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ENVIRONMENTAL MANAGEMENT FOR BUSINESS

ENVIRONMENTAL LIABILITY RISK ASSESSMENT

PANDA

RATHDRINAGH,

BEAUPARC,

COUNTY MEATH

WASTE LICENCE NO. W0140-04

Prepared For: -

PANDA,
Rathdrinagh,
Beauparc,
Navan,
Co. Meath

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Client	PANDA W0140-04

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1. INTRODUCTION

Nurendale, trading as PANDA operates a Materials Recovery Facility at Beauparc, Rathdrinagh, County Meath under a Waste Licence (W0140-04) issued by the Environmental Protection Agency (the Agency).

Condition 12.2.2 of the previous licence (W0140-03) required Panda to prepare a fully costed Environmental Liabilities Risk Assessment (ELRA), which addresses the liabilities from past and present activities. The ELRA was prepared, submitted to and approved by the Office of Environmental Enforcement.

It is proposed to accept and process approximately 130,000 tonnes per annum non-hazardous incinerator bottom ash (IBA) from the Dublin Waste to Energy Ltd waste recovery plant at Poolbeg at the facility. PANDA applied for a review the current licence to accommodate the acceptance of the IBA and the Agency requested the ELRA to be revised to include the proposed activities.

1.1 Methodology

The original ELRA was based on PANDA's direct experience of a fire at the facility which occurred in 2012 and the Agency's final guidance on assessing and costing environmental liabilities (2014) and included:

- A review of site operations including waste acceptance, handling and on-site recovery processes, raw material storage and handling practices and emissions to identify and assess existing and potential sources of environmental pollution;
- Establishment of the environmental setting and the identification of any particular sensitive receptors that could be impacted in the short, medium and long term by the site operations;
- Review of the site history and regulatory compliance.

1.2 Limitations

The ELRA is based on the current activities and the proposed acceptance of the IBA. The assessments of costs required to reduce or mitigate the environmental liabilities identified in this report are based on the information available at the time of the report preparation and may be subject to amendment based on future investigations.

2. SITE OPERATION

2.1 Facility Location

The facility is located is in the townland of Rathdrinagh, at National Grid Reference: E2973 N2689. It is on the N2, approximately 4km south of Slane.

2.2 Facility Layout

The installation occupies 7.9 hectares (ha) and comprises operational and undeveloped areas. The operational area (4.7ha) is either paved or occupied by buildings and an Integrated Constructed Wetland. There are three main waste processing buildings (Buildings 1, 2 ad 3) a skip repair building, a weighbridge, an administration building. The undeveloped area (3.2ha), which is to the east of the operational area has not been developed and is where Building 4, in which it was intended to install the biological treatment plant, will be constructed.

Table 2.1 – Site Infrastructure

Infrastructure	Details
Administration Building	Located adjacent to the site entrance at the northern boundary.
2 No Weighbridge and associated office	Located close to the facility entrance in the north of the facility
Building 1	SRF and DMR
Building 2	C&D Processing
Building 3	SRF Manufacture
Skip Repair Building	The building (372m^2) is located between Buildings 2 and 3.
2 No Dust suppression system	Building 1 and Building 2 have water sprayers installed to control dust levels
2 No Drying Tunnels	Located adjacent to Building 1 and not used
Above ground water tank	660 m^3 capacity
Truck wash	Located to the northeast of Building 1.
Paved Yards	35,000m^2
Above ground water storage tank	660m^3
Underground surface water storage tank	72m^3
Underground wastewater storage tanks (5No)	Serving B1 – 11m^3 Serving B2 – 3m^3 Serving B3 – 3m^3 Serving truck wash-3m^3 Serving Wright Tunnels-25m^3
Biocycle wastewater treatment plant	
Oil Storage Tanks	Diesel Oil – 30,000 litres Gas Oil – 9,000 litres Adblu – 2 x 1,000 litres

Facility operations require the use of a range of fixed and mobile plant which are listed in Table 2.2.

