

IPPC Document B2.7

Risk Assessment

Waste recycling facility and baling plant

Hal Far, l/o Birżebbuġa

PA 2453/10

EPF/A/PAF/12/75

UPDATE

Dr. Joe A Doublet PhD (Wales)

Applicant

Perit Ġorg Cilia

Architect

Perit Joe Grech B.E.& A. (Hons), A.& C.E.

April 2017



Table of Contents

1	Introduction.....	8
1.1	Hazardous characteristics of Petrol and Diesel.....	8
1.2	Fire and explosion hazards.....	9
1.3	Health Hazards.....	10
1.4	Environmental Hazards.....	10
2	Hazard identification.....	12
2.1	<i>Operational phase</i>	12
2.1.1	ELV facility	12
2.1.1.1	Hazardous Area Classification	12
2.1.1.2	Fuel Extraction procedures	14
2.1.1.3	Spillage control	14
2.1.1.4	Escape routes/ fire fighting	14
2.1.1.5	Control of ignition sources	14
2.1.1.6	Personal Protective Equipment	15
2.1.2	Shredder Area	15
2.1.2.1	Dusts generated from shredding process	15
2.1.2.2	Noise generated from shredding machine	16
2.1.2.3	Contamination from hazardous materials.....	16
2.1.3	Baler area	16
2.1.3.1	Dusts generated from baling process.....	16
2.1.3.2	Noise generated from baling machine.....	17
2.1.3.3	Contamination from hazardous materials.....	17
2.1.4	Fuel loading area.....	17
2.1.4.1	Hazardous Area classification.....	17
2.1.4.2	Loading of fuels	18
2.1.5	Yard Management.....	19



Waste recycling facility, ELV and baling plant, *Hal Far*, I/o *Birżebbuġa*

3	Identification of consequences.....	20
3.1	<i>Operational phase</i>	20
3.1.1	ELV Facility.....	20
3.1.1.1	Hazardous areas	20
3.1.1.2	Fuel Extraction procedures	20
3.1.1.3	Spillage control	21
3.1.1.4	Escape routes/ fire fighting	21
3.1.1.5	Control of ignition sources	21
3.1.1.6	Personal Protective Equipment	22
3.1.2	Shredder Area	22
3.1.2.1	Dusts generated from shredding process	22
3.1.2.2	Noise generated from shredding machine	22
3.1.2.3	Contamination from hazardous materials.....	23
3.1.3	Baler area	23
3.1.3.1	Dusts generated from baling process.....	23
3.1.3.2	Noise generated from baling machine.....	23
3.1.3.3	Contamination from hazardous materials.....	24
3.1.4	Fuel loading area.....	24
3.1.4.1	Hazardous areas	24
3.1.4.2	Fuel loading of recovered fuel	24
3.1.5	Yard Management.....	25
4	Magnitude of consequences.....	26
4.1	<i>Operational phase</i>	26
4.1.1	ELV facility	26
4.1.1.1	Hazardous Areas	26
4.1.1.2	Fuel extraction procedures	27
4.1.1.3	Spillage control	28
4.1.1.4	Escape routes/ fire fighting	28
4.1.1.5	Control of ignition sources	29



Waste recycling facility, ELV and baling plant, *Hal Far*, I/o *Birżebbuġa*

4.1.1.6	Personal Protective Equipment	29
4.1.2	Shredder Area	29
4.1.2.1	Dusts generated from shredding process	29
4.1.2.2	Noise generated from shredding machine	30
4.1.2.3	Contamination from hazardous materials.....	30
4.1.3	Baler area	30
4.1.3.1	Dusts generated from baling process.....	30
4.1.3.2	Noise generated from Baling machine	31
4.1.3.3	Contamination from hazardous materials.....	31
4.1.4	Fuel loading area.....	31
4.1.4.1	Hazardous Area classification	31
4.1.4.2	Fuel loading of recovered fuel	32
4.1.5	Yard Management.....	33
5	Probability of Risk	34
5.1	<i>Operational phase</i>	34
5.1.1	ELV facility	34
5.1.1.1	Hazardous Areas	34
5.1.1.2	Fuel Extraction procedures	34
5.1.1.3	Spillage control	34
5.1.1.4	Escape routes/ fire fighting	35
5.1.1.5	Control of ignition sources	35
5.1.1.6	Personal Protective Equipment	36
5.1.2	Shredder Area	36
5.1.2.1	Dusts generated from shredding process	36
5.1.2.2	Noise generated from shredding machine	36
5.1.2.3	Contamination from hazardous materials.....	37
5.1.3	Baler area	37
5.1.3.1	Dusts generated from baling process.....	37
5.1.3.2	Noise generated from Baling machine	37
5.1.3.3	Contamination from hazardous materials.....	38



Waste recycling facility, ELV and baling plant, *Hal Far*, I/o *Birżebbuġa*

5.1.4	Fuel loading area.....	38
5.1.4.1	Hazardous Area classification.....	38
5.1.4.2	Fuel loading of recovered fuel	38
5.1.5	Yard Management.....	39
6	Significance of risk	40
7	Risk Management	41
7.1.1	ELV facility	41
7.1.1.1	Hazardous Area classification.....	41
7.1.1.2	Fuel Extraction procedures	43
7.1.1.3	Spillage control	43
7.1.1.4	Escape routes/ fire fighting	43
7.1.1.5	Control of ignition sources	44
7.1.1.6	Personal Protective Equipment	44
7.1.2	Shredder Area	45
7.1.2.1	Dusts generated from shredding process	45
7.1.2.2	Noise generated from shredding machine	45
7.1.2.3	Contamination from hazardous materials.....	45
7.1.3	Baler area	45
7.1.3.1	Dusts generated from baling process.....	45
7.1.3.2	Noise generated from baling machine.....	46
7.1.3.3	Contamination from hazardous materials.....	46
7.1.4	Fuel loading area.....	46
7.1.4.1	Hazardous Area classification.....	46
7.1.4.2	Fuel loading of recovered fuel	46
7.1.5	Yard Management.....	48
8	Summary Risk Assessment & Risk Management	49



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

List of Figures

Figure 1: Hazardous area warning sign	13
Figure 2: Typical hazardous area arising from petrol extraction	26



List of Tables

Table 1: Typical physical properties of petrol and diesel.	9
Table 2: Estimation of risk from consideration of magnitude of consequences and probability.	40
Table 3: Summary of identified hazards and risks together with mitigation measures being proposed for the Waste recycling facility, ELV and baling plant at Hal Far	50



1 Introduction

The report will focus on the risks¹ arising from the operational phases of the proposed development. The report is structured as follows:

- Introduction to hazardous characteristics of materials and processes taking place on site;
- Hazard identification;
- Identification of consequences;
- Estimation of the magnitude of consequences;
- Estimation of the probability of consequences;
- Evaluation of the significance of risk;
- Risk management.

1.1 Hazardous characteristics of Petrol and Diesel

A brief introduction to potential hazardous characteristic of petrol and diesel, which are two fluids which could give rise to a fire or explosion, is given as a preamble to the risk assessment.

Petrol is a mixture of various organic compounds (C₄-C₁₂) with properties that can give rise to fire, explosion, health and environmental hazards. These hazards can also arise if the substance is misused off site and so it is important that it is only dispensed into properly designed and labelled containers. Similarly diesel is made up of about 75% saturated hydrocarbons and 25% aromatic hydrocarbons. The average chemical

¹ Risk is being defined as a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.
Hazard is being defined as a property or situation that in particular circumstances could lead to harm.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

formula for common diesel fuel is $C_{12}H_{23}$, ranging approximately from $C_{10}H_{20}$ to $C_{15}H_{28}$.

The actual properties of petrol and diesel vary widely, much depending on the original source and the blended composition. Table 1 shows typical physical properties of a sample of petrol and diesel.

Table 1: Typical physical properties of petrol and diesel.

Property	Typical Values	
	Petrol	Diesel
Boiling range	25-120 ⁰ C	160-371 ⁰ C
Vapour pressure at 37.8 ⁰ C	350-900 kPa	0.40mm Hg
Water solubility	30-100 mg/l	negligible
Flashpoint	Less than 40 ⁰ C	>52 ⁰ C
Auto ignition temperature	Greater than 250 ⁰ C	210 ⁰ C
Lower explosion limit (LEL)	1.4 % v/v	0.3% v/v
Upper explosion limit (UEL)	7.6% v/v	10.0% v/v
Density at 15 ⁰ C	0.72-0.79 g/ml	0.82-0.95g/ml
Vapour density at 40% saturation	1.7-2.0	>3

1.2 Fire and explosion hazards

Both fuels are volatile liquids and gives off vapour at low temperatures. The vapour, when mixed with air in certain proportions, can form a flammable atmosphere, which burns or explodes if a source of ignition is present.

Petrol vapour is heavier than air and does not disperse easily in still air conditions. There is a tendency for this fuel to sink into the lowest level areas in the surroundings and may accumulate in tanks, cavities, drains, pits or other depressions. Accumulation



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

in such spaces especially if poorly ventilated can persist for long periods of time, even when there are no visible signs of the liquid. Diesel shows similar behaviour.

Both fuels float on the surface of the water and so may be carried away for long distances by water courses, sewers, ducts, drains or groundwater and create a hazard remote from its point of release.

Flammable atmospheres may be present in the vapour spaces of tanks containing petrol and in tanks after petrol has been removed. They may also exist where clothing and other absorbent material or substances are contaminated with petrol.

