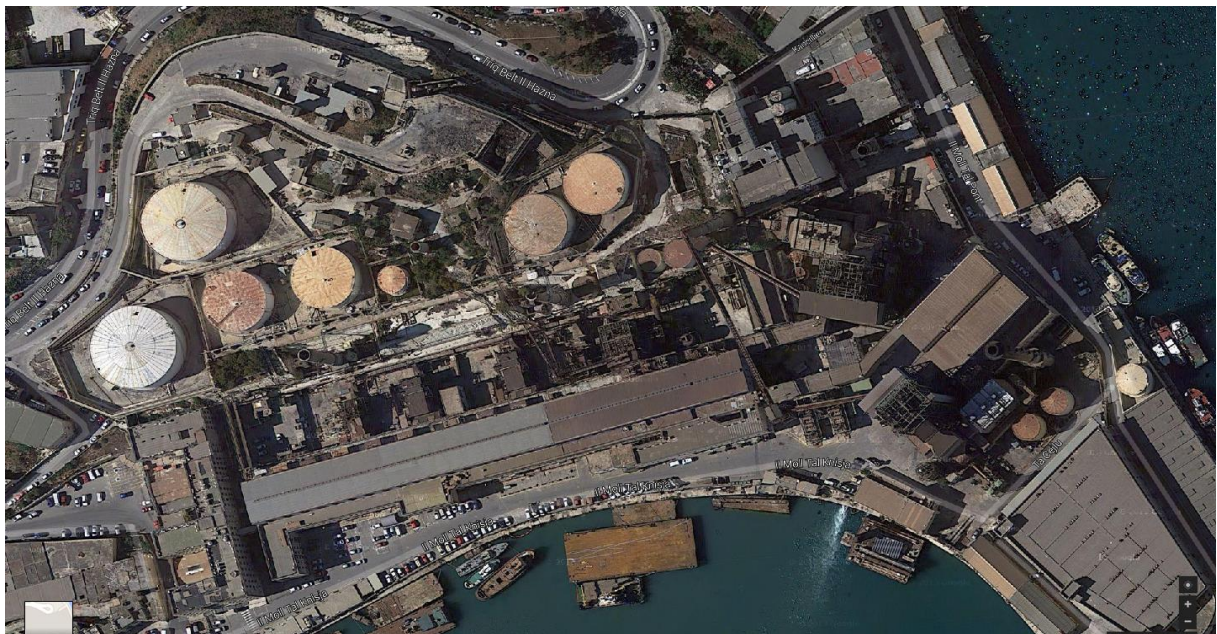




## DECOMMISSIONING OF MARSA POWER STATION

---

### WASTE MANAGEMENT PLAN



**Version I: May 2017**



**Report Reference:**

**Adi Associates Environmental Consultants Ltd, 2017. Decommissioning of Marsa Power Station. Waste Management Plan. San Gwann, May 2017; v + 13pp + 1 Appendix.**

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RESPECT THE ENVIRONMENT – KEEP IT DIGITAL**



## Quality Assurance

### Decommissioning of Marsa Power Station Waste Management Plan May 2017

Report for: **Salv. Bezzina & Sons Ltd**

### Revision Schedule

| Rev | Date     | Details              | Written by:  | Checked by:                      | Approved by:                              |
|-----|----------|----------------------|--|----------------------------------|---|
| 00  | May 2017 | Submission to client | <b>Krista Farrugia</b><br>Senior Environmental<br>Consultant | <b>Rachel Xuereb</b><br>Director | <b>Adrian Mallia</b><br>Managing Director |

File ref: G:\\_Active Projects\Waste Mgt Plans\SBS002 - WMP for Marsa PS Decommissioning\WMP\Full  
WMP\WMP for IPPC Application of 1 August\_May 2017.docx



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It is pointed out that ISO14001 certification covers the management system only and not the contents of this report.

