shovel and mechanical grab pre-sort the waste and load the material into the shredder where initial ferrous separation takes place and the material is shredded down to approximately 300 or smaller.

The shredded raw waste is fed by mechanical shovel into the platefeeder hopper which feeds into the rotary screen which automatically separates the material into three sizes, which are below 100mm, below 300mm and above 300mm.

Once separated out and graded according to size, the waste is transported via conveyor belts, the material smaller than 100mm falls onto a conveyor and goes directly into a skip for disposal. The two other grade size go through an enclosed area known as the picking room. In this area QA of the feed stock is performed to ensure large pieces of material are removed, so that they do not damage the processing equipment further on.

Once the conveyor systems leave the picking room the waste is transported through several automatic processes to salvage recyclable materials such as ferrous and non-ferrous metals.

The balance of the waste which is further processed by secondary and tertiary shredding to reduce the feedstock in size to 65mm and further with further ferrous and non-ferrous separation also applied.

This material is then fed in to the in-vessel bio- stabilisation reactors in Fuel Preparation

The Material fed into the in-vessel reactors is subjected to metabolic process were aerobic conditions enable the feedstock to undergo partial biodegradation in order to stabilise the feedstock by bio-drying resulting in a reduction of moisture, reduction of odour associated with the material and improve calorific value. This resulting residue is further refined for customer specification for use in high energy industries like the cement manufacturing industry.

Objective

The objective of this review is to ensure a robust odour management is in place that reflects the importance placed by Neath Port Talbot (Recycling) Ltd on controlling odour at the site and understanding the potential impact it can have.

The review of the odour management plan shall include, but not be limited to, he following issues.

a) A comprehensive risk assessment shall be undertaken detailing:
   - All potential sources of odour at the plant (fixed and mobile). This shall also include specific activities that may give rise to odour (e.g. unloading of the in-vessel tunnels)
   - All potential receptors
   - Odour pathways and release points
   - Control methods in place to prevent odour release or mitigate risk

b) Identification of the actions to be taken in the event of an abnormal event or conditions which might lead to odour or potential odour problems.

c) A complete list of control measures utilised on site to prevent or control odour. This shall include references to all relevant "Work Instructions" that form part of the site environmental management system

d) An assessment of all waste handling equipment to prevent fugitive odour releases including details of any preventative maintenance programmes.

e) Procedures to periodically empty and clean the waste reception hall

f) An undertaking of the impact in the event of abnormal events and conditions, for example the failure of the de-duster or fast acting doors. This may require modelling the dispersion of odours under such circumstances.

g) Communication with complainants if an odour problem arises or is likely to arise. Checks on whether a record is kept of any complaints received, what they relate to (source/operation) and remediation action taken. The types and source of odorous substances used or generated, relevant release points and any monitoring undertaken.

h) Frequency of the re-evaluation of control techniques used at the facility

i) A specific odour management plan review period

The operator shall have regard to the requirements of H4 – Horizontal odour guidance Part 1 – Regulation and Permitting and Part 2: Assessment and control when preparing a plan

ENVIRONMENTAL RISK ASSESSMENT			
Organisation: NPT Recycling	Location: MREC	Assessment Date: 01/09/2015	Assessor: Kevin Stewart

ASSESSING THE RISK & ENVIRONMENTAL IMPACT FROM ODOUR

Potential Odour Sources	Potential Odour Receptors	Odour pathways and emission point	Control measures in place	Effectiveness of controls		Risk is reduced to an acceptable level
				Reduction of risk	Used in Practice	
				Y/N	Y/N	Y/N
Refuse Collection Vehicles Arriving on Site	General public on route to the site	Vehicle – Vehicles passing potential receptors on Fabian Way. All vehicles use the designated roadway to the site, which runs via the Amazon turn-off at the Fabian Way roundabout. This has the moved vehicles away from the potential receptors on Fabian Way.	Local authority cleaning regime of the vehicles – NPT CBC run their own vehicle Fleet and BCBC sub- contract to BIFFA	Y	Y	Y
Ejector Vehicles Arriving on Site	General public on route to the site	Vehicle – Vehicles passing potential receptors on Fabian Way. All vehicles use the designated roadway to the site, which runs via the Amazon turn-off at the Fabian Way roundabout. This has the moved vehicles away from the potential receptors on Fabian Way.	Vehicle fleet are sub-contracted by the landfill site and are used for transporting other wastes – the regularity of cleaning these vehicles is unknown. Due to the increase in diversion the number of vehicles entering and leaving site have dramatically reduced. Where there were three to six a day, there are now only three to six a week.	Y	Y	Y

Delivery of Waste to the Reception Hall	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors if wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a building is in the pathway	The reception hall is constructed of double skinned cladding with insulation, with fast acting doors on the entry and exits. Odour suppressant misting probes positioned above the exit door and throughout the reception hall. The deduster system ensures negative pressure is maintained whilst remaining odourous air is passed through a wet scrubbing system and exhaust air is treated in the stack with a continuous misting lance that dispense an odour treatment chemical that destroys odourous molecules safely. There are turbulence fans in the south and west walls that pull air into the hall and have anti-gravity shutters, in addition the air louvers at ground level have anti- gravity shutters and carbon filters installed. The amount of waste brought to site has dramatically reduced with on average only 120 deliveries a week in 2013 compared with 160 deliveries in 2008.	Y	Y	Y
Processing Waste in Reception	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors if wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a building is in the pathway	The reception hall is constructed of double skinned cladding with insulation, with fast acting doors on the entry and exits. Odour suppressant misting probes positioned above the exit door and throughout the reception hall. The deduster system ensures negative pressure is maintained whilst remaining odourous air is passed through a wet scrubbing system and exhaust air is treated in the stack with a continuous misting lance that dispenses an odour treatment chemical that destroys odourous molecules safely. There are turbulence fans in the south and west walls that pull air into the hall and have anti-gravity shutters, in addition the air louvers at ground level have anti-gravity shutters and carbon filters installed. The operation in reception has been improved with the introduction of new processing equipment that ensures waste is processed quickly and minimizes rejects returning for landfill disposal. Material brought to site is regularly shredded and cleared within 24 hours.	Y	Y	Y

