



**IP 0006/13**

**WEEE TREATMENT FACILITY AT WEEE RECYCLE 4U COMPANY LTD, HAL FAR**

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**APPLICATION FOR IPPC PERMIT**

**VOLUME 3: LAND AND GROUNDWATER RISK ASSESSMENT**



**Version 5: April 2020**



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## Quality Assurance

**WEEE Treatment Facility at WEEE Recycle 4U Company Ltd, Hal Far**  
**Application for IPPC Permit: Volume 3**  
 April 2020

**Report for: WEEE Recycle 4U Company Ltd**

### Revision Schedule

Rev	Date	Details	Prepared by	Reviewed by	Approved by
00	Nov. 2015	Submission to client	<b>Rachel Decelis</b> Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director
01	Nov. 2018	Consolidated IPPC application	<b>Rachel Decelis</b> Senior Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director
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03	March 2020	Updates to company name, drawings, operational details	<b>Rachel Decelis</b> Senior Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director
04	Apr. 2020	Addition of toners and waste oils	<b>Rachel Decelis</b> Senior Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director

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**En-Sure Ltd**  
**Kappara Business Centre**  
**113 Birkirkara Road**  
**San Gwann SGN 4197**

**Tel.: 21378180**  
**Email: [info@ensure.com.mt](mailto:info@ensure.com.mt)**  
**Web: [www.ensure.com.mt](http://www.ensure.com.mt)**



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## LAND AND GROUNDWATER RISK ASSESSMENT

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### Introduction

1. En-Sure Ltd was commissioned by WEEE Recycle 4U Company Ltd to carry out a land and groundwater risk assessment for the proposed WEEE treatment facility at Hal Far, as requested by the former Malta Environment and Planning Authority (MEPA) as part of the IPPC application for the facility.
2. The facility, hereinafter referred to as the “Scheme”, will comprise an industrial unit for the recycling and treatment of Waste Electrical and Electronic Equipment (WEEE) as well as shredding of wood. The site, located at HHF 040, Hal Far Industrial Estate (**Figure 1**), was abandoned and undeveloped prior to the start of construction of the Scheme.
3. The project is proposed by Mr Charles Galea, on behalf of WEEE Recycle 4U Company Ltd, and is the subject of Planning Permits PA 0441/16 and PA 0535/18. Mr Charles Galea on behalf of WEEE Recycle 4U Company Ltd is hereinafter referred to as ‘the Applicant’.
4. The Applicant intends to relocate, expand and upgrade his current operations from his current location at three garages in the Ta’ Magġi Industrial Zone in Żabbar to the Scheme site.<sup>1</sup> An Environmental Impact Statement was also prepared for the Scheme.
5. The operation of the site also requires an Integrated Pollution Prevention and Control (IPPC) permit.

### Terms of Reference

6. Section B.1.4.1 of the IPPC application form required the submission of:

*A site report, providing a history of the site (including current and past uses) and describing the condition of the site of that part of the installation in respect of which you are applying for a permit, and, in particular, identifying any substance in, on or under the land which may constitute a pollution risk. A baseline report assessing the state of the groundwater and land may also be required by the Authority.*

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<sup>1</sup> Operations at the Ta’ Magġi Industrial Zone are carried out by the company Electronic Products Ltd, of which Mr Galea is Managing Director. The Applicant will trade under the company WEEE Recycle 4U Company Ltd at the Scheme site.





**Figure 1: Site location**







7. In respect of the baseline report, the requirements in the Industrial Emissions (Integrated Pollution Prevention and Control) Regulations (Legal Notice 10 of 2013) apply:

*Regulation 5 (1): An application for a permit shall include a description of the following:*

*(d) the conditions of the site of the installation;*

*(e) where applicable, a baseline report in accordance with regulation 16(2);*

*Regulation 16 (2): Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013.*

*The baseline report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for under sub-regulation (3).*

*The baseline report shall contain at least the following information:*

*(a) information on the present use and, where available, on past uses of the site;*

*(b) where available, existing information on soil and groundwater measurements that reflect the state at the time the report is drawn up or, alternatively, new soil and groundwater measurements having regard to the possibility of soil and groundwater contamination by those hazardous substances to be used, produced or released by the installation concerned.*

*Where information produced pursuant to other national or European Union law fulfils the requirements of this sub-regulation, that information may be included in, or attached to, the submitted baseline report.*

*In the preparation of the baseline report, the operator shall take into account any guidance published by the European Commission on the content of the baseline report.*

*(3) (a) Upon definitive cessation of the activities, the operator shall assess the state of soil and groundwater contamination by*



*relevant hazardous substances used, produced or released by the installation. Where the installation has caused significant pollution of soil or groundwater by relevant hazardous substances compared to the state established in the baseline report referred to in sub-regulation (2), the operator shall take the necessary measures to address that pollution so as to return the site to that state. For that purpose, the technical feasibility of such measures may be taken into account.*

*(b) Without prejudice to paragraph (a), upon definitive cessation of the activities, and where the contamination of soil and groundwater at the site poses a significant risk to human health or the environment as a result of the permitted activities carried out by the operator before the permit for the installation is updated for the first time after 7 January 2013 and taking into account the conditions of the site of the installation established in accordance with regulation 5(1)(d), the operator shall take the necessary actions aimed at the removal, control, containment or reduction of relevant hazardous substances, so that the site, taking into account its current or approved future use, ceases to pose such a risk.*

8. The European Commission has also published guidance on preparing baseline reports (Communication 2014/C 136/03). According to this guidance, the first step is to determine whether a baseline report is needed, since baseline land / groundwater measurements are only required when the activity involves the use, production or release of relevant hazardous substances, and taking into account the possibility of soil and groundwater contamination by the Scheme.

## **Description of the Site and the Surroundings**

### **Location**

9. The Scheme site covers an area of approximately 1,600 m<sup>2</sup> and is located close to the eastern boundary of the Hal Far Industrial Estate, as shown in **Figure 1**. Access is through a wide surfaced road.

### **History**

10. The history of the Scheme site and its surroundings has been obtained through a review of available documentation and communication with Malta Industrial Parks Ltd.<sup>2</sup>
11. The 1915 survey sheet for the area shows the Scheme site and its surroundings as agricultural.
12. The site used to form part of the former Hal Far airfield, which operated between the 1920s and the 1970s; this is confirmed from aerial photos from the 1940s<sup>3</sup>

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<sup>2</sup> Rizzo Naudi, J. (MIP) Personal communication, 12<sup>th</sup> August 2014.

and 1950s (**Figure 2**), maps from the 1950s (**Figure 3**) and the former MEPA's 1968 base map. The site is located immediately south of the former runway 27; due to its proximity to the runway, for safety reasons it is unlikely to have been used for any particular purpose at the time (such as refuelling). The airfield was heavily bombed during World War II.

13. Aerial photos from 1998 to 2012 (**Figure 1**) indicate that the site was abandoned and disturbed during this period, and was overlain by a layer of dumped material, probably inert construction waste. The surroundings appear to be a mix of mainly industrial uses (in the northwest, west and south directions) and agricultural uses (northern and eastern directions).

### **Current Use of the Site**

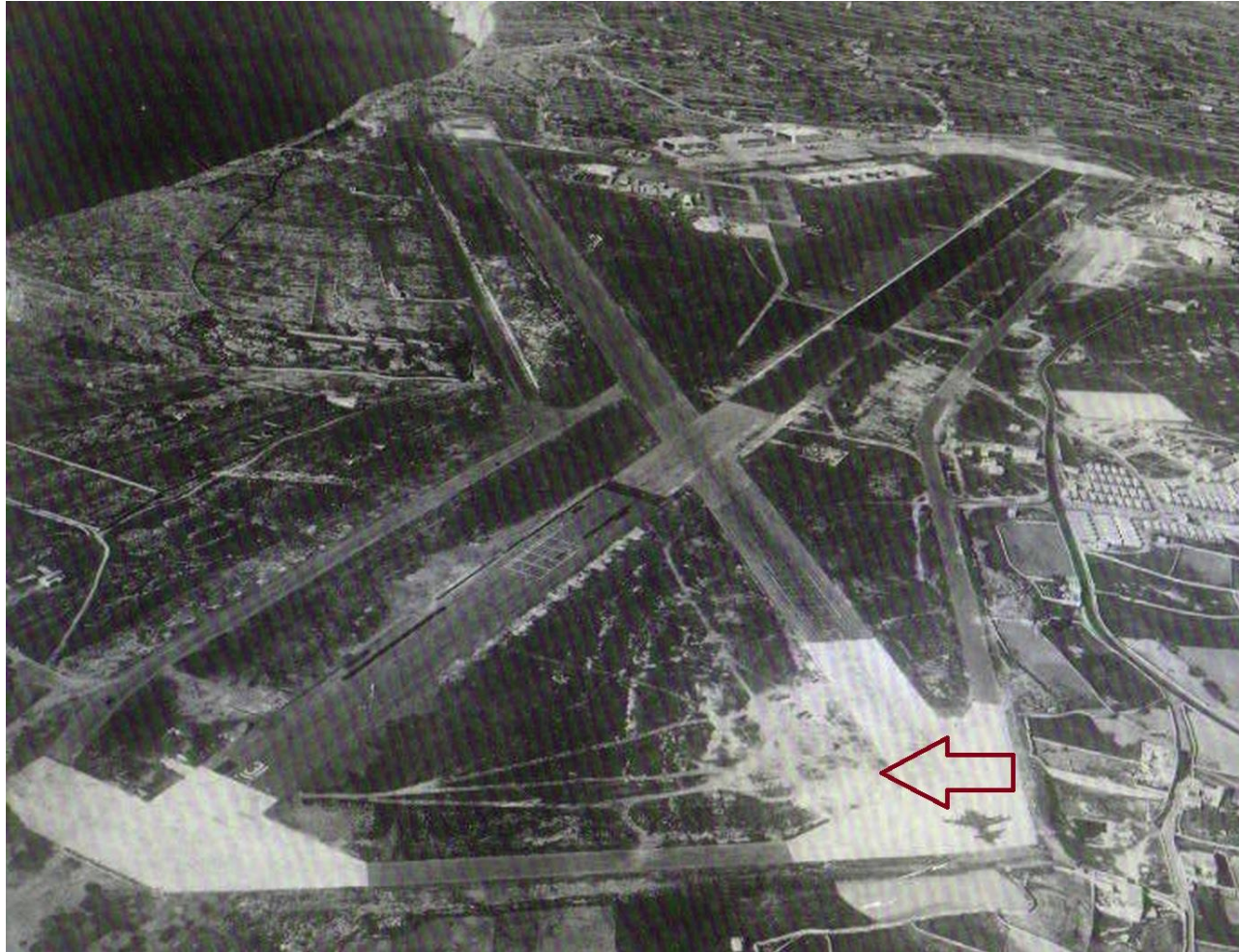
14. Immediately prior to the start of construction of the Scheme, the site was unused and disturbed land. Site visits on 17<sup>th</sup> October 2014, 25<sup>th</sup> February 2015 and 13<sup>th</sup> May 2015 revealed that the site surface was covered in what appears to be mainly construction / demolition waste; the area was also overgrown with vegetation during these visits (**Figure 4** and **Figure 5**). Other material noted to be deposited on site included clothes, metal structures, plastic items and wooden pallets.
15. The deposited material was removed in June 2015; the architect's report (**Appendix 1**) states that approximately 3,300 m<sup>3</sup> of inert material was removed during this activity. No hazardous waste was recorded. **Figure 6** shows the Scheme site after the dumped material had been removed.

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<sup>3</sup> H.M.S. Falcon – RNAS Hal Far [www.hms-vengeance.co.uk/falcon.htm](http://www.hms-vengeance.co.uk/falcon.htm).



**Figure 2: 1959 aerial photo<sup>4</sup>**

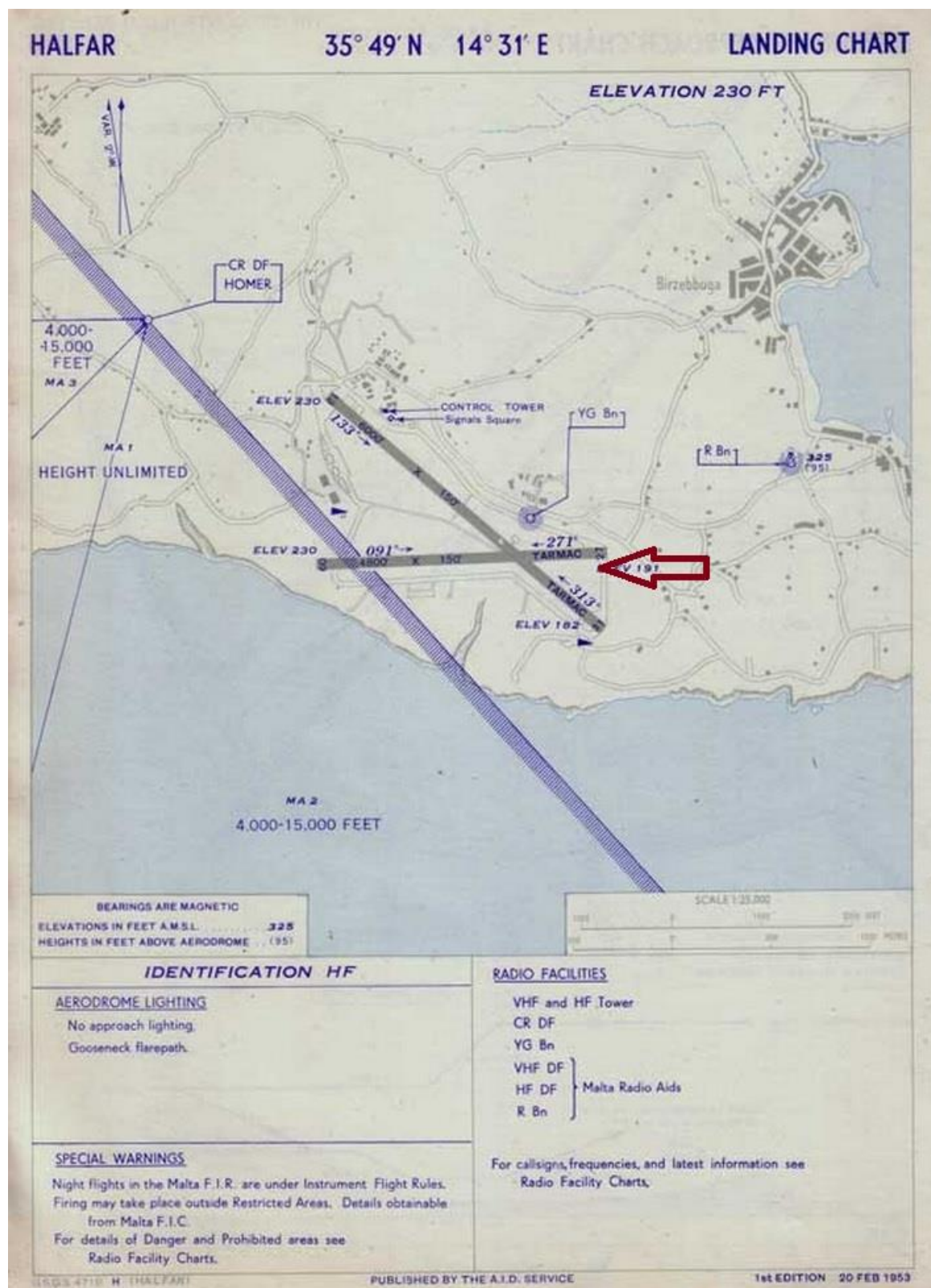


<sup>4</sup> RAF Hal Far (HMS Falcon) [www.ronaldv.nl/abandoned/airfields/MT/malta.html#halfar](http://www.ronaldv.nl/abandoned/airfields/MT/malta.html#halfar). The approximate location of the Scheme site is marked with an arrow.





**Figure 3: 1953 map of Hal Far airfield<sup>5</sup>**



<sup>5</sup> *RAF Hal Far (HMS Falcon)* [www.ronaldv.nl/abandoned/airfields/MT/malta.html#halfar](http://www.ronaldv.nl/abandoned/airfields/MT/malta.html#halfar). The approximate location of the Scheme site is marked with an arrow.



**Figure 4: Scheme site before removal of dumped material (17<sup>th</sup> October 2014)**



**Figure 5: Scheme site before removal of dumped material (25<sup>th</sup> February 2015)**





**Figure 6: Scheme site after removal of dumped material (6<sup>th</sup> June 2015)**

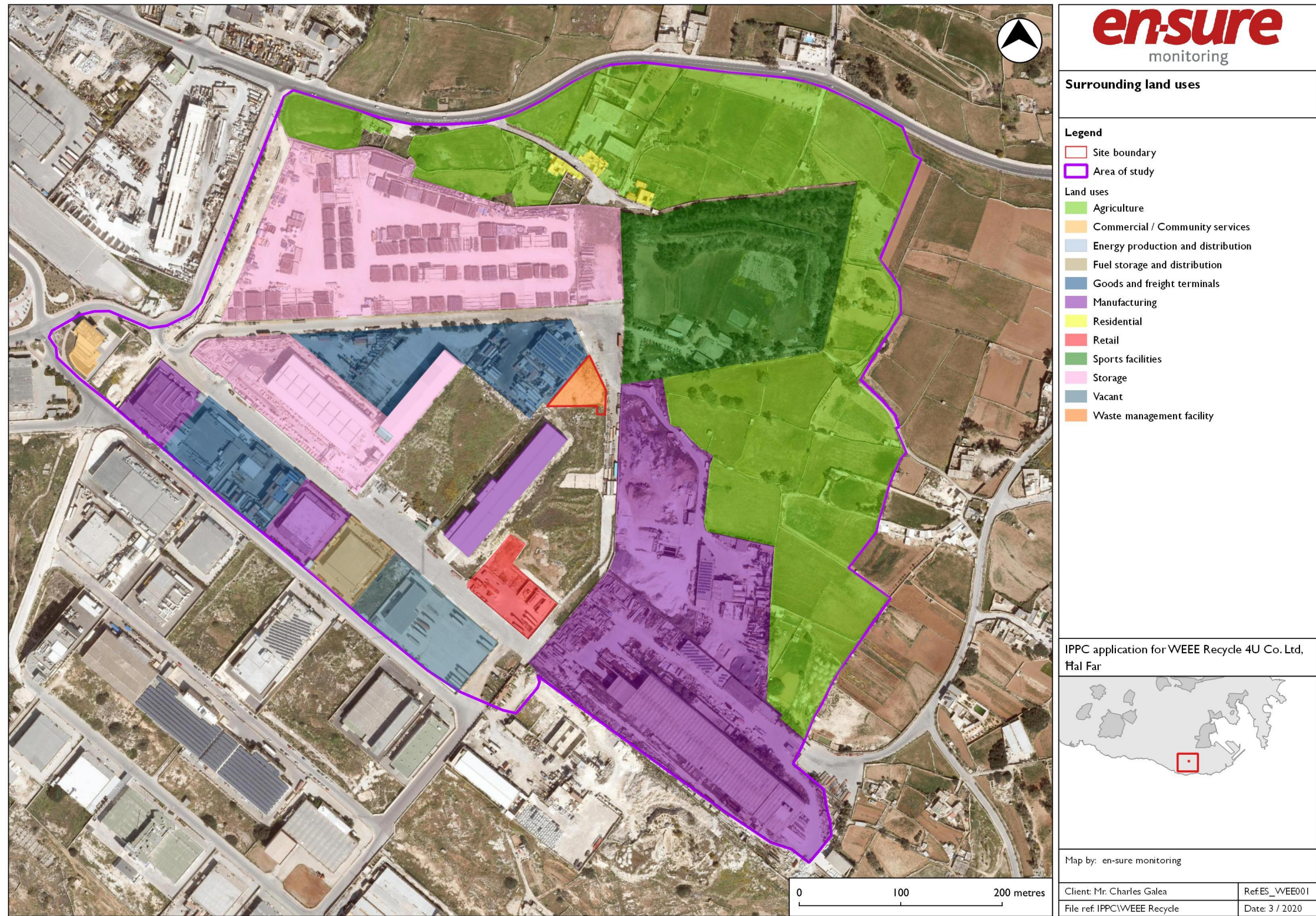


### **Surrounding Land Uses**

16. A land use survey was carried out on 17<sup>th</sup> October 2014. The predominant land uses in the surrounding area are industrial and agricultural, as shown in **Figure 7**.
17. The primary land uses in the surrounding area are industrial (**Figure 8**) – a range of activities including pharmaceuticals, transportation, manufacturing and oil-related businesses. The activities immediately surrounding the Scheme site (**Figure 9**) are a goods and freights terminal (adjoining site to the west), a steel manufacturing facility (located to the south), and concrete batching plants (**Figure 10**, located to the east and southeast).
18. Immediately to the northeast of the Scheme site, adjoining the industrial estate, there is an open-air shooting range (**Figure 11**).
19. The area beyond the industrial estate, to the north and east of the Scheme site, is predominantly agricultural, with fields still under cultivation (**Figure 12**).
20. The nearest residential property to the Scheme site is a farmhouse located to approximately 175 m to the north. The intervening area is occupied by the goods and freight terminal (immediately adjoining the site) and beyond this a large open storage yard for buildings supplies (**Figure 13**).



Figure 7: Land uses







**Figure 8: Various industrial uses**



**Figure 9: The Scheme's block**



**Figure 10: Concrete batching plants**



**Figure 11: Southern Shooting Club shooting range**



**Figure 12: Agricultural fields**



**Figure 13: Open-air storage**



## Existing Air Quality

21. Monitoring for mercury was carried out in order to establish baseline levels, particularly since the Scheme site is located close to concrete batching plants.<sup>6</sup>
22. Two baseline monitoring sessions were conducted; the results are shown in **Table 1**.

**Table 1: Baseline monitoring results**

Date	Mercury concentration	WHO long-term inhalation exposure limit
3 <sup>rd</sup> August 2015	<0.05 µg/m <sup>3</sup>	0.2 µg/m <sup>3</sup>
14 <sup>th</sup> October 2015	<0.05 µg/m <sup>3</sup>	0.2 µg/m <sup>3</sup>

23. The results show that baseline mercury levels at the Scheme site are well below the concentration of 0.2 µg/m<sup>3</sup> set by the World Health Organisation (WHO)<sup>7</sup> for long-term inhalation exposure to elemental mercury vapour.
24. The full monitoring reports are included in **Appendix 2**.

