

## 1. Overview

This plan relates to the manufacture of unbound aggregate from steel slag for use in construction at the Stockyard 10, Tata Llanwern, Newport. NP19 4QZ.

This plan sets out steps that are undertaken to ensure the quality of the aggregates is attained and demonstrable. This procedure should be read in conjunction with the operational method statement, the crushing/screening plant permits. Schematic 1 details the stages in production. The wastes to be treated and recovered are:

- EWC 10 02 01 'waste from iron and steel industry from slag processing; and
- EWC 10 02 02 'unprocessed slag waste from the iron and steel industry.

This Factory Protocol has been prepared in accordance with the Environment Agency Guidance 'Aggregate from waste steel slag: quality protocol' and details the following:

- The specification of products and associated quality controls;
- The process stages, maintenance and responsibility.
- Waste acceptance criteria;
- Production and testing;
- Training;
- Records; and
- Documentation.

The responsibility for implementing this plan is Dave Cobern, Operational Director and the HCD Site Manager.

## 2. Product Specification and Standards

### 2.1 Standards

All aggregates, sands and cohesive fill be manufactured following the principals set out in this standard:

- BS EN 13242: Aggregate for unbound and hydraulically materials for use in civil engineering and road construction; and

### 2.2 Products, Specification and Quality Controls

Table 2.1 sets out the products manufactured. The standards may be supplemented by Client specific specification.

Product	Specification	Quality controls
Unbound recycled aggregate: General Granular	Specification for Highway Works (SHW) Series 600	Level 4 as set out in BS EN 13242.
<ul style="list-style-type: none"> <li>• Fill Class 1A or C</li> </ul>		
Selected Granular Fill		
<ul style="list-style-type: none"> <li>• 6F4 and 6F5</li> </ul>		

### 3. Implementation and Management of the Plan

#### 3.1 Responsibility

The HCD Site Manager is the primary person responsible for this plan being implemented. They will ensure there is sufficient sources available for the training and testing of the materials.

The site and plant manager are responsible for the implementation of the inspection, maintenance, and testing requirements.

Sub-contractors, including testing consultants, will be responsible for adhering to this plan, as directed by HCD Ltd

#### 3.2 Distribution

This plan will be issued to and implemented by the Site Manager and Technical Competent Person. This includes the acceptance procedures, maintenance and inspection requirements and sampling protocols to be implemented.

#### 3.3 Training

All responsible persons on site and undertaking the testing will receive training on the plan. This includes the managers and the organisation's responsible for sampling.

#### 3.4 Review

The Plan will either be reviewed on an annual basis or in the event of a significant production failure. The plan will be reviewed by the Operations Director.

### 4. Waste Acceptance Procedure

The waste feed stock will be inspected and the following determined and recorded:

- The type of slag
  - Blast Furnace Slag (BFS);
- The inspector will inspect it to ensure there are no other co-mingled materials within the feed stock;
- The volume/weight of the feedstock material;
- Source / producer of the waste;

In the event waste shows significant co-mingled waste (>1% w/w) or does not fit the EWC description it will be rejected on site. Every load will be inspected during placement in the feed stock by a trained member of the HCD team. Rejected loads will be directed to the quarantine area.

Rejected loads will be recorded in the site diary

## 5. Production and Testing

### 5.1 Overview

The plant will be operated, maintained, and routinely inspected to ensure the feed stock are suitably processed and quality aggregated and engineering materials recovered/manufactured.

Schematic 1 details the specific stages and a descriptive overview is provided in the technical standard. Schematic 2 set out the quality control process.

### 5.2 Operational Management, Maintenance, and Inspection

The plant will be operated and maintained in accordance the method statement and associated manufacturers maintenance plans. The type of plant and its serial number will be recorded.

### 5.3 Treatment

The site operates three treatment processes:

- Segregation (manual and automated);
- Crushing to reduce the size of minerals to a conforming specification; and
- Separation by size fraction by screening.

The specification required will be reviewed. The screen/crusher will be set to the required grading. The following controls will be applied:

- During the loading of the screen/crusher hopper, the materials will be inspected. If unforeseen contamination is identified, either physical or environmental, the load will be transferred to quarantine;
- The conforming load will be treated through the crushing/screening plant re-sizing the material stream;
- The material will pass below the ferrous magnet, removing any residual metals;
- The re-sized material will be inspected. Any residual unacceptable materials will be handpicked.