Dispatching Waste From Reception	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors with the wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway All vehicles use the designated roadway to the site, which runs via the Amazon turn-off at the Fabian Way roundabout. This has the moved vehicles away from the potential receptors on Fabian Way.	The reception hall is constructed of double skinned cladding with insulation, with fast acting doors on the entry and exits. Odour suppressant misting probes positioned above the exit door and throughout the reception hall. The deduster system ensures negative pressure is maintained whilst remaining odourous air is passed through a wet scrubbing system and exhaust air is treated in the stack with a continuous misting lance that dispenses an odour treatment chemical that destroys odourous molecules safely. There are turbulence fans in the south and west walls that pull air into the hall and have anti-gravity shutters, in addition the air louvers at ground level have anti-gravity shutters and carbon filters installed. The operation in reception has been improved with the introduction of new processing equipment that ensures waste is processed quickly and minimizes rejects returning for landfill disposal. The amount of waste dispatched from the site has dramatically reduced with on average only 3 loads a week sent to landfill in 2013 compared with 90 loads sent to landfill in 2008.	Y	Y	Y
Processing Waste in Process Hall	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors if wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a building is in the pathway	The material is processed via enclosed conveyors that have extraction points for the process de-duster were odourous air is passed through a wet scrubbing system and exhaust air is treated in the stack with a continuous misting lance that dispenses an odour treatment chemical that destroys odourous molecules safely, odour suppressant misting probes positioned above the entry and exit doors and throughout the process hall. All doors remain closed during operation. The process hall is constructed with double skinned cladding with insulation. Material run through process is regularly cleared within 24 hours.	Y	Y	Y

Processing Waste in Fuel Preparation Area	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors if wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a building is in the pathway	A balanced extraction system operates in the fuel preparation hall that utilizes fresh air taken from the hall and is used to feed air into the tunnels as part of the aerobic process of bio-stabilising the fuel, this ensures negative pressure is maintained in this area. The air that is extracted from the tunnels can be re-circulated during the process or is passed through a humidifier unit and then is treated by a bio-filter. Any residual odour is treated with a continuous misting lance installed in the stack. The process of bio-drying the material educes the moisture content and renders the material stabilized and odourless.	Y	Y	Y
Emptying bio-stabilisation tunnels	General public who live close to the site and the surrounding industrial activity	Entry and exit points, emission point for de-duster, air louvers at front of reception and wall turbulence fans – odour could reach potential receptors if wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a building is in the pathway	A balanced extraction system operates in the fuel preparation hall that utilizes fresh air taken from the hall and is used to feed air into the tunnels as part of the aerobic process of bio-stabilising the fuel, this ensures negative pressure is maintained in this area. The air that is extracted from the tunnels can be re-circulated during the process or is passed through a humidifier unit and then is treated by a bio-filter. Any residual odour is treated with a continuous misting lance installed in the stack. The process of bio-drying the material educes the moisture content and renders the material stabilized and odourless.	Y	Y	Y
Storing fuel in fuel preparation area	General public who live close to the site and the surrounding industrial activity	Entry and Exit doors and Bio-filter emission point - odour could reach potential receptors with the wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	A balanced extraction system operates in the fuel preparation hall that utilizes fresh air taken from the hall and is used to feed air into the tunnels as part of the aerobic process of bio-stabilising the fuel, this ensures negative pressure is maintained in this area. The air that is extracted from the tunnels can be re-circulated during the process or is passed through a humidifier unit and then is treated by a bio-filter. Any residual odour is treated with a continuous misting lance installed in the stack. The process of bio-drying the material educes the moisture content and renders the	Y	Y	Y

Loading Fuel into Vehicles	General public who live close to the site and the surrounding industrial activity	Entry and Exit doors and Bio-filter emission point - odour could reach potential receptors with the wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	A balanced extraction system operates in the fuel preparation hall that utilizes fresh air taken from the hall and is used to feed air into the tunnels as part of the aerobic process of bio-stabilising the fuel, this ensures negative pressure is maintained in this area. The air that is extracted from the tunnels can be re-circulated during the process or is passed through a humidifier unit and then is treated by a bio-filter. Any residual odour is treated with a continuous misting lance installed in the stack. The process of bio-drying the material educes the moisture content and renders the material stabilized and odourless. All vehicles are loaded inside with the doors closed and the vehicles are sheeted before leaving building prior to leaving site.	Y	Y	Y
Dispatching Fuel from Fuel Preparation Area	General public who live close to the site and the surrounding industrial activity. General public on route to cement Kiln	Entry and Exit doors and Bio-filter emission point – Vehicles pass potential receptors on Fabian way. All vehicles use the designated roadway to the site, which runs via the Amazon turn-off at the Fabian Way roundabout. This has the moved vehicles away from the potential receptors on Fabian Way.	A balanced extraction system operates in the fuel preparation hall that utilizes fresh air taken from the hall and is used to feed air into the tunnels as part of the aerobic process of bio-stabilising the fuel, this ensures negative pressure is maintained in this area. The air that is extracted from the tunnels can be re-circulated during the process or is passed through a humidifier unit and then is treated by a bio-filter. Any residual odour is treated with a continuous misting lance installed in the stack. The process of bio-drying the	Y	Y	Y
Delivery of Kerbside Collected Material – Paper, cardboard plastic etc.	General public who live close to the site and the surrounding industrial activity	Various recyclate delivery bays - odour could reach potential receptors with warm weather and wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	The various recyclate wastes are delivered to site and are bulked up for third party processing. This material is clean when brought to the site.	Y	Y	Y