## Scheme Description

25. The Scheme is mainly intended for the storage and treatment of all types of WEEE, including the following categories:
  - Large / medium-sized household appliances including fridges, freezers, washing machines, microwave ovens, air-conditioning units, electric fans and electric radiators;
  - Small household appliances including toasters, irons, vacuum cleaners and hairdryers;
  - IT and telecommunications equipment including computers, servers, photocopiers, mobile phones, printers, toners, and facsimile machines;
  - Cathode ray tube (CRT) monitors and liquid crystal displays (LCDs);
  - Consumer electronics including DVD players, hi-fi equipment, electric guitars, amplifiers, radios and cameras;
  - CRT TVs and flat-panel TVs;
  - Lighting equipment, including fluorescent and neon tubes / lights;
  - Electrical and electronic tools including drills, electric saws, sewing machines, lawnmowers, sanders, nail guns, etc.;

<sup>6</sup> Cement dust can be a source of mercury.

<sup>7</sup> World Health Organisation (2007) *Exposure to Mercury: A Major Public Health Concern*  
[www.who.int/phe/news/Mercury-flyer.pdf](http://www.who.int/phe/news/Mercury-flyer.pdf).

- Toys, leisure and sports equipment including video game consoles, electronic fitness equipment, electric trains and car racing systems, coin slot machines, etc.;
  - Medical devices including analysers, imaging and radio therapy equipment;
  - Monitoring and control instruments including smoke detectors and thermostats; and
  - Automatic dispensers including cold drinks and snacks dispensers, and cash machines.
26. Batteries will also be accepted for storage prior to export.
27. The Scheme will also shred clean wood waste to generate a product that can be used for animal bedding or briquettes (once the required end-of-waste permit is obtained from ERA).
28. The proposed layout of the Scheme is shown in **Figure 14**.

### **Incoming Waste and Raw Materials**

29. **Table 2** identifies the wastes to be accepted on site and the treatment method proposed.
30. Incoming waste will be received in the WEEE treatment building (shown in **Figure 14**), where it will be sorted for storage in the appropriate area as described below.
31. Waste designated for dismantling will be stored indoors, in the area designated as “pre-treatment storage on pallets” in **Figure 14**.
32. Fluorescent tubes will be stored carefully in one of two boxes dedicated for incoming fluorescent tubes (**Figure 14**) before processing. Containers having tubes / lamps that are received broken will be stored inside the fluorescent tube crushing room to reduce the risk of fugitive mercury emissions.
33. Batteries will be stored in storage bins inside the main building.
34. Fridges / freezers, WEEE-related packaging, certain WEEE components, waste oils from WEEE, and wood items will be stored in the outdoor storage area (covered). Waste oils will be placed on a prefabricated bund.
35. Any unauthorised waste that may enter the site will be stored in the quarantine area (in a closed skip or similar) prior to removal to authorised facilities.

**Table 2: Incoming waste**

EWC code	HP code <sup>8</sup>	Description	Estimated annual quantities	Estimated maximum quantity stored	Treatment
16 02 13* 16 02 14 16 02 15* 16 02 16 08 03 17* <sup>9</sup> 08 13 18 9 09 01 10 09 01 11* 09 01 12 20 01 35* 20 01 36	HP 5, HP 14	WEEE and WEEE components / parts	1,600 tonnes	13 tonnes <sup>10</sup>	Manual dismantling, crushing of cables and non-hazardous components
16 02 13* 20 01 35*	HP 5, HP 14	CRT televisions and monitors	300 tonnes	13 tonnes <sup>10</sup>	Dismantled and broken in CRT breaking room, shredding of wooden components (e.g. from old TVs)
16 02 13* 20 01 21*	HP 5, HP 6, HP 14	Fluorescent tubes and bulbs	30 tonnes	2 tonnes	Crushed in crusher room (after removing from housing, where applicable)
16 02 11* 16 02 13* 20 01 23*	HP 5, HP 14	Fridges / freezers	200 tonnes	8 tonnes	Storage prior to export
16 02 11* 20 01 23*	HP 5, HP 14	Discarded equipment containing refrigerants	10 tonnes	8 tonnes	Degassing, followed by manual dismantling of equipment
16 06 01* 16 06 02* 16 06 03* 16 06 04 20 01 33*	HP 5, HP 6, HP 8, HP 14	Batteries	50 tonnes	1 tonne	Storage prior to export

<sup>8</sup> According to EU Regulation 1357/2014; HP codes only apply when the waste is hazardous.

<sup>9</sup> Referring to toner cartridges.

<sup>10</sup> Approximate total capacity of the “pre-treatment storage on pallets” area, shown in **Figure 14**.

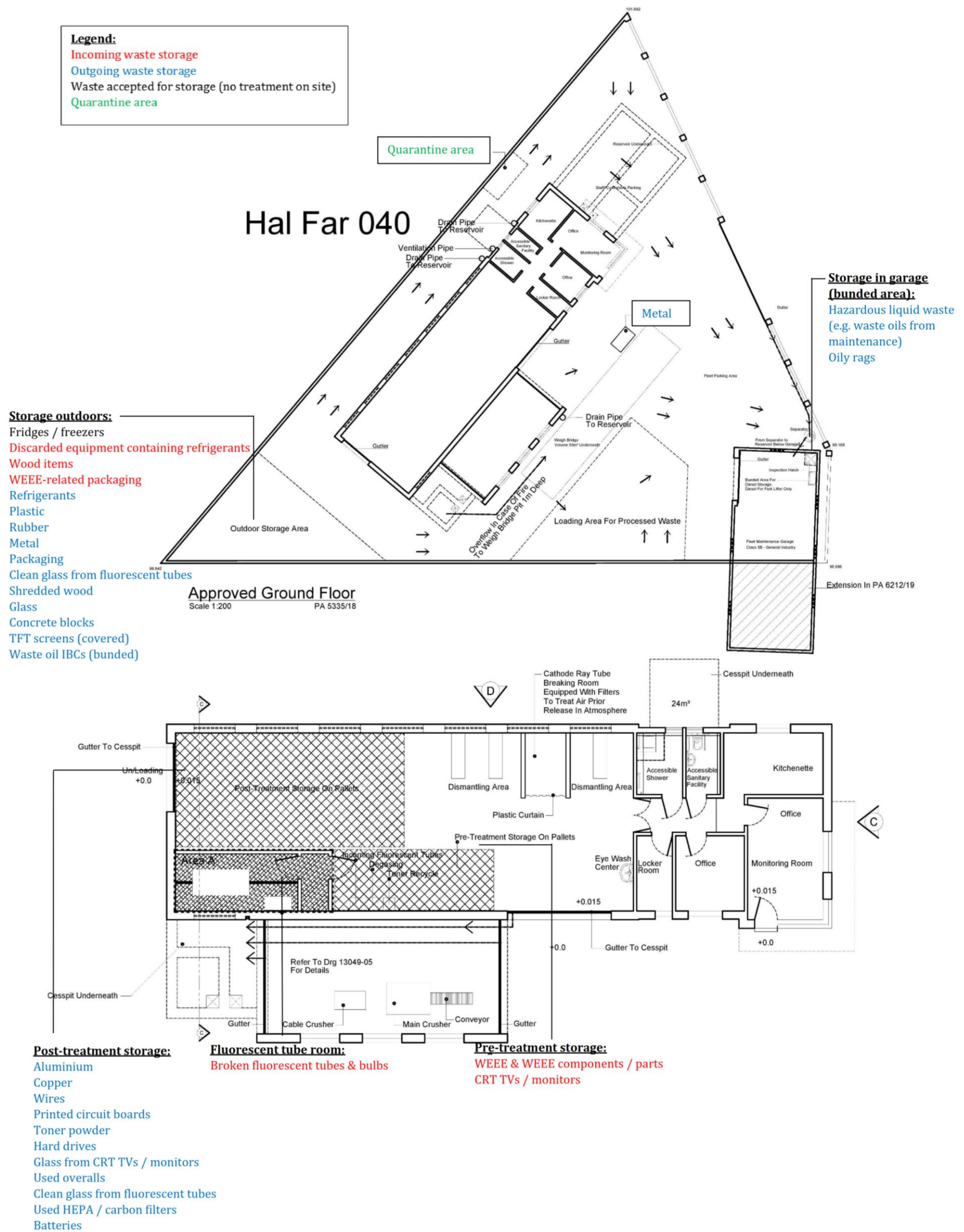


EWC code	HP code <sup>8</sup>	Description	Estimated annual quantities	Estimated maximum quantity stored	Treatment
20 01 34					
15 01 01 15 01 02 15 01 06	-	WEEE-related packaging	25 tonnes	13 tonnes <sup>10</sup>	Segregated from WEEE and sent to an authorised recycling facility
03 01 05 15 01 03 17 02 01 19 12 07 20 01 38	-	Wood items (e.g. pallets, offcuts, wood from old TVs <sup>11</sup> )	100 tonnes	13 tonnes <sup>10</sup>	Once end-of-waste application is approved by ERA: Shredding for production of animal bedding / briquettes; in the interim such waste will be sent to a licensed facility.

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<sup>11</sup> Confirmed to be non-hazardous through testing; please refer to **Appendix 3**. However, in light of recent test results indicating contamination by lead of a tested sample of wood from old TVs, retesting will be carried out once the IPPC permit is issued and the new site is operational. The Applicant expects that the improved operational controls at the new site will reduce the risk of contamination.

Figure 14: Scheme layout



36. The principal raw materials during operation are identified in **Table 3**.

**Table 3: Raw materials**

Raw material	Associated activity	Maximum quantity stored on site	Storage location and containment
Diesel	Operation of on-site forklifts and trucks	50 L	Stored in the garage (shown in <b>Figure 14</b> ), which is connected to an oil-water separator.
Engine start formula	Operation of an older truck (assists with cold diesel engine start-up)	500 mL	Stored in the garage (shown in <b>Figure 14</b> ), which is connected to an oil-water separator.
LPG	Operation of a forklift truck	25 kg	Cylinder inside the WEEE treatment building, against a wall.
Hydraulic oil	Maintenance of on-site forklifts and trucks	25 L	Stored in the garage (shown in <b>Figure 14</b> ), which is connected to an oil-water separator.

## Waste Treatment

### WEEE Processing

37. Treatment of each WEEE stream will be carried out in accordance with an ERA-approved work plan.<sup>12</sup> In general, the process will involve the following steps:
- Receipt of goods and storage in the WEEE treatment building (shown in **Figure 14**);
  - Sorting and storage of waste in designated areas, depending on the type of waste;
  - Depollution of equipment when required (e.g. degassing of air-conditioning units containing refrigerant gas, removal of oil from oil heaters);
  - Manual dismantling and segregation of components into different waste streams; in the case of toner cartridges, dismantling occurs in specialised equipment which also allows for separate collection of the toner powder;
  - Crushing of certain components using one of three crushers, as described in further detail below; and
  - Storage of each waste stream, segregated by type, in designated areas prior to transfer to authorised facilities, locally or abroad.
38. Manual dismantling and segregation of most components will be carried out in the dismantling area identified in **Figure 14**. Dismantling of CRT monitors and

<sup>12</sup> Work plans and flow diagrams are included in section B2.2.1 and B2.2.3 of the IPPC application (**Volume 2**).

TV sets will be carried out by first dismantling the casings and circuitry, then breaking the glass neck; the glass neck will be broken in the purpose-built CRT breaking room. Manual dismantling of toners occurs inside specialised equipment designed to capture the toner powder.

39. Three crushers are proposed:

- Main crusher: This crusher (**Figure 15**) will be used for non-hazardous waste, and is able to process a range of materials, including non-ferrous metals, plastic materials, composite materials, wood, etc. It will also be equipped with a conveyor belt equipped with a magnet to enable removal of unwanted materials (e.g. iron parts) before they enter the crusher;
- Cable crusher: This crusher will facilitate the recycling of electric cables through a process of grinding and separating the plastic from the copper / aluminium components (**Figure 16**); and
- Fluorescent tube crusher (**Figure 17**): Fluorescent tubes and lamps will be fed into the rotating drum and crushed. Glass fragments collected at the base of the drum will then be washed with water to remove mercury, and the clean glass will be collected in jumbo bags. This activity allows clean glass to be generated and the volume of the tubes to be significantly reduced, thus reducing storage space requirements and shipping costs. The crushing area has also been purposely designed to minimise air emissions and land / groundwater contamination – the crusher will be housed inside two rooms with extensive air treatment, wastewater from tube washing will be reused (after treatment when necessary), and a wastewater treatment system will be in place based on sand and carbon filters. **Figure 18** provides details of the layout of the fluorescent tube crusher room.

**Figure 15: Main crusher**



**Figure 16: Cable crusher**



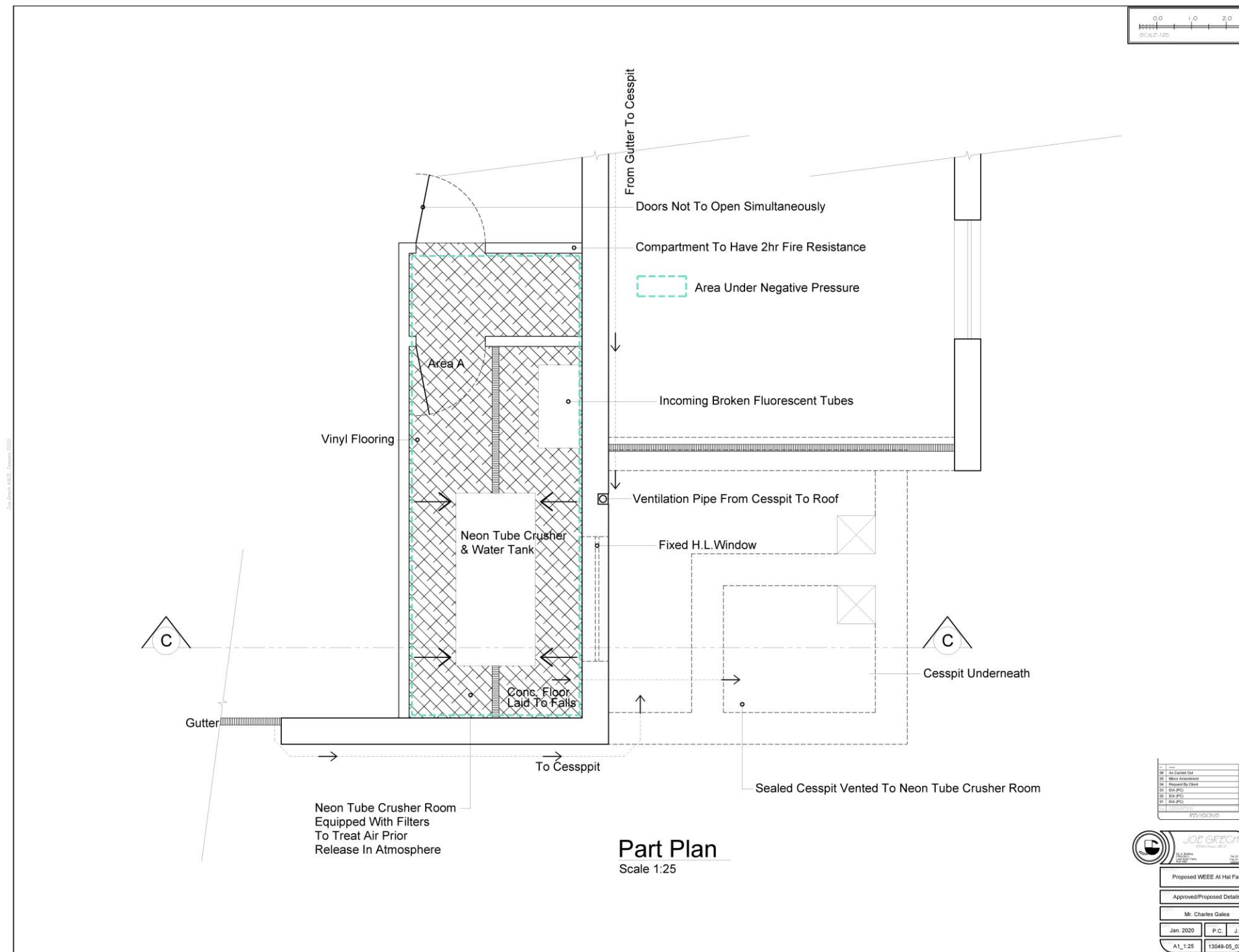
**Figure 17: Fluorescent tube crusher**



40. Certain WEEE streams will be stored on site prior to shipment, without any dismantling or processing, except for any packaging necessary for shipment. This option is planned for those categories of WEEE that the site will not be equipped to treat (at least initially), such as fridges / freezers containing ozone-depleting substances. Similarly, waste batteries will also be accepted on site for temporary storage in a bunded area in the main building prior to shipment to an authorised facility abroad.



**Figure 18: Fluorescent tube crusher room**





### Wood Processing

41. Wood will be shredded using the main crusher, to generate a product that can be used for animal bedding or briquettes<sup>13</sup>.

### Outgoing Waste

42. **Table 4** lists the principal wastes to be generated during the operation of the Scheme, together with storage and containment measures.

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<sup>13</sup> In light of recent test results indicating contamination by lead of the tested sample of wood from old TVs, retesting will be carried out once the IPPC permit is issued and the new site is operational. An end-of-waste application will be submitted to ERA at that stage. The Applicant expects that the improved operational controls at the new site will reduce the risk of contamination. In the interim and until the end-of-waste application is approved by ERA, such waste will be sent to a licensed facility.





**Table 4: Outgoing waste**

Activity	EWC code	HP code <sup>14</sup>	Description	Estimated annual quantity	Storage and containment	Maximum quantity stored	Destination
WEEE degassing, dismantling, and crushing of non-hazardous components and cables	14 06 01*	HP 5, HP 14	Refrigerants	1 tonne	Gas cylinders in designated area indoors or in outdoor storage area	1 tonne	<ul style="list-style-type: none"> <li>Ozone-depleting substances: Exported to an authorised facility for destruction</li> <li>Other refrigerants: Sold for reuse</li> </ul>
	16 02 15* 16 02 16	HP 5, HP 14	Printed circuit boards / TFT screens	250 tonnes	In jumbo bags <sup>15</sup> on pallets indoors / covered outdoor storage area	24 tonnes	Exported to authorised recycling facility
	19 12 04	-	Plastic	200 tonnes	Covered outdoor storage area	2 tonnes	Sent to authorised facility for recycling
	19 12 02	-	Ferrous metal	400 tonnes	Covered outdoor storage area / shipping container	10 tonnes	Sent to authorised facility for recycling
	19 10 02 19 12 03	-	Non-ferrous metal	100 tonnes	In jumbo bags on pallets indoors	3 tonnes	Sent to authorised facility for recycling
	17 04 01	-	Copper wire	50 tonnes		3 tonnes	
	19 12 05	-	Glass	50 tonnes	Covered outdoor storage area	20 tonnes	Sent to authorised facility for recycling
	17 01 01	-	Concrete block from washing machines	100 tonnes	Covered outdoor storage area	10 tonnes	Sent to authorised facility for recycling
	13 03 06* 13 03 07* 13 03 08* 13 03 09*	HP 5, HP 6, HP 7, HP 14	Waste oils (e.g. from oil heaters)	3,000 L	In an IBC on a prefabricated bund in the outdoor storage area	2,000 L	Sent to authorised facility for recovery
	08 03 17*	HP14 (if	Toner powder	2 tonnes	In jumbo bags on	20 tonnes	Sent to authorised facility for

<sup>14</sup> According to EU Regulation 1357/2014; HP codes only apply when the waste is hazardous.

<sup>15</sup> Jumbo bags are typically stacked two high.

Activity	EWC code	HP code <sup>14</sup>	Description	Estimated annual quantity	Storage and containment	Maximum quantity stored	Destination
	08 03 18	hazardous)			pallets indoors		recycling
	16 02 15*	HP 5, HP 14	Hard drives	15 tonnes	In jumbo bags on pallets indoors	1 tonne	Exported to authorised recycling facility
	16 02 16						
	16 06 01*	HP 5, HP 6,	Batteries	50 tonnes	In battery storage bins indoors	1 tonne	
	16 06 02*	HP 8, HP 14					
	16 06 03*						
	16 06 04						
Removal of waste packaging from WEEE	15 01 01	-	Paper / cardboard packaging	10 tonnes	Covered outdoor storage area	2 tonnes	Sent to authorised facility for recycling
	15 01 02	-	Plastic packaging	5 tonnes		500 kg	
	15 01 06	-	Mixed packaging	10 tonnes		2 tonnes	Sent to authorised facility for disposal
Breaking of CRT televisions and monitors	16 02 15*	HP 5, HP 7, HP 14	Glass	180 tonnes	In jumbo bags on pallets indoors	24 tonnes	Exported to authorised recycling facility
	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used disposable overalls	10 m <sup>3</sup>	In jumbo bags on pallets indoors	<1 m <sup>3</sup>	Sent to authorised facility for incineration
Crushing of fluorescent tubes / lamps	19 12 05 <sup>16</sup>	-	Clean glass from crushing of fluorescent tubes	25 tonnes	In jumbo bags on pallets indoors / in covered outdoor storage area	5 tonnes	Exported to authorised recycling facility
	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used disposable overalls	5 m <sup>3</sup>	In jumbo bags on pallets indoors	<1 m <sup>3</sup>	Sent to authorised facility for incineration
Storage of fridges / freezers	16 02 11* 16 02 13* 20 01 23*	HP 5, HP 14	Fridges / freezers	200 tonnes	Covered outdoor storage area	8 tonnes	Exported to authorised facility for recovery (and destruction / recovery of refrigerant)
Storage of batteries	16 06 01* 16 06 02*	HP 5, HP 6, HP 8, HP 14	Batteries	50 tonnes	In battery storage bins indoors	1 tonne	Exported to authorised facility for recovery

<sup>16</sup> Test results (**Appendix 5**) on crushed glass generated by the existing installation at Ta' Maggi Industrial Estate confirm that the glass is non-hazardous even without washing; the mercury content is lower than 0.5 mg/kg.

