NORTH LONDON WASTE AUTHORITY

NORTH LONDON HEAT AND POWER PROJECT

FUEL MANAGEMENT ASSESSMENT

The Planning Act 2008 The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5 (2) (q)

AD05 . 05

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nlwa
north london waste authority

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Executive summary

Background and purpose of the Fuel Management Assessment

i.i.i The North London Waste Authority (the Applicant) is applying for a Development Consent Order (DCO) for the North London Heat and Power Project (the Project). The Project comprises the construction, operation and maintenance of an Energy Recovery Facility (ERF) capable of an electrical output of around 70 megawatts (MW_e) at the Edmonton EcoPark in north London. The capacity of the proposed ERF would be 700,000 tonnes and would replace the existing Energy from Waste (EfW) facility at the Edmonton EcoPark.

i.i.ii The associated development includes a Resource Recovery Facility (RRF) inclusive of a publically accessible Reuse and Recycling Centre (RRC). The RRF serves a number of functions including bulking and waste pre-treatment such as sorting and shredding. The RRC is where members of the public and small business vehicles may deposit waste for disposal or recycling.

i.i.iii Waste (inclusive of recyclate not destined for energy recovery) delivered to the Edmonton EcoPark would be directed as appropriate to one of the following facilities for processing:

a. delivery to the RRF for bulking/pre-treatment;
b. direct delivery to the proposed ERF (no pre-treatment in the RRF required); or
c. delivery to the RRC (by members of the public).

i.i.iv The Fuel Management Assessment report has been prepared in support of the Application and sets out how waste (which forms the fuel for the proposed ERF received onto the Edmonton EcoPark would be managed. The residual waste is considered to be fuel which may potentially be used in the proposed ERF to generate power.

i.i.v A waste mass balance for the Edmonton EcoPark has been produced in order to demonstrate how waste would be moved through the Edmonton EcoPark and quantifies the expected tonnages of waste which would be handled including inputs and outputs. The mass balance produced has been completed for 2024/25 as this is around when the ERF is expected to become operational. The Edmonton EcoPark mass balance summarising the waste inputs and flows of waste through the site is provided in Section 2.6.

Local Authority and Non-Local Authority Collected Waste Arisings

i.i.vi The north London area covers almost 30,000 hectares and has a residential population of around 1.9 million. Municipal waste arising in this area is collected by the seven waste collection authorities (Constituent Boroughs) which have responsibility for the collection of waste in the north London area. North London Waste Authority (NLWA) has a statutory responsibility to arrange for the disposal of waste collected by the Constituent Boroughs.

i.i.vii In 2012/13 the Constituent Boroughs collected around 827,000 tonnes of waste referred to as Local Authority Collected (LAC) waste[1]. Around 689,000 tonnes was household waste while around 102,000 tonnes was sourced from businesses across north London. The remaining LACW (referred to as 'Other' waste) included waste other than household and business waste which is managed by north London including fly-tipping, grounds clearing waste, highways waste etc. The north London boroughs achieved a reuse, composting and recycling rate of around 32 per cent in 2012/13.

i.i.viii A waste forecasting model has been developed to inform future waste arisings based on three scenarios: low recycling (40 per cent household recycling by 2020/21 and static thereafter); central recycling (50 per cent household recycling by 2020/21 and remaining static thereafter); and high recycling – 50 per cent household recycling by 2020/21, rising to 60 per cent by 2031/32 and remaining static thereafter).

i.i.ix Modelling indicates the Authority is expected to manage around 995,000 tonnes of LAC waste by 2024/25. This is expected to increase to over 1 million tonnes by 2050/51.

i.i.x For the purposes of the Fuel Management Assessment total residual LACW(consisting of household, business and other waste) forecast under the central recycling scenario has been assessed within the mass balance for the Edmonton EcoPark. In addition to LACW the Applicant is proposing to treat non-LACW if less residual LACW is produced or recycling rates increase above what is expected. Non-LAC has been considered within the overall mass balance.

i.i.xi The proposed ERF would treat predominantly LAC residual waste. In 2024/25 almost 572,000 tonnes would be sourced from residual LACW rising to around 611,000 tonnes by 2050/51 (based on the central recycling scenario). Under the central recycling scenario the proposed ERF is expected to treat around 128,000 tonnes of non-LACW in 2024/25 reducing to around 88,700 tonnes by 2050/51. Non-LACW would reduce proportionally in line with the additional capacity as LACW is expected to increase. The capacity of the proposed ERF and the need is discussed in the Need Assessment (AD05.15).

Waste delivered to the Edmonton EcoPark

i.i.xii Waste delivered to the Edmonton EcoPark would consist of LACW and some non-LACW. In 2024/25 around 837,700 tonnes of LAC and non-LACW is expected to be received at the Edmonton EcoPark. A large proportion of this waste would be LACW (around 710,000 tonnes) from borough collections, transfer stations and RRCs located across north London. The remaining waste would consist of non-LAC collected residual waste (expected to be around 128,000 tonnes in 2024/25).

[1] Local Authority Collected Waste refers to all waste collected by the local authority including household waste, business waste and other waste including, for example, flytipping, grounds waste and street cleansing.

i.i.xiii The mass balance diagram shows that the total tonnage of waste delivered to the Edmonton EcoPark would be greater than the amount of waste expected to be treated at the proposed ERF (capacity of the ERF would be 700,000 tonnes). This is because some of the waste delivered to the Edmonton EcoPark would be bulked in the RRF and transported off-site for recycling.

i.i.xiv Some recyclable materials managed separately by the Constituent Boroughs would not be delivered to the Edmonton EcoPark site and would be sent elsewhere for processing as is the current arrangement. The recyclable materials which are not delivered to the Edmonton EcoPark are not captured within the mass balance diagram.

i.i.xv Based on 2024/25 figures, around 451,500 tonnes would be directly delivered to the proposed ERF without requiring pre-treatment in the RRF. The RRF would be expected to handle around 386,200 tonnes of waste and recycling annually. This tonnage is inclusive of around 128,000 tonnes of non-LAC residual waste. The tonnage delivered to the RRF would also include around 8,000 tonnes of waste and recycling from the RRC.

i.i.xvi Outputs from the RRF would include:

a. recycling: around 135,700 tonnes of recyclate would be transferred off site for onward processing;

b. residual waste: around 248,500 tonnes of residual waste would be bulked and/or processed (material separation/shredding) at the RRF and delivered internally within the Edmonton EcoPark for treatment in the ERF (451,000 tonnes would be delivered directly to the ERF); and

c. waste unsuitable for treatment via the ERF (around 2,000 tonnes of gully wastewater and minor waste unsuitable for treatment e.g. oversized items).

i.i.xvii A number of solid outputs would be produced as a result of the combustion and the flue gas cleaning process in the proposed ERF. This information is provided in Section 3.8.