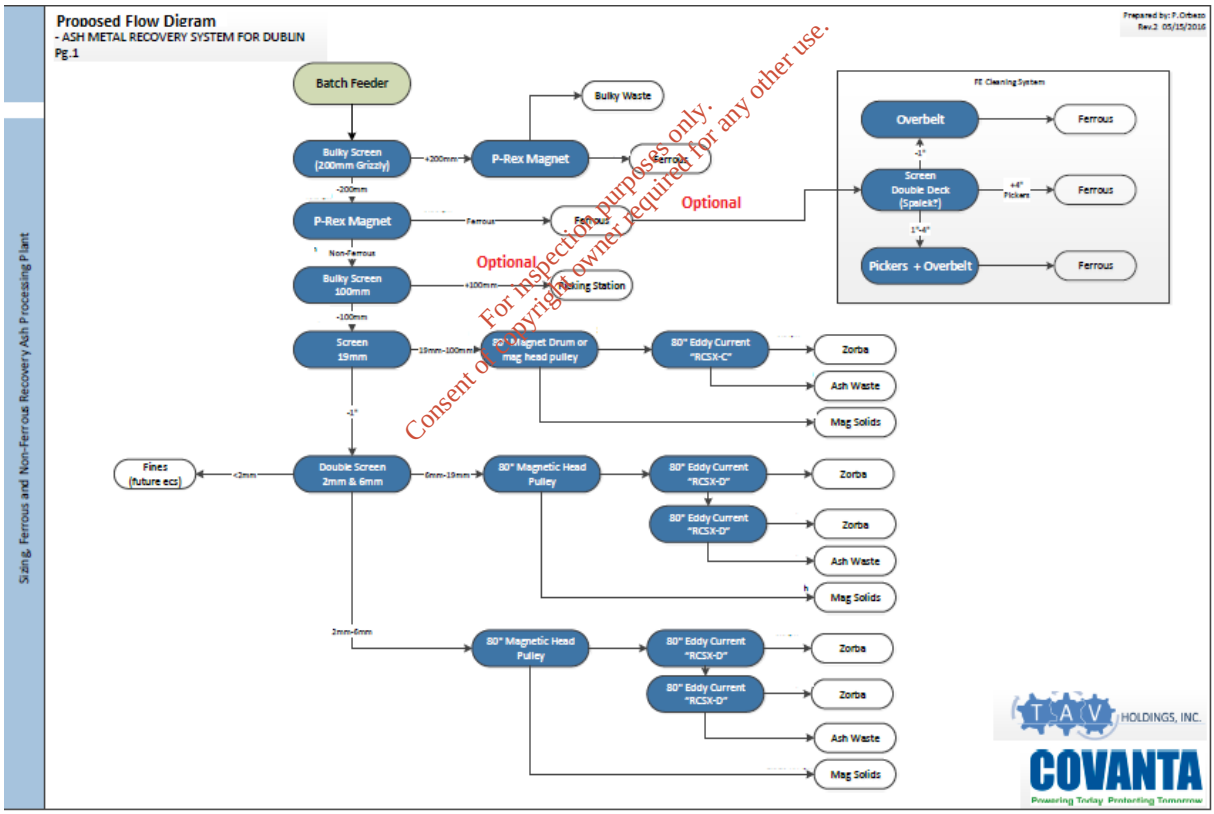
Table 2.2 Plant List

No.	*Fixed Plant*	No.	*Mobile Plant*
2	Composting Tunnels	3	Volvo L120
1	Doppstadt Wood Shredder	2	Kobelco Tracked Machine
1	M&J Shredder	1	Volvo L60
1	Trommel	1	Teleporter
2	Magnets	2	Hoists
1	Nihot Density Separator	1	Forklift
1	Ballistic Separator	2	Fuchs Grabs
1	Flip Flop Screen	1	Shunter
1	Wind Shifter		
1	Crusher		

The mobile plant are serviced in the maintenance garage that adjoins the licensed area.

The proposed IBA treatment plant will comprise a series of conveyors, screens, magnets and eddy current separators, as shown on Figure 2.1.

Figure 2.1 IBA Processing Plant



2.3 Waste Processes

Waste processing activities have evolved over time in response to changes in waste management policy, the opening of new markets for recyclable materials and the development of new treatment technologies.

Building 1 was originally used to process mixed MSW, with the organic fines loaded into the two Wright Tunnels south of the building for treatment before being sent to landfill. An

odour abatement system was provided on the Tunnels, comprising air extraction and treatment in an on-site biofilter. Owing to the introduction of source segregation collection systems and the access to alternatives to landfill, the processing of the mixed MSW and the use of the Tunnels stopped and the associated biofilter was decommissioned. It is now used to take in dry waste for SRF production and dry mixed recyclables for bulking.

C&D processing used to be carried out in the open, but this is now carried out in Building 2 using a shredder, trommel, density separator, magnet, ballistic separator and a picking line to recover ferrous and non-ferrous metals, rubble, timber and inorganic fines. The 'light fraction' which comprises paper and plastics, are sent to Building 3 for further processing to produce SRF, while the 'heavy fraction is sent to the crusher. Wood and timber recovered from the in-coming waste is shredded and then sent to various outlets for different uses, such as the manufacturing of pallet blocks.