Activity	EWC code	HP code <sup>14</sup>	Description	Estimated annual quantity	Storage and containment	Maximum quantity stored	Destination
	16 06 03* 16 06 04 20 01 33* 20 01 34						
Air treatment	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used HEPA filters	6 filters (estimate)	Designated area indoors	6 filters	Exported to authorised facility for disposal
	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used carbon filters	As required	Designated area indoors	200 kg	Exported to authorised facility for disposal
	19 12 11* (or 19 12 12 if testing shows the waste is not hazardous)	HP 5 (potentially, if hazardous)	Dust from cyclone bin (linked to main crusher and cable crusher)	As required	Designated area indoors	As required	Sent to authorised facility for disposal
Wastewater treatment	15 02 02*	HP 5, HP 14	Used filters	<3 filters	Waste water treatment room	3 filters	Exported to authorised facility for disposal
	19 08 08* 19 08 99*	HP 5, HP 14	Filter backwash / concentrate from RO unit	<3 m <sup>3</sup>	Bunded containers in wastewater treatment room	<1 m <sup>3</sup>	Exported to authorised facility for disposal
	16 10 01* 16 10 02	HP 5, HP 14 (only if hazardous)	Wastewater from fluorescent tube crushing room and WEEE treatment building	<5 m <sup>3</sup>	Fluorescent tube crushing room: Sealed tank within impermeable concrete bund;  WEEE treatment building: Impermeable underground cesspit	1 m <sup>3</sup>  4 m <sup>3</sup>	Normally reused after treatment; however, if discharge is required the wastewater will be tested and either: (a) discharged to the sewerage network if found to be below the WSC discharge limit; or (b) exported to an authorised facility if not.
Surface water	13 05 07*	HP 3, HP 5,	Oils collected by	5 L	Designated bunded	5 L	Sent to authorised facility for



Activity	EWC code	HP code <sup>14</sup>	Description	Estimated annual quantity	Storage and containment	Maximum quantity stored	Destination
management		HP 6, HP 7, HP 14	interceptor		waste oils drum indoors		recovery
Maintenance of on-site vehicles and machinery	15 02 02*	HP 3, HP 7, HP 14	Oily rags	5 kg	Garage (connected to oil-water separator)	5 kg	Sent to authorised facility for recovery
	13 02 06* 13 01 11*	HP 5, HP 6, HP 7, HP 14	Engine oils Hydraulic oils	50 L	Garage (connected to oil-water separator)	50 L	Sent to authorised facility for recovery
	15 02 02* 15 02 03	HP14 (if hazardous)	Toner machine filters	2 filters	WEEE treatment building	2 filters	Sent to authorised facility for disposal / recycling
Administration facilities	20 03 01	-	Mixed domestic waste	800 kg	Offices	5 kg	Sent to authorised facility for disposal
	20 01 01 20 01 02 20 01 39 20 01 40	-	Recyclable domestic waste	1,000 kg	Offices	10 kg	Sent to authorised facility for recycling

43. Shredded wood aimed for reuse as animal bedding / briquettes is not included in **Table 4** since the former MEPA had accepted that this material may be considered to have reached end-of-waste status under Schedule 10 of Legal Notice 184 of 2011. In light of recent test results indicating contamination by lead of the tested sample of wood from old TVs, retesting will be carried out once the IPPC permit is issued and the new site is operational. The Applicant expects that the improved operational controls at the new site will reduce the risk of contamination. Wood will be stored in the outdoor storage area (covered) prior to removal from site.

### Relevant Hazardous Substances and Waste

44. Many of the incoming waste items (**Table 2**) and some of the outgoing wastes (**Table 4**) are classified as hazardous. In addition, most of the raw materials proposed (excluding charcoal, see **Table 3**) are also hazardous; Safety Data Sheets are included in **Appendix 4**.
45. The main contaminants which, without mitigation, would be relevant to land / groundwater contamination are identified in **Table 5**, together with the processes associated with these contaminants. It is noted that toner powder is typically not classified as hazardous waste, and is therefore not included here.

**Table 5: Main contaminants of relevance to land / groundwater contamination**

Contaminants	Justification for inclusion	Associated processes
Hydrocarbons from diesel / oils	Used as raw materials	Operation and maintenance of vehicles
	May be present in WEEE motors	Manual dismantling of general WEEE and storage of separated components
	Oily waste is generated on site	Maintenance of site vehicles and machinery
		Surface water management (oil-water interceptor)
Metals	Present in most WEEE	Treatment of certain WEEE (notably oil heaters)
		Manual dismantling of general WEEE and storage of separated components
		Crushing of fluorescent tubes / lamps (contain mercury vapour and phosphor <sup>17</sup> )
	Breaking of CRT neck (contains lead, barium, strontium, zirconium, fluorescent coatings / phosphors <sup>18</sup> )	
	Lead-acid batteries contain lead	Storage of batteries
Sulphuric acid	Present in lead-acid batteries	Storage of batteries

<sup>17</sup> The phosphor in fluorescent tubes is typically either calcium halophosphate (in older lamps), or a mix of rare earth compounds and barium / aluminium oxide (in newer triphosphate lamps).

<sup>18</sup> In CRTs, these can include zinc, cadmium and yttrium sulphides, copper or silver chloride and occasionally arsenic.

46. Refrigerants in fridges / freezers (and other equipment), as well as LPG, are gaseous under normal temperature and pressure, and so do not present a risk of land or groundwater contamination; therefore they have been excluded from **Table 5**.

## Risk Assessment Methodology

### Source-Pathway-Receptor Linkage

47. An environmental risk occurs when there is a means by which a hazard can result in a deleterious impact on the surrounding environment, i.e. receptors. The presence of a hazard alone does not constitute a risk. A risk is only present if there is a pathway which links the source (hazard) to the receptor. This is known as the source-pathway-receptor linkage.<sup>19</sup>
48. Environmental risk assessment is the process by which source-pathway-receptor linkages are identified and evaluated. If any of the three elements are absent then there is no complete linkage and thus no unacceptable risk.

### Risk Assessment Criteria

49. If a source-pathway-receptor linkage is found, the magnitude of a risk is a function of the consequences of pollution and the likelihood that such pollution will occur.
50. The risk criteria being applied to this assessment are based on a matrix consistent with the Australian Standard AS4360 on Risk Management and ISO 31010: *Risk management: Risk assessment techniques*.
51. **Table 6** presents criteria for assessing environmental consequences, whereas **Table 7** presents criteria for assessing the likelihood of the event occurring.
52. The overall risk level is then determined by combining the two factors, using the matrix in **Table 8**.

**Table 6: Criteria for assessing environmental consequences**

Severity level	Effects on natural environment
1: Insignificant	Limited damage to minimal area of low significance.
2: Minor	Minor effects on biological or physical environment. Minor short/medium-term damage to small area of limited significance.
3: Moderate	Moderate effects on biological or physical environment (e.g. air, water) but not affecting ecosystem function. Moderate short/medium-term widespread impacts (e.g. significant spills).
4: Major	Serious environmental effects with some impairment of ecosystem function. Relatively widespread medium-long term impacts.
5: Catastrophic	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment (e.g. national park).

<sup>19</sup> Defra (2002) *Groundwater Protection Code: Petrol Stations and other Fuel Dispensing Facilities involving Underground Storage Tanks*  
<http://archive.defra.gov.uk/environment/quality/water/waterquality/ground/documents/groundwater-petrol.pdf>.

**Table 7: Measure of likelihood**

Level	Descriptor	Description	Guideline frequency
A	Almost Certain	Consequence is expected to occur in most circumstances	Occurs more than once per month
B	Likely	Consequence will probably occur in most circumstances	Occurs once every 1 month - 1 year
C	Occasional	Consequence should occur at some time	Occurs once every 1 year - 10 years
D	Unlikely	Consequence could occur at some time	Occurs once every 10 years - 100 years
E	Rare	Consequence may only occur in exceptional circumstances	Occurs less than once every 100 years

**Table 8: Risk matrix**

Likelihood	Environmental consequence					No pollutant linkage
	1: Insignificant	2: Minor	3: Moderate	4: Major	5: Catastrophic	
<b>A: Almost Certain</b>	Low	Moderate	Extreme	Extreme	Extreme	None
<b>B: Likely</b>	Low	Moderate	High	Extreme	Extreme	
<b>C: Occasional</b>	Very low	Moderate	High	High	Extreme	
<b>D: Unlikely</b>	Very low	Low	Moderate	High	High	
<b>E: Rare</b>	Very low	Low	Moderate	Moderate	High	

## Risk Assessment

### Overview

53. As described, the Scheme's operations will include storage and processing of hazardous substances and waste which, without mitigation, could create a risk to land and groundwater through underground, surface and airborne pollution.
54. **Table 9** summarises potential sources of pollution and the respective pathway to the relevant receptors. The generation of used fire-fighting water in the event of a fire / explosion has also been considered.
55. **Table 9** also includes the mitigation measures that will be adopted to mitigate such risks, distinguishing between fixed structural elements incorporated into the Scheme and procedural mitigation measures. It is to be noted that all the mitigation measures in the Table will be implemented in the Scheme.





**Table 9: Pollution pathway identification and mitigation measures**

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Spillage of diesel / oils	Permeable strata above water table; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> <li>Entire site surface covered in concrete underlain by a geotextile membrane.</li> <li>Building for temporary storage of incoming waste, having gutters leading to an impermeable cesspit.</li> <li>Garage floor laid to fall to an oil-water interceptor leading to a reservoir (which overflows to road; the overflow will only be installed when PA 6212/19 is granted).</li> <li>The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Incoming waste sorted in WEEE treatment building.</li> <li>Diesel / oil raw materials stored in garage.</li> <li>WEEE motors stored in a bunded area inside the main building.</li> <li>Oily waste stored in a bund; oils from the interceptor are typically retained in the interceptor until collected.</li> <li>Unauthorised waste to be stored in quarantine area (closed skip or similar).</li> <li>An inspection and maintenance programme for storage and containment areas will be in place.</li> <li>Spill prevention and response plan and spill kits in place; staff training.</li> </ul>
Metal emissions from manual dismantling of general WEEE and storage of separated components	Air dispersion (prevailing wind direction); wastewater from floor washing; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> <li>Entire site surface covered in concrete underlain by a geotextile membrane.</li> <li>Wastewater from any washing of floors in the WEEE treatment building will be collected in gutters, received in an underground impermeable cesspit and treated to remove trace contaminants before reuse.</li> <li>The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>Incoming waste sorted in WEEE treatment building.</li> <li>Dismantling will occur indoors in the main building; hazardous components will be stored in this building or in the outdoor area (covered).</li> <li>Unauthorised waste to be stored in quarantine area (closed skip or similar).</li> <li>Replacement of wastewater filters in accordance with maintenance schedule.</li> </ul>

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Mercury / phosphor emissions from fluorescent tube crushing	Air dispersion (prevailing wind direction); wastewater from tube and floor washing; rainwater runoff; direct contamination of permeable strata above water table (from wastewater)	Land Groundwater	<ul style="list-style-type: none"> <li>Crusher installed inside a purposely built two-room system with double doors (cannot be opened simultaneously) and sealed windows.</li> <li>Negative pressure unit linked to a HEPA filter and two activated carbon filters.</li> <li>Sealed vinyl flooring inside crushing room.</li> <li>Wastewater will be received in a sealed prefabricated stainless steel tank housed inside a lined concrete chamber, and treated using sand and carbon filters to remove mercury before reuse. Tank will be fitted with level gauge to ensure no overfilling.</li> <li>Entire site surface covered in concrete underlain by a geotextile membrane.</li> </ul>	<ul style="list-style-type: none"> <li>Operation of a water mister inside the crushing room.</li> <li>Storage of incoming broken fluorescent tubes / lamps inside crushing room.</li> <li>Replacement of air and wastewater filters in accordance with maintenance schedule.</li> <li>Monitoring of emissions as required by IPPC permit.</li> <li>Industrial vacuum cleaners equipped with mercury filters will be available to immediately clean up any accidental breakages of fluorescent tubes / lamps.</li> <li>Operators wear disposable overalls.</li> </ul>
Metal / phosphor emissions from breaking of CRT neck	Air dispersion (prevailing wind direction); wastewater from floor washing; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> <li>CRT breaking room includes an air extraction unit equipped with a HEPA filter; room will be fitted with a thick HDPE curtain.</li> <li>Entire site surface covered in concrete underlain by a geotextile membrane.</li> <li>Wastewater from washing of floors will be collected in gutters, received in an underground impermeable cesspit and treated to remove trace contaminants before reuse.</li> </ul>	<ul style="list-style-type: none"> <li>Broken CRT TVs / monitors stored in jumbo bags in designated area indoors.</li> <li>Only undamaged jumbo bags will be used for storage of broken CRTs; jumbo bags will be closed well when full.</li> <li>Replacement of air and wastewater filters in accordance with maintenance schedule.</li> <li>Operators wear disposable overalls.</li> </ul>

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Leakage of lead / acid from batteries	Permeable strata above water table; wastewater from floor washing; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> <li>Entire site surface covered in concrete underlain by a geotextile membrane.</li> <li>Wastewater from any washing of floors in the WEEE treatment building will be collected in gutters, filtered to remove trace contaminants, and received in an underground cesspit for reuse.</li> </ul>	<ul style="list-style-type: none"> <li>Batteries stored in a container inside the WEEE treatment building.</li> <li>Quantity of batteries stored limited to 1 tonne.</li> <li>An inspection and maintenance programme for storage and containment areas will be in place.</li> </ul>
Used fire-fighting water (generated in case of a fire / explosion)	Permeable strata above water table; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> <li>Dedicated 100 m<sup>3</sup> reservoir 1 (always kept full for fire-fighting purposes) to provide 2.5 hours of fire-fighting water</li> <li>Used fire-fighting water will be received in different cesspits / reservoirs depending on the area on site, as follows: <ul style="list-style-type: none"> <li>WEEE treatment building: Received in underground cesspit with automatic level meter to ensure spare capacity of 22.5 m<sup>3</sup>; cesspit overflows to weighbridge pit (capacity of 50 m<sup>3</sup>; any overflow would be to the separator and then reservoir 2);</li> <li>Outdoor areas, covered storage area and garage: Reservoir 2 (476 m<sup>3</sup>), after treatment in oil-water separator; any overflow to road will be of treated water (the overflow will only be installed when PA 6212/19 is granted).</li> </ul> </li> <li>Fluorescent tube crushing room equipped with automatic gas suppression system, based on argonite; no used water will be generated in this area. Room equipped with a fire resistant door.</li> </ul>	<ul style="list-style-type: none"> <li>A fire and explosion prevention and response plan will be commissioned by the Applicant once the Scheme has been constructed.</li> <li>A competent fire expert has been engaged to advise on and install a fire detection system and any additional fire-fighting equipment required.</li> <li>Fire safety procedures and equipment will be certified by a competent fire expert once they are in place.</li> <li>Signage for safe operation will be installed (e.g. no smoking signs).</li> <li>No storage of flammable substances in the fluorescent tube crushing room.</li> </ul>





## Identification of Potential Releases

56. Releases could occur from accidental spillages of diesel, oils and oily waste stored and handled on site, as well as leaks from vehicles / equipment and drips from maintenance activities. The substances released would be hydrocarbon-based, and if the largest container is spilt entirely the maximum quantity released would be limited to 50 L of diesel or hydraulic / engine oil, since storage beyond these quantities will not be required.
57. Dismantling of general WEEE could result in the release of hazardous metal components. However, most WEEE components (e.g. hard drives, printed circuit boards) are solids and significant metal leaching is not expected under normal conditions. This activity therefore presents a minimal pollution risk.
58. Air emissions containing hazardous metals will also be generated from fluorescent tube crushing and breaking of CRT monitors. Hazardous wastewater (contaminated with mercury) will also be generated from washing of crushed fluorescent tubes. Mitigation measures will, however, be in place to reduce air emissions and to treat the wastewater.
59. Leaks of acid and lead could also result in a release; however, considering that battery storage will be limited to 1 tonne (**Table 4**) the maximum release is estimated at less than 100 kg. It is to be noted that even a release of this magnitude would require a serious incident such as a forklift truck crashing into the battery container.
60. Used fire-fighting water will also be generated in some areas of the Site in the event of a fire / explosion, and, without mitigation this may become contaminated with hazardous substances / waste being stored on site.

## Identification of Migration Pathways

### Without Mitigation

61. In the absence of mitigation, including site containment, spills and leaks of diesel, oils, hazardous wastewater from fluorescent tube washing, and lead / acid from batteries could contaminate land directly and potentially also reach the groundwater through the permeable rock strata underlying the site, although some attenuation is expected due to the depth of rock above the groundwater.
62. Wastewater from washing of indoor areas, particularly the fluorescent tube room and CRT breaking room, could also become contaminated and present a migration pathway.
63. Spills could also contaminate rainwater reaching the site, resulting in potential on-site and off-site contamination of land (and eventually groundwater) through rainwater runoff. A similar contamination scenario could occur if used fire-fighting water is generated.

64. The pathway for air emissions would be air dispersion, particularly in the prevailing wind direction, as well as contamination through precipitation of the pollutants in rainwater.

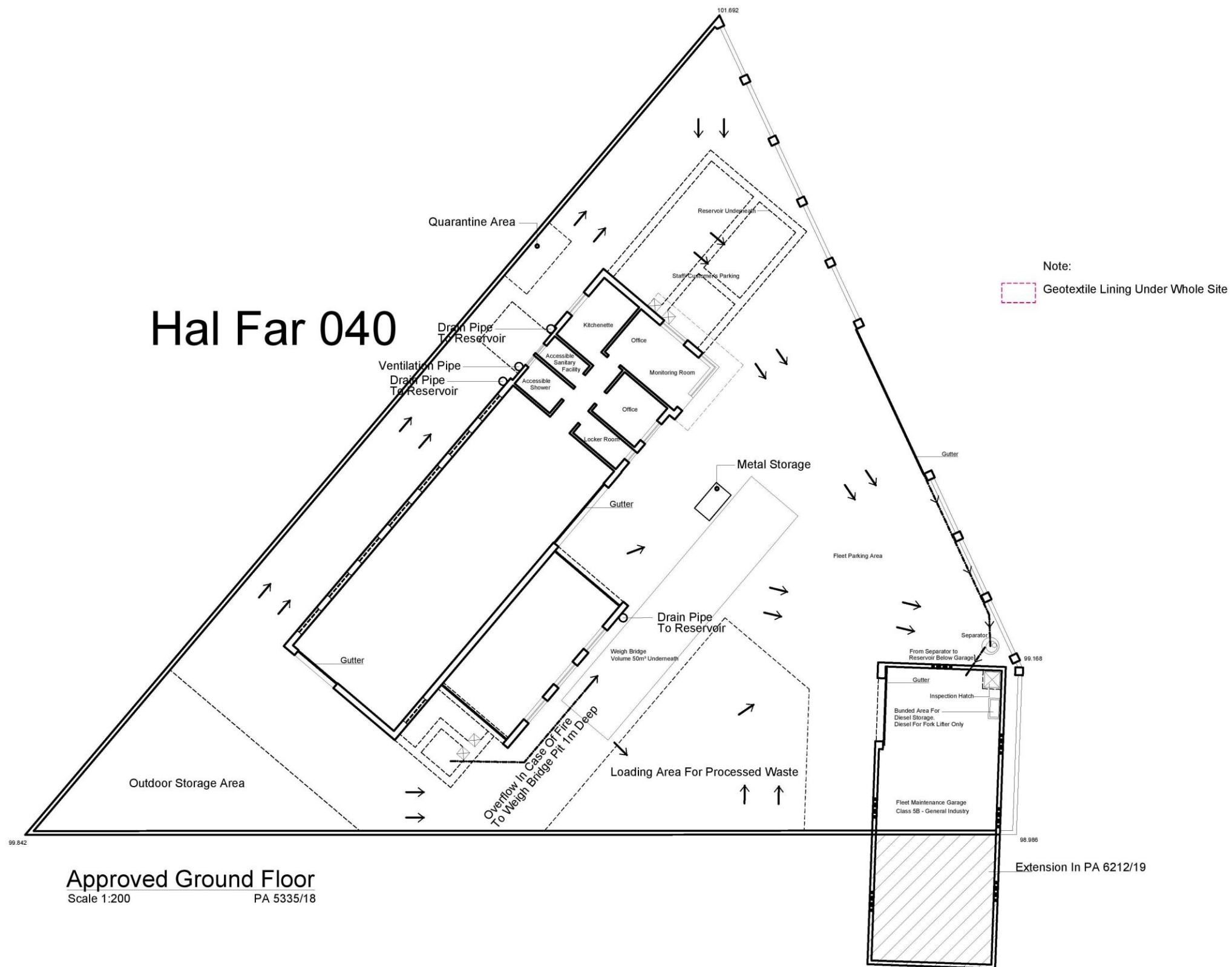
### **With Mitigation**

65. A number of mitigation measures will be in place at the Scheme to prevent migration of contaminants towards land and groundwater, as described below and in **Table 9**.
66. The entire Scheme site will be concreted and lined with an underlying impermeable geotextile membrane. As shown in **Figure 19**, the ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a 476 m<sup>3</sup> reservoir (**Figure 20**), therefore surface water (and any spills) from these areas will be treated. Spills can also be collected by trained site operators using spill kits.
67. Wastewater from washing of floors inside the WEEE treatment building (including the CRT breaking room) will be collected in gutters and received in an underground impermeable ventilated cesspit to remove trace contaminants before reuse (**Figure 20**). It is envisaged that the wastewater treatment system will consist of a sand and carbon filter followed by Reverse Osmosis.
68. The fluorescent tube crusher room will, however, have a separate wastewater management system. The crushing machine will have an underlying water tank, in which water used to wash the tubes is recirculated for reuse in a closed-loop system. The room will also be connected, through open floor drains, to a sealed 1 m<sup>3</sup> prefabricated stainless steel tank designed to receive wastewater from floor cleaning, any spills from the crusher's water tank, and used water from the same water tank (in the event that it needs to be replaced). Wastewater in the steel tank will be treated using a sand filter and an activated carbon filter, and returned to the same cesspit. The tank will be sealed<sup>20</sup>, and housed inside a concreted and lined impermeable chamber. The treated wastewater generated will be reused for washing of fluorescent tubes during crushing and cleaning of this room, and a level gauge will be installed with an alarm to ensure that the tank's capacity is not reached. This room will also have sealed vinyl flooring.
69. Hazardous waste and raw materials will also be stored in designated areas; liquid waste / raw materials will be bunded, while solid waste will be stored under cover or inside a building.

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<sup>20</sup> The ventilation pipe will emit to the tube crushing room, which will have air filtration.

