

MMV Environment Services Ltd

# Energy from Waste Combined Heat and Power Facility, Forties Road, Dundee

Environmental Statement  
Volume Two

ARUP-REP-ES-Vol2

Issue | 28 October 2016



 **MMV** Environment

**ARUP**

MMV Environment Services Ltd  
**Energy from Waste Combined  
Heat and Power Facility, Forties  
Road, Dundee**

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 245510-00

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**ARUP**

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# 1 Overview

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- 1.1.1** This Environmental Statement (ES) is part of a suite of documents submitted to Dundee City Council (DCC) in support of an application for planning permission by MMV Environment Services Limited (MMV) (the Applicant) for the construction and operation of an Energy from Waste Combined Heat and Power Facility (EfW CHP facility) (The Proposed Scheme) on land situated on Forties Road, in the north-east of Dundee (the Application Site).
- 1.1.2** The proposed EfW CHP facility would replace the existing DERL EfW facility on the neighbouring site on Forties Road.
- 1.1.3** The ES has been prepared pursuant to The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (EIA Regulations). It comprises two volumes with supporting appendices, and a non-technical summary (NTS), namely:
- a. **Volume One:** This provides a description of the existing Application Site and surroundings (Section 2), a description of the Proposed Scheme (Section 3), a description of alternatives (Section 4), a description of the EIA approach and methodology (Section 5) and a summary of the environmental assessment results (Section 6);
  - b. **Volume Two (this volume):** This provides assessments for the following topics:
    - Acoustics (Volume 2, Section 2);
    - Air Quality (Volume 2, Section 2.16.1);
    - Ecology (Volume 2, Section 4);
    - Ground Conditions and Contamination (Volume 2, Section 5);
    - Landscape and Visual Amenity (Volume 2, Section 6);
    - Socio-economics (Volume 2, Section 6.15);
    - Traffic and Transport (Volume 2, Section 8);
    - Water Resources (Volume 2, Section 9); and
    - Interactive Effects<sup>1</sup> (Volume 2, Section 10).
  - c. **Volume Three:** this provides the supporting figures to Volume One and Volume Two;

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<sup>1</sup> It is noted that cumulative effects are assessed in the topic section (Volumes 2) of the ES.

- d. **Appendix Volume One:** this provides supporting reports and documents to Volume One;
- e. **Appendix Volume Two:** this provides supporting reports and documents to Volume Two; and
- f. **Non-Technical Summary:** This provides a summary description of the Proposed Scheme and environmental assessment results presented in a non-technical language.

**1.1.4** In addition to the appendix of figures, there are also some images within the main body of Volumes One and Two.

**1.1.5** A master glossary and abbreviations section has been included in Volume One for use with all Proposed Scheme application documents. The ES should be read alongside this glossary and abbreviations.

**1.1.6** The ES has been prepared by Arup with the exceptions of the following sections, for which information has been provided by the Applicant:

- The Applicant (Volume 1, Section 1.3);
- Site location and context (Volume 1, Sections 2.2 and 2.3);
- Existing site use and operation (Volume 1, Section 2.4);
- Proposed Scheme development stages (Volume 1, Section 2.6);
- Proposed Scheme description (Volume 1, Section 3);
- Alternatives (Volume 1, Section 4);
- Engagement (Volume 1, Section 5.2);
- Construction Environmental Management Plan (CEMP) (Volume 1 Appendix F1);
- Site Waste Management Plan (SWMP) (Volume 1 Appendix G1); and
- The baseline photography and photomontages, which have been commissioned by the Applicant (Volume 3).



## 2 Acoustics

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### 2.1 Introduction

**2.1.1** This section describes the likely significant effects of noise and vibration associated with the Proposed Scheme on the surrounding environment. The Proposed Scheme has the potential to affect noise and/or vibration at sensitive receptors. This section describes the likely significant effects arising from construction noise and vibration; and changes in operational traffic flows. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application.

**2.1.2** The following technical appendices accompany this section:

- Volume 1 Appendix A1 - Terminology;
- Volume 1 Appendix A2 - Key noise policy and guidance;
- Volume 1 Appendix A3 - Engagement;
- Volume 1 Appendix A4 - Baseline noise survey; and
- Volume 1 Appendix A5 - Construction noise assumptions.

### 2.2 Engagement

**2.2.1** Consultation was undertaken with DCC and SEPA to confirm the scope and methodology of the noise and vibration assessment. The outcomes of this are summarised in Volume 2 Appendix A3. Consultation included agreement of survey locations, measurement and assessment methodologies.

### 2.3 Methodology

#### Overview

**2.3.1** The assessment of changes in noise and vibration as a result of the Proposed Scheme is based on the Government's noise policy as described in Volume 2 Appendix A2 e.g. SPP and NPF3. Further to SPP requirements, this assessment also examines the impacts of noise change, not just absolute levels. The assessment of noise effects has compared predicted noise levels during construction relative to the baseline noise levels.

**2.3.2** The change in noise levels has been evaluated along with other parameters, such as the number of receptors and their sensitivity, in order to assess the significance of the effect. The significance criteria distinguish between residential properties and non-residential properties.

**2.3.3** In the case of vibration from construction activities, the significance of effects has been assessed in terms of the likely exceedance of particular threshold levels associated with disturbance.

**2.3.4** Detailed assessment stages and criteria adopted to determine significant effects are set out in this section as agreed with DCC.

## Construction noise

### Methodology

**2.3.5** The predicted noise levels at surrounding dwellings have been calculated by considering the individual source noise levels of impact piling machinery taken from BS5228-1, the number and proportion of time for which the machinery is expected to operate, the distance to the receptors and any intervening screening.

**2.3.6** The assessment is based on the assumption that works will be undertaken using best practicable means (BPM) as required by section 72 of the Control of Pollution Act and described in BS5228-1. The assessment assumes that construction activities will only take place during weekday daytimes (07:00-18:00) and between 08:00-1300 on Saturdays.

### Assessment criteria

**2.3.7** The thresholds for determining potentially significant construction noise effects have been determined using the 'ABC method' described in Annex E of BS5228-1 and the measured noise levels (see Table 1). The criteria are derived from logarithmically averaged noise levels obtained via attended measurements on site. Measured freefield ambient noise levels have been converted to façade levels by adding 3dB, as specified in BS5228-1.

Table 1: Summary of ambient noise levels and construction noise criteria (façade levels)

| Location<br>(Illustrated in<br><br><b>Figure 1:<br/>Attended<br/>and<br/>unattended<br/>noise<br/>monitoring<br/>locations</b><br><br>Figure 1) | Measured noise<br>levels<br>Day dBL <sub>Aeq,T</sub> | Construction<br>noise criteria<br>Day dBL <sub>Aeq,16hr</sub><br>(ABC Category) |
|---|--|---|
| A   | 65   | 70 (B)  |
| B   | 53   | 65 (A)  |
| C   | 74   | 75 (C)  |
| D   | 65   | 70 (B)  |

|   |    |        |
|---|----|--------|
| E | 66 | 70 (B) |
| F | 68 | 75 (C) |
| G | 68 | 75 (C) |

**2.3.8** The assessment of EIA significance is determined by evaluating the construction noise thresholds along with other factors, such as the number of receptors and their sensitivity.

## Construction vibration

### Methodology

**2.3.9** Vibration from construction sources has been predicted using the procedures described in BS 5228: Part 22. As for the construction noise, the vibration assessment assumes the use of BPM.

### Assessment criteria

**2.3.10** The risk of vibration causing damage to buildings is assessed in terms of the peak particle velocity (PPV) at the base of the building<sup>3</sup>. The building damage risk criteria given in Table 2 have been applied to all buildings, below which there is no risk of building damage.

Table 2: Assessment criteria for risk of building damage from vibration

| Category of building   | Peak particle velocity (PPV) at building foundation |                                    |
|--|---|------------------------------------|
|  | Transient <sup>1</sup> vibration                    | /Continuous <sup>2</sup> vibration |
| Potentially vulnerable buildings <sup>3</sup>  | ≥6 mm/s   | ≥3 mm/s                            |
| Structurally sound buildings   | ≥12 mm/s  | ≥6 mm/s                            |
| 1. Transient vibration relative to building response such as impulsive vibration from percussive piling<br>2. Continuous vibration relative to building response such as vibrating rollers<br>3. BS7385-2 highlights that the criteria for aged buildings may need to be lower if the buildings are structurally unsound. The standard also notes that criteria should not be set lower simply because a building is important or historic (listed). Where information about these structures is not currently known, the significance criteria for these receptors has been set at a lower level on a precautionary basis |   |                                    |

<sup>2</sup> British Standards Institution (2009); BS 5228-1:2009+A1:2014 and BS 5228 Part 2 *Code of Practice for Noise and Vibration Control on Open Construction Sites*

<sup>3</sup> British Standards Institution (1993); BS7385 1993 –Part 2 *Evaluation and Measurement for vibration in buildings – Guide to damage levels for groundborne vibration*

**2.3.11** BS 5228: Part two provides guidance on human perception in terms of PPV and states that at 0.3mm/s and above, vibration may be ‘just perceptible in residential environments’. Where a PPV above 0.3mm/s is predicted, assessment of significance is evaluated according to criteria given in British Standard 6472. Part 1 of BS6472 assesses the impact of vibration using the vibration dose value (VDV). This indicator takes into account how people respond to vibration in terms of frequency content, vibration magnitude and the number and duration of vibration events during an assessment period. Assessment criteria for exposure to vibration are given in Table 3.

Table 3: Criteria for human exposure to vibration in buildings

| Impact classification  | Vibration exposure <sup>1</sup>                  |   |
|--|--|---|
|  | VDV daytime (07:00-23:00) (m/s <sup>1.75</sup> ) | VDV night time (23:00-07:00) (m/s <sup>1.75</sup> ) |
| Minor  | 0.2  | 0.1   |
| Moderate   | 0.4  | 0.2   |
| Major  | 0.8  | 0.4   |
| 1. Determined at the worst location on a normally loaded floor (usually the centre of the floor)<br>NOTE: For offices and workshops, multiplying factors of two and four respectively should be applied to the above vibration dose value ranges for a 16hr day. |  |   |

## Operational road traffic noise

### Methodology

**2.3.12** Operational road traffic noise has been calculated using CRTN to calculate noise changes from changes in traffic flows. Changes in traffic flows have been derived from the traffic and transport impact assessment (Section 8). Noise change has been quantified by calculating the Basic Noise Level (BNL), defined in CRTN, for the do minimum (without the Proposed Scheme) and do something (with the Proposed Scheme) scenarios for the assessment year.

### Assessment criteria

**2.3.13** The scale or severity of any road traffic noise change, whether beneficial or adverse, requires description to indicate the degree of impact where possible. DMRB states that a change in road traffic noise of 1dBLA10,18hr in the short-term is the smallest considered perceptible. A change of 3dBLA10,18hr or greater is taken as an indicator of potential significant effect.

**2.3.14** The magnitude criteria in Table 4 as outlined in DMRB are used to assess noise effects arising from the operation of the Proposed Scheme.

Table 4: Impact significance criteria for operational road traffic as per DMRB (short-term)

| Change in noise level $\text{dBL}_{A10,18h}$ | Impact category        | Initial indicator of significance |
|--|------------------------|-----------------------------------|
| >5.0   | Substantial adverse    | Potentially significant increase  |
| 3.0 to 4.9                                   | Moderate adverse       |                                   |
| 1.0 to 2.9                                   | Minor adverse          | Unlikely to be significant        |
| 0.1 to 0.9                                   | Negligible             | Not significant                   |
| 0  | No change              |                                   |
| -0.9 to -0.1                                 | Negligible             |                                   |
| -2.9 to -1.0                                 | Minor beneficial       | Unlikely to be significant        |
| -4.9 to -3.0                                 | Moderate beneficial    | Potentially significant decrease  |
| < -5.0                                       | Substantial beneficial |                                   |

### 2.3.15

Where a potentially significant effect has been identified i.e. a change of  $3\text{dBL}_{A10,18hr}$  or greater, consideration has been given to other factors and professional judgement has been applied to determine whether the effect would be significant or not. These factors include the:

- Number of receptors affected;
- Receptors' sensitivity;
- Duration and magnitude of the impact; and
- External and internal absolute levels compared against criteria outlined in national and international guidelines.

## Operational industrial noise

### 2.3.16

Industrial noise arising from the proposed EfW CHP facility will be controlled through design to meet established noise criteria based on the existing baseline noise levels at the closest noise sensitive receptors in accordance with Horizontal Guidance Note IPPC H3 (part 1) Regulation and Permitting and Horizontal Guidance Note IPPC H3 (part 2) Noise assessment and Control. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application.

## 2.4 Assumptions and limitations

### 2.4.1

For some of the sources of noise that will arise from construction and operation of the Proposed Scheme it is not possible, at this stage of the project design, to quantify levels of noise that will arise. Where possible, calculations have been carried out based on the assumptions set out in Volume 2 Appendix A5. These assumptions are considered

sufficiently robust such that the assessment is adequate for the purpose of this application.

## 2.5 Baseline

**2.5.1** The proposed site is located immediately adjacent to the existing DERL facility on Forties Road. The surrounding area consists predominantly of industrial estates and residences, in addition to a number of open spaces. The proposed site is bounded by Drumgeith Road to the north, Baldovie Road to the east and Balunie Drive to the south. A Michelin tyre production facility (the Michelin facility) is located to the east of the proposed site and a car dismantling yard is located to the south.

**2.5.2** The following residential noise sensitive receptors (NSR) have been identified:

- Residences on Strathaven Terrace;
- Residences on Britannia Drive;
- Residences on Montpellier Gardens;
- Residences on Hawick Drive; and
- Residences on Balunie Drive.

**2.5.3** Survey positions were chosen to be representative of residences at these locations. The survey positions are shown in Figure 1.

**2.5.4** Attended noise measurements were carried out on 20 and 26 June 2016 at the following times:

- Daytime inter-peak measurements between the hours of 10:00 and 17:00hrs;
- Evening measurements 20:00-22:00hrs; and
- Night time measurements 01:00-04:00hrs.

**2.5.5** Attended measurements were ten minutes in duration during daytime and night time periods.

**2.5.6** Unattended logging sound level meters were deployed on the north and south boundaries of the Michelin facility, in lieu of suitable residential locations, which captured relevant noise metrics in 15 minute intervals between 20 and 26 June 2016.

**2.5.7** Details of the survey methodology and survey results are presented in Volume 2 Appendix A4.





Figure 1: Attended and unattended noise monitoring locations

## Attended noise measurements

### 2.5.8

Noise levels at each measurement location are summarised in Table 5 to Table 7 for daytime, evening and night time, respectively. Each table summarises measurements made during a weekday and weekend. For all values, LAeq,T is presented as an energy average whereas LA90,T, LA10,T, and LAmax,F, are presented as arithmetic averages.

Table 5: Summary of measured daytime noise levels (07:00-19:00), freefield.

| Measurement location                   | Measured noise level dB (re 20µPa) |        |        |          |
|--|------------------------------------|--------|--------|----------|
|  | LA90,T                             | LAeq,T | LA10,T | LAmax, F |
| <i>Attended measurements- Weekday</i>  |                                    |        |        |          |
| Location A                             | 55                                 | 62     | 64     | 77       |
| Location B                             | 49                                 | 50     | 52     | 62       |
| Location C                             | 59                                 | 71     | 75     | 83       |
| Location D                             | 58                                 | 62     | 65     | 83       |
| Location E                             | 52                                 | 63     | 67     | 76       |
| Location F                             | 46                                 | 65     | 70     | 77       |
| Location G                             | 53                                 | 65     | 69     | 81       |
| <i>Attended measurements - Weekend</i> |                                    |        |        |          |
| Location A                             | 53                                 | 61     | 64     | 71       |
| Location B                             | 48                                 | 50     | 52     | 61       |
| Location C                             | 58                                 | 71     | 75     | 83       |
| Location D                             | 54                                 | 61     | 64     | 74       |
| Location E                             | 47                                 | 60     | 64     | 75       |
| Location F                             | 43                                 | 63     | 66     | 76       |
| Location G                             | 49                                 | 64     | 68     | 83       |

Table 6: Summary of measured evening noise levels (19:00-23:00), freefield.

| Measurement Location                  | Measured noise level dB (re 20µPa) |        |        |          |
|---------------------------------------|------------------------------------|--------|--------|----------|
|                                       | LA90,T                             | LAeq,T | LA10,T | LAmax, F |
| <i>Attended measurements- Weekday</i> |                                    |        |        |          |
| Location A                            | 51                                 | 59     | 63     | 73       |
| Location B                            | 48                                 | 50     | 52     | 60       |
| Location C                            | 51                                 | 68     | 73     | 82       |
| Location D                            | 51                                 | 61     | 65     | 76       |



|   |    |    |    |    |
|---|----|----|----|----|
| Location E  | 46 | 60 | 65 | 74 |
| Location F  | 42 | 60 | 65 | 77 |
| Location G  | 44 | 62 | 65 | 82 |
| <i>Attended measurements - Weekend</i>                            |    |    |    |    |
| Location A  | 49 | 59 | 63 | 68 |
| Location B  | 43 | 46 | 48 | 59 |
| Location C  | 52 | 69 | 73 | 83 |
| Location D  | 50 | 59 | 63 | 71 |
| Location E  | 41 | 57 | 60 | 75 |
| Location F  | 39 | 59 | 59 | 75 |
| Location G  | 43 | 61 | 65 | 77 |
| During the evening a single measurement was made at each location |    |    |    |    |

Table 7: Summary of measured night time noise levels (23:00-07:00), freefield.

| Measurement Location                                 | Measured noise level dB (re 20µPa) |                    |                    |                      |
|--|------------------------------------|--------------------|--------------------|----------------------|
|  | L <sub>A90,T</sub>                 | L <sub>Aeq,T</sub> | L <sub>A10,T</sub> | L <sub>Amax, F</sub> |
| <i>Attended measurements- Weekday</i>                |                                    |                    |                    |                      |
| Location A   | 38                                 | 46                 | 52                 | 70                   |
| Location B   | 40                                 | 41                 | 42                 | 53                   |
| Location C   | 44                                 | 57                 | 54                 | 83                   |
| Location D   | 44                                 | 51                 | 50                 | 71                   |
| Location E   | 40                                 | 56                 | 58                 | 74                   |
| Location F   | 39                                 | 46                 | 45                 | 69                   |
| Location G   | 39                                 | 57                 | 57                 | 77                   |
| <i>Attended measurements - Weekend</i>               |                                    |                    |                    |                      |
| Location A*  | 39                                 | 53                 | 56                 | 71                   |
| Location B*  | 40                                 | 42                 | 43                 | 52                   |
| Location C*  | 44                                 | 58                 | 51                 | 78                   |
| Location D*  | 45                                 | 53                 | 54                 | 73                   |
| Location E*  | 39                                 | 42                 | 43                 | 60                   |
| Location F*  | 40                                 | 55                 | 48                 | 78                   |
| Location G*  | 34                                 | 49                 | 39                 | 74                   |
| *A single measurement was made during the night time |                                    |                    |                    |                      |

## Unattended noise measurements

**2.5.9** Noise levels captured by logging sound level meters are summarised in Table 8 and Table 9 for daytime and night time, respectively. For all values,  $L_{Aeq,T}$  is presented as an energy average whereas  $L_{A90,T}$ ,  $L_{A10,T}$ , and  $L_{Amax,F}$ , are presented as arithmetic averages.

Table 8: Summary of unattended noise levels (07:00-23:00), daytime freefield.

| Measurement Location | Measured noise level dB (re 20 $\mu$ Pa) |             |             |              |
|----------------------|--|-------------|-------------|--------------|
|                      | $L_{A90,T}$                              | $L_{Aeq,T}$ | $L_{A10,T}$ | $L_{Amax,F}$ |
| Logger 1             | 48                                       | 50          | 51          | 62           |
| Logger 2             | 41                                       | 46          | 48          | 60           |

Table 9: Summary of unattended noise levels (23:00-07:00), night time freefield.

| Measurement Location | Measured noise level dB (re 20 $\mu$ Pa) |             |             |              |
|----------------------|--|-------------|-------------|--------------|
|                      | $L_{A90,T}$                              | $L_{Aeq,T}$ | $L_{A10,T}$ | $L_{Amax,F}$ |
| Logger 1             | 46                                       | 48          | 48          | 57           |
| Logger 2             | 41                                       | 46          | 48          | 60           |

## 2.6 Potential effects and good environmental design management

**2.6.1** The risk of likely significant effects from construction is greatest for activities that involve piling and earthworks. Noise between source and receptor will be attenuated with distance and through screening by intervening structures.

**2.6.2** Building services from the proposed EfW CHP facility will be designed to meet the noise criteria adopted for this development. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application.

**2.6.3** The surrounding road network is likely to be affected by the Proposed Scheme given the number of HGVs that would service the proposed EfW CHP facility.

## 2.7 Assessment – Construction

**2.7.1** The construction works have been divided into two main stages which represent distinct activities in terms of potential noise impact. The estimated programme duration is estimated to be 35 months beginning in late 2017 and finishing in 2020.

## Construction noise

**2.7.2** Results of the noise emissions from construction activities upon residential receptors are presented in Table 10, alongside the relevant significance threshold.

Table 10: Predicted construction noise levels at each residential NSR

| NSR   | Location Ref | Threshold<br>dBL <sub>Aeq,T</sub><br>(ABC category) | Construction noise level<br>(dBL <sub>Aeq,T</sub> ) |   |
|---|--------------|---|---|---|
|   |              |   | Mobilisation and<br>early works                     | Main works<br>and process<br>installation |
| Residences on Summerfield Avenue                    | A            | 70 (B)  | 49  | 48  |
| Residences on Britannia Drive                       | B            | 65 (A)  | 51  | 51  |
| Residences on Montpelier Gardens                    | C            | 75 (C)  | 54  | 56  |
| Residences on Hawick Drive                          | D            | 70 (B)  | 47  | 51  |
| Residences on Balunie Drive<br>(south-west of site) | E            | 70 (B)  | 44  | 49  |
| Residences on Balunie Drive<br>(south of site)      | F            | 75 (C)  | 51  | 57  |
| Residences on Balunie Drive<br>(south-east of site) | G            | 75 (C)  | 54  | 55  |

**2.7.3** The highest predicted noise levels per phase are presented for the daytime period. No evening or night-time calculations have been undertaken as no construction activities are currently anticipated to be carried out during these periods.

**2.7.4** The predicted noise levels arising from construction activities is below the construction thresholds for potential significant effect and therefore are assessed as not significant.

## Construction vibration

**2.7.5** As ground borne vibrations diminish strongly with distance and the distances to all the existing residential receptors from the proposed works are greater than 100m, the level of vibration is predicted to be well below levels at which there is a risk of causing damage.

**2.7.6** BS 5228: Part two states that PPV of 0.3mm/s and above will be 'just perceptible in residential environments'. Considering the distances to the closest receptors and the expected piling methods (bored piling),

the level of vibration is predicted to be well below levels at which complaints are likely. Therefore, no significant effect from construction vibration is identified at dwellings.

## Road traffic noise during construction

### 2.7.7

The Basic Noise Level (BNL) has been calculated in accordance with the Calculation of Road Noise (CRTN) with and without the development using traffic flow data presented in Section 8, on the roads indicated in Figure 2. The results are shown in Table 11. It can be seen that during construction a minor increase in noise level (in DMRB terms as described in Table 4) is predicted for Forties Road (north). At all other roads, no change in noise level or a negligible increase has been predicted. Therefore no significant effects have been identified.

Table 11: Road traffic noise assessment – during construction

| (Link ID*) Road           | Future Traffic noise without development<br>BNL L <sub>10</sub> dB(A) | Future Traffic noise during construction<br>BNL L <sub>10</sub> dB(A) | Difference (with-without)<br>dB(A) |
|---------------------------|---|---|------------------------------------|
| (A) Drumgeith Road (west) | 71.1  | 71.3  | 0.2                                |
| (B) Balunie Drive         | 66.4  | 66.4  | 0.0                                |
| (C) Forties Road (south)  | 58.8  | 58.8  | 0.0                                |
| (D) Forties Road (north)  | 63.2  | 64.4  | 1.2                                |
| (E) Drumgeith Road (east) | 68.9  | 69.0  | 0.1                                |
| (F) Ballumbie Road        | 63.9  | 63.9  | 0.0                                |
| (G) Drumgeith Road (east) | 69.0  | 69.1  | 0.1                                |
| (H) Kellas Road           | 66.3  | 66.3  | 0.0                                |
| (I) Baldovie Road         | 68.2  | 68.3  | 0.1                                |

## 2.8 Assessment – Switching

### 2.8.1

It is understood that there would be no overlap in operations of the existing DERL and proposed EfW CHP facility. Therefore, noise arising from the switchover of facilities has not been assessed nor will be assessed within the permit application.

## 2.9 Assessment – Decommissioning of the existing DERL facility

### 2.9.1

It is understood that the existing DERL facility will be retained but rendered non-operational. As a result there are no current plans to decommission or demolish DERL and therefore this has not been assessed as part of this ES.

## 2.10 Assessment – Operation

### Operational road traffic noise

**2.10.1** The Basic Noise Level (BNL) has been calculated with and without the development using traffic flow models, on the roads indicated in Figure 2. The results are shown in Table 12. In reference to the significance criteria, it can be seen that the development will result in a negligible increase in noise level at Drumgeith Road (west) and Forties Road (north). At all other locations there is no increase in predicted noise from road traffic therefore no significant effects have been identified.

Table 12: Road traffic noise assessment – during normal operating conditions

| (Link ID*) Road           | Future Traffic noise without development<br>BNL L <sub>10</sub> dB(A) | Future Traffic noise with development<br>BNL L <sub>10</sub> dB(A) | Difference (with-without)<br>dB(A) |
|---------------------------|---|--|------------------------------------|
| (A) Drumgeith Road (west) | 71.1  | 71.2   | 0.1                                |
| (B) Balunie Drive         | 66.4  | 66.4   | 0.0                                |
| (C) Forties Road (south)  | 58.8  | 58.8   | 0.0                                |
| (D) Forties Road (north)  | 63.2  | 63.4   | 0.2                                |
| (E) Drumgeith Road (east) | 68.9  | 68.9   | 0.1                                |
| (F) Ballumbie Road        | 63.9  | 63.9   | 0.0                                |
| (G) Drumgeith Road (east) | 69.0  | 69.0   | 0.0                                |
| (H) Kellas Road           | 66.3  | 66.3   | 0.0                                |
| (I) Baldovie Road         | 68.2  | 68.2   | 0.0                                |

### Industrial noise from proposed EfW CHP facility

**2.10.2** Industrial noise arising from the proposed EfW CHP facility will be controlled through design to meet established noise criteria based on the existing baseline noise levels at the closest noise sensitive receptors. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application. Provided SEPA permit requirements are met, the noise emission is considered to be not significant subject to suitable evidence provided to SEPA and DCC.



Figure 2: Road links included in road traffic noise assessment



## 2.11 Supplementary mitigation

### Construction and decommissioning

- 2.11.1** Construction works will take place during daytime only, with vehicles mainly accessing the Application Site during these hours. For logistical reasons it may be necessary to have some deliveries outside these hours, such as if any abnormal loads are required to transport large items.
- 2.11.2** Any works required to be undertaken outside the core hours will need agreement between the contractor and DCC. This is reflected and specified in the CEMP as shown in Volume 1 Appendix F1.
- 2.11.3** Although no significant effect from construction traffic noise is predicted, any risk of disturbance to residents will be mitigated and minimised by considerate behaviour, such as not leaving engines idling and minimising the need to wait on the public highway.
- 2.11.4** It is understood that the existing DERL facility will be retained but rendered non-operational. Therefore, no mitigation options have been explored as part of this assessment to account for any demolition/decommissioning.

### Industrial noise

- 2.11.5** Industrial noise arising from the operational Proposed Scheme will be controlled through design to achieve acceptable noise criteria based on the existing baseline noise levels at the closest noise sensitive receptors. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application. Provided SEPA permit requirements are met, the noise emission is considered to be not significant. Therefore, no mitigation is suggested.

### Road traffic noise

- 2.11.6** No significant effects have been identified from changes in operational road traffic noise at the identified NSRs. Therefore, no mitigation is suggested.

## 2.12 Residual effects

- 2.12.1** As no significant effects are identified during construction or due to operational road traffic, no additional mitigation has been proposed and there will be no significant residual effects of noise or vibration.

## **2.13 Sensitivity test for programme delay**

- 2.13.1** Considering that there are no plans for operating the existing DERL facility and proposed EfW CHP facility simultaneously, it is unlikely that any programme delay will significantly affect the outcome of the noise assessment. As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application.

## **2.14 Cumulative effects**

### **Cumulative effects from construction**

- 2.14.1** For construction noise effects (including vibration) nearby committed developments have the potential to contribute to cumulative effects.
- 2.14.2** No other committed construction activities have been identified within the local area during the expected construction programme. Therefore cumulative effects from construction noise are assessed as not significant.
- 2.14.3** With regards to construction traffic noise, the assessment did not identify any significant effects associated with the Proposed Scheme. It is very unlikely that the committed developments would give rise to a 3dB(A) increase in noise level given the necessary time overlap during the construction of the Proposed Scheme. Therefore, cumulative effects from construction traffic noise are assessed as not significant.

### **Cumulative effects from operational noise sources**

- 2.14.4** The noise climate may be permanently changed as a result of stationary noise sources such as building services or fixed plant, associated with other committed developments. However, this change is likely to be minor given the large distances in between developments and receptors.
- 2.14.5** It is expected that operational noise arising from committed developments would be controlled by design.
- 2.14.6** As agreed with DCC, the operational noise (and vibration) assessment will be submitted to SEPA as part of the permit application.

### **Cumulative effects from operational road traffic noise**

- 2.14.7** With regards to cumulative effects from operational road traffic on the wider road network, nearby developments were included within the traffic flow figures presented in Section 8, and therefore the assessment takes account of cumulative effects inherently. Operational road traffic will also be assessed and submitted to SEPA as part of the permit application.



## 2.15 Assessment summary

### Construction

Table 13: Assessment summary - construction

| Acoustics – Construction noise                                     |  |   |   |
|--|--|---|---|
| Aspect of the project  | Description of effect and significance   | Supplementary mitigation                | Residual effects summary                      |
| Noise arising from construction activities                         | Prediction of noise levels arising from construction activities at the closest receptor were found to be below construction noise thresholds (as reported in Table 1) and therefore <b>not significant</b> | None proposed assuming BPM are applied. | Effects unchanged.<br><b>Not significant.</b> |
| Vibration from construction activities                             | Effects from vibration upon existing receptors are assessed as <b>not significant</b>  | None proposed                           | Effects unchanged.<br><b>Not significant.</b> |
| Noise from increase in construction traffic on nearby road network | Increase in traffic flows are expected to be less than 3dB increase as a result of construction traffic and therefore effects are assessed as <b>not significant.</b>                                      | None proposed                           | Effects unchanged.<br><b>Not significant.</b> |

### Operation

Table 14: Assessment summary – operation

| Acoustics – Operational noise                    |   |                          |   |
|--|---|--------------------------|---|
| Aspect of the project                            | Description of effect and significance  | Supplementary mitigation | Residual effects summary                      |
| Operational noise from proposed EfW CHP facility | Operational noise has not been assessed but it is assumed that it would be controlled by design to meet DCC/SEPA policy and has therefore been assessed as <b>not significant</b> | None proposed            | Effects unchanged.<br><b>Not significant.</b> |

| Acoustics – Operational noise                         |   |                          |   |
|---|---|--------------------------|---|
| Aspect of the project                                 | Description of effect and significance  | Supplementary mitigation | Residual effects summary                      |
| Noise from increase in traffic on nearby road network | Increase in traffic flows are expected to be less than 3dB increase as a result of operational traffic and therefore effects are assessed as <b>not significant</b> . | None proposed            | Effects unchanged.<br><b>Not significant.</b> |

## 2.16 Further work to be undertaken for the ES

**2.16.1** It is considered that there is no additional work to be undertaken in support of the noise and vibration assessment of the ES.

## 3 Air quality

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### 3.1 Introduction

**3.1.1** This section describes the likely significant effects of the Proposed Scheme on air quality and odour.

**3.1.2** Effects of the following will require assessment:

- Construction of the Proposed Scheme;
- Operation of the Proposed Scheme;
- Decommissioning of the existing DERL; and
- Operation of the Proposed Scheme in combination with other consented developments in the vicinity of the Application Site i.e. cumulative effects.

**3.1.3** Air quality studies are concerned with the presence of airborne pollutants in the atmosphere. For construction and decommissioning impacts, the assessment examines the potential emissions of dust and particulate matter from construction and demolition activities and exhaust emissions generated by plant and traffic associated with the Proposed Scheme.

**3.1.4** As agreed with DCC, the operational air quality and odour assessment will be submitted to SEPA as part of the permit application.

### 3.2 Engagement

**3.2.1** Consultation has been carried out with DCC and SEPA to confirm the scope and methodology of the air quality assessment and air quality monitoring. Consultation included agreement of monitoring locations and assessment methodologies.

**3.2.2** A scoping opinion was provided by DCC and key issues relating to air quality raised in the scoping opinion comments included the importance of assessing worst-case options for the Proposed Scheme. The comments also included details of modelling requirements for the EfW CHP and traffic, and sensitivity tests, which will be addressed in the operational air quality and odour assessment to be submitted to SEPA as part of the permit application.

### 3.3 Methodology

**3.3.1** This section provides an overview of the methodology for assessing the likely significant effects of the Proposed Scheme on air quality and odour during construction and decommissioning. Full details of the topic methodology are provided in Volume 2 Appendix B1, including relevant air quality standards, limit values and environmental assessment levels.

## Construction dust assessment

- 3.3.2** The construction dust assessment has been carried out for the construction and decommissioning works associated with the construction of the proposed EfW CHP facility and the decommissioning of the existing DERL facility.
- 3.3.3** The relevant aspects include the potential to generate dust from earthworks, track out, construction, and demolition activities, and emissions from construction equipment and vehicles.
- 3.3.4** The construction effects have been assessed using a qualitative approach based on latest guidance from the Institute of Air Quality Management (IAQM)<sup>4</sup>. The guidance methodology has been followed, and provides the basis for the determination of significance for the construction dust assessment. It is considered that where the overall construction dust significance is deemed to be medium or high risk, the overall construction dust impacts of the Proposed Scheme would be significant.
- 3.3.5** For the construction assessment works have been assumed to occur across the whole development site. This is a precautionary assumption as it assumes dust impacts can occur across the whole site. Taking a precautionary approach ensures any mitigation identified would be sufficient to effectively manage any potential dust emissions.

## Traffic emissions during construction and operation

- 3.3.6** The Proposed Scheme has the potential to impact on air quality as a result of road traffic exhaust emissions during all stages. These emissions include nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and are associated with light goods vehicles and heavy goods vehicles (HGVs) travelling to and from the Application Site. A screening assessment has been undertaken using the criteria contained within the Environmental Protection UK (EPUK) and IAQM guidance document to determine the required level of detail for the assessment.

## 3.4 Assumptions and limitations

- 3.4.1** For the construction assessment works have been assumed to occur across the whole development site, as a precautionary assumption
- 3.4.2** Selected baseline background concentrations are considered to be representative of concentrations at the Application Site.

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<sup>4</sup> IAQM (2014) Guidance on the assessment of dust from demolition and construction

## 3.5 Baseline

**3.5.1** This section sets out the current and future baseline conditions for air quality in and around the Proposed Scheme site.

**3.5.2** Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

**3.5.3** The section includes background data from relevant monitoring studies carried out as part of the local air quality management regime, and data from national monitoring studies, for the following pollutants:

- Nitrogen oxides (NO<sub>x</sub>) and nitrogen dioxide (NO<sub>2</sub>);
- Carbon monoxide (CO);
- Total organic carbon (TOC) as benzene;
- Sulphur dioxide (SO<sub>2</sub>);
- Fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>);
- Hydrogen fluoride (HF) and Hydrogen chloride (HCl);
- Ammonia (NH<sub>3</sub>);
- Dioxins and furans;
- Polychlorinated biphenyls (PCB), and Polycyclic aromatic hydrocarbons (PAHs) as benzo(a)pyrene; and
- Trace metals: lead (Pb), arsenic (As), cadmium (Cd), nickel (Ni), thallium (Tl), mercury (Hg), antimony (Sb), chromium (Cr and CrVI), cobalt (Co), copper (Cu), manganese (Mn) and vanadium (V).

**3.5.4** The baseline assessment has considered background air pollutant concentrations from sources including:

- Local authority review and assessment reports and local air quality monitoring data<sup>5</sup>;
- Project specific air quality monitoring carried out by Arup;
- Defra UK Air Information Resource website<sup>6</sup> for details on air quality monitoring and AQMAs;
- Ammonia, Acid Gases and Aerosols, and Heavy Metals Monitoring Networks for the UK<sup>7</sup>, and

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<sup>5</sup> Dundee City Council (2016) <https://www.dundeeecity.gov.uk/air-quality>

<sup>6</sup> Defra (2016) <https://uk-air.defra.gov.uk/data/>

<sup>7</sup> Defra (2016) <https://uk-air.defra.gov.uk/networks/network-info?view=metals>

- Air Quality Scotland website<sup>8</sup> for local authority background data, and predicted background pollutant concentrations.

**3.5.5** Dust is not included in the air quality standards, and so no routine monitoring is undertaken of dust. PM10 and PM2.5 are constituents of dust that are of concern with regard to human health impacts, and baseline data for PM10 and PM2.5 is included in this section.

**3.5.6** Local authorities are required to review and assess air quality in their local areas. Where air quality is been found to exceed the relevant air quality standards, local authorities must declare an air quality management area (AQMA). Where an AQMA is declared, an Air Quality Action Plan (AQAP) must be prepared which includes measures to improve air quality within the AQMA.

**3.5.7** The entire area of Dundee City was declared an AQMA in 2013<sup>5</sup>, and is shown in Figure 1. The AQMA was declared due to exceedences of the 1-hour and annual mean NO<sub>2</sub> air quality objectives, and the annual mean PM10 air quality objective, included in the Air Quality Standards (Scotland) Regulations 2010.



Figure 3: Dundee Air Quality Management Area

## Local air quality monitoring

**3.5.8** The city of Dundee carries out automatic monitoring of NO<sub>2</sub> and PM10 concentrations at seven monitoring sites in the city. Details of

<sup>8</sup> Air quality in Scotland (2016) <http://www.scottishairquality.co.uk/>

the monitoring sites are outlined in Table 15. Automatic monitoring involves the use of instruments which continuously draw air through the instrument, and provide data on short averaging periods such as 15 minutes.

**3.5.9** Local monitoring data on the Air Quality Scotland<sup>8</sup> website has been reviewed, and data from all automatic air quality sites in Dundee is shown in

### 3.5.10

**3.5.11** Table 16 and Table 17 for 2013, 2014 and 2015, with site locations shown in Figure 4.

**3.5.12** Annual mean concentrations of NO<sub>2</sub> and PM<sub>10</sub> are shown in

### 3.5.13

**3.5.14** Table 16. There are no sites monitoring PM<sub>2.5</sub> in Dundee.

**3.5.15** Annual mean concentrations of NO<sub>2</sub> exceeded the air quality objective of 40µg/m<sup>3</sup> at the two kerbside sites (DUN5 Seagate and DUN6 Lochee Road) in 2015. Annual mean concentrations of PM<sub>10</sub> exceeded the air quality objective of 18µg/m<sup>3</sup> at one of the kerbside sites, DUN6 Lochee Road, in 2015.

**3.5.16** The number of exceedences of the short-term air quality objectives for NO<sub>2</sub> and PM<sub>10</sub> are shown in Table 17. For PM<sub>10</sub> daily mean concentrations of 50µg/m<sup>3</sup> are not to be exceeded more than seven times a year, and for NO<sub>2</sub> hourly mean concentrations of 200µg/m<sup>3</sup> are not to be exceeded more than 18 times a year. There were no sites which exceeded the PM<sub>10</sub> objective in 2013, 2014 or 2015. One site (DUN6 Lochee Road) which is a kerbside site, exceeded the NO<sub>2</sub> objective in 2013; no other sites exceeded the NO<sub>2</sub> objective in 2013, 2014 or 2015.

**3.5.17** Concentrations at the background monitoring sites (DUN1 Mains Loan, DUN4 Broughty Ferry Road) met the relevant air quality objectives for NO<sub>2</sub> and PM<sub>10</sub> in 2013, 2014 and 2015.

Table 15: Automatic air quality monitoring sites in Dundee City

| Site ID | Site name           | Site type        | OS grid reference |        |
|---------|---------------------|------------------|-------------------|--------|
|         |                     |                  | x                 | y      |
| DUN1    | Mains Loan          | Urban background | 340970            | 731892 |
| DUN3    | Union Street        | Roadside         | 340234            | 730091 |
| DUN5    | Seagate             | Kerbside         | 340486            | 730446 |
| DUN4    | Broughty Ferry Road | Urban industrial | 341970            | 730976 |
| DUNM    | Meadowside          | Roadside         | 340243            | 730658 |
| DUN6    | Lochee Road         | Kerbside         | 338859            | 730774 |
| DUN7    | Whitehall Street    | Roadside         | 340277            | 730154 |

Table 16: Long-term automatic air quality monitoring data in Dundee City

| Site ID | Site name           | Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> ) |           |           | Annual mean PM <sub>10</sub> concentration (µg/m <sup>3</sup> ) |           |           |
|---------|---------------------|--|-----------|-----------|---|-----------|-----------|
|         |                     | 2013   | 2014      | 2015      | 2013  | 2014      | 2015      |
| DUN1    | Mains Loan          | *  | 13        | 10        | 12  | 13        | 12        |
| DUN3    | Union Street        | 31   | 29        | 28        | 15  | 16        | 17        |
| DUN5    | Seagate             | <b>55</b>  | <b>55</b> | <b>50</b> | 16  | 18        | 14        |
| DUN4    | Broughty Ferry Road | -  | -         | -         | 16  | 15        | 13        |
| DUNM    | Meadowside          | <b>49</b>  | <b>40</b> | 38        | <b>19</b>   | 17        | 16        |
| DUN6    | Lochee Road         | <b>52</b>  | <b>46</b> | <b>48</b> | 18  | <b>19</b> | <b>20</b> |
| DUN7    | Whitehall Street    | <b>41</b>  | <b>43</b> | 36        | -   | -         | -         |

Notes: '-' indicates no monitoring of this pollutant is undertaken at this site.  
 '\*' indicates data capture less than 75% at the monitoring site in this year.  
 Concentrations in **bold** exceed the relevant air quality objectives.