1 Introduction

1.1 Introduction

1.1.1 This Fuel Management Assessment has been prepared to support North London Waste Authority's (the Applicant's) application (the Application) to the Secretary of State for Energy and Climate Change for a Development Consent Order (DCO) pursuant to Section 37 of the Planning Act 2008 (as amended).

1.1.2 The Application is for the North London Heat and Power Project (the Project) comprising the construction, operation and maintenance of an Energy Recovery Facility (ERF) capable of an electrical output of around 70 megawatts (MW_e) at the Edmonton EcoPark in north London with associated development, including a Resource Recovery Facility (RRF). The proposed ERF would replace the existing Energy from Waste (EfW) facility at the Edmonton EcoPark.

1.1.3 The Project is a Nationally Significant Infrastructure Project for the purposes of Section 14(1)(a) and section 15 in Part 3 of the Planning Act 2008 (as amended) because it involves the construction of a generating station that would have a capacity of more than 50MWe.

1.2 Purpose of this document

1.2.1 This Assessment forms part of a suite of documents accompanying the Application submitted in accordance with the requirements set out in section 55 of the Planning Act (as amended) and Regulations 5, 6 and 7 of the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 (APFP Regulations 2009), and should be read alongside those documents (see Project Navigation Document AD01.02).

1.3 Document structure

1.3.1 The Fuel Management Assessment Report is structured as follows:

a. Section 1: Introduction

- overview of the North London Waste Authority (Section 1.4);
- background to the Application Site, Surrounding Area and the Project (Section 1.5 through to Section 1.8);

b. Section 2: Fuel Management Strategy including:

- waste collection logistics (Section 2.1 and 2.2): provides an overview of how waste is managed in north London;
- expected waste arisings and waste composition (Section 2.3 and 2.4): a summary of the expected waste arisings and composition of the waste stream;
- Edmonton EcoPark mass balance (Section 2.5 and 2.6);

- reception of waste and on-site handling (Section 2.7 and 2.8): an explanation as to how waste would be received and managed on-site;
- overview of the combustion process (Section 2.9 to 2.12): description of how waste is managed in the bunker, through the combustion process and final treatment of the flue gases; and
- post combustion residue handling (Section 2.13).

c. Section 3: Waste Forecasting Model.

1.4 The Applicant

1.4.1 Established in 1986, the Applicant is a statutory authority whose principal responsibility is the disposal of waste collected by the seven north London boroughs of Barnet, Camden, Enfield, Hackney, Haringey, Islington and Waltham Forest (the Constituent Boroughs).

1.4.2 The Applicant is the UK's second largest waste disposal authority, handling approximately 3 per cent of the total national Local Authority Collected Waste (LACW) stream. Since 1994 the Applicant has managed its waste arisings predominantly through its waste management contract with LondonWaste Limited (LWL) and the use of the EfW facility at the existing Edmonton EcoPark and landfill outside of London.

1.5 The Application Site

1.5.1 The Application Site, as shown on the Site Location Plans (A_0001 and A_0002 in the Book of Plans (AD02.01)), extends to approximately 22 hectares and is located wholly within the London Borough of Enfield (LB Enfield). The Application Site comprises the existing waste management site known as the Edmonton EcoPark where the permanent facilities would be located, part of Ardra Road, land around the existing water pumping station at Ardra Road, Deephams Farm Road, part of Lee Park Way and land to the west of the River Lee Navigation, and land to the north of Advent Way and east of the River Lee Navigation (part of which would form the Temporary Laydown Area and new Lee Park Way access road). The post code for the Edmonton EcoPark is N18 3AG and the grid reference is TQ 35750 92860.

1.5.2 The Application Site includes all land required to deliver the Project. This includes land that would be required temporarily to facilitate the development.

1.5.3 Both the Application Site and the Edmonton EcoPark (existing and proposed) are shown on Plan A_0003 and A_0004 contained within the Book of Plans (AD02.01). Throughout this report references to the Application Site refer to the proposed extent of the Project works, and Edmonton EcoPark refers to the operational site. Upon completion of the Project the operational site would consist of the Edmonton EcoPark and additional land required to provide new access arrangements and for a water pumping station adjacent to the Deephams Sewage Treatment Works outflow channel.

Edmonton EcoPark

1.5.4 The Edmonton EcoPark is an existing waste management complex of around 16 hectares, with an EfW facility which treats circa 540,000 tonnes per annum (tpa) of residual waste and generates around 40MWe (gross) of electricity; an In-Vessel Composting (IVC) facility; a Bulky Waste Recycling Facility (BWRF) and Fuel Preparation Plant (FPP); an Incinerator Bottom Ash (IBA) Recycling Facility; a fleet management and maintenance facility; associated offices, car parking and plant required to operate the facility; and a former wharf and single storey building utilised by the Edmonton Sea Cadets under a lease

1.5.5 In order to construct the proposed ERF, the existing BWRF and FPP activities would be relocated within the Application Site; the IVC facility would be decommissioned and the IBA recycling would take place off-site.

Temporary Laydown Area and eastern access

1.5.6 The proposed Temporary Laydown Area is an area of open scrubland located to the east of the River Lee Navigation and north of Advent Way. There is no public access to this area. The Temporary Laydown Area would be reinstated after construction and would not form part of the ongoing operational site.

1.5.7 In addition to the Temporary Laydown Area the Application Site includes land to the east of the existing Edmonton EcoPark which would be used for the new Lee Park Way entrance and landscaping along the eastern boundary.

Northern access

1.5.8 The Application Site also includes Deephams Farm Road and part of Ardra Road with land currently occupied by the EfW facility water pumping station between the junction of A1005 Meridian Way and Deephams Farm Road.

1.6 Surrounding area

1.6.1 The Application Site is located to the north of the A406 North Circular Road in an area that is predominantly industrial. The Lee Valley Regional Park (LVRP) is located to the east of the Edmonton EcoPark.

1.6.2 Land to the north and west of the Application Site is predominantly industrial in nature. Immediately to the north of the Edmonton EcoPark is an existing Materials Recovery Facility (MRF), which is operated by a commercial waste management company, alongside other industrial buildings. Further north is Deephams Sewage Treatment Works. Beyond the industrial area to the north-west is a residential area with Badma Close being the nearest residential street to the Application Site (approximately 60m from the nearest part of the boundary) and Zambezie Drive the nearest to the Edmonton EcoPark at approximately 125m west.

1.6.3 Eley Industrial Estate, located to the west of the Application Site, comprises a mixture of retail, industrial and warehouse units.