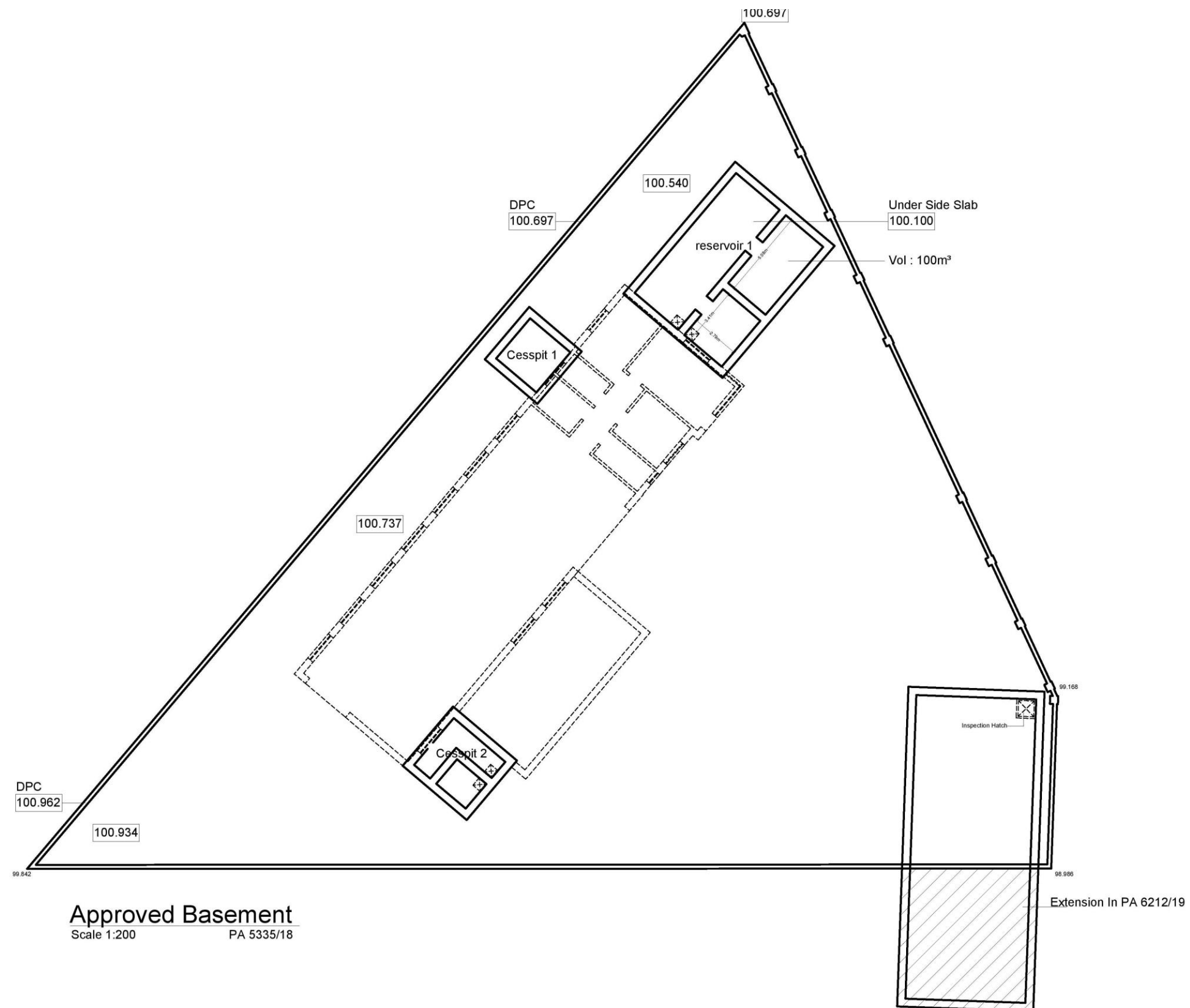
**Figure 19: Effluent management (outdoor areas)**







**Figure 20: Reservoirs and cesspits**





70. Crushing of fluorescent tubes / lamps will be carried out inside a purposely built internal room located within a second outer room. These rooms will be equipped with a double-door system, where an automatic system will be installed such that the internal door can only be opened once the external door has been closed (and vice-versa); both doors will be kept closed except when personnel are entering / exiting the area, and will be kept closed during the crusher's operation. The outer room's windows will be sealed to prevent unauthorised opening. In the internal room, a water mister will be in continual operation to encourage wet precipitation of dust, and the room will be equipped with a negative pressure unit, thus creating a seal. The exhaust air from the negative pressure unit will include three filters in series, as follows:
- Two activated carbon filters: The first filter (F-55) will be inside the crushing room, while the second filter (Dorex) will be installed outside the crushing room. The first filter will be impregnated with sulphur to capture mercury;
  - A HEPA filter, having up to 99.97% filtration efficiency on particles  $\geq 0.3 \mu\text{m}$ .
71. This abatement system is expected to ensure that mercury emissions from fluorescent tube crushing are lower than 0.001 ppb ( $0.008 \mu\text{g}/\text{m}^3$ ); correspondence in this regard from the supplier is included in **Appendix 6**. Additionally, broken incoming fluorescent tubes will be stored immediately inside the internal fluorescent tube room, awaiting processing. Care will also be taken during storage and handling to reduce the risk of breakage outside the fluorescent tube room; nonetheless, industrial vacuum cleaners equipped with mercury filters will be available to immediately clean up any accidental breakages of fluorescent tubes / lamps.
72. Breaking of the CRT neck will take place in a CRT breaking room that includes a thick HDPE curtain with 1 – 2 inch overlapping panels, equipped with an air extraction unit connected to a HEPA filter. Additionally, site operatives will ensure that broken CRTs are only stored in undamaged jumbo bags; the integrity of jumbo bags will be inspected prior to use, and jumbo bags will be closed well when full.
73. Filters will be replaced at intervals in accordance with the maintenance plan, and an air monitoring programme will be in place. Additionally, disposable overalls will be worn by employees working in the CRT / fluorescent tube crushing areas to ensure that any particles that adhere to clothing / shoes are not taken outside; these will be disposed of as hazardous waste.
74. In the event of a fire / explosion, a  $100 \text{ m}^3$  dedicated underground reservoir (reservoir 1) will provide fire-fighting water to contain and put out the fire as soon as possible. This reservoir will always be kept full for fire-fighting purposes.
75. Used fire-fighting water from the WEEE treatment building will be received in the underground  $26.5 \text{ m}^3$  cesspit; a level gauge will be installed to ensure there is

always at least 22.5 m<sup>3</sup> spare capacity in this cesspit, which corresponds to 30 minutes of fire-fighting activity. This cesspit overflows to the 50 m<sup>3</sup> weighbridge pit; any overflow would be to reservoir 2, located beneath the maintenance garage (after treatment in an oil-water separator). Reservoir 2, which has a capacity of 476 m<sup>3</sup>, overflows to road (the overflow will only be installed when PA 6212/19 is granted); however, given that the capacity of this reservoir is far in excess of the fire-fighting water capacity of the site, an overflow of used fire-fighting water from this reservoir is a remote scenario.

76. Used fire-fighting water from the outdoor areas and the garage will be collected in a 476 m<sup>3</sup> reservoir (reservoir 2) after treatment in an oil-water separator; this reservoir overflows to the road. Any overflows to the road surface will therefore be of treated water, however, as mentioned the likelihood of an overflow is remote (the overflow will only be installed when PA 6212/19 is granted).
77. Used fire-fighting water will not be generated in the fluorescent tube crushing room. This room will be equipped with an automatic gas suppression system that uses aragonite rather than water. In order to reduce the likelihood and spread of fire inside this room, it will be equipped with a fire resisting door providing two hours of fire resistance, and there will be no storage of flammable substances inside the room.

### Identification of Potential Receptors

78. In the event of a spill or leak, in the unmitigated scenario the main receptor is the underlying land. The geology of the site and its immediate surroundings are as shown in **Figure 21**. At the Scheme site, the exposed rock formation is Lower Globigerina Limestone and Lower Coralline Limestone.
79. Contaminants could also eventually reach the groundwater in the unmitigated scenario. The mean sea level aquifer is the principal hydrogeological feature in the area (**Figure 22**), and the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface. The site is located outside the Groundwater Safeguard Zone; however, there are seven groundwater boreholes (six private, one public) located within around 400 m of the site. However, in the event of a spill, some attenuation of contaminants is expected even in the unmitigated scenario, considering that there is a considerable depth of rock before the material is able to reach the groundwater (provided there are no direct routes to groundwater, such as fissures).
80. The closest receptors sensitive to emissions to air from the Scheme are the residences located approximately 175 m north of the Scheme site. However, these are not considered in this risk assessment, which is aimed at identifying land and groundwater risks. Without mitigation, air emissions may also be deposited onto land and eventually find their way to the groundwater (although significant attenuation is expected before contaminants reach groundwater).

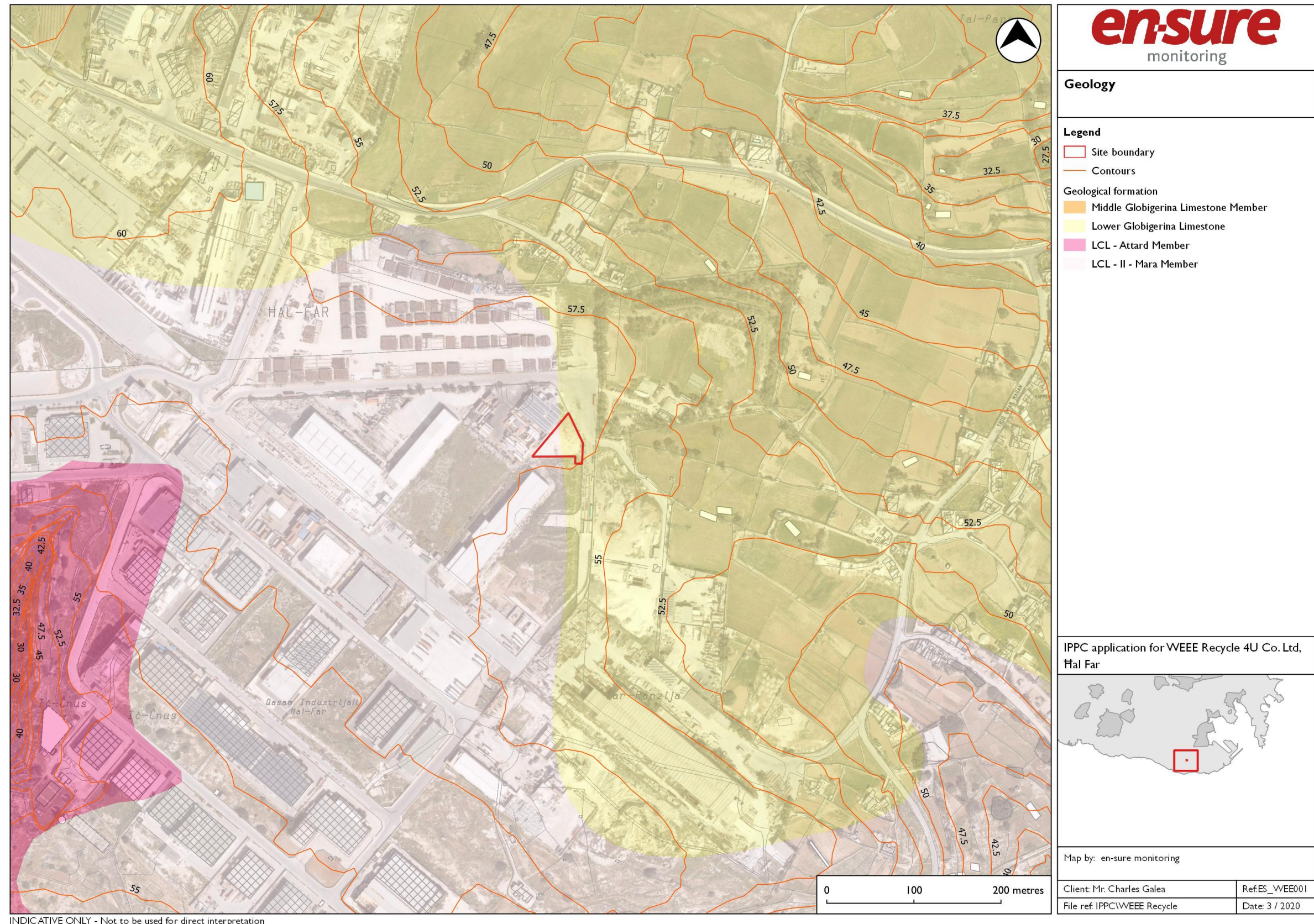


81. In the event of a fire, in the unmitigated scenario the relevant receptors for used fire-fighting water are the land and, to a lesser extent due to attenuation, the groundwater. With mitigation, the risk to receptors is reduced since:
- Used fire-fighting water from the outdoor areas and the garage will be treated in the oil-water interceptor before being received in a 476 m<sup>3</sup> reservoir, and any overflows to the road surface will be of treated water (the overflow will only be installed when PA 6212/19 is granted), although the chances of this being required are remote;
  - Used fire-fighting water from the WEEE treatment building will be received in an impermeable concreted cesspit with a capacity for at least 30 minutes of fire-fighting water, and which overflows to the weighbridge pit and then reservoir 2 if this fills up (526 m<sup>3</sup> capacity in total); the chances of an overflow to road being required is remote (the overflow will only be installed when PA 6212/19 is granted);
  - No used fire-fighting water will be generated in the fluorescent tube crushing room.
82. There are no protected areas in the immediate vicinity of the site that could act as receptors. The nearest protected site is located just over 200 m away, and is an area designated as a Special Protected Area (SPA), Special Area of Conservation (SAC) – Candidate Site of International Importance, and scheduled as an Area of Ecological Importance / Site of Scientific Importance (AEI / SSI). The cliffs making up this part of the SPA / SAC are home to protected seabird breeding colonies, including the Scopoli's and Yelkouan Shearwaters. The blue rock thrush (*il-merill*), which is a species of conservation importance, also frequents and breeds in the area.





**Figure 21: Geology of the Scheme site and its surroundings**

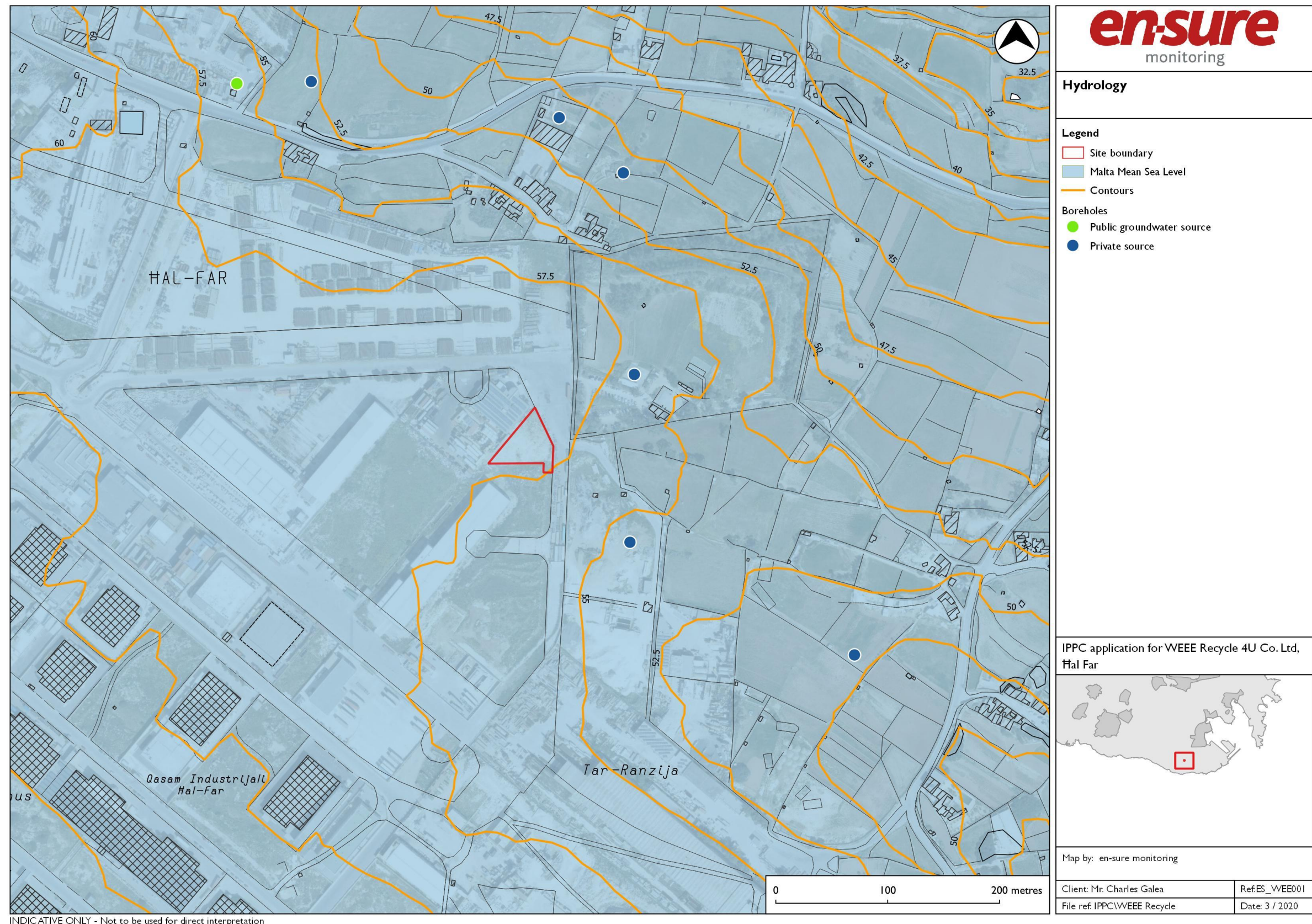








**Figure 22: Hydrology of the Scheme site and its surroundings**







## Risk Evaluation

83. The risks to land and groundwater will be assessed using the evaluation criteria described earlier.
84. The risks associated with both the unmitigated and mitigated scenarios are evaluated. It should be noted that the Scheme proposes to include all the mitigation measures described.

## Without Mitigation

85. **Table 10** presents risk levels for each source in the scenario without mitigation.

**Table 10: Risk levels without mitigation**

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spillage of diesel / oils	Minor	Likely	Moderate
Metal emissions from manual dismantling of general WEEE and storage of separated components	Minor	Likely	Moderate
Mercury / phosphor emissions from fluorescent tube crushing	Major	Almost certain	Extreme
Metal / phosphor emissions from breaking of CRT neck	Moderate	Almost certain	Extreme
Leakage of lead / acid from batteries	Moderate	Likely	High
Used fire-fighting water	Major	Occasional	High

86. Leaks of diesel / oils from vehicles are rather common, although failure of storage containers is less so. The environmental consequence is being considered as minor, due to the small quantities in use / storage. The extent of any leak / spill would be quite limited and localised.
87. Metal emissions from manual dismantling of general WEEE and storage of separated components are being classified as minor, since most WEEE components are solids and significant metal leaching is not expected under normal conditions. This scenario is being classified as likely, since while dismantling is a routine operation at the Scheme, not all WEEE contain hazardous metals.
88. The environmental consequences of air emissions and discharge of contaminated wastewater from fluorescent tube crushing are considered major in the unmitigated scenario, due to the particular hazards of mercury and the fact that the glass will be finely crushed. The likelihood is almost certain since such emissions are routinely expected from fluorescent tube crushing.
89. Emissions from breaking of the neck of CRT monitors / screens are considered to have moderate consequences, since there is no fine crushing of the monitor, thus limiting the generation and dispersal of fine particles, and the potential for contamination of wash water by these particles. However, as such emissions are routinely generated the likelihood has been classified as almost certain.

90. The environmental consequences of lead / acid emissions from batteries, if the mitigation measures planned (including limiting the quantity stored) are not implemented, are considered to be moderate. If batteries are not stored properly, leakages to land / groundwater are routinely expected (typically in small quantities but over a prolonged period), and therefore this scenario has been classified as likely.
91. Without mitigation, used fire-fighting water could result in major environmental consequences if contaminated with hazardous substances, including mercury. The likelihood of a major fire is occasional considering the flammability of the substances in storage (e.g. wood).

### With Mitigation

92. **Table 11** presents risk levels for each source in the scenario with mitigation as planned.

**Table 11: Risk levels with mitigation**

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spillage of diesel / oils	No pollutant linkage		None
Metal emissions from manual dismantling of general WEEE and storage of separated components	Insignificant	Occasional	Very low
Mercury / phosphor emissions from fluorescent tube crushing	Insignificant	Almost certain	Low
Metal / phosphor emissions from breaking of CRT neck	Insignificant	Almost certain	Low
Leakage of lead / acid from batteries	Insignificant	Occasional	Very low
Used fire-fighting water from outdoor areas and garage	Minor	Rare	Very low
Used fire-fighting water from WEEE treatment building	Minor	Rare	Very low
Used fire-fighting water from fluorescent tube crushing room	No pollutant linkage		None

93. Considering that the Scheme will have an impermeable hardstanding and oil-water interceptor leading to a concreted reservoir, together with specific bunding for oily waste, any spills / leaks would not be able to contaminate the underlying land / groundwater as the pathway to the receptor would have been removed. As the pollutant linkage in this scenario has been removed, the resultant risk is reduced to none.
94. Since WEEE dismantling will be undertaken indoors, and storage of WEEE / WEEE components will take place either indoors or under cover, with wastewater from washing of floors being received in an impermeable cesspit and treated, with testing being carried out before any discharge to sewer or disposal, no significant metal emissions are expected from these activities. The likelihood of metal emissions being generated is classified as occasional, taking into account that the fact that significant metal leaching is not expected even without

abatement, and that not all WEEE contain hazardous metals; however, air from the dismantling area is not specifically treated.