Table 17: Short-term automatic air quality monitoring data in Dundee City

| Site ID | Site name           | No. exceedences of the hourly mean NO <sub>2</sub> air quality objective of 200 µg/m <sup>3</sup> |      |      | No. exceedences of the daily mean PM <sub>10</sub> air quality objective of 50 µg/m <sup>3</sup> |      |      |
|---------|---------------------|---|------|------|--|------|------|
|         |                     | 2013  | 2014 | 2015 | 2013   | 2014 | 2015 |
| DUN1    | Mains Loan          | *   | 0    | 0    | 1  | 1    | 1    |
| DUN3    | Union Street        | 0   | 0    | 0    | 1  | 2    | 7    |
| DUN5    | Seagate             | 10  | 0    | 0    | 4  | 2    | 3    |
| DUN4    | Broughty Ferry Road | -   | -    | -    | 4  | 1    | 2    |
| DUNM    | Meadowside          | 0   | 0    | 0    | 4  | 2    | 4    |
| DUN6    | Lochee Road         | <b>100</b>  | 1    | 6    | 3  | 1    | 5    |
| DUN7    | Whitehall Street    | 0   | 0    | 0    | -  | -    | -    |

Notes: '-' indicates no monitoring of this pollutant is undertaken at this site.  
 '\*' indicates data capture less than 75% at the monitoring site in this year.  
 Concentrations in **bold** exceed the relevant air quality objectives.



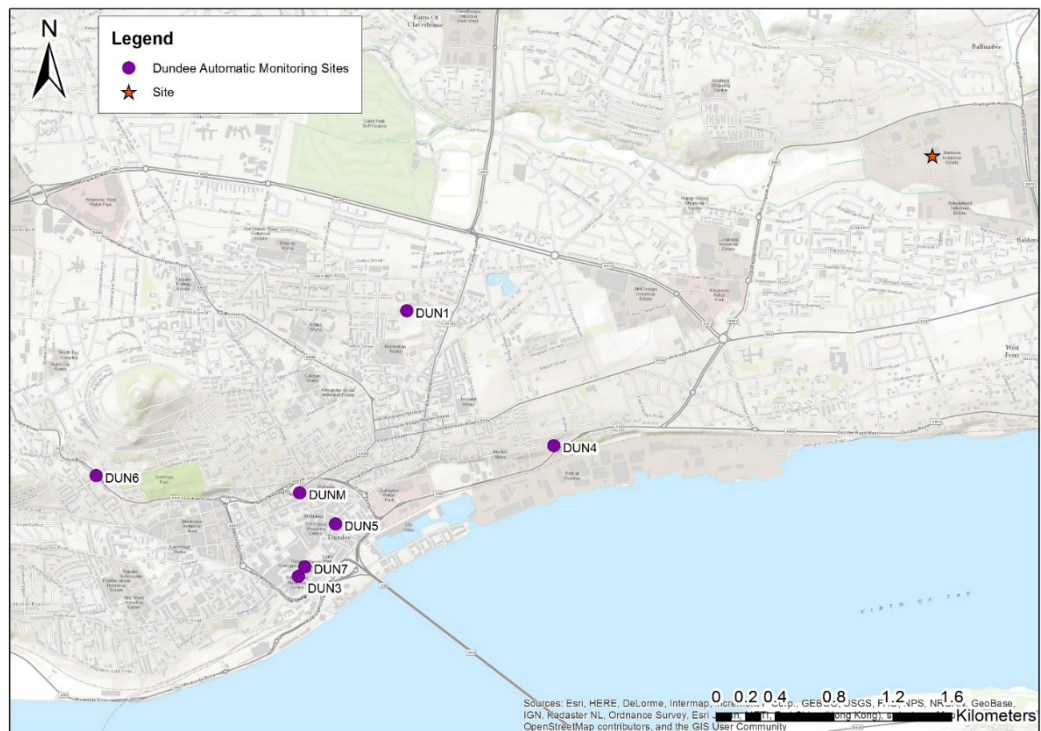


Figure 4: Dundee City automatic air quality monitoring sites

## Project-specific monitoring

- 3.5.18** The Applicant is currently undertaking baseline monitoring of NO<sub>2</sub> in the area around the Application site, to complement the baseline assessment of existing air quality conditions in the area.
- 3.5.19** Monitoring is being undertaken using diffusion tubes, which are a passive monitoring method widely used in the UK for measuring ambient concentrations of NO<sub>2</sub>. Diffusion tubes consist of a small plastic tube containing a chemical reagent which absorbs the pollutant to be measured (in this case NO<sub>2</sub>) directly from the air.
- 3.5.20** Eleven monitoring points were selected, including one adjacent to the existing DERL facility, eight locations close to residential properties, one background location and one co-located with an automatic monitor operated by Dundee City. The monitoring locations are shown in Figure 5.
- 3.5.21** Diffusion tubes are attached to street furniture, fixed at a height representative of exposure. Duplicate or triplicate tubes are used at each location and, following a four-week monitoring period, they are sent to a UKAS accredited laboratory for analysis.

**3.5.22**

The first nine months of monitoring (mid-November 2015 to mid-August 2016) have been carried out and results are shown in Table 18. They show that average concentrations at all monitoring sites close to the Proposed Scheme are below the annual mean air quality objective. Concentrations at the co-located Dundee Meadows automatic monitor are at the air quality objective level. However, the results have not yet been bias-adjusted (which would be on the basis of one year's data from the tubes co-located with the automatic monitor) and so are indicative at this stage. In addition, only annual mean concentrations should strictly be compared to the annual air quality objective.

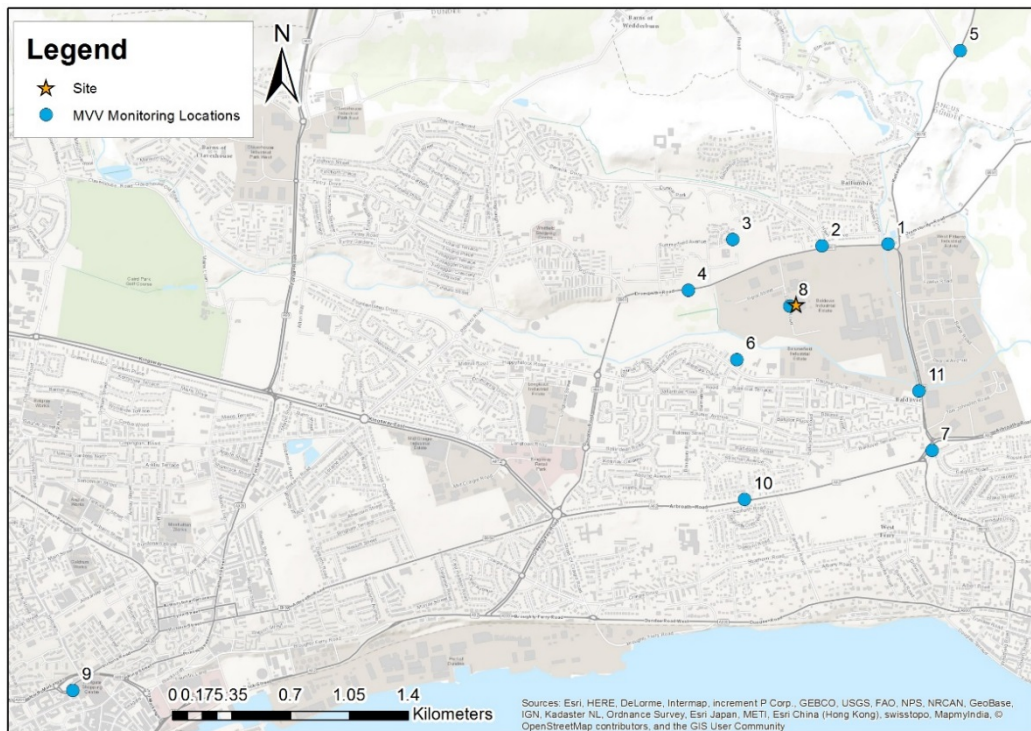


Figure 5: Proposed Scheme monitoring sites

Table 18: Proposed Scheme air quality monitoring data for the nine monitoring periods (mid-November 2015 to mid-August 2016)

| Site ID   | Site Name                         | Site Type  | OS Grid Ref |        | Mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> ) |             |             |             |          |          |          |          |          |             |
|---|-----------------------------------|------------|-------------|--------|---|-------------|-------------|-------------|----------|----------|----------|----------|----------|-------------|
|   |                                   |            | x           | y      | Period 1  | Period 2    | Period 3    | Period 4    | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Average     |
| 1   | Baldovie/Drumgieth Road           | Roadside   | 345088      | 733302 | 39.0  | 25.2        | 34.5        | 32.0        | 24.5     | 22.2     | 24.5     | 21.5     | 21.3     | 27.2        |
| 2   | Drumgeith Road                    | Roadside   | 344696      | 733290 | <b>41.0</b>   | 24.6        | 34.3        | 32.2        | 23.0     | 18.1     | 19.3     | 18.8     | 17.7     | 25.5        |
| 3   | Britannia Drive                   | Roadside   | 344167      | 733328 | 20.7  | 15.5        | 18.7        | 15.6        | 8.6      | 6.4      | -        | 8.7      | -        | 13.5        |
| 4   | Britannia Drive                   | Roadside   | 343903      | 733028 | 33.2  | 21.1        | 30.3        | 28.5        | 16.5     | 13.2     | 13.9     | 15.1     | 13.5     | 20.6        |
| 5   | Kellas Road                       | Background | 345517      | 734449 | 21.4  | 16.9        | 17.9        | 16.9        | 9.7      | 8.9      | 8.0      | 9.9      | 9.4      | 13.2        |
| 6   | Balmerino Road                    | Roadside   | 344190      | 732616 | 22.2  | 16.3        | 21.4        | 20.0        | 9.3      | 6.9      | 6.1      | -        | 8.6      | 13.9        |
| 7   | Balunie Drive                     | Roadside   | 345349      | 732079 | 24.6  | 29.8        | 37.9        | 37.5        | 24.7     | 19.2     | 18.9     | 23.2     | 22.4     | 26.5        |
| 8   | Baldovie Road (Proposed Site)     | Roadside   | 344504      | 732934 | 22.8  | 17.8        | 21.6        | 21.4        | 12.0     | 9.7      | 9.8      | 7.9      | 11.0     | 14.9        |
| 9   | Meadowside Automatic Monitor      | Roadside   | 340245      | 730655 | <b>51.2</b>   | <b>40.1</b> | <b>46.5</b> | <b>45.1</b> | 39.1     | 36.3     | 34.7     | 33.9     | 33.0     | <b>40.0</b> |
| 10  | Arbroath Road/ Gotterstone Avenue | Roadside   | 344236      | 731786 | -   | -           | -           | <b>42.4</b> | 29.1     | 24.1     | 27.3     | 25.7     | 30.7     | 29.9        |
| 11  | 4 Bro'ty Ferry Court              | Roadside   | 345272      | 732430 | -   | -           | -           | 31.9        | 21.0     | 17.1     | 21.0     | 20.3     | -        | 22.3        |
| Notes: Concentrations in <b>bold</b> exceed the NO <sub>2</sub> air quality objective, however this strictly applies to a full year of data. '-' denotes no monitoring undertaken at that site during that period. Average results have not been annualised or bias adjusted. |                                   |            |             |        |   |             |             |             |          |          |          |          |          |             |

## Background summary

- 3.5.23** Background concentrations for each pollutant are shown in Table 19. This shows the selected background concentrations for the Proposed Scheme site for each pollutant and the reasoning behind the choice.
- 3.5.24** Full details are outlined in the methodology Volume 2 Appendix B1.

Table 19: Summary of background air quality monitoring data

| Pollutant  | Averaging period        | Concentration | Units             | Year       | Reasoning   |
|--|-------------------------|---------------|-------------------|------------|---|
| Nitrogen oxides (NO <sub>x</sub> )                                     | Annual mean             | 15.7          | µg/m <sup>3</sup> | 2014-2015  | Data from Dundee Mains Loan automatic urban background monitoring site, for average of 2014 and 2015 (2013 has data capture <75%).  |
| Nitrogen dioxide (NO <sub>2</sub> )                                    | Max 1-hour mean         | 92.5          | µg/m <sup>3</sup> | 2014-2015  | Data from Dundee Mains Loan automatic urban background monitoring site, for average of 2014 and 2015 (2013 has data capture <75%).  |
|  | Max 24-hour mean        | 41.5          | µg/m <sup>3</sup> | 2014-2015  |   |
|  | Annual mean             | 11.6          | µg/m <sup>3</sup> | 2014-2015  |   |
| Carbon monoxide (CO)   | Max 8-hour running mean | 0.8           | mg/m <sup>3</sup> | 2013-2015  | Data from Edinburgh St Leonards urban background monitoring site, for average of 2013 to 2015. This is the nearest background monitoring site to the Proposed Scheme site, which monitors for CO.               |
|  | Max 1-hour mean         | 1.2           | mg/m <sup>3</sup> | 2013-2015  |   |
| Total organic carbon (TOC) as benzene (C <sub>6</sub> H <sub>6</sub> ) | Max 1-hour mean         | 5.0           | µg/m <sup>3</sup> | 2013       | Data from Auchencorth Moss rural background monitoring site. This is the nearest automatic benzene monitoring site to the Proposed Scheme site. 2013 data selected, as data capture for 2014 and 2015 was <75%. |
|  | Annual mean             | 0.3           | µg/m <sup>3</sup> | 2013       |   |
| Sulphur dioxide (SO <sub>2</sub> )                                     | Max 15-minute mean      | 68.7          | µg/m <sup>3</sup> | 2013-2015  | Data from Edinburgh St Leonards urban background monitoring site, for average of 2013 to 2015. This is the nearest background monitoring site to the Proposed Scheme site, which monitors for SO <sub>2</sub> . |
|  | Max 1-hour mean         | 43.7          | µg/m <sup>3</sup> | 2013-2015  |   |
|  | Max 24-hour mean        | 9.7           | µg/m <sup>3</sup> | 2013-2015  |   |
|  | Annual mean             | 1.5           | µg/m <sup>3</sup> | 2013-2015  |   |
| Fine particulate matter (PM <sub>10</sub> )                            | Max 24-hour mean        | 53.0          | µg/m <sup>3</sup> | 2013-2015  | Data from Dundee Mains Loan automatic urban background monitoring site, for average of 2013 to 2015.  |
|  | Annual mean             | 12.3          | µg/m <sup>3</sup> | 2013-2015  |   |
| Ultra-fine particulate matter (PM <sub>2.5</sub> )                     | Annual mean             | 7.2           | µg/m <sup>3</sup> | 2013, 2015 | Data from Edinburgh St Leonards urban background monitoring site, for average of 2013 and 2015, as data capture for 2014 is <75%. No monitoring for PM <sub>2.5</sub> is carried out in Dundee.                 |
|  | Max 1-hour mean         | None          | -                 | -          | No background monitoring carried out in the UK.   |

| Pollutant   | Averaging period | Concentration | Units                 | Year      | Reasoning   |
|---|------------------|---------------|-----------------------|-----------|---|
| Hydrogen fluoride (HF)                                    | Monthly average  | None          | -                     | -         |   |
| Hydrogen chloride (HCl)                                   | Max 1-hour mean  | 3.4           | µg/m <sup>3</sup>     | 2013-2014 | Data from Auchencorth Moss rural background monitoring site. This is the nearest automatic monitoring site to the Proposed Scheme site. Data for average of 2013 and 2014 has been selected, as 2015 has data capture <75%.   |
| Ammonia (NH <sub>3</sub> )                                | Max 1-hour mean  | 20.4          | µg/m <sup>3</sup>     | 2013-2014 | Data from Auchencorth Moss rural background monitoring site. This is one of the nearest automatic monitoring sites to the Proposed Scheme site, and has recorded concentrations higher than at Edinburgh St Leonards. Data for average of 2013 and 2014 has been selected, as 2015 has data capture <75%. |
|   | Annual mean      | 1.2           | µg/m <sup>3</sup>     | 2013-2014 |   |
| Dioxins and furans  | Annual mean      | 19.1          | fg TEQ/m <sup>3</sup> | 2010      | Data from Auchencorth Moss rural background monitoring site. This is the nearest Toxic Organic Micro Pollutants (TOMPs) monitoring site to the Proposed Scheme site. 2010 is the most recent data available.  |
| Polychlorinated biphenyls (PCB)                           | Max 1-hour mean  | 0.000076      | µg/m <sup>3</sup>     | 2010      | Data from Auchencorth Moss rural background monitoring site. This is the nearest Toxic Organic Micro Pollutants (TOMPs) monitoring site to the Proposed Scheme site. 2010 is the most recent data available. Max 1-hour mean has been calculated as twice the annual mean concentration.                  |
|   | Annual mean      | 0.000038      | µg/m <sup>3</sup>     | 2010      |   |
| Polycyclic aromatic hydrocarbons (PAHs) as benzo(a)pyrene | Annual mean      | 0.1           | ng/m <sup>3</sup>     | 2013-2015 | Data from Edinburgh St Leonards urban background monitoring site, for average of 2013 to 2015. Recorded concentrations were higher than at Auchencorth Moss.  |
| Lead (Pb)   | Annual mean      | 0.2           | ng/m <sup>3</sup>     | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.   |

| Pollutant                   | Averaging period | Concentration | Units             | Year      | Reasoning   |
|-----------------------------|------------------|---------------|-------------------|-----------|---|
| Arsenic (As)                | Annual mean      | 0.03          | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.   |
| Cadmium (Cd)                | Annual mean      | 1.3           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.   |
| Nickel (Ni)                 | Annual mean      | 0.4           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.   |
| Thallium (Ti)               | Annual mean      | None          | -                 | -         | No background monitoring carried out in the UK.   |
| Mercury (Hg)                | Max 1-hour mean  | 1.8           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site. Max 1-hour mean has been calculated as twice the annual mean concentration.   |
|                             | Annual mean      | 0.9           | ng/m <sup>3</sup> | 2013-2015 |   |
| Antimony (Sb)               | Max 1-hour mean  | 0.5           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site. Max 1-hour mean has been calculated as twice the annual mean concentration.   |
|                             | Annual mean      | 0.2           | ng/m <sup>3</sup> | 2013-2015 |   |
| Chromium (Cr)               | Max 1-hour mean  | 2.1           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for 2015. Concentrations in 2015 were greater than average concentrations over the period from 2013 to 2015, therefore data for 2015 has been used as a worst case assessment. This is the nearest heavy metals monitoring site to the Application Site. Max 1-hour mean has been calculated as twice the annual mean concentration. |
|                             | Annual mean      | 1.1           | ng/m <sup>3</sup> | 2013-2015 |   |
| Hexavalent chromium (CrVI), | Annual mean      | 0.2           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.  |

| Pollutant      | Averaging period | Concentration | Units             | Year      | Reasoning   |
|----------------|------------------|---------------|-------------------|-----------|---|
| Cobalt (Co)    | Annual mean      | 0.02          | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site.   |
| Copper (Cu)    | Max 1-hour mean  | 1.7           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site. Max 1-hour mean has been calculated as twice the annual mean concentration. |
|                | Annual mean      | 0.9           | ng/m <sup>3</sup> | 2013-2015 |   |
| Manganese (Mn) | Max 1-hour mean  | 1.9           | ng/m <sup>3</sup> | 2013-2015 | Data from Auchencorth Moss rural background monitoring site, for average of 2013 to 2015. This is the nearest heavy metals monitoring site to the Proposed Scheme site. Max 1-hour mean has been calculated as twice the annual mean concentration. |
|                | Annual mean      | 0.9           | ng/m <sup>3</sup> | 2013-2015 |   |
|                | Max 1-hour mean  | 0.7           | ng/m <sup>3</sup> | 2013-2015 |   |



## Industrial processes

- 3.5.25** Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) system. The larger more polluting processes are regulated by the Scottish Environment Protection Agency (SEPA), and the smaller less polluting ones by the local authorities. Local authorities tend also to regulate only for emissions to air, whereas the SEPA regulates emissions to air, water and land.
- 3.5.26** A review of the Scottish Pollutant Release Inventory (SPRI) shows that there are 28 processes regulated by SEPA within 16km (10miles) of the Proposed Scheme site, as shown in Figure 6 and Table 20.
- 3.5.27** Any emissions from these SPRI sites are included in background concentrations, and therefore have not been explicitly modelled in this assessment. The two exceptions being the existing DERL facility and Michelin facility, which will be included in the baseline assessment and cumulative assessment respectively.

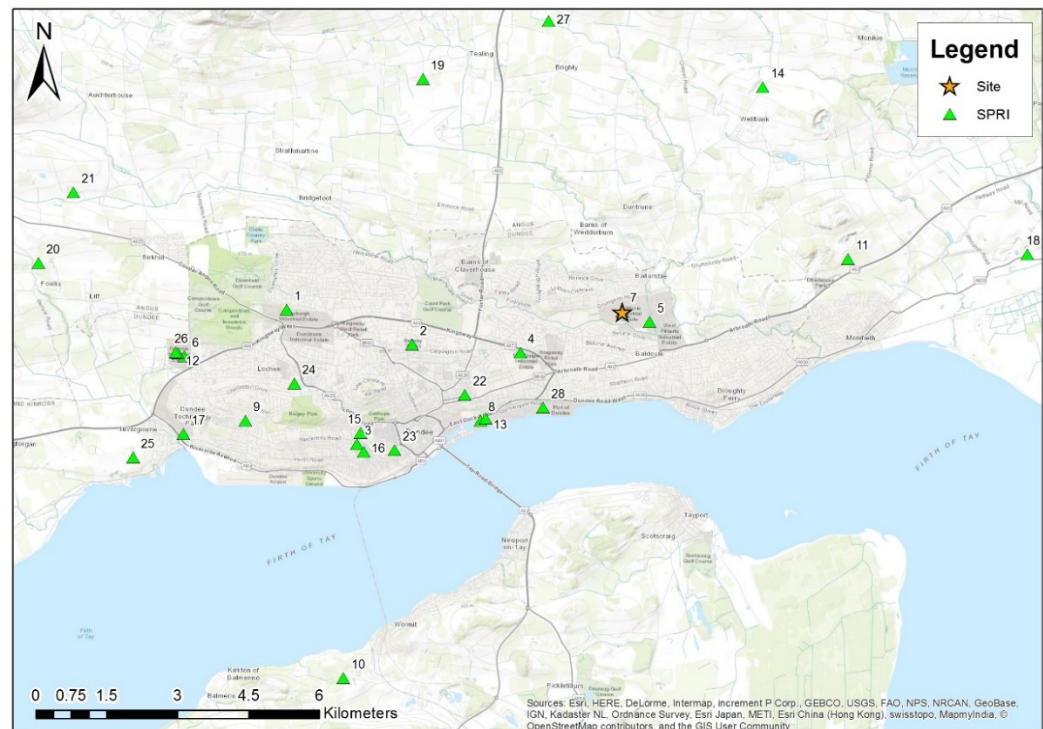


Figure 6: Scottish Pollutant Release Inventory (SPRI) sites within 16km of the Proposed Scheme site

Table 20: SPRI sites within 16km of the Proposed Scheme

| ID | Site name                                   | Approximate site location (OS grid ref) |        | Distance from site (km) and (direction) |
|----|---|---|--------|---|
|    |   | x                                       | y      |   |
| 1  | ASKA Energy                                 | 337449                                  | 732996 | 7.1 (E)                                 |
| 2  | Day International                           | 340102                                  | 732264 | 4.5 (E)                                 |
| 3  | Halley Stevenson (Dyers & Finishers)        | 338933                                  | 730157 | 6.3 (SW)                                |
| 4  | D C Thomson & Company                       | 342386                                  | 732087 | 2.3 (SW)                                |
| 5  | Michelin Tyres                              | 345118                                  | 732736 | 0.6 (E)                                 |
| 6  | Rockwell Solutions                          | 335280                                  | 732011 | 9.3 (E)                                 |
| 7  | Dundee Energy Recycling                     | 344545                                  | 732960 | 0.1 (N)                                 |
| 8  | GRC Skip Hire & Waste Management            | 341551                                  | 730652 | 3.8 (SW)                                |
| 9  | Ninewells Medical School, NHS Tayside       | 336570                                  | 730654 | 8.3 (SW)                                |
| 10 | Peacehill Farm, T D Forster & Son           | 338648                                  | 725206 | 9.7 (SW)                                |
| 11 | Ardownie Quarry, D Geddes (Contractors)     | 349323                                  | 734071 | 4.9 (E)                                 |
| 12 | Healthcare Environmental Services           | 335144                                  | 732081 | 9.4 (E)                                 |
| 13 | Nynas UK                                    | 341650                                  | 730701 | 3.7 (SW)                                |
| 14 | Wellbank Landfill Site, UK Waste Management | 347520                                  | 737702 | 5.6 (NE)                                |
| 15 | Ninewells Hospital, NHS Tayside             | 339005                                  | 730390 | 6.1 (SW)                                |
| 16 | University of Dundee Incubator Building     | 339072                                  | 729992 | 6.2 (SW)                                |
| 17 | Millipore                                   | 335260                                  | 730373 | 9.6 (SW)                                |
| 18 | Poultry Farm, Ian Jamieson & Partners       | 353117                                  | 734167 | 8.7 (E)                                 |
| 19 | Tealing Poultry Farm                        | 340326                                  | 737875 | 6.5 (SW)                                |
| 20 | Cransley First Broiler Farm                 | 332191                                  | 733988 | 12.4 (E)                                |
| 21 | East Adamston Poultry Farm                  | 332936                                  | 735482 | 11.9 (NE)                               |
| 22 | Discovery Flexibles                         | 341216                                  | 731199 | 3.8 (SW)                                |
| 23 | University Of Dundee                        | 339727                                  | 730031 | 5.6 (SW)                                |
| 24 | Ramsay McBain                               | 337605                                  | 731437 | 7.1 (SW)                                |
| 25 | The James Hutton Institute                  | 334196                                  | 729871 | 10.8 (SW)                               |
| 26 | D J Laing (Contracts)                       | 335099                                  | 732101 | 9.5 (E)                                 |
| 27 | Petterden Waste Recycling                   | 342988                                  | 739105 | 6.4 (N)                                 |
| 28 | The British Millerain Co                    | 342872                                  | 730928 | 2.6 (SW)                                |

Notes: N = north, E = east, S = south, W = west.

## 3.6 Potential effects and good environmental design management

- 3.6.1 The proposed EfW CHP will include best available techniques (BAT), will comply with the required emission limits and will include the required odour management.

## 3.7 Assessment – Construction

- 3.7.1 During construction, the project has the potential to impact air quality through emissions from construction and demolition activities and traffic emissions from construction vehicles travelling to/from the Application Site. This may cause dust deposition or elevated PM<sub>10</sub> concentrations.

### Assessment of dust effects from construction

#### Sensitive receptors

- 3.7.2 Sensitive receptors are defined as those dwellings, schools and hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of the Proposed Scheme.
- 3.7.3 A review of the areas surrounding the main EfW CHP site (Areas A, C, D and E as shown on Volume 1 Appendix C1) has been carried out, and a map is shown in Figure 7 which identifies the sensitive receptors within 20m, 50m, 100m and 350m of the Application Site boundary, as per the IAQM guidance.
- 3.7.4 There are no receptors within 100m of the main site boundary which are considered to be of a high sensitivity, such as residential dwellings. There are fewer than 10 commercial properties within 100m which are considered to be of a medium sensitivity. Newlands Primary School lies within 350m of the Application Site, and there are residential receptors within 350m of the Proposed Scheme, to the north and south. The receptor sensitivity to dust soiling and PM<sub>10</sub> exposure has therefore been classified as high according to the IAQM guidance, as a precautionary assumption.
- 3.7.5 For the pre-selected flood mitigation area (Area B) there are approximately 20 residential receptors within 20m of the Application Site boundary, to the south.
- 3.7.6 There are no ecological receptors sensitive to dust within 350m of the Application Site boundary, and therefore the sensitivity of the area to ecological impacts is negligible.

**3.7.7** Transient receptors, such as users of access roads, local footpaths and other public rights of way, are not considered to be of high sensitivity as they are not exposed to emissions continuously or for extended periods.

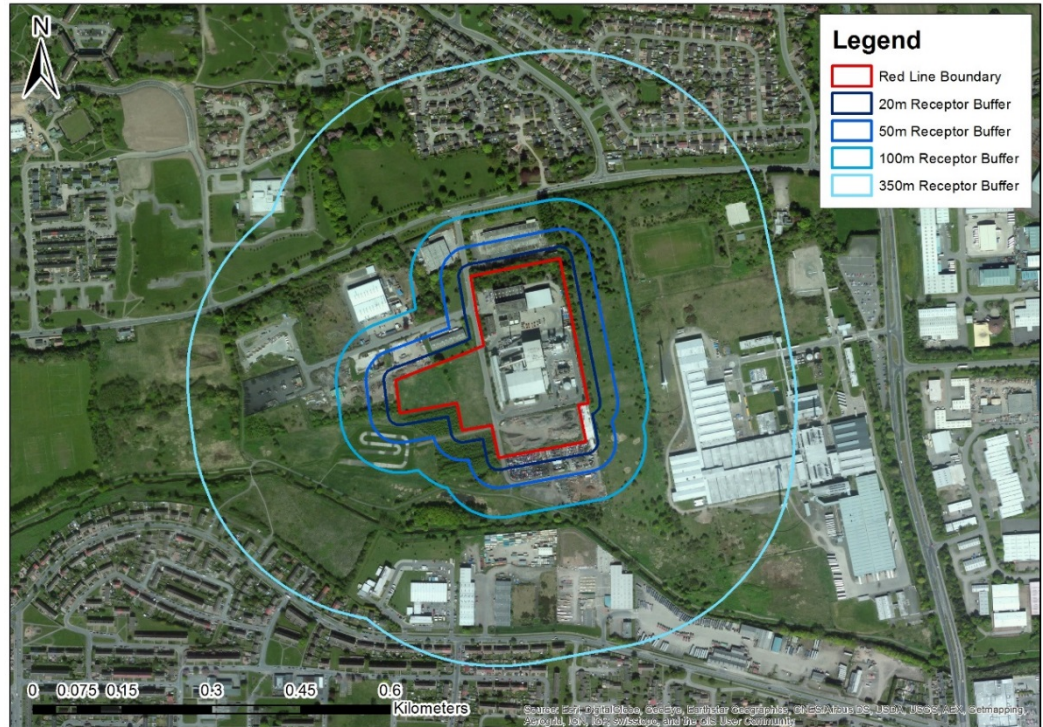


Figure 7: Construction dust receptor buffer areas

### Dust emission magnitude

**3.7.8** Following the methodology outlined previously, each dust generating activity has been assigned a dust emission magnitude as shown in Table 21. For the pre-selected flood mitigation area, only earthworks are expected to occur.

Table 21: Dust emission magnitude for dust generating activities

| Activity   | Dust emission magnitude | Reasoning  |
|------------|-------------------------|--|
| Demolition | -                       | No demolition will be required.  |
| Earthworks | Large                   | Total site area for the main EfW CHP site (Areas A, C, D and E) is greater than 10,000m <sup>2</sup> (expected to be around 60,000m <sup>2</sup> ). Total site area for the pre-selected flood mitigation area (Area B) is greater than 10,000m <sup>2</sup> (expected to be around 20,000m <sup>2</sup> ). The area has a potentially dusty soil type (clay, silt, and gravel). Material is expected to be imported to raise the main site level by approximately 1m. |

| Activity     | Dust emission magnitude | Reasoning  |
|--------------|-------------------------|--|
| Construction | Large                   | Total building volume greater than 100,000m <sup>3</sup> (expected to be around 200,000m <sup>3</sup> ). Work on-site during construction is anticipated to include excavations, earthworks, piling, and concrete construction of foundations, buildings, roads and hard-standing areas.     |
| Trackout     | Large                   | Between greater than 50 HDV (>3.5t) outward movements in any one day during the peak construction period, and dusty surface material (clay). Unpaved road will run around the full perimeter of the main building site (estimated to be around 350m) outside of the main building footprint. |

### Sensitivity of the area

- 3.7.9** For the main EfW CHP site (Areas A, C, D and E), the sensitivity of the area to dust soiling has been assigned as medium, due to the presence of approximately four commercial receptors within 20m of the Application Site boundary.
- 3.7.10** For the pre-selected flood mitigation area (Area B) the sensitivity of the area to dust soiling has been assigned as high, due to the presence of approximately 20 residential receptors within 20m of the Application Site.
- 3.7.11** The sensitivity of the main EfW CHP site and pre-selected flood mitigation site to human health impacts has been assigned as low, due to background PM10 concentrations of 12.3µg/m<sup>3</sup>.

### Risk of impacts

- 3.7.12** Taking into consideration the dust emission magnitude and the sensitivity of the area, the main EfW CHP site (Areas A, C, D and E) has been classified as medium risk to dust soiling and low risk to human health impacts for all activities, as shown in Table 22. For earthworks at the flood mitigation area, the Application Site has been classified as high risk to dust soiling and low risk to human health impacts. Specific relevant mitigation is described in the CEMP.



Table 22: Summary of dust risks prior to mitigation

| Activity                                  | Sensitivity of the surrounding area |              |
|---|-------------------------------------|--------------|
|   | Dust soiling                        | Human health |
| <b>Earthworks</b> (main site)             | Medium Risk                         | Low risk     |
| <b>Earthworks</b> (flood mitigation area) | High Risk                           | Low risk     |
| <b>Construction</b>                       | Medium Risk                         | Low risk     |
| <b>Trackout</b>                           | Medium Risk                         | Low risk     |

### 3.8 Assessment – Switching

**3.8.1** During the proposed switching period, it is understood that the existing DERL facility would not be burning waste at the same time as the new EfW CHP. Therefore it is understood that there will be no operations which would give rise to air pollution or odour during the switching period from facility operation. The assessment of dust from the construction of the proposed EfW CHP is included in Section 3.7.

### 3.9 Assessment – Decommissioning of the existing DERL facility

**3.9.1** It is understood that demolition of the exiting DERL facility is not included within the scope of this planning application, therefore it is understood that there are no operations which would give rise to dust, air pollution or odour during decommissioning of the existing DERL facility.

### 3.10 Assessment – Operation

**3.10.1** Potential air quality impacts resulting from the proposed EfW CHP will be controlled through design to meet the IED emission limits and relevant air quality standards, in accordance with relevant guidance.

**3.10.2** As agreed with DCC, the operational air quality and odour assessment will be submitted to SEPA as part of the permit application.

**3.10.3** The assessment of air quality impacts during operation will comprise an assessment of the impacts of emissions from the stack and other fugitive sources on local air quality.

**3.10.4** The air quality assessment will consider the likely significant change in air quality that would arise as a result of the operation of a new EfW CHP installation. It will examine the changes in air pollutant concentrations in the area including the potential effect on designated wildlife site and on human health.

**3.10.5** The assessment will consider:

- Impacts of the stack emissions on sensitive human receptors during operation;

- Impacts of the stack emissions on sensitive habitat sites in relation to ammonia, NO<sub>x</sub> and SO<sub>2</sub> emissions during operation; and
- An assessment of the impacts of any changes in traffic on the local road network during operation or construction.

**3.10.6** The assessments will consider the changes in air quality that will result from operation of the proposed EfW CHP facility at full capacity (assumed to be 2020 as a worst case assessment), cumulative assessment (where information is available) and abnormal operation of the proposed EfW CHP facility.

**3.10.7** To help inform the design, a stack height assessment was carried out, and is presented in Volume 2 Appendix B2. Detailed dispersion modelling was used to assess the impacts from the various stack heights being considered for the proposed EfW CHP facility.

**3.10.8** The modelling predicted NO<sub>2</sub> concentrations for the proposed EfW CHP, and examined the impact of the stack at heights between 70m and 110m (above ground level).

**3.10.9** The assessment showed that annual mean (long-term) NO<sub>2</sub> concentrations are predicted to decrease steadily with height. Hourly mean (short-term) concentrations decrease as the stack height increases up to around 87.5m. At heights above 90m, the rate of decrease in concentration is reduced. As such, it is considered that the use of a 90m stack represents a height at which the visual impact of a high stack would begin to outweigh the air pollutant dispersion benefits.

## **Traffic emissions**

**3.10.10** A screening assessment will be undertaken using the criteria contained within the EPUK/IAQM Land-Use Planning & Development Control: Planning for Air Quality guidance document<sup>9</sup>, to determine the required level of detail for the assessment.

**3.10.11** Total traffic flows will be assessed for construction and operational traffic. The EPUK/IAQM guidance document details the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- A change of LDV flows of more than 100 in Annual Average Traffic Daily (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;

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<sup>9</sup> IAQM, 2016. Land-Use Planning & Development Control: Planning For Air Quality. Available at <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>



- A change in road alignment of more than 5m and the road is in an AQMA;
- Introduction of a new junction that causes a significant change in vehicle acceleration/deceleration;
- Introduction or change of a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- An underground car park with extraction system.

**3.10.12** Should these criteria not be met, then the EPUK/IAQM guidance document considers air quality impacts associated with a scheme to be negligible and no further assessment is required.

### **Traffic data review**

**3.10.13** Traffic data has been provided by the transport consultant for this project, Arup. The provided traffic data is outlined in Table 23 for construction and operation. It was advised that the construction traffic data is based on a 'worst case' scenario of the construction works, when traffic flows are likely to be at their peak.

**3.10.14** A review of traffic data shows that the increase in LDVs and HGVs is less than the relevant EPUK/IAQM criteria for the operational period of the Proposed Scheme, and therefore traffic emissions during operation are not considered to require detailed assessment.

**3.10.15** The data shows that further assessment is required for vehicles during the construction phase of the Proposed Scheme, as the increase in LDVs and HGVs on Drumgeith Road, Baldovie Road and Forties Road exceed the suggested EPUK/IAQM criteria.

**3.10.16** The assessment of construction traffic emissions will be carried out using the ADMS-Roads dispersion model, and results will be predicted at all the discrete receptor locations. The model will be verified using the project specific monitoring data, where applicable. Significance will be determined through the methodology in the EPUK/IAQM guidance. There will be no assessment of vehicle emissions during operation.

Table 23: Traffic data

| Location                   | 24hr AADT  |       |              |       |                              |      |
|----------------------------|------------|-------|--------------|-------|------------------------------|------|
|                            | Do-minimum |       | Do-something |       | Change with proposed EfW CHP |      |
|                            | LDVs       | HGVs  | LDVs         | HGVs  | LDVs                         | HGVs |
| <b>Construction (2016)</b> |            |       |              |       |                              |      |
| Drumgeith Road (west)      | 12,018     | 1,202 | 12,282       | 1,272 | + 264                        | + 70 |
| Balunie Drive              | 4,648      | 445   | 4,648        | 445   | 0                            | 0    |

| Location                                 | 24hr AADT  |       |              |       |                              |       |
|--|------------|-------|--------------|-------|------------------------------|-------|
|  | Do-minimum |       | Do-something |       | Change with proposed EfW CHP |       |
|  | LDVs       | HGVs  | LDVs         | HGVs  | LDVs                         | HGVs  |
| Forties Road (south of site access)      | 371        | 99    | 371          | 99    | 0                            | 0     |
| Forties Road (north of Piper Street)     | 1,549      | 370   | 1,989        | 487   | + 440                        | + 116 |
| Drumgeith Road (east of Forties Road)    | 14,129     | 787   | 14,305       | 833   | + 176                        | + 47  |
| Ballumbie Road (north of Drumgeith Road) | 5,675      | 146   | 5,713        | 146   | + 37                         | 0     |
| Drumgeith Road (east of Ballumbie Road)  | 15,621     | 689   | 15,759       | 736   | + 138                        | + 47  |
| Kellas Road (north of Drumgeith Road)    | 9,027      | 321   | 9,068        | 321   | + 41                         | 0     |
| Baldovie Road (south of Kellas Road)     | 13,139     | 557   | 13,236       | 603   | + 97                         | + 47  |
| <b>Operation (2020)</b>                  |            |       |              |       |                              |       |
| Drumgeith Road (west)                    | 12,117     | 1,202 | 12,157       | 1,214 | + 40                         | + 11  |
| Balunie Drive                            | 4,648      | 445   | 4,648        | 445   | 0                            | 0     |
| Forties Road (south of site access)      | 371        | 99    | 371          | 99    | 0                            | 0     |
| Forties Road (north of Piper Street)     | 1,549      | 370   | 1,615        | 389   | + 66                         | + 19  |
| Drumgeith Road (east of Forties Road)    | 14,229     | 787   | 14,255       | 794   | + 26                         | + 8   |
| Ballumbie Road (north of Drumgeith Road) | 5,695      | 146   | 5,700        | 146   | + 6                          | 0     |
| Drumgeith Road (east of Ballumbie Road)  | 15,700     | 689   | 15,721       | 697   | + 21                         | + 8   |
| Kellas Road (north of Drumgeith Road)    | 9,047      | 321   | 9,053        | 321   | + 6                          | 0     |

| Location                                | 24hr AADT  |      |              |      |                              |      |
|---|------------|------|--------------|------|------------------------------|------|
|   | Do-minimum |      | Do-something |      | Change with proposed EfW CHP |      |
|   | LDVs       | HGVs | LDVs         | HGVs | LDVs                         | HGVs |
| Baldovie Road<br>(south of Kellas Road) | 13,199     | 557  | 13,213       | 564  | + 15                         | + 8  |

Notes: AADT = Annual average daily traffic, LDVs = Light duty vehicles, HDVs = Heavy duty vehicles. Figures in bold indicate a change in AADT greater than then EPUK/IAQM criteria.

## 3.11 Supplementary mitigation

### Construction

- 3.11.1** The dust emitting activities can be greatly reduced or eliminated by applying the Application Site -specific mitigation measures for medium risk sites according to the IAQM guidance. Applicable mitigation measures are included in the CEMP, and no further mitigation measures are therefore required.

## 3.12 Residual effects

### Construction

- 3.12.1** Based on the dust risk summary, it is considered that the significance of the project during construction would be significant without the application of mitigation. Applicable mitigation measures to control dust and emissions are included in the CEMP, and mitigation should be applied across the whole site and at the flood mitigation area when earthworks are carried out at Area B. The CEMP and proposed monitoring scheme should be agreed with DCC prior to commencement of works on-site.
- 3.12.2** With the application of the appropriate mitigation measures the residual impact would be not significant.
- ## 3.13 Sensitivity test for programme delay
- 3.13.1** For the assessment of air quality and odour effects, a change to the programme of plus or minus twelve months would not be likely to materially change the assessment findings.

## 3.14 Cumulative effects

- 3.14.1** The cumulative assessment will consider the proposed EfW CHP and Michelin installation, running together in parallel. This will be considered in the permit application.
- 3.14.2** Information on the Michelin facility has yet to be provided, however we aim to use the existing monitored emissions data from the Michelin monitoring programme in the assessment.
- 3.14.3** The main pollutants of concern in the area are considered to be NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, and therefore these parameters would be included in the cumulative assessment.
- 3.14.4** The industrial emissions, attributed to the DERL and Michelin facility, would be removed from the relevant 1km<sup>2</sup> squares of the modelled Defra background concentrations for use in the assessment, to avoid double counting.