Delivery of Kerbside Collected Material – Green Waste	General public who live close to the site and the surrounding industrial activity	Green waste delivery bay - odour could reach potential receptors with warm weather and wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	Green waste is delivered to site and is bulked up for third party processing on the same day, no green waste is stored overnight and the material is delivered in sealed bags	Y	Y	Y
Delivery of Kerbside Collected Material – Kitchen Waste	General public who live close to the site and the surrounding industrial activity	Kitchen waste delivery bay - odour could reach potential receptors with warm weather and wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	Kitchen waste is delivered to site and is bulked up for third party processing on the same day, no kitchen waste is stored overnight and the material is delivered in bags	Y	Y	Y
Leachate from underground storage	General public who live close to the site and the surrounding industrial activity	None	This task has now been changes and the leachate water is pumped directly into the mains sewerage system.	Y	Y	Y
Site roads	General public who live close to the site and the surrounding industrial activity	Site road - odour could reach potential receptors with the wind direction dispersing the odour in the direction of Baldwin's and Elba crescent, however a recently constructed building is in the pathway	The site roads are cleaned daily with an onsite road sweeper and regularly with water based treatment solution on a daily basis and we utilize road sweepers to clean up any residue off the roads.	Y	Y	Y

This environmental risk assessment is nothing more than a systematic general examination of the undertaking, all of our work activities and the condition of our premises. The assessment involves identifying the potential odour sources, evaluating the extent of the impact and the potential receptors and pathways

The first stage is to identify what needs to be assessed. This could be based on assessing an individual activity and its component tasks, items of work equipment, be geographically based or cover whole area/site issues. The means of determining what has to be assessed is not important, but it is important to ensure that all foreseeable activities are covered.

For each area, activity, etc. to be assessed, the next stage is to identify all relevant potential odour sources and the potential receptors. Against each identified the potential odour sources, pathways and receptors we establish what the existing PREVENTIVE and PROTECTIVE MEASURES in place are. The

possible Preventive and Protective Measures are either based on legal requirements or what is considered to be best practices. The preventive and protective measures are evaluated for effectiveness in principle and practice and whether they are sufficient. This assessment doesn't consider other industrial activities in the area and their contribution to odour in the area

Abnormal operations

Potential abnormal conditions could arise on site and therefore there is a need for robust contingency plans to address these

Potential Odour Sources	Release Point	Possible Failures Or Abnormal Operation	Potential Outcome In The Event Of Failure	Preventative Measure In Place To Reduce Risk	What Actions Are Taken
Ejector Vehicles Leaving Site	General public on route to the site	Vehicle breakdown	Local residents exposed to odours from the vehicle	Vehicles are brought back onto site if practicable to limit the impact and contractor is contacted to change shunting vehicles	MREC contacts the vehicle owner to address the breakdown and the NRW are informed in the event of any complaints received.
Failure of Fast Acting Doors	Entry or exit door	Electrical fault or collision with vehicle	Local residents exposed to odours from reception	Manual steel roller shutter doors are used and if required the odour misting units are put into operation. The local maintenance contractor is called in the event of a breakdown to limit repair lead time	NRW are informed of the problem as are Local authorities. Fast acting door contractor contacted to attend site and repair the door
De-duster Failure	Fugitive emission points in reception	Electrical or mechanical failure or utility failure	In the event of the reception de-duster failing there is a provision in the permit to continue waste acceptance for 4 hours if the unit can be repaired in that time. If the de-duster cannot be repaired within that time, then waste acceptance must be stopped. In the event of the de-duster failing the reception hall could develop a positive pressure environment.	The De-duster units are subject to monthly preventative maintenance and cleaning to ensure efficient operation. Odour misting sprays operate in reception and anti-gravity shutters will activate on the ventilation louvers and hall fans and activated carbon filters have been installed on the louvers. The process de-duster can be used to ventilate the reception hall in the event of the reception de-duster failing	NRW and LA contacted, site procedures initiated to prevent fugitive odours

Bio-filter Failure	A4 emission point	Bio filter medium no longer active	Potential odours from the tunnels could exit the bio-filter stack	The bio-filter stack has a misting lance in the stack that is continuously operating	NRW and LA contacted, site procedures initiated to prevent fugitive odours
Power Failure	Bio-filter emission point, entry and exit doors, fugitive emissions from reception	Power supply to operate de-duster, odour misting probes and lances, fast acting doors and hall fans, bio-filter fans and humidifier	Potential odours from reception and bio-filter stack	There is a back up generator on site that operates in the event of a power cut In the event of power not being able to be maintained waste will be removed from the site and deliveries will cease	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours. Back-up generator activated
Water Utility Failure	Bio-filter emission point, entry and exit doors, fugitive emissions from reception	The failure of the water supply will impact the operation of the de-dusters, biofilter and odour misting sprays	Potential odours from reception and bio-filter stack	There is a 20000 litre water tank on the site used for the fire protection system and it could be used to continue spraying the bio-filter, however in the event of the water utility not working we will cease accepting waste and look to removing waste from site	NRW and LA contacted, site procedures initiated to prevent fugitive odours
Flood	Flooding of the site will lead to site emergency procedures being initiated resulting in isolation of energy sources and utilities	Electrical isolation and utility isolation will impact the operation of the de- dusters, odour misting sprays and bio-filter in addition to fast acting doors and hall fans	Potential odours from reception and bio-filter stack	All plant equipment will be isolated with plant doors closed and hall fans closed. Waste deliveries will cease and remaining waste will be taken from site when it is safe to do so	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours.

Body parts in the waste stream	Waste in reception area being unable to be processed and 48 hour requirement to process the waste could pass	Unable to process the waste will result in degradation of the waste leading to odours	Potential odours from reception	De-duster will remain operational and dosing of odour misting system will be increased accordingly, waste deliveries will cease or waste will be removed to landfill	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours.
Munitions in waste stream	Waste in reception area being unable to be processed and 48 hour requirement to process the waste could pass	Unable to process the waste will result in degradation of the waste leading to odours, potential damage to equipment on site	Potential odours from reception	De-duster will remain operational and dosing of odour misting system will be increased accordingly, waste deliveries will cease or waste will be removed to landfill	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours.
Excessive amounts of waste on site, due to machinery breakdowns on site	Waste in reception area being unable to be processed and 48 hour requirement to process the waste could pass	Unable to process the waste will result in degradation of the waste leading to odours	Potential odours from reception	De-duster will remain operational and dosing of odour misting system will be increased accordingly, waste deliveries will cease or waste will be removed to landfill	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours.
Excessive amounts of waste on site, due to bio-filter media replacement	Waste in reception area being unable to be processed and 48 hour requirement to process the waste could pass	Unable to process the waste will result in degradation of the waste leading to odours	Potential odours from reception	De-duster will remain operational and dosing of odour misting system will be increased accordingly, waste deliveries will cease or waste will be removed to landfill	NRW and LA contacted, site emergency procedures initiated to prevent fugitive odours.