95. Emissions to air of mercury from fluorescent tube crushing are expected to be lower than  $0.008 \mu\text{g}/\text{m}^3$ , which is well below the tolerable concentration of  $0.2 \mu\text{g}/\text{m}^3$  for long-term inhalation exposure to elemental mercury vapour estimated by the World Health Organisation (WHO)<sup>21</sup>. Cumulative impacts are also not expected since baseline monitoring has shown that existing mercury levels are below detection limits. Additionally, wastewater from this activity will be received in a sealed impermeable tank located within concrete containment and treated, with testing being carried out before any discharge to sewer or disposal. As a result, the environmental consequences of this activity can be classified as insignificant. The frequency has been retained as almost certain, since emissions to air and wastewater are routinely generated during crushing.
96. With mitigation, the environmental effects of CRT neck breaking are expected to be insignificant, since the HEPA filter has a 99.97% filtration efficiency on particles  $\geq 0.3 \mu\text{m}$ . Additionally, wastewater from this area will be collected in an impermeable cesspit and treated, with testing being carried out before any discharge to sewer or disposal is carried out. Emissions to air are routinely generated during dismantling and thus the frequency has been retained as almost certain.
97. Considering that the quantity of batteries stored will be limited and that the entire site will be impermeable, with wastewater from floor washing being received in an impermeable underground cesspit, treated and analysed for compliance with the applicable limit values before any discharge, the environmental consequences of a lead / acid leakage will also be insignificant. The occurrence of leaks will also be reduced through proper storage in a secondary container, which will be checked regularly to ensure that its integrity is maintained.
98. The environmental consequences of used fire-fighting water from the outdoor areas and garage are reduced to minor with mitigation, since used water will be treated in the interceptor; thus any overflow would be of treated water (the overflow will only be installed when PA 6212/19 is granted). The likelihood of a fire is reduced to rare, due to the operational procedures and equipment that will be in place to limit the risk of fire as well as reduce the risk of it spreading. Similarly, used fire-fighting water from the WEEE treatment building will be received in an impermeable concreted cesspit; this cesspit will have a spare capacity for at least 30 minutes of fire-fighting water and will overflow to a weighbridge pit and reservoir having a total capacity of  $526 \text{ m}^3$ ; therefore the possibility of overflow of untreated water to the road surface is remote (the overflow will only be installed when PA 6212/19 is granted). Additionally, as no

---

<sup>21</sup> World Health Organisation (2007) *Exposure to Mercury: A Major Public Health Concern*  
[www.who.int/phe/news/Mercury-flyer.pdf](http://www.who.int/phe/news/Mercury-flyer.pdf).

used fire-fighting water will be generated in the fluorescent tube crushing room, there is no environmental risk from this scenario.

## **Conclusion and Recommendations**

99. As a result of the planned mitigation measures, risks to land and groundwater from the Scheme are considered to be low and very low, with no risk to land / groundwater being detected in the case of spillages of hydrocarbon-based products and a fire in fluorescent tube crushing room.
100. Since baseline land / groundwater measurements are only required when the activity involves the use, production or release of relevant hazardous substances, and taking into account the possibility of soil and groundwater contamination by the Scheme, on the basis of this risk assessment, baseline land and groundwater monitoring is not considered necessary.
101. It is recommended that a monitoring programme is set up to ensure that the planned mitigation measures are implemented and functioning effectively. A monitoring programme is proposed in section B3.10 of the IPPC application.
102. It is also recommended that the risk assessment be updated in future if new categories of relevant hazardous substances / waste are proposed to be used or processed in significant quantities, or if the implementation / effectiveness of the planned mitigation measures is reduced.



## **Appendix 1: Report on the removal of dumped material**



**JOE GRECH BE & A (HONS) A & CE**  
ARCHITECT & CIVIL ENGINEER

Office 7, Cassia House, Cassia Road, Paola PA1906  
Tel: 2180 6548 Fax: 2182 0837 Mobile: 9877 6829  
Email: jg@jgrechj.com

27<sup>th</sup> August, 2015

The Chairman  
MEPA  
St. Francis Ravelin,  
Floriana

***RE: Construction of industrial unit for the recycling/treatment of waste  
electrical and electronic equipment at Hal Far – TRK 159436***

With reference to the removal of inert material illegally dumped on the site above-mentioned, the undersigned architect and civil engineer hereby certifies that approximately 3300 cu. Metres of inert material was excavated and transported by John Bonavia & Nephews Ltd. The material was dumped at the Bilven Quarries at Wied Incita, Attard.

Kindly acknowledge receipt of this letter.

Regards,

**Joe Grech A&CE**



## **Appendix 2: Baseline air monitoring for mercury**



Member of the Royal Society of Chemistry N°.: 440777

Dr. Robert Cortis  
B.Sc. (Hons.) *Melit.* M.Sc. *Melit.* Ph.D. (Strathclyde) MRSC  
*Industrial & Environmental Chemist*

7, Little Danny Fl. 2,  
Dun Xand Cortis Street,  
Birkirkara, BKR 1530,  
Malta, EU.  
VAT N°.: MT 1852-1917

Tel N°.: +356 21440144

Mob N°.: +356 79069621

E-mail: robert.cortis.02@um.edu.mt

## Hg in Air Monitoring Report

### Details of Client and Project Site

Client:	WEEE Recycle IT Ltd.
Address:	47, Old Railway Track, St. Venera, SVR 9014, Malta
Project Site:	HHF 040, Hal Far Industrial Estate, Malta
Test Date:	03 August 2015

### Test Type

Indoor Air Quality	
Outdoor Air Quality	✓

### Operating Procedure

Sampling was carried out actively using an ultralow-volume sampler (SKC Universal 224-44MTX 5-4000 ml/min Pump) connected to an Anasorb C300 tube (SKC 226-17-3A) with a flow rate of 0.2 L/min. The sample tube's flow rate was calibrated *in situ* using a Field Rotameter (SKC 320-2A05 50-500 ml/min). The sample tube was supplied by, and then returned for analysis to, SAL Ltd. of 9, Hadfield House, Hadfield Street, Manchester, M16 9FE, England (UK). The laboratory is ISO 17025:2005 Accredited. The analysis of the sample tube followed standard method NIOSH 6009 and was carried out using CVAFS. This test is specifically accredited. The laboratory report is reproduced separately with this report.

### Limit Values

The existing limit values for Hg are listed in Table 1 below. The strictest limit is the WHO's long-term inhalation value, which should not be exceeded at any time.

**Table 1:** Stipulated limit values

Document	Limit value	Comment
EH40:2005 (WEL)	0.02 mg/m <sup>3</sup> ( $\equiv$ 20 $\mu$ g/m <sup>3</sup> )	8-hr TWA
WHO	1 $\mu$ g/m <sup>3</sup>	Annual average
WHO	0.2 $\mu$ g/m <sup>3</sup>	Long-term inhalation
WHO	2 $\mu$ g/kg body weight/day	Tolerable intake of total mercury

### Job Description

A background air sample has been collected from the point on the site where the stack for emissions from the fluorescent tube crusher is proposed to be constructed. This sample was collected during the hot and arid summer conditions. The sampling day was chosen based on the meteorological prediction of having southerly winds to place the sampling site downwind of a nearby cement factory, whose operation is a known potential source of airborne Hg emissions.



The monitoring details and results (taken from the laboratory report) are given in Table 2.

**Table 2: Sampling Details and Test Results**

Sampling details	08.45 am of 03/08/15 to 16.45 pm of 03/08/15
Total sampled volume, L	96
Total mass determined, ng	<5
<b>Total concentration of Hg (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>&lt;0.052</b>
<b>Remarks</b>	<b>Below Limit Values*</b>
Relevant Activity	Background – Hot / Arid Conditions

\*Refer to values listed in Table 1

The meteorological conditions on the day of sampling are listed in Table 3.

**Table 3: Meteorological Conditions**

Max Temperature, °C	35.9
Min Temperature, °C	30.4
Total Rain, mm	Nil
Mean Humidity, %RH	55
Mean Wind Direction, °	212 (SSW)
Mean Wind Speed, km/h	11.1

The wind direction was generally ideal with respect to placing the sampling location downwind of the cement factory nearby. A map showing the respective locations, as well as the predominant wind direction on this sampling date is attached at the end of this report.

### Concluding Remarks

Under these meteorological conditions, the *in situ* background Hg levels are very low, so much so that they are lower than the instrumental limit of detection. Therefore, the strictest WHO limit value of  $0.2 \mu\text{g}/\text{m}^3$  is not being exceeded. Any contribution of airborne Hg from nearby potential sources appears to be negligible at this time.

Another sample shall be collected in the near future from the same sampling point, with a similar wind direction, after the initial autumn heavy rains and cooler temperatures.

The background results shall then be used as benchmarks for comparison with monitoring results taken during the eventual plant operations.

**Report issued on:** 11 September 2015

**Name of Air Quality Consultant:** Dr. Robert Cortis  
B.Sc. (Hons.) M.Sc. Ph.D. MRSC

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-Authorised representatives of the abovementioned Client & Project Site  
-Authorised representatives of the Occupational Health and Safety Authority (OHSA)

Distribution to other parties is strictly prohibited, unless by mutual consent of the Author and of the abovementioned authorised representatives.

**Signed:** \_\_\_\_\_

## Land uses

### Legend

- Location of site
- Area of study

### Land uses

- Agriculture
- Commercial / Community services
- Energy production and distribution
- Goods and freight terminals
- Road storage and distribution
- Manufacturing
- Residential
- Sports facilities
- Storage
- Vacant

DN 01678/13 - Construction of an industrial unit for the recycling / treatment of WEEE, Hal Far



Map by: Adi Associates Environmental Consultants Ltd

Client: WEEE Recycling	Ref: WEE001
Rev: 01/06/2006 (Revised Map)	Date: 10/1/2017



# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2404

Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 499115-1

**Date of Report:** 12-Aug-2015

**Customer:** Robert Cortis  
7  
Little Danny Fl.2  
Dun Xand Cortis Str  
Birkirkara BKR 1530  
Malta

**Customer Contact:** Mr Robert Cortis

**Customer Job Reference:** HHF 040, Hal Far Industrial Estate

**Date Job Received at SAL:** 05-Aug-2015

**Date Analysis Started:** 06-Aug-2015

**Date Analysis Completed:** 12-Aug-2015

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with SAL SOPs

All results have been reviewed in accordance with Section 25 of the SAL Quality Manual



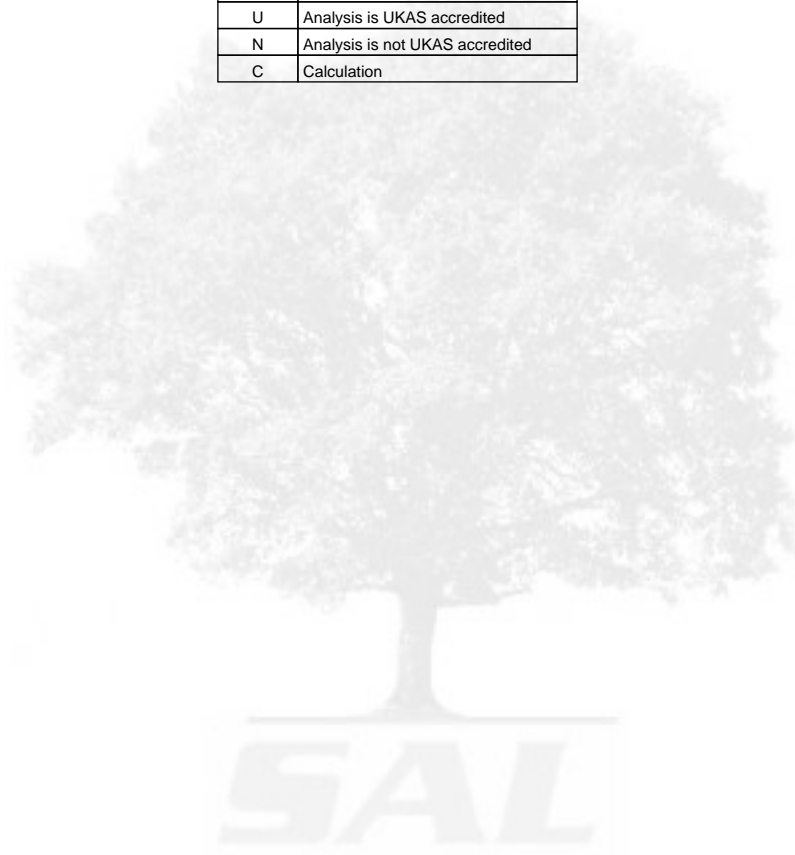
Report checked  
and authorised by :  
Mary Drury  
Project Manager

Issued by :  
Mary Drury  
Project Manager

<b>SAL Reference:</b> 499115					
<b>Customer Reference:</b> HHF 040, Hal Far Industrial Estate					
<b>Tube (Anasorb C 300)</b> Analysed as Tube (Anasorb C 300)					
<b>Miscellaneous</b>					
<b>SAL Reference</b>			<b>499115 001</b>		
<b>Customer Sample Reference</b>			<b>HHF 040, HAL FAR INDUSTRIAL ESTATE</b>		
<b>Test Sample</b>			<b>AR</b>		
<b>Volume l</b>			<b>96</b>		
<b>Date Sampled</b>			<b>03-AUG-2015</b>		
<b>Determinand</b>	<b>Method</b>	<b>LOD</b>	<b>Units</b>	<b>Symbol</b>	
Mercury	CVAFS	5	ng	U	<5
	Calc	Calc	ug/m3	N	<0.052
	Calc	Calc	ppb	N	<0.0063

## Index to symbols used in 499115-1

Value	Description
AR	As Received
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited
C	Calculation





Member of the Royal Society of Chemistry N°.: 440777

Dr. Robert Cortis  
B.Sc. (Hons.) *Melit.* M.Sc. *Melit.* Ph.D. (Strathclyde) MRSC  
*Industrial & Environmental Chemist*

7, Little Danny Fl. 2,  
Dun Xand Cortis Street,  
Birkirkara, BKR 1530,  
Malta, EU.  
VAT N°.: MT 1852-1917

Tel N°.: +356 21440144

Mob N°.: +356 79069621

E-mail: robert.cortis.02@um.edu.mt

## Hg in Air Monitoring Report

### Details of Client and Project Site

<b>Client:</b>	WEEE Recycle IT Ltd.
<b>Address:</b>	47, Old Railway Track, St. Venera, SVR 9014, Malta
<b>Project Site:</b>	HHF 040, Hal Far Industrial Estate, Malta
<b>Test Date:</b>	14 October 2015

### Test Type

<b>Indoor Air Quality</b>	
<b>Outdoor Air Quality</b>	✓

### Operating Procedure

Sampling was carried out actively using an ultralow-volume sampler (SKC Universal 224-44MTX 5-4000 ml/min Pump) connected to an Anasorb C300 tube (SKC 226-17-3A) with a flow rate of 0.2 L/min. The sample tube's flow rate was calibrated *in situ* using a Field Rotameter (SKC 320-2A05 50-500 ml/min). The sample tube was supplied by, and then returned for analysis to, SAL Ltd. of 9, Hadfield House, Hadfield Street, Manchester, M16 9FE, England (UK). The laboratory is ISO 17025:2005 Accredited. The analysis of the sample tube followed standard method NIOSH 6009 and was carried out using CVAFS. This test is specifically accredited. The laboratory report is reproduced separately with this report.

### Limit Values

The existing limit values for Hg are listed in Table 1 below. The strictest limit is the WHO's long-term inhalation value, which should not be exceeded at any time.

**Table 1:** Stipulated limit values

Document	Limit value	Comment
EH40:2005 (WEL)	0.02 mg/m <sup>3</sup> ( $\equiv$ 20 $\mu$ g/m <sup>3</sup> )	8-hr TWA
WHO	1 $\mu$ g/m <sup>3</sup>	Annual average
WHO	0.2 $\mu$ g/m <sup>3</sup>	Long-term inhalation
WHO	2 $\mu$ g/kg body weight/day	Tolerable intake of total mercury

### Job Description

A background air sample has been collected from the point on the site where the stack for emissions from the fluorescent tube crusher is proposed to be constructed. This sample was collected after the initial autumn heavy rains and cooler temperatures. The sampling day was chosen based on the meteorological prediction of having southerly winds to place the sampling site downwind of a nearby cement factory, whose operation is a known potential source of airborne Hg emissions.

The monitoring details and results (taken from the laboratory report) are given in Table 2.

**Table 2: Sampling Details and Test Results**

Sampling details	09.10 am of 14/10/15 to 17.10 pm of 14/10/15
Total sampled volume, L	96
Total mass determined, ng	<5
<b>Total concentration of Hg (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>&lt;0.052</b>
<b>Remarks</b>	<b>Below Limit Values*</b>
Relevant Activity	Background – Hot / Arid Conditions

\*Refer to values listed in Table 1

The meteorological conditions on the day of sampling are listed in Table 3.

**Table 3: Meteorological Conditions**

Max Temperature, °C	27.9
Min Temperature, °C	25.8
Total Rain, mm	Nil
Mean Humidity, %RH	72
Mean Wind Direction, °	149 (SSE)
Mean Wind Speed, km/h	21.1

The wind direction was generally ideal with respect to placing the sampling location downwind of the cement factory nearby. A map showing the respective locations, as well as the predominant wind direction on this sampling date is attached at the end of this report.

### Concluding Remarks

Under these meteorological conditions, the *in situ* background Hg levels are very low, so much so that they are lower than the instrumental limit of detection. Therefore, the strictest WHO limit value of  $0.2 \mu\text{g}/\text{m}^3$  is not being exceeded. Any contribution of airborne Hg from nearby potential sources appears to be negligible at this time.

This sample followed that collected in August from the same sampling point, with a similar wind direction, during the hot and arid summer conditions.

Thus, the background results obtained from both scenario sampling sessions were similar and below the instrumental limit of detection. This data shall be used as a benchmark for comparison with monitoring results taken during the eventual plant operations.

**Report issued on:** 02 November 2015

**Name of Air Quality Consultant:** Dr. Robert Cortis  
B.Sc. (Hons.) M.Sc. Ph.D. MRSC

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-Authorised representatives of the abovementioned Client & Project Site  
-Authorised representatives of the Occupational Health and Safety Authority (OHSA)

Distribution to other parties is strictly prohibited, unless by mutual consent of the Author and of the abovementioned authorised representatives.

**Signed:** \_\_\_\_\_



## Land uses

### Legend

- Location of site
- Area of study

### Land uses

- Agriculture
- Commercial / Community services
- Energy production and distribution
- Goods and freight terminals
- Fuel storage and distribution
- Manufacturing
- Residential
- Sports facilities
- Storage
- Vacant

Sampling Point



Cement Factory

Wind Direction



DN 01678/13 - Construction of an industrial unit for the recycling / treatment of WEEE, Hal Far



Map by: Adi Associates Environmental Consultants Ltd

Client: WEEE Recycle

Ref: WEE001

File ref: PDS\WEEE Recycle\Maps\

Date: 10 / 2014

0 80 160 Metres



# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2404

Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 519709-1

**Date of Report:** 02-Nov-2015

**Customer:** Robert Cortis  
7  
Little Danny Fl.2  
Dun Xand Cortis Str  
Birkirkara BKR 1530  
Malta

**Customer Contact:** Mr Robert Cortis

**Customer Job Reference:** HHF 040, Hal Far Industrial Estate

**Date Job Received at SAL:** 23-Oct-2015

**Date Analysis Started:** 26-Oct-2015

**Date Analysis Completed:** 29-Oct-2015

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with SAL SOPs

All results have been reviewed in accordance with Section 25 of the SAL Quality Manual



1549

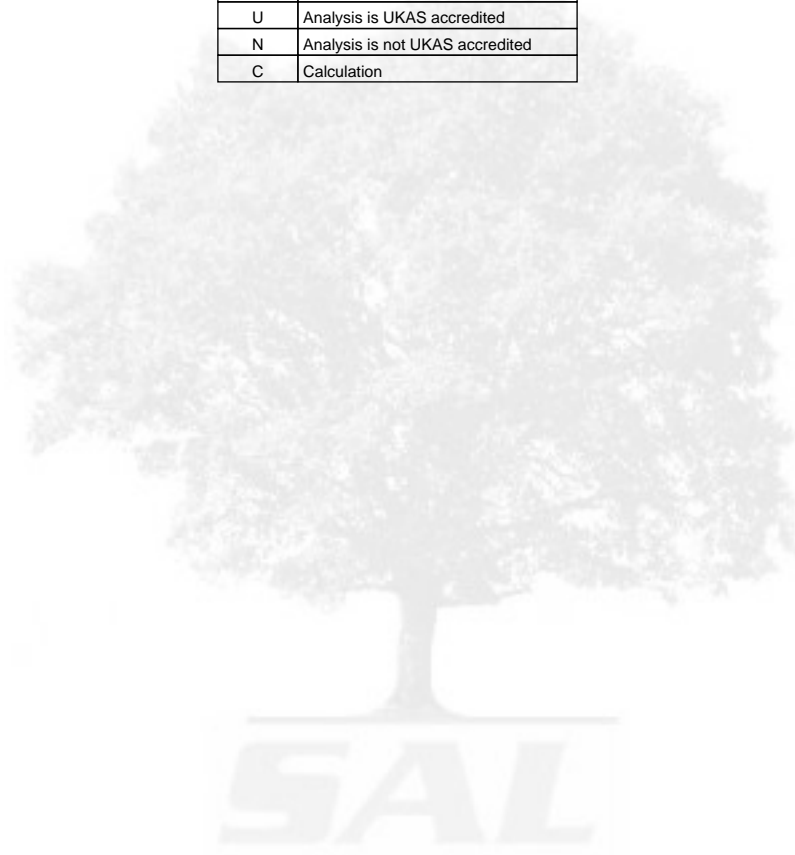
Report checked  
and authorised by :  
Lauren Clarke  
Trainee Project Manager

Issued by :  
Mary Drury  
Senior Project Manager

<b>SAL Reference:</b> 519709					
<b>Customer Reference:</b> HHF 040, Hal Far Industrial Estate					
<b>Tube (Anasorb C 300)</b> Analysed as Tube (Anasorb C 300)					
<b>Miscellaneous</b>					
<b>SAL Reference</b>				<b>519709 001</b>	
<b>Customer Sample Reference</b>				<b>HHF040, HAL FAR INDUSTRIAL ESATE</b>	
<b>Test Sample</b>				<b>AR</b>	
<b>Volume l</b>				<b>96</b>	
<b>Date Sampled</b>				<b>14-OCT-2015</b>	
<b>Determinand</b>	<b>Method</b>	<b>LOD</b>	<b>Units</b>	<b>Symbol</b>	
Mercury	CVAFS	5	ng	U	<5
	Calc	Calc	ug/m3	N	<0.052
	Calc	Calc	ppb	N	<0.0063

## Index to symbols used in 519709-1

Value	Description
AR	As Received
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited
C	Calculation





### **Appendix 3: Test report for wood from old TVs**

SAL Ref : 484824  
Client Ref : R Cortis

**Hazardous Property Assessment  
Waste (England and Wales) Regulations 2011**

**Sample SAL Ref 494824-001  
Client Ref TV Wood Chips**

Sample Description : wood chips-natural appearance

<i>Hazard Group</i>	<i>Definition</i>	<i>Assessment Method Ref WM2 3rd edition Appendix C :Environment Agency</i>	<i>Result</i>	<i>Conclusion</i>
H1	Explosive	EC Test Method A14, C1.7.1	Not explosive after 5mins. treatment with open flame.	Not hazardous
H2	Oxidising	EC Test M C2.7.	No oxidising action action after 5 mins. treatment with open flame.	Not hazardous
H3A and H3B	Flammable	Information supplied by client	Flash point >55 C	Not hazardous
H4	Irritant	probe	pH=7	Not Irritant
H5	Harmfull	GC MS SVOC scanning run  Total Metal concentration ICP OES analysis	Total SVOC content 0.05%  Worst case threshold not exceeded  Total metals less than generic cut off 0.1 %	Not Hazardous  Threshold not exceeded Not hazardous



SAL Ref : 484824  
Client Ref : R Cortis

## Hazardous Property Assessment Waste (England and Wales) Regulations 2011

<i>Hazard Group</i>	<i>Definition</i>	<i>Assessment Method Ref WM2 3rd edition Appendix C :Environment Agency</i>	<i>Result</i>	<i>Conclusion</i>
H6	Toxic	Not tested	See Harmful	Not hazardous
H7	Carcinogenic	See H5	Thresholds not exceeded for worst case situation (0.1%)	Not hazardous
<b>H8</b>	<b>Corrosive</b>	probe	pH 7	Not Hazardous
H9	Infectious	Not tested	No evidence from process or products used to indicate any hazard.	Not Hazardous
H10	Toxic for Reproduction	Not tested	No evidence from process or products used to indicate any hazard. See H5	Not Hazardous
H11	Mutagenic	Not tested	No evidence from process or products used to indicate any hazard. See H5	Not Hazardous
H12	Toxic Gas Production	C12.5	No evidence of gas production -stable aqueous suspension	Not Hazardous
H13	Sensitizing	GC and ICP analysis	No evidence to suspect sensitizing products present.	Not Hazardous
H14	Eco-toxicity	Direct testing on biological organism not carried out	Chemical evidence suggests no ecotoxicity.	Not Hazardous
H15	Waste capable of forming another on disposal	Review of all results	Technically insignificant risk	Not Hazardous
<b>Overall Conclusion</b>			Wood chips with no contamination of concern.	<b>Not Hazardous EWC Waste Classification 03-01-05 MN</b>

**SAL Ref : 484824**  
**Client Ref : R Cortis**

## **Hazardous Property Assessment** **Waste (England and Wales) Regulations 2011**

**This assessment is based on the laboratory test data which forms part of this report and the information provided by the client.**

**Assessment prepared by; W A Cohen [bcohen@salltd.co.uk](mailto:bcohen@salltd.co.uk) 07778 595814**  
**Date of Assessment: 24<sup>th</sup> June 2015**

Risk phrases used in this assessment are taken from Chemicals (Hazard Information and Packaging for Supply) Regulations 2009.