1.3 Health Hazards

Both petrol and diesel can give rise to health problems following excessive skin contact, aspiration, ingestion or vapour inhalation. Petrol is extremely volatile and can give rise to significant amounts of vapour at ambient temperatures. The vapours, even if present in the atmosphere at levels below the lower explosive limit, can have acute and chronic effects if inhaled. Diesel shows similar behaviour.

1.4 Environmental Hazards

Both fuels are made up of a variety of hydrocarbons with varying degrees of toxicity towards living organisms and plants. If released from tanks and pipes, they may, in absence of adequate controls, either soak into the ground directly or flow into drains or culverts. Its subsequent dispersion and movement will be difficult to predict and



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

will depend on the geology of the area and the physico-chemical properties of the soil and rocks.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

2 Hazard identification

2.1 Operational phase

There are a number of sources of potential hazards in the operational phase of the proposed development. These could be split into three areas, the ELV area, the Shredder area and the Baler Area. Whereas the ELV area is situated under cover, the rest are all found in the open yard.

2.1.1 ELV facility

2.1.1.1 Hazardous Area Classification

A *Hazardous Area* is a term used to define those parts of a site or factory where flammable concentrations of vapours or gases may occur and where special precautions are necessary to control ignition sources. Fuel (petrol and diesel), recovered from fuel tanks during the ELV process is one of the flammable fluids falling within this category.

The concept of hazardous area classification and zoning set out for fixed electrical equipment in BS 5345 Parts 1 and 2 should be followed during the design, construction and operational phases of the development. All sources of ignition, including those associated with sparks of any sort or hot surfaces of electrical equipment, should be excluded from hazardous areas or, in the case of electrical equipment, should be specially protected. This includes both fixed and portable equipment.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

BS 5345 defines the following hazards zones:

- **Zone 0:** in which an explosive gas-air mixture is continuously present or present for long periods.
- **Zone 1:** in which an explosive gas-air mixture is likely to occur in normal operation.
- **Zone 2:** in which an explosive gas-air mixture is not likely to occur in normal operation and if it occurs, it will exist only for a short time.

BS 5345 also defines the areas outside these zones as non-hazardous.

A warning sign as shown in Figure 1 should normally be provided to indicate the presence of any hazardous areas.



Figure 1: Hazardous area warning sign

Ignition sources should be excluded from all hazardous areas and only equipment that has been certified as meeting a particular ignition-protected standard can be brought into any particular zone. Equipment with potential ignition sources that has been supplied for use in hazardous areas must meet the requirements of the European ATEX Directive (94/9/EC) and such equipment is frequently referred to as *ATEX equipment*. The proposed equipment for the development uses certified ATEX equipment (see Appendix I).

It is the responsibility of the competent person operating the equipment to ensure that he assesses the equipment and operating procedures within the hazardous areas and



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birżebbuġa*

that work activities could be carried out safely before the equipment is brought into use.

Equipment which is not capable of generating a spark or generate enough heat to ignite petrol vapour does not need to be marked with an **Ex** symbol.

Fuel recovered from vehicles will be stored in appropriate storage tanks having a capacity of 1000 ltrs each. The tanks have a standard overflow safety and ventilation system installed.

2.1.1.2 Fuel Extraction procedures

Fuel extraction procedure might not always be as efficient as desired. Tools being used in this operation should be sharp enough not to create excessive heat and could be operated in such a manner as not to create sparks or any other possibility which could give rise to a fire.

2.1.1.3 Spillage control

Fluid recovery operations during the ELV process could give rise to a variety of spills on the ground which could prove to be hazardous and also could give rise to a fire.

2.1.1.4 Escape routes/ fire fighting

Blocked escape routes as a result of equipment or sources of fire which could block workers in certain parts of the compound could prove fatal.

2.1.1.5 Control of ignition sources

Sources of ignition such as electrically operated tools, smoking, bad earthing, use of static clothing are all sources of a potential fire in this environment.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

2.1.1.6 *Personal Protective Equipment*

Static cloths and cloths which could act as good absorbents could prove to be a hazard in terms of health of the person wearing them but also a good source of a spark which could result in a fire in the area and also a person being injured as a result that his cloths start burning.

Removing impregnated clothing and storing material which could have been used to absorb flammable liquids could also prove to be dangerous especially when these are stored in confined spaces where their vapours are released and accumulate. A spark in such confined areas could lead to an explosion or a fire.

2.1.2 *Shredder Area*

2.1.2.1 *Dusts generated from shredding process*

The shredding of different materials, ferrous, non-ferrous and non-metallic could lead to a certain amount of dust being generated into the surrounding environment. Dust material of different sizes will settle around the source. The distance travelled by such particles depends on the external forces energizing it and also on its own properties. Small sized dust (<10 micrometers) could reach the deeper parts of the lungs with potential health effects. Small sized dust is the one which remains mostly buoyant in the atmosphere and would settle at a considerable distance away from the sources. Heavier particles settle closer to source.

Particulate matter could also affect vegetation since it interferes with the photosynthetic process of plants due to the shading effect it creates on the leaves.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

2.1.2.2 Noise generated from shredding machine

It is estimated that the shredder produces a sound power of about 93db at a distance of 1m during operation. This level of noise is well over and above any background noise levels recorded in the surroundings during any period of the week. Noise could have an effect on the hearing and communication abilities of the workmen in the vicinity. It could also be a cause of a nuisance for people in the vicinity.

2.1.2.3 Contamination from hazardous materials

The shredder will be used to shred material arising from the ELV process and also from other sources of waste arriving at the plant. Hazardous materials such as radioactive sources, toxic metals and non-metals such as acids, lead, antimony, mercury and other metals could make it into the shredder if these are not removed during an inspection and decontamination procedure prior to the shredding process.

2.1.3 Baler area

2.1.3.1 Dusts generated from baling process

The baling of ferrous and non-ferrous materials could lead to a certain amount of dust being generated into the surrounding environment. Dust material of different weight and diameter will settle around the source. The distance travelled by such particles depends on the external forces energizing it and also on its own properties. Small sized dust (<10 micrometers) could reach the deeper parts of the lungs with potential health effects. Small sized dust is the one which remains mostly buoyant in the atmosphere and would settle at a considerable distance away from the sources. Heavier particles settle closer to source.



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birżebbuġa*

Particulate matter could also affect vegetation since it interferes with the photosynthetic process of plants due to the shading effect it creates on the leaves.

2.1.3.2 Noise generated from baling machine

It is estimated that the Baler produces a sound power of about 85db at a distance of 1m during operation. This level of noise is well over and above any background noise levels recorded in the surroundings during any period of the week.

2.1.3.3 Contamination from hazardous materials

The baler will be used to shear and bale material arising from different sources of waste arriving at the plant. Hazardous materials such as radioactive sources, toxic metals and non-metals such as acids, lead, antimony, mercury and other metals could make it into the baler if these are not removed during an inspection and decontamination procedure prior to the baling process.

2.1.4 Fuel loading area

2.1.4.1 Hazardous Area classification

The loading of fuel recovered from the ELV facility will take place in this area, hence same standards are applicable.

The safe development and operation of loading facility should be based on an assessment of the likelihood of flammable or explosive atmospheres being present during the operations of the plant, together with the need to prevent sources of ignition reaching such atmospheres. The concept of hazardous area classification and zoning set out for fixed electrical equipment in BS 5345 Parts 1 and 2 should be followed during the design, construction and operational phases of the development.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

All sources of ignition, including those associated with sparks of any sort or hot surfaces of electrical equipment, should be excluded from hazardous areas or, in the case of electrical equipment, should be specially protected. This includes both fixed and portable equipment.

BS 5345 defines the following hazards zones:

- **Zone 0:** in which an explosive gas-air mixture is continuously present or present for long periods.
- **Zone 1:** in which an explosive gas-air mixture is likely to occur in normal operation.
- **Zone 2:** in which an explosive gas-air mixture is not likely to occur in normal operation and if it occurs, it will exist only for a short time.

BS 5345 also defines the areas outside these zones as non-hazardous.

2.1.4.2 Loading of fuels

Fuel loading is a hazardous operation taking place in a zone 1 area. During this process, fuel vapours are being displaced from the fuel tank resulting in a gaseous air mixture, which could prove dangerous both in terms of fire and in terms of health to the operators and persons in the vicinity. During the operation, the vapours are also dispersing downwind from the source to the neighbouring environment. Apart from the above-mentioned hazards, one must also mention that there is also the risk of spillage of fuel on the forecourt. The amount of such a spillage could vary from just a few drops to a few litres. The latter situation could arise due to overfilling the recipient tanks.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

Fluids handled in this area have a direct effect on the health of people in the vicinity. They could also affect flora and fauna in the vicinity especially if the fluids end up in the soil or on vegetation or reach underground waters.

2.1.5 Yard Management

Run off water together with spilled fuels are washed away from the yard ending up in the sensitive watercourses in the surroundings and / or in the water table and / or in the surrounding agricultural land. Such events could happen either during heavy rains or as a result of washing activity taking place on the forecourt.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

3 Identification of consequences

3.1 Operational phase

The consequential effects arising from the identified hazards in section 2 could become evident immediately, such as fires but could also take a long time to manifest themselves, such as effects on the health of individuals. Such consequences could also manifest themselves within the confines of the development but could also become evident at certain distances away due to for example dispersion of dusts.

3.1.1 ELV Facility

3.1.1.1 Hazardous areas

Activities in areas, which, due to the nature and siting of equipment, as cited in section 2.1.1 above, are found in zones 0, 1 and 2, could give rise to a fire or explosion with the resulting consequential effects if proper health and safety procedures are not followed.

