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Design and Access Statement

Planning Application for the Development of Houghton Main Renewable Energy Park (comprising a Timber Resource Recovery Centre and an Anaerobic Digestion Facility) Including Associated Infrastructure

Land off Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley

Peel Environmental Management (UK) Limited and Houghton Main Waste Limited

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Houghton Main Renewable Energy Park

Design and Access Statement

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May 2014

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1 Introduction

1.1 Background

Peel Environmental Management (UK) Limited and Houghton Main Waste Limited (Peel) propose the development of land off Park Spring Road as a Renewable Energy Park (REP).

The subject site is located approximately 1km west of Little Houghton and 6.5km east of Barnsley town centre. Access to the site is from a spur off a roundabout (known as Houghton Main Colliery Roundabout) on the A6195 Park Spring Road.

Formerly part of the now reclaimed Houghton Main Colliery, the development site is 4.14 hectares in area and is shown edged red on the attached drawing '*Fig. 1 Site Location Plan*'. The site is brownfield land and is allocated as an '*Employment Policy Area*' (Policy DA3) and an '*Area of Investigation for Potential Employment Development*' (Policy DA4) in the Barnsley Unitary Development Plan (UDP) (December 2000) (Saved Policies).

Planning permission was previously given by Barnsley Metropolitan Borough Council (BMBC) to build 19 industrial units on the site in 2008, which was extended in 2011. However the development has failed to move forward due to a lack of interest from potential occupiers.

This Design and Access Statement is submitted in support of Peel's proposed REP and in preparing this document, reference has been made to the Department for Communities and Local Government document entitled: "Guidance on Information Requirements and Validation".

1.2 The Proposed Scheme

The proposed REP will create two distinct but compatible energy generation facilities comprising a 60,000tpa Anaerobic Digestion Facility (AD), a 150,000tpa Timber Resource Recovery Centre (TRRC), and associated infrastructure. The REP will have the potential to generate 23MW of electricity (20MW (net) from the TRRC and 3MW from the AD facility) and to provide a direct heat and/or electrical supply to appropriate off-takers in the local area.

Delivery of the TRRC will be the responsibility of Northern Bio Power Limited and delivery of the AD will be Tamar Energy Limited.

The overall development would represent £80 million of private investment into the local economy and would create around 200 jobs during construction and 30 positions once the REP is up and running. Building and operating the REP would also provide supply chain opportunities, of which local traders could take advantage.