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## APPENDIX

Appendix 1: Calcium silicate test results

## I. INTRODUCTION

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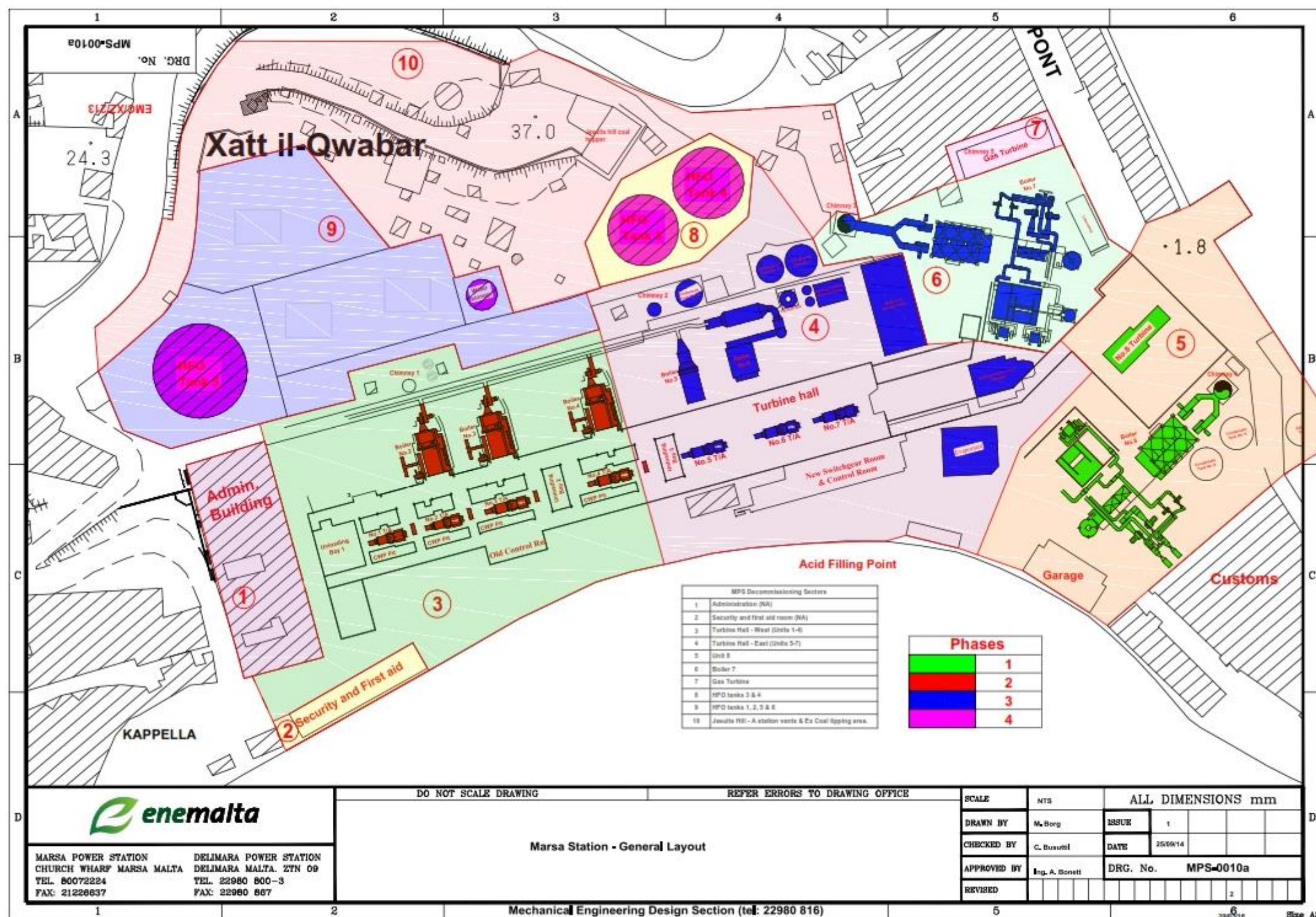
- I.1. Adi Associates Environmental Consultants Ltd (“Adi Associates”) has been commissioned by Salv Bezzina & Sons Ltd (“the contractor”) to prepare a Waste Management Plan (WMP) for the decommissioning of the Marsa Power Station, following the award of a tender by Enemalta to Salv Bezzina & Sons Ltd. **Figure 1.1** illustrates a block plan of the Marsa Power Station as originally built. **Figure 1.2** shows what remains to be demolished.
- I.2. The scope of this WMP only includes the following:
- HFO Tank 5;
  - Unit 8 shed including transformers and switchgear;
  - Chimney M2;
  - Sludge Tank;
  - Screen Plant and Evaporator No. 1;
  - [Turbine +3 to 7 block;](#)
  - [Tank 3 and Tank 4; and](#)
  - [Chimney M4.](#)
- I.3. This WMP should be considered as a live document to be updated regularly as each phase is implemented because it will only be possible to establish certain detail, such as waste quantities generated, during actual decommissioning works. In order to inform and build the WMP a hazardous materials survey and a Hazardous Material Sampling Plan were undertaken; hazardous materials to be tested for further characterisation are identified in the HAZMAT. The results of the hazardous waste testing have been presented in a separate HAZMAT report<sup>1</sup>.
- I.4. Asbestos testing and surveying is reported upon in a separate document and falls outside the scope of this WMP.