## 3.15 Assessment summary

### Construction

Table 24: Assessment summary - construction

| Air quality and odour |  |                          |   |
|-----------------------|--|--------------------------|---|
| Aspect of the Project | Description of effect and significance   | Supplementary mitigation | Residual effects summary                    |
| Dust emissions        | With the application of the appropriate embedded mitigation measures outlined in the CEMP, the impact would be not significant.  | None required            | Effects unchanged<br><b>Not significant</b> |
| Vehicle emissions     | Air quality from traffic associated with construction of the EfW CHP has not been assessed as part of the ES but will be assessed as part of the permit submitted to SEPA. | -                        | -   |

### Switching

Table 25: Assessment summary - switching

| Air quality and odour   |  |                          |                          |
|-------------------------|--|--------------------------|--------------------------|
| Aspect of the Project   | Description of effect and significance   | Supplementary mitigation | Residual effects summary |
| Air pollutant emissions | It is understood that there will not be coincident facility operation during the switching period. | None required            | No assessment required   |

## Decommissioning of the existing DERL facility

Table 26: Assessment summary – decommissioning of the existing DERL facility

| Air quality and odour   |  |                          |                          |
|-------------------------|--|--------------------------|--------------------------|
| Aspect of the Project   | Description of effect and significance   | Supplementary mitigation | Residual effects summary |
| Air pollutant emissions | It is understood that demolition of the exiting DERL facility is not included within the scope of this planning application, therefore it is understood that there are no operations which would give rise to dust, air pollution or odour during decommissioning of the existing DERL facility. | None required            | No assessment required   |

## Operation

Table 27: Assessment summary – operation

| Air quality and odour             |   |                          |                          |
|-----------------------------------|---|--------------------------|--------------------------|
| Aspect of the Project             | Description of effect and significance  | Supplementary mitigation | Residual effects summary |
| Air pollutant and odour emissions | Operational air quality and odour from the EfW CHP installation has not been assessed as part of the ES but will be assessed as part of the permit submitted to SEPA. | -                        | -                        |

## **3.16 Further work to be undertaken for the ES**

- 3.16.1** It is considered that there is no additional work to be undertaken in support of the air quality and odour assessment of the ES.



## 4 Ecology

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### 4.1 Introduction

**4.1.1** This section identifies key aspects of the Proposed Scheme in relation to Ecology and provides an assessment of likely significant ecological impacts arising from the construction, operation and decommissioning of the Proposed Scheme.

**4.1.2** The aim of this assessment is to:

- Assess the baseline ecological features, both flora and fauna, of the site;
- Identify and describe all potential likely effects on ecological features associated with the Proposed Scheme;
- Detail mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- Identify how mitigation measures will be implemented;
- Provide an assessment of the significance of any residual effects;
- Identify appropriate enhancement measures; and
- Detail the requirements for post-construction monitoring.

### 4.2 Engagement

**4.2.1** A consultation exercise has been undertaken in order to gather additional data and agree the scope of surveys to support the planning application for the Proposed Scheme. The stakeholders consulted were:

- Scottish Natural Heritage (SNH);
- Dundee City Council (DCC);
- Dighty Connect; and
- East Dundee Environment Network (EDEN).

**4.2.2** The principal outcome of the consultation exercise was the inclusion of three breeding bird surveys in order to inform the assessment of the value of the site for breeding birds, and the agreement to scope out a feature of low bat roost potential from further bat surveys as the feature was located outside the Zone of Influence (ZoI) of the Proposed Scheme.

**4.2.3** Table 28 details the responses to each specific consultation comment received.

Table 28: Summary of Consultation

| No. | Organisation and date                         | Comment   | Response   |
|-----|---|---|--|
| 1   | Operations Officer, Tayside and Grampian, SNH | <i>SNH do not intend to offer formal comment on this proposal, however it is recommended local groups and the local biological records centre are consulted.</i>  | Noted and consultation undertaken.   |
| 2   | Greenspace Team Leader, DCC                   | <i>Suggested a breeding bird survey is undertaken as the site possess the potential to support nesting sites for ground breeding birds. Also recommended that contact is made with Dighty Connect as they have conducted a lot of work in the vicinity.</i>                   | Noted. Three breeding bird surveys were undertaken and Dighty Connect were contacted.  |
| 3   | Dighty Connect and EDEN                       | <i>Otter and water vole records from the site have been submitted to the National Biodiversity Network (NBN) so it is suggested these are obtained, and the local British Trust for Ornithology (BTO) ringer will be contacted and records passed on if consent is given.</i> | Noted. Otter and water vole data from NBN is a challenge to obtain as the resolution of species records is not precise enough to inform development control decisions. In addition written permission is required from all data providers. As a result no further action was taken.<br><br>No data was received from the BTO ringer. |
| 4   | Operations Officer, SNH                       | <i>Agreed that the mature sycamore tree possessing low bat roosting potential and located to the north of Drumgeith Road can be scoped out of further bat surveys.</i>  | Noted. Mature tree scoped out of further bat surveys.  |

## 4.3 Methodology

### Baseline Methodology

**4.3.1** This section summarises the baseline ecological surveys undertaken and the methods used in order to assess the ecological status of the site. For habitat and species-specific reports, please refer to Volume 2 Appendix C.

## Extended Phase 1 Habitat Survey

- 4.3.2** On 9<sup>th</sup> September 2015, an Extended Phase 1 Habitat Survey of the site and surrounds was undertaken in order to identify the presence of, or features with the potential to support, protected and/or notable species. As a result, habitat types were identified and mapped in accordance with best practice guidelines and further surveys recommended for specific species as required (Volume 2 Appendix C1).
- 4.3.3** Concurrently, a desk study was undertaken to identify designated sites and historic records of protected species within 2km of the Proposed Scheme (Volume 2 Appendix C1).

## Bat Surveys

- 4.3.4** On 9<sup>th</sup> September 2015, a bat scoping assessment of all structures and mature trees present within the initial survey area was undertaken in accordance with the best practice guidelines at the time<sup>10</sup> (Volume 2 Appendix C2).
- 4.3.5** As a result, one structure (the Baldovie Waste Recycling and Waste Processing Plant) was identified as possessing low bat roost potential and consequently one emergence survey was undertaken on 16<sup>th</sup> June 2016 (Volume 2 Appendix C2).

## Breeding Bird and Kingfisher Surveys

- 4.3.6** Breeding bird and kingfisher (*Alcedo atthis*) surveys were carried out on the 22<sup>nd</sup> March, 6<sup>th</sup> April and 16<sup>th</sup> June 2016, with the methodology adapted from the British Trust for Ornithology (BTO) Breeding Bird Survey guidance<sup>11</sup> (Volume 2 Appendix C3).

## Otter and Water Vole Surveys

- 4.3.7** A habitat assessment for otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) was undertaken on 9<sup>th</sup> September 2015 along the Dighty Water and Fithie Burn which are located on the southern and eastern boundaries of the initial survey area (Volume 2 Appendix C4).
- 4.3.8** As a result, otter surveys were conducted on the 19<sup>th</sup> November and 16<sup>th</sup> December 2015, and the 14<sup>th</sup> January, 17<sup>th</sup> February and 13<sup>th</sup> October 2016.

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<sup>10</sup> Hundt, L. (2012); Bat Surveys: Good Practice Guidelines, 2nd edition; The Bat Conservation Trust; London

<sup>11</sup> Nobel, D.G., Bashford, R.R., and Bailey, S.R. (2000); Breeding Bird Survey 1999; British Trust for Ornithology, Joint Nature Conservation Committee and Royal Society for the Protection of Birds; Thetford

**4.3.9** In accordance with best practice methodology<sup>12</sup>, both banks of the Dighty Water and Fithie Burn were surveyed for signs of otter activity and potential shelters (Volume 2 Appendix C4).

**4.3.10** A water vole survey was undertaken on 13<sup>th</sup> October 2016 in accordance with best practice methodology<sup>13</sup> (Volume 2 Appendix C4). Both banks of the Dighty Water and Fithie Burn were surveyed for signs of water vole activity.

### Assessment Methodology

**4.3.11** The assessment will determine the significance of any potential effects on the ecological features recorded during the baseline surveys within the (ZoI) for each feature.

**4.3.12** The ZoI is the area over which ecological features may be subject to significant effects as a result of the Proposed Scheme and associated activities. Consequently, the ZoI is considered to be all features within the Proposed Scheme red line boundary (where the potential for direct impacts exist), as well as adjacent areas where ecological receptors could be subject to additional indirect impacts or disturbance e.g. sections of the Dighty Water and Fithie Burn outside of the Proposed Scheme red line boundary.

**4.3.13** An ecologically significant effect is defined as ‘an effect that either supports or undermines biodiversity conservation objectives for *‘important ecological features’ or for biodiversity in general*’<sup>14</sup>.

**4.3.14** Significance has been determined by assessing the impacts on the structure and function of habitats and ecosystems, and the conservation status of habitats and species. This includes extent, abundance, distribution and geographical importance of the habitat or species. The levels of geographical importance used in this assessment follows the Chartered Institute of Ecology and Environmental Management’s (CIEEM) Ecological Impact Assessment guidance.

- International and European – Statutory sites designated or classified under international conventions or European legislation. Sites supporting a species or species’ assemblage important in an international context;
- National – Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSIs). Sites supporting a species or species’ assemblage important in a national context;

<sup>12</sup> Chanin. P. (2003); Monitoring the Otter *Lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10; English Nature; Peterborough

<sup>13</sup> Strachan, R., Moorhouse, T., and Gelling, M. (2011); Water Vole Conservation Handbook. Third Edition; Wildlife Conservation Research Unit; Oxford

<sup>14</sup> Chartered Institute for Ecology and Environmental Management (CIEEM) (2016); Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition; CIEEM; Winchester

- Regional - Statutory designated Local Nature Reserves (LNRs), non-statutory designated sites such as Sites of Nature Conservation Importance (SNCI). Sites supporting a population of a species or species' assemblage important in a regional context;
- Metropolitan, County, vice-county or other local authority-wide area - Non-statutory designated sites given lower than county importance for nature conservation. Sites supporting a population of a species or species' assemblage important in a metropolitan, County, vice-county or other local authority-wide context;
- Local - Sites that have no formal designation but contain species or habitats that are important to the ecological integrity of the local area, and
- Negligible - No effect on species or habitats present are anticipated.

**4.3.15** The assessment is then repeated taking into account the implementation of any required mitigation measures to determine the residual effects. This assessment considers the likely success of the mitigation, given knowledge of the tolerance or adaptability of the resource or feature to environmental change.

**4.3.16** A cumulative assessment has also been undertaken which considers whether any of the cumulative developments described in Volume 1 Appendix J1 have the potential to alter the significance of impacts as a result of the Proposed Scheme.

## **4.4 Assumptions and Limitations**

**4.4.1** Ecological surveys are limited by factors which affect the presence of plants and animals, such as the time of year, migration patterns and behaviour. Therefore, the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, professional judgement allows for the likely presence of these species to be predicted with sufficient certainty so as to not significantly limit the validity of these findings.

**4.4.2** It has been assumed that no construction activities associated with this Proposed Scheme will take place to the north of Drumgeith Road. Therefore, any features possessing bat roosting potential which lie to the north of Drumgeith Road have been scoped out of surveys. This approach was agreed with the Operations Officer at Scottish Natural Heritage (SNH).

**4.4.3** It is acknowledged that a single water vole survey has been undertaken which is not in accordance with best practice guidance. Guidance advises two surveys are carried out; one during the period April to June (inclusive), and a second during the period July to

October (inclusive). Since the habitat assessment was undertaken, the habitat had degraded to an extent that it was deemed unsuitable for water voles along the Dighty Water or Fithie Burn. Furthermore, the desk study undertaken revealed a lack of historic records of water vole in the area as and the lack of any field signs identified during the single water vole survey, it is considered that no further surveys are necessary for this species. As such, using professional judgement, this is not considered to be a significant limitation.

## 4.5 Baseline

**4.5.1** This section sets out the baseline conditions for Ecology in and around the site.

### Designated Sites

**4.5.2** One statutory designated site is located within 2km of the Proposed Scheme red line boundary (Table 29). There are no non-statutory designated sites within 2km of the Proposed Scheme and these are therefore not considered further in this assessment.

Table 29: Designated sites within 2km of the Proposed Scheme red line boundary

| Site                                 | Designation                        | Approximate distance and orientation from the Proposed Scheme | Principal citation  |
|--------------------------------------|------------------------------------|---|---|
| <b>Firth of Tay and Eden Estuary</b> | Special Area of Conservation (SAC) | 1.3km south   | <p>The presence of Annex I habitats are the primary reason for the designation of this site. These include:</p> <ul style="list-style-type: none"> <li>• Estuaries;</li> <li>• Sandbanks;</li> <li>• Mud-flats; and</li> <li>• Sand-flats.</li> </ul> <p>The presence of a nationally important breeding colony of Harbour seal (<i>Phoca vitulina</i>), an Annex II species, is also a qualifying reason for the designation of this site.</p> |

**4.5.3** The Firth of Tay and Eden Estuary SAC is a significant distance away from the Proposed Scheme and separated by an urbanised area. However the Dighty Water, into which the Fithie Burn flows, provides

a continuous pathway from the ZoI to this internationally designated site. This feature is considered to be of international ecological value.

## Habitats

### 4.5.4

The land within the ZoI of the Proposed Scheme is composed of a mosaic of the following habitat types:

- Broadleaved woodland;
- Mixed plantation woodland;
- Scrub;
- Neutral grassland;
- Ruderal tall herb and fern;
- Swamp;
- Amenity grassland;
- Ephemeral/short perennial;
- Buildings;
- Hardstanding; and
- Bare ground.

### 4.5.5

Habitats within the ZoI present the ability to support an assemblage of breeding birds, especially within the more open habitats of the flood alleviation zone and the mosaic of habitats along the Dighty Water. Furthermore, broadleaved woodland which is present close to the Proposed Scheme red line boundary is listed as a Habitat of Principal Importance (HoPI) on the Scottish Biodiversity List<sup>15</sup>. For these reasons, it is considered that the habitat on site possess local ecological value.

### 4.5.6

In addition, the invasive plant species giant hogweed (*Heracleum mantegazzianum*) and Indian balsam (*Impatiens glandulifera*) were recorded in several locations along the Dighty Water and Fithie Burn. This habitat has the potential to limit ecological value and is therefore considered to be of negligible importance.

### 4.5.7

For further details of survey results, see Volume 2 Appendix C1.

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<sup>15</sup> Scottish Biodiversity List; <http://www.biodiversityscotland.gov.uk/advice-and-resources/scottish-biodiversity-list/> Scottish Biodiversity List; Accessed: 23 September 2016



## Species

### Bats

**4.5.8** Within the ZoI, one feature with low bat roost potential was identified; the Baldovie Waste Recycling and Waste Processing Plant, located in Zone D of the Proposed Scheme red line boundary for the Proposed Scheme. During an emergence survey on this building, no bats were recorded emerging from the feature of interest by surveyors, and no foraging or commuting bat activity was recorded. As a result, bats have been scoped out of this assessment.

**4.5.9** For further details of survey results, see Volume 2 Appendix C2.

### Breeding Bird and Kingfisher

**4.5.10** The mosaic of vegetated habitats within the ZoI including dense and scattered scrub, broadleaved woodland, ruderal herbs and grassland, offer suitable foraging and nesting habitat for breeding birds. In total, 40 species of bird were recorded within the ZoI of which 18 were Species of Principal Importance (SoPI)<sup>16</sup>, Tayside Local Biodiversity Action Plan (LBAP)<sup>17</sup> species and/or Red and Amber listed Birds of Conservation Concern (BoCC)<sup>18</sup>.

**4.5.11** No Schedule 1 species were recorded within the ZoI, although a potential kingfisher nest burrow was identified on the southern bank of the Dighty Water at NO 44450 32685.

**4.5.12** A peregrine falcon has historically been identified flying over the initial survey area. Although potential foraging habitat for this species are present within the ZoI, it is considered that habitats within the ZoI are unsuitable for this species to nest and no evidence of peregrine habitat use was recorded during the 2016 surveys.

**4.5.13** For further details of survey results, see Volume 2 Appendix C3.

**4.5.14** The majority of bird territories are located along the south of Drumgeith Road, within the western half of the ZoI and along the Dighty Water. Within the Proposed Scheme red line boundary, several territories belonging primarily to passerine species exist, particularly within the flood alleviation area. These species are generally abundant and typical of the habitats in which they were recorded, with no exceptionally rare species identified.

**4.5.15** As a result, the breeding bird assemblage (including kingfisher) present on the site is considered to have local ecological value.

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<sup>16</sup>

<sup>17</sup> Tayside Local Biodiversity Action Plan; <http://www.taysidebiodiversity.co.uk/action-plan/action-plan-new-lbap-2015/>; Accessed: 23 September 2016

<sup>18</sup> Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands, and the Isle of Man; [https://www.rspb.org.uk/Images/birdsofconservationconcern4\\_tcm9-410743.pdf](https://www.rspb.org.uk/Images/birdsofconservationconcern4_tcm9-410743.pdf); Accessed: 23 September 2016

## Otter

- 4.5.16** Historic records of otter are minimal in the area. Of the data sources searched, there are no records of otter within 2km of the Proposed Scheme red line boundary since 1995.
- 4.5.17** During every otter survey undertaken, evidence of otter activity in the form of spraints was recorded along the Dighty Water and Fithie Burn within the ZoI. No holts were identified, but several potential couches were recorded. As a result, it is considered that otter have a local ecological value as the watercourses have evidence of regular use by commuting otter.

## Water vole

- 4.5.18** Of the desk study data analysed, there are no historic records of water vole within 2km of the Proposed Scheme red line boundary since 1980.
- 4.5.19** No evidence of water vole activity was recorded during the water vole survey in October 2016. It was also considered that the habitat on site had degraded to an extent to which it had become unsuitable for the species. As a result, water vole possess a negligible ecological value.

## Summary of Ecological Resources

- 4.5.20** Ecological features that have been considered as requiring further assessment based upon their ecological value are:
- Designated sites;
  - Habitats;
  - Breeding bird and kingfisher; and
  - Otter.

## 4.6 Potential Effects and Good Environmental Design Management

- 4.6.1** The Proposed Scheme is described in Volume 1 of the ES. The elements of the project of relevance to ecology are set out below and further detailed within the Construction Environmental Management Plan (CEMP) and the Design and Access Statement (DAS).

## Construction

- 4.6.2** Due care and attention will be given to the prevention of surface run-off. For example, stockpiling of materials within the vicinity of drainage systems will be avoided wherever practicable. Where this is not possible, a bund will be provided to control run off and minimise pollution risks to adjacent habitats, the Dighty Water and Fithie Burn. All tanks, bunds, drains and hardstanding will be inspected frequently for damage, maintained and remedial works conducted if necessary.

- 4.6.3** During mobilisation and early works, the flood alleviation pond will be formed in Zone B of the Proposed Scheme red line boundary. To do this, vegetation in this area which is known to support breeding birds will require clearance.
- 4.6.4** Furthermore, during the main works, site earthworks will take place which may involve the clearance of vegetation or structures able to support nesting birds. Any necessary clearance works such as tree felling and scrub removal will be undertaken outwith the bird nesting season (March to August inclusive).
- 4.6.5** Construction lighting will be reduced to a minimum commensurate with the need to maintain the security requirements of the site in order to reduce the environmental impact and minimise light pollution. Furthermore, wherever possible, lighting will be directed away from retained habitat areas.

## Operation

- 4.6.6** For safety and security reasons, street lighting is proposed at the entrances to the site and entrances to the building. It is proposed that the internal roadways are illuminated during the hours of darkness, and when required, in the early evenings. Street lighting, where required, will use light columns with the attachment of directional hoods in order to ensure that the light is directed at a suitable angle to ensure adequate illumination whilst minimising extraneous light. Daylight sensors and automatic cut-off switches will be used where possible. Cowling will also be used to minimise light spillage and brightness of the lighting will also be kept as low as possibly commensurate with operational requirements and limited during periods after dusk and pre-dawn in order to provide some dark periods. Should a lighting strategy be produced, ecology will be a key consideration in the formulation of the plan.
- 4.6.7** There is already extensive landscaping along the footpath which screens the scrap yards lying to the south of the Proposed Scheme. At this stage, it is not anticipated that any additional on-site or off-site landscaping will be undertaken given the off-site landscaping which already exists and the height and maturity of the trees.
- 4.6.8** To prevent spillages, the facility will be constructed and operated in accordance with the Pollution Prevention Guidelines and will be licensed by SEPA under the Environmental Permitting regime. All bulk storage tanks will be appropriately bunded and located on areas of hard standing and all wastes (including wastes to be delivered to the proposed EfW CHP facility) will be stored appropriately within the building. All tanks, bunds, drains and hard standing will be inspected frequently for damage, maintained and remedial works conducted if necessary.

## 4.7 Assessment – Construction

### Designated Sites

- 4.7.1** The Dighty Water, which flows along the southern boundary of the ZoI and into which flows the Fithie Burn, forms a surface water connection to the Firth of Tay and Eden Estuary SAC. As a result, this SAC may be indirectly impacted by any pollution accidentally entering the water body upstream.
- 4.7.2** However, a comprehensive CEMP has been developed which guides the storage of all potential pollutants and details the measures being undertaken to prevent any pollution incidents.
- 4.7.3** As a result, this effect would be **not significant**.

### Habitats

- 4.7.4** The total amount of vegetation being permanently cleared within the Proposed Scheme red line boundary is 4800m<sup>2</sup>. Where possible, the felling of trees and clearance of vegetation will be avoided. In addition, the Proposed Scheme has been sited to limit the amount of vegetation lost.
- 4.7.5** As a result, there would be a temporary adverse minor effect which would be **not significant**.

### Breeding Birds and Kingfisher

- 4.7.6** Habitats across the ZoI are considered optimal for an assemblage of generally widespread breeding bird species. In addition, a potential kingfisher nest burrow has been identified along the Dighty Water.
- 4.7.7** Where possible, any structural demolition and vegetation clearance of areas with nesting potential will take place outwith the breeding bird season. However, should clearance works of suitable areas need to be undertaken during the breeding season, vegetation will be checked by a SQE within the 24 hours prior to works taking place. Legislation will be complied with should an active nest be identified; in this scenario, an exclusion zone will be formed around the nest at a suitable distance (species-dependent) within which no works are permitted until the SQE has confirmed that the nest is no longer active and the young have fledged.
- 4.7.8** Should works be required within 100m of either bank of either the Dighty Water or the Fithie Burn during the bird breeding season, a pre-construction survey for kingfisher burrows should be undertaken by a SQE. Legislation will be complied with should an active nest be identified, as detailed in Section 4.7.7. Depending upon river conditions, the location of kingfisher nest burrows may alter annually

and so any pre-works checks required should be repeated on an annual basis.

- 4.7.9** As a result, there would be a temporary adverse minor effect which would be **not significant**.

### Otter

- 4.7.10** It is anticipated that there will be no construction works along or immediately adjacent to the Dighty Water or Fithie Burn. Should any construction works be conducted within 100m of either bank of either watercourse, a pre-works check should be conducted by a SQE to ensure that no sites of otter breeding or resting are adversely impacted by works.

- 4.7.11** As a result, there would be a negligible effect which would be **not significant**.

## 4.8 Assessment – Operation

### Designated sites and habitats

- 4.8.1** The Dighty Water and Fithie Burn are located in close proximity to the Proposed Scheme red line boundary. During operation, any pollution may affect the water quality of the watercourses, affecting any associated flora and fauna. This is considered unlikely as operational guidance will be implemented so as to avoid any significant discharges of pollutants into the watercourse.

- 4.8.2** As a result there would be a negligible effect which would be **not significant**.

### Breeding Bird and Kingfisher

- 4.8.3** It is considered that operational activities including lighting and noise are unlikely to deter birds from using suitable nesting habitat. As a result there would be a negligible effect which would be **not significant**.

### Otter

- 4.8.4** Operational activities will not be located in close proximity of the Dighty Water or Fithie Burn, and it is considered that there will be minimal additional disturbance to this species as a result of the Proposed Scheme.

- 4.8.5** As a result there would be a negligible effect which would be **not significant**.

## 4.9 Supplementary Mitigation

- 4.9.1 No mitigation measures have been proposed with respect to effects from construction/operation/decommissioning of the project.

## 4.10 Residual Effects

- 4.10.1 As no mitigation measures are proposed, the residual construction/operational effects remain as described in Section 4.12.

## 4.11 Cumulative Effects

- 4.11.1 The majority of the proposed developments assessed for in-combination effects lie outwith the ZoI of this assessment and thus will not create any significant cumulative effects upon the ecological features identified.
- 4.11.2 However one application site (15/00035/FULM) is located within the ZoI. This scheme has now been approved, subject to planning conditions being met.
- 4.11.3 The application site area fell within the habitat and species surveys undertaken to inform this planning application.
- 4.11.4 The breeding bird assemblage in this area was not diverse or particularly notable and there was a lack of suitable bird nesting habitat. Although otter activity was recorded along the Dighty Water and Fithie Burn, construction will comply with legislation, meaning that any potential holts or couches within 100m of the application site will undergo a pre-construction assessment in order to prevent any adverse effects on the otter population. Thus it is concluded that the in-combination effects of this Proposed Scheme and the application site will be **not significant**.

## 4.12 Assessment Summary

### Construction

Table 30: Assessment summary - construction

| Ecology   |  |                          |   |
|---|--|--------------------------|---|
| Aspect of the Project                           | Description of effect and significance   | Supplementary mitigation | Residual effects summary                      |
| Pollution incident                              | As the CEMP includes all necessary measures for preventing any pollution incidents, the effects of any pollution incident would be <b>not significant</b> .  | None required            | Effects unchanged.<br><b>Not significant.</b> |
| Clearance of vegetation or felling of trees     | As the CEMP includes all necessary measures for the timing of vegetation clearance, the effects of clearance would be <b>not significant</b> .   | None required            | Effects unchanged.<br><b>Not significant.</b> |
| Potential disturbance to kingfisher nest burrow | Should works be required within 100m of either bank of either the Dighty Water or the Fithie Burn during the bird breeding season, a pre-construction survey for kingfisher burrows should be undertaken by an SQE. Therefore the effects of any potential disturbance would be <b>not significant</b> . | None required            | Effects unchanged.<br><b>Not significant.</b> |
| Potential disturbance to otter couches          | Should works be required within 100m of either bank of either the Dighty Water or the Fithie Burn, a pre-works check for otter activity would be undertaken by an SQE. Therefore the effects of any potential disturbance would be <b>not significant</b> .  | None required            | Effects unchanged.<br><b>Not significant.</b> |



## Operation

Table 31: Assessment summary – operation

| Ecology  |  |                          |   |
|--|--|--------------------------|---|
| Aspect of the Project  | Description of effect and significance   | Supplementary mitigation | Residual effects summary                      |
| Pollution incident   | As the CEMP includes all necessary measures for preventing any pollution incidents, the effects of any pollution incident would be <b>not significant</b> .                            | None required            | Effects unchanged.<br><b>Not significant.</b> |
| Additional lighting and noise as a result of the Proposed Scheme | As the CEMP includes all necessary measures for the control of operational lighting and noise, the effects of these aspects would be <b>not significant</b> .                          | None required            | Effects unchanged.<br><b>Not significant.</b> |
| Additional disturbance to otter along the watercourses           | Operational activities will be located adjacent to areas already in use and located away from the watercourses. Therefore the effects of this aspect would be <b>not significant</b> . | None required            | Effects unchanged.<br><b>Not significant.</b> |

## 4.13 Enhancement and Recommendations

**4.13.1** Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures.

**4.13.2** In accordance with Scottish Planning Policy (SPP), developments are required to “*seek benefits for biodiversity where possible, including the restoration of degraded habitats and the avoidance of further fragmentation or isolation of habitats*”. National policy also promotes the inclusion of measures to enhance biodiversity within development proposals.

**4.13.3** Therefore three enhancement measures are proposed in order to align this development with national and Scottish policy. These are as follows:

- The Dighty Water provides an important green corridor traversing the landscape. Where possible, the habitat along this watercourse should be enhanced through native species planting of berry-bearing species (such as alder, rowan, birch, hazel and blackthorn);
- Given the confirmed presence of kingfisher along the Dighty Water and the suitable habitat offered by both this watercourse and the Fithie Burn, it is suggested that up to four artificial kingfisher burrows could be created in the banks of this watercourse;
- Currently the Dighty Water and Fithie Burn offer suitable, but not optimal, habitat for several species. It is recommended that both watercourses are improved through the removal of litter and eradication of invasive species, such as Himalayan balsam and giant hogweed, which currently line sections of the banks, and

**4.13.4** In order to ensure the water vole surveys comply with best practice guidance, it is recommended that one further water vole survey is undertaken between April and June (inclusive) in 2017, prior to works commencing.

## 4.14 Further work to be undertaken for the ES

**4.14.1** No further work is proposed.

## 5 Ground conditions and contamination

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### 5.1 Introduction

**5.1.1** This section provides an assessment of likely ground conditions and contamination impacts of the Proposed Scheme upon the Application Site and surrounding area.

**5.1.2** The review focusses on information pertaining to geology and any potential impacts of the Proposed Scheme on the geological setting.

**5.1.3** This section describes the potential likely significant effects of the Proposed Scheme on the following key subject areas:

- Drift Geology;
- Solid Geology;
- Hydrogeology;
- Designated Geological sites;
- Mining and Quarrying, and
- Contamination.

**5.1.4** The site is located on Forties Road in the Baldovie Industrial Estate in Dundee. The Application Site is divided into six key development areas which are as follows:

**Area A** – The proposed EfW CHP facility;

**Area B** – Preselected flood mitigation area;

**Area C** – Existing ATS site;

**Area D** – Construction compound and contractor's parking; and

**Area E** – The Existing DERL EfW facility.

The location of each development area is presented on Volume 1 Appendix C1.

**5.1.5** Surrounding land uses include the Michelin tyre factory to the east and south-east, the Dighty Water to the south and industrial units within the Baldovie industrial estate to the north and west.

**5.1.6** The Proposed Scheme comprises the construction of a new EfW CHP facility on Area A. It is proposed that the Applicant will also take over the operation of the existing DERL facility (Area E) and the ATS site (Area C) with flood prevention proposed in Area B. Site levels on Area A are understood to require to be raised by approximately 0.5-1m (to approx. 28.5m OD) to alleviate potential flooding risk.

## 5.2 Legislation and Planning Framework

- 5.2.1** Following a search of the Scottish Natural Heritage Interactive Map Viewer<sup>19</sup>, the site is not located on or within a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SAC), RAMSAR or National Scenic Area.
- 5.2.2** Development of potentially contaminated brownfield or statutorily identified contaminated land will be considered where a site investigation is submitted, establishing the nature and extent of any contamination, and that suitable remediation is proposed, as per Policy 45 of the Dundee Local Plan.
- 5.2.3** Land contamination is regulated under several regimes, including environmental protection, pollution prevention and control, waste management, planning and development control and health and safety regimes.
- 5.2.4** The primary UK legislation relating to land contamination is contained within Part IIA of the Environmental Protection Act (1990) (EPA). This legislation came into force in Scotland in 2000, in conjunction with the Contaminated Land (Scotland) Regulations (2000). It was subsequently further amended by the Contaminated Land (Scotland) Regulations (2005).
- Under this legislation ‘Contaminated Land’ is defined as:
- ‘any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that –*
- significant harm is being caused or there is a significant possibility of significant harm being caused*
- or*
- significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused.’*
- 5.2.5** The principles of Part IIA are extended to land affected by radioactivity by the Radioactive Contaminated Land (Scotland) Regulations 2007. These regulations identify SEPA as the enforcing authority.
- 5.2.6** The legislation endorses the principle of a ‘suitable for use’ approach in dealing with land contamination. This aims to ensure that proportionate and appropriate remedial action can be required where unacceptable risks exist to health or the wider environment.
- 5.2.7** The Part IIA Statutory Guidance [Scottish Executive, 2006] promotes the adoption of a risk assessment based upon a Source-Pathway-

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<sup>19</sup> Scottish Natural Heritage; Interactive Map; <http://www.snh.gov.uk/publications-data-and-research/snhi-information-service/map/#map> Accessed: 15 March 2016

Receptor model, in order to identify where unacceptable risks may exist. Such a model contains the following components:

- The principal contamination hazards associated with the site (the sources);
- The principal receptors at risk from the identified hazards, and
- The existence, or absence, of plausible pathways which may exist to expose the receptor to the identified hazards.

- 5.2.8** In order for land to be identified as Contaminated Land under Part IIA, and therefore require remediation from a legislative perspective, all three elements (source, pathway and receptor) of a significant pollutant linkage must be present.
- 5.2.9** Whereas the Contaminated Land regime under Part IIA deals with the existing condition of land, the risk and remediation requirements of land contamination are also considered through the planning regime.
- 5.2.10** Planning Advice Note PAN 33 [Scottish Executive, 2000] provides advice to ensure that the potential risks posed by contamination are appropriately addressed through the planning regime. It identifies that, for planning purposes, ‘contaminated sites... may be regarded as any site where the presence or suspected presence of contaminants may present an obstacle to development’.
- 5.2.11** PAN 33 also adopts the ‘suitable for use’ and site specific source-pathway-receptor risk assessment process advocated within Part IIA. It highlights the need for the risk assessment to be based upon a suitable site characterisation, to ensure that potentially unacceptable risks can be appropriately identified. The Local Planning Authority may require remedial works to facilitate development over and above that which would be required under Part IIA for the current use of the site.

## **5.3 Engagement**

- 5.3.1** This assessment has been informed by consultation with DCC and SEPA. Responses received pertaining to ground conditions and contamination are presented in Table 32.

Table 32: Consultation Responses

| No. | Organisation and date                         | Comment  | Response |
|-----|---|--|----------|
| 1.  | Scottish Environment Protection Agency (SEPA) | <i>“Results from a full, intrusive site investigation will be required at the PPC Permitting stage to provide baseline information on any potential contamination prior to commencing construction and operations”.</i>  | Noted.   |
| 2.  | Dundee City Council                           | <i>“Development of potentially contaminated brownfield or statutorily identified contaminated land will be considered where a site investigation is submitted, establishing the nature and extent of any contamination, and that suitable remediation is proposed, as per Policy 45 of the Dundee Local Plan”.</i> | Noted    |
| 3.  | Dundee City Council                           | <i>“It would be expected that a preliminary risk assessment (desk study) would be submitted with a planning application. Given the proximity of the application to the Dighty, and that it is over the sandstone, particular consideration will need to be given to possible impact on the water” environment.</i> | Noted.   |

## 5.4 Methodology

**5.4.1** A description of the methodology for baseline data collection and the assessment criteria is provided.

**5.4.2** The section includes details on mitigation measures identified that will be required to prevent, reduce or offset any impacts.

**5.4.3** This section does not assess the physical effects upon the hydrological regime or flood risk within the vicinity of the application site.

**5.4.4** The assessment of the impacts of the Proposed Scheme on the geology and soils is based on an appraisal of the sensitivity of the receptors, the likely magnitude of impacts and the overall significance of

impacts Table 33 defines the criteria that were used to assign receptor importance.

Table 33: Receptor sensitivity criteria

| Sensitivity | Criteria   | Typical Examples  |
|-------------|--|---|
| Very High   | Attribute has a high quality and rarity on a regional or national scale. | <p>Geology</p> <ul style="list-style-type: none"> <li>Site protected under EU legislation, e.g., SPA, SAC, Ramsar site.</li> </ul> <p>Soils</p> <ul style="list-style-type: none"> <li>Site on which soils yield high levels of agricultural value – prime quality land.</li> </ul> |
| High        | Attribute has a high quality and rarity on a local scale.                | <p>Geology</p> <ul style="list-style-type: none"> <li>Site protected under UK legislation, e.g. SSSI.</li> </ul> <p>Soils</p> <ul style="list-style-type: none"> <li>Site on which soils yield medium to high levels of agricultural value.</li> </ul>                              |
| Medium      | Attribute has a medium quality and rarity on a local scale.              | <p>Geology</p> <ul style="list-style-type: none"> <li>Site protected under local designation e.g. SINS or RIGS.</li> </ul> <p>Soils</p> <ul style="list-style-type: none"> <li>Site on which soils yield low levels of agricultural value.</li> </ul>                               |
| Low         | Attribute has a low quality and rarity on a local scale.                 | <p>Geology</p> <ul style="list-style-type: none"> <li>Site not protected</li> </ul> <p>Soils</p> <ul style="list-style-type: none"> <li>Poor quality soils</li> </ul>   |

#### 5.4.5

Table 34 defines the criteria used to evaluate impact magnitude.

Table 34: Impact magnitude criteria

| Magnitude                       | Criteria   | Example   |
|---------------------------------|--|---|
| Major<br>(adverse and positive) | <p>Loss of attribute and/or quality and integrity of the attribute.</p> <p>Major improvement to quality and integrity of the attribute</p> | <p>Major shift away from the baseline conditions. Permanent Change</p> <p>Extensive change to the systems or processes or features that form the basis for a geological SSSI designation</p> <p>Major impacts on human health from mobilisation of contaminants during construction</p> |



| Magnitude                            | Criteria  | Example  |
|--------------------------------------|---|--|
| Moderate<br>(adverse and positive)   | Impact on integrity of attribute or loss of part of attribute.                                | A significant shift from the baseline conditions that may be long-term or temporary<br>Moderate change to the systems or processes or features that form the basis for a geological SSSI designation<br>Moderate impacts on human health from mobilisation of contaminants during construction |
| Minor<br>(adverse and positive)      | Results in some measurable change in attribute quality or vulnerability.                      | Minor shift away from the baseline conditions that may be short-term or temporary<br>Minor change to the systems or processes or features that form the basis for a geological SSSI designation<br>Minor impacts on human health from mobilisation of contaminants during construction         |
| Negligible<br>(adverse and positive) | Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. | Very slight change from the baseline conditions, such that little or no discernible effect upon the geology<br>No change to the systems or features that form the basis for a geological SSSI designation<br>No effects on human health from mobilisation of contaminants                      |

**5.4.6** Table 35 presents the matrix for the derivation of the significance of impact from receptor importance and impact magnitude.

Table 35: Significance of impact matrix

| Importance of Receptor |           | Magnitude of Impact |                 |                  |                  |
|------------------------|-----------|---------------------|-----------------|------------------|------------------|
|                        |           | Negligible          | Minor           | Moderate         | Major            |
|                        | Very High | Neutral             | Moderate/Large  | Large/Very Large | Very Large       |
|                        | High      | Neutral             | Slight/Moderate | Moderate/Large   | Large/Very Large |
|                        | Medium    | Neutral             | Slight          | Moderate         | Large            |
|                        | Low       | Neutral             | Neutral         | Slight           | Slight/Moderate  |

**5.4.7** The development is understood to comprise three distinct phases which are understood to be undertaken during the following timeframes:

- **Phase 1 - Construction** of new Energy from Waste Combined Heat and Power (EfW CHP) facility (3<sup>rd</sup> Quarter 2017 to 4<sup>th</sup> Quarter 2019);
- **Phase 2 - Construction and commissioning (switching)** – final external construction works and final internal process works and transition between the existing DERL site and new plant including the shutdown of the existing DERL. (1<sup>st</sup> to 3<sup>rd</sup> Quarter 2020), and
- **Phase 3 - Operation of proposed EfW CHP facility and decommissioning of existing DERL** (4<sup>th</sup> Quarter 2020 onwards).

### Methodology for assessment of effects from phase 1 - construction

**5.4.8** Construction effects are temporary effects that may arise during the construction of the new EfW CHP plant and associated infrastructure. The assessment has considered the nature and form of the Proposed Scheme in assessing the effects of the interactions of the development with the underlying ground conditions. The key impacts to be assessed for the construction phase pertains to ground stability, hydrogeology and contamination.

**5.4.9** The Construction phase will also lead to the potential disturbance and mobilisation of contaminants present in the soils and groundwater beneath and surrounding the site. The principal receptors identified are construction workers, site users, adjacent site workers, structures and services, the water environment and flora and fauna. Existing ground investigation data will form the basis of this assessment which is discussed in Section 1.6.

### Methodology of assessment of effects from Phase 2- Construction and Commissioning (Switching)

**5.4.10** This phase includes construction activities which include the finishing works to roads and hard standings, site landscaping works, mechanical and electrical building services and internal fitting out of the new facility.

**5.4.11** This phase includes minor external construction activities and it is considered that the effects to underlying ground conditions would be minimal as any required mitigation or remediation pertaining to the ground would require to have been performed in the earlier construction phase.

- 5.4.12** The switching of operation from the existing DERL EfW plant to the new site is not considered to have any key significant risks relating to ground conditions or contamination as it is likely that all activities would be above ground and not require any ground disturbance.

### **Methodology of assessment of effects from Phase 3 - Operation of New Plant and Decommissioning of DERL**

- 5.4.13** Operational effects are considered to be primarily associated with the sites use as an Energy from Waste Combined Heat and Power (EfW CHP) plant which will lead to the generation of wastes and residues that will require temporary storage and off-site disposal. This is discussed in further detail in Section 5.6.
- 5.4.14** The decommissioning activities to be performed at the existing DERL facility include the shutting down of DERL and the performance of necessary electrical or process isolations. It is not considered that there are any activities undertaken as part of the decommissioning activity that would impact on ground conditions or contamination as there is to be no internal stripping of materials or demolition activities.

## **5.5 Assumptions and Limitations**

### **Assumptions**

- 5.5.1** The assessment carried out has been based upon the site history, ground and contamination conditions indicated by the desk study and available ground investigation works to date. It is possible that actual conditions may vary from those assumed.

### **Limitations**

- 5.5.2** The Geotechnical and Geo-environmental Desk Study 2016<sup>20</sup> only focussed on Areas A, C and E as this was the Proposed Scheme boundary at the time of completing that report. Baseline information therefore for Areas B and D is limited and is drawn from publically available information (e.g. BGS borehole records). In addition, the exact proposals for Area B were not specifically detailed at the time of writing this ES section.
- 5.5.3** Detailed intrusive ground investigations are currently on-going on site (Areas A, D and E) and therefore the full range of geotechnical and geo-environmental data or an interpretation of that data was not available at the time of completing the ES. Recommendations made within this ES should be reviewed following the completion of the intrusive investigations (scheduled to be November 2016).