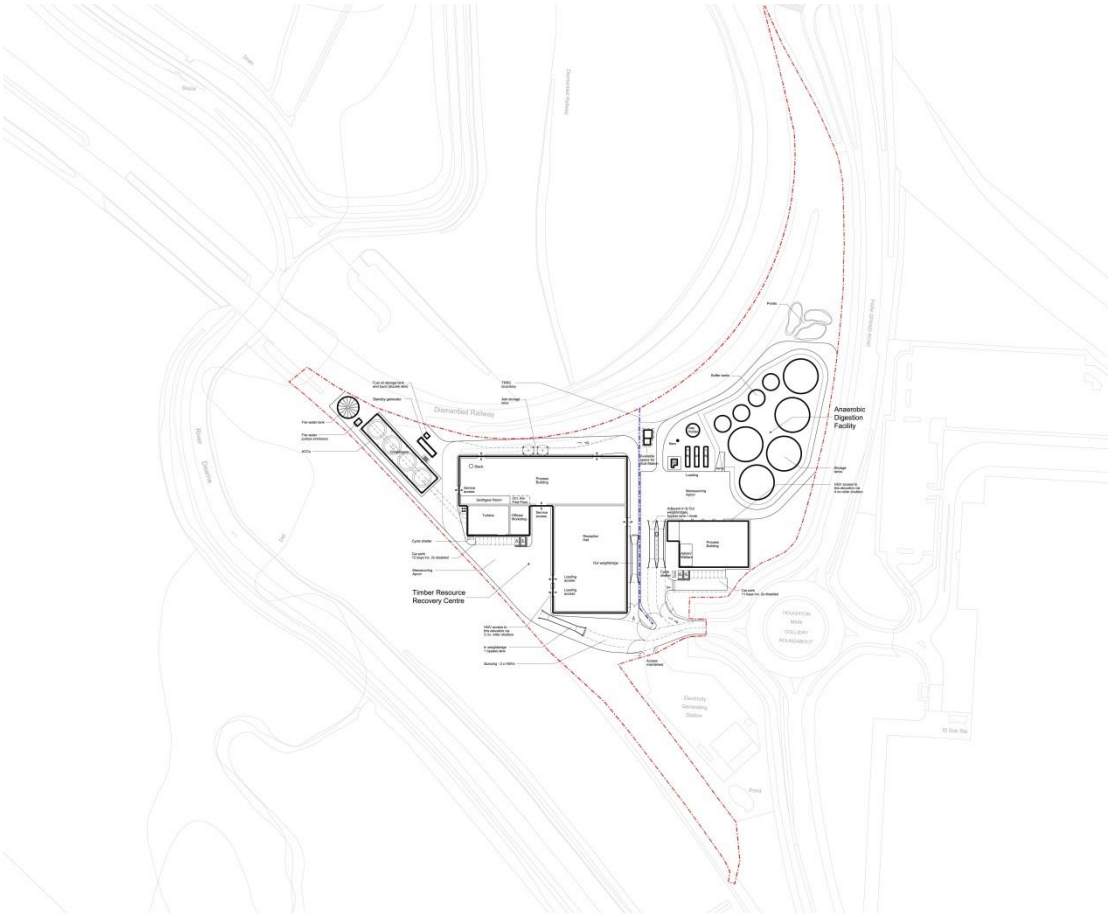

Fig. 1 Site Location Plan

1.3 Site Location

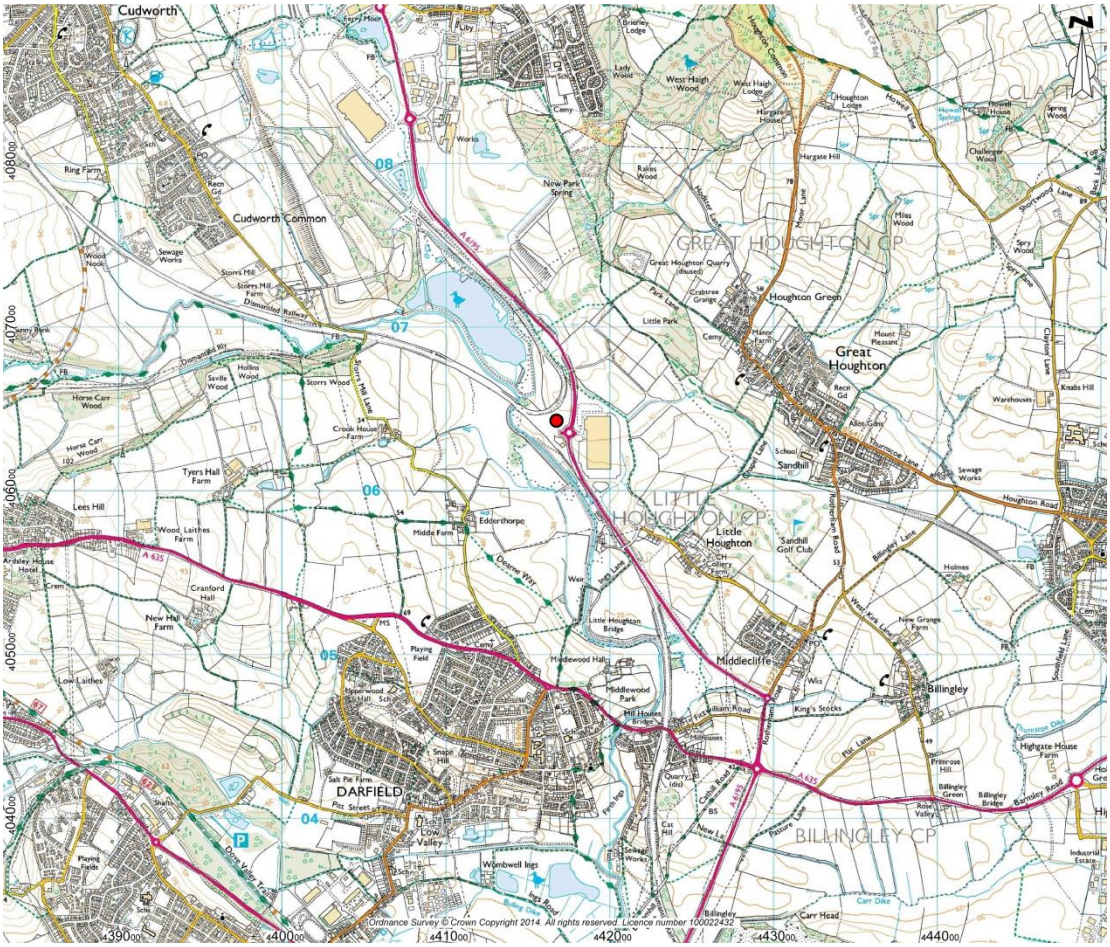

Fig. 2 Context Location Plan

The site is located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley and located approximately 1km west of Little Houghton and 6.5km east of Barnsley town centre and is within the metropolitan borough of Barnsley which is the authority of BMBC.

Triangular in shape, the development site was historically part of the Houghton Main Colliery Site and was reclaimed some time ago. The colliery was subsequently open cast mined by UK Coal in the late 1990s. Open casting was completed and the land was reclaimed and compacted to provide a platform suitable for industrial development.

Vehicular and pedestrian access to the site is from a spur off an existing roundabout (known as Houghton Main Colliery Roundabout) on the A6195 Park Spring Road. The existing access will be improved as part of the proposed development and

tailored to suit the development proposals. The site is well connected to the strategic highway network, with the both the A1(M) and M1 approximately 9km away to the east and west respectively. Access to the motorway network can be gained using the A6195 and other 'A' class roads linking to it. Similarly, a good class of road (A635) provides connection to Barnsley town centre.

The site is bounded by the A6195 Park Spring Road to east and curved flood defence bunds to the north and west which follow the alignment of a disused rail line. The River Dearne runs in a north-south direction to the west of the site.

The site is brownfield land primarily vegetated with rough restored grassland. Some scattered shrubs and small trees are also present on the site. The site is relatively flat except for bunding at its northern and western boundaries. The western corner of the site is around 30m AOD, the southern corner 33.2m AOD and the north eastern corner 34m AOD. The average level along the south western boundary is 32.5m. While much of the site is free from flooding the northern and western extremities are affected by Flood Zone 2 and this is addressed in the NPPF: Flood Risk Assessment document CRM.066.001.R.001. – Houghton Main FRA.