Control Measures

De-duster

The containment of the buildings and the prevention of fugitive emission are achieved via the ventilation system. In the Reception Hall building air is actively extracted for treatment at a rate of 68000m³/hr whilst ambient air is passively drawn into the building via louvers (new louvers have been installed at high elevations to improve air circulation).

The building volume is approximately 22800m³, thus the ventilation system allows approximately two and half air changes per hour. This is sufficient to maintain a negative pressure and prevent fugitive release. The negative pressure within the Reception Hall has been verified by measurement by Carter Environmental Engineering Ltd

In the Process Area building air is actively extracted for treatment at a rate of 43500m³/hr whilst ambient air is passively drawn into the building via louvers. The building volume is approximately 35900m³, thus the ventilation system allows approximately one air changes per hour. Due to the fact that specific operations result in the generation of dust and odour emissions, the extraction system has been designed to provide local exhaust ventilation to process units and picking rooms. The air is treated by a similar de-duster unit to the Reception Hall, designed to treat 68000m³/hr. The commissioning report by Carter Environmental Engineering Ltd for the ventilation system concluded that, following cleaning and maintenance, the systems were operating as design.

The operation of the de-duster is an integral part of maintaining negative pressure in the reception hall. Maintenance requirements for the de-duster units include regular cleaning to ensure ventilation efficiency.

Air Curtains

Although initial advice in 2008 on there being there was little benefit installing an air curtains on the exit door of the Reception building, in February 2011 air curtains were fitted to both the entrance and exit doors in Reception.

Odour Rotary Atomisers

There are two wall mounted oscillating rotary atomiser on the exit door of the Reception building, these are linked to the exit door and give a coverage of between 20 and 30 metres spray coverage so that all exiting vehicles are sprayed with an odour suppressant.

The odour suppressant agent is a new concept in abatement technology, which has been shown highly effective in removing odours. It is used as a very dilute solution in water, from which a fine mist or aerosol is generated within the air space surrounding the odour source. As the aerosol descends through the atmosphere, it captures the organic gas within the droplets and retains them, sweeping the air clean of odour.

The system does not use masking agents or weak intermolecular forces to hide instead of remove odours

The same rotary atomisers are also situated around other parts of the Reception area and in Process; these atomisers are only used when required I.E. if a particularly odourous load in brought to site, this is due to possible health and safety issues if the atomisers are constantly on and also they get the waste wet and again this can increase odour issues.

Sealing the Buildings

In 2010 the implementation of a program of sealing of the joints between the walls and roofs of the reception, processing and fuel prep buildings was undertaken to reduce the potential escape routes of odorous air from the building. Similarly all damaged panels in the walls were repaired and an ongoing report and repair plan undertaken.

Louvers & Ventilation Fans

The ventilation louvers at the west side of the reception building have carbon filters installed. A carbon filter works by using activated granules of charcoal through which the odourous air from the waste is extracted through. Carbon filters can last 12-18 months before they are required to be changes.

These filters have been installed on the ventilation louvers in the reception hall in the event the environment develops a positive pressure atmosphere the filters are designed to treat any odourous air that would escape through the ventilation louvers, these were last replaced on 2nd December 2013 and be changed annually and recorded as such.

The ventilation fans and louvers are constantly pulling fresh air into the Reception building for the employees

Biofilter

The function of the bio-filter is to remove the odours from the processed air before it is discharged to the atmosphere. The bio-filter consists of a grated floor, upon which is laid a mixture of chopped pine tree roots, which have excellent purification capacity, a long life, a limited pressure drop and good moisture retention.

The process air enters the bio-filter under the grated floor, where it dissipates evenly before passing through the biomass. The pollution in the process air is absorbed by the biomass, used as food by the micro-organisms living in the biomass, before being turned into carbon dioxide, water and heat. The micro-organisms are only active in a humid environment, ideally between 50% and 70%. Therefore it is important that the process air passing through the biomass has humidity levels in excess of 98%.

The bio-filter is subject to daily moisture checks and the biomass is regularly sprinkled with clean water to wash out the ammonia, which can affect the micro-organisms. The ammonia emission is a direct reflection on the amount of biological activity in the filter, the more odourous the air passing through the filter will condition the filter by allowing sufficient biological activity to abet the odours and consequently with less odourous air passing through the biological activity will be less and will be reflected in the ammonia emission

The optimum temperature of the biomass is between 30°C and 40°C. At temperatures below 15°C the conversion process stops, even though the biomass does not die. The presence of solid particles in the air-flow also has a negative effect on the biomass, as they block up the biomass reducing the air-flow through it.

The biofilter media was changed in 2011 and was checked by OSILtd in October 2013 and the overall process design for the wood-chip media bio-filter odour control unit is in line with accepted industry standards for such applications.

There was a problem with the design and implementation of the bio-filter irrigation system leading to unsatisfactory wetting of wood-chip media.

Also despite the irrigation problems, the wood-chip media is in relatively good physical condition given

its age (approximately 3 years) and the wood-chip media is in relatively good microbiological condition although excessive amounts of fungal species were noted. The required microbial balance should be restored once correct irrigation is achieved. The irrigation problem has now been corrected and further wood-chip media tests will be undertaken annually.

2015 Review of Potential Odour Sources

This section shows a summary of information from the 2015 Odournet testing.

Overview of the mechanisms that may lead to odour generation

The generation of odour is an inevitable consequence of handling and treating putresible waste and is associated with the release of a variety of odorous volatile organic compounds (VOCs) which are primarily generated as a result of the biological breakdown of the various organic constituents of the waste materials. These compounds are entirely dependent on the waste materials handled but can include organic alcohols, aldehydes, ketones, organic acids, amines, ammonia and reduced sulphur compounds (e.g. hydrogen sulphide, dimethyl sulphide and mercaptans).