3.1.1.2 Fuel Extraction procedures

Fuels or oils are all combustible materials and their recovery should take place using appropriate methods and tools. Unsuitable tools or archaic methods to recover such substances could result in the overheating of a surface or the generation of a spark which could give rise to such a fire or an explosion with the consequential effect that could have on the surroundings, including workmen on site.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

3.1.1.3 Spillage control

Spills found underneath the working rig resulting from the recovery of liquids and also those arising from damaged pipes or overflowing holding tanks or drip trays could all be a source of hazard. In all cases, those which are combustible are a source of fire but also could result as a source of an injury to people working in the area. Furthermore accumulation of spills in a bunded area could defeat the whole purpose of the area in case this would become necessary, with the consequential effect that any fluid lost would eventually overspill from the designated area into the surroundings.

3.1.1.4 Escape routes/ fire fighting

Blocked escape routes or fire exits by means of equipment or other items implies that in cases of emergency someone could get trapped in an area, with the potentially fatal consequential effects that might generate.

The lack of available appropriate fire fighting equipment in the vicinity of hazardous areas implies that fires could easily disperse, with the consequential effects that might have.

3.1.1.5 Control of ignition sources

In hazardous areas surrounding the ELV, a variety of tools and equipment could be a source of heat and sparks which could give rise to a fire.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

3.1.1.6 Personal Protective Equipment

Static clothing could be the cause of a fire, especially if it is impregnated with combustible liquids or is in the presence of a combustible vapour.

Clothing which is impregnated with combustible fluids and stored in a confined chamber could result in the possibility of an explosion or a fire in that chamber, especially if the released vapours come into contact with a source of heat or fire.

3.1.2 Shredder Area

3.1.2.1 Dusts generated from shredding process

The consequences of the dispersal of dust during the operational phase of the shredder are mainly two; those effecting directing the people working in the area and those effecting the surrounding environment. The effect on the people is that very small particles (<PM10) of dust would reach the lower levels of the lungs with potential ill effects at a later stage in life. The deposition of dust material onto the leaves of trees and vegetables in the surrounding fields could reduce the photosynthetic activity of plants and trees, thus affecting their growth. This would in turn affect the income of the farmers using those fields.

3.1.2.2 Noise generated from shredding machine

Noise could also affect the human body with consequential effects on the psyche of the person but also on the hearing apparatus of the people working in the vicinity of such high level noise generating machines.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

3.1.2.3 Contamination from hazardous materials

The different types of hazardous materials which could be found with the material brought to the site could have direct effects on the environment where the material is stored. It could also have a direct effect on the health of the workers in the area and also in areas when the material is in transit from the site to the final destination. It could also contaminate otherwise uncontaminated material and people could suffer consequences when handling such materials. It could also affect the further processing and fate of the material being recovered.

3.1.3 Baler area

3.1.3.1 Dusts generated from baling process

The consequences of the dispersal of dust during the operational phase of the baler are mainly two; those affecting directly the people working in the area and those affecting the surrounding environment. The effect on the people is that very small particles (<PM10) of dust would reach the lower levels of the lungs with potential ill effects at a later stage in life. The deposition of dust material onto the leaves of trees and vegetables in the surrounding fields could reduce the photosynthetic activity of plants and trees, thus affecting their growth. This would in turn affect the income of the farmers using those fields.

3.1.3.2 Noise generated from baling machine

Noise could also affect the human body with consequential effects on the psyche of the person but also on the hearing apparatus of the people working in the vicinity of such high level noise generating machines.



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birżebbuġa*

3.1.3.3 Contamination from hazardous materials

The different types of hazardous materials which could be found with the scrap brought to the site could have direct effects on the environment where the material is stored. It could also have a direct effect on the health of the workers in the area and also in transit from the site to the final destination of the material. It could also contaminate otherwise uncontaminated material and people could suffer consequences when handling such materials. It could also affect the further processing and fate of the material being recovered.

3.1.4 Fuel loading area

3.1.4.1 Hazardous areas

Activities in areas, which, due to the nature and siting of equipment, as cited in section 2.1.4 above, are found in zones 0, 1 and 2, could give rise to a fire or explosion with the resulting consequential effects if proper health and safety procedures and measures are not taken.

3.1.4.2 Fuel loading of recovered fuel

The vapour released during fuel loading poses a risk to the neighbouring environment and also the operator handling the nozzle equipment. As already explained above, the area is a zone 1 hazardous zone with the potential hazardous effects explained above. Direct contact with diesel or petrol and inhalation of the vapours could lead to cancer and/ or other health problems.

Discharge by accident or on purpose or spillage of products, such as petrol, containing benzene or diesel leaks from underground storage tanks can release hydrocarbons into



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

water and soil. Benzene can cause death in plants and roots and membrane damage in leaves of various agricultural crops.

3.1.5 Yard Management

All areas of the yard need to be well managed and regularly cleaned. In the case of open parts of the yard, runoff waters following heavy rainfall will carry with it all dust and small debris with the consequential effect this could have on the surroundings whether inside or beyond. Regular cleaning implies that the material removed needs to be disposed in an appropriate manner.



4 Magnitude of consequences

4.1 Operational phase

The magnitude of the consequences of the identified hazards varies considerably much depending on the circumstances where and when such a hazard is found.

4.1.1 ELV facility

4.1.1.1 Hazardous Areas

The area around an ELV including the fuel storage area is a hazardous area (zones 1 and 2). This is further extended during periods where the fuels are being transferred to a larger tanker truck to be taken to another location.

A hazardous area Zone 2 classification will normally exist within the storage building.

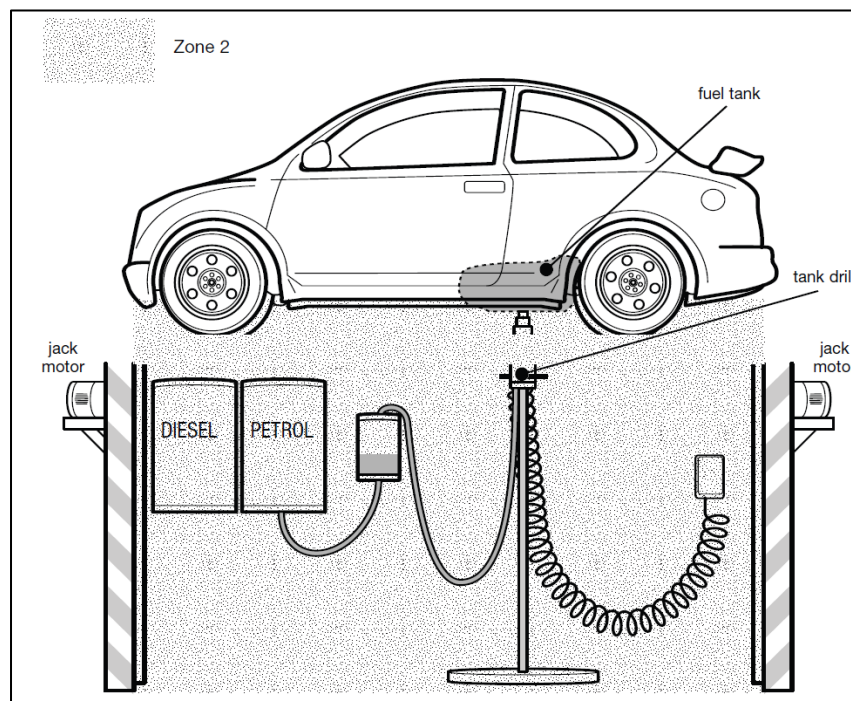


Figure 2: Typical hazardous area arising from petrol extraction

There is a possibility of a fire in zones 0, 1 and 2 as a result of sparks or hot metal works or someone lighting a fire. This is mainly due to the high temperatures and



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

flammability of the liquids and vapours present. The magnitude of consequences is high for any activity which could give rise to a fire or explosion in these hazardous zones.

The use of mobile phones and other equipment which could generate heat or sparks should not be used in these zones.

Petrol vapour contains benzene, which in small amounts can cause headaches, dizziness, drowsiness or nausea. With longer exposure levels, benzene may cause sleepiness, stumbling, irregular heartbeats, fainting or even death. Benzene vapours are mildly irritating to the eyes, skin and lungs. People exposed to small quantities of the vapour are unlikely to suffer long terms effects. Repeated exposure may cause blood disorder and cancer of blood forming cells, the latter two symptoms have been reported in some workers repeatedly exposed to benzene over long periods of time. Exposure to benzene from petrol vapours could result from the removal of fuel from cars or unloading of fuel from storage tanks into tanker trucks or from small spills during the decontamination or even larger spills during the unloading of fuels into UST, or from the vapour displaced from the receiving UST

4.1.1.2 Fuel extraction procedures

The fuel extraction procedure takes place in a high risk zone. Tools which could generate an electric spark or raise the temperature in contact with combustible liquids or vapours could give rise to an explosion or fire. The magnitude of consequences is high for any activity which could give rise to a fire or explosion in hazardous zones 0 and /or 1 and /or 2.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

4.1.1.3 Spillage control

The presence of spills generated from the fluid recovery operations or from tray spillages in the working area could lead to dangerous situations for workers in the area and also potential fire hazards. The magnitude of consequences for either of the identified cases is high.