### 5.4 Product testing

Sampling of product will be undertaken by approved sub-contractor. HCD Ltd will only use suitably UKAS accredited laboratory. Geotechnical testing will be completed in accordance with Table 5.3. Frequencies presented in this section are considered a minimum for each product stream and in the event of either marginal compliance or failure, frequencies will be increased. All frequencies relate to operational periods. In the event the plant is operated periodically in a period, the frequency of testing will be adjusted pro-rata.

Type	Test	Test Reference	Minimum Frequency
Unbound granular material	Particle Size Distribution	BS EN 933-1	Every production week
	Fines content	BS EN 933-1	Every production week
	Particle density and water absorption	BS EN 1097-6	Every production 6 months
	Resistance to Fragmentation (LA Coefficient)	BS EN 1097-2	Every production quarter
	Volume stability	BS EN 1744-1	Every production quarter
	Magnesium sulphate soundness	BS EN 1367-2	Every production year

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The results of the testing will be assessed against specification by the testing consultant and the certificated reports issued. The results will be screened for compliance. In accordance with the factory process, in the event of defect, the following actions will be implemented (dependent upon failure):

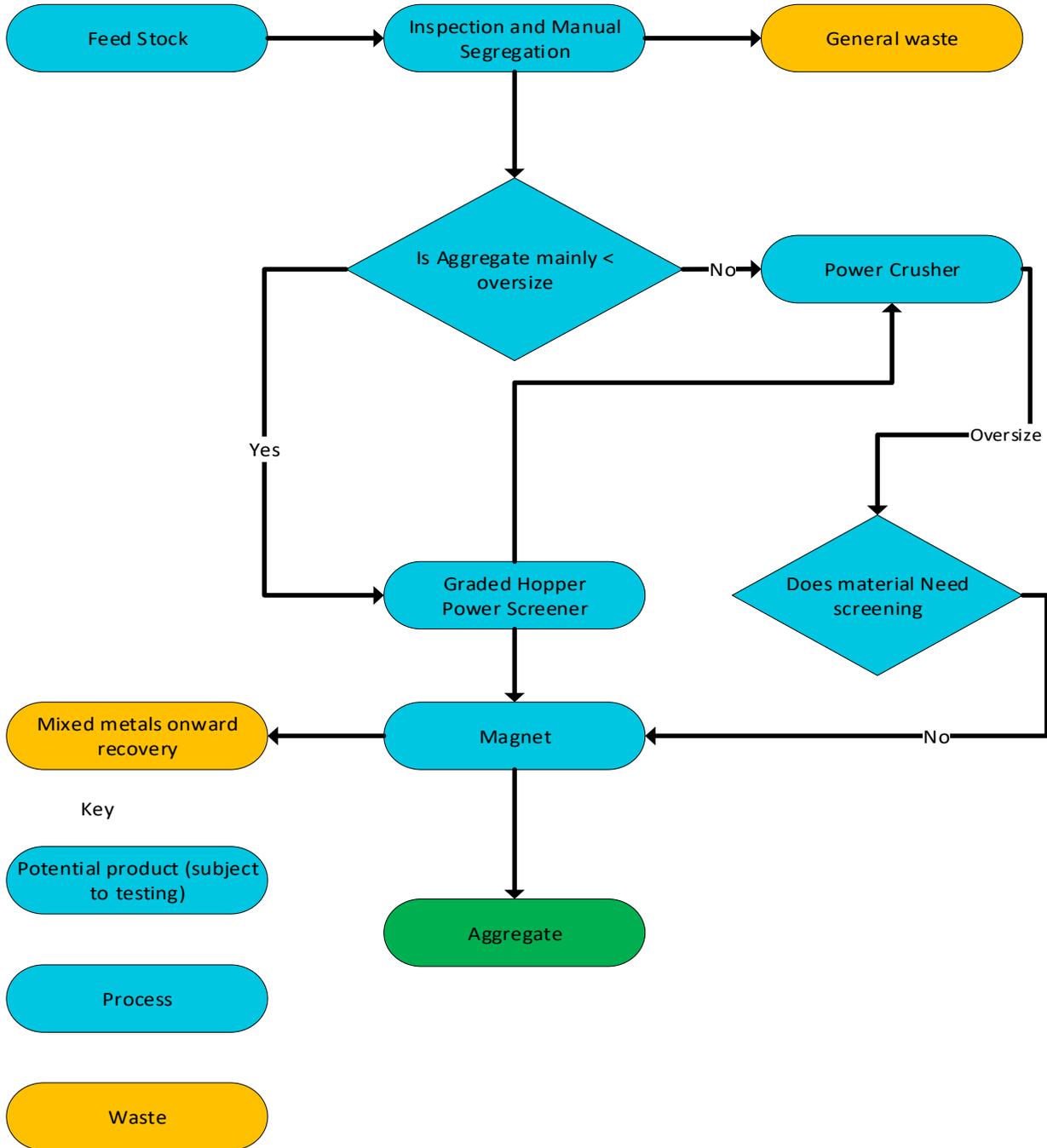
- Results will be checked with laboratory;
- The plant will be reviewed, including the grading screens;
- Inputs will be reviewed in period; and
- Affected material will be treated, transferred to feed stock and re-processed.