The characteristics of the odour generated from processing the waste, in terms of intensity and offensiveness will ultimately depend upon the age, type and quality of materials handled and the nature of the treatment processes applied.

The rate of emission of odour is also influenced by the surface area of the material presented to the atmosphere. As a result, the emission rate of odour tends to be higher from activities which involve agitation of material (e.g. deposit, agitation during transfer and shredding of materials etc.).

Identification of odour sources associated with site activities

On the basis of the site review and inspection, a range of activities were identified that have the potential to generate odorous emissions in each operational area. The key characteristics of the sources are summarised in Table 1 below:

Table 1 Odour emission characteristics

Process Stage	Odorous Activity	Nature of Odour	Frequency & Duration (During Operational Hours)	Route for Release
Waste reception	Waste deposition	'Fresh' and aged putresible waste odours	Semi-continuous	Extracted to deduster via building extraction system / possible fugitive emissions
	Waste storage		Continuous	
	Waste shredding		Semi- continuous	
	Waste transfer		Semi-continuous	
Waste processing	Waste screening	Processed putresible waste odours	Semi-continuous	Extracted to deduster via local extraction points / possible fugitive emissions
	Waste shredding		Semi-continuous	
	Waste densifying		Semi-continuous	
RDF store	Waste storage	Processed putresible waste odours.	Continuous	Possible fugitive emissions
	Waste transfer		Semi-continuous	
Composting building	Waste transfer	Processed putresible /dried composted waste odours	Semi-continuous	Extracted to biofilter via building extraction system/possible fugitive emissions
	Waste shredding		Semi-continuous	

Each of these odour sources are considered in more detail during the remainder of this review.

Review of Emissions from the Deduster, Biofilter and Dust Extraction Plant

Summary of Odour and Trace Gas Measurement Results

The results of the odour analysis conducted on the dedusters, biofilter and dust extraction plant are summarised in Table 2 below.

Table 2 Dedusters, biofilter and dust extraction plant odour and trace gas results

Sample Date	Sample Location	Geometric Mean Odour Concentration [OuE/m³]	Flow rate [m³/s]	Emission Rate [OuE/s]	Quality of Odour
05/02/14	Deduster inlet (reception building)	1181	17.8	21022	Waste
05/02/14	Deduster inlet (processing building)	1552	8.1	12571	Waste
05/02/14	Deduster outlet (combined)	1161	23.6	27411	Waste
05/02/14	Dust extraction inlet	608	13.4*	8147	Composed Waste
05/02/14	Dust extraction outlet	669	13.4	8958	Composed Waste
27/02/14	Biofilter inlet	10960	NM	NM	Bio-dried Waste
27/02/14	Biofilter outlet	18428661	22.2**	40933	Biofilter/Woodchip

'NM' denotes not measured

*Dust extraction plant inlet flow measurement location unsuitable for obtaining accurate flow measurements. The outlet flow rate is presented instead.

**Biofilter outlet flow rate derived from design data as flow measurement location unsuitable for obtaining accurate flow measurements.

The results of the trace gas analysis conducted on the deduster inlets and biofilter and dust extraction plant outlets are summarised in Table 3 below.

Table 3 Summary of results from GC-MS analysis and trace gas monitoring

Compound/Group	Concentration (µg/m³)			
	Reception Inlet Deduster	Processing Inlet Deduster	Dust Extraction Outlet	Biofilter Outlet
Alcohols	611	705	205	54
Aldehydes	4	1	4	14
Aliphatic Hydrocarbons	11224	3579	3443	3799
Amines	1	-	-	-
Aromatic Compounds	2152	1858	1904	1780
Chlorine Containing Compounds	1446	780	15	29
Cyclic Hydrocarbons	2142	262	231	179
Esters	2189	1943	1548	8
Ethers	-	<1	<1	1
Ketones	949	872	32	1209
Nitrogen Containing Compounds (Including NH_3 by detector tubes)	1	-	400	319
Organic Acids	1	-	-	22
Oxygen Containing Compounds	1	2	2	-
Inorganic Sulphur Compounds (H_2S by Hand Analyser)	488	40	59	93
Organic Sulphur Compounds	5	10	6	399

Terpenes	1881	2706	2686	2921
Total VOC's	23095	12758	10535	10827

'-'Denotes none detected

Interpretation of Results Collected From the De-Dusters, Biofilter and Dust Extraction Plant

The results are discussed below:

Dedusters

- The olfactometry data collected from the dedusters indicate that the mean concentration of the air presented to and released from the dedusters were broadly comparable, measured at approximately 200 to 1600 ou /m³.
- The results are within the uncertainty of the analysis technique applied, indicating that the units have little if any effect on odour concentration.
- The results of the chemical analysis indicate broadly similar compound groups present in the airstreams extracted from the 2 No. operational areas. A large range of odorous volatile organic compounds (VOCs) which are commonly associated with waste handling facilities were detected including alcohols, aldehydes, aromatic compounds, aliphatic and cyclic hydrocarbons, chlorine containing compounds, esters, ketones, sulphur containing compounds and terpenes. 11 No. compounds were detected at concentrations above their respective odour threshold values (hydrogen sulphide, butyl acetate and butanedione by the greatest amount), and are likely to be contributing to the odour of the outlet airstream. The presence of hydrogen sulphide and other reduced sulphur compounds in samples from the waste reception and processing areas is a clear marker for anaerobic degradation of organic matter.
- In comparison to the 2010 study the type of compounds present are broadly similar, but both the airflow rate measured from the outlet stack and the odour concentration of the air emitted are lower, resulting in an overall reduction in emissions from the stack (from approximately 74,000 OuE/s in 2010 to approximately 27,000 OuE/s in 2014).