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<sup>20</sup> Arup (2016) Proposed Energy from Waste (EfW) Plant, Dundee. Geotechnical & Geo-environmental Desk Study

## 5.6 Baseline Conditions

### Methodology for Establishing Baseline Conditions

**5.6.1** The baseline conditions at the site have been established through a review of the following resources. This report includes the review of the following information:

- British Geological Survey (BGS) Scotland Sheet NO 43 SW Solid and Drift (1:10,560). 1976<sup>21</sup>;
- BGS Borehole Records and Hydrogeological mapping;
- Geotechnical Engineering Ltd (GEL) Factual Report 2015<sup>22</sup>;
- SLR Consulting Factual Ground Contamination Report 2015<sup>23</sup>;
- Arup Geotechnical and Geoenvironmental Desk Study 2016<sup>2</sup>, and
- Draft GEL Factual Report October 2016<sup>24</sup>.

### Site Topography

**5.6.2** The topography of the site is gently sloping downwards in a north to south direction towards the Dighty Water. The ground level within Area A is approximately 0.5 – 1.5m lower than the surrounding land uses. Steep downward slopes are present in the northern, eastern and southern site boundaries of this area with the greatest level difference with the surrounding areas identified in the east of Area A.

### Site History

**5.6.3** The historical maps contained within the Arup desk study indicate that the Area's C and E were occupied by a nursery in 1865, the date of the earliest historical map of the site. The nursery was no longer labelled between 1903 and 1975, and the site was open ground. Between 1975 and 1982 an incinerator was constructed on Area C. Between 1994 and 1995, the south-eastern part of Area E was used as a public refuse tip. Buildings associated with the DERL facility have been present on Area E site since the mid 1990's. There has been no change in the site layout through to the present day.

**5.6.4** Area's A and D are shown to have not been developed from the earliest map of 1865 to present day.

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<sup>21</sup> British Geological Survey (1976) Sheet (NO43SW) Solid and drift geology map (1: 10,560)

<sup>22</sup> Geotechnical Engineering Ltd (2015) Factual Report on Ground Investigation. Dundee Energy Recycling Ltd

<sup>23</sup> SLR Consulting (2015) Dundee & Angus Residual Waste Project. Factual Environmental Investigation Report. Draft

<sup>24</sup> Geotechnical Engineering Ltd (2016) Draft Factual Report on Ground Investigations for new EfW Plant, Dundee.

**5.6.5** The map of 1865 shows the ‘*Mill Lade*’ (a channel constructed to carry the swift current of water that drives a mill wheel.) to bisect Area B in a north-west to south east direction. The map of 1903 identifies a ‘*gravel pit*’ located immediately to the east of Area B and this feature is referred to as an ‘*old gravel pit*’ in the map of 1923. The map of 1960 identifies mounds to be present on Area B, the origin and type of material is not clear from the map. The mounds are no longer labelled on the map of 1974-75 and no further development is identified to present day.

**5.6.6** The historical maps show that the area surrounding the site has been previously used for agricultural purposes. Currently, there is a tyre factory to the south-east of the site (operated by Michelin) and a number of industrial sites to the north-west.

## Drift and Solid Geology

### BGS Geological Sheet NO43SW (Drift and Solid)

**5.6.7** The geological map sheet indicates that the superficial deposits beneath the Application Site comprises of ‘alluvium’. Beneath the northern section of the DERL site there is a drift geological boundary shown, whereby the superficial deposits are noted as ‘*glacial meltwater deposits*’ of ‘*moundy sand and gravel*’ to the north. No information on the thickness of the drift deposits is provided.

**5.6.8** The solid geology beneath the Application Site consists of undifferentiated sedimentary units, mainly sandstone, of the Lower Old Red Sandstone Group. Immediately north of the DERL site, an igneous intrusion is identified where the solid geology changes to ‘*tuff and agglomerate*’.

**5.6.9** A geological fault is identified trending from east to west along the southern boundary of Area A, with the downthrow shown to the south (no distance of downthrow is presented).

### BGS Boreholes

**5.6.10** A review of the open geoscience function of the BGS website<sup>25</sup> indicates that the following borehole scans are available within the site area or within close proximity to the site boundary. It should be noted that there are no historical BGS boreholes identified beneath Area’s A and E.

Table 36: Available BGS Borehole Logs

| BGS Borehole ID | Year    | Depth (m) | Location | Additional Information |
|-----------------|---------|-----------|----------|------------------------|
| N043SW1007/01   | unknown | 10m       | Area B   | Baluniefield Dundee 1  |

<sup>25</sup> British Geological Survey; Geology of Britain Viewer (Borehole Scans); <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>; Accessed 16 September 2016

| BGS Borehole ID   | Year    | Depth (m) | Location | Additional Information                 |
|-------------------|---------|-----------|----------|--|
| N043SW1007/02     | unknown | 9m        | Area B   | Baluniefield Dundee 1                  |
| N043SW1007/03     | unknown | 8m        | Area B   | Baluniefield Dundee 1                  |
| N043SW1007/04     | unknown | 10m       | Area B   | Baluniefield Dundee 1                  |
| N043SW1007/06     | unknown | 9m        | Area B   | Baluniefield Dundee 1                  |
| N043SW1007/07     | unknown | 12m       | Area B   | Baluniefield Dundee 1                  |
| N043SW154 (BH13)  | 1972    | 11        | Area C   | Borehole, Drumgrieth Incinerator Plant |
| N043SW155 (BH 16) | 1972    | 6.3       | Area C   | Borehole, Drumgrieth Incinerator Plant |
| N043SW156 (BH17)  | 1972    | 7.9       | Area C   | Borehole, Drumgrieth Incinerator Plant |
| N043SW157 (BH18)  | 1972    | 7.0       | Area C   | Borehole, Drumgrieth Incinerator Plant |
| N043SW153 (BH3)   | 1972    | 6.2       | Area E   | Borehole, Drumgrieth Incinerator Plant |
| N043SW158 (BH19)  | 1972    | 13.75     | Area E   | Borehole, Drumgrieth Incinerator Plant |
| N043SW159 (BH22)  | 1972    | 6.9       | Area E   | Borehole, Drumgrieth Incinerator Plant |

**5.6.11** The exploratory holes undertaken within the surrounding area of the site encountered the following geological conditions:

#### **Area B**

- BGS boreholes in this locality identify the soils to typically comprise topsoil to approx. 0.35m (N043SW1007/07) overlying soft organic sandy silt to 1.2mbgl which in-turn overlies medium dense grey silty sand and gravel to 4 - 6.5mbgl (alluvium). This in-turn overlies granular and cohesive firm becoming stiff glacial till (gravel and clay). These bores went to a maximum depth of 12.35m and terminated on obstructions / possible bedrock.

**Area C and Area E**

- Made ground was encountered in NO43SW6877/9 (BH9) to a depth of 0.45mbgl, comprising clay with gravel. Top soil was encountered in NO43SW6877/8 (BH8) to a depth of 0.6mbgl.
- Bedrock was encountered during the Drumgrieth Incinerator Plant investigation. The boreholes identified 'surface' deposits to a maximum depth of 3.27m in NO43SW158 underlain by bedrock (The rock was noted as sandstone in boreholes NO43SW153 (BH3) and NO43SW158 (BH19); siltstone in borehole NO43SW159 (BH22) and grey igneous rock (Tuff) in boreholes NO43SW157 (BH16) and NO43SW157 (BH18). Bedrock was encountered at a depth between 3mbgl and 10.75mbgl.

**GEL Intrusive Investigation 2015**

- 5.6.12** Seven boreholes and six trial pits were undertaken during the 2015 ground investigation by Geotechnical Engineering Ltd at Dundee Energy Recycling Ltd. This investigation included two boreholes (BH6 & 7) and six trial pits (TP01 -05) on Area A, two boreholes on Area C (BH's 1&2) and three boreholes on Area E (BH's 4, 5 & 8).
- 5.6.13** Made ground comprising black and grey tarmacadam was present in boreholes BH1, BH2, BH5 and BH7. Sandstone and quartzite gravel made ground was encountered in boreholes BH4, BH6 and BH7. At BH8, the made ground comprised light concrete.
- 5.6.14** The boreholes indicate that the depth of the superficial deposits range from 4.85mbgl in the northern most point of Area C (BH1) to 24.55mbgl at the south-east end of the site (BH7) in Area A. The presence of interbedded layers and the description of the superficial deposits suggests that they have glacial meltwater/alluvial origins. They comprise of layers of sandy, silty, peaty or gravelly clay, fibrous peat, fine and medium or fine to coarse sand and fine to coarse gravel.
- 5.6.15** The investigations have confirmed that rockhead between Area C to Area A is highly variable and at significant depth in Area A (proposed new EfW CHP facility location). Rockhead was not encountered in boreholes BH4 and BH6, which terminated at 15m and 15.45m depth respectively. The bedrock is predominantly sandstone (BH1, BH5, BH7 and BH8), but siltstone (BH2) and mudstone (BH1) were also encountered.
- 5.6.16** The trial pits varied in depth from 1.7m to 3.3mbgl. Made ground in the trial pits comprised predominantly dark, fine to coarse crystalline, sandstone gravel with fragments of brick and mortar and reached depth between 2.1m and 3.2m. Metal bars, plastic tape, fragments of geo-membrane and roots have been found in the ground.

**GEL Intrusive Investigation 2016**



- 5.6.17** The GEL intrusive ground investigations were ongoing at the time of writing this ES section. The investigations performed include positions in Area's A, D and E. Investigations have also been performed in the Michelin site along the proposed above ground steam pipe route but it is understood this will be the subject of a separate planning application.
- 5.6.18** The soils on the site typically comprise made ground to a depth of up to 3.1mbgl (Area A). The shallow made ground is typically described as a gravelly silt with the deeper made ground described as granular (sandy gravel). Materials within the made ground include brick, wood, mortar, tarmacadam, ceramics, metal and also rare organic fragments.
- 5.6.19** Beneath the made ground deposits are typically soft cohesive alluvial deposits which includes organic materials including peaty clay and peat and firm laminated clays to depths of approximately 4mbgl. Strong organic odours have been recorded within this horizon. This is quite a distinctive layer across Areas A, D and E. The alluvial materials below this comprise of both cohesive and granular deposits (silt, clay, sand and gravel) to rockhead with cobbles and boulders identified within this strata.
- 5.6.20** Running sands encountered in BHR01 on the proposed Area A between 14.2 and 18mbgl. Rotary coring was performed on Area A and confirmed rockhead in this locality varies between 18.1m and 25.9m. The coring confirmed the bedrock to comprise sedimentary sandstone, siltstone and mudstone.
- 5.6.21** Ground gas and groundwater monitoring standpipes have been installed in the made ground, natural drift and solid geological units to permit the monitoring and sampling of groundwater from all horizons. This will permit an assessment of the risk of contaminants impacting the Water Environment to be undertaken which has been specifically highlighted by DCC.
- 5.6.22** Final laboratory geotechnical and geo-environmental testing and monitoring is ongoing at present and a final factual report is expected to be available in November 2016.

### **Compressible Ground / Stability**

- 5.6.23** As part of the Desk Study researches an Envirocheck Report (available in Volume 2 Appendix D) was obtained. The following information pertaining to the risk of ground stability and compressibility is provided by the British Geological Survey:
- Potential for collapsible ground stability hazards – *no hazard to very low*;
  - Potential for compressible ground stability hazards –*no hazard to moderate*;
  - Potential for ground dissolution stability hazards – *no hazard*;



- Potential for landslide ground stability hazards – *very low*;
- Potential for running sand ground stability hazards – *very low to low*, and
- Potential for shrinking or swelling clay ground stability hazards – *no hazard to very low*.

**5.6.24** The intrusive ground investigations have encountered soft and compressible materials including soft cohesive made ground, soft cohesive alluvial deposits and peat. In addition BHR01 encountered running sands between 14.2m and 18m bgl.

**5.6.25** In general the surface deposits are relatively common in the area. The soils do not support any ecological habitats however peat has an important environmental function in terms of carbon storage. It is understood that site levels within Area A are to be raised and therefore it is unlikely that the peat deposits will be removed as part of the construction works with the exception of some material that may be excavated in the construction of the waste bunker and the machine house areas. The investigations have identified compressible ground / ground stability risks due to the presence of soft and compressible made ground and natural alluvial deposits (peat) and also the identification of running sands at depth in one borehole on Area A.

**5.6.26** Overall, whilst the soils are not rare and the site is not protected it is considered that there are ground stability and compressibility risks and therefore drift geology is considered to be of **medium - high** importance.

**5.6.27** As the solid geology underlying the site is not protected and is not rare; solid geology at the site is considered to be of **low** importance.

## Mining and Quarrying

**5.6.28** Review of historical maps dating back to 1865 and the BGS geological sheet does not identify the site to be located in an area of historic mining or quarrying. An old small scale gravel pit was identified to the east of Area B. The online interactive map viewer from Coal Authority<sup>26</sup> indicates that the area is unlikely to be affected by previous mining activities.

**5.6.29** No economic mineral resources / coal seams are identified as being present beneath the site therefore mineral reserves within the site are considered to be of **low** importance.

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<sup>26</sup> The Coal Authority; Interactive Map Viewer; <http://mapapps2.bgs.ac.uk/coalauthority/home.html>; Accessed: 9 February 2016

## Hydrology and Hydrogeology

- 5.6.30** The most recent groundwater vulnerability map produced by BGS<sup>27</sup> shows that the area in which the site is located is classified as vulnerability class 4. Using the text accompanying the map, the site can be characterised as being “*vulnerable to those pollutants not readily adsorbed or transformed*”.
- 5.6.31** BGS have also produced a report which contains maps of the superficial and bedrock aquifer productivity<sup>28</sup>. From the superficial aquifer productivity map, the site appears to be located within an area of low and high productivity. From the solid aquifer productivity map, the site appears to be located in an area of high productivity where the flow is inter-granular and through fractures.
- 5.6.32** A groundwater vulnerability map received as part of the Envirocheck report<sup>29</sup> (see Volume 2 Appendix D) shows that the area is underlain by highly permeable strata. The vulnerability map represents the vertical pathway of groundwater through strata overlaying an aquifer. Groundwater vulnerability is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface. The map states that the aquifer is “*highly permeable strata usually with a known or probable presence of significant fracturing*”. According to the map, the soils have intermediate leaching potential: “*Soils which have a moderate ability to attenuate diffuse source pollutants or in which it is possible that some non-absorbed diffuse source pollutants and liquid discharges could penetrate the soil layer*”.
- 5.6.33** Groundwater monitoring undertaken as part of the GEL 2015 investigation recorded groundwater levels to vary between 1.48m and 2.8mbgl across Areas A, C and E.
- 5.6.34** One round of groundwater monitoring had been completed from the standpipes installed during the GEL 2016 investigation. The monitored groundwater levels recorded varied between 0.52m and 3.41mbgl. The groundwater monitoring performed to date confirms the presence of a relatively shallow groundwater table across the Application Site.
- 5.6.35** Monitoring of existing structures and infrastructure will be required during any de-watering process to ensure they are not affected by any settlement of the ground that may occur during the dewatering process.

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<sup>27</sup> O' Dochartaigh et al (2011) User Guide: Groundwater Vulnerability (Scotland) GIS dataset, Version 2 British Geological Survey Open Report

<sup>28</sup> O' Dochartaigh et al (2004) British Geological Survey. A GIS survey of aquifer productivity in Scotland

<sup>29</sup> Landmark Information Group (2016) Envirocheck Report for Baldovie Industrial Estate, Dundee

- 5.6.36** The nearest watercourse is the Dighty Water, which is located along the southern boundary of the site. The SEPA River and Coastal Flood Map<sup>30</sup> indicates that there is a moderate to high risk of river flooding. A river flood data (Scotland) map, received as part of the Envirocheck report indicates that the expected flood depth at the 100 year flood is between 1m and 2m. The hydraulic gradient at the site is anticipated to have a southward flow towards the Dighty Water.
- 5.6.37** Due to the presence of shallow groundwater, hydrogeology is considered to be of **medium** importance. Contaminant hydrogeological risks are considered under contamination.

## Contamination and Ground Gas

### GEL intrusive investigations 2015

- 5.6.38** Within Area A, Asbestos (Chrysotile) was encountered in TP03A which was quantified to be <0.001%. Sulphurous (TP03A) and hydrocarbon (TP04) odours were also encountered within Area A, suggesting olfactory evidence of contamination of the made ground. The underlying soil was orangish-brown clay with frequent black and brown rootlets.

### SLR factual environmental report 2015

- 5.6.39** During the Geotechnical Engineering Ltd. investigation, environmental samples were collected from the boreholes and trial pits conducted on Area's A, C and E. Analyses were scheduled and performed on soils and groundwater samples under the instruction of SLR Consulting and were reported in a factual report dated November 2015.
- 5.6.40** As part of the Arup Desk Study (Volume 2 Appendix D), a geo-environmental assessment of the SLR testing was performed. Reference should be made to this report for specific discussion on the contamination assessment undertaken. This assessment permitted the development of a conceptual site model which identified the presence of potential source – pathway – receptor linkages that required further investigation to permit a full assessment of the risks to human health, the water environment, buried structures and services to be undertaken.
- 5.6.41** Four rounds of gas monitoring were undertaken as part of the GEL / SLR investigations. A maximum concentration of 9.2% methane was recorded in BH7 (Area A) within the alluvial deposits and an initial risk assessment calculated that the site would fall into Characteristic Situation 2 in accordance with the guidance provided in British Standard BS8485:2015 and Ciria C665. This Characteristic Situation

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<sup>30</sup> SEPA; River and Coastal Flood Map; <http://map.sepa.org.uk/floodmap/map.htm>; Accessed: 16 September 2016

requires ground gas protection measures to be implemented into the development.

### **GEL intrusive investigation 2016**

**5.6.42** Laboratory testing undertaken to date has encountered Chrysotile asbestos fibres in a total of 4 test locations within the made ground on Area A. Asbestos quantification has determined that the quantity of asbestos is <0.001% from each sample tested. No asbestos containing materials have been identified e.g. cement board or lagging and it is considered that this is asbestos that has been present in the stockpiled materials that have been stored on site by Tayside Contracts (the current operator).

**5.6.43** A full program of laboratory testing of soils, leachate (including Waste Acceptance Testing-WAC) and groundwater with groundwater and gas monitoring is currently ongoing and the final report will be available in November 2016.

### **Radon**

**5.6.44** A Radon report<sup>31</sup> was obtained for the site which identified that the property is not located within a radon affected area and that there would be no requirement under Building Regulations for radon protection in new buildings and extensions in the property location.

### **Contaminants produced by EfW CHP process**

**5.6.45** Volume provides a description of the EfW CHP process. The document outlines that the waste burning process will create soil residues that will form a bottom ash material that will be stored within the ash bunker subsequently transported from site, processed and re-used in addition to the residues from the air pollution control system which will require disposal to a licenced hazardous waste landfill. The reason cited for the material classifying as hazardous is alkalinity.

**5.6.46** The intrusive investigations to date have identified the presence of asbestos within the made ground in Area A, elevated soil contaminants including metals, including metals, Total Petroleum Hydrocarbons (TPH), Sulphate, chloride and Volatile Organic Compounds (VOC) and the presence of elevated ground gas within the natural alluvial soils (peat). In addition, the processes from the new EfW CHP site will lead to the creation of contaminated materials including hazardous wastes that will require offsite disposal to a hazardous landfill. Contamination issues are therefore assessed to be of **high** importance.

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<sup>31</sup> Health Protection Agency & British Geological Survey (2011) Indicative Atlas of Radon in Scotland.

## 5.7 Potential effects and good environmental design management

5.7.1 There are a range of potential impacts arising from the Proposed Scheme which include:

- Potential mobilisation of contaminants.

5.7.2 The design of the project has been informed by environmental protection through:

- Ground investigation to provide an understanding of the ground conditions, and
- Consultation with environmental stakeholders including DCC and SEPA.

## 5.8 Impact Assessment

### Potential Impacts

5.8.1 The Proposed Scheme will the raising of site levels and may require the import of material to create the proposed formation levels for the new structure and associated infrastructure on Area A. The existing DERL site (Area E) is to be decommissioned. Key potential impacts arising on ground conditions and contamination can include:

- Impact on superficial geology;
- Impact on solid geology;
- Impact on Hydrogeology;
- Loss of mineral resources, and
- Contamination.

### Impact on Superficial Geology

5.8.2 Potential impacts may arise during construction and operation of the Proposed Scheme:

#### During the Phase 1 Construction phase

- Disturbance of soils including peat, particularly during piling operations and any excavations to remove made ground for foundations, drainage systems and site infrastructure;
- Exacerbation of ground related hazards, e.g. running sands;
- Construction related sources of contamination or mobilisation of existing contaminants within soils affecting soil quality, and
- Compaction of the soils through the use of heavy machinery.

### During the Phase 2 Construction and Commissioning Phase

- None Identified.

### During Phase 3 Operational and Decommissioning Phase

- None Identified.

**5.8.3** The ground investigations identified the presence of compressible ground conditions across the site which includes soft compressible made ground, soft alluvial silts and clays and peat. Running sands have been also been identified which presents a potential ground stability risk to the development. The current proposals for the development include the raising of site levels within the EfW CHP site and based on the anticipated structural loadings there will likely require to be the installation of piled foundations socketed into bedrock. The transfer of building loadings to the bedrock would reduce the risks associated with ground compressibility in the operational phase.

**5.8.4** The need to raise site levels will therefore require a degree of earthworks to create the site development platform. Earthworks and foundation design activities will require to be specified appropriately following geotechnical interpretation of the ground conditions and appropriate geotechnical design to mitigate risks associated with ground compressibility and stability hazards identified from the investigations undertaken.

**5.8.5** Overall, impacts to drift geology throughout the site are considered to be **moderate** during the phase 1 construction phase, **negligible** during the phase 2 construction and commissioning phase and **negligible** during the phase 3 operational and decommissioning phase.

### Impact on Solid Geology

**5.8.6** Bedrock is located beneath Area A at a depth of between 18.1m and 25.9mbgl. Due to the anticipated loadings of the new EfW CHP structure it is considered that piled foundations socketed into rock may be required. The solid geology at the site is not protected and is not rare; therefore the overall magnitude of impacts due to loss or disturbance to solid geological features is considered to be **negligible** during all phases of the development.

### Impacts on Hydrogeology

**5.8.7** Proposed Scheme drawings provided by the Applicant (Planning Drawing Number 300-00-120) identifies a waste collection bunker (approximately 5m below finished ground level) within the bunker fuel structure and also a lower floor area at a depth of 3.35m below the finished ground level in the Machine House. It is understood that site levels are to be raised by approximately 0.5-1m. Dewatering operations are likely to disrupt groundwater flows and levels

temporarily in the immediate vicinity of the site. The extent to which groundwater levels, and hence licensed abstractions and/or existing building foundations, are affected in the wider area would depend on the techniques used to shore-up the excavation.

**5.8.8** Geotechnical interpretation of the ground investigation and design of appropriate dewatering during construction and the design of an appropriate groundwater control system during the operational phase will be required to mitigate risks associated with shallow groundwater.

**5.8.9** Consideration could be given to the performance of detailed permeability testing when the site is vacated by Tayside Contracts to gain a more comprehensive understanding of the groundwater regime at the site. This would assist in informing the design of groundwater control schemes and allow a water management plan to be created for the bunker excavations, and also to inform the most appropriate option for the permanent bunker structure.

**5.8.10** Overall, impacts to hydrogeology (specifically shallow groundwater) are considered to be **moderate** during the phase 1 construction phase, **negligible** during the phase 2 construction and commissioning phase and **minor** during the phase 3 operational and decommissioning phase.

### Impact on mineral resources

**5.8.11** Desk study research has identified that there is no history of coal mining or quarrying in this locality and that there are no economic resources beneath the site. On the basis of the above, the potential impact on mineral resources is considered to be **negligible during all phases of the development**.

### Contamination issues

**5.8.12** The principal evidence of contamination identified from the 2015 intrusive investigations undertaken by GEL and SLR included:

- Asbestos fibres (Chrysotile) within the made ground materials in Area A;
- Elevated ground gases (methane) within the soft alluvial deposits in Area A; and
- Elevated levels of soil contaminants in Areas A, C and E including metals, Total Petroleum Hydrocarbons (TPH), Sulphate, chloride and Volatile Organic Compounds (VOC) in soils.

**5.8.13** The Arup Desk Study (Volume 2 Appendix D) included an assessment of existing geo-environmental test data which permitted the development of a refined Conceptual Site Model (CSM). The CSM concluded that there were a number of potential source areas that had



not been investigated (e.g. inside DERL structures) and that insufficient testing of leachate and groundwater and limited ground gas monitoring had been performed meaning that the presence of source – pathway – receptor contamination linkages required further investigation and assessment.

- 5.8.14** The ongoing 2016 investigations have also identified the presence of asbestos (Chrysotile fibres) within Area A made ground. At the time of writing this report, the geo-environmental testing of soils, groundwater, leachate and ground gas monitoring are ongoing and are due to be completed in November 2016.
- 5.8.15** Following conclusion of the investigations, a geo-environmental assessment will be required to be undertaken and the site CSM updated to reflect any required remediation and mitigation in relation to contamination present on the site.
- 5.8.16** Impacts related to contamination may arise during the initial construction phase from the disturbance of potentially contaminated materials within soils or groundwater. Contaminants present on site are likely to pose risks to human health via construction workers who may come into direct contact with contaminated materials in addition to the water environment which may be impacted by any contaminants that are leaching and migrating into the groundwater beneath the site (including the deeper aquifer) and potentially down hydraulic gradient to the Dighty Water. In addition, contaminants may be present on site that pose risks to structures, water pipes and flora and fauna. There is also a risk that water required to be dewatered from excavations during construction may be contaminated and disposal to a sewer would require approval from Scottish Water.
- 5.8.17** Overall, the phase 1 construction phase impacts in respect to contamination issues are considered to be **moderate – major** (without appropriate remediation and mitigation) which will only be determined following the completion of the contamination assessment.
- 5.8.18** The impacts of contamination during the phase 2 construction and commissioning phase are assessed to be **negligible** as remediation and mitigation would be required to be devised and undertaken as part of the initial construction phase.
- 5.8.19** Whilst appropriate remediation and mitigation as required from the contamination assessment will have been performed during the construction phase, the EfW CHP process will result in the production of contaminative materials which will require appropriate storage, handling and management, therefore the magnitude of impacts during the operational phase are assessed to be **moderate**.



## Relationship to other Environmental Topics

**5.8.20** The following relationships between the ground conditions and contamination impacts with other environmental topics are identified below:

- The construction activities which will include excavations and the installation of foundations has the potential to be dust generating, and emissions to air will need to be controlled through appropriate dust mitigation measures and air quality management (see Section 3).

## Assessment of effects from Phase 1 construction

**5.8.21** Table 37 presents a summary and assessment of the potential impacts on geology during the construction phase.

Table 37: Potential phase 1 construction impacts

| Impact source                | Geological feature                     | Importance sensitivity | Impact magnitude | Potential significance of impact |
|------------------------------|--|------------------------|------------------|----------------------------------|
| Geology (soils)              | Underlying soils                       | Medium-High            | Moderate         | Moderate / Large                 |
| Geology (bedrock)            | Underlying bedrock                     | Low                    | Negligible       | Neutral                          |
| Hydrogeology                 | Groundwater                            | Medium                 | Moderate         | Moderate                         |
| Mineral Resources            | Underlying bedrock / superficial soils | Low                    | Negligible       | Neutral                          |
| Contamination and Ground Gas | Contaminated Soils / groundwater       | High                   | Moderate - Major | Large                            |

## Assessment of effects from Phase 2 construction and commissioning

**5.8.22** Table 38 presents a summary and assessment of the potential impacts on geology during the construction and commissioning phase.

Table 38: Potential Phase 2 Construction and Commissioning Impacts

| Impact source                | Geological feature                     | Importance sensitivity | Impact magnitude | Potential significance of impact |
|------------------------------|--|------------------------|------------------|----------------------------------|
| Geology (soils)              | Underlying soils                       | Medium High            | Negligible       | Neutral                          |
| Geology (bedrock)            | Underlying bedrock                     | Low                    | Negligible       | Neutral                          |
| Hydrogeology                 | Groundwater                            | Medium                 | Negligible       | Neutral                          |
| Mineral Resources            | Underlying bedrock / superficial soils | Low                    | Negligible       | Neutral                          |
| Contamination and Ground Gas | Contaminated Soils / groundwater       | High                   | Negligible       | Neutral                          |

## Assessment of effects from Phase 3 operation and decommissioning

### 5.8.23

Table 39 presents a summary and assessment of the potential impacts on geology during the operational and decommissioning phase.

Table 39: Potential Phase 3 operational and decommissioning impacts

| Impact source                | Geological feature                     | Importance sensitivity | Impact magnitude | Potential significance of impact |
|------------------------------|--|------------------------|------------------|----------------------------------|
| Geology (soils)              | Underlying soils                       | Medium High            | Negligible       | Neutral                          |
| Geology (bedrock)            | Underlying bedrock                     | Low                    | Negligible       | Neutral                          |
| Hydrogeology                 | Groundwater                            | Medium                 | Minor            | Slight                           |
| Mineral Resources            | Underlying bedrock / superficial soils | Low                    | Negligible       | Neutral                          |
| Contamination and Ground Gas | Contaminated Soils / groundwater       | High                   | Moderate         | Moderate / Large                 |

## 5.9 Mitigation options

### Mitigation of effects from Phase 1 Construction

- 5.9.1** Following completion of the current geotechnical and geo-environmental investigations, a Geotechnical and Geo-environmental Interpretative Report will be prepared to interpret ground conditions and make recommendations for foundations and identified ground related and hydrogeological constraints (e.g. dewatering of shallow groundwater). Appropriate foundation and earthworks specifications will be produced to permit appropriate geotechnical design for the mitigation and management of geotechnical risks (e.g. shallow groundwater and compressible ground) that may impact upon the Proposed Scheme.
- 5.9.2** Consideration could be given to the undertaking of detailed permeability testing when the site is vacated by Tayside Contracts to gain a more comprehensive understanding of the groundwater regime at the site. This would assist in informing the design of groundwater control schemes and allow a water management plan to be created for the bunker excavations, and also to inform the most appropriate option for the permanent bunker structure.
- 5.9.3** A contamination assessment and revised Conceptual Site Model (as part of a wider geo-interpretative report) for the site will be prepared following the completion of the current intrusive investigations. The assessment and revised CSM will identify any remedial activities and mitigation measures required to break source-pathway-receptor contamination linkages that are identified on the site which would pose a risk to human health, water environment, structures and services and flora and fauna.
- 5.9.4** If unacceptable risks are identified at the site, a '*Remediation Statement*' will be prepared which will document and outline all required remedial activities that will be undertaken to mitigate risks associated with contamination at the site. Upon agreement of the Remediation Statement with the CLO and Building Control, the appointed Contractor will be required to perform the required remediation and document all evidence of the activities performed within a '*Contamination Verification Report*' which would be required to remove any planning conditions pertaining to contamination.
- 5.9.5** The investigations performed to date have identified the presence of asbestos fibres within the made ground materials which would pose a particular risk to construction workers via direct contact, inhalation and ingestion. An appropriate asbestos management strategy will require to be created as part of a Site Waste Management Plan (SWMP) for the site detailing requirements for the identification and removal and management of asbestos present within the made ground

materials. This will likely include specific requirements on site health and safety during construction which will likely include:

- Adoption of good working practice and appropriate health and safety measures to control the level of exposure as a matter of course, including use of PPE, hygiene facilities and dust control measures.

## **Mitigation of effects from Phase 2 Construction and Commissioning**

- 5.9.6** The requirements for remediation and mitigation of ground related risks and contamination will need to be performed during the first phase of construction. It is therefore considered that there would be no significant impacts pertaining to ground conditions or contamination that would require mitigation during this phase.

## **Mitigation of effects from Phase 3 Operation and Decommissioning**

- 5.9.7** Following completion of the geotechnical interpretation and geotechnical design activities there will be the requirement for the design of an appropriate groundwater control system during operation of the new EfW CHP plant to mitigate hydrogeological risks associated with shallow groundwater. Consideration could be given to the performance of detailed permeability testing undertaken following the vacation of the site by Tayside Contracts to assist in the design of the most appropriate option for the permanent bunker structure which will be below groundwater level.
- 5.9.8** All waste handling, storage and treatment of the site will be carried out under the Pollution Prevention and Control (PPC) (Scotland) Regulations 2012. The site will be designed and managed to protect against any fugitive emissions from the site, to ground, water and air which will be part of the Site Waste Management Plan. Fuel and liquid raw materials will be stored in appropriate containers with a bund of at least 110% of the largest container or 25% of the total volume storage (whichever is largest).
- 5.9.9** It is assumed the management of contaminative waste materials produced during the EfW CHP process will be performed under controlled conditions which will not permit the release of contaminants to impact upon human health, the water environment, flora and fauna and buildings and services.
- 5.9.10** The decommissioning activities to be undertaken will not include the stripping or disturbance of internal building materials and there is no planned demolition activities. It is therefore considered that there would be no contamination risks associated with the decommissioning of the DERL facility.

## 5.10 Conclusions

### Residual effects

- 5.10.1** A summary of the residual effects and their significance relevant to ground conditions following the above mitigation measures is presented below

### Residual effects from Phase 1 Construction

- 5.10.2** Summary of residual effects relevant to geology following mitigation during the construction phase are presented in Table 40.

Table 40: Residual effects from Phase 1 construction

| Geological Feature / Issue     | Mitigation Measures   | Residual Impact Significance | Comment  |
|--------------------------------|---|------------------------------|--|
| Drift Geology and Hydrogeology | <p>Creation of geotechnical interpretative report.</p> <p>Detailed Permeability Testing</p> <p>Specification of Foundation Requirements and Earthworks</p> <p>Geotechnical Design</p> | Neutral, Mitigated           | <p>Undertaking these activities will permit appropriate geotechnical assessment and recommendations pertaining to ground conditions and hydrogeology to be made.</p> <p>Appropriate geotechnical design which will permit the mitigation of geo-related risks.</p> |

| Geological Feature / Issue | Mitigation Measures   | Residual Impact Significance | Comment  |
|----------------------------|---|------------------------------|--|
| Contamination              | <p>Undertaking of Contamination Assessment and Development of Revised Conceptual Site Model.</p> <p>Site Waste Management Plan</p> <p>Development of Remediation Statement</p> <p>Undertaking of Remedial and Mitigation Activities.</p> <p>Production of Remediation Verification Report</p> | Neutral, Mitigated           | <p>Contamination Assessment will identify contamination Source –Pathway- Receptor Linkages that require remediation and mitigation measures to be developed and will form the basis of the Remediation Statement.</p> <p>Remediation activities undertaken will require to be documented and recorded in Remediation Verification Report to be submitted to CLO / Building Control for sign off of contamination planning conditions to be signed off.</p> |

## Residual effects from Phase 2 construction and commissioning

- 5.10.3** There are no impacts associated with construction and commissioning that are considered to require mitigation.

## Residual effects from Phase 3 operation and decommissioning of DERL

- 5.10.4** Summary of residual effects relevant to geology following mitigation during the operational and decommissioning phase are presented in Table 41.

Table 41: Residual effects from operation and decommissioning of DERL

| Geological feature / issue | Mitigation measures   | Residual impact significance | Comment   |
|----------------------------|---|------------------------------|---|
| Hydrogeology               | Creation of geotechnical interpretative report.<br><br>Detailed Permeability Testing<br><br>Geotechnical Design<br><br>Design of Groundwater Control System | Neutral, Mitigated           | Undertaking these activities will permit mitigation of risks associated with shallow groundwater in the permanent case.                       |
| Contamination              | Appropriate Site Controls for the production, storage, handling and transportation of contaminative materials produced from the EfW process.                | Neutral, Mitigated           | Development of Site Waste Management Plan in adherence to requirements of Pollution and Prevention Control (PPC) regulations (Scotland 2012). |

## 5.11 Cumulative effects

**5.11.1** No cumulative effects with other developments in the surrounding area have been identified with respect to ground conditions and contamination.

## 5.12 Further work to be undertaken for the ES

**5.12.1** It is considered that there is no additional work to be undertaken in support of the Ground Conditions and Contamination Assessment of the ES.

## 6 Landscape and visual amenity

### 6.1 Introduction

**6.1.1** This section of the ES describes the likely significant effects on landscape character and visual amenity on and within the study area, defined in the methodology.

**6.1.2** This landscape and visual impact assessment (LVIA) considers the landscape and visual effects associated with the full life-cycle of the development proposals, through construction and operation. The LVIA has considered the Proposed Scheme that will be undertaken in Areas A and E (Volume 1, Section 3) only. Mitigation measures, residual effects and any cumulative effects are also considered.

### 6.2 Engagement

**6.2.1** A request for a scoping opinion was prepared and submitted to DCC on 22 September 2015. DCC responded on 13 November 2015, also incorporating comments from SEPA. A summary of the comments relevant to the topic of landscape and visual amenity are provided in Table 42.

Table 42: Summary of the scoping response comments relevant to Landscape and Visual Amenity

| No. | Organisation and date                            | Comment  | Response  |
|-----|--|--|---|
| 1   | Within the Ecology scoping response              | The Environment Impact Assessment should assess the visual and landscape impacts of the Proposed Scheme by determining the value of the existing woodland and tree resource and other landscape features e.g. the Dighty | The value of woodland and tree resource as well as other landscape features has been considered as part of the wider consideration of value undertaken as part of this LVIA.      |
| 2   | Within the Ecology scoping response              | The Environment Impact Assessment should identify measures to avoid, reduce or compensate for negative ecological / landscape and visual impacts.  | Mitigation measures have not been proposed, due to the existing industrialised nature of the site and its surroundings and the limited screening afforded by existing vegetation. |
| 3   | Within the Landscape and Visual scoping response | Representative viewpoints to form a baseline for the Landscape and Visual Impact Assessment have been submitted as:  | Change to location of Viewpoint 4 noted.  |



| No. | Organisation and date | Comment  | Response |
|-----|-----------------------|--|----------|
|     |                       | <p>Viewpoint 1 - Balunie Drive – residential and recreational receptor to the south-west</p> <p>Viewpoint 2 - Dighty Water cycle route – recreational receptors to the south-east</p> <p>Viewpoint 3 - Open space at Traquair Gardens – recreational and residential receptor to the north</p> <p>Viewpoint 4 - Drumsturdy Road/B961 – transport and residential receptor to the north-east</p> <p>Viewpoint 5 - Middleton Farm – long distance view, residential and transport receptor to the north-west</p> <p>Viewpoint 6 - Dundee Law – recreational receptor at designated viewpoint (also Listed Building, War Memorial) to the south-west</p> <p>These have been accepted as reasonable viewpoints, with Viewpoint 4 at Drumsturdy Road being moved slightly to account for potential views from the new cemetery, Pitkerro Grove.</p> |          |

**6.2.2** A separate consultation on viewpoint locations was sent to the Planning Officer in March 2015 and an initial response was received in November 2015 (Volume 3 Section E1).

**6.2.3** Following a visit to site to finalise the viewpoint locations further consultation was undertaken with DCC in January 2016 regarding the exact location of viewpoints and the minimum number of visualisations to be prepared in support of the Proposed Scheme. A response from DCC was received in February 2016 (Volume 3 Section E1). DCC also requested that if night time view was considered to be contentious then it should be illustrated (Volume 3 Section E1). It should be noted that night time lighting would no greater than the present lighting at the exiting DERL facility and as such has not been considered within the assessment.

**6.2.4** Subsequent to agreeing the viewpoint locations with DCC Viewpoint 1 was moved at the client's request. This was agreed with DCC, see Volume 3 Section E1.

## 6.3 Methodology

### Introduction

- 6.3.1** The methodology adopted for the assessment of landscape and visual effects arising from the Proposed Scheme is based on Guidelines for Landscape and Visual Impact Assessment 3rd Edition<sup>32</sup> (GLVIA3).
- 6.3.2** A summary of the methodology for the assessment of landscape and visual effects has been provided within this section with the full methodology provided in Volume 3 Section E2.

### Baseline methodology

- 6.3.3** The existing landscape and visual baseline has been informed by an initial desktop study, including a review of national and local landscape character assessments, datasets and data held by Multi-Agency Geographic Information for the Countryside<sup>33</sup> (MAGIC), Dundee Local Development Plan<sup>34</sup>, Ordnance Survey (OS) data and aerial photography. A local landscape characterisation exercise has been undertaken to inform the assessment.
- 6.3.4** The findings of the preliminary desktop study have been verified in the field during September 2016.
- 6.3.5** A 5km study area was initially agreed with DCC for the consideration of both landscape and visual effects. However, following detailed site work and consultation with DCC, a reduced 2km study area for the assessment of landscape effects was considered appropriate to capture all of the likely significant effects that would arise as a result of the construction and operation of the Proposed Scheme, see Volume 3, Figure 6.1.
- 6.3.6** Zone of Theoretical Visibility (ZTV) plans have been produced, see Section 6.5.27.1, to show the area over which the Proposed Scheme, with and without the stack, would potentially be visible.
- 6.3.7** The ZTV along with desk based study and site work has been used to inform the identification of potential visual receptors and specific viewpoints which have been verified in the field. The viewpoints, which have been used to inform the assessment, have been agreed with DCC.

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<sup>32</sup> Landscape Institute and Institute of Environmental Management & Assessment (2013); Guidelines for Landscape and Visual Impact Assessment 3rd Edition; Routledge; Abingdon.

<sup>33</sup> <http://magic.defra.gov.uk/> accessed 6<sup>th</sup> September 2016

<sup>34</sup> Dundee City Council (December 2013) Dundee Local Development Plan

## Assessment methodology for construction and operational effects

**6.3.8** The assessment of landscape and visual effects are separate, although linked procedures. Landscape effects derive from alterations to the physical landscape, which may give rise to changes in the landscape character, while visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape. The landscape baseline, its analysis and the assessment of landscape effects all contribute to the assessment of visual effects.

**6.3.9** The two principal criteria which have been used to determine the significance of an effect, whether a landscape or visual effect, are:

- The sensitivity of the receptor; and
- The magnitude of change (impact).

### Sensitivity

**6.3.10** An assessment will be made of the sensitivity of the landscape and of visual receptors to the Proposed Scheme, and the magnitude of change caused by the Proposed Scheme.

**6.3.11** The sensitivity of landscape and visual receptors has been determined by reference to the value and susceptibility of the receptor, see Volume 3 Section E2. Attributes which contribute to the sensitivity of landscape and visual receptor are described in Table 43 and Table 44, respectively. The occurrence of any one attribute may be sufficient to determine the sensitivity rating.