---

<sup>1</sup> Adi Associates Environmental Consultants Ltd, 2017. Decommissioning of Marsa Power Station. HAZMAT Report. San Gwann, April 2017



Figure I.1: Marsa Power Station as built







## 2. MARSA POWER STATION

### BACKGROUND

- 2.1. The Marsa Power 'B' Station was first commissioned in 1966<sup>2</sup> with the commissioning of the first two units. This station was further expanded over time to meet the electrical load and currently comprises the units listed in **Table 2.1**. Total generation capacity is 267MW. The steam units burn 0.7% sulphur heavy fuel oil and the gas turbine burns distillate fuel oil (diesel). In summary, the plant consists of steam plants, comprising six heavy fuel oil fired boilers (Boilers 3 – 8), eight conventional steam turbines (Turbines 1-8) and one open cycle diesel fired gas turbine.
- 2.2. Operational plant is situated in the centre of the site; a workshop, administration buildings and a medical clinic are located in the west of the site. Bulk storage tanks are located on a higher level on top of Jesuits Hill on the northern part of the site.

**Table 2.1: Plant at Marsa Power Station**

| Units  | Year Commissioned |
|--|-------------------|
| 2 x 90 ton/hr steam raising boilers <sup>3</sup>   | 1966              |
| 2 x 10MW steam turbines and generators             | 1966              |
| 2 x 120 ton/hr steam raising boilers               | 1970              |
| 2 x 30MW steam turbines and generators             | 1970              |
| 1 x 130 ton/hr steam raising boiler                | 1982              |
| 1 x 30MW steam turbine and generator <sup>4</sup>  | 1982              |
| 1 x 130 ton/hr steam raising boiler                | 1984              |
| 1 x 30MW steam turbines and generator <sup>5</sup> | 1984              |
| 1 x 300 ton/hr steam raising boiler                | 1985              |
| 1 x 30MW steam turbine and generator <sup>6</sup>  | 1985              |
| 1 x 60MW steam turbine and generator <sup>7</sup>  | 1987              |
| 1 x 300 ton/hr steam raising boiler                | 1987              |
| 1 x 37MW open cycle gas turbine and generator      | 1990              |

<sup>2</sup> An underground station, located beneath Jesuits Hill was commissioned in 1953 and was eventually increased to a final total capacity of 30MW. This station, known at the 'A' station, was decommissioned in 1993.

<sup>3</sup> The steam generators were decommissioned in 1994 and 1999, respectively.

<sup>4</sup> The steam turbine is refurbished plant, first commissioned in 1952 in Palermo, Sicily.

<sup>5</sup> The steam turbine is refurbished plant, first commissioned in 1952 in Palermo, Sicily. This unit was run on coal between its commissioning date and 1995 when coal firing was discontinued.

<sup>6</sup> The steam turbine is refurbished plant, first commissioned in 1952 in Palermo, Sicily. This unit was run on coal between its commissioning date and 1995 when coal firing was discontinued.

<sup>7</sup> The steam turbine is a refurbished plant, which was first commissioned in 1954 at Little Barford in the UK. In 1996, this unit was refurbished again to extend its lifetime for a further 15 years. This unit was run on coal between its commissioning date and 1995 when coal firing was discontinued.

## **DISMANTLING AND DECOMMISSIONING**

- 2.3. As mentioned only the following equipment is within the scope of this WMP:
- HFO Tanks [3, 4 and 5](#);
  - Unit 8 shed and transformers and switchgear;
  - Chimney M2;
  - Sludge Tank;
  - Screen Plant and Evaporator No. 1; and
  - [Turbine +3 to 7 Block](#);
  - [Chimney M4](#).
- 2.4. Unit Shed 8 comprises demolition of the concrete turbine block and infilling of pits with inert material, demolition of the roof, concrete and masonry structures nad the shed steel structure as well as the decommissioning of transformers, cables, switchgear, batteries, and a gantry crane.
- 2.5. Chimney 02 is approximately 40 m high. Chimney 02 is similar to Chimney 01 which was recently demolished, however insulation may be present in Chimney 02. Enemalta staff<sup>8</sup> has confirmed that the chimney is made up of brickwork sandwiched between an external concrete skin and an internal iron plate.
- 2.6. Heavy Fuel Oil tanks [3, 4 and 5](#) together with the [associated](#) sludge tank and settling tanks will be dismantled and it will be carted away together with associated pipework. [Any HFO from tanks and equipment will be removed prior to dismantling. VOC emission testing will also be carried out.](#)
- [2.7. Chimney 4 is located in the area of Boiler 8 and is mainly composed of inner bricks surrounded by a concrete structure. Samples have been taken of the bricks at the base of the chimney and bricks from the uppermost of the chimney. The bricks are non-hazardous however, further testing is envisaged once the demolition commences.](#)
- 2.8. The rest of the equipment has already been dismantled and decommissioned and has been included in a separate WMP.
- 2.9. Structures that will not be demolished include the underground 'A' station, the administration building and main gate security rooms, the inlet jetty and gas turbine 9 (including associated fuel tank, pipework and control equipment).