Biofilter

- The olfactometric data from the biofilter indicate that it is currently achieving an odour abatement efficiency of around 85%. The odour concentration measured in the outlet air from the biofilter is within the range typically expected from a unit that is performing well (i.e. typical outlet concentrations from 'optimally' operating units range from 500 to 5000 OuE/m³ compared to a geometric mean concentration of 1842 OuE/m³ measured in this case.
- The chemical analysis data indicates that the odours emitted from the system are composed of broadly similar compound groups to those presented to the dedusters for treatment. 10 No. compounds are detected at concentrations above their respective odour threshold values (hydrogen sulphide and methanethiol by the greatest amount), and are likely to be contributing to the odour of the outlet airstream. The presence of reduced sulphur compounds including hydrogen sulphide and dimethylsulphide in the samples again indicates some degree of anaerobic degradation of organic matter.
- In comparison to the results of the 2010 study, the performance of the biofilter has improved markedly, which is likely to be a result of the replacement of the media in 2010 and implementation of improvements to the irrigation system in 2013. The lower outlet odour

concentration means that the odour emissions from the unit are significantly lower than was measured in 2010 (approximately 41,000 OuE/s compared to 194,000 OuE/s in 2010).

Dust Extraction Plant

- The odour analysis results for the dust extraction plant serving the fuel preparation (composting) building indicate that the unit provides no significant odour abatement of the air prior to discharge to atmosphere. This is an expected result as the unit is designed only to physically remove particulates (dust) from the airstream.

- The chemical analysis data indicates that the odours emitted from the system are composed of a similar range of odorous or potentially odorous VOCs to those emitted from the dedusters and biofilters, and which are typical for waste handling facilities. 10 No. compounds are present at concentrations above their odour threshold value, with hydrogen sulphide, butyl acetate, butanedione and methanethiol exceeding their respective odour threshold values by the greatest amounts. If the application of odour control to this airstream is considered, the ability of any system to treat these compounds will require assessment.

Review of Fugitive Emissions

Summary of Results

Building Integrity and Leakage Testing

The results of the smoke testing conducted on 4th and 5th November 2014 to assess the integrity of the site buildings to contain odours and potential air leakage points are presented in Table 6 below:

Table 6 Results of Smoke Testing

Building	Leakage Points	Magnitude of Emissions
Reception Building	No significant leakage points noted in main building structure	None
	Main vehicular doors fitted with air curtains appear to provide an effective level of containment of odours, although potential exists for short term intermittent releases as vehicles pass through door	Minor, intermittent
	Small leakage route through wall between reception and disused MSW building (open cable panel).	Very minor
Processing Building	No significant leakage points noted in main building structure.	None
	Potential for minor short term emissions during door open events	Minor, intermittent
Fuel preparation (Composting) Building	No significant leakage points noted in main building structure.	None
	Vehicular shutter door on eastern wall.	Minor

Local Exhaust Ventilation System Testing

The findings of the smoke testing and local airflow measurements of the LEV systems serving the buildings and specific aspects of the plant in the reception, processing and fuel preparation buildings are presented in Table 7 below:

Table 7 Results of smoke testing

Process Area	LEV System	Observations
Reception	Roof extraction duct system	Extraction into roof mounted ductwork appears effective (based on airflow measurement data – smoke testing not possible due to access restrictions).
Processing	First hopper and inclined conveyor	Moderate level of containment provided by enclosure.
	Enclosed shredder	High level of containment with minimal leakage of smoke
	Shredder with hood extraction	Smoke capture provided by hood moderately effective.
Fuel Prep	Roof extraction system	Smoke was drawn in effectively to each vent on a local basis and extraction appeared effective

The airflow monitoring results conducted on the main ducts serving each process area and the calculated air extraction rates provided are summarised in Table 8 below:.

Table 8 Design and Measured Air Extraction Rates from Main Buildings

Building	Design extraction rate (m^3/hr)	Design air changes per hour	Actual extraction rate (m^3/hr)	Actual estimated air changes per hour[4]
Reception Building	68,000	-2	65,445	-2
Processing Building	43,500	-1	30,240	-0.7
Composting Building	Unknown	Unknown	74,000	2.1

***Note:** the calculated extraction rate from the fuel preparation building does not take account of the fact that up to approximately 85,000 m^3/hr is introduced into the building by the wall mounted ventilation fans. The introduction of this air in close proximity to the extraction ductwork is likely to mean that substantially less than the calculated air changes per hour are provided.

Summary Building Odour Concentration Results

The results of the building air odour sampling are presented in Table 9 below:

Table 9 Odour measurement results and estimated fugitive odour emission rates

Date	Building	Range of measured odour concentrations [ou_e/m^3]	Geometric mean odour concentration (ou_e/m^3)
16/01/15	Reception	3512 - 7288	4751
20/03/15		1024 - 1814	1355
15/04/15		2177 - 3232	2712
16/01/15	Process	2633 – 5851	3930
20/03/15		2260 – 5350	3450
15/04/15		3971 – 5016	4541
16/01/15	Fuel Prep (Compost)	2055 – 7035	3540
20/03/15		1514 – 2133	1825
15/04/15		1701 – 2780	2224

Discussion of Results

Review of the data presented in table 4 indicates that the potential for leakage of odours from the waste reception and processing buildings under current operational conditions has decreased in comparison to the 2010 study (the smoke testing, odour measurement data and field assessment data from the 2010 study is presented in Annex E for reference), although the potential still exists for minor fugitive releases of odour from all three of the operational buildings. The condition of each building from this regard and effectiveness of the extraction systems in comparison to design are discussed below:

- Reception building. No significant routes for air leakage from the reception building were identified during the assessment. The only potential routes for escape of odour from this area were through an open cable panel into the adjoining MSW building, and entrainment of odours in the wake of vehicles as they exit the building. Both of these potential odour release points were considered to be minor, and overall a significant improvement in the containment provided by the building has been achieved (i.e. leakage was no longer observed where the roofs and walls meet, or through any vents or holes in the building, and damaged sections of

the wall have been repaired and air curtains installed on the main vehicular doors). The extraction rate provided to the building appears to be roughly in accordance with design, providing approximately 2 air changes per hour.