Greenbelt surrounds the site to the north, south and west. The surrounding Green Belt is largely made up of agricultural fields and farms. Other local land use on the surrounding Green Belt exist in the form of New Park Spring Nature Reserve that begins 137m to the north of the site and Sandhill Golf Club located in the village of Little Houghton 950m to the south east of the site.

Adjacent developments include a large Distribution Centre, currently occupied by a clothing retailer, on land to the east and south east of the site. The warehouse was developed by Prologis and was constructed under Reserved Matters Approval 2005/1441 (which followed Outline Planning Permission B/03/0762/HR granted in 2003 for Class B1, B2 and B8 development of the site). The warehouse is now operated by ASOS as its Fulfilment Centre and it is a major local employer. It has also recently been granted planning permission for an extension (ref: 2012/1018). To the south a mine gas utilisation plant operated by Alkane Energy borders the site and can generate up to 3 MW electricity from mine gases extracted from the former colliery.

The site is relatively remote however there are a few sparsely scattered farms and properties within the 2.5km radius study area, namely:

- Crook House Farm located approximately 0.8km to the west;
- Store Mill Farm located 1.5km to the north west;
- Tyers Hall Farm located 1.8km to the south west; and.
- A housing development located on Doncaster Road, located 1.8km south west of the site.

1.4 Methodology

The Environmental Statement (ES) that accompanies the planning application assesses the suitability of the development in its context and suggests environmental mitigation measures, where necessary, in order to reduce the environmental impact upon the surrounding area.