1.6.4 Advent Way is located to the south of the Application Site adjacent to the A406 North Circular Road. Beyond the A406 North Circular Road are retail and trading estates; this area is identified for future redevelopment to provide a housing-led mixed use development known as Meridian Water.

1.6.5 The LVRP and River Lee Navigation are immediately adjacent to the eastern boundary of the Edmonton EcoPark, and Lee Park Way, a private road which also forms part of National Cycle Network (NCN) Route 1, runs alongside the River Lee Navigation. To the east of the River Lee Navigation is the William Girling Reservoir along with an area currently occupied by Camden Plant Ltd. which is used for the crushing, screening and stockpiling of waste concrete, soil and other recyclable materials from construction and demolition. The nearest residential areas to the east of the Application Site and LVRP are located at Lower Hall Lane, approximately 550m from the Edmonton EcoPark and 150m from the eastern edge of the Application Site.

1.7 The Project

1.7.1 The Project would replace the existing EfW facility at Edmonton EcoPark, which is expected to cease operations in around 2025, with a new and more efficient ERF which would produce energy from residual waste, and associated development, including temporary works required to facilitate construction, demolition and commissioning. The proposed ERF would surpass the requirement under the Waste Framework Directive (Directive 2008/98/EC) to achieve an efficiency rating in excess of the prescribed level, and would therefore be classified as a waste recovery operation rather than disposal.

1.7.2 The main features of the Project once the proposed ERF and permanent associated works are constructed and the existing EfW facility is demolished are set out in the Book of Plans (AD02.01) and comprise:

a. a northern area of the Edmonton EcoPark accommodating the proposed ERF;

b. a southern area of the Edmonton EcoPark accommodating the RRF and a visitor, community and education centre with offices and a base for the Edmonton Sea Cadets (‘EcoPark House’);

c. a central space, where the existing EfW facility is currently located, which would be available for future waste-related development;

d. a new landscape area along the edge with the River Lee Navigation; and

e. new northern and eastern Edmonton EcoPark access points.

1.7.3 During construction there is a need to accommodate a Temporary Laydown Area outside of the future operational site because of space constraints. This would be used to provide parking and accommodation for temporary staff (offices, staff welfare facilities), storage and fabrication areas, and associated access and utilities.

1.7.4 Schedule 1 of the draft DCO (AD03.01) sets out the authorised development and the works are shown in the Book of Plans (AD02.01), supplemented by Illustrative Plans (included in the Design Code Principles, AD02.02) that set out the indicative form and location of buildings, structures, plant and equipment, in line with the limits of deviation established by the draft DCO (AD03.01).

1.8 Stages of development

1.8.1 The proposed ERF is intended to be operational before the end of 2025, but with the precise timing of the replacement to be determined. In order to do this, the following key steps are required:

a. obtain a DCO for the new facility and associated developments;

b. obtain relevant environmental permit(s) and other licences, consents and permits needed;

c. identify a suitable technology supplier;

d. agree and arrange source(s) of funding;

e. enter into contract(s) for design, build and operation of new facility and associated development;

f. move to operation of new facility; and

g. decommission and demolish the existing EfW facility.

1.8.2 Site preparation and construction would be undertaken over a number of years and it is expected that the earliest construction would commence is 2019/20, although this may be later. Construction would be implemented in stages to ensure that essential waste management operations remain functioning throughout. This is especially relevant for the existing EfW facility and associated support facilities.

1.8.3 The stages of the Project are as follows:

a. Stage 1a: site preparation and enabling works;

b. Stage 1b: construction of RRF, EcoPark House and commencement of use of Temporary Laydown Area;

c. Stage 1c: operation of RRF, EcoPark House and demolition/clearance of northern area;

d. Stage 1d: construction of ERF;

e. Stage 2: commissioning of ERF alongside operation of EfW facility, i.e. transition period;

f. Stage 3: operation of ERF, RRF and EcoPark House, demolition of EfW facility; and

g. Stage 4: operation of ERF, RRF and EcoPark House, i.e. final operational situation.

2 Fuel management strategy

2.1 Existing north London waste collection logistics

2.1.1 The north London area covers almost 30,000 hectares and has a residential population of around 1.9 million. Municipal waste arising in this area is collected by the seven waste collection authorities (Constituent Boroughs) which are;

a. London Borough of Barnet;

b. London Borough of Camden;

c. London Borough of Enfield;

d. London Borough of Hackney;

e. London Borough of Haringey;

f. London Borough of Islington; and

g. London Borough of Waltham Forest.

2.1.2 NLWA has a statutory responsibility to arrange for the disposal of waste collected by the Constituent Boroughs.

Figure 2.1: Map of the London and North London Waste Authority (highlighted)

2.1.3 Previously known as municipal waste, Local Authority Collected Waste (LACW) is the term that is used to describe all wastes collected by the Constituent Boroughs. LACW includes all waste collected by the Constituent Boroughs for recycling, composting, recovery and disposal, both from households and from businesses (non-household) in the area.

2.1.4 In 2012/13 the Constituent Boroughs collected around 827,000 tonnes of recyclable and residual waste comprising household waste (679,000 tonnes) and waste produced by businesses (102,000 tonnes). The remainder was made up of a variety of minor waste streams arising from

street cleaning, flytipping, construction and demolition, and highways cleaning.

2.1.5 LACW arisings in north London are handled through a number of facilities in north London. Waste is delivered by the Constituent Boroughs to either the Edmonton EcoPark in Enfield for treatment at the existing EfW facility or for bulking up at the on-site bulky waste facility.

2.1.6 Additionally, waste is delivered and loaded onto rail containers at the Hendon Rail Transfer Station or at the Hornsey Street Road Transfer Station for transport to landfills sites outside of London (locations provided in Figure 2.2). The purpose of the waste transfer stations is to bulk up LACW deposited by local borough collection operations for onward treatment or disposal; the transfer stations support the Applicant's waste transport logistics.

Figure 2.2: Geographical location of North London Waste Authority operated waste facilities in north London

2.1.7 Waste is delivered to the Edmonton EcoPark either directly via Constituent Borough waste collection operations or indirectly via the waste transfer stations post bulking.

2.1.8 The Edmonton EcoPark receives household kitchen and green waste which is composted at the IVC facility. The Applicant also manages seven Reuse and Recycling Centres (RRCs) across north London. Material from the RRCs is either: bulked at the transfer stations for onward treatment or recycling; or delivered to the Edmonton EcoPark for treatment.

2.1.9 All residents in the north London area have access to all of the RRCs. The level of provision has been approximately one site per 100,000 people.

2.1.10 In 2012/13 around 63,000 tonnes of waste was collected via the RRC network. Approximately 60 per cent of the waste deposited at the sites was recycled. The remainder was taken into the Edmonton EcoPark for use in the existing EfW facility or landfill, as appropriate.