Building 3 was constructed in 2010 and used for processing of mixed and source separated dry recyclables and the trial of the RDF manufacture. The building was damaged by fire in 2012, but is now back in operation. It now produces SRF from the 'lights' from Building 2 and residuals from dry recycling MRFs. The plant includes a shredder, magnets, eddy current separator, ballistic separator, density separators and final shredders.

It is proposed to relocate the SRF manufacturing and C&D processing lines to other licensed installations in Dublin, but to continue to accept skip waste and dry recyclables from the local area. It is proposed to accept and process approximately 130,000 tonnes per annum non-hazardous incinerator bottom ash (IBA) from the Dublin Waste to Energy Ltd waste recovery plant at Poolbeg.

In the short term, the processing will be carried out in Building 3 and will initially be confined to the removal of the ferrous and non-ferrous metals, which will then be sent for recycling. Following the construction of Building 4 the IBA processing may be relocated to there.

2.4 Services

The facility obtains its water supply from an on-site well. There is a 660m^3 water tank and associated pump house located at the northern boundary, which is topped up from the well as required.

Water from floor wash downs inside the waste processing buildings discharges to three underground holding tanks located inside the buildings. All the wastewater is sent to the municipal wastewater treatment plant.

Sanitary wastewater from the Administration Building is collected and directed to an on-site Biocycle wastewater treatment plant, located to the south of the building. The treated effluent used to discharge to an on-site percolation area, but this has been discontinued and the effluent is currently sent off-site for treatment in a local authority owned municipal wastewater treatment plant.

2.5 Oils & Chemicals

Diesel and gas oil are stored in above ground tanks (59,000 litres and 14,000 litres respectively) in dedicated structure at the eastern boundary, close to Building 1. The tanks

are provided with individual bunds, each of which has a minimum capacity of 110% of the volume of the tank. The bunds are subject to routine integrity testing, as required by the Licence conditions and are structurally sound. Adblu, a diesel additive, is stored in a 1,000 litre IBC which is bunded and located adjacent to the oil bunds. The maximum amount of fuel and Adblu stored on site at any one time are is shown in Table 2.3.

Table 2.3 – Raw Materials

Products	Quantity Stored litres
Diesel Oil	59,000
Gas Oil	14,000
Adblu	900

2.6 Emissions

Potential and actual emissions from the facility include: -

- Noise,
- Dust,
- Surface Water,
- Odours
- Biofilter Emissions (Drying Tunnels)

Schedule B of the Licence sets emission limits for air, surface water discharge, noise and dust. Schedule C specifies a monitoring programme which includes surface water, wastewater, biofilter, noise and dust monitoring.

2.7 Risk Mitigation Measures

The Licence conditions require the provision of mitigation measures, both infrastructural and procedural, that effectively minimise the risk of environmental liabilities associated with unplanned events. Such measures, which are subject to regular review both by the licensee and in response to the findings of Agency inspections, include:

- Provision of an appropriately experienced Facility Management Team and implementation of appropriate staff programmes;
- Implementation of a site specific Environmental Management System (EMS), including an Environmental Management Programme (EMP) and Corrective Action Procedures;
- Adoption of site specific APP and ERP, which are reviewed annually;
- Provision of impermeable concrete surfaces in all areas of the facility;

- Provision and maintenance of silt traps and oil interceptors on the storm water system;

- Provision of appropriate bunding for all tank and drum storage areas, and routine integrity testing of these and underground tanks and pipework to ensure that they are fit for purpose;

- Provision and maintenance of appropriate spill response and clean-up equipment in areas where there is a risk of spills occurring;

- Regular site inspections.

3. OPERATION PERFORMANCE

3.1 Site History

Waste activities began in the northern area of the site (approximately 3.4ha) in the early 1990's. Prior to this, the site was undeveloped and used for agricultural purposes (pasture). The initial waste activities involved the acceptance and transfer of Construction & Demolition (C&D), Commercial & Industrial (C&I) and Municipal Solid Wastes (MSW).

Following the introduction of the Waste Management Licensing regime in 1999, Panda applied to the Agency for a Waste Licence, which was issued in July 2002 (W0140-01) and allowed the acceptance of 45,000 tonnes of non-hazardous waste annually. In 2004 Panda applied to the Agency to expand the facility to allow for the acceptance of 165,000 tonnes of similar waste types per annum, to operate an MSW drying system, construct Building 2 and install ancillary infrastructure including paved areas and drainage. The revised licence was issued in April 2005 (W0140-02).