---

<sup>8</sup> Ing. Albert Bonett and Ing. Spiru Grima during site visit dated 6<sup>th</sup> April 2016.

---

### **3. POLICY & LEGISLATIVE CONTEXT**

---

- 3.1. The legislation and policy documents relevant to the Scheme in relation to the WMP are outlined below.

#### **NATIONAL LEGISLATION**

- 3.2. The key Regulations in force under the Environment and Development Planning Act 2010 include the following Legal Notices that are relevant to the Scheme:

- Legal Notice 184 of 2011 (as amended by Legal Notice 441 of 2011), the Waste Regulations (S.L. 504.37) and Legal Notice 106 of 2007, the Waste Management (Activity Registration, S.L. 504.78) Regulations. These Regulations regulate the production and disposal of hazardous and non-hazardous wastes. The Regulations aim to control all operations relating to the production and management of waste and promote sound waste management practices so as to safeguard human health and the environment.

- 3.3. The Scheme and the appointed Contractor responsible for the works is required to handle all waste streams in accordance with the relevant Regulations.

#### **Waste Management Plan for the Maltese Islands, 2014 - 2020**

- 3.4. The latest Waste Management Plan for the Maltese Islands discusses legislation relevant to waste management in the Maltese Islands, presents a detailed picture of the waste arisings, and includes a strategy in relation to all waste streams, with the objective of moving waste management in Malta up the waste hierarchy through increased prevention of waste generation, re-use, recycling and recovery. This strategy is designed specifically to implement the measures identified in the Solid Waste Management Strategy for the Maltese Islands, 2010 (described below).

- 3.5. The Waste Management Plan for the Maltese Islands defines waste management policy based on four principles:

- To reduce waste and to prevent waste occurring, with a view to achieving a zero-waste society by 2050.
- To manage waste in accordance with the waste hierarchy, whereby it is recognised that waste should be prevented or reduced, and that what is generated should be recovered by means of re-use, recycling or other recovery options, in order to reduce waste going to landfill, and to use the collection system to aid with achieving these goals.
- To cause the least possible environmental impacts in the management of waste.
- To ensure that the polluter-pays principle is incorporated in all waste management procedures.

- 3.6. The Scheme complies with the principle to manage waste in accordance with the

waste hierarchy outlined in the Waste Management Plan for the Maltese Islands.



## 4. WASTE MANAGEMENT

- 4.1. **Table 4.1** provides the waste log of expected waste to be generated during site decommissioning. The wastes have been classified in accordance with the European list of waste, also known as European Waste Codes (EWC). During execution of works, the waste logs will be completed whereby 'Quantity generated' will be recorded and permitted disposal facility will be confirmed. Any proposed change to the 'Permitted disposal facility' will be communicated to the Environmental Resources Authority for its approval prior to transportation. It is noted that the waste quantities included in the tables are only estimates, as they cannot be quantified with precision due to the extensive nature of the site. Furthermore any waste generated that has not yet been identified will be included in the waste log that is filled in by the Contractor. Where there is uncertainty on the nature of the waste, this will be tested. In this case waste will be stored in a bunded area until testing results are available.

- 4.2. The Waste Hierarchy has been applied when forming this Waste Management Plan (WMP). Where practical, waste has been selected for reuse and recycling.

### **Pollution prevention and control measures**

- 4.3. All wastes generated during decommissioning will be segregated by type and stored temporarily in appropriate labelled and secure containers on site (e.g. skips, IBCs) prior to removal. Any oily rags or similar used to clean equipment while working will be treated as hazardous waste and stored separately. Mixing of different waste types will be avoided.
- 4.4. Hazardous waste will be stored inside a bund manufactured from steel beams near Evaporator No2 and inside the bund wall of No6 Tank.
- 4.5. At the close of each working day, working areas will be cleaned. The material collected will be placed in skips or other appropriate containers and transported to an authorised waste management facility once they are full.
- 4.6. Stockpiles of inert dusty material on site will be wetted or covered to minimise dust emissions.