## 6.0 Documentation

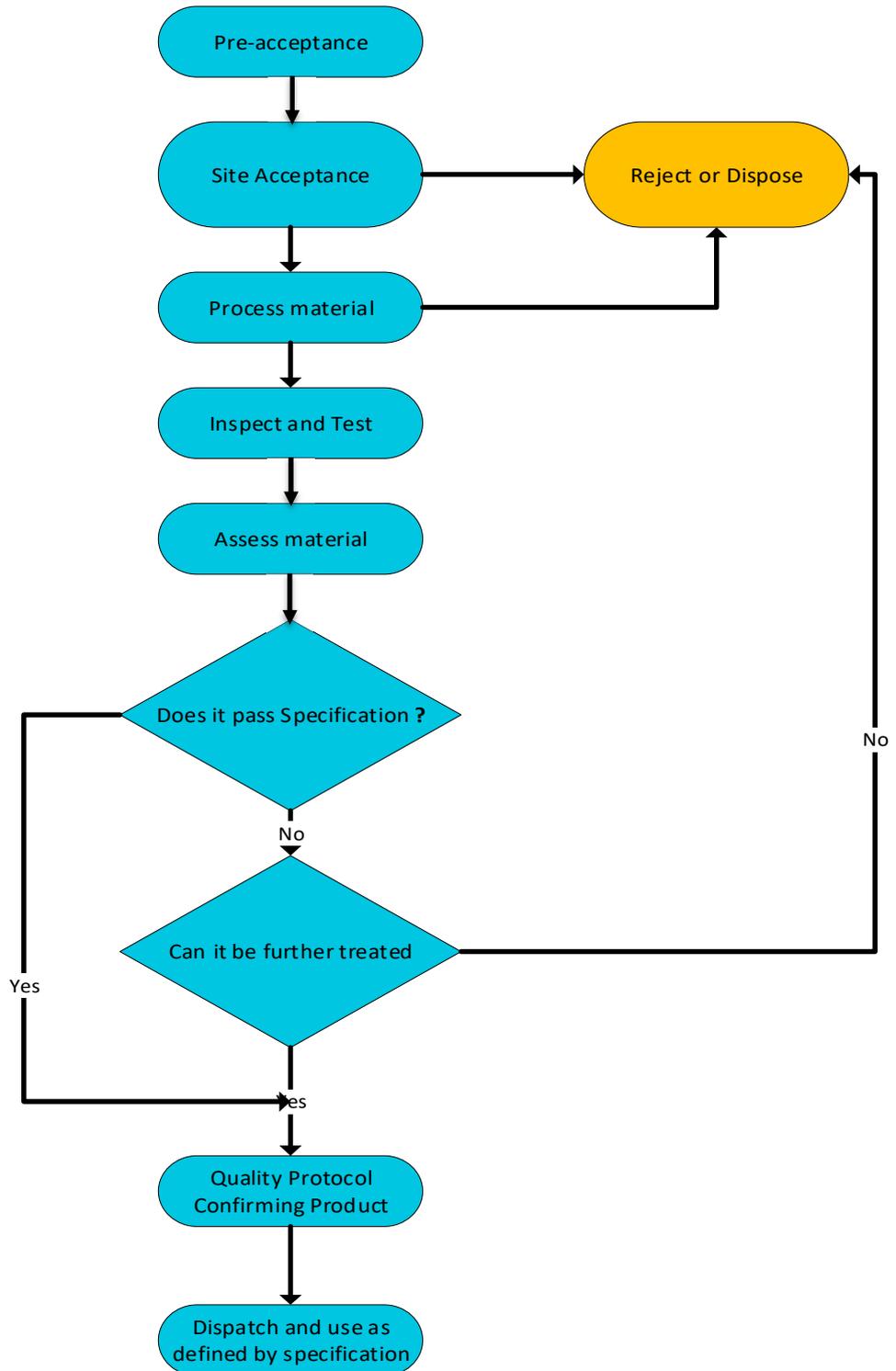
- Maintenance and Inspection records will be maintained for at least a 12-month period.
- Certificated testing records will be maintained;
- Records of delivery will be maintained for at least 12 months detailed against specification. This will include:
  - Producing site details;
  - Product and date dispatched;
  - Identifying batch details;
  - Details of the customers use;
  - Quantity transferred;
- Records of the results and the product will be maintained on file for at least two years and available to clients on request;
- The quality results will be maintained by product line to ensure compliance;

Declaration of Performance and conformity will be maintained and available on request.