2.2 Existing borough collection logistics

2.2.1 In 2012/13 around 438,600 tonnes of LACW delivered to the Edmonton EcoPark by the Constituent Boroughs was treated in the existing EfW facility. Each Constituent Borough is responsible for collecting LACW in their area and has tailored those collection services to the local requirements.

2.2.2 As a minimum, each Constituent Borough provides their residents with the following waste collection services:

a. residual waste service;

b. comingled recycling service; and

c. either mixed food waste/garden waste or separately collected food and garden waste.

2.2.3 The extent of the service and the types of materials collected varies depending on the local circumstances. Residual waste collections are offered on a weekly basis and in some cases more often such as on main streets.

2.2.4 Similarly, the majority of properties receive a weekly recycling collection service, however, more frequent recycling collections are provided in busy areas or where space is limited for storage such as high streets. Food waste and mixed food/garden waste are generally collected on a weekly basis. Some fortnightly collections of garden waste are provided e.g. for suitable low rise properties.

2.2.5 The Applicant managed around 827,000 tonnes of LACW in 2012/13. Figure 2.3 shows the split between household, business and other waste for each of the Constituent Boroughs.

2.2.6 Around 689,000 tonnes was household waste while around 102,000 tonnes was sourced from businesses across north London. ‘Other’ waste includes waste other than household and business waste which is managed by north London such as fly-tipping, grounds clearing waste, highways waste etc.

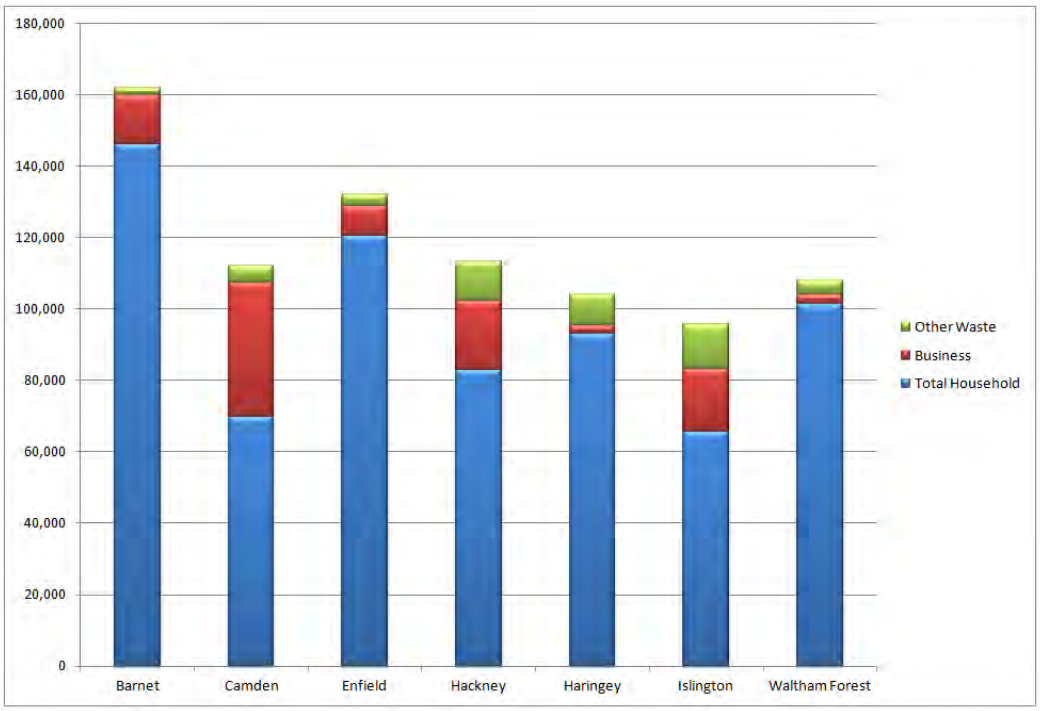


Figure 2.3: North London Local Authority Collected Waste (household, non-household and other waste)

2.2.7 The Constituent Boroughs achieved a reuse, composting and recycling rate of around 32 per cent in 2012/13. The recycling rate has increased from 23 per cent in 2006/07.

2.3 Forecast residual waste

Local authority collected waste

2.3.1 A waste forecasting model has been developed in order to estimate the amount of LACW likely to be produced over the anticipated operational life of the facility (up to 2051). The baseline year of the model is set as 2012/13 as, at the time of modelling, this was the year up to which actual tonnages of waste were available. The proposed ERF is expected to remain operational up to 2050/51. The model is based on three scenarios:

a. low recycling (40 per cent household recycling by 2020/21 and static thereafter);

b. central recycling (50 per cent household recycling by 2020/21 and remaining static thereafter); and

c. high recycling (50 per cent household recycling by 2020/21, rising to 60 per cent by 2031/32 and remaining static thereafter).

2.3.2 For the purposes of the Fuel Management Assessment and mass balance, tonnages of LACW have been forecast using the central recycling scenario above. Further details and assumptions relating to the modelling methodology are available in the Waste Forecasting Report as an appendix to the Need Assessment (AD05.15).

2.3.3 The results of the model indicate the Applicant is expected to manage around 995,000 tonnes of LACW by 2024/25. This is expected to increase to over 1 million tonnes by 2050/51 (the anticipated operational life of the proposed ERF). Waste forecasts as part of the central scenario are provided in Table 2.1.

2.3.4 On average the proposed ERF would be expected to treat almost 572,000 tonnes of residual LACW in 2024/25. This is expected to increase to around 611,000 tonnes by 2050/51.

Table 2.1: Waste forecast modelling results (central recycling scenario)

Waste Managed (thousand tonnes)	2012/13*	2020/21	2024/25	2036/37	2050/51
Recycling	229,570	418,169	422,853	438,153	457,185
Residual	597,717	566,872	571,615	588,914	611,277
Total	827,288	985,041	994,469	1,027,067	1,068,462

**2012/13 reflects actual tonnages*

2.3.5 The majority of the waste delivered to the proposed ERF would be household waste (around 404,000 by 2050/51). By 2050/51, the remaining residual LACW is expected to include around 160,000 tonnes of waste collected from business waste and other waste (around 46,000 tonnes) which includes materials such as highways waste, ground waste and flytipping.

Non-local authority collected waste

2.3.6 In addition to waste collected by the Constituent Boroughs the Applicant is proposing to treat non-LACW if less residual LACW is produced or recycling rates increase above what is expected. This is discussed in detailed within the Need Assessment (AD05.15).

2.3.7 Potential sources of non-LACW may include:

a. Constituent Borough non-LAC commercial and industrial (C&I) waste;

b. other London LAC municipal solid waste (MSW); and

c. non-London LAC MSW and C&I waste.