Table 43: Landscape sensitivity

| Sensitivity | Typical attributes  |
|-------------|---|
| High        | <p>Is valued at the borough scale or higher;</p> <p>Is a designated landscape at international, national, regional or borough level e.g. World Heritage Site, National Park, Areas of Outstanding Natural Beauty;</p> <p>Is predominantly characterised by landscape components that are rare and distinctive and/or listed;</p> <p>Is designated as a conservation area, registered park and garden or public open space;</p> <p>Has a character that is rare within the assessment area;</p> <p>High importance and rarity which contains rare elements;</p> <p>Susceptible to change; and</p> <p>No or limited scope for substitution or positive enhancement.</p> |
| Medium      | <p>Is locally valued;</p> <p>Has some components that are rare and/or distinctive;</p> <p>Has a character which is common within the assessment area;</p> <p>Moderate importance and rarity with some degraded elements; and</p> <p>Some scope for substitution or positive enhancement.</p>  |

| Sensitivity | Typical attributes   |
|-------------|--|
| Low         | Has limited landscape value;<br>Has few or no distinctive components, or components that detract from the overall character of the site;<br>Has a character that is common within the assessment area;<br>Low importance and rarity with few, if any valued feature;<br>Scope for substitution or positive enhancement; and<br>Low susceptibility to change. |

Table 44: Visual sensitivity

| Sensitivity | Typical description   |
|-------------|---|
| High        | Receptors with key interest in the view such as residential properties, and receptors undertaking recreation including tourists where the view is a key reason for the activity and attention is focused on the surrounding landscape e.g. users of Public Rights of Way and Open Access Land |
| Medium      | Receptors with moderate interest in their environment e.g. outdoor workers, pedestrian users of major movement corridors and people taking part in outdoor sports.  |
| Low         | Receptors with passing or momentary interest in their environment e.g. motorists and office or shop workers. Their attention is generally focused on the activity rather than on the wider landscape.   |

## Magnitude of change

### 6.3.12

The criteria which have been used to guide the assessment of the magnitude of change that would be experienced by landscape and visual receptors are outlined in Table 45 and Table 46, respectively. The occurrence of any one attribute may be sufficient to determine the magnitude of change.

Table 45: Landscape magnitude of change

| Magnitude of change | Definition   |
|---------------------|--|
| High                | Total loss of or major alteration to key characteristics or components of the landscape;<br>Addition of new features or landscape components that would substantially change the existing character of the landscape;<br>and<br>Loss or addition of features that would substantially alter the immediate setting of the landscape receptor. |
| Medium              | Partial loss of or alteration to one or more key characteristics or components of the landscape;   |

| Magnitude of change | Definition   |
|---------------------|--|
|                     | <p>Addition of new features or landscape components that may be prominent, but are largely in character with the landscape; and</p> <p>Loss or addition of features that represent change to part of the immediate setting of a landscape receptor.</p>  |
| Low                 | <p>Fairly small loss or alterations to one or more characteristics or components of the landscape;</p> <p>Addition of new features or components that are in character with the existing landscape; and</p> <p>Loss or addition of features in the wider setting of the landscape receptor.</p>          |
| Negligible          | <p>Very limited loss or alteration of characteristic or landscape components of the landscape character area or setting of surrounding; and</p> <p>Addition of new features or landscape components that are relatively inconspicuous and largely in character with the existing landscape receptor.</p> |

Table 46: Visual magnitude of change

| Magnitude of change | Definition   |
|---------------------|--|
| High                | <p>Total loss of or major alteration to key characteristics of the view from a receptor;</p> <p>Addition of new features or components which would be continuously highly visible and markedly different in character to the existing composition of the view; and</p> <p>Substantial changes in close proximity to the visual receptor, within the direct frame of view.</p>  |
| Medium              | <p>Partial loss of or alteration to one or more key characteristics of the view from a receptor;</p> <p>Addition of new features or landscape components that may be continuously highly visible, but are largely characteristic of the existing view from a receptor;</p> <p>Changes a relatively short distance from a receptor, but viewed as one of a series of components in the middle ground of the view; and</p> <p>Substantial change partially filtered by intervening vegetation and/or built form, or viewed obliquely from the visual receptor.</p> |

| Magnitude of change | Definition   |
|---------------------|--|
| Low                 | <p>Fairly small loss of, or alterations to, one or more characteristics of the view from a receptor;</p> <p>Addition of new features or components that may be continuously or intermittently visible, but are largely characteristic of the existing view from a receptor;</p> <p>Changes within the background of the view, viewed as one of a series of components in the wider panoramic view from a receptor; and</p> <p>Change largely filtered by intervening vegetation and/or built form, or viewed obliquely from the visual receptor.</p> |
| Negligible          | <p>Very limited loss or alteration of inconspicuous characteristics of the view from a receptor;</p> <p>Addition of new features or components that are largely inconspicuous and characteristic of the existing site when viewed from a receptor;</p> <p>Changes within the background of the view, viewed as an inconspicuous element within the wider panoramic view from a receptor; and</p> <p>Change almost entirely obscured by intervening vegetation and/or built form.</p>   |

## Significance criteria

### 6.3.13

The determination of the level of effect that would be experienced by a landscape or visual receptor requires the application of impartial professional judgement to weigh the findings of the sensitivity of a receptor and the magnitude of change that would be experienced. The presence of any combination of factors which contribute to the sensitivity of a receptor or the magnitude of change experienced may be considered when assessing the level of effect. This allows professional judgement to be used when determining the relative importance of different factors, which varies on a site specific basis. Effects may be adverse or beneficial or, in some circumstances, neutral.

#### 6.3.13.1

The broad criteria that influence the level of significance for landscape and visual effects are identified in Table 47 and Table 48, respectively. Any one aspect described may result in a categorisation within that significance level.

Table 47: Significance criteria for assessment of landscape effects

| Significance of effect | Typical description  |
|------------------------|--|
| Major adverse          | At considerable variance with the existing landscape character, degrading its integrity;<br>Permanently degrade, diminish or destroy the integrity of valued characteristic features, elements and /or their setting;<br>Adverse at a national or regional level; and<br>Affects a large proportion of the LCA or its setting. |
| Moderate adverse       | At variance with existing landscape character;<br>Cannot be fully mitigated and may cumulatively amount to a moderate adverse effect;<br>Adverse at a local level; and<br>Affects a part of the LCA or its setting.  |
| Minor adverse          | Slightly at variance with the existing landscape character;<br>Largely mitigated with only small residual adverse effect; and<br>Affects only a small proportion of the LCA or its setting.  |
| Negligible             | Compatible with the existing landscape character; and<br>Affects only a small proportion of the wider setting of a LCA.  |
| Minor beneficial       | Improves and enhances existing landscape character;<br>Restores valued characteristic features partially lost through other land uses; and<br>Enhances a small proportion of the LCA or its setting  |
| Moderate beneficial    | Markedly improves and enhances existing landscape character;<br>Restores valued characteristic features substantially lost through other land uses; and<br>Enhances a part of the LCA or its setting.  |
| Major beneficial       | Considerably and distinctly improves and enhances the existing landscape character;<br>Restores valued characteristic features substantially or entirely lost through other land uses; and<br>Enhances a large proportion of the LCA or its setting.   |

Table 48: Significance criteria for assessment of visual effects

| Significance of effect | Typical description                               |
|------------------------|---|
| Major adverse          | A marked deterioration in the existing view.      |
| Moderate adverse       | A noticeable deterioration in the existing view.  |
| Minor adverse          | A discernable deterioration in the existing view. |

| Significance of effect | Typical description   |
|------------------------|---|
| Negligible             | No perceptible deterioration or improvement in the existing view. |
| Minor beneficial       | A discernable improvement in the existing view.                   |
| Moderate beneficial    | A noticeable improvement in the existing view.                    |
| Major beneficial       | A marked improvement in the existing view.                        |

**6.3.14** For both landscape and visual effects major and moderate effects are considered to constitute a significant effect as these would discernibly alter the character of the area or the existing views

## 6.4 Assumptions and limitations

### Assumptions

**6.4.1** There is currently limited data available regarding the programme for the construction and operational stages of the EfW CHP development. However for the purpose of this assessment it is reasonable to assume that there would be construction activities, such as the erection of buildings and movement of construction plant, including tall cranes as well as the presence of operational buildings at various times and in various locations throughout the area.

**6.4.2** It has been assumed that the following measures will be implemented during the construction phase:

- The construction site and compound area will be well-kept and tidy;
- Construction lighting will be kept to a safe minimum with focused directional lighting to minimise light pollution beyond the boundary of the site;
- Winter working during morning/evening hours will be minimised to reduce the need for lighting;
- No vegetation will be removed as part of development work within parcels A and E considered in this assessment, and
- Provide, and retain throughout the duration of the construction works, suitable protective fencing in accordance with the recommendations in BS5837: Trees in relation to design and construction, to existing trees and other vegetation that are to be retained.

**6.4.3** It has been assumed that there is no landscape planting proposed as part of the development.



- 6.4.4** It has been assumed that the operational lighting of the proposed EfW CHP would be similar to that of the existing DERL facility and will replace the existing DERL facility lighting when the DERL facility is decommissioned. While there will be additional lighting during the construction phase it will be viewed within a wider industrialised setting. As such the lighting during all of the phases considered in this assessment is not considered to be contentious and has not been assessed for individual viewpoints.

## **Limitations**

- 6.4.5** The LVIA has been written based on information made available by the Applicant.
- 6.4.6** The LVIA has considered the Proposed Scheme that will be undertaken in parcels A and E only. It does not consider the impact of the proposed flood storage (parcel B) as this information was not available at the time of assessment.
- 6.4.7** During the baseline survey there were some areas such as private land and residential buildings, which were inaccessible. In these instances professional judgement, which was informed by aerial photography and Ordnance Survey (OS) mapping, and visibility within the surrounding area as identified from the ZTVs and verified in the field, has been used to approximate the view from these visual receptors.
- 6.4.8** The baseline photography and photomontages have been commissioned by the Applicant from TYPOCAD GmbH, Leipzig. The photography is unverified and as such the photomontages which have been generated are considered unverified and are for illustrative purposes only.

## **6.5 Baseline**

- 6.5.1** This section sets out the baseline conditions for the visual assessment in and around the Application Site.

### **The Application Site and surroundings**

- 6.5.2** The site is located within the Baldovie Industrial Estate in Baldovie, a suburb of Dundee situated 5km to the north-west of the city centre. The site is within the valley formed by the Dighty Water.
- 6.5.3** The site boundary includes five parcels of land, including the existing DERL facility building in Area E, refer to Volume 1 Appendix C2. The existing DERL facility comprises four buildings, with a maximum height of approximately 29m. There are two chimney stacks within the existing DERL facility stack, one to the east of approximately 70m height and to a smaller to the west of approximately 20.3m, the stacks are both white with a black top.

- 6.5.4** The proposed EfW CHP would be developed within Area A to the south of the existing DERL facility. The 0.85ha plot of land is currently undeveloped, surfaced with gravel and comprised of a number of spoil heaps, the boundary of the site is formed by high metal fencing. The site is currently accessed from Forties Road that bounds the western boundary of the site. To the south of Area A is a car scrap yard, a similar area to Area A.
- 6.5.5** To the south of the industrial area is the Dighty Water, a well wooded watercourse and recreational route that divides the existing DERL facility and Balunie Trading Estate from the Douglas and Angus housing estate to the south.
- 6.5.6** The immediately surrounding townscape is predominantly industrial in nature, industrial units are separated by expansive areas of scrub, grassland and woodland. The industrialised townscape is dominated by large scale buildings and vertical infrastructure elements, such as chimney stacks and wind turbines that are frequent features within views. Beyond the industrial area the townscape is predominantly residential, comprised of 2-3 storey terraced properties.

### National landscape designations

- 6.5.7** No national landscape designations (such as National Park or National Scenic Areas) apply to the site or its immediate surroundings. The nearest nationally designated landscape is the Cairngorms National Park, approximately 40km to the north of the site.
- 6.5.8** Newnham Paddox is a Grade II Registered Park and Garden is beyond the study area extent, approximately 5km to the north-west.

### Local designations

- 6.5.9** There are no local landscape designations which apply to the Application Site or would be directly impacts upon by the Proposed Scheme.
- 6.5.10** Core Paths in close proximity to the site include:
- The 1E Core Path/ Green Circular, located approximately 100m to the south of Area A, which aligns with Dighty Water. The path can be accessed from Forties Road; and
  - Core Path '37', located approximately 300m to the north of Area A, which runs parallel to Drumgeith Road B961 to the north of the site.
- 6.5.11** Local ecological designation within close proximity to the site include the Dighty Water and Fithie Burn that are designated as Site of Importance for Nature Conservation and Wildlife Corridors under Policy 34 of the Dundee Local Development Framework, located approximately 50m to the south of Area A.

## Landscape character

**6.5.12** Scottish Natural Heritage (SNH) assess the landscape character of Scotland, classifying and mapping what is distinctive about the landscape. The site is within the Dundee urban extent and as such is not assessed. However the northern extent of the study area is within the Tayside Lowland Regional Character Area<sup>35</sup>. This area is broken down into a number of Landscape Character Types (LCT). The study area extends into LCT 13 Dipslope Farmland (Volume 3 Figure 6.4).

**6.5.13** LCT 13 Dipslope Farmland is described as “*one of the most fertile and productive agricultural areas in Scotland, it is not surprising, therefore, that intensive agriculture, is the dominant land use. Field tend to be large and rectangular. Woodland cover is low or even absent in some areas, particularly closest to the coast, creating an open exposed landscape in some places.*”

**6.5.14** Key characteristics of LCT 13 Dipslope Farmland include:

- *Extensive area of land , generally sloping from the north- west to the south- east;*
- *Domination by productive agricultural land;*
- *Low woodland cover, except on large estates and along river corridors;*
- *A variety of historic sites;*
- *Dispersed settlement patter, including some suburban development; and*
- *Limited visual impact of Dundee and Arbroath.*

**6.5.15** In terms of visibility, the assessment states that Dundee is relatively well screened from the landscape to the north due to a ridge line running parallel to the Firth of Tay.

**6.5.16** Guidelines for development and management within LCT 13 Dipslope Farmland as identified in the Tayside Landscape Character Assessment<sup>35</sup> that are relevant to the Proposed Scheme include:

- *Assess any proposals for aerals or masts in terms of their visual and landscape impact; and*
- *Focus new development in existing towns and villages so as to reinforce the historic pattern of settlements.*

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<sup>35</sup> Scottish Natural Heritage No 122 Tayside Landscape Character Assessment, 1999, Land Use Consultants

## County/District landscape character

- 6.5.17** There is limited landscape characterisation at a county level within the study area and surrounding landscape. However a Strategic Landscape Capacity Assessment for Wind Energy in Angus<sup>36</sup> was produced by Scottish Natural Heritage in 2014. The assessment considers *‘the capacity of the Angus landscape to accommodate onshore wind energy development’*. It includes landscape character assessment and review of relevant landscape designations.
- 6.5.18** Within the assessment, the landscape of Angus beyond the urban extent, is described to be *‘characterised by a transition from coastal landscape in the southeast progressing northwest to agricultural lowland and lowland hills, thence to highland landscapes in the northwest that grade into the Cairngorms National Park. The bulk of the population lives in small towns and villages in the lowland and coastal areas, through which the main transport routes pass.’*
- 6.5.19** The assessment identifies a number of discrete LCTs. The study area for this assessment extends into the Dipslope Farmland LCT. The character of the landscape is said to vary from relatively small scale enclosed farmland in shallow valleys to large open arable fields to areas of heather moorland on the highest ground.
- 6.5.20** The Dipslope Farmland LCT is divided into sub-areas, the sub-area ‘Tealin Farmlands’ covers the majority of the landscape within the study area. It is described as: *‘a sub-area in a bowl between the ridge enclosing Dundee in the south and the escarpment of the Sidlaw Hills to the north and west. Close proximity to the urban area means it is more populated with villages and roads and crossed by several electricity transmission lines converging on a major substation. The backdrop of the hills contains and shelters the area from the north and west’*.

## Local Landscape Character Areas

- 6.5.21** As part of this LVIA the study area has been assessed to determine the local landscape character of the area. Six local landscape character areas (LLCAs) have been identified within the study area by means of desktop study and on-site verification, see Volume 3 Figure 6.5. A short description of the defining characteristics of each LLCA is provided here.

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<sup>36</sup> Scottish Natural Heritage (2014) Strategic Landscape Capacity Assessment for Wind Energy in Angus

### LLCA01 Balumbie Dipslope Farmlands

- 6.5.22** A rural undulating landscape, gently increasing in elevation to the north from the edge of Dundee to the Sidlow Hills beyond the study area. A mix of smaller scale field pattern in the Fithie Burn and Dighty Water valleys to medium scale open arable fields beyond. Due to the southern facing aspect of the dipslope, frequent views are available towards the urban extent of Dundee, reducing levels of perceived ruralness. The golf course to the west of Burnside of Duntree is within this LLCA, due to its open nature and proximity to surrounding rural landscape

### LLCA02 Whitfield Dipslope Residential

- 6.5.23** A residential area to the north-east of Dundee of varied housing character, located on the south facing valley of the Firth of Tay. Within the Finella Gardens estate to the west of the LLCA, housing is characterised by two storey terraced housing predominantly constructed of concrete and pebble dash or wooded cladding. Newer estates, scattered within open amenity grassland to the centre of the LLCA and to the west are generally semi-detached on larger plots with gardens. Burnside of Duntrune, to the north-west, is detached from the main settlement edge and sheltered due to its location within the wooded Fithie Burn valley. This LLCA has views to the north and the west to the rural landscape of LLCA 01.

### LLCA03 Dighty Industrial Valley Floor

- 6.5.24** The industrial areas of West Pitkerro and Baldovie are located adjacent to the convergence of Fithie Burn and Dighty Water. The LLCA is characterised by large manufacturing and waste processing units, interspersed within areas of grassland, scrub and woodland. The skyline is dominated by vertical detracting elements such as chimneys and wind turbines, characterising the LLCA within the wider landscape/townscape. The LLCA generally has an enclosed nature due to industrial units and extensive areas of vegetation.

### LLCA04 Dighty River Corridor

- 6.5.25** This LLCA is designated for its ecological value due to areas of semi natural habitat including watercourse, woodland and grassland within the floodplain of the Dighty Water and Fithie Burn. Along with its ecological value, the LLCA provides a recreational resource to walkers on the Green Circular path. It is valued due to the distinct change of character in relation to the surrounding urban and industrial townscape. The moderate levels of tranquillity that are afforded within this narrow LLCA are frequently intruded upon by adjoining industrial and urban features within LLCA02 and LLCA03.

### LLCA05 Firth of Tay Residential

- 6.5.26** A residential area of mixed character to the south of LLCA03, sloping to the south to the Firth of Tay. To the north housing is higher density and predominantly constructed of concrete and pebble dash whereas to the south housing is lower density and generally comprised of well-maintained semi-detached properties. The West Ferry and Grove conservation area bound the edge of the Firth of Tay, forming a historic and distinctive character.

### LLCA06 Port of Dundee

- 6.5.27** A heavily industrialised area along the north bank of the Firth of Tay. The area is characterised by large scale industrial buildings and infrastructure, and large areas of hardstanding. There is little planting throughout the LLCA with vegetation frequently only occurring at the perimeter of a development plot. LLCA06 only extends a little way into the study area.

## **Viewpoints**

- 6.5.27.1** Two separate ZTV maps have been produced to use as a basis for the visual assessment; one for the proposed buildings (excluding the stack) and one for the buildings and full height of the stack, see Volume 3 Figures 6.4 and 6.5. These show the area in which the structures would theoretically be visible, allowing for topography, intervening structures and large scale blocks of woodland as recorded on the National Woodland Inventory.
- 6.5.28** Six viewpoints have been identified from desk based study and have been verified in the field and agreed with the council, see Table 49 and Figure 6.6.

Table 49: Viewpoints

| Viewpoint  | Baseline description   |
|--|--|
| <p>1: Balunie Drive, Douglas and Angus</p> <p>See Volume 3 Section E5, Figures E5.1 – 5.3 (winter) and E5.4 – E5.6 (summer)</p>            | <p>This viewpoint is located to the south of the site boundary on Balunie Road. The view is looking in a northerly direction. The foreground of the view is comprised of Balunie Drive, grass verges on the road side and metal fencing which aligns the Balumbiefield Trading Estate. The midground is formed by the industrial units and scrubland within the trading estate and semi-mature vegetation which lines Dighty Water.</p> <p>The wind turbines within the adjacent Michelin facility, along with the chimney stacks within the existing DERL facility, are prominent features within the industrial skyline.</p> <p>Receptors: Residential (to the SE) and transport along Balunie Drive</p>   |
| <p>2: Dighty Water, Core Path 1E/ Green Circular</p> <p>See Volume 3 Section E5, Figures E5.7 – 5.9 (winter) and E5.10 – 5.12 (summer)</p> | <p>This viewpoint is located to the south-east of the site boundary on Core Path 1E Dundee Green Circular, which runs parallel with Dighty Water. The view is looking in a north-westerly direction.</p> <p>High metal fencing and concrete posts bounding the path filters views to the site, the existing DERL facility and chimney stacks are visible within the mid- background of the view forming the skyline of the view. Trees along Dighty Water and to the south of the site partially screen the existing DERL facility.</p> <p>Receptors: Recreational- walkers and cyclists using the Core Path.</p>  |
| <p>3: Open space at Traquair Gardens</p> <p>See Volume 3 Section E5, Figures E5.13 – 5.15 (winter) and E5.16 -5.18 (summer)</p>            | <p>This viewpoint is located to the north-west of the site boundary, situated within the open space between Traquair Gardens and Carradale Drive. The view is looking in a southerly direction.</p> <p>Views towards the site are obstructed by semi-detached residential properties along Peebles Drive, garden vegetation and belt of semi-mature trees aligning B961 Drumgeith Road and Dighty Water within the valley floor.</p> <p>The chimney stacks within the existing DERL facility and wind turbines within the Michelin Tyre manufacturing plant form prominent features within mid-ground of the view.</p> <p>The back ground of the view is comprised of steeply rising pastoral landscape on the adjacent side of the River Tay.</p> <p>Receptors: Residential -Peebles Drive and recreational – people using the open space</p> |

| Viewpoint  | Baseline description  |
|--|---|
| <p>4: Core Path 23A</p> <p>See Volume 3 Section E5, Figures E5.19 – E5.21 (winter) and E5.22 – 5.24 (summer)</p>                           | <p>This viewpoint is located to the north-east of the site boundary, situated on Core Path 23A. The view is looking in a south-westerly direction. Vegetation bounding Fithie Water filter long distance views of the buildings within existing DERL facility. The two DERL chimney stacks, along with the wind turbines and chimneys within the Michelin facility, are highly visible features within the view.</p> <p>The background of the view is formed by the rising wooded slopes of Scotsraig on the adjacent side of the River Tay. Scaffolding within the Port is visible and the Dundee Law.</p> <p>Receptors: Recreational – walkers using the Core Path</p>  |
| <p>5: Middleton Farm, Barns of Wedderburn</p> <p>See Volume 3 Section E5, Figures E5.25 – 5.27 (winter) and E5. 28 – 5.30 (summer)</p>     | <p>This viewpoint is located adjacent to Middleton Farm, Barns of Wedderburn. The view is looking in a south-easterly direction. Long range towards the existing DERL facility are filtered by intervening belts of woodland surrounding Braeview Academy, though the 70m high chimney stack is visible, though barely perceptible amongst many other vertical industrial features within the view.</p> <p>Open views are available towards the wind turbines within the Michelin facility which form prominent features within the view.</p> <p>The background of the view is comprised of views across West Ferry and the River Tay estuary and Tentsmuir Forest on the horizon.</p> <p>Receptors: Residential at Middleton Farm.</p> |
| <p>6: Dundee Law, Law Road (Scheduled Monument)</p> <p>See Volume 3 Section E5, Figures E5.31 – 5.33 (winter) and E5.34 -5.36 (summer)</p> | <p>This viewpoint is located to the south-west of the site boundary, situated on Dundee Law (Grade B listed building/ scheduled monument, facing to the north-east. The elevated nature of the viewpoint, allows wide and open panoramic views of Dundee and the surrounding landscape. Views towards the site are mostly obstructed by built form within the view. The existing DERL facility is situated within the wider industrial landscape of the city and is viewed in context.</p> <p>Receptors: Recreational</p>   |

## 6.6 Potential effects and good environmental design management

**6.6.1** The project is described in Volume 1 of the ES. The elements of the project relevant to this LVIA are set out here.



## Construction

**6.6.2** The specific construction works which may give rise to temporary effects on visual receptors are listed here, with the activities likely to give rise to the most substantial effects described first:

- Presence of hoardings;
- Provision of site offices, storage of construction materials, plant and machinery;
- Provision of new access points into the existing DERL facility;
- Construction and demolition activities;
- Formation of the building shell, including scaffolding;
- Presence of existing DERL facility and proposed EfW CHP facility side by side during the transition stage (Stage 2); and
- Use of construction plant activity including tall cranes.

**6.6.3** Measures contained in the CEMP relevant to the visual assessment include:

- Protection of any trees which may be affected by the proposals in line with BS5837: 'Trees in relation to design, demolition and construction': any works to trees or felling would be carried out in accordance with BS 3998: Tree work – Recommendations;
- Maintenance of adequate fencing and hoardings to an acceptable condition and to provide screening where required;
- Well-ordered site and construction working areas, including location of stockpiles away from sensitive receptors where practicable;
- Siting plant away from site boundaries and potential sensitive receptors, where practicable; and
- Keeping lighting of the construction site to the minimum necessary to enable safety and security.

## Operation

**6.6.4** The proposed EfW CHP would be sited adjacent to the existing DERL facility. The specific components of the Project which may give rise to effects on visual receptors are:

- The physical presence, massing and height of the proposed EfW CHP building and stack; and
- An increase in vehicle movements along Forties Road and Drumgeith Road.

## 6.7 Assessment – Sensitivity of receptors

### Sensitivity of landscape

#### LLCA01 Balumbie Dipslope Farmlands

- 6.7.1** The undeveloped and open nature of this LLCA is considered to result in this LLCA having a medium susceptibility to the type of development proposed, in part due to vertical industrial features within LLCA 03 being prevalent within the landscape. The local value and medium susceptibility of LLCA 04 are judged to result in a medium sensitivity for this LLCA.

#### LLCA02 Whitfield Dipslope Residential

- 6.7.2** The developed nature of LLCA02 is considered to result in this LLCA having a medium susceptibility to the type of development proposed, frequent industrial features within the wider townscape reduce the susceptibility of the LLCA to this type of development. The local value and medium susceptibility are judged to have an overall medium sensitivity for this LLCA.

#### LLCA03 Dighty Industrial Valley Floor

- 6.7.3** The heavily man modified nature of LLCA03 is considered to result in this LLCA having a low susceptibility to the type of development proposed. The limited value and low susceptibility of LLCA03 are judged to result in a low sensitivity for this LLCA.

#### LLCA04 Dighty River Corridor

- 6.7.4** While this LLCA has a generally undeveloped character it is considered to have a medium susceptibility to the type of development due to surrounding industrial and urban development, though its character is rare within the townscape. The local value and medium susceptibility are judged to have an overall medium sensitivity for this LLCA.

#### LLCA05 Firth of Tay Residential

- 6.7.5** The developed nature of LLCA05 is considered to result in this LLCA having a medium susceptibility to the type of development proposed, frequent industrial features within the wider townscape reduce the susceptibility of the LLCA to this type of development. The local value and medium susceptibility are judged to have an overall medium sensitivity for this LLCA.

#### LLCA06 Port of Dundee

- 6.7.6** The heavily man modified nature of LLCA06 is considered to result in this LLCA having a low susceptibility to the type of development proposed. The limited value and medium susceptibility are judged to have an overall low sensitivity for this LLCA.

## Visual

### Viewpoint 1: Balunie Drive, Douglas and Angus

- 6.7.7** Residential receptors located on Balunie Drive are the closest residential receptors to the proposed site. These receptors are considered to experience locally valued views of the surrounding townscape, though views are degraded by large industrial units and wind turbines within the Baluniefield, Baldovie and West Pitkerro Industrial Estates, resulting in a medium susceptibility to change. As such residential receptors at Viewpoint 1 are considered to have a medium sensitivity.

### Viewpoint 2: Core Path 1E/ Green Circular, Dighty Water

- 6.7.8** Recreational receptors using the Green Circular path are considered to experience locally valued views of the surrounding townscape as part of their recreational experience. The frequency of existing industrial elements within the view results in a medium susceptibility to change. As such recreational receptors at Viewpoint 2 are considered to have medium sensitivity.

### Viewpoint 3: Open space at Tranquair Gardens, Ballumbie

- 6.7.9** Residential receptors located on Peebles drive and recreational users of the open space between Tranquair Gardens and Caradale Drive are considered to have experience valued views of the surrounding townscape at a local level. However, views are frequently degraded by wind turbines and chimney stacks within the West Pitkerro and Balunie Industrial Estates, therefore they are considered to have a medium susceptibility to change. As such residential receptors at Viewpoint 3 are considered to have medium sensitivity.

### Viewpoint 4: Core Path 23A

- 6.7.10** Recreational receptors using the Core Path 23A are considered to experience valued views of the landscape at the local level as part of their recreational experience. However, views are degraded by large industrial units, chimney stacks and wind turbines within the industrial estates, resulting in a medium susceptibility to change. As such recreational receptors at Viewpoint 4 are considered to have medium sensitivity.

### Viewpoint 5: Middleton Farm, Barns of Wedderburn

- 6.7.11** Residential receptors at Middleton Farm are considered to experience locally valued long distance views across the mouth of the River Tay. Frequent industrial buildings and vertical infrastructural elements within the view result in a medium susceptibility to change. As such residential receptors at viewpoint five are considered to have medium sensitivity.

### Viewpoint 6: Dundee Law, Law Road

- 6.7.12** Recreational receptors at Dundee Law are considered to experience valued panoramic views at a regional scale at this recognised vista. These receptors are considered to have a high susceptibility to change as their attention is likely to be largely focussed on the surrounding landscape. As such recreational receptors at Viewpoint 6 are considered to have high sensitivity.

### **Summary of sensitivity**

- 6.7.13** A summary of the sensitivity of the individual landscape and visual receptors is provided in Table 50.

Table 50: Summary of landscape and visual sensitivity

| Receptor  | Value    | Susceptibility | Sensitivity |
|---|----------|----------------|-------------|
| LLCA01 Balumbie Dipslope Farmlands                      | Local    | Medium         | Medium      |
| LLCA02 Whitfield Dipslope Residential                   | Local    | Medium         | Medium      |
| LLCA03 Dighty Industrial Valley Floor                   | Limited  | Low            | Low         |
| LLCA04 Dighty River Corridor                            | Local    | Medium         | Medium      |
| LLCA05 Firth of Tay Residential                         | Local    | Medium         | Medium      |
| LLCA06 Port of Dundee                                   | Limited  | Low            | Low         |
| Viewpoint 1: Balunie Drive, Douglas and Angus           | Local    | Medium         | Medium      |
| Viewpoint 2: Core Path 1E/ Green Circular               | Local    | Medium         | Medium      |
| Viewpoint 3: Open space at Tranquair Gardens, Ballumbie | Local    | Medium         | Medium      |
| Viewpoint 4: Core Path 23A                              | Local    | Medium         | Medium      |
| Viewpoint 5: Middleton Farm, Barns and Wedderburn       | Local    | Medium         | Medium      |
| Viewpoint 6: Dundee Law, Law Road                       | Regional | High           | High        |

## 6.8 Assessment – Construction

- 6.8.1 The main changes to the landscape and visual amenity during the construction phase would be the presence of construction machinery and associated construction activities. The existing DERL facility would be visible and operational whilst the EfW CHP is being constructed. The construction work would take place over approximately three years, in which all groundwork's, excavations, piling, construction of buildings, ancillary equipment and construction of chimney would occur.

### Landscape

#### LLCA01 Balumbie Dipslope Farmlands

- 6.8.2 The construction activities at the Proposed Scheme site would not directly impact on this LLCA. Although there would be some visibility from this landscape of the works, it would be unlikely to affect the existing industrialised setting of the LLCA. This would be a relatively small scale change and would be temporary in nature. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.

- 6.8.3 The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a Minor adverse effect.

#### LLCA02 Whitfield Dipslope Residential

- 6.8.4 The construction activities at the Proposed Scheme site would not directly impact on this LLCA though there would be some visibility from this LLCA of the works, however it would be in the context of the existing industrialised setting of the LLCA. This would be a relatively small scale change and would be temporary in nature. Overall, the magnitude of change that would occur is judged to be low and adverse in nature.

- 6.8.5 The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

#### LLCA03 Dighty Industrial Valley Floor

- 6.8.6 The Proposed Scheme site is located within this LLCA. The construction works would be in the context of the existing industrial townscape character of the LLCA. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.

- 6.8.7 The low sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

#### LLCA04 Dighty River Corridor

- 6.8.8** The Proposed Scheme site boundary directly abuts this LLCA. The construction activities associated with the Proposed Scheme would only influence a small proportion of the overall LLCA, the setting of which is heavily industrial in nature. As such, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.
- 6.8.9** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a Minor adverse effect.

#### LLCA05 Firth of Tay Residential

- 6.8.10** The construction activities at the Proposed Scheme site would not directly impact on this LLCA. Although there would be some visibility from this LLCA of the works, it would be in the context of the existing industrialised setting of the LLCA. This would be a relatively small scale change and would be temporary in nature. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.
- 6.8.11** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

#### LLCA06 Port of Dundee

- 6.8.12** The construction activities at the Proposed Scheme would not be visible from this LLCA and therefore would not impact on the setting of the LLCA. As such the magnitude of change that would occur is judged to be negligible.
- 6.8.13** The low sensitivity of this LLCA considered alongside the negligible magnitude of change would result in a **Negligible** effect.

### **Visual**

#### Viewpoint 1: Balunie Drive, Douglas and Angus

- 6.8.14** Residences to the south of Balunie Drive, that are orientated to the north, would have open views of mid- upper levels of construction works. Lower elements of construction activities would be screened by industrial units in the mid-ground and vegetation that aligns Dighty Water to the south of site. However, activities such as the use of lifting cranes and the construction of the buildings and chimney stacks would be visible. The construction works would be seen in the context of the surrounding industrial estate.
- 6.8.15** Overall, the magnitude of change that would occur is judged to be medium. These impacts are considered to be adverse and temporary in nature.

- 6.8.16** The medium sensitivity of the receptors at this viewpoint considered alongside the medium magnitude of change would result a **Moderate adverse** effect.

Viewpoint 2: Core Path 1E/ Green Circular

- 6.8.17** Recreational receptors on the Green Circular path would experience mid-long distance view of construction works. Views towards the construction works would be filtered by mesh perimeter fencing in the foreground. Mid- upper levels of construction activity would be visible such as the use of lifting cranes and the construction of the buildings and chimney stacks. Lower elements of construction activities would be screened by the scrap yard, fencing and trees to the south of the site, if retained. The construction works would be viewed in combination with the existing DERL facility.

- 6.8.18** Overall, the magnitude of change that would occur is judged to be medium. These impacts are considered to be adverse and temporary in nature.

- 6.8.19** The medium sensitivity of the receptors at this viewpoint considered alongside the medium magnitude of change would result a **Moderate adverse** effect.

Viewpoint 3: Open space at Tranquair Gardens, Ballumbie

- 6.8.20** There would be intermittent views of the upper levels of construction works within views from recreational users in this public open space. The viewpoint is in an elevated location, therefore low- mid levels of construction would be obscured by intervening built form and vegetation lower on the valley side.

- 6.8.21** Higher elements of construction works, such as the use of cranes involved with the construction of the proposed Fuel Bunker, Boiler House and Flue Gas Cleaning buildings and chimney stack would be visible, viewed in combination with the existing DERL chimney stack and turbines within the view. Nearby residential receptors may experience views of the upper levels of construction from first floor windows, though predominantly obscured by built form in the foreground. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.

- 6.8.22** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

Viewpoint 4: Core Path 23A

- 6.8.23** There would be views of the mid – upper levels of construction works within views from recreational users on this path. The viewpoint is located on an elevated location on the valley side, therefore woodland within the view would form a screening function of the works on the



lower lying proposal site. The construction of the proposed Fuel Bunker, Boiler House and Flue Gas Cleaning buildings and chimney stack would be visible above the canopy of intervening woodland. These construction activities would be viewed in combination with the existing DERL chimney stack and turbines within the view. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.

- 6.8.24** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

#### Viewpoint 5: Middleton Farm, Barns of Wedderburn

- 6.8.25** Upper levels of construction works would be apparent within views from Middleton Farm. The viewpoint is located on an elevated location on the valley side, therefore woodland within the view would form a screening function of the works on the lower lying proposal site. The upper levels of the construction of the proposed Fuel Bunker, Boiler House and Flue Gas Cleaning buildings and chimney stacks would be visible above the canopy of intervening woodland. These construction activities would be viewed in combination with the existing DERL chimney stack and large industrial buildings and turbines within the West Pitkerro Industrial Estate. Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.

- 6.8.26** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

#### Viewpoint 6: Dundee Law, Law Road

- 6.8.27** There would be long range views of the construction works within elevated views from the Dundee Law. Mid- upper levels of construction works such as the use of cranes would be visible, however the works would be a small element within a wide and open panoramic view across Dundee and River Tay. Additionally, construction activities would be seen in the context of the surrounding large industrial units, chimney stacks and wind turbines, and would therefore not be incongruous within the view.
- 6.8.28** Overall, the magnitude of change that would occur is judged to be low. These impacts are considered to be adverse and temporary in nature.
- 6.8.29** The high sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.



## 6.9 Assessment – Construction and commissioning (switching)

- 6.9.1** This phase involves the transition stage between the shutting down of the existing DERL facility and the start-up of the EfW CHP. There will be minor construction activities taking place, such as finishing works to roads and hardstanding, site landscaping works and internal works.
- 6.9.2** While these elements will be visible during this phase it is not considered that they would elevate the landscape and visual effects above those identified for Phase 3: Operation of proposed EfW CHP facility and decommissioning of the existing DERL facility. This is because it is considered that the main factor influencing the magnitude of change and resulting significance of effect in terms of both landscape and visual amenity is the presence of the proposed EfW CHP facility.

## 6.10 Assessment – Operation of the proposed EfW CHP facility and decommissioning of the existing DERL facility

- 6.10.1** This section considers the landscape and visual effects that would arise as a result of the completed (i.e. fully operational) development. These effects would be brought about predominantly by the presence of the buildings and associated infrastructure, and vehicle movements on the site. The existing DERL facility is to be retained but will not working, while the proposed EfW CHP facility will be fully operational. There are no plans for the demolition of the existing DERL facility within the scope of this application.

### Landscape

#### LLCA01 Balumbie Dipslope Farmlands

- 6.10.2** The operation of the EfW CHP and decommissioning of the existing DERL facility would not directly impact on this LLCA. While there would be some visibility of both facilities from this landscape, it would not noticeably affect the existing industrialised setting of the LLCA. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.3** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

#### LLCA02 Whitfield Dipslope Residential

- 6.10.4** The operation of the EfW CHP would not directly impact on this LLCA although the Proposed Scheme would be visible and would increase the existing industrial setting of the LLCA, particularly in

proximity to LLCA03. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.5** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

LLCA03 Dighty Industrial Valley Floor

- 6.10.6** The Proposed Scheme site is located within this LLCA. The Proposed Scheme would only impact a small proportion of the overall LLCA and would relate well to the heavily industrialised nature of the LLCA. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.7** The low sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

LLCA04 Dighty River Corridor

- 6.10.8** The Proposed Scheme site boundary is in close proximity to this LLCA. The operation of the proposed EfW CHP and decommissioning of the existing DERL facility would only influence a small proportion of the overall LLCA, the setting of which is heavily industrial in nature. As such, the magnitude of change that would occur is judged to be low.

- 6.10.9** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

LLCA05 Firth of Tay Residential

- 6.10.10** The operation of the EfW CHP and decommissioning of the existing DERL facility would not directly impact on this LLCA. However the Proposed Scheme would be visible and would increase the existing industrial setting of the LLCA, particularly in close proximity to LLCA03. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.11** The medium sensitivity of this LLCA considered alongside the low magnitude of change would result in a **Minor adverse** effect.

LLCA06 Port of Dundee

- 6.10.12** The Proposed Scheme would not be visible from this LLCA and therefore would not impact on the setting of the LLCA. As such the magnitude of change that would occur is judged to be negligible.

- 6.10.13** The low sensitivity of this LLCA considered alongside the negligible magnitude of change would result in a **Negligible** effect.

## Visual

### Viewpoint 1: Balunie Drive, Douglas and Angus

- 6.10.14** Residences to the south of Balunie Drive, that are orientated to the north, would have open views of the proposed EfW CHP, see Volume 3 Section E5, Figures E5.2, E5.3, E5.5 and E5.6. Some limited screening of views would be afforded by industrial units in the midground and vegetation that flanks Dighty Water to the south of site. However, the Boiler House, Fuel Bunker and the chimney stack associated with the Proposed Scheme would be highly visible and would obstruct views of the exiting DERL facility beyond.
- 6.10.15** The proposed EfW CHP would be viewed as part of the surrounding industrial area and would therefore not be uncharacteristic of the view; however it would obstruct some views north towards the rising landscape of Barns of Wedderburn from this residential area. Overall the magnitude of change that would occur is judged to be medium.
- 6.10.16** The medium sensitivity of the receptors at this viewpoint considered alongside the medium magnitude of change would result a **Moderate adverse** effect.

### Viewpoint 2: Core Path 1E/ Green Circular, Dighty Water

- 6.10.17** Recreational receptors on the Green Circular path would experience mid- long distance views of the proposed EfW CHP, partially filtered by mesh perimeter fencing in the foreground and by trees lining the Dighty Water and vegetation to the south of the site, see Volume 3 Section E5, E5.8, E5.9, E5.11 and E5.12 The Boiler House, Fuel Bunker and the chimney stack associated with the Proposed Scheme would be highly visible and would obstruct views of the exiting DERL facility beyond. The proposed EfW CHP would be viewed as part of the surrounding industrial area and would therefore not be uncharacteristic of the view. Overall, the magnitude of change that would occur is judged to be medium.
- 6.10.18** The medium sensitivity of the receptors at this viewpoint considered alongside the medium magnitude of change would result a **Moderate adverse** effect.