- In overall terms, the leakage rate from the building is therefore considered likely to have decreased substantially in comparison to that measured in 2010. This conclusion appears to be supported by the internal building air odour concentration data that indicates that the average concentrations of odour within the building were approximately 30% greater on average than those measured in 2010.
- Processing building. No significant routes for air leakage were identified from the waste processing building during the assessment. This reflects a significant improvement in the containment effectiveness of the building structure in comparison to 2010 when leakage routes were identified where the roofs and walls meet and through damaged sections of the wall cladding.
- The extraction rate applied to the building has increased in comparison to the 2010 study but is still only approximately two thirds of the design rate. The removal of the trommel and reduction in area of conveyors, along with the introduction of containment/extraction to the waste shredding plant, is likely to result in a reduction in the emission rate of odours into the building. Despite this the internal building air odour concentration data broadly indicates a slight overall increase (approximately 15%) in the average odour concentration within the building in comparison to 2010.
- Overall, the leakage rate from the processing building is considered likely to have decreased in comparison to that measured during the 2010 study.
- Fuel preparation (composting) building. No significant routes for air leakage were identified from the fuel preparation building during the assessment, reflecting an improvement in the situation since 2010 when leakage was noted from several locations. Only one potential leakage route was observed, around the vehicular door on the eastern wall, but the potential for odour leakage through this route is considered to be minor.
- Review of the modifications to the extraction system indicate that although increased extraction has been applied via the dust extraction plant, the beneficial effects of this extraction are likely to be offset by the introduction of fresh air into the building by 5 No. new wall mounted fans.
- In overall terms there is unlikely to be any substantial change to the leakage of odours from the fuel preparation building (which was not noted as a significant source of odour emissions) compared to that observed during the 2010 study.

Management Controls – Waste Handling, Maintenance and Management Procedures

The biggest change since 2008 has been the amount of input material coming to site. In 2008 the tonnage for the year was NPT Recycling Ltd was 100,920 tonne (77.03% diversion) and 2014 was 87,347 tonne (91.97% diversion).

This means that the amount of vehicles delivering to site has dropped; with approximately 90 ejector vehicles a month taking waste to landfill in 2008, compared to 8 vehicles a month in 2014.

With this in mind NPT Recycling Ltd are clearing the site of waste virtually every 24 hours as shown in the photos below, which shown the waste hall at 2pm on Monday 10th February 2014.

With the introduction of a new Doppstadt shredder which has improved the throughput of the waste, this has resulted in less residence time of waste in the reception hall and more material being processed completely through the plant. The fact that excess waste inventories have now effectively been eliminated the potential for odorous releases from waste held on site have been dramatically reduced.

This added to the fact that NPTCC and BCBC are recycling more, means that the highly odourous element of black bag material I.E. food waste has reduced by around 80%. This has an added benefit in that the material is an ideal homogenous mix for further processing in the in vessel reactors.

Additionally the continuing enforcement of the door management work instruction is ensuring that each door is closed after use.

A robust preventative maintenance programme is in operation on site ensuring plant equipment maintains operational efficiency and does no lead to major engineering issues that will impact the operation of the site. All plant equipment and conveyors are cleaned regularly and shredding equipment is maintained to ensure size reduction throughput is maintained.

The in-vessel reactors are also cleaned regularly to ensure air spigot are cleaned and can deliver the required air for aerobic processing of the fuel in the tunnels. The de-dusters are maintained regularly to ensure mechanical ventilation remains efficient and negative pressure is maintained.

External contactors maintain the probe misting system on a monthly basis, with daily checks performed by the team leader on shift to ensure the equipment is working correctly.

All plant procedures for addressing odour management are validated by the business management system that has achieved accreditation to ISO9001, ISO14001 & OHSAS18001. The procedures in place ensure door management on site is maintained, odour treatment equipment is maintained, the spraying of outgoing waste vehicles. Emergency procedures are also in place and as part of the company management system emergency scenarios are practiced by each shift to ensure they are familiar with the requirements in the event of a real emergency. These procedures encompass abnormal operation situations like floods to site, fire, and munitions in the waste in addition to spillage and pollution procedures.

On every complaint the Team Leader will contact the complainant if possible and conduct thorough investigation detailing the plant operating parameter and a visit to our potential receptors at Baldwin's and Elba Crescent are undertaken and a formulated report is submitted to Natural Resources Wales and the senior management. A formal response to Natural Resources Wales will also been sent by a senior manager giving a more detailed report the ASAP.

Due to the nature of operating a facility that accepts and processes waste the weekend is the ideal opportunity to conduct housekeeping and maintenance activities. The reception hall is cleaned on the weekends following the shredding and processing of waste and continued on a Monday morning when oversize and reject material is removed from site. Throughout the week cleaning is conducted when the opportunity arises.

A more thorough clean of walls and the floor is performed on a monthly basis in addition to equipment cleaning and maintenance. The site roads are cleaned on a daily basis.

Actions to Monitor Odours and Trigger Point to Remedy Odours

- The **Trigger Point** for remedial actions to be taken as specified below is considered as:

Odour generation from the waste(s) currently being stored or processed on-site that is ***likely of causing a nuisance or offence*** to the local nearby receptors (residents, general public and workers) beyond the site boundary.

- **Monitoring of trigger point:**

1. ***Olfactory monitoring of the site perimeter***

Olfactory monitoring for odours will be carried out by a competent member of staff 3 times in a day by each shift teamleader and entered on the ***Shift Report*** (See attached);

i) 06:00hrs till 14:00hrs

ii) 14:00hrs till 22:00hrs

iii) 22:00hrs till 06:00hrs

The daily olfactory monitoring and any observations odours and actions taken or needed will be recorded on the teamleaders ***Shift Report*** by a competent member of staff. Meteorological conditions are recorded automatically by the onsite weather station

2. ***Monitoring of incoming wastes for potentially offensive odour generation.***

All wastes delivered to the site will be checked by the operatives for strong or offensive odours where practicable before offloading, where strong or offensive odours are detected, then the operator will inform the competent member of staff and actions to remedy the odours or reject the waste will be recorded on the teamleaders ***Shift Report*** by a competent member of staff.