Note; The assessment conclusions are based on protocols published in: Environment Agency (England and Wales) : Hazardous Waste: Interpretation of the definition and classification of hazardous waste (3rd Edition ) 2013

A “Not Hazardous” means that thresholds for the Waste Regulations are not exceeded. This does not necessarily imply that the waste does not pose a risk to human health or the environment.



# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2468

Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 484824-1

**Date of Report:** 24-Jun-2015

**Customer:** Robert Cortis  
7  
Little Danny Fl.2  
Dun Xand Cortis Str  
Birkirkara BKR 1530  
Malta

**Customer Contact:** Mr Robert Cortis

**Customer Job Reference:**

**Date Job Received at SAL:** 08-May-2015

**Date Analysis Started:** 11-Jun-2015

**Date Analysis Completed:** 24-Jun-2015

The results reported relate to samples received in the laboratory  
This report should not be reproduced except in full without the written approval of the laboratory  
Tests covered by this certificate were conducted in accordance with SAL SOPs  
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

Report checked  
and authorised by :  
Bianca Prince  
Project Management

Issued by :  
Bianca Prince  
Project Management

<b>SAL Reference:</b> 484824 <b>Customer Reference:</b>  <b>Bulk Product</b> Analysed as Bulk Product <b>Miscellaneous</b>					
<b>SAL Reference</b>				<b>484824 001</b>	
<b>Customer Sample Reference</b>				<b>TV Wood Chippings (476118/001)</b>	
<b>Date Sampled</b>				<b>06-MAY-2015</b>	
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>	
SVOC (Top 10 screen)	T16	AR	10	mg/kg	Bis (2-ethylhexyl)phthalate (100) <b>380</b>
					Di-n-butylphthalate (100) <b>110</b>
					No other compounds detected above (100) <b>20</b>

<b>SAL Reference:</b> 484824 <b>Customer Reference:</b>  <b>Bulk Product</b> Analysed as Bulk Product <b>Metals (15) Ni,Zn,Cd,Pb,Cr,As,Hg,Sb,Mn,Ti,Be,Co,Se,Te,V</b>					
<b>SAL Reference</b>				<b>484824 001</b>	
<b>Customer Sample Reference</b>				<b>TV Wood Chippings (476118/001)</b>	
<b>Date Sampled</b>				<b>06-MAY-2015</b>	
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>	
Antimony	T6	AR	10	mg/kg	<10
Arsenic	T6	AR	1	mg/kg	<1
Beryllium	T6	AR	10	mg/kg	<10
Cadmium	T6	AR	1	mg/kg	<1
Chromium	T6	AR	1	mg/kg	<1
Cobalt	T6	AR	10	mg/kg	<10
Lead	T6	AR	1	mg/kg	<b>3</b>
Manganese	T6	AR	1	mg/kg	<b>85</b>
Mercury	T6	AR	1	mg/kg	<1
Nickel	T6	AR	1	mg/kg	<1
Selenium	T6	AR	10	mg/kg	<10
Tellurium	T6	AR	10	mg/kg	<10
Thallium	T6	AR	10	mg/kg	<10
Vanadium	T6	AR	10	mg/kg	<10
Zinc	T6	AR	1	mg/kg	<b>15</b>

## Index to symbols used in 484824-1

Value	Description
AR	As Received
100	LOD determined by sample aliquot used for analysis
N	Analysis is not UKAS accredited

## Notes

These samples have been analysed exceeding recommended holding times for SVOC analysis. It is possible therefore that the results provided may be compromised.

## Method Index

Value	Description
T6	ICP/OES
T16	GC/MS

## Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
SVOC (Top 10 screen)	T16	AR	10	mg/kg	N	001
Antimony	T6	AR	10	mg/kg	N	001
Arsenic	T6	AR	1	mg/kg	N	001
Beryllium	T6	AR	10	mg/kg	N	001
Cadmium	T6	AR	1	mg/kg	N	001
Chromium	T6	AR	1	mg/kg	N	001
Cobalt	T6	AR	10	mg/kg	N	001
Lead	T6	AR	1	mg/kg	N	001
Manganese	T6	AR	1	mg/kg	N	001
Mercury	T6	AR	1	mg/kg	N	001
Nickel	T6	AR	1	mg/kg	N	001
Selenium	T6	AR	10	mg/kg	N	001
Tellurium	T6	AR	10	mg/kg	N	001
Thallium	T6	AR	10	mg/kg	N	001
Vanadium	T6	AR	10	mg/kg	N	001
Zinc	T6	AR	1	mg/kg	N	001



## **Appendix 4: Safety data sheets for raw materials**



# DIESEL FUEL

## MATERIAL SAFETY DATA SHEET

### NATIONAL COOPERATIVE REFINERY ASSOCIATION (NCRA)

BOX 1404 MCPHERSON, KS 67460  
316-241-2344 OR 2345, PRODUCT INFORMATION, S. G. CATER

EMERGENCY CONTACT: CHEMTREC 1-800-424-9300 - USE ONLY IN THE CASE  
OF EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT  
INVOLVING CHEMICALS.

## SUBSTANCE IDENTIFICATION

SUBSTANCE: DIESEL FUEL

CHEMICAL FAMILY: PETROLEUM HYDROCARBON

CAS NUMBER: 68334-30-5

TRADE NAMES/SYNONYMS: DIESEL OIL; DIESEL FUEL; DIESEL OIL, LIGHT;  
DIESEL OIL PETROLEUM PRODUCT; DIESEL FUEL, NO.  
1-D; NO. 1-D FUEL OIL; PETROLEUM DIESEL OIL  
PRODUCT; SUMMER DIESEL; DIESEL FUEL #1.

CERCLA RATINGS (SCALE 0-3): HEALTH = 1 FIRE = 2 REACTIVITY = 0  
PERSISTENCE = 1

NFPA RATINGS (SCALE 0-4): HEALTH = 0 FIRE = 2 REACTIVITY = 0

## COMPONENTS AND CONTAMINANTS

HAZARDOUS INGREDIENTS	CAS NUMBER	PERCENT
DIESEL FUEL	68334-30-5	>99

MAY INCLUDE TRACES OF SULFUR

HYDROGEN SULFIDE	7783-06-4
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**EXPOSURE LIMIT:**

**MINERAL OIL MIST:**

5 MG/M<sup>3</sup> OSHA TWA  
5 MG/M<sup>3</sup> ACGIH TWA  
10 MG/M<sup>3</sup> ACGIH STEL  
5 MG/M<sup>3</sup> NIOSH RECOMMENDED TWA  
10 MG/M<sup>3</sup> NIOSH RECOMMENDED STEL

**MEASUREMENT METHOD:**

PARTICULATE FILTER; 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE; INFRARED SPECTROMETRY; (NIOSH VOL. III #5026).

**HYDROGEN SULFIDE:**

10 PPM (14 MG/M<sup>3</sup>) OSHA TWA  
15 PPM (21 MG/M<sup>3</sup>) OSHA STEL  
10 PPM (14 MG/M<sup>3</sup>) ACGIH TWA  
15 PPM (21 MG/M<sup>3</sup>) ACGIH STEL  
10 PPM NIOSH RECOMMENDED 10-MINUTE CEILING  
10 PPM (14 MG/M<sup>3</sup>) DFG MAK TWA  
20 PPM (28 MG/M<sup>3</sup>) DFG MAK 10-MINUTE PEAK MOMENTARY  
VALUE: 4 TIMES/SHIFT

**MEASUREMENT METHOD:**

DRYING TUBE/MOLECULAR SIEVE TUBE; THERMAL DESORPTION APPARATUS; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. II(6) #296).

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**PHYSICAL DATA**

**DESCRIPTION:**

YELLOW-BROWN, OILY LIQUID WITH A MILD PETROLEUM ODOR.

**SOLUBILITY IN WATER:**

INSOLUBLE

**SPECIFIC GRAVITY:**

0.80

**VAPOR PRESSURE:**

2 MM HG @ 20 C

**VAPOR DENSITY:**

>1 AIR = 1.0

**BOILING POINT:**

325 - 675 F (163 - 357 C)

**MELTING POINT:**

-30 F (-34 C)

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**FIRE AND EXPLOSION DATA**

**FIRE AND  
EXPLOSION HAZARD:**

MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT AND FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 100 F (38 C) (CC)  
UPPER EXPLOSIVE LIMIT: 6.0 %  
LOWER EXPLOSIVE LIMIT: 1.3 %  
AUTOIGNITION TEMP.: 350 F (177 C)  
OSHA FLAMMABILITY CLASS: II  
FIREFIGHTING MEDIA: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR  
REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK,  
DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR  
FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P  
5800.5).

FIREFIGHTING: MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT  
WITHOUT RISK. APPLY COOLING WATER TO SIDES OF  
CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL  
AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS.  
FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE  
HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE,  
WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW  
IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING  
SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO  
FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF  
TANK, RAIL CAR, OR TANK TRUCK IS INVOLVED IN FIRE  
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5,  
GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE  
FLOODING AMOUNTS OF WATER AS FOG, SOLID STREAMS MAY  
BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING  
AMOUNTS OF WATER. APPLY WATER FROM AS FAR A  
DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP  
UPWIND.

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## TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD  
CLASSIFICATION 49 CFR 172.101:

COMBUSTIBLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING  
REQUIREMENTS 49 CFR 172.101 AND SUBPART E: NONE

DEPARTMENT OF TRANSPORTATION PACKAGING  
REQUIREMENTS:  
EXCEPTIONS:

NONE  
49 CFR 173.118(A)

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181C, HM-181D, AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90).

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING  
NAME-ID NUMBER, 49 CFR 172.101: DIESEL FUEL-NA 1993

U.S. DEPARTMENT OF TRANSPORTATION HAZARD  
CLASS OR DIVISION, 49 CFR 172.101: 3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING  
GROUP, 49 CFR 172.101: PG III

U.S. DEPARTMENT OF TRANSPORTATION LABELING  
REQUIREMENTS, 49 CFR 172.101 AND SUBPART E: NONE

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING  
REQUIREMENTS:  
EXCEPTIONS: 49 CFR 173.150  
NON-BULK PACKAGING: 49 CFR 173.203  
BULK PACKAGING: 49 CFR 173.241

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY  
LIMITATIONS, 49 CFR 172.101:  
PASSENGER AIRCRAFT OR RAILCAR: 60 L  
CARGO AIRCRAFT ONLY: 220 L

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## TOXICITY

### DIESEL FUEL

IRRITATION DATA: 500 MG SKIN-RABBIT MODERATE.

TOXICITY DATA: 9 GM/KG ORAL-RAT LD50; 7.5 GM/KG (MARKET PLACE SAMPLE) ORAL-RAT LD50 (AETODY); >5 ML/KG (MARKET PLACE SAMPLE) SKIN-RABBIT LD50 (AETODY).

CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL LIMITED EVIDENCE (IARC-GROUP 3). (SEE ADDITIONAL DATA).

LOCAL EFFECTS: IRRITANT - INHALATION, SKIN.

ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY DERMAL ABSORPTION; RELATIVELY NON-TOXIC BY INGESTION.

**TARGET EFFECTS:** CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE LIVER AND KIDNEYS.

**ADDITIONAL DATA:** ANIMAL STUDIES HAVE CONFIRMED AN ASSOCIATION BETWEEN THE INDUCTION OF CANCER, PRIMARILY OF THE LUNG, AND INHALATION EXPOSURE TO WHOLE DIESEL EXHAUST. LIMITED EPIDEMIOLOGIC EVIDENCE ALSO SUGGESTS AN ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND LUNG CANCER (NIOSH, 1988).

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## HEALTH EFFECTS AND FIRST AID

### INHALATION:

**DIESEL FUEL:** IRRITANT/NARCOTIC.

**ACUTE EXPOSURE:** VAPORS OR MIST MAY CAUSE RESPIRATORY TRACT IRRITATION. A HUMAN EXPOSURE HAS RESULTED IN IMMEDIATE COUGH, DYSPNEA, CYANOSIS AND UNCONSCIOUSNESS FOR ONE HOUR. A PRODUCTIVE COUGH WITH SPUTUM SMELLING OF DIESEL FUEL PERSISTED FOR 37 DAYS. CHEST X-RAYS SHOWED DIFFUSE SHADOWING, MOST PROMINENT AT THE LUNG BASES, WHICH RESOLVED SLOWLY WITH TREATMENT BUT WAS STILL PRESENT AT DAY 37. HIGH LEVELS MAY ALSO CAUSE CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION WITH SYMPTOMS POSSIBLY INCLUDING RESTLESSNESS, CONFUSION, ATAXIA, HEADACHE, DIZZINESS, ANOREXIA, NAUSEA, VOMITING, WEAKNESS, INCOORDINATION, STUPOR, DELIRIUM, AND COMA.

**CHRONIC EXPOSURE:** PROLONGED OR REPEATED EXPOSURE MAY CAUSE IRRITATION. ONE INDIVIDUAL EXPOSED TO DIESEL VAPORS IN A TRUCK CAB DEVELOPED NEPHROTOXIC EFFECTS.

**FIRST AID:** REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

### SKIN CONTACT:

**DIESEL FUEL:** IRRITANT.

**ACUTE EXPOSURE:** MAY CAUSE SMARTING, REDNESS AND IRRITATION. A SAMPLE OF DIESEL FUEL APPLIED TO RABBITS UNDER A PATCH FOR 24 HOURS CAUSED EXTREME IRRITATION WITH SEVERE ERYTHEMA AND EDEMA WITH BLISTERING AND OPEN SORES.

**CHRONIC EXPOSURE:**

REPEATED OR PROLONGED EXPOSURE MAY CAUSE DEFATTING AND DRYING OF THE SKIN RESULTING IN SEVERE IRRITATION AND DERMATITIS. CUTANEOUS HYPERKERATOSIS HAS BEEN DESCRIBED IN ENGINE DRIVERS WITH OCCUPATIONAL EXPOSURE TO DIESEL FUEL. TWO INDIVIDUALS WITH TOPICAL EXPOSURE FROM WASHING HAIR OR HANDS WITH DIESEL FUEL DEVELOPED ACUTE RENAL FAILURE; ONE ALSO HAD GASTROINTESTINAL SYMPTOMS. REPEATED APPLICATIONS TO RABBIT SKIN PRODUCED 67 % MORTALITY AT 8 ML/KG. THE PRIMARY CAUSE OF DEATH WERE DEPRESSION AND ANOREXIA WHICH WERE INDUCED BY DERMAL IRRITATION WITH INFECTION, RATHER THAN SYSTEMIC INTOXICATION. AUTOPSY REVEALED EFFECTS ON THE LIVER AND KIDNEYS.

**FIRST AID:**

REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15 - 20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:**

**DIESEL FUEL:**

**ACUTE EXPOSURE:**

LIQUID OR VAPOR MAY CAUSE SLIGHT IRRITATION, ALTHOUGH TESTS WITH ONE SAMPLE OF DIESEL FUEL IN RABBIT EYES WAS NON-IRRITATING.

**CHRONIC EXPOSURE:**

REPEATED OR PROLONGED EXPOSURE MAY CAUSE IRRITATION.

**FIRST AID:**

WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:**

**DIESEL FUEL:**

NARCOTIC.

**ACUTE EXPOSURE:**

MAY CAUSE NAUSEA, VOMITING, CRAMPING, DIARRHEA, AND POSSIBLY SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION. ASPIRATION OF EVEN SMALL AMOUNTS DURING INGESTION OR VOMITING MAY RESULT IN SEVERE PULMONARY IRRITATION WITH COUGHING, GAGGING, DYSPNEA, SUBSTERNAL DISTRESS, AND PNEUMONITIS, PULMONARY EDEMA AND HEMORRHAGE, AND DEATH.

**CHRONIC EXPOSURE:**

NO DATA AVAILABLE.



**FIRST AID:**

ONLY HYDROCARBONS THAT ARE SOLVENTS FOR A TOXIC AGENT OR ARE THEMSELVES TOXIC NEED TO BE EVACUATED. EXTREME CARE MUST BE TAKEN TO AVOID ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX, EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PREFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

**ANTIDOTE:**

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

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**REACTIVITY**

**REACTIVITY:**

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES IN A CLOSED CONTAINER.

**INCOMPATIBILITIES:**

**DIESEL FUEL AND:**

STRONG OXIDIZERS: MAY REACT.

**DECOMPOSITION:**

THERMAL DECOMPOSITION MAY INCLUDE TOXIC OXIDES OF SULFUR AND CARBON.

**POLYMERIZATION:**

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

**CONDITIONS TO AVOID:**

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

TRACE AMOUNTS OF HYDROGEN SULFIDE MAY BE PRESENT. THERE IS A POTENTIAL FOR THE ACCUMULATION OF HYDROGEN SULFIDE IN THE HEAD SPACE OF CONTAINERS OR IN ENCLOSED AREAS WHERE THIS PRODUCT IS STORED, HANDLED OR USED.

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**STORAGE AND DISPOSAL**

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

**STORAGE:**

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

**BONDING AND GROUNDING:**

SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

**THRESHOLD PLANNING  
QUANTITY (TPQ):**

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION (SERC) FOR THAT STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE.

**HYDROGEN SULFIDE:**

SARA SECTION 302 TPQ: 500 POUNDS.

**DISPOSAL:**

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. ALSO COMPLY WITH APPROPRIATE STATE STANDARDS.

**EPA HAZARDOUS  
WASTE NUMBER:**

D001

**CERCLA SECTION 103  
REPORTABLE QUANTITY:**

100 POUNDS

**REPORTABLE QUANTITY(RQ):** THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

**D001 HAZARDOUS WASTE:**

**CERCLA SECTION 103  
REPORTABLE QUANTITY:**

100 POUNDS

**HYDROGEN SULFIDE:**

CERCLA SECTION 103                      100 POUNDS  
REPORTABLE QUANTITY (RQ):

SARA SECTION 304                      100 POUNDS  
REPORTABLE QUANTITY (RQ):

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**SPILLS AND LEAKS**

**OCCUPATIONAL SPILL:**

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

---

**PROTECTIVE EQUIPMENT**

**VENTILATION:**

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

**RESPIRATOR:**

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S) AND A FULL FACEPIECE.

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER), WITH A FULL FACEPIECE.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

**CLOTHING:**

WEAR OIL IMPERVIOUS CLOTHING. AVOID PROLONGED OR REPEATED CONTACT WITH SUBSTANCE. AVOID WEARING OIL SOAKED CLOTHING.