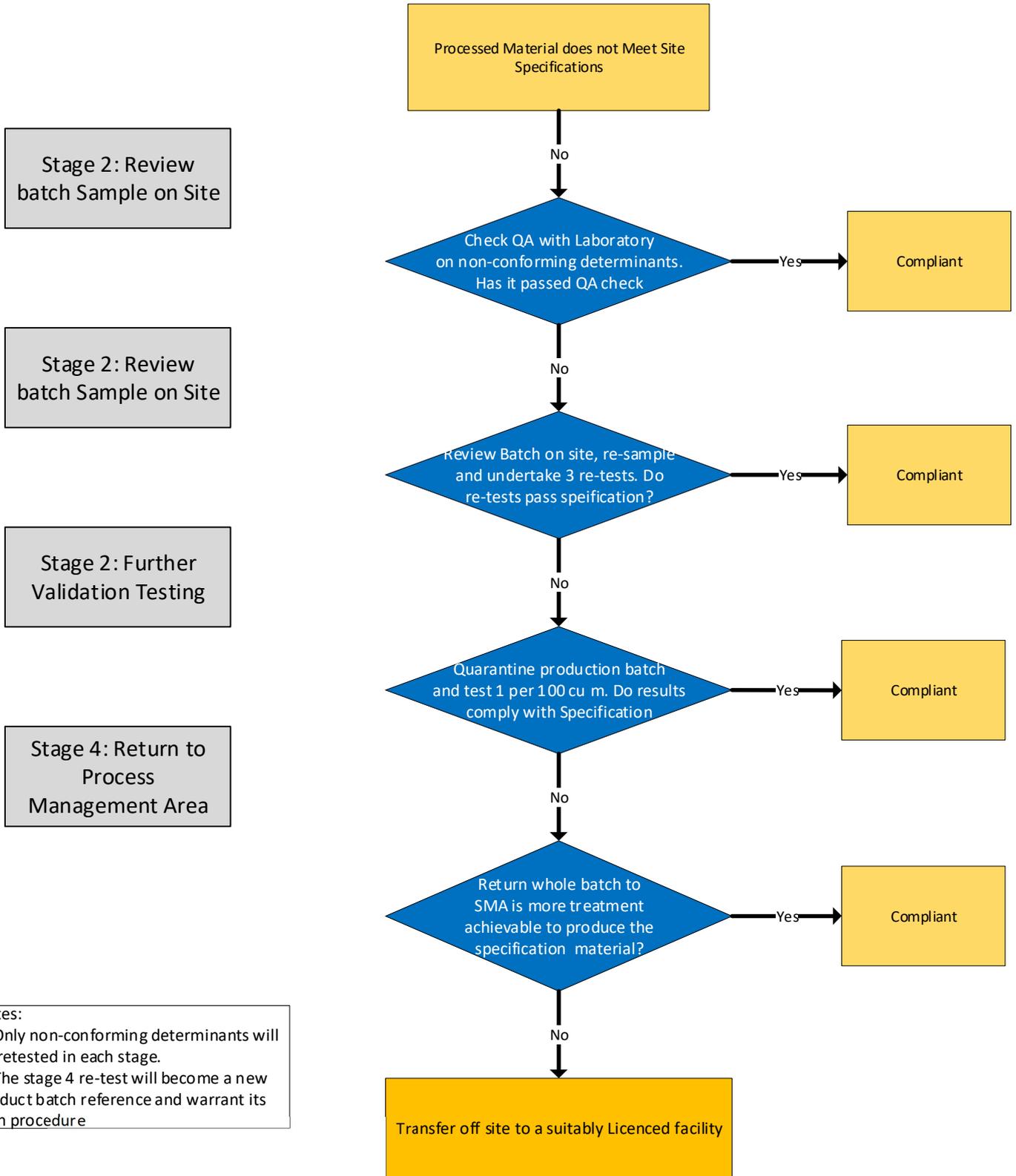
**Schematic 1: Process Flow Diagram**



**Schematic 2: Process Flow Diagram**



**Schematic 3: Non-Conformance Procedure**



FACTORY PRODUCTION PLAN & QUALITY PROTOCOL (AGGREGATES FROM STEEL SLAG)

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