In May 2007, Panda applied to revise the Licence to increase the license area, construct Building 3 and the Skip Repair Building and increase the volume of waste inputs 250,000 tonnes per annum. The Licence was issued in March 2009 (W0140-03) and Building 3 and the Skip Repair Building were constructed.

In September 2009, Panda applied to revise Licence to extend the licence area and construct a new building (Building 4), which will house a combined Anaerobic Digestion (AD) and Composting system. This application is currently being considered by the Agency and does not form part of this assessment.

In June 2012 there was a fire in Building 3. The emergency response plan was activated and the fire services were called to the site. The fire was contained to Building 3 and the while residents in nearby houses were evacuated, the incident did not result in any significant environmental liabilities. Fire water run-off was contained within the site and subsequently removed for off-site treatment. Building 3 was severely damaged, but was refurbished and waste activities restarted in the building in 2013.

In 2016 the current licence (W0140-04) was issued in September 2016. This authorises the operation of the biological treatment plant in Building 4 and the introduction of a new drying process in Building 3 to enhance the quality of the solid recovered fuel manufactured in the building. Building 4 has not been constructed and for commercial reasons it has been decided not to proceed with the biological treatment plant.

3.2 Facility Management

The facility is managed by a suitably qualified and experienced Facility Manager and all facility personnel are provided with appropriate training and have the requisite qualifications and experience to complete their assigned tasks.

The Facility Manager has 7 years' experience in Waste Management and holds a BSc Degree in Environmental Science and Technology and a Certificate in Compost Facility Management. The Deputy Manager has 5 years' experience in waste management and will be attending the next Waste Management and EPA Waste Licence Training (agreed equivalent to the FAS Waste Management Training Course).

PANDA has prepared a documented Environmental Management Programme (EMP) which serves as a guidance document for facility staff and describes operational control and management practices. The EMP is a core element of the facility's Environmental Management System (EMS).

Panda has prepared and adopted an Accident Prevention Policy (APP) and Emergency Response Procedures (ERP). The APP addresses all potential hazards, with particular reference to the prevention of accidents that may cause damage to the environment. The ERP identifies all potential hazards that may cause damage to the environment and also specifies roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise environmental impacts.

3.3 Compliance History

In 2016, the installation received eight (8 No.) non-compliances in relation to waste management. In 2017, the installation received three (3No.) non-compliance in relation to materials handling.

3.4 Enforcement History

In 2009 Nurendale was prosecuted by the Agency for exceeding the annual limit for the amount of waste accepted at the site in 2007. This is the only enforcement action against the facility taken by the regulatory authorities.

4. ENVIRONMENTAL SENSITIVITY

4.1 Surrounding Land Use

The facility is bordered to the west by the N2 and to the north by the Knockcommon Road. Surrounding land use is predominantly agriculture, however there are some commercial units to the west. There are nine residential dwellings with 0.5km of the site along Knockcommon Road, with a further thirteen residences within 0.5km, along the N2 and Senchelstown Road.

4.2 Surface Water

The ground slopes from north to south and there is a land drain along the southern site boundary that flows from west to east and discharges into an unnamed third order stream, which is a tributary of the River Boyne. This stream enters the Boyne at Roughgrange, approximately four kilometres northeast of the facility.

Originally, surface water run-off from site discharged directly to the land drain on the southern site boundary, but this stopped in 2006 with the agreement of the Agency. The surface water drainage system was changed to divert runoff to an underground holding tank via silt traps and an oil interceptor from where it discharges to an on-site constructed wetland. The wetland discharges to drain on the southern site boundary.

4.3 Geology & Hydrogeology

The description of the site geology and hydrogeology is based on a review of databases maintained by the Geological Survey of Ireland (GSI) and Teagasc, data derived from an intrusive hydrogeological investigation carried out in 2009 in the proposed extension area and the construction logs of two on-site groundwater wells.

The soil maps prepared by Teagasc indicates that the subsoil type is a till derived from Namurian Shales and Sandstones (TNSSs). The site investigation confirmed the subsoils comprise a brown clay to approximately 1m, which is underlain by a grey/black clay. The groundwater well logs indicate that the subsoils are at least 10-12m deep.

The site is underlain by the Balrickard Formation, which is described by the GSI as coarse sandstone, shale. It is classified by the GSI as a bedrock aquifer that is generally unproductive except for local zones (Pl). The subsoils are the single most important natural feature influencing groundwater vulnerability. The Vulnerability Map for Meath indicates that the vulnerability at the site is Low, which is supported by the available data on the thickness of the subsoils (10m).