4.1.1.4 Escape routes/ fire fighting

Escape routes are meant to be free for people to reach an exit point during an emergency. Blocking such passages with vehicles, parts, equipment or any items could prove to be fatal for people wanting to get out as quickly as possible during an emergency. Similarly, fire fighting equipment is meant to be readily available and in good working order. Such equipment should not be obstructed or used for other purposes. Misuse of such equipment is an extremely dangerous thing to do. The magnitude of consequences in both cases is high since in the former case it could prove to be fatal for the people involved. In the latter case, a small fire which could be easily handled by means of a fire extinguisher could end up as an uncontrolled fire if the extinguisher is either not available or not in good working order, with the consequences that could generate, as a result.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

4.1.1.5 Control of ignition sources

The ELV area is considered as a hazardous zone and fluids in the area could give rise to an explosion or a fire as a result of the presence of a spark. Such a spark could arise from an electrical source, ignition source, bad earthing or source of static electricity such as clothing. The magnitude of consequence is high mainly due to the fact that all these sources could give rise to an explosion or a fire.

4.1.1.6 Personal Protective Equipment

Static clothing could become the source of a fire or an explosion in the ELV area, especially if these are impregnated with combustible fluids.

The storage of impregnated cloths could also result in a fire or an explosion, especially if stored in a confined area and there is a spark.

The magnitude of consequence is high mainly due to the fact that in both cases an explosion or a fire could result.

4.1.2 Shredder Area

4.1.2.1 Dusts generated from shredding process

The dust, which will be dispersed during the shredding process, will be of an intermittent nature, especially if the shredder is not employed regularly. However, the magnitude of consequence will still be considered as high mainly due to its effects of health. The fine dust which could be generated is from stuff which would have accumulated over the items being shredded- metallic dust is heavy and should settle in the immediate surroundings of the machinery. Finer dust will travel longer distances and could also affect vegetation in the vicinity.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

4.1.2.2 Noise generated from shredding machine

The noise generated from the shredding machine is significantly high in the immediate surroundings. Since this could have an effect on the health of the workmen in the vicinity, the magnitude of consequence could be considered as high. The noise levels will attenuate with distance away from the source, hence the magnitude at longer distances would be considered as low.

4.1.2.3 Contamination from hazardous materials

The presence of hazardous materials mixed with other wastes is of grave concern and shows lack of waste management skills and defects in the processing lines of the company. The magnitude of consequence is high because of the effects such materials could have elsewhere.

4.1.3 Baler area

4.1.3.1 Dusts generated from baling process

The dust, which will be dispersed during the shearing and baling process, will be of an intermittent nature, especially if the baler is not employed regularly. However, the magnitude of consequence will still be high mainly due to the ill effects dust has on the health of individuals and also of vegetation in the immediate surroundings. The fine dust which could be generated is from stuff which would have accumulated over the items being baled- metallic dust is heavy and should settle in the immediate surroundings of the machinery.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

4.1.3.2 Noise generated from Baling machine

The noise generated from the baling machine is significantly high in the immediate surroundings. Since this could have an effect on the health of the workmen in the vicinity, the magnitude of consequence could be considered as high. The noise levels will attenuate with distance away from the source, hence the magnitude at longer distances would be considered as low.

4.1.3.3 Contamination from hazardous materials

The presence of hazardous materials mixed with other wastes is of grave concern and shows lack of waste management skills and deficiencies in the processing lines of the company. The magnitude of consequence is high because of the consequential effects such materials could have elsewhere.

4.1.4 Fuel loading area

4.1.4.1 Hazardous Area classification

The area around a fuel dispensing area including the fuel storage area is a hazardous area (zones 0, 1 and 2). This is further extended during periods where the fuels are being transferred to a larger tanker truck to be taken to another site.

There is a possibility of a fire in zones 0, 1 and 2 as a result of sparks or hot metal works or someone lighting a fire. This is mainly due to the high temperatures and flammability of the liquids and vapours present. The magnitude of consequences is high for any activity which could give rise to a fire or explosion in hazardous zones 0 and /or 1 and /or 2.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

The unhealthy effects of petrol vapour has already been identified in section 4.1.1.1. Vapours can be displaced and dispersed in the surrounding environment during fuel transfer operations. The magnitude of consequences is high since workers will be exposed to fuel vapour which has its own ill effects.

Fuel vapours could also affect the surrounding natural environment. There are no local studies on the effect of fuel vapours on vegetation. It is very difficult to predict the magnitude of the consequence of such an effect due to the variables involved.

Spillage of fuels, both during the fuel loading in vehicles could have serious consequences outside the area of the plant. The possible situation when this could result, is where an accident happens during the loading of the fuel and some of the fuel is spilled in the yard. If the hydrocarbons and/ or effluents leave the yard, they will end up in the storm water system, which leads to the water system and subsequent systems further downstream. The ecological importance of these water systems is well known and hence the magnitude of such a consequence could be high both in the immediate surroundings of the spill and also beyond the proposed development area.

4.1.4.2 Fuel loading of recovered fuel

Fuel dispensing is a high risk activity and as it has already been described in sections 2.1.4.1 and 4.1.4.1, the area is divided into different zones, according to the risk level. As a result, various potential activities, which for one reason or another could take place around the fuel dispensers, were assessed. There is a possibility of a fire in zones 1 and 2 as a result of sparks or hot metal works or someone lighting a fire. This



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

is mainly due to the high temperatures and flammability of the liquids and vapours present. The magnitude of consequences is high for any activity which could give rise to a fire or explosion in hazardous zones 0 and /or 1 and /or 2.

4.1.5 Yard Management

Water runoff from the open areas of the yard could end up in the external surrounding areas, including sensitive watercourses and agricultural fields. The magnitude of consequence is considered high since the run off water could contain hydrocarbons and other substances which could prove to be toxic to flora and fauna.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

5 Probability of Risk

5.1 Operational phase

The probabilities of an accident occurring at the site will much depend on the standard work practices applied and the up keeping of the tools used at the place of work and the due diligence used by the staff and management in assessing the risks undertaken during the various processes taking place on site.

5.1.1 ELV facility

5.1.1.1 Hazardous Areas

The probability of a fire in zones 1 and 2 is moderate and much depends on the people present and the working practices employed in the area. The probability could be lowered if standard tools and working practices and all health and safety practices are employed.

5.1.1.2 Fuel Extraction procedures

The probability of a fire or an explosion during the fuel extraction procedure is low provided standard ATEX certified tools are used and that these are kept in good working order and regularly cleaned and serviced.

5.1.1.3 Spillage control

The probability of a fire arising from spillages is low provided that there is regular housekeeping and that spills are immediately addressed by means of spill control kits such as the presence and use of inert absorbent materials such as sand, vermiculite or a proprietary material.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

5.1.1.4 Escape routes/ fire fighting

The probability of escape routes being blocked is low since the working area is large and there is ample space to leave clear designated unobstructed pathways. This mainly depends much on the prevailing working practices on site.

The probability of a fire is low provided all precautions are followed in order to avoid such a risk. The site will however have a fire detection system in compliance with BS5839: Part 1 and any subsequent updated version. There will also be a number of smoke and heat detectors, fire manual call points and portable fire fighting equipment complying with BS 5423 and installed in accordance with BS 5306: Part 3. The most important thing is that such equipment is not obstructed by other items and that there is regular maintenance of all the equipment. Lack of maintenance will increase the probability of a fire and the spread of such a fire to other areas.

5.1.1.5 Control of ignition sources

The probability of an ignition source in the ELV area is low provided that the equipment undergoes regular maintenance and that the standard ATEX equipment is used. All equipment used should be well earthed to prevent the buildup of electric charge and production of a spark at a later stage. Furthermore, other equipment such as normal electrical equipment is not used in the area and also that electrical switches in the hazardous zones are of the desired standard for such areas. Furthermore, appropriate antistatic clothing and footwear should be used by all people working in this area.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

5.1.1.6 Personal Protective Equipment

The probability of a fire starting from the use of static cloths is low provided the management provides appropriate protective clothing to all employees. Protocols should be in place for the handling of impregnated clothing in order to control the dispersion and/or accumulation of vapours from such sources.

5.1.2 Shredder Area

5.1.2.1 Dusts generated from shredding process

The probability of dispersion of dusts from the shredding process is low mainly because the equipment has a dust water dousing mechanism intended to control dusts generated by the process. The up keeping of such equipment is fundamental to the success in controlling such dusts.

5.1.2.2 Noise generated from shredding machine

The probability of high noise levels within the immediate surroundings of the machinery is high, however, the probability of high noise levels beyond the confines of the development are low. This is mainly due to the fact that the machinery will be surrounding by a noise absorbing structure which should reduce the noise levels beyond its perimeter. Workers in the vicinity of the machinery should wear appropriate personal protective equipment such as safety shoes, safety hat and ear muffs.



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birżebbuġa*

5.1.2.3 Contamination from hazardous materials

The probability of contamination from hazardous materials is low to moderate. The probability is low with regards to materials arising from the ELV process since these would have been inspected and decontaminated as part of the ELV process. The probability is of a higher order with materials bought on site and it would be rather difficult to identify such properties as for example the presence of radioactive materials or hazardous substances which have formed part and parcel of the lot. Ideally, there should be a portable radioactive detector on site to detect the presence of such materials which are not easily to detect unless they are clearly marked. Otherwise, all material which is earmarked for shredding should be inspected thoroughly prior to the process.

5.1.3 Baler area

5.1.3.1 Dusts generated from baling process

The probability of dispersion of dusts from the baling process is moderate mainly because the equipment doesn't have dust water dousing mechanism intended to control dusts generated by the process.

5.1.3.2 Noise generated from Baling machine

The probability of high noise levels within the immediate surroundings of the machinery is high, however, the probability of high noise levels beyond the confines of the development are low. This is mainly due to the fact that the machinery will be surrounding by perimeter walls of the yard which should reduce the noise levels beyond this point. Workers in the vicinity of the machinery should wear appropriate personal protective equipment such as safety shoes, safety hat and ear muffs.