2.3.8 The composition of the non-LACW is expected to be of a similar composition to LACW arisings in north London (waste composition is discussed in Section 2.4).

2.3.9 The Applicant considered the availability of residual C&I waste (i.e. from non-LAC sources) within a 50 mile radius of the Edmonton EcoPark. The study showed that total C&I waste within the 50 mile radius amounts to around 8.3 million tonnes in 2024/25 increasing to around 8.6 million tonnes by 2050/51.

2.3.10 Further analysis was undertaken to estimate what proportion of the total residual C&I waste produced may be available for treatment within a 50 mile radius, taking into consideration the catchment of other residual

waste treatment facilities currently in operation as well as those in construction.

2.3.11 The analysis estimated that, by 2024/25, around 353,000 tonnes of residual C&I waste could be available for disposal within a 50 mile radius of the Edmonton EcoPark decreasing to around 278,000 tonnes by 2050/51. These figures include the residual output from mechanical biological treatment facilities within the 50 mile radius (assuming a 50 per cent residual output).

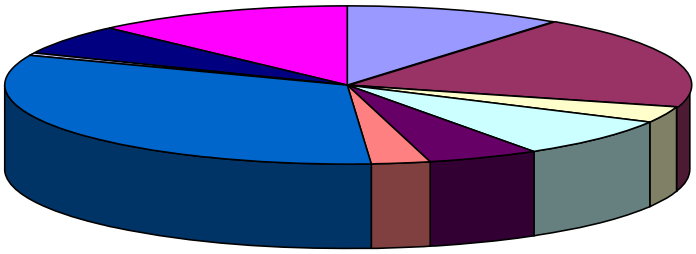
2.3.12 Around 128,000 tonnes of non-LACW would be sourced in 2024/25 reducing to around 89,000 tonnes by 2050/51. The factors influencing sizing and the associated risk to the Authority are discussed in detail in the Need Assessment Report (AD05.15).

2.3.13 A mass balance was developed in order to demonstrate how the tonnages of waste delivered to the Edmonton EcoPark would be managed. This is discussed in Section 2.5.

2.4 Incoming waste composition

2.4.1 The predominant source of waste to be supplied to the proposed ERF would be household waste, along with smaller amounts of waste collected from businesses of a similar composition to household waste and 'Other' wastes such as street cleaning, gully waste etc.

2.4.2 The most recent waste composition survey for north London was conducted in 2010 and the analysis is shown in Figure 2.4.



Key

- Glass (10.4%)
- Paper (19.1%)
- Metal (3.3%)
- Dense plastic (8.1%)
- Film plastic (5.3%)
- Textiles (2.8%)
- Organics (32.3%)
- WEEE (0.4%)
- Other combustibles (6.2%)
- Miscellaneous (12.2%)

Figure 2.4: Local Authority Collected Waste composition in north London (2010)

2.4.3 The existing EfW facility is used to treat small amounts of the clinical waste arising from north London (just over 400 tonnes in the model base year 2012/13). The proposed ERF would be designed to manage a similar amount of clinical waste. A description of how this waste would be managed in the new facility is provided in Section 2.10.

2.5 Waste deliveries to the Edmonton EcoPark

2.5.1 The total tonnage of waste delivered to the Edmonton EcoPark is expected to be around 837,700 tonnes by 2024/25. This figure includes residual LACW, a proportion of the recyclable element of the LACW stream, and non-LACW. The majority of the waste delivered (around 710,000 tonnes) would be LACW from borough collections, transfer stations and RRCs across north London. As shown in Table 2.1, total LACW is expected to be around 995,000 tonnes in 2024/25; around 285,000 tonnes would be recyclable material which would be managed separately by the Constituent Boroughs and would not be delivered to the Edmonton EcoPark (as is the current management method).

2.5.2 Any shortfall between the capacity of the proposed ERF and the amount of residual LACW delivered to the Edmonton EcoPark could be sourced from non-LAC sources. As discussed, this proportion of non-LACW is expected to be approximately 128,000 tonnes in 2024/25, decreasing to approximately 88,700 tonnes by 2050/51, as total LACW is expected to increase overtime.

2.5.3 Material delivered to the site would be directed as appropriate to either one of the following facilities for processing:

a. direct delivery to the ERF (no pre-treatment required);

b. delivery to the RRF; or

c. delivery to the RRC (public access).

2.5.4 A more detailed description of these facilities and how the waste is processed is described in Section 3 onwards.

2.5.5 The Edmonton EcoPark mass balance is based on 2024/25 waste tonnages as this is around when the proposed ERF is expected to become operational. The Edmonton EcoPark mass balance is shown in Section 2.6.

2.5.6 Based on 2024/25 tonnage figures, around 451,500 tonnes would be directly delivered to the proposed ERF without requiring pre-treatment in the RRF. The material delivered to the proposed ERF would largely consist of the normal Constituent Borough household waste collections.

2.5.7 The remaining residual waste (248,500 tonnes) would be processed in the RRF before being treated in the ERF. This is illustrated in the Edmonton EcoPark mass balance (Figure 2.5). The RRF is expected to handle around 386,200 tonnes of waste and recycling annually based on 2024/25 waste tonnages (inclusive of around 128,000 tonnes non-LACW). This tonnage also includes around 8,000 tonnes of waste and recycling from the RRC which is part of the RRF. The RRF serves a number of functions

including bulking and pre-treatment such as sorting and shredding. The RRC is where members of the public and waste from small businesses may deposit waste for disposal or recycling.

2.5.8 Of the 386,200 tonnes of waste inputs to the RRF, the following outputs are expected based on 2024/25 waste tonnages:

a. recycling: around 135,700 tonnes of recyclate would be sent off site for onward processing;

b. residual waste: around 248,500 tonnes of residual waste would be bulked and delivered internally within the EcoPark site for treatment in the proposed ERF; and

c. waste unsuitable for treatment via the proposed ERF (around 2,000 tonnes of gully wastewater and minor waste unsuitable for treatment e.g. oversized items).

2.5.9 The Edmonton EcoPark mass balance shown at Figure 2.5 shows how the waste received onto the Edmonton EcoPark is expected to be managed.

2.5.10 A more detailed description of each stage in the movement of waste through the proposed ERF is provided in Section 3.

2.6 Edmonton EcoPark mass balance

2.6.1 The Edmonton EcoPark mass balance was produced in order to demonstrate how waste entering the Edmonton EcoPark would be managed. The main management routes include:

a. direct delivery to the ERF for treatment;

b. direct delivery to the RRF for bulking or treatment (e.g. sorting and size reduction);

c. internal delivery of waste from the RRF to the proposed ERF for treatment; and

d. removal of recyclates and waste unsuitable for treatment from the Edmonton EcoPark.