5. RISK ASSESSMENT

5.1 Environmental Liabilities

Environmental liabilities arise from contamination or damage to environmental media (air, surface water, soils and groundwater), which can act as pathways to sensitive receptors. The Agency, in reaching a decision to grant the Waste Licence concluded that the facility, if designed and operated in accordance with the Licence conditions, will not give rise to environmental liabilities.

Therefore, for the purposes of this ELRA, future environmental liabilities are confined to incidents such as fires, explosions, spills and leaks. The receptors that are potentially susceptible to adverse impacts associated with such incidents include, air, soils, groundwater, surface water and nearby commercial activities and residences.

5.2 Emissions to Air

Potential emissions to air include odours, dust, litter, and noise that could occur as a result of a fire/explosion or, when it is operational, a failure of the biofilter serving the MSW drying system. The ERP sets out the measures that will be taken by trained staff in the event of a fire or explosion. In the event of release to air during an incident, for example a fire, such emissions (smoke, dust, odours etc.) will only have short-term impacts, which will not require post incident remediation.

5.3 Emissions to Soil & Groundwater

Potential emissions that might affect the quality of the run-off are associated with unexpected releases e.g. spills or leaks of wastewater, oils and contaminated fire water run-off.

The site is fully paved with concrete. Separate wastewater and surface water collection systems are provided, with all wastewater and surface water collected in underground storage tanks. Surface water from the yards and roof areas passes through a silt trap and oil interceptor before collecting in the underground storage tank.

The only risk to soil and groundwater is discharge through damaged paved areas or leaks from the underground surface and waste water tanks. All open areas and the floor of the buildings are regularly visually inspected for evidence of damage. Any damaged areas are repaired as soon as practical.

The pipe work and storage tanks, including interceptors are tested every three years to confirm they are fit for purpose. The most recent tests confirmed the tanks and pipework are fit for purpose and working satisfactorily.

5.4 Emissions to Surface Water

The wetland outfalls to an existing land drain that discharges into an unnamed third order stream, which is a tributary of the River Boyne. A shut off valve is installed upstream of the inlet to the wetland.

The diesel and oil storage tanks in the eastern yard are surrounded by a bund, which eliminates the risk of being damaged by vehicles. The dispensing pumps are locked when not in use thereby reducing the risk of accidental spills. The Waste Quarantine area is fully enclosed, which protects the waste storage containers from being damaged by vehicles.

Spills and leaks of oil can occur during the refuelling of plant, filling of the storage tank and when handling and storing lubricants, hydraulic fluids and waste oils. PANDA has prepared and implemented written procedures for the proper handling of all oils at the site, which include the corrective actions to be taken in the event of a spill. PANDA maintains an adequate supply of spill kits to contain and absorb any spill that may occur and facility personnel are provided with appropriate training to deal with any such incidents.

In the event of an incident (spill, explosion, fire), the shut off-valve on the inlet to the wetland will be shut to contain contaminated run off inside the site. The interceptor and surface water storage tank will be emptied and the contents sent off site for treatment as soon as practical following the incident.

A potential source of surface water contamination is firewater run-off. Details of the fire response procedures, which ensure a rapid response to and control of any fire so as to minimise the adverse impacts, are included in the ERP.

PANDA has completed an assessment of the firewater retention capacity at the facility, which concluded that there is capacity to retain a significant volume of firewater within the site and that the risk of firewater contamination to surface water is low. The adequacy of the retention capacity was confirmed in 2012, when all firewater generated during the suppression of the fire in Building 3 was contained within the site boundaries.

Given the distance between the process buildings, office and skip repair building it is reasonable to assume that a fire in one building will not spread to the other buildings.

5.5 Risk Identification

The plausible risks identified at the site are presented in Table 5.1.

Risk ID	Process	Potential Hazards/Risks
1	Diesel/Oil Storage	Accidental release of diesel from bulk storage tanks-surface water contamination
2		Accidental release of diesel during deliveries and dispensing-surface water contamination.
3		Accidental release of diesel and oils- soil and groundwater and surface water contamination.
4	Wastewater	Leak from underground storage tanks-soil and groundwater contamination
5		Overtopping of the underground storage tanks
6	Fire in Process Buildings/ Skip Repair Building /Lean To and Offices	Emissions to air.
7		Firewater run-off to surface water drains-surface water contamination.
8		Firewater infiltration to ground-soil, groundwater and surface water contamination

5.6 Risk Analysis

An assessment of the risks presented by the facility operations was completed taking consideration of site specific characteristics and the Classification Tables for Likelihood and Consequence in the Agency's Draft Guidance Document (Ref Table 5.2 and 5.3).