### Viewpoint 3: Open space at Tranquair Gardens, Ballumbie

- 6.10.19** There would be views of the upper levels of the buildings and the chimney stack associated with the proposed EfW CHP within views from recreational users in this public open space, see Volume 3 Section E5, Figures E5.14, E5.15, E5.17 and E5.18. The viewpoint is in an elevated location and low-mid levels the proposed EfW CHP would be obscured by intervening built form and vegetation lower on the valley side.
- 6.10.20** It is anticipated that the tops of the proposed Boiler House, Fuel Bunker and Flue Gas Cleaning buildings along with the mid- upper

levels of the chimney stack would be visible above the roofs of the intervening residential area. The proposed buildings would obscure some long distance views to rising land on the opposite side of the Firth of Tay. The EfW CHP would be viewed as part of the surrounding industrial area including the retained DERL facility, existing chimney stacks, and wind turbines and would therefore not be uncharacteristic of the view. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.21** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

#### Viewpoint 4: Core Path 23A

- 6.10.22** There would be mid-long distance views of the new buildings and chimney stack within the proposed EfW CHP, see Volume 3 Section E5, Figures E5.20, E5.21, E5.33 and E5.24. Lower elements within the proposed EfW CHP would be obscured by intervening woodland. It is anticipated that the mid-upper levels of the proposed Boiler House, Fuel Bunker and Flue Gas Cleaning buildings along with the chimney stack would be visible above the canopy of intervening woodland.

- 6.10.23** The new buildings and chimney stack associated with the proposed EfW CHP would be apparent to users of the Core Path, however this would be viewed in the context of the surrounding industrial built form including the retained DERL facility. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.24** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

#### Viewpoint 5: Middleton Farm, Barns of Wedderburn

- 6.10.25** There would be long distance views of the upper levels of new buildings and chimney stack within the proposed EfW CHP within views from receptors at Middleton Farm, see Volume 5 Section E5, Figures E5.26, E5.27, E5.39 and E5.30. The lower level views of the proposed EfW CHP would be obstructed by vegetation and built form, particularly the woodland to the north of the industrial estate that bounds the Drumgeith Road. It is anticipated that the mid-upper levels of the proposed Boiler House, Fuel Bunker and Flue Gas Cleaning buildings along with the chimney stack would be visible above the canopy of intervening woodland. However the proposed EfW CHP would be viewed in the context of the surrounding industrial built form including the retained DERL facility. Overall, the magnitude of change that would occur is judged to be low.

- 6.10.26** The medium sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

Viewpoint 6: Dundee Law, Law Road

- 6.10.27** There would be long range views of the upper levels of the new buildings and chimney stack within the proposed EfW CHP within elevated views from the Dundee Law, see Volume 3 Section E5, Figures E5.32, E5.33, E5.35 and E5.36. The lower levels of the proposed EfW CHP would be obstructed by vegetation and built form within the view. The proposed buildings and chimney stack would become small elements within this wide and open panoramic view across Dundee and River Tay.
- 6.10.28** Additionally, the proposed EfW CHP would be seen in the context of the surrounding large industrial units including the retained DERL facility, chimney stacks and wind turbines, and would therefore not be incongruous within this long distance view. Overall, the magnitude of change that would occur is judged to be low.
- 6.10.29** The high sensitivity of the receptors at this viewpoint considered alongside the low magnitude of change would result a **Minor adverse** effect.

## **6.11 Supplementary mitigation**

- 6.11.1** No supplementary mitigation measures have been proposed with respect to effects from Phase 1: Construction, Phase 2: Construction and commissioning (switching) and Phase 3: Operation of proposed EfW CHP facility and decommissioning of the existing DERL facility.

## **6.12 Residual effects**

- 6.12.1** As no supplementary mitigation measures are proposed, the residual effects remain as described in Sections 6.8, 6.9 and 6.10.

## **6.13 Cumulative effects**

- 6.13.1** A list of six developments for consideration within the ES has been identified, as described in Volume 1 Appendix J. Of these developments only three are considered to potentially result in cumulative landscape or visual effects in conjunction with the Proposed Scheme, see Table 51.

Table 51: Cumulative development considered in the LVIA

| Development   | Justification for including/excluding from cumulative LVIA   |
|---|--|
| Land At Aberlady Crescent<br>(Ref: 15/00257/FULL)   | This site is located approximately 0.8km to the east of the development site and would not be discernable from the wider townscape when viewed from the viewpoints considered in the LVIA.<br><br>This development is therefore not considered within the cumulative assessment.   |
| Land To North Of Whitfield Terrace And East of Whitfield Loan<br>(Ref: 15/00120/FULL)             | This site is located 1km to the north-west of the development site and is unlikely to be visible in conjunction with the Proposed Scheme from any of the viewpoints considered within the LVIA.<br><br>This development is therefore not considered within the cumulative assessment.  |
| St Pius RC Primary School<br>(Ref: 15/00148/FULL)   | This site is located in approximately 1km to the south-west boundary of the Proposed Scheme site and would not be discernable from the wider the viewpoints considered in the LVIA.<br><br>This development is therefore not considered within the cumulative assessment.  |
| Land to North Of Drumgeith Road And West Of Summerfield Avenue                                    |  |
| Phase 1 of land to North Of Drumgeith Road And West Of Summerfield Avenue<br>(Ref: 14/00086/FULL) | The three phases within this residential development are within separate planning applications, however they have been considered as one within this assessment.<br><br>The development is located 0.5km to the north-west of the Proposed Scheme, construction works may be visible conjunction with the Proposed Scheme site from several viewpoints considered in the LVIA. |
| Phase 2 of Land To North Of Drumgeith Road And West Of Summerfield Avenue<br>(Ref: 15/00442/FULL) |  |
| Phase 3 Land To North Of Drumgeith Road And West Of Summerfield Avenue (Ref: 16/00536/FULL)       |  |

### 6.13.2

Effects on LLCAs 01- 06 have not been discussed in this section as it is not considered that the cumulative effect of all developments listed in Table 51 during either the construction phase or the operational

phase, would significantly modify the characteristics of these areas due to the type and scale proposed.

### Cumulative visual effects from construction

Viewpoint 1: Balunie Drive, Douglas and Angus; Viewpoint 2: Core Path 1E/ Green Circular, Dighty Water; Viewpoint 3: Open space at Tranquair Gardens, Ballumbie; Viewpoint 4 Core Path 23A; and Viewpoint 5: Middleton Farm, Barns of Wedderburn

- 6.13.3** It is anticipated that none of the committed developments at construction would be visible in conjunction with views of the construction of the proposed EfW CHP from Viewpoints 1 - 5, as such this would not result in a raise in the level of effects identified in Section 6.8.

Viewpoint 6: Dundee Law, Law Road

- 6.13.4** It is anticipated that due to the elevated nature of viewpoint 6 that construction activities associated with the proposed residential development at the Land to North of Drumgeith Road would be visible from this location. However, given the separation distance between Viewpoint 6 and the developments, and the urbanised setting of the developments, it is considered that the level of effects identified in Section 6.8 would not be elevated.

### Cumulative visual effects from operation

Viewpoint 1: Balunie Drive, Douglas and Angus; Viewpoint 2: Core Path 1E/ Green Circular, Dighty Water; Viewpoint 3: Open space at Tranquair Gardens, Ballumbie; Viewpoint 4 Core Path 23A; and Viewpoint 5: Middleton Farm, Barns of Wedderburn

- 6.13.5** It is anticipated that none of the operational committed developments would be visible in conjunction with views of the proposed EfW from Viewpoints 1 - 5, as such this would not result in a raise in the level of effects identified in Section 6.10.

Viewpoint 6: Dundee Law, Law Road

- 6.13.6** It is anticipated that due to the elevated nature of Viewpoint 6 that the proposed residential development at the Land to North of Drumgeith Road would be visible from this location. However, given the separation distance between Viewpoint 6 and the developments, and the urbanised setting of the developments this would not result in a raise in the level of effects identified in Section 6.10.



## 6.14 Assessment summary

### Assessment – Phase 1: Construction

Table 52: Assessment summary - Construction

| Landscape and Visual Amenity - Construction |  |                          |  |
|---|--|--------------------------|--|
| Receptor                                    | Description of effect and significance   | Supplementary mitigation | Residual effects summary                     |
| LLCA01 Balumbie Dipslope Farmlands          | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> | None proposed            | Effects unchanged.<br><b>Not significant</b> |
| LLCA02 Whitfield Dipslope Residential       | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA03 Dighty Industrial Valley Floor       | Direct impact on this LLCA resulting in a Minor adverse effect.<br><b>Not significant.</b>               |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA04 Dighty River Corridor                | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA05 Firth of Tay Residential             | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.                           |                          | Effects unchanged.<br><b>Not significant</b> |



| Landscape and Visual Amenity - Construction             |   |                          |  |
|---|---|--------------------------|--|
| Receptor  | Description of effect and significance  | Supplementary mitigation | Residual effects summary                     |
|   | <b>Not significant</b>  |                          |  |
| LLCA06 Port of Dundee                                   | No impact on the setting of the LLCA resulting in a Negligible effect.<br><b>Not significant</b>  |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 1: Balunie Drive, Douglas and Angus           | Views of the construction activities associated with the Proposed Scheme resulting in a Moderate adverse effect.<br><b>Significant</b>  |                          | Effects unchanged.<br><b>Significant</b>     |
| Viewpoint 2: Core Path 1E/ Green Circular               | Views of the construction activities associated with the Proposed Scheme resulting in a Moderate adverse effect.<br><b>Significant</b>  |                          | Effects unchanged.<br><b>Significant</b>     |
| Viewpoint 3: Open space at Tranquair Gardens, Ballumbie | Views of the construction activities associated with the Proposed Scheme resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 4: Core Path 23A                              | Views of the construction activities associated with the Proposed Scheme resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 5: Middleton Farm, Barns and Wedderburn       | Views of the construction activities associated with the Proposed Scheme resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |

| Landscape and Visual Amenity - Construction |   |                          |  |
|---|---|--------------------------|--|
| Receptor                                    | Description of effect and significance  | Supplementary mitigation | Residual effects summary                     |
| Viewpoint 6: Dundee Law, Law Road           | Views of the construction activities associated with the Proposed Scheme resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |

## Phase 2: Construction and commissioning (switching)

**6.14.1** As outlined in Section 6.9 the landscape and visual effects that would arise during this phase are considered to be the same as those that would arise during Phase 3: Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility. This is because, while there would be some visibility of the ongoing minor construction works it is considered that the main factor influencing the magnitude of change and resulting significance of effect in terms of both landscape and visual amenity is the presence of the proposed EfW CHP.

### Phase 3: Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility

Table 53: Assessment summary – Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility

| Landscape and Visual Amenities - Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility |  |                          |  |
|---|--|--------------------------|--|
| Aspect of the Project   | Description of effect and significance   | Supplementary mitigation | Residual effects summary                     |
| LLCA01 Balumbie Dipslope Farmlands  | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> | None proposed.           | Effects unchanged.<br><b>Not significant</b> |
| LLCA02 Whitfield Dipslope Residential   | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA03 Dighty Industrial Valley Floor   | Direct impact on this LLCA resulting in a Minor adverse effect.<br><b>Not significant.</b>               |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA04 Dighty River Corridor  | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| LLCA05 Firth of Tay Residential   | Limited impact on the setting of the LLCA resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |

| Landscape and Visual Amenity - Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility |  |                          |  |
|---|--|--------------------------|--|
| Aspect of the Project   | Description of effect and significance   | Supplementary mitigation | Residual effects summary                     |
| LLCA06 Port of Dundee   | No impact on the setting of the LLCA resulting in a Negligible effect.<br><b>Not significant</b>                                 |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 1: Balunie Drive, Douglas and Angus   | Views of the proposed EfW and the existing retained DERL facility resulting in a Moderate adverse effect.<br><b>Significant</b>  |                          | Effects unchanged.<br><b>Significant</b>     |
| Viewpoint 2: Core Path 1E/ Green Circular   | Views of the proposed EfW and the existing retained DERL facility resulting in a Moderate adverse effect.<br><b>Significant</b>  |                          | Effects unchanged.<br><b>Significant</b>     |
| Viewpoint 3: Open space at Tranquair Gardens, Ballumbie   | Views of the proposed EfW and the existing retained DERL facility resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 4: Core Path 23A  | Views of the proposed EfW and the existing retained DERL facility resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |
| Viewpoint 5: Middleton Farm, Barns and Wedderburn   | Views of the proposed EfW and the existing retained DERL facility resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |

| Landscape and Visual Amenity - Operation of proposed EfW CHP facility and Decommissioning of the existing DERL facility |  |                          |  |
|---|--|--------------------------|--|
| Aspect of the Project   | Description of effect and significance   | Supplementary mitigation | Residual effects summary                     |
| Viewpoint 6: Dundee Law, Law Road   | Views of the proposed EfW and the existing retained DERL facility resulting in a Minor adverse effect.<br><b>Not significant</b> |                          | Effects unchanged.<br><b>Not significant</b> |

## **6.15 Further work to be undertaken for the ES**

### **6.15.1** No further work is proposed.



## 7 Socio-economics

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### 7.1 Introduction

**7.1.1** This section describes the likely significant socioeconomic effects of the proposed scheme.

**7.1.2** An Economic Impact Assessment of the Community Benefits of the proposed scheme was undertaken 2015-2016 as part of the residual waste contract bid process. MVV has competitively tendered for and is the sole remaining bidder the Dundee and Angus Residual Waste Treatment and Disposal Contract, under which they need the proposed EfW CHP facility. The economic impact assessment has been subsequently updated reflecting further development of the proposed scheme. This should be referred to as a more detailed background document.

**7.1.3** The economic impact assessment adopted the framework developed by the Partnership Councils to measure community benefits. This framework is commensurate with the breadth of likely socio-economic effects of the proposed scheme. Accordingly, socio-economic effects are considered in line with this framework. These considers effects under the following four headings:

- Supplier development
- Employment and skills activity
- Community and awareness raising activity
- Environmental awareness

**7.1.4** The assessment considers effects from construction, construction and commissioning (switching) and operation phases using both qualitative and quantitative analysis techniques. Effects are considered at the local and regional level relevant to socio-economic characteristics.

### 7.2 Engagement

**7.2.1** In undertaking the economic impact assessment of Community Benefits, discussions were held with MVV, the University of Dundee, Abertay University and Dundee & Angus College.

**7.2.2** These discussions were critical in shaping the focus of the study and identifying key areas of collaborative between MVV and local educational institutions.



## 7.3 Methodology

### Overview

- 7.3.1** This section sets out the methodology and scope of the assessment determining socio-economic effects relating to employment and skills.
- 7.3.2** The assessment is desk-based and informed by relevant publically available datasets, background studies and engagement responses. The assessment includes a review of baseline conditions and effects during the following phases:
- Phase 1 – Construction
  - Phase 2 - Construction and commissioning (switching)
  - Phase 3 - Operation of new plant and decommissioning of DERL
- 7.3.3** Cumulative impacts of the Proposed Scheme are considered as set out in the Cumulative Effects Schedule.
- 7.3.4** The baseline is intended to be succinct and focused, covering the aspects that are considered to be of most significance to the assessment. This includes population, employment, economic activity, industrial base, skills and measures of economic deprivation. The data has been sourced primarily from the Office for National Statistics (ONS), Scottish government and the relevant local authorities. An important part of the baseline has also been to develop an understanding of the area in terms of regeneration plans and other development activity.
- 7.3.5** Where availability allows, the baseline analysis compares key economic and social indicators at the following geographies: Core study area, Wider study area, Angus, Dundee and Scotland. The Core Study Area is approximate to a 3-mile radius around the project site. This is commensurate with a reasonable walking distance of the site. The Wider Study Area extends further to include a greater area of Angus.
- 7.3.6** There is no definitive set of regulations for assessing the significance of socio-economic effects, although there are conventions and good practice guidance. The assessment is therefore based on convention, professional judgment and experience and consider the value and sensitivity of receptors from the baseline socio-economic characteristics, based on their importance, size and potential for substitution, as well as the magnitude of the net additional impact based on qualitative and quantitative (where applicable) evidence.
- 7.3.7** The approach is based principally on a widely accepted methodology set out in the Homes and Communities Agency Additionality Guide<sup>37</sup>.

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<sup>37</sup> Homes and Communities Agency (2014) Additionality Guide Fourth Edition, January 2014

This includes the estimation of effects on a “with development” and “without development” basis to identify the “net additional” effect compared to what would have otherwise happened. The assessment takes account of leakage, deadweight and displacement in order to determine the genuinely additional outputs.

- 7.3.8** The focus of the assessment is on local level effects and effects generated at the Dundee and Angus local authority level. The assessment identifies the geographical areas within which specific effects are likely to occur.
- 7.3.9** Effects are identified as beneficial or adverse with a level of significance (minor, moderate, or major). It should be noted that there is no specific guidance relating to the criteria for assessing the significance of socio-economic effects.
- 7.3.10** Where the methodology varies between construction, construction and commissioning (switching) and operational phases, this is explained in the following sub-sections.

### Construction

- 7.3.11** The assessment of effects during the construction phase examines the potential effects of the proposed scheme under the following four headings:
- Supplier development
  - Employment and skills activity
  - Community and awareness raising activity
  - Environmental awareness
- 7.3.12** An estimate of the employment effect is made, expressed in terms of the Full Time Equivalent (FTE) posts created. This estimate is based on information from MVV on comparable projects that the company has delivered.
- 7.3.13** Where appropriate, opportunities for up skilling (local labour sourcing, apprenticeships and other means of enhancing local ability to compete for employment opportunities) are considered qualitatively as part of the assessment.

### Construction and commissioning (switching)

- 7.3.14** No socio-economic effects are identified during this phase.

### Operation of new plant and decommissioning of DERL

- 7.3.15** The assessment of effects during the operation phase examines the potential effects of the proposed scheme under the following four headings:

- Supplier development
- Employment and skills activity
- Community and awareness raising activity
- Environmental awareness

- 7.3.16** An estimate of the employment effect is made, expressed in terms of the Full Time Equivalent (FTE) posts created. This estimate is based on analysis of information provided by MVV.
- 7.3.17** An estimate of the impact on Gross Value Added (GVA), a measure of economic output, is also provided where appropriate. This draws on recognised benchmarks and national statistics data on output.
- 7.3.18** Where appropriate, opportunities for up skilling (local labour sourcing, apprenticeships and other means of enhancing local ability to compete for employment opportunities) are considered qualitatively as part of the assessment.

## **7.4 Assumptions and Limitations**

### **Assumptions**

- 7.4.1** Key assumptions are outlined at appropriate points within the methodology section.

### **Limitations**

- 7.4.2** In the course of undertaking this assessment, no limitations to the assessment process were encountered.

## **7.5 Baseline**

- 7.5.1** This section sets out the key findings and implications of baseline socio-economic conditions in and around the site. The baseline provides a reference point for the assessment of impacts during all phases.
- 7.5.2** The socio-economic baseline including reference data is provided in full in Section 4 of the Economic Impact Assessment of Community Benefits.
- 7.5.3** The baseline is intended to be succinct and focused, covering the aspects that are considered to be of most significance to the assessment. This includes population, employment, economic activity, industrial base, skills and measures of economic deprivation.
- 7.5.4** An important part of the baseline has been to develop an understanding of the area in terms of regeneration plans and other development activity.

**7.5.5** The key findings and implications are outlined below.

### **Economic Policy and Development**

**7.5.6** Scotland's Economic Strategy<sup>38</sup> sets out the government's focus on the dual objectives of boosting competitiveness and tackling inequality.

**7.5.7** The local economic strategies<sup>39</sup> for the area place priority on pathways to employment, tackling youth unemployment and the role of higher/further education institutions in driving growth.

### **Population**

**7.5.8** Dundee has a significantly higher proportion of 16-29 year olds and the Core Study Area a higher proportion of under-16s compared to the Scotland average<sup>40</sup>.

### **Employment**

**7.5.9** Whilst total employee numbers<sup>41</sup> in the Core Study Area increased by +1.1% in 2009 to 2014, they decreased by -3.9% in the Wider Study Area, -2.0% in Angus and -2.9% in Dundee. This is in contrast to national trends where the level has increased slightly.

### **Labour Market and Skills**

**7.5.10** Residence based wages<sup>42</sup> in Dundee are significantly lower than the comparable figures in Angus and Scotland. Workplace based wages<sup>43</sup> in Dundee are significantly higher than residence based wages. This may suggest that in commuters from outside Dundee are taking up higher paid posts within Dundee due to skills issues.

**7.5.11** The health sector accounts for the largest proportion of employment in the Core Study Area (15.6%)<sup>44</sup>. The manufacturing and retail sectors are also important, accounting for 12.2% and 12.0% of employment respectively – and account for a greater proportion of employment than nationally.

<sup>38</sup> Scottish Government (2015) Scotland's Economic Strategy. Available online at <http://www.gov.scot/Publications/2015/03/5984/downloads>

<sup>39</sup> Dundee Economic Partnership (2013) Dundee Economic Strategy. Available online at <http://www.dundeepartnership.co.uk/sites/default/files/Dundee%20Partnership%20Economic%20Strategy%20&%20Action%20Plan%20Final.pdf> and Angus Community Planning Partnership (2013) Angus Economic Strategy. Available online at [www.angus.org.uk/pdfs/AEDPEconomicStrategy.pdf](http://www.angus.org.uk/pdfs/AEDPEconomicStrategy.pdf)

<sup>40</sup> 2011 mid-year estimates and 2011 Census Population Data (2011) Scottish National Statistics.

<sup>41</sup> 2014 NOMIS (2014) Business Register and Employment Survey.

<sup>42</sup> NOMIS (2015) Annual Survey of Hours and Earnings - Resident Analysis

<sup>43</sup> NOMIS (2015) Annual Survey of Hours and Earnings - Workplace Analysis

<sup>44</sup> NOMIS (2014) Business Register and Employment Survey

- 7.5.12** Wider trends toward reduced employment in some of the sectors in which some of Dundee's largest employers operate (e.g. publishing) present a challenge to future employment opportunities in Dundee.
- 7.5.13** The proportion of the population holding NVQ 1-4 qualifications<sup>45</sup> is lower in Dundee than in Angus and Scotland as a whole. There are a higher proportion of individuals with no qualifications in Dundee which could be limiting access to employment opportunities for local people.
- 7.5.14** Economic activity rates<sup>46</sup> in Dundee have been significantly lower than the Scotland national average since June 2011. This gap in performance has also increased over time. There is a significant gap in the employment rate in Dundee compared with rates in Angus and Scotland as a whole.
- 7.5.15** Dundee has a higher amount of lower and non-skilled trades and less managerial and skilled trades compared to the national average<sup>47</sup>.

### Deprivation

- 7.5.16** The proposed project site is within close proximity of communities that are some of the most deprived in Scotland on employment, education and overall IMD measures<sup>48</sup>.
- 7.5.17** The areas to the west and south west of the site are some of the most deprived areas in Scotland (within the 0-5% most deprived).

## 7.6 Potential Effects and Good Environmental Design Management

- 7.6.1** The scope for the assessment of socio-economic effects has been informed by baseline conditions and an understanding of the components of the proposed scheme relevant to socio-economic impacts.
- 7.6.2** The proposed scheme is described in the Section 5 of the ES. The elements of the proposed scheme relevant to socio-economic effects are set out below.

### Construction

- 7.6.3** The likely socio-economic impacts during the construction phase of the proposed scheme will be centred on job creation and skills development. There will also be benefits to the wider economy

<sup>45</sup> NOMIS (2015) Annual Population Survey Jan 2014-Dec 2014

<sup>46</sup> NOMIS (2015) Annual Population Survey - Economic Activity Rate - Jul 2008 – Jun 2015

<sup>47</sup> Scottish Neighbourhood Statistics (2011) Occupational Profile

<sup>48</sup> Scottish Neighbourhood Statistics (2012) Scottish Index of Multiple Deprivation

through additional supply chain effects related to the procurement of services and equipment.

**7.6.4** Issues of likely significance are considered to include effects on the following:

- Employment and training opportunities;

### **Construction and commissioning (switching)**

**7.6.5** No socio-economic effects are identified during this phase.

### **Operation of new plant and decommissioning of DERL**

**7.6.6** The likely socio-economic impacts during the operation phase of the proposed scheme will be centred on job creation and skills development. There will also be benefits to the wider economy through additional supply chain effects related to the procurement of services and equipment.

**7.6.7** Issues of likely significance are considered to include effects on the following:

- Employment and training opportunities;

## 7.7 Assessment – Construction

**7.7.1** Temporary effects will arise from the construction activities associated with the proposed scheme.

**7.7.2** The construction of the proposed scheme is expected to occur in late-2017 to late-2020. MVV's proposed community benefits package includes a number of measures during this period. These relate to the following aspects which are considered below:

- Supplier development;
- Employment and skills; and
- Community and awareness raising activity.

**7.7.3** The existing facility will remain operational during this time along with its associated economic activity.

### Supplier development

**7.7.4** Activities under supplier development refer to the development of the Small to Medium Enterprise (SME) sector and Social Enterprise Organisations (SEOs). The outcomes associated with these activities are:

- Local supplier contract spend (£)
- Supplier development events (no.)
- Business mentoring for SMEs and SEOs (hours)

**7.7.5** Local supplier contract spend refers to spend during the construction period that goes to local suppliers. 'Local' is defined as a supplier or sub-contractor whose headquarters is located within 35 miles of the facility.

**7.7.6** The total estimated cost of construction of the facility is £100 million. It is estimated that 30% of this spend will go to local suppliers (£30 million). These costs are based on approximate estimates available at the time of the study. Using Scottish Input-Output data<sup>49</sup> for the construction sector, this change in output can be expressed in GVA and its total impact on the economy estimated. The GVA equivalent of the local impact is approximately £24 million. Applying the GVA multiplier for construction (2.1) indicates that the total expected change in GVA including indirect and induced multiplier effects is in order of £50 million.

**7.7.7** Supplier development events refer to support for SMEs, local business and social enterprises - including Meet The Buyer events, presentation at the Supplier Development Programme events or other Business Development Events. The LES proposed by MVV will include at least

<sup>49</sup> <http://www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output/Downloads>

1 event per annum. This will contribute toward improving access to potential project contracts for local businesses.

**7.7.8** The LES proposed by MVV will include at least 24 hours of business mentoring for SMEs and SEOs per annum. This activity will support the local business base and maximise their ability to access relevant contract opportunities arising from the project.

**7.7.9** Together, these contributions are identified as a moderate beneficial effect.

## Employment and skills

**7.7.10** Activities under employment and skills refer to the use of local labour, new employment opportunities and skills development. The outcomes associated with these activities are:

- Local labour (%)
- New start employment opportunities (no.)
- Apprenticeships (no.)
- Vacancy sharing (%)
- Work experience placements (no.)

**7.7.11** Local labour refers to the extent to which the construction expenditure of the project benefits local labour. 'Local' is defined as individuals ordinarily resident within 35 miles of the facility. MVV will seek to ensure that not less than 70% of the workers employed in the construction phase live within the wider locality.

**7.7.12** New start employment opportunities refer to the number of positions that can be created during the construction phase that is accounted for by the previously unemployed or new starts. Based on MVV's experience with other projects, the construction of the plant will require in excess of 500 people to work on the construction contract over the 3-year period with up to 300 on site at any one time. These will include opportunities in construction related disciplines, for example civil engineering which is relatively accessible to the local labour force.

**7.7.13** MVV will operate a Local Employment Scheme (LES) for the construction of the facility. The LES will deliver 4 new start employment opportunities. Applying average GVA per employee in the construction sector in Scotland, this is equivalent to gross additional GVA of approximately £197,000 per annum.

**7.7.14** Through its community benefits package, MVV will provide sponsorship of up to £3,000 per annum comprising of:

- 5 Construction Trade Apprenticeship roles (project initiated) – created with a contractor or sub-contractor;



- 1 Construction Trade Apprenticeship roles (project initiated) – created with a sub-contractor where the sub-contractor agrees to the LES and the sub-contract is over a threshold value; and
- 4 Apprenticeship roles (existing) – on a recognised framework already employed by the contractor or sub contractor.

**7.7.15** There is a particular opportunity for MVV to work collaboratively with Dundee and Angus College in the provision of apprenticeships and training. The College has a strong focus on working with Dundee City Council and Angus Councils in creating training opportunities for young people. In terms of potential beneficiaries, the College's construction course offer has approximately 441 FE students and 174 HE students. This offer also includes civil engineering. The College also delivers courses on Marketing and PR with current numbers around 18 FE students and 95 HE students.

**7.7.16** There is also the potential for an agreement with Michelin Tyre Company for the training of apprentices in relevant engineering skills who could work on the construction project. Michelin currently operate an apprentice training school and provide apprentice training for other employers.

**7.7.17** Vacancy sharing refers to jobs advertised through the Construction Skills Bank. The Construction Skills Bank has been developed by Dundee's employability partnership (Discover Opportunities) and is managed by Jobcentre Plus. This provides a vacancy management service by matching employers' vacancies with unemployed clients who are actively seeking work in the construction industry. The LES will, where appropriate, use the Construction Skills Bank – targeting 100%. This will contribute to improving the matching of project opportunities with the local workforce.

**7.7.18** Through its community benefits package, MVV will provide 6 work experience placements (employability programmes). These will be a mix of Graduate Employment Work Experience Placements and Employability Work Placement for students on employability programmes including Employability Fund, Jobcentre Plus programmes, College and University Programmes and other employability programmes or courses relevant to the operation of the DERL Facility and the EfW CHP Facility. It is expected that the project's provision of work experience will contribute toward increased employment rates and lower claimant activity in the local economy.

**7.7.19** Together, these contributions are identified as a moderate beneficial effect.

## Community and awareness raising activity

**7.7.20** Activities under community and awareness raising refer to measures aimed at engaging with the local community and raising awareness of waste. The outcomes associated with these activities are:

- Awareness raising/curriculum support events (no.)
- Donation of materials

**7.7.21** For the purpose of the construction phase there will be available a suitable area established within the DERL Facility, or the RWT Facility temporary construction camp area to welcome all visitors to the site and carry out health and safety inductions. No visitors will be allowed on site unless it is pre-arranged due to health and safety.

**7.7.22** MVV will employ a dedicated Community Liaison Manager to communicate and raise public awareness of waste management and assist in positive change in attitude and behaviour. The community Liaison Manager will manage and contribute to a number of events that raise awareness amongst the local community. It is proposed that 4 events will be held.

**7.7.23** Where material is identified which is surplus to requirements, contractors and sub-contractors will be encouraged to donate this to SEOs and other community groups, making use of the existing reuse facilities in place within each of the Partnership Council areas such as the Reuse Hub at Baldovie Recycling Centre which operates in partnership with a number of third-sector organisations. This may offer potential value to social enterprise organisations in the local area.

**7.7.24** Together, these contributions are identified as a moderate beneficial effect.

## 7.8 Assessment – Construction and commissioning (switching)

**7.8.1** There will be no concurrent operation of the proposed scheme and the existing DERL facility burning residual waste; instead the transition between DERL and the new EfW CHP facility will be almost instantaneous, with the shutdown of DERL following the hot commissioning of the new facility.

**7.8.2** There are no socio-economic effects to consider during this phase.

## 7.9 Assessment – Operation of new plant and decommissioning of DERL

- 7.9.1** Permanent effects will arise from the operation activities of the proposed scheme.
- 7.9.2** The operation of the new plant is expected to start in late-2020. MVV's proposed community benefits package includes a number of measures during this period.
- 7.9.3** The existing facility (DERL) will be retained but will not be operational. Decommissioning will take place; shutting down the DERL and carrying out any necessary electrical or process isolations.
- 7.9.4** Effects are considered with reference to the 'do nothing' in which the proposed scheme does not go ahead. In the 'do nothing', operations and employment at the existing plant are assumed to cease.

### Supplier development

- 7.9.5** Activities under supplier development refer to the development of the Small to Medium Enterprise (SME) sector and Social Enterprise Organisations (SEOs). The outcomes associated with these activities are:
- Local supplier contract spend (£)
  - Supplier development events (no.)
  - Business mentoring to SMEs and SEOs (hours)
- 7.9.6** Local supplier contract spend refers to spend during the operation period that goes to local suppliers. 'Local' is defined as a supplier or sub-contractor whose headquarters is located within 35 miles of the facility.
- 7.9.7** The operation of facility will be associated with annual spending on goods and services. This may support the local economy by providing opportunities for local businesses to supply goods and services to the facility. The level of this spending is not known at the stage and the economic impact has not been quantified. It is expected however that the spending will include areas that could potentially be served by local businesses (e.g. security and sundry supplies), in turn supporting local employment and income.
- 7.9.8** Supplier development events refer to support for SMEs, local business and social enterprises – including Meet The Buyer events, presentation at the Supplier Development Programme events or other Business Development Events. The LES proposed by MVV will include at least 1 event per annum. An Industry and Suppliers Day will be held either on site or at a local College, hotel or conference centre, to inform local businesses and SEOs about both the new EfW CHP Facility and DERL Facility, this will provide suppliers with the

opportunity to meet the operations and maintenance teams and to explain the types of contract which would be available during the operational life of the facilities.

**7.9.9** This will contribute toward improving access to potential project contracts for local businesses.

**7.9.10** The LES proposed by MVV include at least 24 hours of business mentoring to business mentoring support for SMEs and SEOs per annum. An Industry and Suppliers' Day will be held. This activity will support the local business base and maximise their ability to access relevant contract opportunities arising from the project.

**7.9.11** Together, these contributions are identified as a minor beneficial effect.

### **Employment and skills**

**7.9.12** Activities under employment and skills refer to the use of local labour, new employment opportunities and skills development. The outcomes associated with these activities are:

- Local labour (%)
- New start employment opportunities (no.)
- Apprenticeships (no.)
- Vacancy sharing (%)
- Work experience placements (no.)

**7.9.13** Local Labour refers to the extent to employment posts associated with the operation of the facility are fulfilled using local labour. 'Local' is defined as individuals ordinarily resident within 35 miles of the facility. During the Operational Phase there will be a need to replace skilled engineering staff who either retire or who move on to work for other employers. There will also be a need to recruit unskilled and semi-skilled waste operators who are likely to move on to other employment more frequently and who will need to be replaced on a regular basis.

**7.9.14** Waste operators are more likely to be "new starters" who will need training on the job and who will be encouraged to acquire skills and qualifications to help them undertake a full range of activities on site associated with their role and which will probably encourage many of them to progress and apply for other employment elsewhere.

**7.9.15** The majority of the new recruits to the permanent staff will be expected to be local staff as a result of the recruitment policy of advertising vacancies in the local media, using local agencies, local universities and colleges and the Michelin Training Centre as well as community contacts and advertising on the Contractor's web site.

- 7.9.16** MVV will seek to ensure that not less than 70% of the workers employed live within the wider locality.
- 7.9.17** New start employment opportunities refer to the number of positions that can be created during the operation phase that comprises previously unemployed or new starts.
- 7.9.18** The current operations at the existing plant support around 45 jobs. It is noted that the number of posts has varied from year to year however.
- 7.9.19** The operation of the proposed new facility will provide employment for 37 staff; comprising 33 technical staff and 4 waste operatives. Work will be organised on a shift pattern with 5-6 shifts of 2 staff. It is expected that there will be a maximum of 15 people on site at any one time.
- 7.9.20** The steady-state operation of the plant will also support further jobs indirectly. This will create opportunities requiring engineering skills across steam, electrical and mechanical aspects. Alongside this requirement, there will also be broader opportunities requiring computing, environmental and media based skills.
- 7.9.21** Applying the median annual full-time wage in Dundee and converting to GVA using input-output data for the waste sector – the 37 direct posts are equivalent to an annual GVA contribution of approximately £1 million per annum. Taking into account indirect and induced multiplier effects<sup>50</sup> the equivalent total GVA impact is in order of approximately £1.3 million per annum.
- 7.9.22** In addition to employment opportunities in core operational periods, there will also be further opportunities when the facility is required to go off-line for maintenance. It is anticipated the facility will need to go offline for maintenance for 3-weeks each year with a longer outage required every 3 years. Outage periods will provide additional employment of approximately 70 jobs through operations sub-contractors. These are opportunities that are potentially well suited to local companies requiring skills such as scaffolding, painting and general engineering.
- 7.9.23** MVV will operate a Local Employment Scheme (LES) for the operation of the facility. The LES will deliver 4 new start employment opportunities. Applying median full time wages per employee in Dundee and converting to GVA, this is equivalent to gross additional GVA of approximately £74,000 per annum.
- 7.9.24** The Contractor will work closely with recognised community groups, SEOs, Job Centre Plus, Dundee City Council's Economic Development team, and the Construction Skills Bank providing them with information about roles available and the qualifications required

<sup>50</sup> Using the Scottish GVA multiplier for the waste sector of 1.9 from <http://www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output/Downloads>

so that those who are not in employment and are classed as “new starters” will be able to obtain employment on the project. There will also be opportunities for skilled or semi-skilled workers who have been laid off in other industries such as the oil industry, or on other major construction projects in the Dundee area which have been completed, to apply for vacancies in permanent positions with DERL or the EfW CHP Facility.

**7.9.25** Through its community benefits package, MVV will support 6 Apprenticeship roles (2 project initiated, 4 existing). These roles will be within the waste or engineering and related industries. Recruitment would start to coincide with commencement of operation of the plant in 2020.

**7.9.26** There is a particular opportunity for MVV to work collaboratively with Dundee and Angus College in the provision apprenticeships and training. The College has a strong focus on working with Dundee City Council and Angus Councils in creating training opportunities for young people. It works closely with Skills Development Scotland to develop practical training courses that meet the needs of both students and employers. The College has achieved the best results in Highers for their students in 2013/14 and was second in the grades achieved by any College the grades achieved by students.

**7.9.27** Discussions with the College prospectus indicate that the opportunities provided by the facility are most aligned with courses within the following subjects:

- Construction & Technology
- Engineering
- Marketing

**7.9.28** MVV would also welcome the opportunity to work with Dundee and Angus College on the Skills for Growth Project and as a member of the Industry Advisory Boards which the College is establishing to help to develop and shape the course which the College offers to meet the need so employers and to improve the employment opportunities of students.

**7.9.29** Vacancy Sharing refers to jobs advertised through employability partner. The LES proposed by MVV will, where appropriate, use the employability partner – targeting 100%. This will contribute to improving the matching of project opportunities with the local workforce.

**7.9.30** MVV will provide 1 work experience placement (employability programmes) per annum – working collaboratively with the University of Dundee, Abertay University and Dundee & Angus College. Further, it will use reasonable endeavours to maintain links with local secondary schools in order to provide work experience opportunities and bursaries or sponsorship for students of the schools

to attend waste or engineering courses relevant to the operation of the Facilities up to a limit of five thousand pounds (£5,000) per annum.

- 7.9.31** The work experience placements to students on employability programmes will cover occupations relevant to the operation of the plant.
- 7.9.32** In terms of beneficiaries, these opportunities provide good alignment with a number of courses at Abertay University. Abertay University have been already been involved with the Baldovie facility in the past, taking students on visits there and facilitating student work placements and projects based on the operation of the plant. Discussions with the University indicate that they would be keen to develop those contacts further and to take advantage of the opportunities to enhance the learning experience for their students and to explore opportunities to develop career opportunities.
- 7.9.33** The University has a programme of work placements during the 3rd year of the Engineering Course which operates successfully but the ability to have placements in Dundee would make them more attractive to students enabling them to retain their accommodation in Dundee during the 6 month placement and to travel to work by public transport. In addition to work placements, there may also be opportunities for site visits and guest lectures.
- 7.9.34** The work placement opportunities at the facility also provide good alignment with a number of courses at the University of Dundee. Discussions with the University indicate that it is keen to create opportunities for its students to visit the site to become familiar with the operation of the facility and to participate in placements and work experience opportunities which could lead to full time career opportunities and practical based dissertation and research projects.
- 7.9.35** It is expected that the provision of work experience will contribute toward increased employment rates and lower claimant activity in the local economy.
- 7.9.36** Together, these contributions are identified as a moderate beneficial effect.

### **Community and awareness raising activity**

- 7.9.37** Community and awareness raising activities refer to measures aimed at engaging with the local community and raising awareness of waste. The outcomes associated with these activities are:
- Awareness Raising/Curriculum Support Activities Events (no.)
- 7.9.38** The local community will be continually engaged and an integrated approach will be developed through in order to present a positive image regarding the impact of the new EfW CHP Facility. This will



be undertaken formally through scheduled community engagement meetings and informally through the Community Liaison Manager.

- 7.9.39** A minimum of 2 Awareness Raising activities or visits per annum over the lifetime of the project will be delivered.
- 7.9.40** The role of the Community Liaison Manager will also be to work with established organisations across Dundee and Angus such as the Dundee & Angus College, the University of Dundee and Abertay University, Jobcentre plus and Employability partners from Partnership Councils to promote awareness of the project and work with the groups to help local people find employment on the project and in other related developments by preparing them for the work environment and helping them to acquire relevant skills and qualifications, and IT competence, so that even those who have left school with minimum qualifications can find employment opportunities the project and prepare for positions such as Tipping Hall operatives, fork lift drivers and weighbridge operators as they become available.
- 7.9.41** The Community Liaison Manager will initiate and facilitate visits to the existing DERL Facility and the EfW CHP Facility during the Operational phase for local community and interest groups; students from secondary and further education institutions and from professional bodies to understand how the recovery of energy from waste can contribute to a sustainable and circular economy and operate without adversely affecting air quality or human health and play a significant role in sustainable development.
- 7.9.42** Together, these contributions are identified as a minor beneficial effect.

### **Environmental Awareness**

- 7.9.43** This refers to activities that promote increased public awareness of waste management issues.
- 7.9.44** The Community Liaison Manager will initiate and facilitate visits to the EfW CHP Facility during the Operational phase for local community and interest groups; students from secondary and further education institutions and from professional bodies to understand how the recovery of energy from waste can contribute to a sustainable and circular economy and operate without adversely affecting air quality or human health and play a significant role in sustainable development.
- 7.9.45** The Community Liaison Manager will assist the Partnership Councils in relevant environmental awareness-raising and community events throughout the duration of the Contract including:



- Delivering a minimum of 10 “Environmental Events” for each year of the contract, such as facility open days, attendance at local gala days;
- Activities to raise public awareness of waste management and assist in positive change in the community’s attitudes and behaviour;
- Liaison meetings with local community; i.e. tenants & residents groups;
- Develop the potential to link to existing local initiatives to deliver small scale environmental improvement projects;
- Promote environmental awareness and information stands at community roadshows and at major events such as the Dundee Flower & Food Festival and similar events in Angus;
- Provide outreach education and site tours for schools, colleges, residents groups, professional groups which will continue in the EfW CHP Facility once operational.
- Understanding of the relationship between large waste management facilities and small local businesses; and
- Promoting training and employment opportunities for both skilled and unskilled residents.

**7.9.46** Together, these contributions are identified as a minor beneficial effect.

## **7.10 Supplementary Mitigation**

**7.10.1** No mitigation measures have been proposed with respect to effects from construction/operation/decommissioning of the proposed scheme.

## **7.11 Residual Effects**

**7.11.1** As no mitigation measures are proposed, the residual effects remain as described in Section 4.7-4.9.

## **7.12 Sensitivity Test for Programme Delay**

**7.12.1** A programme delay is not expected to have a significant impact on the identified socio-economic effects. No sensitivity test has therefore been undertaken.