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

5.1.3.3 Contamination from hazardous materials

The probability of contamination from hazardous materials is moderate. This is due to the fact it would be rather difficult to identify such properties as for example the presence of radioactive materials or hazardous substances which have formed part and parcel of the lot of some materials which are being baled. Ideally, there should be a portable radioactive detector on site to detect the presence of such materials which are not easily to detect unless they are clearly marked. Otherwise, all materiel which is marked for baling should be inspected thoroughly prior to the process.

5.1.4 Fuel loading area

5.1.4.1 Hazardous Area classification

The probability of a fire resulting from sparks and /or hot metal works or fire during fuel dispensing activity (used fuel tanks to tanker) is low. This is in view of the popular knowledge that this activity is a hazardous one and so the risks are high apart from the fact that the quantities of fuels involved in relatively small. Warning signs are usually placed around the hazardous zones in fuelling area indicating such hazards. In the case of loading of fuels, the workers involved in the operation are much aware of these hazards and are well trained, thus reducing the risks even further.

The ill effects and dangers created from combustible fluids have already been mentioned above.

5.1.4.2 Fuel loading of recovered fuel

The probability of inhaling vapours resulting large spills are a rarity and so the probability of occurrence is low. It is also even lower due to the fact that the largest



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

spill which could occur is during the loading of recovered fuels and such an operation is only limited to a short period. So the probability of occurrence is low and the resulting vapour from such occurrences is even lower.

5.1.5 Yard Management

The probability that contaminated waters from the yard ending up in the watercourses and agricultural fields further downstream are low. This is mainly due to the fact that a forecourt separator (10,000 ltrs) will be installed according to EN 858 in the refuelling area whereas a full retention separator will be installed at the entrance of the yard, so any contaminants, especially hydrocarbons will be retained. Furthermore, the separators will be connected to underground water reservoirs.



6 Significance of risk

The significance of risk is being estimated using the matrix found in Table 2 for each separate hazard; combining the probability of the consequence and the magnitude of those consequences yields an estimation of risk. The matrix can provide a consistent basis for decision-making.

Table 2: Estimation of risk from consideration of magnitude of consequences and probability.

	Magnitude of Consequences			
Probability	High	Medium	Low	Negligible
High	High	High	Medium/low	Near zero
Medium	High	Medium	Low	Near zero
Low	High/medium	Medium/low	Low	Near zero
Negligible	High/Medium/low	Medium/low	Low	Near zero

The significance of risk for all the hazards, which have been identified for the proposed fuel station, are found in Table 3, which includes also a summary of the risk assessment and risk management.

7 Risk Management

7.1.1 ELV facility

7.1.1.1 *Hazardous Area classification*

The zone known as hazardous area around the fuel dispensing equipment should be clearly marked and easily identified. All workers and visitors should be clearly made aware of the hazards found in this area. This could be done by means of large signage such as: **NO SMOKING/ NO NAKED FLAMES/ NO HOT METAL WORKS/ NO MOBILE PHONES/ SWITCH OFF ENGINE**. Hot metal work in connection with the baling and shredding plant should be designated in areas as far away as possible from this point, especially during periods when fuels are being handled. The ELV area together with the enclosed areas in the vicinity and underground are considered as a high risk areas.

The concept of hazardous area classification and zoning set out for fixed electrical equipment in BS 5345 Parts 1 and 2 should be followed during the design, construction and operational phases of the development. All sources of ignition, including those associated with sparks of any sort or hot surfaces or electrical equipment, should be excluded from hazardous areas or, in the case of electrical equipment, should be specially protected. This includes both fixed and portable equipment.

The recovery unit of the ELV facility will be situated in a bunded area (Site Plan III) which could contain at least 110% of the capacity of the largest container.

The storage area should be separated from other high risk activities by an appropriate distance or a 2m high fire wall. The surface of the storage area should be slightly sloping to one side so that any leaks will be directed away from the containers. The

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

ground should be completely impervious and the area should be secure during all times of the day.

The building where such hazardous liquids are stored should be well ventilated (at least 5 air changes per hour) in order to disperse any vapours.

A hazardous area Zone 2 classification will normally exist within the storage building. All source of ignition should be excluded from this area. The use of mobile phones in these areas is not recommended due to the microwaves used in the reception of the phones. There is a potentially known risk that under certain circumstances, fuel vapours and microwaves generated during reception and transmission, could give rise to a fire or an explosion. Although this occurrence is unknown to have happened locally, experiments have shown that this could occur. It has become standard practice to display signs to refrain from using mobile phones in hazardous zones.

People who are not working or haven't got any knowledge of the ELV process should not be allowed in these areas. No smoking signs and the use of mobile phones should be prohibited in such areas. Antistatic wear should be used by people working on ELVs. The transfer of fuels should be undertaken by trained personnel using standard methods. The area should be well ventilated and traps where vapour could accumulate should be identified and well ventilated. Tools which are not standard equipment in the ELV station such as normal electrical tools should not be used in the area. The collecting vehicle should be within the demarked area where any spillages could end up being retained in the forecourt separator found next to the fuel pump.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

7.1.1.2 Fuel Extraction procedures

Tools being used in this operation should be sharp enough not to create excessive heat and could be operated in such a manner as not to create sparks or any other possibility which could give rise to a fire.

The fuel extraction procedure should ensure that:

- Where reasonably practicable, the tank penetration mechanism cannot be operated unless the fuel extraction is operating;
- There is a clear indication of the necessary operating pressures or vacuums for safe use of the equipment;
- The tank penetration mechanism does not create sparks or frictional heating capable of igniting petrol vapours;
- Drilling components cannot pull out under their own weight if they are left unsupported (this may involve operational procedures to disconnect heavy motor units from the drills)
- Forward and reverse controls on drills are clearly indicated to minimize incorrect operation and to prevent partly formed drill holes that cannot be sealed.

7.1.1.3 Spillage control

All areas where petrol is handled or where potential leaks or spills can occur should be provide with a means for controlling spills and preventing them spreading to other non-hazardous areas. Recessed and gridded drip trays may be provided, but petrol and other liquids should not be allowed to accumulate within them.

An inert, absorbent material such as sand, vermiculite or a proprietary material should be provided to aid the prompt treatment and disposal of any fuel spills or leaks.

7.1.1.4 Escape routes/ fire fighting

Installation of equipment associated with the ELV should not in any way hinder or obstruct any exit or escape routes. One must also ensure that there are no places around the equipment which could end up as traps for people in case of a fire.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

There should be at least two dry powder fire extinguishers with a capacity of 9kg (rated as 233B according to BS EN3) readily available for use next to the fuel extraction equipment. Staff should have basic fire fighting training on a regular basis.

7.1.1.5 Control of ignition sources

The hazardous area created by the depollution equipment should be free from sources of ignition with particular attention to the following:

- Drills to have protected electrics or are pneumatically powered;
- Pumps have protected electrics or are pneumatically powered
- Lights (including inspection lamps) have protected electrics;
- Smoking materials and other obvious ignition sources are excluded;
- Anti-static footwear is worn
- Earth bonding provided.

Retention trays and bunded areas should be regularly cleaned from oils and fuels.

Operators should be clearly informed of the different zones of operation in the ELV area and precautionary measures which need to be undertaken.

7.1.1.6 Personal Protective Equipment

Employee handling petrol or extracting it from vehicles should be provided with and wear anti-static footwear (i.e. to BS 514527 or BS 7193). Employees should be provided with fire retardant/ resistant overalls especially when there is a possibility of petrol spilling over them.

Changing and washing facilities should be provided so that any employee could quickly change out of any petrol impregnated clothing. Any clothing or overalls that have been contaminated with petrol should be hung up in a well-ventilated place until they are completely dry before they are washed or sent for cleaning.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

7.1.2 Shredder Area

7.1.2.1 Dusts generated from shredding process

Water dousing equipment should be used regularly and ensure that it is working efficiently. Drop heights of shredded material should be reduced as much as possible in order to reduce the dispersion of dusts. Ideally, one should treat waste heaps with water, especially on windy days. Regular cleaning in the surroundings should prevent the whipping action of the wind on dust.

7.1.2.2 Noise generated from shredding machine

Operators working in the vicinity of the shredder should wear full protective clothing, including ear muffs. Furthermore, the shredder should be cladded in order to reduce the transmission of noise to the surroundings.

7.1.2.3 Contamination from hazardous materials

Materials which should be shredded should be regularly inspected for hazardous materials including radioactive materials. This would prevent contamination of products with hazardous substances. Any hazardous substances recovered should be stored and/or disposed in an appropriate manner.

7.1.3 Baler area

7.1.3.1 Dusts generated from baling process

Drop heights of material should be reduced as much as possible in order to reduce the dispersion of dusts. Ideally, one should treat waste heaps with water, especially on windy days. Regular cleaning in the surroundings should prevent the whipping action of the wind on dust.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

7.1.3.2 Noise generated from baling machine

Operators working in the vicinity of the baler should wear full protective clothing, including ear muffs.

7.1.3.3 Contamination from hazardous materials

Materials which should be sheared and baled should be regularly inspected for hazardous materials including radioactive materials. This would prevent contamination of products with hazardous substances. Any hazardous substances recovered should be stored and/or disposed in an appropriate manner.

7.1.4 Fuel loading area

7.1.4.1 Hazardous Area classification

The risks of a fire in a hazardous area such as a fuelling area could be addressed by making everyone continuously aware of the risk. This is done by fixing large signage such as: **NO SMOKING/ NO NAKED FLAMES/ NO HOT METAL WORKS/ NO MOBILE PHONES/ SWITCH OFF ENGINE**. Although such signage continuously reminds people of the dangers present in the area, still the management needs to have readily available systems that could tackle fires immediately. A fire cabinet containing dry powder fire hydrants and sand should be available and easily found and marked on the forecourt area.