Table 5.2 – Risk Classification Table (Likelihood)

Risk	Category	Description
1	Very Low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very High	Very high chance of hazard occurring in 30 yr. period

Table 5.3– Risk Classification Table (Consequence)

Risk	Category	Description
1	Trivial	No damage or negligible change to the environment
2	Minor	Minor/localised impact or nuisance
3	Moderate	Moderate damage to the environment
4	Major	Severe damage to the environment
5	Massive	Massive damage to a large area, irreversible in the medium term

The Risk Analysis Form is presented in Table 5.4. The assignation of the severity rating scores takes into consideration the mitigation measures that are already in place. OCM does not consider it plausible that all of the containment and control measures already in place would fail at the time of an incident, as this would require:

a) PANDA to wilfully disregard the licence conditions regarding bund integrity testing; accident prevention and emergency response provisions; inspection and repair of paved areas; maintenance of plant and equipment; staff levels and training, and

b) a failure by the Agency to properly regulate the facility to such an extent that allowed all the control and containment measures to fail.

Table 5.4 Risk Analysis Form

Risk ID	Process*	Potential Risks	Environmental Effect	Likelihood	Basis of Likelihood	Consequence	Basis of Severity	Risk Score (Severity x Occurrence)
1	Diesel Storage	Uncontrolled release from above ground bulk storage tanks that escapes the bund and enters the surface water drains.	Contamination of the surface water drains	1	The bund design and construction complies with licence requirements and has more than 110% capacity of the largest tank (59m^3). The bund is subject to regular visual inspection and routine integrity testing and repaired as required. Oil interceptor and shut off-valve on storm water drains. ERP ensures rapid response to incident, including closing of shut off valve on inlet to the Constructed Wetland. The risk is **Very Low.**	2	No direct or indirect emission points to off-site surface water courses. All drainage passes through oil interceptor and into storage tank and is currently sent off site. The constructed wetland will have a shut off valve that will contain contaminated runoff within the site. The severity of the impact would be **Minor**	2
2	Diesel Storage	Escape of diesel or oil to surface water drainage system during filling/dispensing	Contamination of the surface water drains	2	Oil stored in fully bunded area. Documented procedure on refuelling/dispensing and staff fully trained in spill prevention and clean-up. The APP and ERP minimises the risk of accidents and ensure rapid response to incident. The risk is **Low**	2	No direct or indirect emission points to off-site surface water courses. All drainage passes through oil interceptor and into storage tank and is currently sent off site. The constructed wetland will have a shut off valve that will contain contaminated runoff within the site. The severity of the impact would be **Minor**	4

Risk ID	Process*	Potential Risks	Environmental Effect	Likelihood	Basis of Likelihood	Consequence	Basis of Severity	Risk Score (Severity x Occurrence)
3	Diesel/Oil Storage	Uncontrolled released from bund or spill during dispensing/refilling diesel storage tanks that leaks through damaged paving or leaks in the surface water drains.	Soil / Groundwater contamination	2	Oil stored in bunded tanks, staff fully trained in spill prevention and clean-up All operational areas are paved with concrete, Routine inspection and repair of damaged paved areas. Routine integrity testing of the drains. The APP and ERP minimises the risk of accidents and ensure rapid response to incident. The risk is **Low**.	1	Thick, poorly permeable subsoils protect the aquifer. There are groundwater wells on site but these are not used for human consumption. Potable water obtained from mains supply. The severity of the impact would be **Trivia**l	2
4	Wastewater	Leak from Underground Storage Tanks / Pipe work	Soil/ Groundwater contamination	2	Routine integrity testing of tank & pipes. The risk is **Low**	1	Thick, poorly permeable subsoils protect the aquifer. There are groundwater wells on site but these are not used for human consumption. Potable water obtained from mains supply. The severity of the impact would be **Trivia**l	2
5	Wastewater	Overtopping of wastewater storage tanks	Contamination of surface water drains	2	Regular inspection and emptying of the tanks. The risk is **Low**	1	No direct or indirect emission points to off-site surface water courses. All drainage currently collected in storage tank and sent off site. The constructed wetland will have a shut off valve that will contain contaminated runoff within the site. Given the relatively small volume The severity of the impact, would be **Trivial.**	2