2.6.2 The mass balance is shown in Figure 2.5. Outputs from the ERF are described in Section 3.8.

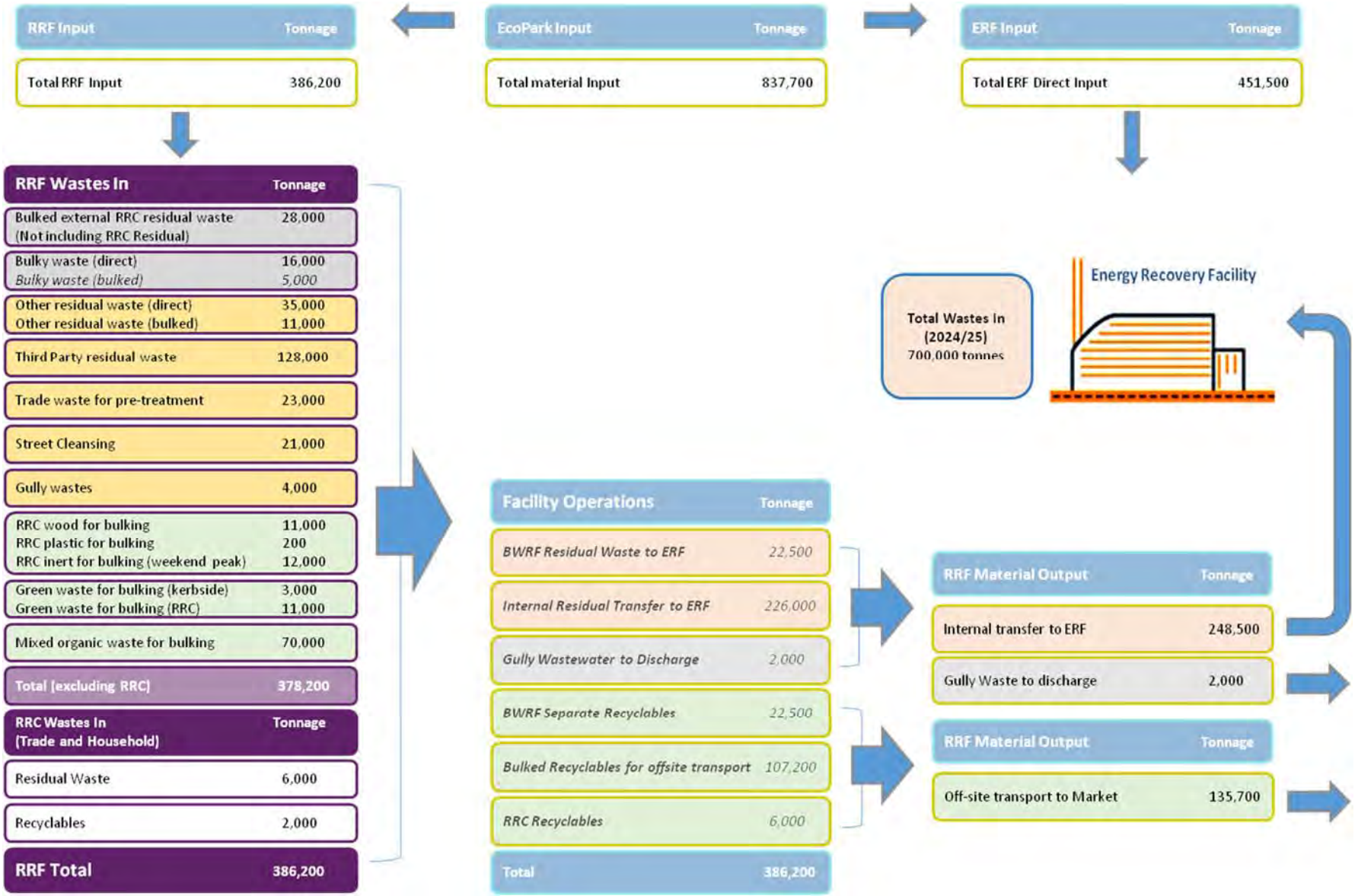


Figure 2.5: Edmonton EcoPark mass balance (based on 2024/25 waste tonnages)

3 Treatment process overview

3.1.1 This section provides an overview of how waste which is received onto the Edmonton EcoPark would be managed. An overview of the proposed ERF treatment process is described and the expected quantities of outputs from the proposed ERF are provided.

3.2 Reception

3.2.1 Each vehicle entering the Edmonton EcoPark would be weighed on entering and exiting the Edmonton EcoPark. Weighing the vehicles allows the amount of waste delivered to be accurately captured.

3.2.2 The weighbridges would be positioned at specific locations around the Edmonton EcoPark to aid the flow of traffic and prevent excessive queuing; weighbridges would be located north of the site serving the ERF and south of the site serving the RRF.

3.2.3 Vehicle movements in and out of the Edmonton EcoPark would be controlled by staff at the weighbridges. Vehicles would be directed to the proposed ERF or the RRF as appropriate to deposit their waste loads.

3.2.4 Operational vehicles intending to deliver waste to the proposed ERF may enter through either the southern access (Advent Way) or through the northern access (Deephams Farm Road).

3.2.5 Public vehicles would be kept separate from operational traffic and would enter the Edmonton EcoPark through the proposed new entrance off Lee Park Way to the east of the Edmonton EcoPark. The route would provide a separate road for public vehicles, pedestrians and cyclist wishing to access the RRC or EcoPark House.

3.2.6 The internal circulation strategy of the RRF was developed to take account of the Edmonton EcoPark's circulation arrangements so as to maximise the efficiency of site vehicle movements and improve site safety.

3.2.7 Materials which would not be suitable for direct tipping to the waste bunker (e.g. bulky waste) would be deposited in the RRF.

3.3 On-site handling and fuel preparation

3.3.1 The RRF would be designed to manage a range of waste streams which require either bulking for onward deliveries (e.g. green waste) or pre-treatment prior to delivery to the proposed ERF. The capacity of the RRF would be 386,200 tonnes.

3.3.2 As identified in the Edmonton EcoPark mass balance (Figure 2.5) the RRF would be designed to manage a number of waste types including:

a. RRC wastes from direct deliveries by public/trade;

b. RRC residual waste from other sites;

c. RRC recyclates (e.g. green, wood, hard plastics) bulked from other RRC sites;

d. third party residual waste from direct delivery Refuse Collection Vehicles (RCV) and bulkers;

e. trade waste from direct delivery borough RCVs that requires pre-treatment;

f. bulky wastes from direct delivery RCV and small vehicles (e.g. fly tips);

g. other residual wastes from direct delivery RCV and bulkers requiring pre-treatment;

h. gully waste for dewatering; and

i. food and garden wastes from direct delivery RCVs (household and trade).