7.1.4.2 Fuel loading of recovered fuel

Fuel vapour, especially petrol, could have serious health consequences on the employees.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

Fuel vapours could also arise from spillage of fuels. Buckets containing absorbent material and / or spill kits should be readily available 24/7 on the forecourt in order to address spillages. Small spillages could be avoided both by addressing any defective mechanisms immediately and also by staff exercising great care during dispensing operations. Personnel who are loading fuels should remain near the truck in order to maintain continuous surveillance on the operation and avoid any mishaps.

Spills, could reach the surrounding vegetation either by sweeping the material into the soil or near landscaped areas or due to the fact that the spill occurred in the vicinity of a landscaped area. It is also recommended that any material which is used to absorb spillages is not disposed into the landscaped area but in an appropriate manner. It is also recommended that all the forecourt and gullies are well-sealed and made from materials of high standard in order to prevent any leakages reaching the soils and the aquifer below.

Good management necessitates that employees are given sufficient training in the handling of the equipment both for their own safety but also that of others. It is also important that they are aware of the consequences of potential irresponsible actions.

The forecourt will have a sedimentation tank and “Forecourt” fuel separator Class1 in accordance with EN858. This should have enough volume to retain all the fuel from more than one chamber of a tanker truck in case this is all unloaded onto the forecourt. All the runoff water from the forecourt should be channelled through the separator before being discharged. The management is bound to keep a proper log book available on site of the cleaning operations of the sedimentation tank and fuel separator. The separator should also have maximum level alarms. It should be

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

regularly inspected and maintenance should be performed according either to the manufacturer instructions and / or not less than twice annually and / or immediately after a substantial spillage especially after spillages in excess of 500 litres.

7.1.5 Yard Management

The management is duty bound to keep the yard clean and prevent accumulation of dust material in the yard. It should also ensure that all tools are in good working order and that the appropriate tools are used for the particular jobs. It should also give proper health and safety equipment to be worn by all the staff working at the yard.

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

8 Summary Risk Assessment & Risk Management

Table 3 is the summary of the risk management assessment and risk management during operational phase for the Waste Recycling facility, ELV and Baling Plant at Hal Far.

All certification of relevant fire safety procedures will be issue once the necessary equipment would be in place and tested accordingly.



Table 3: Summary of identified hazards and risks together with mitigation measures being proposed for the Waste recycling facility, ELV and baling plant at Hal Far

	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
ELV Facility	Hazardous area	None	Presence of hazardous material	Air/ ground	Inhalation/ air and high temperatures	Air/ ground	Humans and materials within and in the vicinity of Zones 0, 1 and 2	Very short time to long time	High in view of hazardous zone	Medium	High	Large signage indicating: NO SMOKING/ NO NAKED FLAMES/ NO HOT METAL WORKS should be installed in the vicinity of Zones 0, 1 and 2. Workmen should wear antistatic protective clothing. Area should be well ventilated and tools should be well kept	The likelihood that such an event occurs is remote since the consequential effects are very well known. A number of dry powder fire hydrants and sand buckets should be readily available 24/7 in the ELV area and a fire alarm and smoke detector system should be installed. Standards regarding ventilation and appropriate location of equipment should be applied.



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Fuel extraction Procedures	Tools and equipment in vicinity	Combustible fluids	Air/ ground	Inhalation/ air and high temperatures	Air/ ground	Humans and materials within and in the vicinity of Zones 0, 1 and 2	Very short time to long time	High in view of hazardous zone	Low	Medium-High	Tools used should be kept in good working order and appropriate tools and equipment should be used in area	Probability of such an event is low provided appropriate equipment and practices are employed
	Spillage control	Tools, equipment and workmen in the area	Combustible fluids and slippery environment	Air/ ground	Inhalation/ air and high temperatures	Air/ ground	Humans and materials within and in the vicinity of Zones 0, 1 and 2	Very short time to long time	High in view of hazardous zone and risk to life and limb	Low	Medium-High	Trays and bunded areas should be present and kept clean. Absorbent materials should be present and used accordingly	The probability of fire arising from spills is low provided regular good and regular housekeeping.
	Escape routes/ fire fighting	Workmen	Obstruction with objects/ malfunctioning/ absence of fire extinguishers	Ground	Air	Air	Humans	Variable	High in view of hazardous zone and risk to life and limb	Low	Medium-High	Good housekeeping; Installation of fire, heat detection systems, manual call points and fire fighting equipment	The probability of such events is low provided there is good housekeeping and the equipment is regularly serviced and kept in good working order



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Control of ignition sources	Combustible fluids and vapours	Sources of ignition	Air/ ground	Air/ ground	Air/ground	Workmen/ property	Variable	High in view of hazardous zone and risk to life and limb and property	Low if ATEX tools are used	Medium-High	Use ATEX equipment and equipment which could be used in zones 1 and 2	Management must ensure that precautionary measures are undertaken and appropriate fittings and equipment are used in these areas
	Personal protective equipment	Inappropriate clothing and combustible fluids	Hazardous fluids and static properties of materials/ storage of impregnated cloths	Air	Air	Air / ground	Humans	Very short time to long time	High in view of hazardous zone and risk to life and limb	Low	Medium-High	Provision of appropriate clothing to workers and facilities to dry impregnated clothing	The probability of such an event are low provided all conditions are met
Shredder Area	Dusts generated from process	Air currents	Lung infections and respiratory tract problems/ effect on plant life	Air and wind activated transport	Air	Air	Humans and plants	Intermittent	High due to ill effects on humans and also effects on plants	Low	Medium-High	Water dousing and good up keeping of equipment and good housekeeping	The probability of such an event are low if the mitigation measures are adhered to



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Noise generated from machinery	Air	Effect hearing and a nuisance	Air	Air	Air	Humans	Intermittent	High due to effects on health	High	High	Use of protective equipment and installation of noise abatement cladding sheets around machinery	The effectiveness of such measures depends much on the adherence to wear protective clothing and also on the effective levels of noise generated and the cladding used
	Contamination from hazardous materials	Scrap materials	Non hazardous materials becoming hazardous due to presence of hazardous materials	Air	Air	Non hazardous materials	Recipients of shredded materials	Unknown	High	Moderate	High	Strict standard protocols to be applied across the board and adhered to by everyone	The probability of such an event occurring is moderate to low. In the case of ELV material, this should be low since the procedure is that to remove hazardous materials. In the case of other materials, much depends on the protocols in place



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
Baler Area	Dusts generated from process	Air currents	Lung infections and respiratory tract problems/ effect on plant life	Air	Air	Air	Humans and plants	Intermittent	High due to ill effects on humans and also effects on plants	Moderate	High	Water dousing and good up keeping of equipment and good housekeeping	The probability of such an event are low if the mitigation measures are adhered to
	Noise generated from machinery	Air	Effect hearing and a nuisance	Air	Air	Air	Humans	Intermittent	High due to effects on health	High	High	Use of protective equipment and installation of noise abatement cladding sheets around machinery	The effectiveness of such measures depends much on the adherence to wear protective clothing and also on the effective levels of noise generated and the cladding used



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Contamination from hazardous materials	Scrap materials	Non hazardous materials becoming hazardous due to presence of hazardous materials	Air	Air	Non hazardous materials	Recipients of maters	Unknown	High	Moderate	High	Strict standard protocols to be applied across the board and adhered to by everyone	The probability of such an event occurring is moderate to low. In the case of ELV material, this should be low since the procedure is that to remove hazardous materials. In the case of other materials, much depends on the protocols in place



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
Fuel Dispensing Area	Hazardous area	Fire/sparks/hot metal works	Presence and management of hazardous fluids	Air/ ground	Inhalation/ air and high temperatures	Air/ ground	Humans and materials within and in the vicinity of Zones 0, 1 and 2	Very short time to long time	High in view of hazardous zone	Low	Medium-High	Large signage indicating: NO SMOKING/ NO NAKED FLAMES/ NO HOT METAL WORKS should be installed in the vicinity of Zones 0, 1 and 2.	<p>The likelihood that such an event occurs is remote since the consequential effects are very well known.</p> <p>A number of dry powder fire hydrants and sand buckets should be readily available 24/7 in the fuelling area and a fire alarm and smoke detector system should be installed.</p>



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Loading of recovered fuels	Fire/sparks/hot metal works	Fire/ explosion due to gaseous/air mixture and presence of flammable fluids	Air	Air and high temperatures	Air	Humans and objects in vicinity of Zones 0, 1 and 2	Very short time	High in view of hazardous zone.	Should be low in view of popular knowledge of flammability of substance and also the low volumes involved.	Medium-High	<p>Large signage indicating: NO SMOKING/ NO NAKED FLAMES/ NO HOT METAL WORKS/ NO USE OF MOBILE PHONES should be installed in the vicinity of Zones 0, 1 and 2.</p>	<p>The likelihood that such an event occurs is remote since the consequential effects are very well known. The only chances if this were to occur is in case of careless people doing hot works in the vicinity.</p> <p>A number of dry powder fire hydrants and sand buckets should be readily available 24/7 on the forecourt and a fire alarm system should be installed.</p>



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Loading of recovered fuels	none	Health hazards including potential carcinogen	Vapour transport through air	Inhalation/ contact	Air	Workers	Short but repetitive over a long period of time for regular handlers of hazardous fluids	High in Zones 1 and 2	Low	High/medium	Standard working practices should be in place and workers should wear all personal protective equipment	The people at greatest risk are the workmen operating the nozzles who inhale constant quantities of vapour released from fuel tanks to the detriment of their health.
	Loading of recovered fuels	none	Vegetative dieback	Vapour transport through unsaturated zone	Absorption of vapours	Soil gases	Adjacent vegetation	Duration and effect depends on proximity of vegetation to source and also on quantities of vapours involved	Low due to the low volumes involved	Low due to construction materials used and distance of sources from soil areas	Low	Forecourt and gullies should be well sealed and high kerbs should separate forecourt from landscaped area. Fuel dispensing activity should be kept away from landscaped areas.	The suggested mitigation measures should address this risk sufficiently.