In terms of landscape and visual impacts, due to the scale of the proposed REP, distant views of it would be available from both private and public land. By employing a careful approach to the building's massing and choice of materials and finishes, it has been possible to significantly reduce the visibility of the development. In addition, the relatively depressed nature of the site, in its landscape context, ensures that distant views of the REP are restricted.

The ES also contains comprehensive assessments of the potential of the proposed development to give rise to impacts upon a range of other environmental receptors. Some of these impacts would be mitigated, in part, through use of state of the art, highly efficient technology to produce low emission clean electricity and local heating.

The Transport Assessment contained within chapter 6 of the ES that accompanies this application serves to demonstrate that the proposed vehicle profile can be safely accommodated within the existing road network.

All the above contribute to making the chosen site ideal for the proposed development.

When working through the design development process for the REP a number of specific factors that influence the proposal have had to be carefully considered such as:

- Site Suitability
- Emissions Modelling
- Visual Impact Assessment
- Noise receptors
- Public transport links and suitable road access

These create a wider set of design principles that should be employed during the scheme's realisation for the means of achieving a positive and successful outcome.

1.5 Site Suitability

Included in the Environmental Statement that accompanies this application is an assessment of the suitability of the site in an environmental context. The site will be visible from nearby public and private land, although this will not be subject to an unacceptable level of impact given the existing industrial development in the vicinity, and the landscaping and topography of surrounding areas. These issues are explained in detail in the Landscape and Visual Impact Assessment. The site has good transport links and the Transport Assessment that accompanies this application has demonstrated that the proposed vehicle profile can be safely accommodated within the existing road network. All the above contribute to making the chosen site ideal for the proposed development and greater information on this is detailed in the Environmental Statement.

1.6 Land Use Policies

Suitability of the proposed development and chosen site is re-enforced by their accordance with national, regional, sub-regional and local planning policy. The detailed findings of the policy review can be found in Chapter 5.0 of the Planning Statement, document: CRM:066.001.R3_HMREP_PS

2 Size and Scale of the Proposed Development

2.1 Introduction

The proposed REP will create two distinct but compatible energy generation facilities comprising an Anaerobic Digestion Facility (AD) and a Timber Resource Recovery Centre (TRRC). The site is accordingly split into two areas along a north to south dividing line to segregate the different processes. Ancillary storage tanks and plant to support the technological process lie outside two main building groupings though their positioning is dictated to ensure the most efficient throughput of organic and biomass fuel and operation of the REP.

Building enclosures within the REP are sized to ensure containment of the various process equipment and the required clearance zones for operational activities. The buildings are sized and the equipment is located in order to ensure a safe and efficient working environment.

The REP's constituent individual buildings and their sizes are listed in table 1 below.

Table 1 – Maximum Building and Structure Dimensions

	Length (m)	Width (m)	Height (m)
TRRC			
Reception Hall	65.0	45.0	11.4 (TO upstand) 11.0 (roof ridge) 9.0 (eaves)
Process Building	102.0	30.0	30.0 (TO parapet)
Stack	2.5 (diameter)		45.0
Turbine Hall	25.7	18.0	17.9 (TO parapet)
Offices / Workshop	12.3	18.0	17.9 (TO parapet)
Condensers	53.7	13.4	23.0 (TO duct)

Ash Storage Silos	6.6 (diameter)		14.8
Fire Water Tank	13.0 (diameter)		7.0 (TO railings)
Fuel Oil Storage Tank	3.0	2.4	2.5
Standby Generator	13.2	3.2	2.0
Fire Water Pumps Enclosure	4.0	3.0	2.5
AD			
Process Building	42.0	28.0	12.5 (TO upstand) 12.1 (roof ridge) 11.0 (eaves)
Admin / Welfare	n/a (within Process Building)		
Filters	12.2	7.2	5.0
Storage Tanks	21.1 (diameter)		15.7 (TO railings)*
Buffer Tanks	10.1 (diameter)		16.0 (TO railings)*
Gas Holder	8.0 (diameter)		7.8
CHP Engines	12.2	2.5	3.0
Oil Store	12.2	2.5	3.0
Flare	1.0 (diameter)		9.0
Weighbridge Kiosk	1.8	1.2	2.5

* NOTE: All heights are + relative heights from the site datum of 33.5m AOD except in relation to the AD facility's buffer and storage tanks which sit on external hard standing ground that is 1m lower than the site datum i.e. 32.5m AOD. The heights for these tanks are relative to this level of 32.5m AOD.