### **Transport of waste**

- 4.7. Waste will be removed from site using waste carriers registered for that type of waste (in accordance with Legal Notice 106 of 2007), or collected by authorised waste brokers after the necessary permits are issued by the former MEPA, now ERA.
- 4.8. Waste sent off-site for recovery or disposal will only be transported by an authorised waste carrier as per Activity 38 of Schedule 1 of Legal Notice 106 of 2007. The transport of waste from the Power Station to its destination should be such that it will not affect the environment and will be in accordance with all relevant National and European legislation.

- 4.9. Transport of hazardous waste within the Maltese Islands will be accompanied by the necessary waste transfer permits issued by ERA. The Contractor will be responsible to prepare applications for such permits through the hazardous waste consignment note procedure available from ERA. Each movement of hazardous waste to authorised facilities will be covered by a valid consignment permit.
- 4.10. Records will be maintained for the disposal of all hazardous waste, including quantities, dates, contractor name and manner of disposal. The contractor will keep records for every consignment of wastes removed from the Site indicating the EWC Code, description, quantities, date of removal, consignment note number (where applicable) and manner and place of final disposal/recovery. Additional records may be requested by the Environment & Resources Authority (formerly MEPA).
- 4.11. **Figure 4.2** illustrates some of the waste streams.

**Table 4.1: Preliminary waste log**

| No  | Type of Waste                                | EWC code              | Quantity projected (estimated) | Quantity generated (to be compiled during actual works) | Classification  | Waste Carrier reg No / Waste Broker reg No | Permitted disposal facility                   | Method of storage and containment for wastes to be retained on site   |
|-----|--|-----------------------|--------------------------------|---|-----------------|--|---|---|
| W1  | Stone  | 17 01 02              | 500 m <sup>3</sup>             |   | Non-hazardous   | DDE Attard Ltd                             | To be confirmed by contractor at a later date | Stored on site until final disposal   |
| W2  | Concrete                                     | 17 01 01              | 3,000 m <sup>3</sup>           |   |                 |  |   |   |
| W3  | Mixture of concrete, bricks, tiles, ceramics | 17 01 07              | Small amounts                  |   |                 |  |   |   |
| W4  | Sanitaryware                                 | 17 01 03              | Small amounts                  |   | Non-hazardous   | DDE Attard Ltd                             | WasteServ Malta Ltd                           | Stored safely on site in a bunded area until disposal by a licensed contractor to a licensed facility or exported |
| W5  | Cables / wires                               | 16 02 16              | Several metres                 |   | Non-hazardous   |  | DDE Attard Ltd                                |   |
| W6  | Lights                                       | 20 01 21*             | Small amounts                  |   | Hazardous       |  | WasteServ Malta Ltd                           |   |
| W7  | Waste Electric & Electronic Equipment        | 16 02 13*             | few tonnes                     |   | Hazardous       |  | WasteServ Malta Ltd                           | Stored safely on site in a bunded area until disposal by a licensed contractor to a licensed facility or exported |
| W8  | Transformer oils                             | 13 01 13 <sup>9</sup> | Small quantities               |   | Hazardous       | PTMatic                                    | <del>WasteServ Malta Ltd for E-export</del>   |   |
| W9  | Mercury switches from transformers           | 16 02 13*             | 18 <sup>10</sup>               |   | Hazardous       | PTMatic                                    | <del>WasteServ Malta Ltd for eExport</del>    |   |
| W10 | Lubricating Oil                              | 13 02 05*             | Few litres drained from the    |   | Hazardous waste | PTMatic                                    | <del>WasteServ Malta Ltd for eExport</del>    |   |

<sup>9</sup> Transformer oils were sampled and tested. Results show that although PCBs are present, their concentration is less than 50 mg/kg, so although the oil is hazardous the relevant EWC code is 13 01 13\* (refer to **HAZMAT Report**). [2h5](#)

<sup>10</sup> Number may increase where sealed relays are not accessible.