**GLOVES:**

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

**EYE PROTECTION:**

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

**EMERGENCY EYE WASH:**

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

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CREATION DATE: 01/04/90

MOST RECENT REVISION: 06/03/92

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# CRC 5040 Jump Start (NZ)

CRC Industries (CRC Industries New Zealand)

Chemwatch: 4546-42

Version No: 7.1.1.1

Safety Data Sheet according to HSNO Regulations

Chemwatch Hazard Alert Code: 4

Issue Date: 12/02/2014

Print Date: 04/05/2015

Initial Date: Not Available

S.GHS.NZL.EN

## SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

### Product Identifier

<b>Product name</b>	CRC 5040 Jump Start (NZ)
<b>Synonyms</b>	CRC 5040 Engine Start, CRC 5040 Jump Start, Manufacturer's Code 5040
<b>Proper shipping name</b>	AEROSOLS
<b>Other means of identification</b>	Not Available

### Relevant identified uses of the substance or mixture and uses advised against

<b>Relevant identified uses</b>	Application is by spray atomisation from a hand held aerosol pack Engine starting fluid.
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### Details of the manufacturer/importer

<b>Registered company name</b>	CRC Industries (CRC Industries New Zealand)
<b>Address</b>	10 Highbrook Drive East Tamaki Auckland New Zealand
<b>Telephone</b>	+64 9 272 2700
<b>Fax</b>	+64 9 274 9696
<b>Website</b>	www.crc.co.nz
<b>Email</b>	customerservices@crc.co.nz

### Emergency telephone number






<b>Association / Organisation</b>	Not Available
<b>Emergency telephone numbers</b>	+64 9 278-7913
<b>Other emergency telephone numbers</b>	Not Available

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

**Considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation.**  
**Classified as Dangerous Goods for transport purposes.**

#### CHEMWATCH HAZARD RATINGS




	Min	Max
Flammability	4	
Toxicity	2	
Body Contact	2	
Reactivity	1	
Chronic	3	

0 = Minimum  
1 = Low  
2 = Moderate  
3 = High  
4 = Extreme

<b>GHS Classification</b> [1]	Flammable Aerosol Category 1, Skin Corrosion/Irritation Category 2, Germ Cell Mutagen Category 1B, Carcinogen Category 1B, STOT - SE (Narcosis) Category 3, STOT - RE Category 2
<b>Legend:</b>	1. Classified by Chemwatch; 2. Classification drawn from CCID EPA NZ ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI
<b>Determined by Chemwatch using GHS/HSNO criteria</b>	2.1.2A, 6.3A, 6.6A, 6.7A, 6.9 (narcotic), 6.9B

### Label elements



GHS label elements	  
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SIGNAL WORD	DANGER
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Hazard statement(s)

H222	Extremely flammable aerosol
H315	Causes skin irritation
H340	May cause genetic defects
H350	May cause cancer
H336	May cause drowsiness or dizziness
H373	May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of water and soap
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P405	Store locked up.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
8006-61-9	30-60	<u>gasoline</u>
Not Available	5-20	<u>Diethyl ether GPR RECTAPUR</u>
64-17-5	1-9	<u>ethanol</u>
Not avail	1-9	<u>mineral oil</u>
124-38-9	1-9	<u>carbon dioxide</u>
Not Available	NotSpec.	NOTE: Manufacturer has supplied full igredient
Not Available	NotSpec.	information to allow CHEMWATCH assessment.

NOTE: Manufacturer has supplied full igredient information to allow CHEMWATCH assessment.

SECTION 4 FIRST AID MEASURES

NZ Poisons Centre 0800 POISON (0800 764 766) | NZ Emergency Services: 111

Description of first aid measures

Eye Contact	<p>If aerosols come in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Immediately hold the eyelids apart and flush the eye continuously for at least 15 minutes with fresh running water.</li> <li>▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally</li> </ul>
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	<ul style="list-style-type: none"> <li>▶ lifting the upper and lower lids.</li> <li>▶ Transport to hospital or doctor without delay.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If solids or aerosol mists are deposited upon the skin:</p> <ul style="list-style-type: none"> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Remove any adhering solids with industrial skin cleansing cream.</li> <li>▶ <b>DO NOT use solvents.</b></li> <li>▶ Seek medical attention in the event of irritation.</li> </ul>
<b>Inhalation</b>	<p>If aerosols, fumes or combustion products are inhaled:</p> <ul style="list-style-type: none"> <li>▶ Remove to fresh air.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>▶ Avoid giving milk or oils.</li> <li>▶ Avoid giving alcohol.</li> </ul> <p>Not considered a normal route of entry.</p>

### Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- ▶ Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- ▶ Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO<sub>2</sub> 50 mm Hg) should be intubated.
- ▶ Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- ▶ A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- ▶ Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- ▶ Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

Treat symptomatically.

for lower alkyl ethers:

#### BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ A low-stimulus environment must be maintained.
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate and treat, where necessary, for seizures.
- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

#### ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension without signs of hypovolaemia may require vasopressors.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

#### EMERGENCY DEPARTMENT

- ▶ Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- ▶ Ethers may produce anion gap acidosis. Hyperventilation and bicarbonate therapy might be indicated.
- ▶ Haemodialysis might be considered in patients with impaired renal function.
- ▶ Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

## SECTION 5 FIREFIGHTING MEASURES

### Extinguishing media

**SMALL FIRE:**

	<ul style="list-style-type: none"> <li>▶ Water spray, dry chemical or CO2</li> </ul> <b>LARGE FIRE:</b> <ul style="list-style-type: none"> <li>▶ Water spray or fog.</li> </ul>
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Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> <li>▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result</li> </ul>
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ May be violently or explosively reactive.</li> <li>▶ Wear breathing apparatus plus protective gloves.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> </ul>
Fire/Explosion Hazard	<ul style="list-style-type: none"> <li>▶ Liquid and vapour are highly flammable.</li> <li>▶ Severe fire hazard when exposed to heat or flame.</li> <li>▶ Vapour forms an explosive mixture with air.</li> <li>▶ Severe explosion hazard, in the form of vapour, when exposed to flame or spark.</li> </ul>

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	<ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid breathing vapours and contact with skin and eyes.</li> <li>▶ Wear protective clothing, impervious gloves and safety glasses.</li> <li>▶ Shut off all possible sources of ignition and increase ventilation.</li> </ul>
Major Spills	<ul style="list-style-type: none"> <li>▶ Remove leaking cylinders to a safe place if possible.</li> <li>▶ Release pressure under safe, controlled conditions by opening the valve.</li> <li>▶ <b>DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.</b></li> <li>▶ Clear area of personnel and move upwind.</li> </ul>

	Personal Protective Equipment advice is contained in Section 8 of the MSDS.
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SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> </ul>
Other information	<ul style="list-style-type: none"> <li>▶ Keep dry to avoid corrosion of cans. Corrosion may result in container perforation and internal pressure may eject contents of can</li> <li>▶ Store in original containers in approved flammable liquid storage area.</li> <li>▶ <b>DO NOT store in pits, depressions, basements or areas where vapours may be trapped.</b></li> <li>▶ No smoking, naked lights, heat or ignition sources.</li> </ul>

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> <li>▶ Aerosol dispenser.</li> <li>▶ Check that containers are clearly labelled.</li> </ul>
Storage incompatibility	<ul style="list-style-type: none"> <li>▶ Avoid reaction with oxidising agents</li> </ul>

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
New Zealand Workplace Exposure Standards (WES)	gasoline	Petrol (Gasoline)	890 mg/m3 / 300 ppm	1480 mg/m3 / 500 ppm	Not Available	Not Available
New Zealand Workplace Exposure Standards (WES)	Diethyl ether GPR RECTAPUR	Hydroquinone	2 mg/m3	Not Available	Not Available	Suspected carcinogen


New Zealand Workplace Exposure Standards (WES)	ethanol	Ethyl alcohol	1880 mg/m3 / 1000 ppm	Not Available	Not Available	Not Available
New Zealand Workplace Exposure Standards (WES)	mineral oil	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	Sampled by a method that does not collect vapour.
New Zealand Workplace Exposure Standards (WES)	carbon dioxide	Carbon dioxide	9000 mg/m3 / 5000 ppm	54000 mg/m3 / 30000 ppm	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
gasoline	Gasoline	Not Available	Not Available	Not Available
ethanol	Ethyl alcohol; (Ethanol)	Not Available	Not Available	Not Available
carbon dioxide	Carbon dioxide	30,000 ppm	30000 ppm	50000 ppm

Ingredient	Original IDLH	Revised IDLH
gasoline	Not Available	Not Available
Diethyl ether GPR RECTAPUR	Not Available	Not Available
ethanol	15,000 ppm	3,300 [LEL] ppm
mineral oil	Not Available	Not Available
carbon dioxide	50,000 ppm	40,000 ppm
NOTE: Manufacturer has supplied full ingredient	Not Available	Not Available
information to allow CHEMWATCH assessment.	Not Available	Not Available

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.</p>
Personal protection	
Eye and face protection	<p>No special equipment for minor exposure i.e. when handling small quantities.</p> <p><b>OTHERWISE:</b> For potentially moderate or heavy exposures:</p> <ul style="list-style-type: none"> <li>▸ Safety glasses with side shields.</li> <li>▸ <b>NOTE:</b> Contact lenses pose a special hazard; soft lenses may absorb irritants and <b>ALL</b> lenses concentrate them.</li> </ul>
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> <li>▸ No special equipment needed when handling small quantities.</li> <li>▸ <b>OTHERWISE:</b></li> <li>▸ For potentially moderate exposures:</li> <li>▸ Wear general protective gloves, eg. light weight rubber gloves.</li> <li>▸ For potentially heavy exposures:</li> <li>▸ Wear chemical protective gloves, eg. PVC. and safety footwear.</li> </ul>
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> <li>▸ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent]</li> <li>▸ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent]</li> <li>▸ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.</li> </ul>
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000

Glove selection is based on a modified presentation of the:  
**"Forsberg Clothing Performance Index".**  
The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:  
CRC 5040 Jump Start (NZ)

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE/EVAL/PE	C
PVA	C
PVC	C
TEFLON	C
VITON	C
VITON/NEOPRENE	C

\* CPI - Chemwatch Performance Index  
A: Best Selection  
B: Satisfactory; may degrade after 4 hours continuous immersion  
C: Poor to Dangerous Choice for other than short term immersion  
**NOTE:** As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -  
\* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

& 149:2001, ANSI Z88 or national equivalent)  
Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AX-AUS / Class1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+			Airline**

\* - Continuous Flow \*\* - Continuous-flow or positive pressure demand  
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	22aer Clear water white flammable liquid with an ethereal odour; partially miscible with water. Supplied in an aerosol pack. Contents under PRESSURE. Contains carbon dioxide propellant.		
Physical state	Liquid	Relative density (Water = 1)	0.75
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	<500
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	35	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	-45	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	48.0	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1.9	Volatile Component (%vol)	95
Vapour pressure (kPa)	39.9	Gas group	Not Available
Solubility in water (g/L)	Partly Miscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	>1	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	<ul style="list-style-type: none"> <li>▸ Elevated temperatures.</li> <li>▸ Presence of open flame.</li> <li>▸ Product is considered stable.</li> <li>▸ Hazardous polymerisation will not occur.</li> </ul>
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

## SECTION 11 TOXICOLOGICAL INFORMATION

### Information on toxicological effects

<b>Inhaled</b>	<p>Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>When inhaled, diethyl ether can cause rapid loss of consciousness, and with continuous exposure, respiratory muscle weakness, stoppage of breathing and death.</p>
<b>Ingestion</b>	<p>Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)</p> <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions.</p>
<b>Skin Contact</b>	<p>Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.</p> <p>Spray mist may produce discomfort</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Aromatic hydrocarbons may produce sensitivity and redness of the skin. They are not likely to be absorbed into the body through the skin but branched species are more likely to.</p> <p>The material may cause severe inflammation of the skin either following direct contact or after a delay of some time.</p>
<b>Eye</b>	<p>There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure. Not considered to be a risk because of the extreme volatility of the gas.</p> <p>Direct eye contact with petroleum hydrocarbons can be painful, and the corneal epithelium may be temporarily damaged.</p>
<b>Chronic</b>	<p>There is sufficient evidence to suggest that this material directly causes cancer in humans.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>There is some evidence from animal testing that exposure to this material may result in reduced fertility.</p> <p>There is some evidence from animal testing that exposure to this material may result in toxic effects to the unborn baby.</p>

<b>CRC 5040 Jump Start (NZ)</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>gasoline</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: >1900 mg/kg <sup>[1]</sup>	Eye (man): 500ppm/1h moderate
	Inhalation (guinea pig) LC50: 300 mg/L/5M <sup>[2]</sup>	Eye (man): 140ppm/8h mild
	Inhalation (mouse) LC50: 300 mg/L/5M <sup>[2]</sup>	
	Inhalation (rat) LC50: 300 mg/L/5md <sup>[2]</sup>	
	Oral (rat) LD50: >4500 mg/kg <sup>[1]</sup>	
<b>Diethyl ether GPR RECTAPUR</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>ethanol</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 17100 mg/kg <sup>[1]</sup>	Eye (rabbit): 500 mg SEVERE
	Inhalation (rat) LC50: 64000 ppm/4h <sup>[2]</sup>	Eye (rabbit):100mg/24hr-moderate
	Oral (rat) LD50: >11872769 mg/kg <sup>[1]</sup>	Skin (rabbit):20 mg/24hr-moderate
		Skin (rabbit):400 mg (open)-mild
<b>mineral oil</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available



carbon dioxide	TOXICITY	IRRITATION
	Inhalation (mouse) LC50: 200000 ppm/2H <sup>[2]</sup>	Not Available
	Inhalation (mouse) LC50: 361 mg/L/2H <sup>[2]</sup>	
	Inhalation (rat) LC50: 470000 ppm/30M <sup>[2]</sup>	
<b>Legend:</b>	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's msds. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

<b>GASOLINE</b>	Oral (unspec) LD50: 500 - 5000 mg/kg [Manufacturer] Substance has been investigated as a tumorigen.
<b>ETHANOL</b>	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
<b>MINERAL OIL</b>	<p>Toxicity and Irritation data for petroleum-based mineral oils are related to chemical components and vary as does the composition and source of the original crude.</p> <p>A small but definite risk of occupational skin cancer occurs in workers exposed to persistent skin contamination by oils over a period of years. This risk has been attributed to the presence of certain polycyclic aromatic hydrocarbons (PAH) (typified by benz[a]pyrene).</p> <p>Petroleum oils which are solvent refined/extracted or severely hydrotreated, contain very low concentrations of both.</p>
<b>CARBON DIOXIDE</b>	- pulmonary effects IDLH: 50,000 ppm
<b>CRC 5040 Jump Start (NZ) &amp; GASOLINE</b>	<p><b>for petroleum:</b></p> <p>This product contains benzene which is known to cause acute myeloid leukaemia and n-hexane which has been shown to metabolize to compounds which are neuropathic.</p> <p>This product contains toluene. There are indications from animal studies that prolonged exposure to high concentrations of toluene may lead to hearing loss.</p> <p>This product contains ethyl benzene and naphthalene from which there is evidence of tumours in rodents</p> <p><b>Carcinogenicity:</b> Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans.</p>

<b>Acute Toxicity</b>	☹	<b>Carcinogenicity</b>	✓
<b>Skin Irritation/Corrosion</b>	✓	<b>Reproductivity</b>	☹
<b>Serious Eye Damage/Irritation</b>	☹	<b>STOT - Single Exposure</b>	✓
<b>Respiratory or Skin sensitisation</b>	☹	<b>STOT - Repeated Exposure</b>	✓
<b>Mutagenicity</b>	✓	<b>Aspiration Hazard</b>	☹

**Legend:** ✓ – Data required to make classification available  
✗ – Data available but does not fill the criteria for classification  
☹ – Data Not Available to make classification

## CMR STATUS

<b>REPROTOXIN</b>	carbon dioxide	ILO Chemicals in the electronics industry that have toxic effects on reproduction
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## SECTION 12 ECOLOGICAL INFORMATION

### Toxicity

Most ethers are very resistant to hydrolysis, and the rate of cleavage of the carbon-oxygen bond by abiotic processes is expected to be insignificant. Direct photolysis will not be an important removal process since aliphatic ethers do not absorb light at wavelengths >290 nm

For Hydrocarbons: log Kow 1. BCF~10.

For Aromatics: log Kow 2-3.

### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
carbon dioxide	LOW	LOW

### Bioaccumulative potential

Ingredient	Bioaccumulation
ethanol	LOW (LogKOW = -0.31)
carbon dioxide	LOW (LogKOW = 0.83)

### Mobility in soil

Ingredient	Mobility
ethanol	HIGH (KOC = 1)
carbon dioxide	HIGH (KOC = 1.498)

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> <li>▶ <b>DO NOT</b> allow wash water from cleaning or process equipment to enter drains.</li> <li>▶ It may be necessary to collect all wash water for treatment before disposal.</li> <li>▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li> <li>▶ Where in doubt contact the responsible authority.</li> </ul>
	Ensure that the disposal of material is carried out in accordance with Hazardous Substances (Disposal) Regulations 2001.

### SECTION 14 TRANSPORT INFORMATION

#### Labels Required

	
Marine Pollutant	NO
HAZCHEM	2YE

#### Land transport (UN)

UN number	1950
Packing group	Not Applicable
UN proper shipping name	AEROSOLS
Environmental hazard	No relevant data
Transport hazard class(es)	<div>Class2.1</div> <div>SubriskNot Applicable</div>
Special precautions for user	<div>Special provisions63;190;277;327;344</div> <div>Limited quantitySee;SP 277</div>

#### Air transport (ICAO-IATA / DGR)

UN number	1950
Packing group	Not Applicable
UN proper shipping name	Aerosols, flammable
Environmental hazard	No relevant data
Transport hazard class(es)	<div>ICAO/IATA Class2.1</div> <div>ICAO / IATA SubriskNot Applicable</div> <div>ERG Code10L</div>
Special precautions for user	<div>Special provisionsA145A167A802</div> <div>Cargo Only Packing Instructions203</div> <div>Cargo Only Maximum Qty / Pack150 kg</div> <div>Passenger and Cargo Packing Instructions203</div> <div>Passenger and Cargo Maximum Qty / Pack75 kg</div> <div>Passenger and Cargo Limited Quantity Packing InstructionsY203</div> <div>Passenger and Cargo Limited Maximum Qty / Pack30 kg G</div>

#### Sea transport (IMDG-Code / GGVSee)

UN number	1950
Packing group	Not Applicable
UN proper shipping name	AEROSOLS

<b>Environmental hazard</b>	Not Applicable	
<b>Transport hazard class(es)</b>	IMDG Class	2.1
	IMDG Subrisk	Not Applicable
<b>Special precautions for user</b>	EMS Number	F-D , S-U
	Special provisions	63 190 277 327 344 959
	Limited Quantities	See SP277

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This substance is to be managed using the conditions specified in an applicable Group Standard

HSR Number	Group Standard
HSR002517	Aerosols (Flammable, Toxic [6.7]) Group Standard 2006

<b>gasoline(8006-61-9) is found on the following regulatory lists</b>	"New Zealand Inventory of Chemicals (NZIoC)", "International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "New Zealand Workplace Exposure Standards (WES)"
<b>Diethyl ether GPR RECTAPUR() is found on the following regulatory lists</b>	"Not Applicable"
<b>ethanol(64-17-5) is found on the following regulatory lists</b>	"New Zealand Inventory of Chemicals (NZIoC)", "New Zealand Workplace Exposure Standards (WES)", "New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals"
<b>mineral oil(Not avail) is found on the following regulatory lists</b>	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "New Zealand Workplace Exposure Standards (WES)"
<b>carbon dioxide(124-38-9) is found on the following regulatory lists</b>	"New Zealand Inventory of Chemicals (NZIoC)", "New Zealand Workplace Exposure Standards (WES)", "New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals"

Location Test Certificate

Subject to Regulation 55 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations, a location test certificate is required when quantity greater than or equal to those indicated below are present.

Hazard Class	Quantity beyond which controls apply for closed containers	Quantity beyond which controls apply when use occurring in open containers
2.1.2A	3 000 L (aggregate water capacity)	3 000 L (aggregate water capacity)

Approved Handler

Subject to Regulation 56 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations and Regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations, the substance must be under the personal control of an Approved Handler when present in a quantity greater than or equal to those indicated below.

Class of substance	Quantities
6.7A	10 kg or more, if solid 10 L or more, if liquid
2.1.2A	3 000 L aggregate water capacity

National Inventory	Status
Australia - AICS	N (mineral oil)
Canada - DSL	N (mineral oil)
China - IECSC	N (mineral oil)
Europe - EINEC / ELINCS / NLP	N (mineral oil)
Japan - ENCS	N (gasoline; mineral oil)
Korea - KECI	N (mineral oil)
New Zealand - NZIoC	N (mineral oil)
Philippines - PICCS	N (mineral oil)
USA - TSCA	N (mineral oil)

**Legend:**

Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

**SECTION 16 OTHER INFORMATION****Other information****Ingredients with multiple cas numbers**

Name	CAS No
gasoline	8006-61-9, 86290-81-5

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

[www.chemwatch.net](http://www.chemwatch.net)

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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TEL (+61 3) 9572 4700.

**Material Safety Data Sheet**

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**1. MATERIAL AND COMPANY IDENTIFICATION**

**Material Name** : Shell TELLUS OIL S 46  
**Uses** : Hydraulic oil

**Manufacturer/Supplier** : SOPUS Products  
PO BOX 4427  
Houston, TX 77210-4427  
USA

**MSDS Request** : 877-276-7285

**Emergency Telephone Number**

**Spill Information** : 877-242-7400

**Health Information** : 877-504-9351

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**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Highly refined mineral oils and additives.

The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

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**3. HAZARDS IDENTIFICATION**

<b>Emergency Overview</b>	
<b>Appearance and Odour</b>	: Amber. Liquid. Slight hydrocarbon.
<b>Health Hazards</b>	: High-pressure injection under the skin may cause serious damage including local necrosis.
<b>Safety Hazards</b>	: Not classified as flammable but will burn.
<b>Environmental Hazards</b>	: Not classified as dangerous for the environment.

**Health Hazards** : Not expected to be a health hazard when used under normal conditions.

**Health Hazards Inhalation** : Under normal conditions of use, this is not expected to be a primary route of exposure.

**Skin Contact** : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

**Eye Contact** : May cause slight irritation to eyes.

**Ingestion** : Low toxicity if swallowed.

**Other Information** : High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.

**Signs and Symptoms** : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhoea.

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<b>Aggravated Medical Condition</b>	: Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
<b>Environmental Hazards</b>	: Not classified as dangerous for the environment.
<b>Additional Information</b>	: Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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**4. FIRST AID MEASURES**

<b>General Information</b>	: Not expected to be a health hazard when used under normal conditions.
<b>Inhalation</b>	: No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
<b>Skin Contact</b>	: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
<b>Eye Contact</b>	: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
<b>Ingestion</b>	: In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
<b>Advice to Physician</b>	: Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

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**5. FIRE FIGHTING MEASURES**

Clear fire area of all non-emergency personnel.

<b>Flash point</b>	: Typical 218 °C / 424 °F (PMCC / ASTM D93)
<b>Upper / lower Flammability or Explosion limits</b>	: Typical 1 - 10 %(V)(based on mineral oil)
<b>Auto ignition temperature</b>	: > 320 °C / 608 °F
<b>Specific Hazards</b>	: Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.



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- Suitable Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use water in a jet.
- Protective Equipment for Firefighters** : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

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**6. ACCIDENTAL RELEASE MEASURES**

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations.

- Protective measures** : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
- Additional Advice** : Local authorities should be advised if significant spillages cannot be contained.