Risk ID	Process*	Potential Risks	Environmental Effect	Likelihood	Basis of Likelihood	Consequence	Basis of Severity	Risk Score (Severity x Occurrence)
6	Fire in Waste Building/ Office/ Yard	Smoke emission to air.	Air pollution	5	ERP ensures rapid response to incident. The risk is Very High.	1	Smoke presents a potential health risk. Surrounding land use primarily commercial. Emergency Service Co-ordinator will make decision on the need to evacuate nearby commercial premises. Could be significant disruption during incident, but no long term effect. The severity of the impact would be **Trivial.**	5
7	Fire in Process Building /Lean To /Skip Repair/ Office	Escape of Firewater to surface water drainage system	Surface water contamination	2	No direct or indirect emission points to surface water**.** Adequate firewater retention capacity. The constructed wetland will have a shut off valve that will contain contaminated runoff within the site.	2	APP and ERP minimises the risk of fire impacts and ensure rapid response to incident. Experience of fire in 2012 confirmed response procedures were effective. The severity of the environmental impact would be **Minor,** but costs of removal of the firewater and fire damaged materials would be significant.	4
8	Fire in Process Building /Lean To /Skip Repair/ Office	Firewater leak through damaged paving and damaged surface water drains	Soil / Groundwater contamination	2	Routine inspection and repair of damaged paved areas. Integrity testing of surface water drains and repairs as required. The risk is **Low**	1	Thick, poorly permeable subsoils protect the aquifer. There are groundwater wells on site but these are not used for human consumption. Water supply locally is mains supply. The severity of the impact would be **Trivia**l	2

5.7 Risk Evaluation

The risks associated with the operation of the facility fall into two categories:

1 Risk of surface water and or soil and groundwater contamination associated with diesel storage and handling.

2 Risk of surface water and/or soil and groundwater contamination associated with a fire in one of the process buildings.

Each of the risks have been ranked to assist in the prioritisation of treatment and these are presented in Table 5.5. Only those risks with a risk score greater than 2 have been included.

Table 5.4 Risk Ranking

Risk ID	Process	Potential Risk	Consequence	Likelihood	Risk Score
7	Fire in Process Building/ /Skip Repair/ Office	Firewater runoff contamination of the surface water drains	2	2	4
4	Fire in Process Building/ Office/ Yard	Air Pollution	1	5	5
1	Diesel Storage	Contamination of surface water drains	2	2	4

A colour coded risk matrix (Table 5.5) has been prepared to provide a broad indication of the critical nature of each risk and is a visual tool for regular risk reviews since the success of mitigation can be easily identified.

Table 5.5 Risk Matrix

Likelihood						
V. High	5					
High	4					
Medium	3					
Low	2		**7**	**1**		
V. Low	1	**4**				
Consequence		Trivial	Minor	Moderate	Major	Massive
		1	2	3	4	5

Red – High-level risks requiring priority attention.

.

Amber – Medium-level risks requiring treatment, but not as critical as a High risk.

Green – Lowest-level risks that do not need immediate attention but there is a need for continuing awareness and monitoring on a regular basis.

There are no risks in the red or amber zones that requiring either priority attention or treatment. The risks are in the green zone indicating a need for continuing awareness and

monitoring on a regular basis. This will be achieved by a combination of the material handling procedures, site inspections and maintenance programmes, the design and construction of the tanks and containment infrastructure, routine integrity testing of the tanks, pipelines and bunds and staff training in emergency response and spill prevention and clean-up procedures.

6. RISK TREATMENT

The risk management programme for the facility is set out in Table 6 .1

Table 6.1 –Risk Management Plan

Risk ID	Potential Risk	Risk Score	Mitigation Measures	Outcome	Action	Person Responsible
7	Contamination of the surface water drains by fire water run-off.	6	No existing direct connection to off-site water courses. Drainage is currently contained and sent off site. All drainage passes through interceptor and shut off valve will be provided following installation of constructed wetland. ERP prepared and staff training provided.	No further physical mitigation measures required.	Ensure shut off valve is installed on the constructed wetland. Update ERP to refer to this valve. Staff refresher training on ERP to continue.	Facility Manager
4	Smoke from fire causes localised air pollution.	5	APP and ERP prepared and staff trained.	While the risk of occurrence is very high, the impact would be trivial. No further physical mitigation measures required.	Staff refresher training on ERP to continue.	Facility Manager
1	Contamination of surface water drains by diesel.	4	No existing direct connection to off-site watercourses. Drainage is currently contained and sent off site. All drainage passes through interceptor and shut off valve will be provided following installation of constructed wetland. ERP prepared and staff training provided. The constructed wetland when installed will be provided with an emergency shut off valve.	No further physical mitigation measures required.	Ensure shut off valve is installed on the constructed wetland. Update ERP to refer to this valve. Staff refresher training on ERP and spill response and clean up to continue.	Facility Manager

7. COSTING

7.1 Worst Case Scenario

The risk analysis did not identify any with a moderate or major consequence. The risk analysis identified two risks (Risk ID 1 and 7) with a minor consequence; therefore, further analysis was conducted to determine the worst case scenario.