	Risk Assessment											Risk Management	
	Primary source	Secondary source	Hazard	Transport mechanism	Pathway	Medium of exposure	Receptor	Duration	Magnitude of Consequence	Probability	Significance	Mitigation Measures	Appraisal
	Loading of recovered fuels	Contaminated forecourt area	Derogation of surface water quality	Ducting systems and water	Dissolution in runoff waters	Water	Adjacent valley system downstream	Duration depends on quantities involved. The larger the quantities, the longer the duration	High in Zones 1 and 2	Low	Low risk where small quantities are involved since these are unlikely to reach watercourse;	The forecourt should be equipped with a 'Forecourt' fuel Separator Class 1 in accordance to EN858. This should have enough volume to retain all the fuel being loaded.	It is extremely important that separator is well monitored and a log book of maintenance activity is kept. If more fuel is spilled beyond that which could be contained in the separator or if separator is not working properly then spillage outside the station is likely.
Yard Management	Yard Management	Run off water	Pollutants found in yard	Run off water	Ground	Ground	Valley system and fields downstream	Short to long timescale	High in view of properties of materials involved	Low	Medium-high	Installation of two full retention separators, one serving the fuelling area and the other for the whole yard	The probability that polluting waters exiting the yard are low provided the separators and the yard are kept clean and in good working order

Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

Appendix I

ELV Equipment



Waste recycling facility, ELV and baling plant, *Hal Far*, l/o *Birżebbuġa*

[ELV equipment.pdf](#)

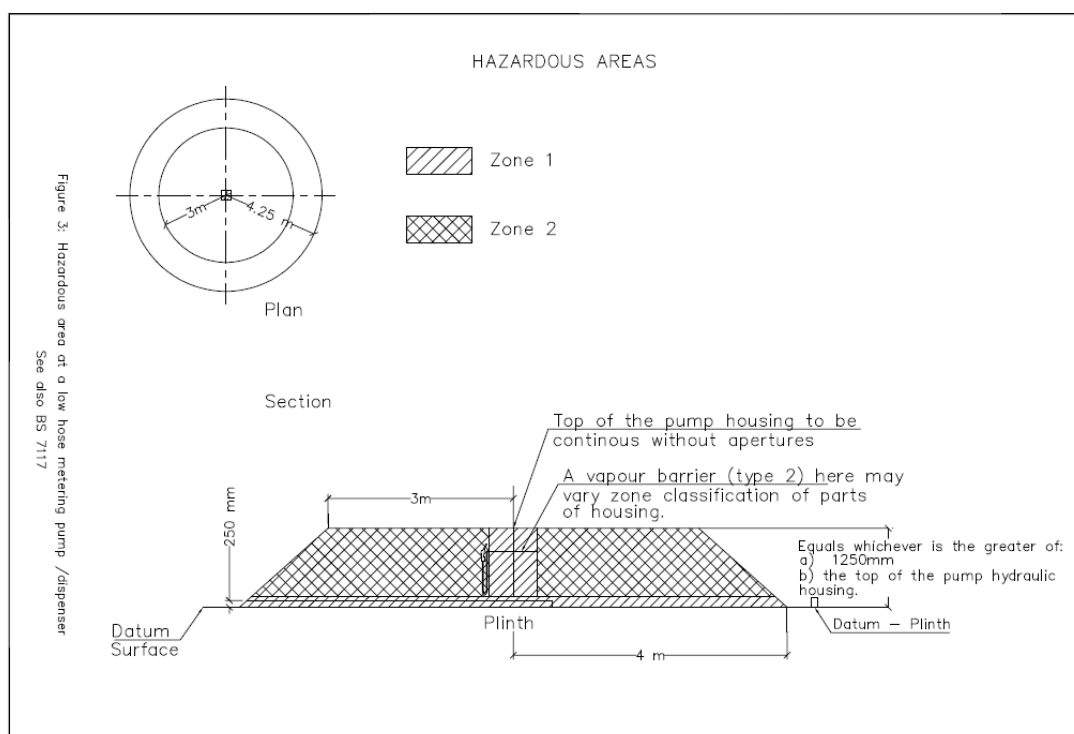
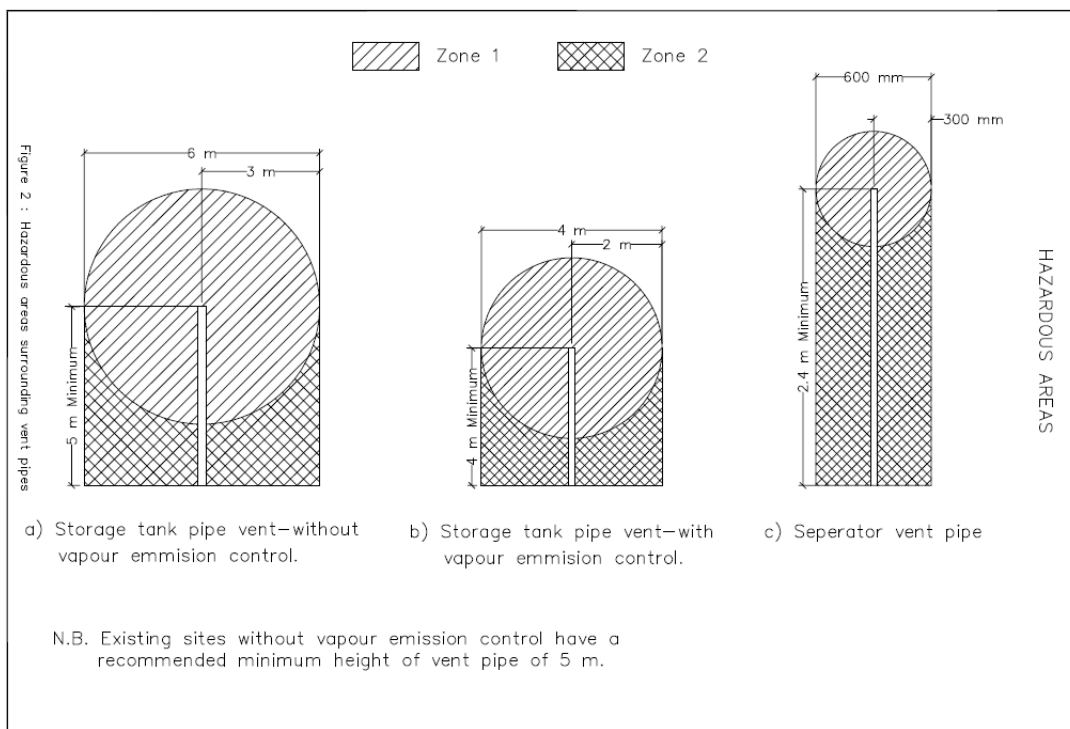