## **7.13 Cumulative Effects**

**7.13.1** This section considers whether socioeconomic effects may be elevated due to the combined effects of the Proposed Scheme with other specified developments.

## Construction

**7.13.2** No cumulative effects are identified.

## Construction and commissioning (switching)

**7.13.3** No cumulative effects are identified.

## Operation of new plant and decommissioning of DERL

**7.13.4** No cumulative effects are identified.

## 7.14 Assessment Summary

### 7.14.1 Construction

Table 54: Assessment summary - construction

| Socio-economic        |   |                          |                          |
|-----------------------|---|--------------------------|--------------------------|
| Aspect of the Project | Description of effect and significance  | Supplementary mitigation | Residual effects summary |
| Supplier development  | <p>The total expected change in GVA generated by local supplier contract spend is estimated to be the order of £50 million including indirect and induced multiplier effects.</p> <p>Supplier development events and business mentoring to SMEs and SEOs will support the local business base and maximise their ability to access relevant contract opportunities arising from the project.</p> <p>Overall, this is identified as a moderate beneficial effect.</p>  | None required            | Effects unchanged        |
| Employment and skills | <p>The construction of the plant will require in excess of 500 people over the 3-year period with up to 300 on site at any one time. These posts will include opportunities in construction related disciplines that are relatively accessible to the local labour force.</p> <p>Not less than 70% of the workers employed in the construction phase will live within the wider locality.</p> <p>A Local Employment Scheme (LES) will operate and deliver 4 new start employment opportunities.</p> <p>The project will support 10 Construction Trade Apprenticeships (6 project initiated, 4 existing) and work collaboratively with Dundee and Angus College. There is also the potential for an agreement with Michelin Tyre Company.</p> <p>The LES will, where appropriate, use the Construction Skills Bank – targeting 100%. This will contribute to improving the matching of project opportunities with the local workforce.</p> | None required            | Effects unchanged        |

| <b>Socio-economic</b>                    |  |                                 |                                 |
|--|--|---------------------------------|---------------------------------|
| <b>Aspect of the Project</b>             | <b>Description of effect and significance</b>  | <b>Supplementary mitigation</b> | <b>Residual effects summary</b> |
|  | <p>The project will provide 6 work experience placements – contributing toward increased employment rates and lower claimant activity in the local economy.</p> <p>Overall, this is identified as a moderate beneficial effect.</p>  |                                 |                                 |
| Community and awareness raising activity | <p>An area will be established within the DERL Facility or the RWT Facility temporary construction camp area to welcome all visitors to the site.</p> <p>A dedicated Community Liaison Manager will communicate and raise public awareness of waste management and assist in positive change in attitude and behaviour. The community Liaison Manager will manage and contribute to a number of events that raise awareness amongst the local community.</p> <p>Where material is identified which is surplus to requirements, contractors and sub-contractors will be encouraged to donate this to SEOs and other community groups. This may offer potential value to social enterprise organisations in the local area.</p> <p>Overall, this is identified as a minor beneficial effect.</p> | None required                   | Effects unchanged               |

### 7.14.2 Construction and commissioning (switching)

Table 55: Assessment summary – Construction and commission (switching)

| Socio-economic  |  |                          |                          |
|---|--|--------------------------|--------------------------|
| Aspect of the Project                                       | Description of effect and significance | Supplementary mitigation | Residual effects summary |
| No socio-economic effects are identified during this phase. |  |                          |                          |

### 7.14.3 Operation of new plant and decommissioning of DERL

Table 56: Assessment summary – Operation of new plant and decommissioning of DERL

| Socio-economic        |   |                          |                          |
|-----------------------|---|--------------------------|--------------------------|
| Aspect of the Project | Description of effect and significance  | Supplementary mitigation | Residual effects summary |
| Supplier development  | <p>The operation of facility will be associated with annual spending on goods and services. This will support the local economy by providing opportunities for local businesses to supply goods and services to the facility.</p> <p>Supplier development events and business mentoring to SMEs and SEOs will support the local business base and maximise their ability to access relevant contract opportunities arising from the project.</p> <p>Overall, this is identified as a minor beneficial effect.</p>   | None required            | Effects unchanged        |
| Employment and skills | <p>The majority of the new recruits to the permanent staff will be expected to be local staff as a result of the recruitment policy. Not less than 70% of the workers employed will live within the wider locality.</p> <p>The operation of the new facility will provide employment for 37 staff; comprising 33 technical staff and 4 waste operatives. Taking into account indirect and induced multiplier effects the equivalent total GVA impact is in order of approximately £1.3 million per annum.</p> <p>Outage periods will provide additional employment of approximately 70 jobs through operations sub-contractors. These are opportunities that are potentially well suited to</p> | None required            | Effects unchanged        |

| <b>Socio-economic</b>                    |   |                                 |                                 |
|--|---|---------------------------------|---------------------------------|
| <b>Aspect of the Project</b>             | <b>Description of effect and significance</b>   | <b>Supplementary mitigation</b> | <b>Residual effects summary</b> |
|  | <p>local companies requiring skills such as scaffolding, painting and general engineering.</p> <p>A Local Employment Scheme (LES) will operate and deliver 4 new start employment opportunities.</p> <p>The project will support 6 Apprenticeship roles (2 project initiated, 4 existing) and work collaboratively with Dundee and Angus College. In addition, it will provide 1 work experience placement (employability programmes) per annum – working collaboratively with the University of Dundee, Abertay University and Dundee &amp; Angus College.</p> <p>Overall, this is identified as a moderate beneficial effect.</p> |                                 |                                 |
| Community and awareness raising activity | <p>The local community will be continually engaged and an integrated approach will be developed through in order to present a positive image regarding the impact of the new EfW CHP Facility. This will be undertaken formally through scheduled community engagement meetings and informally through the Community Liaison Manager.</p> <p>A minimum of 2 Awareness Raising activities or visits per annum over the lifetime of the project will be delivered.</p> <p>Overall, this is identified as a minor beneficial effect.</p>   | None required                   | Effects unchanged               |
| Environmental awareness                  | The Community Liaison Manager will assist the Partnership Councils in relevant environmental  | None required                   | Effects unchanged               |

| Socio-economic        |   |                          |                          |
|-----------------------|---|--------------------------|--------------------------|
| Aspect of the Project | Description of effect and significance  | Supplementary mitigation | Residual effects summary |
|                       | awareness-raising and community events throughout the duration of the Contract. This will include delivering a minimum of 10 “Environmental Events” each year - such as facility open days, attendance at local gala days.<br><br>Overall, this is identified as a minor beneficial effect. |                          |                          |



## **7.15 Further Work to be undertaken for the ES**

### **7.15.1 No further work is proposed.**

## 8 Traffic and transport

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### 8.1 Introduction

**8.1.1** This chapter describes the likely significant effects of the proposed EfW CHP facility on the surrounding transport networks and sensitive receptors during the construction and operational phases. The scope of the assessment has been defined following a scoping exercise with officers of DCC and other key stakeholders. A high-level summary of the key results of this exercise are presented in Table 57, with a detailed list of the DCC scoping responses presented in Volume 1 Appendix A2.

**8.1.2** The assessment process discussed within this chapter takes into consideration impact magnitude (before and after mitigation) and baseline environmental sensitivity.

**8.1.3** Section 3 of Volume 1 of this ES provides a full description of the Proposed Scheme. The following aspects are particularly relevant to the assessment of the development proposals on the surrounding transportation networks.

- Construction:
  - Construction times and hours of site operation;
  - The number and type of construction vehicles relating to the construction programme; and
  - Preferred route options for the movement of construction vehicles and, in particular, any heavy or abnormal loads.
- Operation:
  - Access arrangements for employee car-based trips;
  - Connectivity and accessibility of the Proposed Scheme to the wider surrounding transport networks; and
  - Predicted future trip volumes of Heavy Goods Vehicle (HGV) trips to and from the site, and an indication of the distribution and assignment of these trips across the wider local road network.

### 8.2 Engagement

**8.2.1** A consultation exercise has been undertaken with a number of stakeholders and other relevant bodies.

Table 57: Summary of Key Consultation Responses and ongoing Technical Discussions

| No. | Organisation and date       | Comment   | Response   |
|-----|-----------------------------|---|--|
| 1   | DCC<br>January 2016         | Traffic surveys are not to be undertaken during January 2016.   | The traffic surveys were undertaken in February 2016.  |
| 2   | DCC<br>February 2016        | The junction between Ballumbie Road and Drumgeith Road should be included as part of the traffic surveys.   | This junction was included within the traffic survey specification.  |
| 3   | DCC<br>June 2016.           | Contents of Arup Transport Assessment Scoping Letter (dated 15 June 2016) are <i>“sufficient to allow you to proceed with the Transport Assessment”</i> . | Noted.   |
| 4   | SEPA / DCC<br>November 2015 | The traffic assessment should include collection of appropriate data to inform the air quality and dust assessment.                                       | The traffic surveys collected peak hour junction turning counts, 7-day, 24hr AADT flows and vehicle speed data.                        |
| 5   | SEPA / DCC<br>November 2015 | Estimates of the numbers and types of vehicles and the routes taken which are associated with the development during construction and operation           | Estimates of these flows have been provided by the Applicant and included as part of the construction and operational assessments.     |
| 6   | DCC<br>November 2015        | Development proposals will be required to have no detrimental impact on the capacity or functioning of the existing road network.                         | As demonstrated by the Transport Assessment, the local road network continues to operate within capacity during the operational phase. |
| 7   | DCC<br>November 2015        | The ES should include a Transport Statement   | As agreed with the transport officers of DCC as part of the Transport Assessment   |

| No. | Organisation and date | Comment | Response  |
|-----|-----------------------|---------|---|
|     |                       |         | scoping process, a Transport Assessment has been prepared in support of this application. This is in contrast to a Transport Statement, with the former being a more detailed assessment process. |

## 8.3 Methodology

### Guidance and best practice

**8.3.1** The assessment process has been prepared in accordance with the guidelines issued by the following organisations:

- The Institution of Highways and Transportation (IHT)<sup>51</sup>, now the Chartered Institution of Highways and Transportation (CIHT); and
- The Institute of Environmental Assessment (IEA)<sup>52</sup>, now the Institute of Environmental Management and Assessment.

**8.3.2** The IHT Guidelines recommend that the traffic and transportation effects of a Proposed Scheme should be assessed in accordance with the IEA Guidelines. The IEA Guidelines advise that the following criteria is used to determine the extent of the road network which is to be assessed:

- Rule 1: Highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); and
- Rule 2: Any specifically sensitive areas where the traffic flows have increased by 10% or more.

**8.3.3** The IEA Guidelines referred to in paragraph 8.3.2 do not specify whether the criteria relate to hourly flows, daily flows, or otherwise. For the purposes of this assessment, however, the thresholds have been applied to Annual Average Daily Traffic (AADT) flows.

<sup>51</sup> Institute of Highways and Transportation (1994); Guidelines for Traffic Impact Assessment; London.

<sup>52</sup> Institute of Environmental Assessment (1993); Guidelines on the Environmental Assessment of Road Traffic (Guidance Note 1); Horncastle.

**8.3.4** Where the IEA thresholds identified in paragraph 8.3.2 are exceeded, transport related environmental impacts should be considered within the context of ten key areas:

- Noise;
- Visual impact;
- Severance;
- Driver delay;
- Fear and intimidation;
- Pedestrian delay;
- Pedestrian and cycle amenity;
- Accidents and safety;
- Hazardous loads;
- Air pollution; and
- Dust and dirt.

**8.3.5** The environmental effects associated with the following areas are addressed elsewhere in Volume Two, and so are excluded from this Section:

- Acoustics (noise): Section 2;
- Air Quality: Section 3; and
- Landscape and Visual Impact: Section 6.

## Criteria

**8.3.6** The extent of the study area has been defined following scoping discussions with the transport officers of DCC, and in accordance with the IEA Guidelines as outlined in paragraph 8.3.2. Within the study area, nine locations on the local road network have been identified and addressed in terms of the potential impact of the development to existing and future traffic flows.

**8.3.7** The criteria relating to the impact areas identified in paragraph 8.3.4 are discussed in more detail here.

### Severance

**8.3.8** Severance is defined in the IEA guidelines as follows:

*‘..... the perceived division that can occur within a community when it becomes separated by a major traffic artery ..... The measurement and prediction of severance is extremely difficult. The correlation between the extent of severance and the physical barrier of a road is not clear and there are no predicative formulae which give simple relationships between traffic factors and levels of severance’.*

In the absence of specific, quantifiable measures to determine the impact of the development proposals on levels of severance, the same 'rules' used to determine traffic impact have also been used to assess levels of severance.

### **Driver delay**

- 8.3.9** As a function of increased traffic flow, traffic delays resulting from the development proposals can occur at various points throughout the surrounding road network. In the absence of journey time data, the same 'rules' used to determine traffic impact have also been used to assess levels of driver delay.

### **Pedestrian delay**

- 8.3.10** The IEA guidelines note that:

*'..... increases in traffic levels are likely to lead to greater increases in [pedestrian] delay. Delays will also depend upon the general level of pedestrian activity, visibility and general physical conditions of the site'.*

- 8.3.11** There are no specific and quantifiable thresholds identified in the IEA Guidelines. However, given that any increase in traffic volume will generally increase pedestrian delay in terms of road crossings, it is suggested that the same 'rules' used to determine traffic impact are also applied to assessing levels of pedestrian delay.

### **Pedestrian and cycle amenity**

- 8.3.12** Pedestrian and cycle amenity can best be described as the 'pleasantness' of a journey using either of these modes. High levels of amenity are generally associated with low traffic levels, separation from traffic and the composition of traffic. In the absence of specific, quantifiable measures to determine the impact of the development proposals on levels of pedestrian and cycle amenity, it is proposed that the same 'rules' used to quantify levels of traffic impacts are applied.

### **Fear and intimidation**

- 8.3.13** The IEA guidelines note that this impact is dependent on a number of variables, including:

*'..... the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths'.*

However,

*'..... there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation, from known traffic and physical conditions'.*

Due to the difficulties in defining meaningful threshold values and, in the interests of maintaining consistency with the other impact criteria,

it is suggested that the same 'rules' used to quantify the levels of traffic impact are also used as a means of assessing fear and intimidation.

### **Hazardous loads**

- 8.3.14** The IEA Guidelines acknowledge that some developments may require the transportation of dangerous or hazardous loads by road. Based on the construction programme as supplied by the Applicant, it is predicted that there will be no hazardous loads associated with the proposed EfW CHP facility. Any further assessment of such loads is therefore excluded from this assessment.

Where oversized or heavy loads are expected to be delivered to the site as part of the construction process, such items can often place significant demands on local infrastructure. The planning for heavy deliveries, or Abnormal Indivisible Loads (AILs), is usually based upon the use of a custom, 'multi-axle steerable' tractor and trailer unit combination. Details of this, along with information regarding the routing of any such deliveries, are discussed in detail in Section 8.7.4 onwards.

### **Accidents and safety**

- 8.3.15** In accordance with paragraph 4.42 of the IEA Guidelines, it is suggested that accidents and safety should be considered in terms of identifying the number of vehicle km for each scenario, and then applying default DMRB accident rates, defined as Personal Injury Accident's (PIA) per million vehicle km. Furthermore, a qualitative assessment will be undertaken based upon data obtained from publically available STATS19 datasets which are available online [accessed 12 October 2016].

### **Dust and dirt**

- 8.3.16** With regards to dust and dirt, the IEA Guidelines note that it is not practicable to quantify the predicted levels likely to be generated during the construction or operational phases. While it is acknowledged that construction vehicles are likely to generate dust and dirt when they access/egress the site, proposed mitigation measures such as 'wheel-wash' facilities at the site entrance will minimise levels of mud and other debris being carried onto the public road network. For these reasons, the assessment of traffic dust and dirt has been scoped out of the transport assessment process.

## **Impact significance and magnitude**

- 8.3.17** When assessing the likely environmental effects it is important to determine the magnitude and significance of any individual effect or the combined effect of the proposed EfW CHP facility on a range of receptors such as the residential areas located south of the Dighty Water and north of Drumgeith Road. These receptors have been

selected as a reflection of their position as those areas of residential development which are located closest to the development site.

### 8.3.18

The significance of an effect on a receptor is defined in accordance with the magnitude of the impact and the importance and sensitivity of the receptor. The criteria that have been used to make judgements on the importance and sensitivity of receptor(s) within the context of the development proposals are summarised in Table 58.

Table 58: Description of Sensitivity

| Level of Sensitivity | Description  |
|----------------------|--|
| High                 | Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident black spots, retirement homes, urban/residential roads without footways that are used by pedestrians (Para. 2.5, IEA Guidelines, 1993).  |
| Medium               | Traffic flow sensitive receptors including congested junctions, doctors' surgeries, hospitals, cemeteries, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycle ways, medium density residential areas, community centres, parks, recreation facilities. |
| Low                  | Receptors include occasional users of the road network, such as public open spaces, low density residential areas, wide footways or trunk roads.   |
| Negligible           | Receptors with no sensitivity to traffic flows, including roads with very small settlements.   |

### 8.3.19

When reviewing the different receptors within the study area, it is considered that those sections of the local road network which are adjacent to existing industrial or commercial land uses are less sensitive than, for example, the residential areas south of the Dighty Water. Indeed, based on the sensitivity descriptors presented in Table 58, the sensitivity of each of the receptor sites, the locations of which are illustrated in **Error! Reference source not found.** Figure 8, are defined as follows:

- Site A: low;
- Site B: low;
- Site C: negligible;
- Site D: negligible;
- Site E: low;
- Site F: medium;
- Site G: low;
- Site H: low; and
- Site I: low.



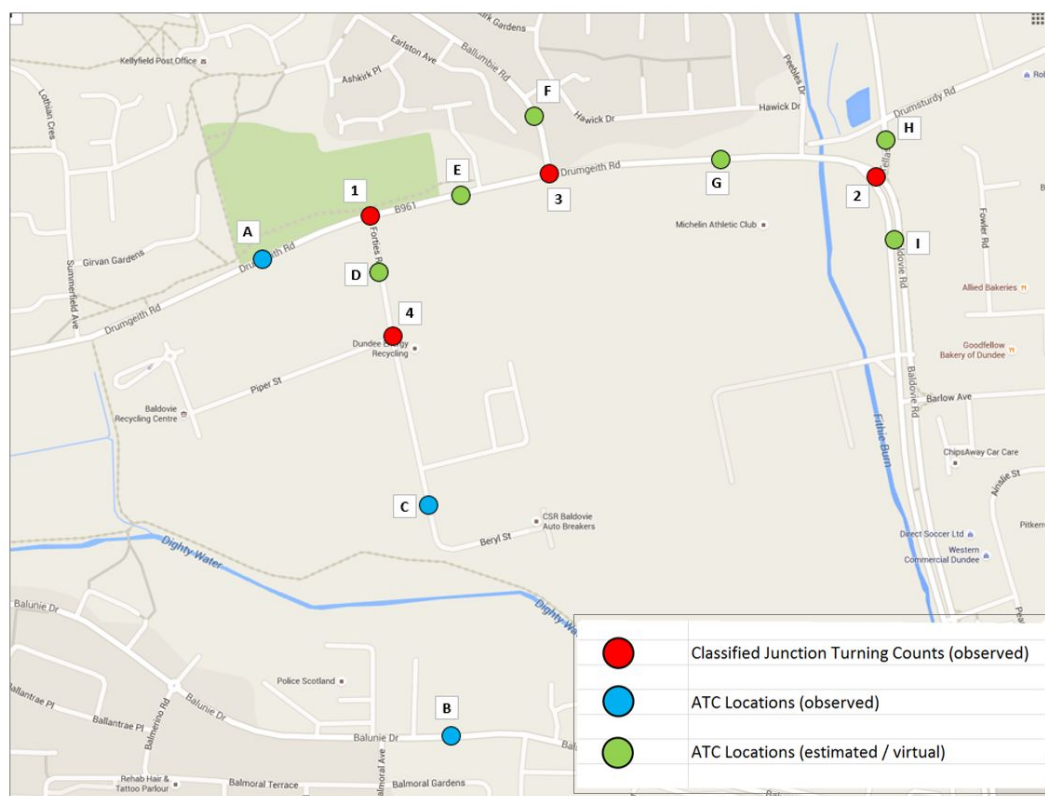


Figure 8: Traffic survey locations (2016)

## 8.3.20

There are no definitive set of criteria for assessing or quantifying the impact of traffic flow increases/decreases on all impact types (i.e. levels of severance, fear and intimidation). In the absence of a set of consistent impact magnitude criteria, it is considered that the magnitude thresholds should be based on paragraph 4.31 of the IEA guidelines, which notes the following:

*‘Changes in traffic flows of 30%, 60% and 90% are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ changes in severance, respectively.’*

The criteria for assessing the magnitude of impact is therefore based on those summarised in Table 59.

Table 59: Magnitude of impact criteria

| Impacts  | Magnitude of Impact            |                            |                            |                            |
|--|--------------------------------|----------------------------|----------------------------|----------------------------|
|  | Negligible                     | Low                        | Medium                     | High                       |
| Traffic Impact – magnitude is based on IEA guidelines.   |                                |                            |                            |                            |
| Severance - results from the creation of new barriers such as roads combined with increased traffic flows along existing routes. | Change in total traffic or HGV | Change in total traffic or | Change of total traffic or | Change in total traffic or |
| Driver Delay – often caused by the impact of the works on  |                                |                            |                            |                            |

| Impacts  | Magnitude of Impact  |                                      |                                      |                                     |
|--|--|--------------------------------------|--------------------------------------|-------------------------------------|
|  | Negligible   | Low                                  | Medium                               | High                                |
| the local road network, along with increases in overall traffic flow along existing routes.  | flows of <30%  | HGV flows of 30-60%                  | HGV flows of 60-90%                  | HGV flows over 90%                  |
| Pedestrian Delay - results from increases in traffic flow, speed or composition along existing routes.   |  |                                      |                                      |                                     |
| Pedestrian and Cyclist Amenity - relates to the relative pleasantness of a journey and can be affected by increases in traffic.  |  |                                      |                                      |                                     |
| Fear and Intimidation - a pedestrian's level of fear and intimidation is linked to the volume of traffic on the local road network.                                    |  |                                      |                                      |                                     |
| Accidents and Safety – the impact of the development through an increase in vehicles could have an effect on the accidents and safety of the surrounding road network. | Change in no. of accidents <30%  | Change in no. of accidents of 30-60% | Change in no. of accidents of 60-90% | Change in no. of accidents over 90% |
|  | A qualitative assessment based on historical accident trends during the last five years. |                                      |                                      |                                     |

### 8.3.21

As a guide to inform the assessment, but not as a substitute for professional judgement, the criteria for determining the significance of traffic related effects are summarised in Table 60. This is based on a combination of the magnitude of the effect with the sensitivity of the receptor. Where effects are classified as being of moderate and/or major significance (either beneficial or detrimental), the effect is considered significant in EIA terms.

Table 60: Effect Significance Matrix

|           |            | Sensitivity |          |          |          |
|-----------|------------|-------------|----------|----------|----------|
|           |            | Negligible  | Low      | Medium   | High     |
| Magnitude | Negligible | Negligible  | Minor    | Minor    | Minor    |
|           | Low        | Minor       | Minor    | Moderate | Moderate |
|           | Medium     | Minor       | Moderate | Moderate | Major    |
|           | High       | Minor       | Moderate | Major    | Major    |

## 8.3.22

Definitions of the significance levels in Table 60, are presented in Table 61.

Table 61: Significance Definitions

| Significance | Definition  |
|--------------|---|
| Major        | Where development is likely to cause a significant improvement or deterioration to the existing environment. Includes receptors with high importance such as settlements with a large number of public services, areas with traffic control signals, loading restrictions, significant traffic calming schemes, street-side retail facilities, narrow but heavily used pavements, and roads not constructed to accommodate HGV movements.<br>Receptors include schools, colleges and accident hotspots. |
| Moderate     | Where the development is likely to cause a noticeable improvement or deterioration to the existing environment. Typically includes receptors with high or medium importance such as settlements with some public services, areas with some traffic calming or other traffic management measures, and wide pavements.<br>Receptors include congested junctions, hospitals, cemeteries and conservation areas.  |
| Minor        | Where the development is likely to cause a barely perceptible improvement or deterioration to the existing environment. Generally includes receptors with low or medium importance. Typically includes smaller settlements with few public services or facilities, little or no traffic management measurements, and (where relevant) wide segregated pavements.<br>Receptors include public open space and residential areas and occasional users of the road network.                                 |
| Negligible   | No discernible improvement or deterioration to the existing environment. Typically includes receptors with little or no importance. Includes roads with no adjacent settlements and strategic routes such as trunk roads and / or motorways.<br>Users not sensitive to transport effects.   |

## Methodology for Establishing Baseline Conditions

- 8.3.23** In order to gain a better understanding of the existing traffic conditions within the network area, 24-hour Automatic Traffic Count (ATC) data was commissioned. This data, which is in the form of 24-hour AADT flows, provides 2016 volumetric counts of traffic travelling along three separate counts sites, the locations of which are shown in Figure 8.
- 8.3.24** As discussed in paragraph 15.4.6, the potential environmental effects at nine receptor sites are being considered as part of this assessment. The data for three of these sites was obtained from the ATC data referred to in the paragraph above. The data for the remaining six sites has been extrapolated from peak hour traffic counts, the details of which are discussed in the Transport Assessment (TA) which forms part of this planning application. The location of all count sites, both observed and 'virtual', are illustrated in Figure 8.
- 8.3.25** Traffic accident data was obtained from the publically accessible STATS19 database for the last five years. This data includes all recorded Personal Injury Accidents (PIA's) in the vicinity of the site, including Balunie Drive to the south and Drumgeith Road to the north.

## Methodology for assessment of effects from construction

### Construction programme and phasing

- 8.3.26** The impact of construction traffic is defined as:
- 'The extent of additional vehicle movements that would be generated during the construction phase – such impacts comprising other light vehicle movements as well as HGV (Heavy Goods Vehicle) movements and will be temporary in nature and will be variable dependant on the level of construction activity taking place at any one time'.*
- 8.3.27** In order to calculate the number of traffic movements, a series of assumptions have been made, summarised as follows:
- All construction related information and programming schedules have been provided by the Applicant;
  - Vehicle movements are defined as a return journey from the vehicle's origin, to the construction site and then back to the vehicles point of origin / elsewhere (i.e. two-way);
  - Excluding any site operatives who will likely be travelling to/from the site by car, all construction vehicles have been assumed to be a HGV. This helps to ensure that a 'worst-case' scenario is being assessed;

- All general construction vehicles have been assumed to travel to / from the construction site via Drumgeith Road and Forties Road. As confirmed by the Applicant, it has been assumed that 60% of all construction vehicles will approach the Baldovie Industrial Estate from the west via Drumgeith Road, while the remaining will travel north along Baldovie Road and along the eastern end of Drumgeith Road; and
- All AILs will arrive and depart the site from either the west or the east, depending on the load type and its origin.

**8.3.28** The methodology used to determine the significance of the construction effects is based upon a quantitative assessment of traffic volumes and other associated numerical data, in conjunction with exercising qualitative professional judgement as part of the interpretation of the analysis.

### Methodology of assessment of effects from operation

**8.3.29** The assessment of the Proposed Scheme during its operational phase is based upon an opening year of 2020, as confirmed by the Applicant.

**8.3.30** No growth of the baseline traffic data has been applied. This is as discussed with the transport officers of DCC and agreed as part of the TA scoping process. To ensure consistency between the TA and the assessment presented by this chapter, the same principle of ‘zero growth’ has been applied as part of both assessment methodologies.

**8.3.31** In a similar manner to the assessment of the likely traffic effects resulting from the construction phase, the operational phase is based on those impact types which have not already been scoped out of the assessment process, namely:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian and cycle amenity;
- Fear and intimidation; and
- Accidents and safety.

## 8.4 Assumptions and limitations

### Limitations

**8.4.1** The construction of the proposed EfW CHP facility will also encompass the construction of a Flood Mitigation area. However, no data is currently available on the extent of the excavation works which are likely to be required and whether the soil can be retained on-site or will be extracted/removed. The environmental effect of this stage will

be assessed separately following discussions with DCC and other key stakeholder, and once the scale of the works is known.

## Assumptions

- 8.4.2** In order to assess the effects which are associated with an intensification of HGV movements associated with the construction of the proposed EfW CHP facility, along with any operational impacts, a range of assumptions have been incorporated into the assessment process. These assumptions are presented in paragraph 8.3.27 and are in keeping with industry standard practice. Furthermore, they focus the assessment process on a ‘worst-case’ scenario and have been applied in accordance with the agreed scope.

## 8.5 Baseline

### Study area and key features

- 8.5.1** The study area extends from Ballumbie Road to the north of the site to Balunie Drive to the south. Forties Road serves the industrial estate and connects the site to Drumgeith Road. To the east lies Kellas Road and Baldovie Road.
- 8.5.2** The study area also include the whole of the Baldovie Industrial Estate, including the east-west running Piper Street. The industrial estate has been identified as a low sensitivity receptor.
- 8.5.3** Footways and lighting are provided along the majority of the roads within the study area. Further segregated footways / footpaths are also provided running adjacent to Dighty Water. Full details of these networks are provided in the Transport Assessment.
- 8.5.4** The industrial estate road network is subject to a speed limit of 30mph, with all other surrounding roads subject to either 40mph or 30mph.
- 8.5.5** Forties Road provides the main access to the proposed EfW CHP facility. This road is operates as a two-way single carriageway with an approximate width of 7.5m along its length. Due to the industrial nature of the surrounding area, its use is largely confined to vehicles which service the various sites which form the industrial estate.

### Road safety and accidents

- 8.5.6** With regards baseline traffic accident data, Table 62 presents a summary of the 16 recorded accidents in the vicinity of the site over the course of the past five years.

Table 62: Recorded road traffic accidents (2010 – 2014)

|                  | Accident no. and Severity |         |       |
|------------------|---------------------------|---------|-------|
|                  | Slight                    | Serious | Fatal |
| No. of Accidents | 10                        | 6       | 0     |

**8.5.7** As shown in Table 62, there have been no fatal accidents occurring during the last five years within the vicinity of the site.

### Observed traffic flow data

**8.5.8** Baseline traffic flow data has been derived using counts from the three observed ATC sites and the six ‘virtual’ ATC sites, referred to in paragraph 8.3.23 and illustrated in Figure 8. The resulting 24-hour 2016 baseline traffic flows are presented in Table 63. Also shown are the number and percentage of HGVs and the level of sensitivity of each receptor.

Table 63: Baseline Traffic Survey Data (2016)

| Count Site Ref | Count Method           | Count Location                           | Receptor Sensitivity | AADT   | No. of HGVs (OGV2) | % of HGVs |
|----------------|------------------------|--|----------------------|--------|--------------------|-----------|
| A              | Observed               | Drumgeith Road (west)                    | Low                  | 13,220 | 93                 | 0.7%      |
| B              | Observed               | Balunie Drive                            | Low                  | 5093   | 8                  | 0.2%      |
| C              | Observed               | Forties Road (south of site access)      | Negligible           | 471    | 4                  | 0.9%      |
| D              | Virtual / extrapolated | Forties Road (north of Piper St)         | Negligible           | 1,920  | 110                | 5.7%      |
| E              | Virtual / extrapolated | Drumgeith Road (east of Forties Road)    | Low                  | 14916  | 224                | 1.5%      |
| F              | Virtual / extrapolated | Ballumbie Road (north of Drumgeith Road) | Medium               | 5,821  | 8                  | 0.1%      |

| Count Site Ref | Count Method           | Count Location                          | Receptor Sensitivity | AADT   | No. of HGVs (OGV2) | % of HGVs |
|----------------|------------------------|---|----------------------|--------|--------------------|-----------|
| G              | Virtual / extrapolated | Drumgeith Road (east of Ballumbie Road) | Low                  | 16,310 | 206                | 1.3%      |
| H              | Virtual / extrapolated | Kellas Road (north of Drumgeith Road)   | Low                  | 9,348  | 88                 | 0.9%      |
| I              | Virtual / extrapolated | Baldovie Road (south of Kellas Road)    | Low                  | 13,695 | 173                | 1.3%      |

**8.5.9** In considering the percentage of HGV movements, it is important to understand the type of industries which operate within the surrounding area. Firstly, there is the existing DERL facility adjacent to the proposed EfW CHP facility. To the north of the DERL facility is the ATS Recycling Centre. Finally, the surrounding area consists of numerous other industrial and commercial businesses, all of which have the potential to contribute to the number of HGVs on the industrial estate road network. Given that this network does not include any 'through' roads and shows relatively low AADT flows, the percentage of HGVs is subsequently higher as a proportion of the background traffic flows.

**8.5.10** For the purposes of this assessment, all traffic analysis has been based upon 24-hour AADT flows. This helps to ensure that all construction vehicle movements, including those associated with any potential 24-hour operations, are captured and incorporated into the overall traffic and transportation assessment.

## **8.6 Potential effects and good environmental design management**

**8.6.1** The elements of the proposed EfW CHP facility relevant to transport are set out in this section.

### **Construction**

**8.6.2** The following aspects of construction are particularly relevant to transport and may give rise to effects:



- An increase in the number of trips on the local highway and public transport networks due to construction workers accessing the construction site;
- Local traffic changes due to HGV movements;
- Temporary road and footway closures; and
- Temporary use of road or land adjacent to the road network for HGV holding areas.

**8.6.3** Potentially adverse effects during construction would be managed through the implementation of a Construction Traffic Management Plan (CTMP). The CTMP sets out the control measures and standards of work required of the Contractor to control potential effects of the construction of the proposed EfW CHP facility. Measures for reducing the traffic and transport effect of the construction process include:

- Measures to minimise the effect of any works on the surrounding road network;
- Measures to avoid / limit and mitigate the deposition of mud and other debris on the highway;
- Traffic safety measures including risk reduction measures and the provision of temporary traffic signs and road markings where necessary; and
- Monitoring of traffic management schemes to maintain their effectiveness.

## Operation

**8.6.4** The following operational aspects of the development proposals are particularly relevant to traffic and transport and could give rise to effects:

- Changes to the number of trips on the local road network due to operational vehicles and employees travelling to and from the site; and
- The provision of a new emergency vehicle access route to the site.

**8.6.5** Potentially adverse effects during operation would be managed through the implementation of an operational (employee) Travel Plan containing measures such as the provision of cycle parking, travel information and encouraging car sharing. A Travel Plan framework is provided as part of the TA.

**8.6.6** An Operations and HGV Management Plan could also be prepared. This would help implement and maintain safe working practices throughout the site, particularly with regards the movement of HGVs when accessing or egressing the site, along with manoeuvres within the tipping hall.

**8.6.7** This Plan would be continually reviewed and updated, if required, throughout the operational period of the

## **8.7 Assessment – Construction**

**8.7.1** The construction programme will comprise four main elements:

- Site mobilisation and construction of haul roads;
- Preliminary construction works (i.e. earthworks);
- Main construction works (i.e. infrastructure and structural); and
- De-mobilisation.

**8.7.2** The project description and application include provision for a construction compound which will include the following key elements:

- Maintenance yards and stores;
- Ancillary facilities such as fuel storage;
- Site operative car parking for 110 spaces;
- Office accommodation;
- Small workshops; and
- Emergency accommodation and canteen facilities.

**8.7.3** The indicative construction programme is expected to start in 2017. This programme is defined in numbers of months rather than taking a date-specific approach. The numbers of months are estimates only.

**8.7.4** The numbers, types and weights of the construction vehicles predicted to be used throughout the construction of the Proposed Scheme will relate directly to the different construction phases identified as part of the anticipated construction build programme.

**8.7.5** It is anticipated that the construction site will, subject to DCC agreement, operate between the hours of 07:00hrs to 18:00hrs during Monday to Friday and from 08:00hrs to 13:00hrs on Saturdays. There will be no construction works on Sundays or public holidays.

**8.7.6** The number of site operatives and other staff present on-site at any one time will vary throughout the course of the construction programme. As a worst case, there will be a maximum of 300 staff present on-site per day during the peak construction month no. 10. This 'worst-case' scenario for site operatives occurs at the same time as the 'worst case' scenario for construction vehicle movements.

**8.7.7** Of the 300 staff who travel to/from the site on a daily basis, it is expected that up to 110 will arrive/depart by car, as this is the maximum number of car parking spaces which will be made available at the car park in the temporary construction compound. Of the operatives who travel by car, a small number of them may 'car share'.

Based on an average car occupancy of 1.51 people per car, as identified in the Scottish Household Travel Survey which includes detailed travel statistics on how people travel to work (Transport Scotland, 2014), this would equate to approximately 73 car-based trips to and from the site (146 two-way trips). However, for the purposes of this 'worst-case' assessment, it has been assumed that all 110 parking spaces will be fully occupied by single occupancy cars, equating to 220 daily trips (two-way).

**8.7.8** As part of the assessment process, dialogue was held with DCC and the Applicant regarding the likely routes for construction vehicles arriving/departing the site. Through these discussions, it was identified and agreed by the Applicant that construction traffic will travel to the site from both the east and the west, with car-based trips distributed based on observed turning proportions and HGV trips distributed with 60% to / from the west and 40% to / from the east.

**8.7.9** Upon reaching the site, general construction vehicles will leave Drumgeith Road and then proceed south along Forties Road to the temporary construction compound which will be located to the west of Forties Road. A review of the pavement construction on this section of road will be undertaken to ensure its suitability for the transportation of all plant and materials prior to the construction works starting.

**8.7.10** It is anticipated that dedicated off-loading areas in the construction compound and on the actual proposed EfW CHP construction site will serve the different elements of the proposed EfW CHP facility. This arrangement will form part of a safe vehicle management operation system as developed by the construction contractor.

**8.7.11** Based on the information provided by the Applicant, the construction activities and the associated average number of vehicle movements that will take place during the construction period are summarised in Table 64. The number of construction vehicle movements are based on the peak construction period during month no. 10, which the Applicant has confirmed will be the 'worst case' scenario. In reality, the number of construction vehicles being generated by the proposed EfW CHP facility is expected to be lower depending on the stage of construction, with a subsequent lessening in the expected impact of the construction phase on the surrounding transportation network.

Table 64: Estimated no. of Construction Vehicle Movements by Vehicle Type (during month no. 10)

| Vehicle Type                     | No. of Daily Vehicle Trips (2-way) |
|----------------------------------|------------------------------------|
| Site operatives and staff travel | 220                                |
| Construction HGVs                | 116                                |
|                                  |                                    |
| <b>Total Daily Trip (2-way)</b>  | <b>336</b>                         |

**8.7.12** The arrival and departure of site operatives will be vary depending on the construction activities being undertaken at that time and, if distributed equally across the hours of construction operations which are permitted, equates to approximately 30 vehicles per hour.

**8.7.13** Given that the largest number of construction vehicle movements is expected to occur in month no. 10, this is the month that has been used to determine the effects of the Proposed Scheme on the operation of the local road network during the construction phase.

**8.7.14** The percentage increase in total traffic volumes and the number of HGV trips throughout the surrounding public road network resulting from the construction phase have been compared against the baseline traffic information and are summarised in Table 65. The impact of construction vehicles on the operation of the public road network has been based upon the AADT flows for 2016.

Table 65: HGV impact during construction (2-way daily flows, month no. 10)

| Count Site Ref | AADT (2016) | No. of HGVs (OGV2) | No of HGV construction vehicles (OGV2) | % increase AADT | % increase HGVs |
|----------------|-------------|--------------------|--|-----------------|-----------------|
| A              | 13,220      | 93                 | 70                                     | 2.5%            | 75.2%           |
| B              | 5,093       | 8                  | 0                                      | 0.0%            | 0.0%            |
| C              | 471         | 4                  | 0                                      | 0.0%            | 0.0%            |
| D              | 1,920       | 110                | 116                                    | 29.0%           | 105.5%          |
| E              | 14,916      | 224                | 47                                     | 1.5%            | 21.0%           |
| F              | 5,821       | 8                  | 0                                      | 0.6%            | 0.0%            |
| G              | 16,310      | 206                | 47                                     | 1.1%            | 22.8%           |
| H              | 9,348       | 88                 | 0                                      | 0.4%            | 0.0%            |
| I              | 13,695      | 173                | 47                                     | 1.1%            | 27.2%           |

**8.7.15** The data presented in Table 65 indicates that the percentage increase in HGVs along Drumgeith Road will range from 75% to the west and 21% to the east. It can be seen that the 30% IEA threshold is exceeded at two of the nine count sites. Based on the magnitude criteria as set out in Table 59 and the effect significance presented in Table 60, the impact of construction vehicles on the operation of the local road network at all nine count sites is considered to be ‘negligible’ to ‘moderate’, as summarised in Table 66.

Table 66: HGV impact significance during construction

| Count Site Ref | Receptor Sensitivity | Receptor Magnitude | Impact Significance |
|----------------|----------------------|--------------------|---------------------|
| A              | Low                  | Medium             | Moderate            |
| B              | Low                  | Negligible         | Minor               |
| C              | Negligible           | Negligible         | Negligible          |
| D              | Negligible           | High               | Minor               |
| E              | Low                  | Negligible         | Minor               |
| F              | Medium               | Negligible         | Minor               |
| G              | Low                  | Negligible         | Minor               |
| H              | Low                  | Negligible         | Minor               |
| I              | Low                  | Negligible         | Minor               |

**8.7.16** Based on the results presented in Table 66 and in terms of the EIA Regulations, the effect of the construction process is therefore considered to be ‘**not significant**’ at all sites, excluding site ‘A’ where the effect is considered to be ‘**significant**’. Refer to Figure 8 for the location of the count sites.

**8.7.17** In addition to the daily HGV trips associated with general construction vehicles, there will also be a limited number of heavy plant or equipment deliveries such as structural elements of the proposed EfW CHP facility or mobile cranes. These items tend to be large and heavy and often put significant demands on local infrastructure.

**8.7.18** The planning for heavy deliveries is usually determined by the heaviest single load. The proposed routing for AILs and other such heavy / over-sized loads will be dependent on the origin of the delivery vehicle / equipment. All deliveries will, however, approach the site using and remaining on either Drumgeith Road and Baldovie Road, thereby removing any potentially negative effects resulting from the transport of AIL through sensitive areas, such as areas of high residential development.

- 8.7.19** The final access route to and from the site will be agreed with DCC, Transport Scotland (where relevant), Police Scotland and all other relevant stakeholders prior to the movement of any AILs. This will include consideration of, amongst other issues, the potential requirement for temporary road closures or the use of convoy operations.
- 8.7.20** Prior to the movement of any AILs, a utility assessment will be undertaken (where necessary) as part of the detailed design stage. This will include consideration of any road widening and pavement strengthening which may be required. Where public road boundaries are altered to permit the formation of a temporary site access point, these will be re-instated at the conclusion of the construction works. This will be conditioned as part of any planning consent and subsequently addressed at the detailed design stage.