| No  | Type of Waste   | EWC code               | Quantity projected (estimated)            | Quantity generated (to be compiled during actual works) | Classification  | Waste Carrier reg No / Waste Broker reg No | Permitted disposal facility                           | Method of storage and containment for wastes to be retained on site                                       |
|-----|---|------------------------|---|---|-----------------|--|---|---|
|     |   |                        | different equipment such as gantry cranes |   |                 |  |   |   |
| W11 | Heavy Fuel Oil  | 13 07 01*              | Amount uncertain – from Tank 5            |   | Hazardous waste | PTMatic                                    | <a href="#">WasteServ Malta Ltd for eExport</a>       |   |
| W12 | Absorbents, filter materials, wiping cloths, protective clothing contaminated by dangerous substances | 15 02 02*              | Small quantities                          |   | Hazardous waste | PTMatic                                    | <a href="#">WasteServ Malta Ltd</a> or Greenskips Ltd |   |
| W13 | Batteries   | 16 06 01*<br>16 06 02* | 175 (number)                              |   | Hazardous       | PTMatic                                    | Exported  | Stored safely on-site by contractor responsible for disposal of hazardous waste until ready for disposal. |
| W14 | Calcium silicate <sup>11</sup>  | 17 06 04               | 30m <sup>3</sup> from evaporator          |   | Non-hazardous   | PTMatic                                    | <a href="#">WasteServ Malta Ltd for export</a>        | Stored safely on-site in jumbo bags by contractor until ready for disposal.                               |
| W15 | Insulation Mineral Wool   | 17 06 04               | Small quantities                          |   | Non-hazardous   |  |   |   |

<sup>11</sup> See Appendix I for calcium silicate testing – no ACM were found therefore the calcium silicate is not considered hazardous.

| No         | Type of Waste                                  | EWC code        | Quantity projected (estimated) | Quantity generated (to be compiled during actual works) | Classification       | Waste Carrier reg No / Waste Broker reg No | Permitted disposal facility | Method of storage and containment for wastes to be retained on site  |
|------------|--|-----------------|--------------------------------|---|----------------------|--|-----------------------------|--|
| W16        | Copper, bronze, brass                          | 17 04 01        | 62 tonnes                      |   | Non hazardous        |  |                             | Separate collection of metals for recycling offsite. Stored temporarily on-site in designated areas for such a limited time only to ensure adequate house-keeping is maintained on site. |
| W17        | Mixed metals                                   | 17 04 07        | <del>63-75</del> tonnes        |   | Non-hazardous        |  |                             |  |
| W18        | Aluminium                                      | 17 04 02        | Few tonnes                     |   | Non-hazardous        |  |                             |  |
| <u>W19</u> | <u>Mixed construction and demolition waste</u> | <u>17 09 04</u> | <u>Few tonnes</u>              |   | <u>Non-hazardous</u> |  | <u>To be decided</u>        | <u>Collection of bricks from chimney and testing prior to disposal</u>   |



**Figure 4.1: Waste streams**

|  |  |
|--|--|
|   |  |
| <p>Mercury switches</p>  | <p>Transformer</p>   |
|  |  |
| <p>Batteries</p>   |  |

## **Appendix I – Calcium Silicate test result**



Member of the Royal Society of Chemistry N°: 440777

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Cumulative Project Report N°: 1

Report Reference N°: 100716

## Bulk Sample Asbestos Analysis Certificate

### Details of Client and Project Site

|                     |  |
|---------------------|--|
| Client:             | PT Matic Environmental Services Ltd.                               |
| Address:            | Alberta Head Office, San Ġwakkin Road,<br>Mrieħel, BKR 3000, Malta |
| Project Site:       | Marsa Power Station, Marsa, Malta                                  |
| Sample(s) taken on: | Various, June 2016   |

### Sample Delivery

|                     |   |
|---------------------|---|
| Collected           |   |
| Submitted by Client | ✓ |

The sampling procedure was carried out in accordance with (U.K.) HSE Guide HSG 264:2012.  
The analysis procedure was carried out using microscopy at a magnification of x500.

### Job Description – Identification of Asbestos Containing Materials (ACM)

Bulk samples from calcium silicate insulation material were randomly collected by the client at different stages whilst their personnel were engaged in removing it, as part of the plant's dismantling process, and submitted for the analytical determination of whether the material is ACM or not.

### Inference

All samples were confirmed as being Not ACM.

### Remarks

The results reported relate to the samples analysed. Samples are retained for 1 month from the date of receipt after which they may be disposed of unless advised otherwise.

Certificate issued on: 12 July 2016

Name of Inspecting  
Consultant:

Dr. Robert Cortis  
B.Sc. (Hons.) M.Sc. Ph.D. MRSC

Signed: Robert Cortis

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