The consequences of a leak or spill of oil/chemicals (Risk ID 7) for soil, groundwater and surface water contamination would be minor; however given the limited volumes that could escape, the impacts and associated clean-up actions would be significantly less than those associated with the much larger volumes of contaminated firewater generated by the emergency response actions to a fire. In this context, it was not considered necessary to carry out a detailed analysis including the costings for these scenarios[1].

It was determined that a fire and the consequent entry of contaminated firewater run-off to the surface water drains is the worst case scenario for the activity in terms of the costs associated with the emergency response actions and consequent clean-up.

7.1 Source-Pathway-Receptor

7.1.1 Source

The source is a fire in one of the waste processing buildings that generates smoke and firewater run-off. The latter is contaminated with soluble hazardous waste.

7.1.2 Pathways

The potential pathways for the smoke is the atmosphere. The pathways for the firewater run-off include the surface water drain and subsoils. There is a shut-off valve on the storm water drain before the inlet to the constructed wetland.

7.1.3 Receptors

Potential receptors that could be affected by the smoke are PANDA staff and the occupants of the adjoining commercial premises and nearby residents.

The potential receptors for the contaminated run-off include surface waters, soils and groundwater and the municipal wastewater treatment plant.

[1] The Agency's Guidance (March 2014) does not require detailed cost analysis of each scenario to justify the identification of the plausible worst case scenario

7.2 Impacts and Remedial Measures

The potential impacts are on human health on terrestrial and aquatic ecosystems associated with smoke emissions and surface water quality, with consequent damage to ecosystems. The potential impact on soil and groundwater is the impairment of the bedrock aquifer.

7.3 Quantification & Costing

The costs of dealing with the 'worst case' scenario, which are presented in Table 7.1, are based on the experience of the fire at the installation in June 2012 and the following assumptions:

- The surface water shut-off device is closed before the emergency services arrive at the site. The retention capacity provided by the existing surface water storage tank ($72m^3$) and the deployment of a vacuum tanker fleet is sufficient to contain the fire water run-off.

- The fire service will be on site within 20 minutes of the alarm being raised. It is assumed that the fire will be fought over a 24 hour period by four fire crews working a three hour shift, with the attendance of one crew on site for 8 hours after the fire has been extinguished.

- A fire in one of the buildings will be contained inside that building. Given the distance between the buildings this is not unreasonable. The volume of firewater run-off generated will be $1,750m^3$, based on Firewater Retention Study.

- It is assumed that there will be approximately 2,500 tonnes on site at the time of the incident evenly distributed across each of the three buildings. The waste will not be completely destroyed and that the fire damaged wastes will have to be disposed of off-site. The disposal costs are those currently incurred by PANDA.

- The rates for transport and treatment of contaminated water are those current rates incurred by PANDA.

- Given the sensitivity of the environmental setting it is considered prudent to allow a contingency of 10%.

Table 7.1 Worst Case Costs

Task	Description	Quantity (No.)	Measurement Unit	Unit Rate (€)	Cost (€)	Source of unit rates
Emergency Response	Fire Services Attendance on Site	4	Tenders	30,000	€120,000	Cost agreed with OEE
Clean Up Actions	Hire of equipment for firewater removal and disposal of firewater.	Item			€21,000	Cost agreed with OEE
	Hire of lights and generator	Item			3,000	Cost agreed with OEE
	Structural survey, building clean down and decommissioning	Item			€14,000	Cost agreed with OEE
	Removal and off-site disposal of fire damaged wastes	8,190	tonne	€31	€256,031	PANDA
	Fuel consumption	Item			€6970	Cost agreed with OEE
	Cleaning oil interceptors	Item			€720	Cost agreed with OEE
	Cleaning yards and drains	Jet Vac			€9,700	Cost agreed with OEE
	Site Security	Item			€36,000	Cost agreed with OEE
	Surface water quality monitoring	Item			€2,500	Cost agreed with OEE
	External consultancy and PR advice	Item			€13,600	Cost agreed with OEE
	Insurance	Item			€6,000	Cost agreed with OEE
Total (€)					**€489,521**	
Contingency (5%)					**€24,4776**	
Total Including Contingency (€)					**€513,997**	

*

8. CONCLUSION

This ELRA has been carried out in accordance with Agency's Guidance of 2014. The costs associated with the 'worst case' scenario is €513,977. The costs will be cover by PANDA's insurer.