### Severance

- 8.7.21** The maximum increase in HGVs associated with the construction phase range from 0% to 75% on the main public road network, with an increase of 106% on Forties Road which functions as a dedicated industrial access road, providing no 'through' access.
- 8.7.22** At site A, after combining the 'low' sensitivity of the receptor and the 'medium' magnitude of the effect, it is considered that the severance effects of HGV construction traffic will be 'moderate' and therefore considered to be **'significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.23** Combining the 'low' sensitivity of the receptors at sites B, E, G, H, and I, along with the 'negligible' magnitude of the effect, it is considered that severance effects of HGV construction traffic at these sites will be 'minor' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.24** At site C, after combining the 'negligible' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the severance effects of HGV construction traffic will be 'negligible' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.25** At site D, after combining the 'negligible' sensitivity of the receptor and the 'high' magnitude of the effect, it is considered that the severance effects of HGV construction traffic will be 'minor' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.26** At site F, after combining the 'medium' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the severance effects of HGV construction traffic will be 'minor' and

therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

### Driver delay

- 8.7.27** There is potential for drivers to be delayed as a result of construction traffic accessing/egressing the site. The IEA Guidelines advise, *'delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system'*.
- 8.7.28** At site A, after combining the 'low' sensitivity of the receptor and the 'medium' magnitude of the effect, it is considered that the levels of driver delay as a result of HGV construction traffic will be 'moderate' and therefore considered to be '**significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.29** Combining the 'low' sensitivity of the receptors at sites B, E, G, H, and I, along with the 'negligible' magnitude of the effect, it is considered that the levels of driver delay as a result of HGV construction traffic at these sites will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.30** At site C, after combining the 'negligible' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the levels of driver delay as a result of HGV construction traffic will be 'negligible' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.31** At site D, after combining the 'negligible' sensitivity of the receptor and the 'high' magnitude of the effect, it is considered that the levels of driver delay as a result of HGV construction traffic will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.32** At site F, after combining the 'medium' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the levels of driver delay as a result of HGV construction traffic will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.33** For the purposes of transporting AILs, it is expected that temporary road closures and the use of convoy operations may be required. However, this will be considered as part of the detailed CTMP prepared in advance of any such operations. Furthermore, the CTMP will be discussed and agreed with all relevant stakeholders such as DCC and Police Scotland prior to any works being undertaken.

### Pedestrian delay



- 8.7.34** Pedestrian delay could be affected due to the construction traffic entering and exiting the site, which could cause delays for pedestrians when crossing the site access junction.
- 8.7.35** At site A, after combining the 'low' sensitivity of the receptor and the 'medium' magnitude of the effect, it is considered that the levels of pedestrian delay as a result of HGV construction traffic will be 'moderate' and therefore considered to be '**significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.36** Combining the 'low' sensitivity of the receptors at sites B, E, G, H, and I, along with the 'negligible' magnitude of the effect, it is considered that the levels of pedestrian delay as a result of HGV construction traffic at these sites will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.37** At site C, after combining the 'negligible' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the levels of pedestrian delay as a result of HGV construction traffic will be 'negligible' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.38** At site D, after combining the 'negligible' sensitivity of the receptor and the 'high' magnitude of the effect, it is considered that the levels of pedestrian delay as a result of HGV construction traffic will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.39** At site F, after combining the 'medium' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the levels of pedestrian delay as a result of HGV construction traffic will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

### **Pedestrian and cycling amenity**

- 8.7.40** At site A, after combining the 'low' sensitivity of the receptor and the 'medium' magnitude of the effect, it is considered that the impact on levels of pedestrian and cycle amenity as a result of HGV construction traffic will be 'moderate' and therefore considered to be '**significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.41** Combining the 'low' sensitivity of the receptors at sites B, E, G, H, and I, along with the 'negligible' magnitude of the effect, it is considered that the impact on levels of pedestrian and cycle amenity as a result of HGV construction traffic at these sites will be 'minor' and therefore considered to be '**not significant**' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.



- 8.7.42** At site C, after combining the 'negligible' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the impact on levels of pedestrian and cycle amenity as a result of HGV construction traffic will be 'negligible' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.43** At site D, after combining the 'negligible' sensitivity of the receptor and the 'high' magnitude of the effect, it is considered that the impact on levels of pedestrian and cycle amenity as a result of HGV construction traffic will be 'minor' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.44** At site F, after combining the 'medium' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that the impact on levels of pedestrian and cycle amenity as a result of HGV construction traffic will be 'minor' and therefore considered to be **'not significant'** in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

### **Fear and intimidation**

- 8.7.45** The increase in HGV movements throughout the surrounding local road network as a direct result of the construction phase has the potential to increase levels of fear and intimidation, particularly for vulnerable road users such as pedestrians and cyclists.
- 8.7.46** At site A, after combining the 'low' sensitivity of the receptor and the 'medium' magnitude of the effect, it is considered that levels of fear and intimidation as a result of HGV construction traffic will be 'moderate' and therefore considered to be 'significant' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.47** Combining the 'low' sensitivity of the receptors at sites B, E, G, H, and I, along with the 'negligible' magnitude of the effect, it is considered that levels of fear and intimidation as a result of HGV construction traffic at these sites will be 'minor' and therefore considered to be 'not significant' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.
- 8.7.48** At site C, after combining the 'negligible' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that levels of fear and intimidation as a result of HGV construction traffic will be 'negligible' and therefore considered to be 'not significant' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

**8.7.49** At site D, after combining the 'negligible' sensitivity of the receptor and the 'high' magnitude of the effect, it is considered that levels of fear and intimidation as a result of HGV construction traffic will be 'minor' and therefore considered to be 'not significant' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

**8.7.50** At site F, after combining the 'medium' sensitivity of the receptor and the 'negligible' magnitude of the effect, it is considered that levels of fear and intimidation as a result of HGV construction traffic will be 'minor' and therefore considered to be 'not significant' in terms of the EIA Regulations. Refer to Figure 8 for the location of the count sites.

### Accidents and safety

**8.7.51** Accidents that are appraised in relation to transport are predominantly those in which personal injury is sustained by those involved. These are referred to as PIAs (Personal Injury Accidents). While it is acknowledged that there are varying road characteristics throughout the surrounding local road network, it is considered that in accordance with the criteria set out in the DMRB this part of the road network is classified as a 'Other S2 Road'. Default accident rates from the DMRB for this standard of road are as follows:

- Other S2 Road (single carriageway): 0.295 PIAs per million vehicle km<sup>53</sup>.

**8.7.52** Based on the above, Table 67 presents the percentage change in the predicted number of accidents on Drumgeith Road at Count Site A, before and during the construction phase. Refer to Figure 8 for the location of the count site.

Count Site A has been selected for the purposes of the accident analysis due to its location on Drumgeith Road which functions as the most heavily trafficked route within the study area, as well as this site experiencing the greatest increase in HGV movements due to construction activities.

Table 67: Predicted accident rates during construction

| Count Site         | Baseline total distance travelled (vehicle km per day, 2-way) <sup>1</sup> | Construction phase total distance travelled (vehicle km per day, 2-way) <sup>2</sup> | PIA % change | Effect magnitude | Effect significance |
|--------------------|--|--|--------------|------------------|---------------------|
| A – Drumgeith Road | 26,017   | 26,674   | 2.5%         | Negligible       | Minor               |

1. Distance in km between count sites A and I used for distance calculations.

<sup>53</sup> Design Manual for Roads and Bridges (2004); Table 4/1, Default Accident Rates, Part 2, The Valuation of Costs and Benefits, Section 1, Volume 13; HMSO, London.

2. Construction traffic includes both HGV movements and site operative trips.

**8.7.53** Based on the results presented in Table 67, the predicted change in the number of accidents along Drumgeith Road / Baldovie Road, and therefore the predicted impact magnitude, is ‘minor’.

**8.7.54** As presented in Table 62, there have been no fatal accidents on the surrounding road network over the course of the last five years. Combining the ‘low’ sensitivity of the receptors at count site A, (as outlined in Table 66, with the location of the count site shown in Figure 8), along with the ‘negligible’ magnitude of the effect at the count site (as outlined in Table 66), it is considered that the effects of HGV construction traffic on accident rates along Drumgeith Road will be ‘minor’. This is therefore considered to be ‘**not significant**’ in terms of the EIA Regulations.

## **8.8 Assessment – Switching**

**8.8.1** The switching phase of the proposed EfW CHP facility is expected to have a limited effect (beneficial or detrimental) on the traffic flows being generated by the site. This is due to the switching phase being predicted to generate no additional car-based or HGV trips to / from the site over and above that which is predicted to be generated by either the construction or operational phases.

**8.8.2** However, should the traffic flows be affected in some way, this is predicted to result in a decrease in the total number of generated trips, with a resulting decrease in any potential impact compared to the construction or operational phases. For this reason, the assessment of the switching phase within the context of traffic and transportation is not considered to be required and has been scoped out of the assessment.

## **8.9 Assessment – Decommissioning of the existing DERL facility**

**8.9.1** Once the proposed EfW CHP facility is operational, the existing DERL facility will be decommissioned. However, this stage does not form part of the proposed EfW CHP facility and will be subject to a separate planning application.

**8.9.2** Furthermore, no data or information is yet available on the details of the actual decommissioning process. For this reason, the assessment of the decommissioning phase of the existing DERL facility within the context of traffic and transportation is not considered to be required and has been scoped out of the assessment.

## 8.10 Assessment – Operation

### Road traffic impacts

**8.10.1** With a predicted year of opening of 2020, the scenarios considered as part of this operational assessment are as follows:

- 2020 Reference Case (do-nothing); and
- 2020 Do-Something (with proposed EfW CHP facility).

**8.10.2** The trips associated with the operation of the proposed EfW CHP facility have been distributed throughout the local road network based on two methods, depending on the vehicle type. These methods are as follows:

- Car-based operational trips: 100% of these trips have been distributed in accordance with the observed turning proportions, as defined by the 2016 traffic surveys and as agreed with the transport officers of DCC; and
- HGV-based operational trips: as confirmed by the Applicant, these trips have been distributed in accordance with a 60% / 40% split along Drumgeith Road, to the west and east, respectively. All HGV trips have been assumed to remain on either Drumgeith Road or Baldovie Road. Of the development trips, 100% are assumed to use Forties Road as a means of accessing the development site.

**8.10.3** The future 2020 Reference Case assumes no background traffic growth, as agreed with the transport officers of DCC as part of the Transport Assessment scoping process.

**8.10.4** In accordance with the agreed scope, an assessment to determine the likely number of vehicle trips generated during the operation of the proposed EfW CHP facility has been undertaken. In order to obtain estimations of the likely traffic generation resulting from the site, the Applicant confirmed that the site will generate minimal volumes of additional traffic (i.e. new trips) over and above what the existing DERL facility generates.

**8.10.5** Table 68: Staff trip generation and distribution (car-based vehicle no.) Table 68 outlines the number of staff-based trips predicted to be arriving/departing the site over the course of 24 hours. These values were provided by the Applicant and assume a 'worst-case' scenario whereby all staff arrive in single occupancy cars. In reality, a proportion of staff may arrive as a car passenger, as a pedestrian, or by public transport. Where this occurs, the total trip generation of car-based trips to / from the site will be lower, with a subsequent reduction on the potential impact.

Table 68: Staff trip generation and distribution (car-based vehicle no.)

| Total no. of Daily Trips (2-way) | Distribution of Daily Trips (veh. no.), 2-way |                |             |               |
|----------------------------------|---|----------------|-------------|---------------|
|                                  | Drumgeith Road (west)                         | Ballumbie Road | Kellas Road | Baldovie Road |
| 66                               | 40  | 6              | 5           | 15            |

### 8.10.6

Using the impact assessment methodology described in paragraph 8.3.29 to 8.3.31, the 24-hour traffic impacts during the operational phase of the EfW CHP facility are presented in Table 69. This represents the increase in traffic flows (i.e. new trips) over the 2020 Reference Case scenario rather than the total traffic generation of the site.

Table 69: AADT operational traffic increase (2-way), Ref vs. Scheme (2020)

| Count Site Ref | AADT Diff (veh. no.) | HGV Diff (veh no.) | % AADT Change | % HGV Change |
|----------------|----------------------|--------------------|---------------|--------------|
| A              | 51                   | 11                 | 0.4%          | 12.2%        |
| B              | 0                    | 0                  | 0.0%          | 0.0%         |
| C              | 0                    | 0                  | 0.0%          | 0.0%         |
| D              | 85                   | 19                 | 4.4%          | 17.3%        |
| E              | 133                  | 8                  | 0.2%          | 3.4%         |
| F              | 25                   | 0                  | 0.1%          | 0.0%         |
| G              | 108                  | 8                  | 0.2%          | 3.7%         |
| H              | 26                   | 0                  | 0.1%          | 0.0%         |
| I              | 82                   | 8                  | 0.2%          | 4.4%         |

### 8.10.7

As shown in Table 69, both count locations show a negligible increase in AADT or HGV movements. Based on the traffic flows summarised in Table 63, it can be seen that the increase in either general traffic flows or in HGV flows is well below the 30% IEA threshold. Given that the percentage increase in traffic flows resulting from the Proposed Scheme is so low, it is considered that the effect significance will be 'negligible'.

### 8.10.8

Based on this, along with professional judgement, all impacts resulting from the operational phase of the development proposals are therefore considered to be '**not significant**' in terms of the EIA Regulations.

## Assessment of effects from post-opening and decommissioning

- 8.10.9** The proposed EfW CHP facility will be constructed in accordance with all relevant building standards and modern construction techniques, and is expected to have a design life such that no decommissioning phase has been considered as part of this assessment. There may, however, be minor ongoing maintenance/renovation works, modification and replacement on an as-needed basis throughout the life of the development.

## 8.11 Supplementary mitigation

- 8.11.1** The EIA Regulations require a description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effect on the environment. The purpose of this section is to consider the different effects that have been identified under Section 8.7 and Section 8.10, and propose appropriate mitigation measures to mitigate the predicted impact.

### Construction

#### Construction Traffic Management Plan Framework

- 8.11.2** The purpose of the Construction Traffic Management Plan (Framework) is to set out the high-level principles that the appointed contractor should look to include within the final CTMP. These include:
- The appointed contractor will be responsible for developing the CTMP;
  - This plan will be prepared by the appointed contractor and will be agreed with DCC, Police Scotland, other relevant bodies and is likely to include details such as the timing of site deliveries;
  - The contractor should commit to minimising vehicle movements and reducing the impact on the local roads via the construction programme. Details of any diversion, disruption or other abnormal use of the public road during construction works should be provided;
  - If any abnormal vehicles are to be used the contractor will liaise and obtain all necessary agreements including from DCC and Police Scotland;
  - Temporary directional signage for construction vehicles should be installed by the contractor indicating the agreed delivery route and details of how contractors, deliveries and visitors will be made aware of routeings and onsite restrictions prior to undertaking the journey;

- Details of how any site access controls are to be operated and staffed and the arrangement for waiting vehicles should be provided along with the details of how construction vehicles are to be coordinated to arrive on-site to avoid any waiting on the public road;
- Details regarding proposed wheel cleaning and road sweeper arrangements should be provided;
- Use of material which is sourced on-site will contribute towards reducing the need for construction traffic to enter/leave the site; and
- The contractor will, where relevant, be expected to attend Local Roads Authority, Utilities Liaison and Community Liaison meetings to discuss the works as they progress.

**8.11.3** Given this, it is proposed that a CTMP is prepared to ensure that all reasonable steps are taken to minimise and mitigate the predicted adverse effects of the construction process.

### **Materials**

**8.11.4** Appropriate techniques shall be employed to minimise the quantities of material being imported or exported to/from the site. Materials resulting from, for example, earthworks will, be reused wherever possible.

### **Operation**

**8.11.5** Due to the limited traffic generation and location of the proposed EfW CHP facility within the Baldovie Industrial Estate, no operational mitigation is proposed.

## **8.12 Residual effects**

**8.12.1** Residual effects are the predicted effects of a project on the environment after the proposed practicable mitigation measures have been adopted. In other words, the predicted actual effects of the project.

## Construction

- 8.12.2** As the CTMP is the responsibility of the appointed contractor to develop, implement and monitor, it is not yet possible to quantify its likely effect on impact magnitude. However, although the volume of construction vehicles is expected to remain as per the assessment, the initiatives contained within the CTMP are predicted to mitigate any potential impacts by, for example, minimising driver delay within the vicinity of the site access through the coordination of construction vehicle delivery schedules. The predicted pre-mitigation impact is based upon a 'worst case' scenario. In reality, the number of construction vehicles being generated by the proposed EfW CHP facility may be lower, with a subsequent lessening in the expected impact of the construction phase on the surrounding transportation network.
- 8.12.3** Furthermore, the residual effects resulting from the construction phase will be of a temporary nature. Subject to the successful implementation and monitoring of the CTMP and in conjunction with the temporary nature of the construction process, it is therefore considered that the impact magnitude will be lessened to 'minor', depending on receptor location. It is therefore considered that the residual effects as a direct result of the construction process will be '**not significant**'.

## Operation

- 8.12.4** It is predicted that there will be no residual effects resulting from the operational stage of the proposed EfW CHP facility.

## 8.13 Sensitivity test for programme delay

- 8.13.1** The effect of any potential delay to the construction programme, or indeed, the other proposed EfW CHP facility phases is expected to have no effect (beneficial or detrimental) on the traffic flows being generated by the site. This is primarily due to no growth being applied to background traffic flows, as agreed with the transportation officer of DCC. Furthermore, the traffic and transportation effects resulting from any known committed developments (Table 70) will be negligible due to the very low volumes of traffic these are expected to generate.
- 8.13.2** For this reason, it is considered that there is no requirement to undertake a sensitivity test to determine the potential traffic and transportation effects resulting from programme delay.



## 8.14 Cumulative effects

### Construction

**8.14.1** There are likely to be very few cumulative effects as a result of the Proposed Scheme during the construction phase as these works will be of a temporary nature. Furthermore, there are no known construction activities relating to any other significant/committed developments within the vicinity of the proposed EfW CHP facility which are likely to occur at the same time as construction of the proposed EfW CHP facility.

**8.14.2** It is therefore predicted that there are unlikely to be any significant cumulative effects resulting from the Proposed Scheme during its construction phase.

### Operation

**8.14.3** For the purposes of the traffic and transport assessment of the operational phase of the proposed EfW CHP facility, a search for planning applications within 1km of the development site was undertaken using DCC's online planning portal on 8 June 2016. This search focused on major new developments, including new buildings, sites of more than ten residential dwellings or any other changes of use which may result in increased vehicular traffic.

**8.14.4** A review of the search outputs identified a number of developments that may need to be accounted for within this assessment. These are summarised in Table 70. Furthermore, Table 70 shows that a number of the developments have either been refused planning permission and/or deemed not to generate any significant numbers of new trips. All such developments can therefore be excluded from the assessment of cumulative effects.

Table 70: Potential Committed Developments

| Applicat<br>ion Ref | Address   | Proposal Description  | To be Included as part of Traffic Assessment? / Reason   |
|---------------------|---|---|--|
| 15/00530<br>/FULL   | Site 1, Forties Road,<br>Baldovie Industrial Estate,<br>Dundee, DD4 0NS   | Change of use to from vacant industrial unit to indoor football and multi sports centre.  | <b>No</b><br>Application refused.  |
| 14/00475<br>/FULL   | Land To North Of Barlow<br>Avenue And East Of Fowler<br>Road, West Pitkerro Industrial<br>Estate, Dundee, DD5 3RU | Erection of industrial building and formation of secure yard for commercial vehicle parking.  | <b>No</b><br>No TA or TS was prepared in support of this application, suggesting minimal traffic generation.                                       |
| 15/00257<br>/FULL   | Land At Aberlady Crescent<br>Dundee, DD4 0LF  | Erection of 26 Houses   | <b>No</b><br>Consent not yet granted. Furthermore, no TA or TS was prepared in support of this application, suggesting minimal traffic generation. |
| 15/00503<br>/FULL   | Land At, Aberlady Crescent<br>Dundee, DD4 0LF   | Erection of 24 Houses (Phase 2)   | <b>No</b><br>Consent not yet granted. Furthermore, no TA or TS was prepared in support of this application, suggesting minimal traffic generation. |
| 14/00847<br>/FULL   | Land To North Of Drumgeith<br>Road And West Of<br>Summerfield Avenue, Dundee<br>DD4 0JE                           | Erection of 11 houses and formation of access road, SUDS basin and associated access (variation to planning application ref: 14/00086/FULL) | <b>No</b><br>No TA or TS was prepared in support of this application, suggesting minimal traffic generation.                                       |
| 14/00827<br>/FULL   | Land To North Of Whitfield<br>Terrace And East Of Whitfield<br>Loan, Dundee, DD4 0BE                              | Erection of 30no. two storey semi-detached houses   | <b>No</b><br>Application withdrawn. Furthermore, no TA or TS was prepared in support of this application, suggesting minimal traffic generation.   |

| Applicat<br>ion Ref | Address  | Proposal Description  | To be Included as part of Traffic Assessment? / Reason   |
|---------------------|--|---|--|
| 15/00120<br>/FULL   | Land To North Of Whitfield Terrace And East of Whitfield Loan, Dundee, DD4 0BE       | Erection of 30No two storey detached houses (re-application)                                | <b><u>Yes</u></b><br>Traffic generation data will be extracted from the associated TS.   |
| 15/00148<br>/FULL   | St Pius Roman Catholic Primary School, Banchory Road, Dundee, DD4 7TQ                | New Nursery Unit  | <b><u>No</u></b><br>No TA or TS was prepared in support of this application, suggesting minimal traffic generation.  |
| 14/00086<br>/FUL    | Land to the north of Drumgeith Road and west of Summerfield Avenue, Dundee (Phase 1) | Erection of 49 dwelling units, access roads, landscaping and associated drainage facilities | <b><u>No</u></b><br>Within the context of traffic and transportation, and as agreed with DCC, this development was identified as having minimal impact on the operation of the surrounding road network.<br>A TS was submitted in support of the application rather than a full, detailed TA, thereby suggesting low levels of traffic generation. |
| 15/00442<br>/FULL   | Phase 2, Land to the north of Drumgeith Road and west of Summerfield Avenue, Dundee  | Phase 2 – 12 domestic dwellings, including associated landscaping and car parking.          | <b><u>No</u></b><br>Construction not yet started. Development to begin by 7 August 2018.<br>No TA or TS was prepared in support of this application, suggesting minimal traffic generation.  |
| 16/00536<br>/FULL   | Phase 3 Land to the north of Drumgeith Road and west of Summerfield Avenue, Dundee   | Erection of 28 houses and associated access roads, car parking and landscaping.             | <b><u>No</u></b><br>Approved subject to conditions. Development to begin 31 August 2019.<br>No TA or TS was prepared in support of this application, suggesting minimal traffic generation.  |

**8.14.5** Based on the committed developments identified in Table 70, the residential development located off Whitfield Terrace was identified by DCC transport officers as needed to be included as part of the TA. To ensure consistency with the TA, the same committed development and levels of traffic generation have been included as part of this assessment.

**8.14.6** The total two-way traffic generation associated with this development is summarised in Table 71.

Table 71: Committed development trips (no. of vehicles, two-way), planning application reference 15/00120/FULL

| Count Site Ref                            | Trip Generation (veh. no.),<br>two-way AADT |
|---|---|
| A – Drumgeith Road (west of Forties Road) | 99  |
| I – Baldovie Road                         | 60  |

**8.14.7** The number of trips predicted to be generated by this committed development is highest (i.e. ‘worst case’) on Drumgeith Road, at count site A located to the west of the access/egress to the Baldovie Industrial Estate and Forties Road (refer to Figure 1). Here, it is estimated that the 24 hour AADT flows relating to the development will amount of 99 two-way car-based trips. Assuming an equal distribution, this equates to only 4 vehicles per hour,

**8.14.8** All trips associated with the committed developments are included as part of the Reference Case (2020) scenario. On this basis, and the low number of trips expected to be generated by the development, the operational impacts are predicted to be ‘negligible’ and therefore ‘**not significant**’ in terms of the EIA Regulations.

## **8.15** **Assessment summary**

**8.15.1** This section provides a summary of the anticipated effects of the development proposals on the operation of the surrounding traffic and transportation networks. While only those impacts which are anticipated to have a ‘moderate’ or ‘major’ impact significance are considered significant in terms of EIA Regulations, all impacts are presented for completeness.

**8.15.2** As noted in Section 8.14, the cumulative impact is considered to be ‘**not significant**’. Furthermore, the temporary nature of the construction process, in conjunction with the development, implementation and monitoring of a CTMP, means that any likely adverse effects will be further minimised.

## Construction

### 8.15.3 Table 72 provides a summary of the likely traffic and transportation effects resulting from the construction of the proposed EfW CHP facility.

Table 72: Assessment summary - construction

| Traffic and Transportation |  |                          |   |
|----------------------------|--|--------------------------|---|
| Aspect of the Project      | Description of effect and significance   | Supplementary mitigation | Residual effects summary  |
| Severance                  | <p>Increase in construction vehicle movements across the local road network within the assessment area.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – <b>significant</b>.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> <p>I – not significant.</p> | Implementation of CTMP.  | <p>The number of construction vehicle movements is expected to remain constant before/after the implementation of the CTMP.</p> <p>However, through the proper implementation and monitoring of the CTMP whereby construction vehicles and delivery schedules will be fully managed, combined with the temporary nature of the residual effects, it is considered that the impact will be <b>not significant</b>.</p> |
| Driver Delay               | <p>Increase in construction vehicles may generate a potential increase in journey times for drivers travelling through the local road network within the assessment area.</p>  | Implementation of CTMP.  | <p>The number of construction vehicle movements is expected to remain constant before/after the implementation of the CTMP.</p> <p>However, through the proper implementation and monitoring of the CTMP whereby construction</p>   |

| Traffic and Transportation |  |                          |   |
|----------------------------|--|--------------------------|---|
| Aspect of the Project      | Description of effect and significance   | Supplementary mitigation | Residual effects summary  |
|                            | <p>Count Site (see Figure 1 for locations):</p> <p>A – <b>significant.</b></p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> <p>I – not significant.</p>   |                          | <p>vehicles and delivery schedules will be fully managed, combined with the temporary nature of the residual effects, it is considered that the impact will be <b>not significant.</b></p>  |
| Pedestrian Delay           | <p>Increase in construction vehicle movements discouraging pedestrians from using the existing pedestrian facilities throughout the local road network within the assessment area and, in particular, across the proposed EfW CHP facility access junction.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – <b>significant.</b></p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> | Implementation of CTMP.  | <p>The number of construction vehicle movements is expected to remain constant before/after the implementation of the CTMP.</p> <p>However, through the proper implementation and monitoring of the CTMP whereby construction vehicles and delivery schedules will be fully managed, combined with the temporary nature of the residual effects, it is considered that the impact will be <b>not significant.</b></p> |

| Traffic and Transportation   |  |                          |   |
|------------------------------|--|--------------------------|---|
| Aspect of the Project        | Description of effect and significance   | Supplementary mitigation | Residual effects summary  |
|                              | I – not significant.   |                          |   |
| Pedestrian and Cycle Amenity | <p>Increase in construction vehicle movements impacting on the ‘pleasantness’ of pedestrian/cycle journeys.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – <b>significant</b>.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> <p>I – not significant.</p> | Implementation of CTMP.  | <p>The number of construction vehicle movements is expected to remain constant before/after the implementation of the CTMP.</p> <p>However, through the proper implementation and monitoring of the CTMP whereby construction vehicles and delivery schedules will be fully managed, combined with the temporary nature of the residual effects, it is considered that the impact will be <b>not significant</b>.</p> |
| Fear and Safety              | <p>An increase in the level of fear and intimidation perceived by pedestrian’s as a result of increased levels of HGV movements on the local road network.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – <b>significant</b>.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p>  | Implementation of CTMP.  | <p>The number of construction vehicle movements is expected to remain constant before/after the implementation of the CTMP.</p> <p>However, through the proper implementation and monitoring of the CTMP whereby construction vehicles and delivery schedules will be fully managed, combined with the temporary nature of the residual effects, it is considered that the impact will be <b>not significant</b>.</p> |

| Traffic and Transportation |  |                          |   |
|----------------------------|--|--------------------------|---|
| Aspect of the Project      | Description of effect and significance   | Supplementary mitigation | Residual effects summary  |
|                            | F – not significant.<br>G – not significant.<br>H – not significant.<br>I – not significant.   |                          |   |
| Accidents and Safety       | Increased levels of conflict between construction vehicles and vulnerable road users, with an associated increase in the potential for accidents to occur.<br>Count Site (see Figure 1 for locations):<br>A – not significant.<br>B – not significant.<br>C – not significant.<br>D – not significant.<br>E – not significant.<br>F – not significant.<br>G – not significant.<br>H – not significant.<br>I – not significant. | Implementation of CTMP.  | The predicted residual effect is expected to remain unchanged due to the number of construction vehicle movements remaining constant before/after the implementation of the CTMP.<br>Any effects will be temporary in nature and considered <b>not significant</b> within the context of the overall low % increase in the number of predicted accidents. |



## Switching

- 8.15.4** As discussed in Section 8.8, the potential effects resulting from the switching phase of the development proposals on the surrounding traffic and transportation networks is predicted to be negligible and therefore ‘not significant’ in accordance with EIA Regulations. It has therefore been scoped out of this assessment.

## Decommissioning of the existing DERL facility

- 8.15.5** As discussed in Section 8.9, the decommissioning of the existing DERL facility and its potential effect on the surrounding traffic and transportation networks will be subject to a separate planning application. It has therefore been scoped out of this assessment.

## Operation

**8.15.6** Table 73 provides a summary of the likely traffic and transportation effects resulting from the construction of the proposed EfW CHP facility.

Table 73: Assessment summary – operation

| Traffic and Transportation |   |   |  |
|----------------------------|---|---|--|
| Aspect of the Project      | Description of effect and significance  | Supplementary mitigation                        | Residual effects summary   |
| Severance                  | <p>Increase in vehicle movements throughout the local road network which forms the assessment area.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – not significant.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> <p>I – not significant.</p> | No supplementary mitigation proposals proposed. | <p>The existing baseline conditions, along with those predicted when the Proposed Scheme opens, include minimal severance effects.</p> <p>The remaining residual effects are therefore negligible and considered <b>not significant</b>.</p> |
| Driver Delay               | <p>Increase in the number of vehicle movements may generate an increase in journey times for drivers travelling throughout the local road network which is included as part of the assessment area.</p>   | No supplementary mitigation proposals proposed. | <p>The number of trips expected to be generated by the proposed EfW CHP facility is minimal.</p> <p>Any residual effects remaining will therefore be negligible and <b>considered not significant</b>.</p>                                   |

| Traffic and Transportation |  |   |  |
|----------------------------|--|---|--|
| Aspect of the Project      | Description of effect and significance   | Supplementary mitigation                        | Residual effects summary   |
|                            | Count Site (see Figure 1 for locations):<br>A – not significant.<br>B – not significant.<br>C – not significant.<br>D – not significant.<br>E – not significant.<br>F – not significant.<br>G – not significant.<br>H – not significant.<br>I – not significant.   |   |  |
| Pedestrian Delay           | Increase in vehicle movements discouraging pedestrians from crossing the proposed site access junction of the proposed EfW CHP facility and creating delay on pedestrian desire lines.<br>Count Site (see Figure 1 for locations):<br>A – not significant.<br>B – not significant.<br>C – not significant.<br>D – not significant.<br>E – not significant.<br>F – not significant.<br>G – not significant.<br>H – not significant. | No supplementary mitigation proposals proposed. | The existing baseline conditions, along with those predicted when the Proposed Scheme opens, include minimal pedestrian activity.<br><br>The remaining residual effects are therefore negligible and considered <b>not significant</b> . |

| Traffic and Transportation   |  |   |  |
|------------------------------|--|---|--|
| Aspect of the Project        | Description of effect and significance   | Supplementary mitigation                        | Residual effects summary   |
|                              | I – not significant.   |   |  |
| Pedestrian and Cycle Amenity | <p>Increase in vehicle movements impacting on the ‘pleasantness’ of pedestrian/cycle journeys.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – not significant.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p> <p>G – not significant.</p> <p>H – not significant.</p> <p>I – not significant.</p> | No supplementary mitigation proposals proposed. | <p>The existing baseline conditions, along with those predicted when the Proposed Scheme opens, include minimal pedestrian and cyclist activity.</p> <p>Any residual effects remaining will therefore be negligible and considered <b>not significant</b>.</p>   |
| Fear and Intimidation        | <p>Increased traffic volumes creating an increase in the level of fear and intimidation perceived by pedestrians.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – not significant.</p> <p>B – not significant.</p> <p>C – not significant.</p> <p>D – not significant.</p> <p>E – not significant.</p> <p>F – not significant.</p>  | No supplementary mitigation proposals proposed. | <p>The existing baseline conditions, along with those predicted when the Proposed Scheme opens, suggest minimal levels of fear and intimidation.</p> <p>Furthermore, the number of trips expected to be generated by the proposed EfW CHP facility is minimal.</p> <p>The remaining residual effects are therefore negligible and considered <b>not significant</b>.</p> |

| Traffic and Transportation |  |   |  |
|----------------------------|--|---|--|
| Aspect of the Project      | Description of effect and significance   | Supplementary mitigation                        | Residual effects summary   |
|                            | G – not significant.<br>H – not significant.<br>I – not significant.   |   |  |
| Accidents and Safety       | <p>Increased levels of conflict between scheme vehicle trips and vulnerable road users, with an associated increase in the potential for accidents to occur.</p> <p>Count Site (see Figure 1 for locations):</p> <p>A – not significant.<br/>B – not significant.<br/>C – not significant.<br/>D – not significant.<br/>E – not significant.<br/>F – not significant.<br/>G – not significant.<br/>H – not significant.<br/>I – not significant.</p> | No supplementary mitigation proposals proposed. | <p>The existing baseline conditions, along with those predicted when the proposed EfW CHP facility becomes operational, indicate negligible change in the predicted accident rate throughout the local road network within the assessment area as a result of the proposed EfW CHP facility.</p> <p>Furthermore, the number of trips expected to be generated by the proposed EfW CHP facility is minimal.</p> <p>Any residual effects remaining will therefore be negligible and considered <b>not significant</b>.</p> |

## **8.16 Further work to be undertaken for the ES**

- 8.16.1** No further work is considered to be required in support of the assessment of the potential environmental effects of the proposed EfW CHP facility on the operation of the traffic and transportation networks surrounding the development site.



## 9 Water resources

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### 9.1 Introduction

- 9.1.1** A Flood Risk Assessment (FRA), consisting of computational hydraulic modelling and a Drainage Strategy of the Proposed Scheme are being undertaken. These will be submitted as part of the Planning Application. It is anticipated that they will be finalised by November 2016. An assessment of any impact will be undertaken within these reports.

### 9.2 Further work to be undertaken for the ES

#### Flood Risk Assessment

- 9.2.1** The development scheme will be assessed in terms of impact on the water environment and flood risk. Based on the SEPA flood maps parts of the proposed site appears to be at risk of flooding under current conditions. The scheme will be designed so the main elements and buildings are protected from flooding. This may require provision of compensatory flood volume storage. The detailed computational hydraulic modelling exercise is looking at this aspect. A proposed compensatory flood storage area has been included as part of the proposed scheme.
- 9.2.2** The current scheme proposals do not include any river crossings, water intakes or direct discharges into the natural water courses, so its impact is considered very limited. The latter will depend on capacity of the Scottish Water network and the location of the discharge point (to be confirmed). If a discharge into the watercourse is necessary a specific assessment will be undertaken.
- 9.2.3** However, given that the development handles waste, uncontrolled surface runoff or flooding may result in the dispersion of waste beyond the site and potentially into the nearby watercourses. The development design and management will ensure that accidental spread of the waste material does not occur. This will be addressed in the CEMP and SWMP.

#### Drainage Assessment

- 9.2.4** A drainage assessment has been undertaken to assess the impact of the new development on the existing Scottish Water surface water and foul water system. To minimise the impact of the surface water from the new development the surface water must be treated and attenuated. It will be treated by SUDS in accordance with the general binding rule 10 of the Controlled Activity Regulations. The SUDS will be designed in accordance with the SUDS Manual. To achieve this the design will include a series of features forming a storm water



management drain throughout the site. This will include source control features such as permeable paving, swales and filter trenches. All these will drain to a final stage of treatment provided in a basin. The basin will also provide storage which will allow the surface water to be attenuated to the greenfield runoff. This will then connect to the existing Scottish Water drainage system or if levels do not allow for this it will discharge to the Dighty Burn. The drainage proposal and discharge rates will be approved by SEPA, Scottish Water and DCC. By meeting the above criteria the impact on the existing surface water systems and watercourse will be minimal.

## 10 Interactive effects

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- 10.1.1** The EIA Regulations require an ES to include an assessment of interactive effects. This is an assessment of multiple effects on a single receptor i.e. bringing the outcomes of the individual topic assessments together.
- 10.1.2** The interactive effects for the sensitive human, ecological, water, ground, landscape and visual receptors in the vicinity of the Application Site are set out in Table 74.
- 10.1.3** There are no receptors predicted to experience a significant effect in relation to more than one topic.
- 10.1.4** Mitigation of impacts during construction will primarily be addressed through the CEMP.



Table 74: Interactive effects

| Receptor   | Topic                               | Mitigation reqd.   | Residual Effect  | Further information      |
|--|-------------------------------------|--|--|--------------------------|
| Within the Application Site<br>Construction workers<br>Operational users and site visitors   | Ground Conditions and Contamination | Yes  | Impacts from contamination arising from construction and operation are assessed as not significant               | ES Volume 2<br>Section 5 |
| Residential areas around the site on:<br>Strathaven Terrace<br>Britannia Drive<br>Montpellier Gardens<br>Hawick Drive<br>Balunie Drive | Air Quality and Odour               | Yes  | Dust emissions from construction have been assessed as not significant.  | ES Volume 2<br>Section 3 |
|  |                                     | <b>Operational emissions have not been assessed as part of this ES and will be assessed as part of the permit submitted to SEPA.</b>           |  |                          |
|  | Noise and Vibration                 | Yes  | Construction noise and vibration have been assessed as not significant.  | ES Volume 2<br>Section 2 |
|  |                                     |  | Road traffic noise during construction has been assessed as not significant.                                     | ES Volume 2<br>Section 2 |
|  |                                     | <b>Operational noise and vibration have not been assessed as part of this ES and will be assessed as part of the permit submitted to SEPA.</b> |  |                          |
|  |                                     |  | Road traffic noise during operation has been assessed as not significant.  | ES Volume 2<br>Section 2 |
|  | Visual                              |  | Visibility from Balunie Drive during construction results in a significant temporary adverse effect.             | ES Volume 2<br>Section 6 |
|  |                                     |  | Visibility of the facility from Balunie Drive during operation result in a significant permanent adverse effect. | ES Volume 2<br>Section 6 |
|  | Water resources and flood risk      | Yes  | Increased risk of flooding arising from the development is assessed as not significant.                          | ES Volume 2<br>Section 9 |

| Receptor  | Topic                          | Mitigation reqd.   | Residual Effect  | Further information      |
|---|--------------------------------|--|--|--------------------------|
| Local workforce   | Socio-economics                |  | Impacts to local workforce are assessed as being a significant temporary positive effect during construction.<br>Impacts to local workforce are assessed as being a significant permanent positive effect during operation.  | ES Volume 2<br>Section 7 |
| Recreational users<br>Core path 1E / Green Circular route<br>Dundee Law<br>Open space users in the vicinity of the site, including Traquair Gardens | Visual                         |  | Visibility from the Core path / Green Circular route during construction results in a significant temporary adverse effect.<br>Visibility of the facility from the Core path / Green Circular route during operation result in a significant permanent adverse effect.<br>Visibility from other receptors during construction and operation are not significant. | ES Volume 2<br>Section 6 |
| Surrounding industrial areas  | Water resources and flood risk | Yes  | Increased risk of flooding arising from the development is assessed as not significant.  | ES Volume 2<br>Section 9 |
|   | Air Quality and Odour          | Yes  | Dust emissions from construction have been assessed as not significant.  | ES Volume 2<br>Section 3 |
|   |                                | <b>Operational emissions have not been assessed as part of this ES and will be assessed as part of the permit submitted to SEPA.</b> |  |                          |
| Water resources   | Water resources and flood risk | Yes  | Increased risk of flooding arising from the development is assessed as not significant.  | ES Volume 2<br>Section 9 |
| Watercourses<br>Dighty Burn<br>Fithie Burn  | Pollution receptors            | Yes  | Impact on ecological receptors from pollution incidents is assessed as not significant.  | ES Volume 2<br>Section 4 |
|   | Disturbance to kingfisher nest | Yes  | Impact on kingfisher nest is assessed as not significant.  | ES Volume 2<br>Section 4 |

| Receptor                   | Topic                               | Mitigation reqd. | Residual Effect  | Further information   |
|----------------------------|-------------------------------------|------------------|--|-----------------------|
|                            | Disturbance to otter couches        | Yes              | Potential disturbance to otter couches is assessed as not significant.                             | ES Volume 2 Section 4 |
| Local trees and vegetation | Ecology                             | Yes              | Impact from clearing of vegetation or removal of trees is assessed as not significant.             | ES Volume 2 Section 4 |
| Road users                 | Transport                           | Yes              | Impact from construction vehicles on road users is assessed as not significant.                    | ES Volume 2 Section 8 |
|                            |                                     |                  | Impact from increased vehicles during operation is assessed as not significant.                    | ES Volume 2 Section 8 |
| Groundwater                | Ground Conditions and Contamination | Yes              | Impact on groundwater from construction have been assessed as not significant.                     | ES Volume 2 Section 5 |
|                            |                                     |                  | Impact on groundwater from operation have been assessed as not significant.                        | ES Volume 2 Section 5 |
| Ground conditions          | Ground Conditions and Contamination | Yes              | Impacts on superficial geology from construction and operation are assessed as not significant     | ES Volume 2 Section 5 |
|                            | Ground Conditions and Contamination | Yes              | Impacts on solid geology from construction and operation are assessed as not significant           | ES Volume 2 Section 5 |
|                            | Ground Conditions and Contamination | Yes              | Impacts on mineral resources from construction and operation are assessed as not significant       | ES Volume 2 Section 5 |
|                            | Ground Conditions and Contamination | Yes              | Impacts from contamination arising from construction and operation are assessed as not significant | ES Volume 2 Section 5 |