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**7. HANDLING AND STORAGE**

- General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
- Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F
- Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- Unsuitable Materials** : PVC.
- Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

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**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Occupational Exposure Limits**

Material	Source	Type	ppm	mg/m3	Notation
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Oil mist, mineral	ACGIH	TWA(Mist.)		5 mg/m3	
Oil mist, mineral	ACGIH	STEL(Mist.)		10 mg/m3	

- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)].
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
- Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur.
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
- Environmental Exposure Controls** : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

**Material Safety Data Sheet****9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	: Amber. Liquid.
Odour	: Slight hydrocarbon.
pH	: Not applicable.
Initial Boiling Point and Boiling Range	: > 280 °C / 536 °F estimated value(s)
Pour point	: Typical -30 °C / -22 °F
Flash point	: Typical 218 °C / 424 °F (PMCC / ASTM D93)
Upper / lower Flammability or Explosion limits	: Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	: > 320 °C / 608 °F
Vapour pressure	: < 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Density	: Typical 876 kg/m <sup>3</sup> at 15 °C / 59 °F
Water solubility	: Negligible.
n-octanol/water partition coefficient (log Pow)	: > 6 (based on information on similar products)
Kinematic viscosity	: Typical 46 mm <sup>2</sup> /s at 40 °C / 104 °F
Vapour density (air=1)	: > 1 (estimated value(s))
Evaporation rate (nBuAc=1)	: Data not available

**10. STABILITY AND REACTIVITY**

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidising agents.
Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage.

**11. TOXICOLOGICAL INFORMATION**

Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Not expected to be a hazard.
Mutagenicity	: Not considered a mutagenic hazard.
Carcinogenicity	: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.

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- Reproductive and Developmental Toxicity** : Not expected to be a hazard.
- Additional Information** : Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

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**12. ECOLOGICAL INFORMATION**

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

- Acute Toxicity** : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
- Mobility** : Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
- Persistence/degradability** : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
- Bioaccumulation** : Contains components with the potential to bioaccumulate.
- Other Adverse Effects** : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

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**13. DISPOSAL CONSIDERATIONS**

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

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**14. TRANSPORT INFORMATION**

**Material Safety Data Sheet****US Department of Transportation Classification (49CFR)**

This material is not subject to DOT regulations under 49 CFR Parts 171-180.

**IMDG**

This material is not classified as dangerous under IMDG regulations.

**IATA (Country variations may apply)**

This material is not classified as dangerous under IATA regulations.

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**15. REGULATORY INFORMATION**

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

**Federal Regulatory Status****Notification Status**

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

**SARA Hazard Categories (311/312)**

No SARA 311/312 Hazards.

**State Regulatory Status****California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

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**16. OTHER INFORMATION**

<b>NFPA Rating (Health, Fire, Reactivity)</b>	: 0, 1, 0
<b>MSDS Version Number</b>	: 5.0
<b>MSDS Effective Date</b>	: 07/03/2008
<b>MSDS Revisions</b>	: A vertical bar ( ) in the left margin indicates an amendment from the previous version.
<b>MSDS Regulation</b>	: The content and format of this MSDS is in accordance with the

## Material Safety Data Sheet

- MSDS Distribution** : OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
: The information in this document should be made available to all who may handle the product.
- Disclaimer** : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.





# Safety Data Sheet

Liquefied Petroleum Gas (LPG)

Issued: March 2011

### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

<b>Product name:</b>	Easigas Liquefied Petroleum Gas (LPG)
<b>Product code:</b>	1075
<b>Product type:</b>	Liquefied Petroleum Gas
<b>Recommended uses:</b>	LPG is used as a domestic, commercial, industrial and automotive fuel, a feedstock in chemical processes and as propellant in pressurised aerosol containers. If Shell Commercial Butane is used for other purposes, please contact the supplier as listed below.
<b>Known misuses / abuses:</b>	Sniffing from aerosols, lighter refills and cylinders by young people.
<b>Address:</b>	Gate 5, Hibiscus Road, Alrode, 1451
<b>Contact numbers:</b>	
Telephone:	(011) 389 - 7700
Fax:	(011) 864 - 9000
Emergency :	(011) 389 - 7700

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms:

Liquefied Petroleum Gas, LPG

Preparation description:

Complex mixture of hydrocarbons consisting predominantly of a 50:50 mixture of Propane and Butane and some other C4 and higher hydrocarbons. Low concentrations of sulphur, hydrogen sulphide and mercaptans may be present. It may also contain one or more of the following additives: odourants (usually ethyl mercaptan), anti-icing agents. 1,3-butadiene, classified as a Category 1 carcinogen and a Category 2 mutagen, may be present at a concentration of less than 0.1 %(m/m).

Dangerous components/constituents:

Component name	EINECS number	Content range	EU hazard	R phrases
Petroleum gases, liquefied	270-704-2	>99 %(m/m)	F+	R12
1,3-butadiene	203-450-8	<0.1 %(m/m)	F+, Carc Cat 1, Muta Cat 2	R12, R45, R46
Ethyl mercaptan	200-837-3	<0.01 %(m/m)	F, Xn, N	R11, R20, R50, R53

Note: CAS numbers for the substances listed above are as follows: Petroleum gases, liquefied - 68476-85-7; 1,3-butadiene - 106-99-0; Ethyl mercaptan - 75-08-1.

Dangerous Substances Directive, 67/548/EEC, Annex I numbers for the above substances are: Petroleum gases, liquefied - 649-202-00-6; 1,3-butadiene - 601-013-00-X; Ethyl mercaptan - 016-022-00-9.

### 3. HAZARDS IDENTIFICATION

<b>EU Classification:</b>	Extremely flammable
<b>Human health hazards:</b>	Prolonged exposure to vapour concentrations may affect the central nervous system. May cause frost burns due to low boiling point.
<b>Safety hazards:</b>	Extremely flammable liquefied gas. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
<b>Environmental hazards:</b>	No specific hazards under normal use conditions.

### 4. FIRST AID MEASURES

<b>Symptoms and effects:</b>	Liquid may cause skin and eye burns. Prolonged exposure to vapour concentrations above the recommended occupational exposure standard may cause headache, dizziness, weakness, nausea, confusion, blurred vision, asphyxiation, cardiac irregularities, unconsciousness and even death.
<b>Protection of first aiders:</b>	Take appropriate steps to avoid fire, explosion and inhalation hazards.
<b>First Aid - Inhalation:</b>	Remove to fresh air. Keep warm and at rest. If the casualty is stuporous, some physical restraint may be necessary to prevent injury. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. If heartbeat absent give external cardiac compression.) Monitor breathing and pulse. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
<b>First Aid - Skin:</b>	Drench affected parts with water. Remove contaminated clothing, rings, watches, etc., if possible, but do not attempt to do so if they are adhering to the skin. Do not attempt to reheat the affected parts rapidly - reheat slowly. Cover with a sterile dressing. Do not apply ointments or powders. Note that contaminated clothing may be a fire hazard. Contaminated clothing should be soaked with water before being removed. It must be laundered before reuse.
<b>First Aid - Eye:</b>	DO NOT DELAY. Flush eye with copious quantities of water. Cover eye with a sterile dressing. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
<b>First Aid - Ingestion:</b>	In the unlikely event of ingestion, obtain medical attention immediately.
<b>Advice to physicians:</b>	Treat symptomatically.

### 5. FIRE FIGHTING MEASURES

<b>Specific hazards:</b>	Hazardous combustion products may include: carbon monoxide, oxides of nitrogen, oxides of sulphur, unburnt hydrocarbons. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapour Explosion (BLEVE).
<b>Extinguishing media:</b>	Shut off supply. If not possible and no risk to surroundings, let the fire burn itself out. Large fires should only be fought by properly trained fire fighters. Dry powder, carbon dioxide may be used for small fires. Water fog should be used to assist the approach to the source of the fire. All containers subject to fire or to radiant heat should be cooled by spraying with water.
<b>Unsuitable extinguishing media:</b>	Water in a jet. Use of Halon extinguishers should be avoided for environmental reasons.
<b>Other information:</b>	Keep adjacent containers cool by spraying with water. All storage areas should be provided with adequate fire fighting facilities.

### 6. ACCIDENTAL RELEASE MEASURES

<b>Personal precautions:</b>	Vapour can travel along the ground for considerable distances. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Shut off leaks, if possible without personal risk. Do not enter confined spaces. Ventilate contaminated area thoroughly. Do not breathe: vapour. Avoid contact with: skin, eyes and clothing. Take off immediately all contaminated clothing - but do not attempt to do so if clothing adhering to the skin. Contaminated clothing may be a fire hazard and therefore should be soaked with water before being removed.
<b>Personal protection:</b>	Wear: monogoggles, chrome leather; neoprene or nitrile rubber gloves, safety shoes or boots.
<b>Environmental precautions:</b>	No specific measures.
<b>Clean-up methods - small spillage:</b>	Allow to evaporate. Do not disperse liquid using water.
<b>Clean-up methods - large spillage:</b>	Attempt to disperse the vapour or to direct its flow to a safe location, for example by using water fog sprays. Otherwise treat as for small spillage.
<b>Other information:</b>	Test atmosphere for vapours to ensure safe working conditions before other personnel are allowed into the area. Local authorities should be advised if significant spillage's cannot be contained. Observe all relevant local regulations.

### 7. HANDLING AND STORAGE

<b>Handling:</b>	This product is intended for use in closed systems only. Do not use in confined areas. When using do not eat, drink or smoke. Do not breathe: vapour. Take precautionary measures against static discharges. Use cylinders in the upright position only - unless specially designed for use in other orientations.
<b>Storage:</b>	Store only in purpose-designed, appropriately labelled pressure vessels or cylinders. Store outdoors or in adequately ventilated storerooms. Locate pressure vessels or cylinders away from heat and other sources of ignition. Do not store in the vicinity of cylinders containing compressed oxygen or other strong oxidisers. All storage areas should be provided with adequate fire fighting facilities. Keep out of reach of children.
<b>Specific uses:</b>	Fuel for use in suitably designed domestic and industrial combustion equipment (e.g. heating, drying), domestic and commercial cooking appliances and motor vehicles. Also used as an aerosol propellant and a feedstock for the petrochemical industry. This product must not be used in applications other than the above without first seeking the advice of the supplier.
<b>Product transfer:</b>	Electrostatic charges may be generated during pumping. Ensure electrical continuity by bonding all equipment. Avoid contact with equipment in view of the risk of cold burns. Do not use compressed air for filling, discharging or handling.
<b>Tank cleaning:</b>	Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions. These include issuing of work permits, gas-freeing of tanks, using a manned harness and lifelines and wearing air-supplied breathing apparatus. Prior to entry and whilst cleaning is underway, the atmosphere within the tank must be monitored using an oxygen meter and/or explosimeter.
<b>Recommended materials:</b>	For containers use: mild steel. For seals and gaskets, use: compressed asbestos fibre, or other materials specifically approved for use with this product. Spirally wound metal gaskets are also suitable.
<b>Unsuitable materials:</b>	With respect to metals, aluminium should not be used if there is a risk of caustic contamination of the product. Certain forms of cast iron are unsuitable. With respect to non-metallic materials, natural rubbers must not be used. Nitrile rubbers and certain plastics may also be unsuitable, depending on the material specification and intended use.
<b>Other information:</b>	Ensure that all local regulations regarding handling and storage facilities are followed. Where large quantities of liquefied petroleum gas are stored, emergency and disaster plans must be developed in conjunction with local authorities.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Engineering control measures:</b>	Use only in well ventilated areas. Provide adequate ventilation in storage areas.			
<b>Occupational exposure standards:</b>	ACGIH threshold limit values are given below. Lower exposure limits may apply locally.			
<i><b>Component name</b></i>	<i><b>Limit type</b></i>	<i><b>Value</b></i>	<i><b>Unit</b></i>	<i><b>Other info</b></i>
Liquefied petroleum gas	TWA	2500	ppm	
Butane	TWA	800	ppm	
1,3-butadiene	TWA	2	ppm	
Hydrogen sulphide	TWA	10	ppm	
Hydrogen sulphide	STEL	15	ppm	
Ethyl mercaptan	TWA	0.5	ppm	
Note: ACGIH - 'Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices', American Conference of Governmental Hygienists, Cincinnati, Ohio, 1996 edition.				
<b>Respiratory protection:</b>	Not normally required. Inhalation of LPG vapours should be minimised. If there is a risk of exposure to high vapour concentrations, respiratory protection / breathing apparatus should be worn.			
<b>Hand protection:</b>	Wear neoprene or nitrile rubber gloves or chrome leather to EN 374 and EN 420. Gloves must maintain flexibility down to the atmospheric boiling point of this product. It may be necessary to increase frequency of changing gloves if immersion or prolonged contact is likely.			
<b>Eye protection:</b>	If splashes are likely to occur, wear goggles or full-face visors to EN 166.			
<b>Body protection:</b>	Protective footwear to EN 345 should be worn when handling cylinders. If splashes are likely to occur, wear long-sleeved overalls made of cotton (100%) or other natural fibres.			
<b>Environmental exposure controls:</b>	No specific measures. Because of its high volatility, LPG is unlikely to cause ground or water pollution.			
<b>Other information:</b>	PPE should be certified according to EC examination and be 'CE' marked.			

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquefied gas
Colour:	Colourless
Odour:	Distinctive and unpleasant if stench ed, odourless if unstench ed
Boiling point:	circa - 45°C Propane and 0°C Butane
Vapour pressure:	circa 650 kPa at 20°C
Density:	circa 555 kg/m <sup>3</sup> at 15°C
Vapour density (air=1):	circa 1.8 at 15°C
Flash point:	-104°C
Flammability limit - lower:	2.2 %(V/V)
Flammability limit - upper:	10 %(V/V)
Auto-ignition temperature:	> 450°C
Explosive properties:	In use, may form flammable/explosive vapour-air mixture
Oxidising properties:	Not applicable
Solubility in water:	Data not available
n-octanol/water partition coefficient:	log P <sub>ow</sub> = 2.3 (estimated value)
Evaporation rate:	Data not available

10. STABILITY/REACTIVITY

Stability:	Stable.
Conditions to avoid:	Heat, flames and sparks.
Materials to avoid:	Strong oxidising agents.
Hazardous decomposition products:	The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected from normal combustion: carbon dioxide, carbon monoxide, polycyclic aromatic hydrocarbons, unburnt hydrocarbons, unidentified organic and inorganic compounds, particulate matter, nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Basis for assessment:	Toxicological data have not been determined specifically for this product. Information given is based on data on the components and the toxicology of similar products.
Acute toxicity - oral:	Data not available.
Acute toxicity - dermal:	Data not available.
Acute toxicity - inhalation:	LC <sub>50</sub> >5 mg/l (Gas).
Eye irritation:	Not irritating. Liquid causes cold burns.
Skin irritation:	Not irritating. Liquid causes cold burns.
Respiratory irritation:	Not irritating (Gas).
Skin sensitisation:	Not expected to be a skin sensitizer.
Carcinogenicity:	This product has not been evaluated in long-term chronic exposure tests. May contain 1, 3-butadiene, classified as a Category 1 carcinogen at a concentration of less than 0.1% (m/m). Other components are not known to be associated with carcinogenic effects.
Mutagenicity:	This product has not been evaluated in long-term chronic exposure tests. May contain 1, 3-butadiene, classified as a Category 2 mutagen, at a concentration of less than 0.1% (m/m). Other components are not known to be associated with mutagenic effects.
Human effects:	See Section 4 for information regarding acute effects to humans.

12. ECOLOGICAL INFORMATION

Basis for assessment:	Ecotoxicological data have not been determined specifically for this product. Information given is based on data on the components and the toxicology of similar products.
Mobility:	Evaporates extremely rapidly from water or soil surfaces. Disperses rapidly in air.
Persistence/degrad ability:	Oxidises rapidly by photochemical reactions in air.
Bioaccumulation:	Does not bioaccumulate.
Ecotoxicity:	Low acute toxicity to mammals.
Sewage treatment:	Not applicable.
Other information:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Precautions:	See Section 8.
Product disposal:	Given the nature and uses of this product, the need for disposal seldom arises. If necessary, dispose by controlled combustion in purpose-designed equipment. If this is not possible, contact the supplier.
Container disposal:	Return part-used or empty cylinders to the supplier.
Local legislation:	(To be provided by the Easigas on request)

14. TRANSPORT INFORMATION

UN Number:	1075
UN Class/Packing Group:	2.1, Packing Group not applicable
UN Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. (Propane Butane Mixture)
UN Number (sea transport, IMO):	1075
IMO Class/Packing Group:	2.1, Packing Group not applicable
IMO Symbol:	Flammable Gas
IMO Marine Pollutant:	No
IMO Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. (Propane Butane Mixture)
ADR/RID Class/Item:	2F
ADR/RID Symbol:	Flammable Gas Shunt With Care (RID only)
ADR/RID Kemler Number:	23-1965
ADR/RID Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. Mixture AO1, Mixture AO2 and Mixture AO (Trade name: butane)
ADNR Class/Item:	(To be provided by the supplier)
UN Number (air transport, ICAO):	1075
IATA/ICAO Class/Packing Group:	2.1, Packing Group not applicable
IATA/ICAO Symbol:	Flammable Gas
IATA/ICAO Proper Shipping Name:	Hydrocarbon Gas Mixtures, Liquefied, n.o.s. (Propane Butane Mixture)
Local regulations:	(To be provided by the supplier)
Other information:	UN Number 1075 is an AEGPL recommendation. Other numbers may be required to be used locally. Transport of this product on passenger aircraft is forbidden.

15. REGULATORY INFORMATION

EC Label name:	Contains propane and butane
EC Classification:	Extremely Flammable

EC Symbols:	F+
EC Risk Phrases:	R12 Extremely flammable
EC Safety Phrases:	S2 Keep out of the reach of children. S9 Keep container in a well-ventilated place. S16 Keep away from sources of ignition - No Smoking.
EINECS (EC):	All components listed
National legislation:	SABS 087 Standards
Other information:	Mobile gas cylinders containing butane, propane or liquid petroleum gas are currently exempt from the health labelling provisions of European Commission Directive 67/548/EEC.

16. OTHER INFORMATION

Relevant R phrases:	R12 Extremely flammable
Uses and restrictions:	Fuel for use in suitably designed domestic and industrial combustion equipment, domestic cooking appliances and motor vehicles. Also used as an aerosol propellant and a feedstock for the petrochemical industry. This product must not be used in applications other than the above without first seeking the advice of the supplier. Abuse involving repeated and prolonged exposures to high concentrations of vapour ('sniffing') may cause death by either asphyxiation or cardiac arrest. Abuse involving direct ingestion of the liquefied gas may cause death by freezing the larynx and causing the lungs to fill with fluid - an effect similar to drowning.
Technical contact pt.:	Easigas (PTY) Ltd.
Technical contact number:	
Telephone:	(011) 389 7700
Fax:	(011) 864 9000
SDS history:	Edition number: 3. First issued: May 24, 1996. Revised: September 24, 1996, 27 January 2003
Revisions highlighted:	Section 2: List of dangerous components added. Section 3 and 7: Editorial changes. Sections 6 and 8: Revised personal protection. Section 12: Estimated Ecotoxicity data deleted. Changes indicated by vertical bar to left of text.
SDS distribution:	This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.
Other information:	The meaning of the Risk phrases quoted in Section 2 of this safety data sheet that relate to the classification of 1,3-butadiene and ethyl mercaptan but that do not apply to the classification of this product are:  R20 Harmful by inhalation R45 May cause cancer R46 May cause heritable genetic damage R50 Very toxic to aquatic organisms R53 May cause long-term adverse effects in the aquatic environment  Useful references include the following:  The Institute of Petroleum, London, 'Model Code of Safe Practice', Part 9, current edition. The UK LP Gas Association Codes of Practice. CONCAWE, Brussels, 'Liquefied petroleum gas'. Product Dossier No 92/102, 1992.
References:	

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

## **Appendix 5: Mercury content of crushed fluorescent tube glass**



Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2404

**Report Number:** 318946-1

**Date of Report:** 15-Mar-2013

**Customer:** Robert Cortis  
7  
Little Danny Fl.2  
Dun Xand Cortis Str  
Birkirkara BKR 1530  
Malta

**Customer Contact:** Mr Robert Cortis

**Customer Job Reference:** Crushed Glass  
**Date Job Received at SAL:** 01-Mar-2013  
**Date Analysis Started:** 05-Mar-2013  
**Date Analysis Completed:** 15-Mar-2013

The results reported relate to samples received in the laboratory  
This report should not be reproduced except in full without the written approval of the laboratory  
Tests covered by this certificate were conducted in accordance with SAL SOPs  
All results have been reviewed in accordance with QP22

Report checked  
and authorised by :  
Mary Drury  
Project Manager

Issued by :  
Mary Drury  
Project Manager

<b>SAL Reference:</b> 318946 <b>Customer Reference:</b> Crushed Glass  <b>Bulk Product</b> Analysed as Bulk Product <b>Miscellaneous</b>					
<b>SAL Reference</b>				<b>318946 001</b>	
<b>Customer Sample Reference</b>				<b>CRUSHED GLASS</b>	
<b>Test Sample</b>				<b>AR</b>	
<b>Determinand</b>	<b>Method</b>	<b>LOD</b>	<b>Units</b>	<b>Symbol</b>	
Mercury	CVAFS	0.5	mg/kg	N	<0.5

## Index to symbols used in 318946-1

Value	Description
AR	As Received
N	Analysis is not UKAS accredited







## **Appendix 6: Achievable emission levels for mercury**



To whom it may concern,

The Client 'Electronic Products Ltd' will be installing two special carbon filters as follows. The F-55 unit will be filled with sulfur impregnated carbon and the Dorex unit will be filled with activated carbon. The sulfur impregnated carbon will adsorb mercury until the effluent mercury concentration is less than 0.001 ppb.

The F-55 unit will be placed inside the crusher room. With an air pick-up hose located close to the crusher for good air capture, any mercury laden air will be pulled through the F-55 unit where the sulfur impregnated carbon will remove the mercury from the air to a level exceeding a 99% removal efficiency. The room will have an exhaust fan that will create a negative pressure in the room. The fan will push the room air through a Dorex filter containing activated carbon which will remove any remaining mercury from the air.

In order to control if the F-55 Drum carbon should be replaced, the said unit needs to be weighted every week. When it reaches 85 lbs. of additional weight, the carbon should be replaced.

The above installation gives a 99+% mercury capture.

Regards,

*Kristen Ascione*

Kristen Ascione  
Sales Engineer  
General Carbon Corp.  
973-523-2223