3.3.3 The RRF would have a number of distinct areas where waste may be tipped including:

a. publically accessible RRC;

b. Recycling and Fuel Preparation Facility (RFPF);

c. non-LAC (or third party) waste transfer;

d. organic waste transfer; and

e. RRC waste transfer.

3.3.4 The RRF would use movable push walls for long-term design flexibility.

3.3.5 The majority of business waste collected by the Constituent Boroughs would be delivered directly to the proposed ERF for thermal treatment. If the vehicle driver is aware that a load contains waste requiring pre-treatment (e.g. bulky items, removal of recyclates) the material would be diverted to the RRF for pre-treatment (e.g. shredding).

3.3.6 The RRF would be used as a central bulking point for some recyclates from the RRC network in order to achieve more economical loads for bulking to off-takes. Organic waste (food and garden waste) collected by the Constituent Boroughs and green waste bulked from the network of RRCs would be bulked at the RRF for onward transport to off-takers.

3.3.7 Other waste which would require reception and handling at the RRF would include: highways waste, grounds waste and flytipping.

3.3.8 The proposed RRC is expected to handle approximately 8,000 tonnes per year in the medium to long term. Waste is likely to arise from householders and small businesses. It is envisaged that the RRC would accept all materials taken by other RRCs plus some other material which are likely to arise from commercial sources. Around 6,000 tonnes of material from the RRC would be processed as recyclable material.

3.3.9 An overview of the materials expected to be received at the RRF and the tonnages modelled are provided in the mass balance in Figure 2.5.

3.4 Waste bunker management

3.4.1 The proposed ERF tipping hall would be a fully enclosed building maintained under negative pressure to ensure that no odours, dust or litter

can escape the building. Vehicles would tip into the waste bunker by reversing into one of the available tipping bays.

3.4.2 The waste storage bunker is an important area of the proposed ERF and serves a number of purposes as follows:

a. receive waste and enable mixing of wastes to create a homogeneous fuel;

b. maintain sufficient fuel in the bunker for continuous plant operations; and

c. enable continued waste reception in the event of plant shutdown, both planned and unplanned.

3.4.3 The proposed bunker would be sized to store waste for a duration corresponding to around seven days operating both lines at full capacity, or for the duration of 14 days with one line out of operation (servicing or maintenance).

3.4.4 The tipping hall as well as access and queuing areas would be capable of accommodating anticipated variations in traffic flows during peak periods, inclement weather, and around public holidays.

3.4.5 Furthermore, deliveries typically vary over a week or day. The majority of the waste would be delivered during weekdays with peaks in the morning and smaller peaks in the afternoon.

3.4.6 The sizing of the bunker supports the optimal requirements for waste reception and mixing of waste. The aim is to produce a homogeneous fuel which is critical for promoting stable plant operations resulting in lower gaseous emissions and reduced operating and maintenance costs.

3.4.7 Waste at the bottom of the bunker would be regularly moved/turned to promote stable waste combustion thereby minimising air emissions and improving energy recovery. The sizing of the bunker minimizes the risk of excessive compaction of waste within the bunker under the weight of overlaying waste layers. The design of the bunker would also provide suitable storage capacity for maintenance stops and promote efficient waste reception.

3.5 Clinical waste management

3.5.1 The proposed ERF would be designed to accommodate and treat small amounts of non-hazardous/non-infectious clinical waste (Grade E Clinical Waste[2]). In 2012/13 the existing facility treated around 420 tonnes and the proposed ERF is expected to treat similar amounts. Hazardous/infectious clinical waste would not be treated at the facility.

3.5.2 Clinical waste would be received at the Edmonton EcoPark and managed separately to household, business and other waste streams. The waste

[2] Wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers) – European Waste Catalogue.

would be delivered to the Edmonton EcoPark in clinical waste bags which have been separately collected by the boroughs.

3.5.3 There are two options for on-site management at the Edmonton EcoPark;

a. bulk in the RRF and then transport to the proposed ERF for disposal; and/or

b. bulk at the proposed ERF within the dedicated clinical waste area.

3.5.4 To maintain flexibility for the volumes received, operational procedures or changes to clinical waste legislation the RRF may be used for bulking of clinical wastes. It would be required for bulking in the interim to allow continued reception of clinical wastes at the existing EfW facility once the northern part of the Edmonton EcoPark site is cleared (where bulking operations are currently conducted). As the area required is minor it is envisaged the optimal location within the RRF would be determined during detailed design.

3.6 Treatment process

3.6.1 The proposed ERF would comprise two lines, each having a processing capacity of 350,000 tonnes per annum at a waste fuel design calorific value (CV) of 10 Gigajoules (GJ) per tonne to give a thermal rating of 122MW_e. The ERF would be expected to manage an average annual throughput of 700,000 tonnes. The design CV is based upon operational experience from the existing EfW facility.

3.6.2 Waste would be deposited into the feed hoppers by the grab cranes. From there, waste would be guided from the hopper into the incinerator through the feed chutes. The feed chutes would be hydraulically operated and feed waste onto the grates in an even layer drawing the waste across the grate to ensure complete combustion.

3.6.3 Hot combustion gases would rise up above the grate into a post-combustion chamber for the final combustion of gases and suspended fuel. These chambers would be sized such that the plant meets the requirements of the Industrial Emissions Directive (IED) exposing the flue gases to a temperature exceeding 850°C for at least two seconds in the presence of sufficient oxygen. This would ensure the proper burnout of partially combusted gases (like carbon monoxide) thereby minimising the production of harmful emissions. The removal of any potentially harmful emissions is discussed in the following section.

3.7 Flue gas cleaning

3.7.1 Flue gas technologies would be employed that offer the highest degree of air emission abatement in order to minimise emissions into the atmosphere which are strictly controlled. This would comprise either a wet or combined flue gas treatment (FGT) solution together with selective catalytic reduction abatement of mono-nitrogen oxides (nitric oxide and nitrogen dioxide) (NOx). Both options are assessed in the ES (AD06.02).

3.7.2 A wet FGT system would consist of a packed column designed to mix the combustion gases with a lime solution. The gases pass through various

scrubber stages (e.g. primary particle separator, acid scrubber, caustic sulphur dioxide scrubber, secondary particle separator) from which wastewater and a solid residue is produced. The wastewater would be treated prior to discharge to the main sewer while the residue would be managed as hazardous waste.

3.7.3 The combined FGT system operates in a similar manner to the wet FGT system, the key difference being wastewater is not produced. Both systems would achieve the same emissions performance which is far below emission limits required by the European Union Industrial Emissions Directive (IED).