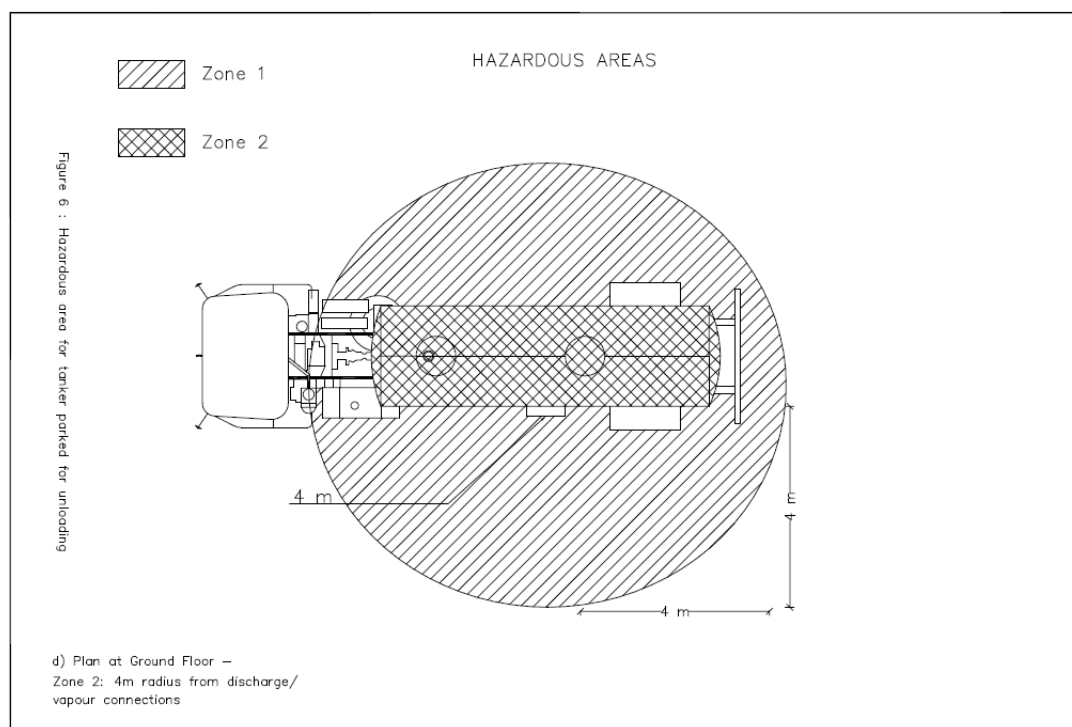
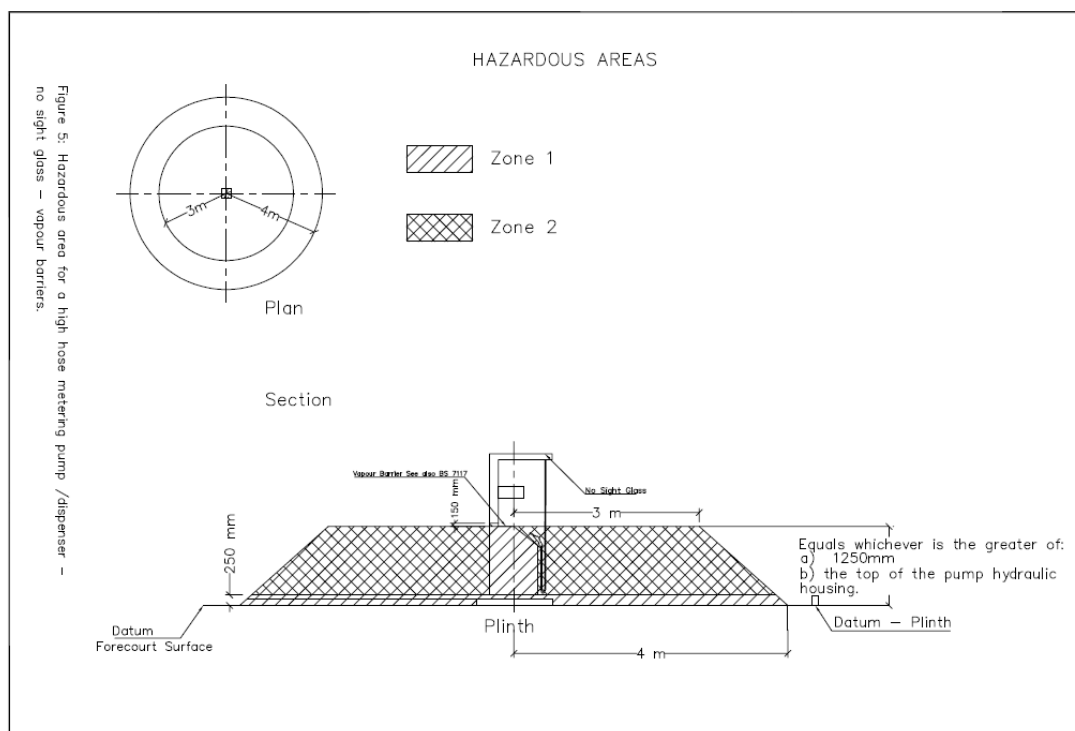
Appendix II

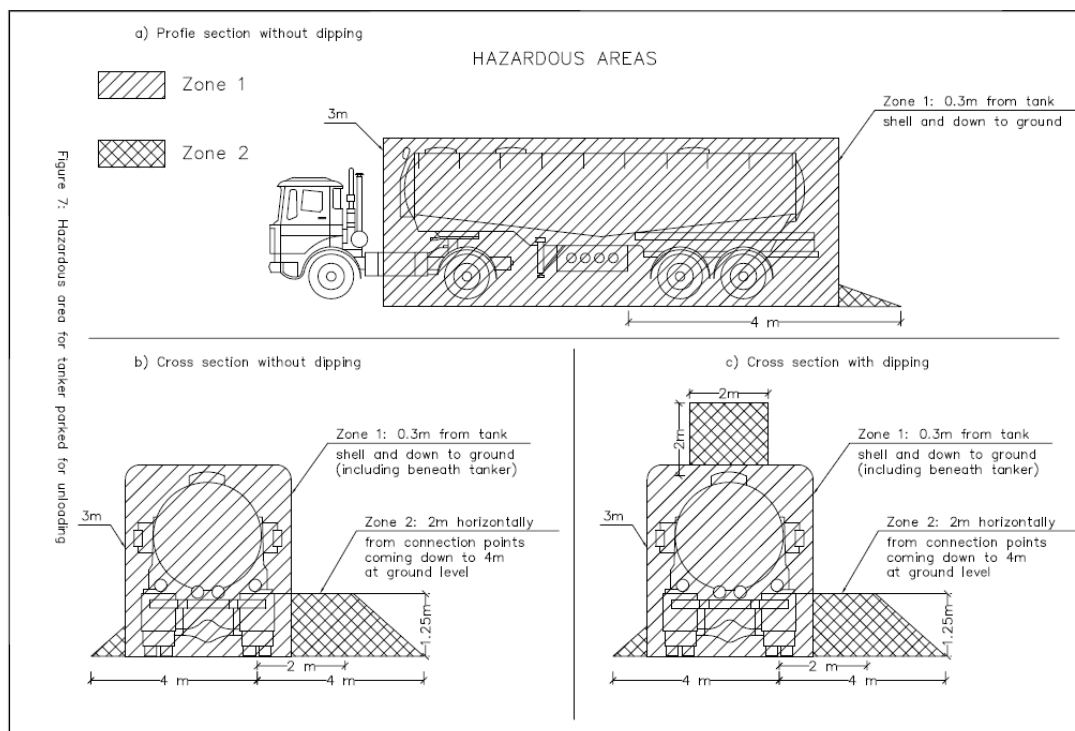
Hazardous Area Classification diagrams



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birżebbuġa*

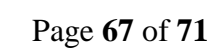








Site Plan I

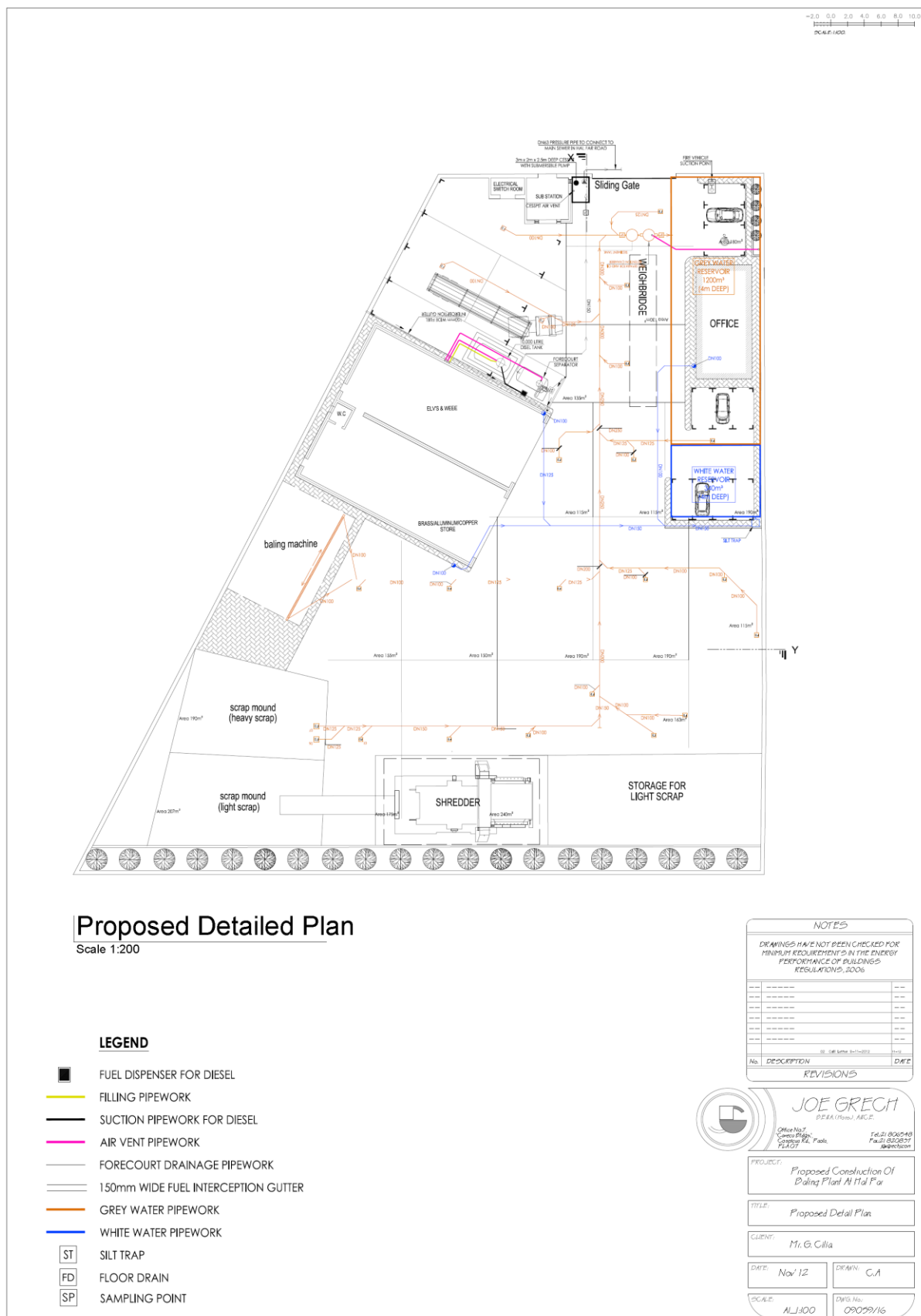




Site Plan II



Waste recycling facility, ELV and baling plant, *Hal Far, l/o Birzebbuga*





Site Plan III