3. ***Receipt of complaints.***

On receipt of an odour complaint, a competent member of staff will carry out additional on-site and site perimeter checks and olfactory monitoring to verify and locate the source and possible cause(s). Additionally the Health & Safety Manager will undertake an investigation of each complaint.

Actions to remedy the odours or remove the waste(s) will be recorded on the teamleaders ***Shift Report*** by a competent member of staff.

Communication

Neath Port Talbot (Recycling) Ltd is committed to effective communication.

Internally, this shall be achieved through regular formal and informal communication with all staff on business, quality, and safety, environmental and other related issues.

Externally, Neath Port Talbot (Recycling) Ltd interfaces with a wide range of appropriate organisations, groups and individuals. Communications may be two ways.

Neath Port Talbot (Recycling) Ltd may communicate with the following groups: Internal:

- Employees, Agency and temporary staff. External:
- Liaison Groups & interested parties.
- Local Authorities.
- Contractors employed directly/indirectly Neath Port Talbot (Recycling) Ltd
- Natural Resources Wales
- Health and Safety Executive
- Media

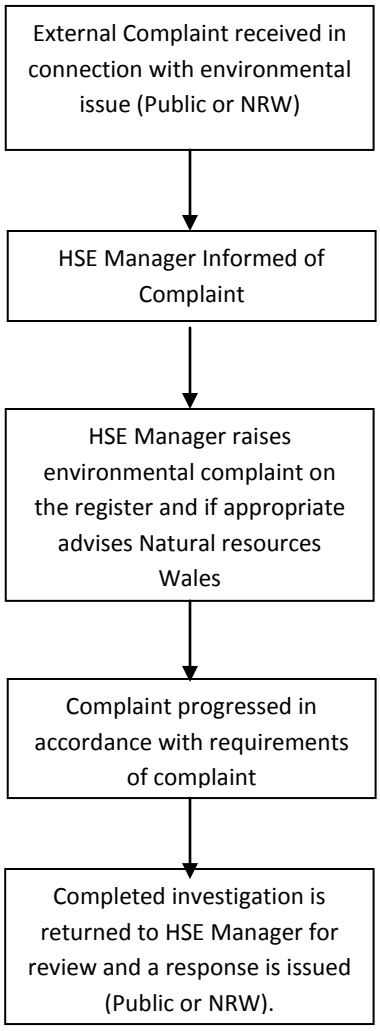
The General Manager will be the usual focus for external communications. Where appropriate, actions are devolved to the Senior Management team & Teamleaders to communicate locally with local bodies and organisations.

The HSE Manager is responsible for day to day enquiries from the regulatory organization and complaints. Any written correspondence or other formal communication will also be the responsibility compliance manager.

Stakeholder Feedback / Complaints Procedure

Contacts from stakeholders are addressed as detailed below on the environmental complaints form. Members of the public (local stakeholders) may pass feedback to Neath Port Talbot (Recycling) Ltd, due to the nature of Waste treatment, these are normally concerns and a flow chart detailing the procedure for dealing with these concerns is shown below. Neath Port Talbot (Recycling) Ltd will endeavour to amicably resolve all concerns that it receives

External Complaints / Feedback



The records of complaints received and investigations are held in a designated complaint register, which is under the control of the HSE Manager. Feedback is usually received via the Natural Resources Wales and is logged, investigated and any necessary action taken. The level of detail in the investigation will include type of odour, duration, time, wind map and date and all operational information at the time of the complaint i.e. vehicle movement, processing activities and weather data is also utilised to ensure all possible parameters are considered.

In the event that an issue is foreseeable that could cause an odour problem the HSE Manager will contact the Natural Resources Wales and community representatives to detail the issue and the remediation actions being undertaken.

The HSE Manager will discuss all complaints with the management team and this will also be discussed in the health & safety, and liaison meetings. Odour has been and will continue to be an agenda item for discussion with a view of developing a productive consensus on addressing issues in the area.

Review and Re-Evaluate

The Odour management plan will be reviewed annually as a minimum in conjunction with the environmental performance of the site and will become an agenda item for future management reviews in line with the business management system evaluation process. Consideration of odour complaints in terms of type of odour, day and time of odour will be reviewed in line with plant operations and maintenance records and any other issues with any requirements being included in the odour management plan.

In the event of major changes to the site in terms of introduction of new technologies or expansion of the site the odour management plan will be reviewed at that time

PROCESS TEAM LEADER SHIFT REPORT

Date:

Team Leader: ..... **Shift** .....

Mornings ☐ **Afternoons** ☐ **Nights** ☐ **Days** ☐ **Nights** ☐

Health and Safety / Accident / Near misses

Fire alarm / First aid alarm incidents / Faults.

Environmental complaints / Site issues

Boiler blow down **pH .....** **Temp .....°C** **Total flow ..... M³**	**Any strong or offensive odours detected on site: Yes** ☐ **No** ☐ **Any wastes delivered to site have strong or offensive odours: Yes** ☐ **No** ☐ **Observations**

Plant / Site cleaning / Actions Taken

Reception

Process

Tonnage to fuel prep

Downtime in minutes

Diesel Tank Reading	Transformer Bund	Kerosene bund
	Empty ☐ Requires emptying ☐	Empty ☐ Requires emptying ☐

Bailing

Rolls of wire

Fuel preparation

Rolls of netting
Rolls of inner wrap
Rolls of wrap

Mechanical repairs / issues

Electrical repairs / issues

Personnel

Contractors

Vehicle Checks

Vehicle	Checks C/O	If not C/O give reason	Fuelled and Quantity	Hours / Mileage
Komatsu 100	☒		☐ Litres	
JCB 416	☒		☐ Litres	
Hook Loader	☒		☐ Litres	
Fork lift 213	☒		☐ Litres	
Fork lift 831	☒		☐ Litres	
Fork lift 786	☒		☐ Litres	
Cherry picker	☒		☐ Litres	
Scissor Lift	☒		☐ Litres	

All vehicle faults must be reported to maintenance