3.7.4 The technical arrangement of a combined FGT system is very similar to a wet FGT system with an additional process that enables the wastewater produced to be reused within the overall ERF process, either for dissolution, dilution or suspension of reagents or for the purposes of recirculation, quenching and residue handling. The net impact is that there is no wastewater produced by the combined FGT system. The wet FGT systems would avoid the production of solid Air Pollution Control (APC) residue. The combined FGT system would produce a solid APC residue which would require treatment or disposal outside the Edmonton EcoPark.

3.7.5 Treated flue gas would be discharged to the atmosphere via a 100m (above ground level) tall stack made of two separate flues.

3.7.6 In addition to a wet/combined FGT system, the Applicant proposes to install a Selective Catalytic Reduction (SCR) process which is effective at reducing emissions of nitrogen oxides.

3.7.7 The consumables utilised in the flue gas cleaning process are listed in Table 3.1: These inputs are used to remove impurities in the flue gases and are removed as either solid or liquid outputs.

Table 3.1: Typical consumption data (1 x 350 ktpa line)

Mass flows	**Unit**	**Combined**	**Wet**
Limestone ($CaCO_3$)	kg/h	-	410
Caustic Soda (NaOH)	kg/h	30	20
Burnt lime (Hydrated lime is also an alternative)	kg/h	430	-
Sodium bicarbonate ($NaHCO_3$)	kg/h	-	-
Activated carbon / lignite coke	kg/h	22	22
TMT-15®[3]	kg/h	-	1.9
Iron III chloride ($FeCl_3$)	kg/h	-	3
Flocculent	kg/h	-	0.6

[3] TMT-15® is a product used to remove heavy metals including mercury

3.7.8 The solid outputs resulting from combustion and the flue gas cleaning process are discussed in the following sections. A table summarising the estimates for the expected tonnage outputs from the ERF is provided in Section 2.13.

3.8 Post-combustion residue handling

Incinerator bottom ash

3.8.1 An inert material, namely IBA, is produced as part of the combustion process. After complete burn-out of the waste the IBA would be cooled and metals (ferrous and non-ferrous) would be recovered.

3.8.2 The ash would fall from the grate into a discharger comprising a water bath and an inclined chute. The water serves to quench the ash and makes it possible to remove the IBA without dust or odour issues.

3.8.3 Ferrous and non-ferrous metals would be removed from the IBA for recycling. The removal of the metals from the IBA would occur off-site. Small volumes of boiler ash from the boiler outlet (excluding boiler fly ash from boiler hoppers) would be combined with the IBA as part of the process.

3.8.4 The ash would be conveyed to a covered storage area and transported by moving belts into dedicated bunkers. The IBA would be removed from the Edmonton EcoPark, metals recyclate would be removed and the remaining material would be processed into an approved aggregate material for road building and construction.

3.8.5 As a result of the incineration process up to 20 per cent by weight of the input materials would become ash which would require further treatment. Approximately 140,000 tonnes per annum is expected to be produced based on a residual waste input of 700,000 tonnes. Bottom ash would be recycled by a specialist contractor. The solid residues produced by the process and the quantities would depend on the ash content of the waste feed material.

3.8.6 Approximately 8,000 tonnes of boiler fly ash from the boiler outlet is expected to be produced in addition to IBA.

3.8.7 Around 14,000 tonnes of metal would be removed from the IBA which may be sold as a product for recycling.

Boiler fly ash

3.8.8 Fly ash from the boiler would be removed from the flue gas by electrostatic precipitation or by a fabric filter.

3.8.9 The fine particles of fly ash would be combined with the APC residues and managed accordingly. By 2050/51 the quantity of fly ash produced would be around 14,000 tonnes (approximately 2 per cent of input tonnage).

Air pollution control

3.8.10 The combustion of waste results in the production of gases consisting of water vapour, carbon dioxide and excess air. A very small proportion

referred to as ‘flue gas’ carries components including acid gases, organic substances, heavy metals and fly ash particles.

3.8.11 A wet FGT or combined FGT system in combination with SCR would be installed to remove pollutants from the flue gas. FGT systems using a reagent such as lime results in the production of solid residues known as APC residues.

3.8.12 Based on a throughput of 700,000 tonnes the facility is expected to produce around 14,000 tonnes of APC residues.

3.8.13 The APC residues are a hazardous material and would be managed appropriately. The residues would be stored on site in sealed silos prior to removal. The residues would be removed in enclosed bulk powder tankers by specialist contractors.

3.8.14 It is expected that the APC residue would be sent to an effluent treatment contractor to be used to neutralise acids and similar materials. This is the management route for APC residues produced at the existing EfW facility.

Other outputs

3.8.15 In addition to the other solid outputs mentioned above other minor outputs would be produced as part of the wet FGT process.

3.8.16 Wet FGT produces a solid residue in the form of gypsum, a non-hazardous output. By using a fabric filter, relatively clean gypsum can be produced that is suitable for reuse. A centrifuge separates the gypsum from the slurry as a dry product that is stored in a container for transport and reuse. Gypsum can be used in the production of building materials, plaster blocks and plasterboard walls. Around 1,700 tonnes per year of gypsum is expected to be produced.

3.8.17 Wet FGT systems produce wastewater that requires treatment before discharge. Small amounts of dewatered hydroxide sludge which is considered as hazardous waste is produced and which can be mixed with fly ash. Hydroxide sludge contains high amounts of heavy metals in its precipitated form. Therefore, treatment is usually not considered as an option and it is managed as a hazardous waste. Less than 1,000 tonnes of hydroxide sludge is expected to result from the treatment process.

3.9 ERF output summary

3.9.1 Table 3.2: provides an estimate of the expected tonnages of solid outputs as a result of the combustion and FGT process. The expected removal frequency for each output is also provided below.

If a wet FGT plant is installed around 40m^3 per hour of effluent from the process would be produced. Prior to discharge, this effluent would need to be treated within a waste water treatment plant to meet the chemical concentration limits detailed within the Thames Water consent (ref: TDEE0804) for the discharge trade effluent into the Chingford Sewer (public sewer).

Table 3.2: Estimated ERF solid outputs per annum for wet and combined flue gas treatment (based on a 700,000 tonne per annum input)

	Combined FGT	**Wet FGT annual Tonnages**	**Expected removal frequency**
Metals	14,000	14,000	Removal offsite from IBA
IBA	140,000	140,000	Daily/weekly
Boiler fly ash at the boiler outlet (excluding boiler fly ash from boiler hoppers)	8,160	8,160	Weekly
Boiler fly ash	14,000	14,000	Weekly
APC residues including carbon, excluding boiler fly ash	14,080	-	Weekly
Gypsum	-	1,760	Weekly
Hydroxide sludge	-	960	Weekly

Series 05 Technical Documents

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