2.2 Process Requirements

The proposed REP will comprise the following key elements:

- AD
- Process Building
- Admin / Welfare
- Digestion Tanks
- Storage Tanks
- Buffer Tanks
- Landscaping ponds
- Gas Holder
- CHP Engines
- Oil Store
- Flare
- Weighbridge kiosk
- Sub-station

- TRRC
- Reception Hall
- Process Building
- Admin / Welfare
- Turbine Hall
- Workshop
- Condensers
- Transformer
- Fuel oil storage tank
- Standby generator
- Fire water pumps enclosure
- Fire water tank

- Other
- Weighbridges
- Site Fencing

- External Lighting

2.3 The Processes

Anaerobic Digestion (AD)

The AD process is well established and is used widely across Europe to make good use of organic materials that would otherwise be landfilled. Here in the UK, it is being used on both a small and large scale to generate energy in a more sustainable way.

The proposed AD facility would be located on the eastern side of the site, closest to the A6195, and would process up to 60,000 tonnes of organic feedstock each year to create around 3MW of electricity. Anaerobic Digestion, or AD, is a natural process where organic or biomass materials, such as food waste, are broken down by micro-organisms and converted into energy.

Materials are placed inside sealed tanks, where micro-organisms digest them in a similar way to composting. This process releases a biogas (a mixture of carbon dioxide and methane) which is then used in a modern gas engine to create heat and electricity. This electricity could be supplied directly to nearby businesses or fed into the National Grid.

The process also produces what is known as a digestate, a nutrient-rich substance that can be used as a bio-fertiliser by farmers. In fact, the AD process has a historic link with the agricultural industry and is common place on farms up and down the country.

The feedstock used in the AD facility would come from the food industry, including production and food processing, through to restaurants, hotels and schools. Tamar Energy, who will design and operate this part of the Energy Park, has several facilities currently in development and operation and aims to establish a network of sustainable energy hubs across the UK.

Timber Resource Recovery Facility (TRRC)

With the need for renewable energy sources a constant demand in today's society, energy generation companies are looking at how we can best use the materials at our disposal. Organic products such as wood contain stored up energy which is lost when they are sent to landfill.

Instead of it going to landfill, Northern Bio Power will process previously used wood from the surrounding area in the TRRC at Houghton Main. The biomass used will include wood products recovered from domestic and industrial sources after the removal of other valuable recyclable materials. Other wood-derived fuels such as paper products may also be used in the process.

The TRRC will be made up of two main components, the reception hall, where biomass will be brought in and stored, and the process hall, where electricity is generated. This feature of the REP will generate up to 20MW of electricity from

150,000 tonnes of material each year and will produce a stable source of energy 24 hours a day.

Gasification, a type of thermal treatment will be used to create energy from biomass materials. The wood, or biomass, is placed into a chamber, where the amount of oxygen present is carefully controlled. The wood is then heated to high temperatures which breaks down the material without burning it. This reaction creates what is known as a syngas. It is this syngas that is the key to creating electricity. The gas is captured and combusted to generate steam, which in turn powers an electricity-producing turbine. The generated energy can then be fed directly to nearby users and into the National Grid.

The technology selected is a fluidised bed gasifier an advanced technology specially designed for the conversion of timber biomass. Highly proven gas treatment technology will ensure that the plant represents Best Available Technology and Best Practicable Environmental Option for the treatment of the waste timber. It will be designed to produce 20MWe of exportable renewable electricity and renewable heat for use within other proposed local businesses.

The plant will be designed and operated to meet the most stringent environmental Standards and will be controlled by the Environment Agency who will ensure that the process has no significant environmental impact. Highly proven gas treatment technology will ensure that the plant represents Best Available Technology and Best Practicable Environmental Option for the treatment of the waste timber.

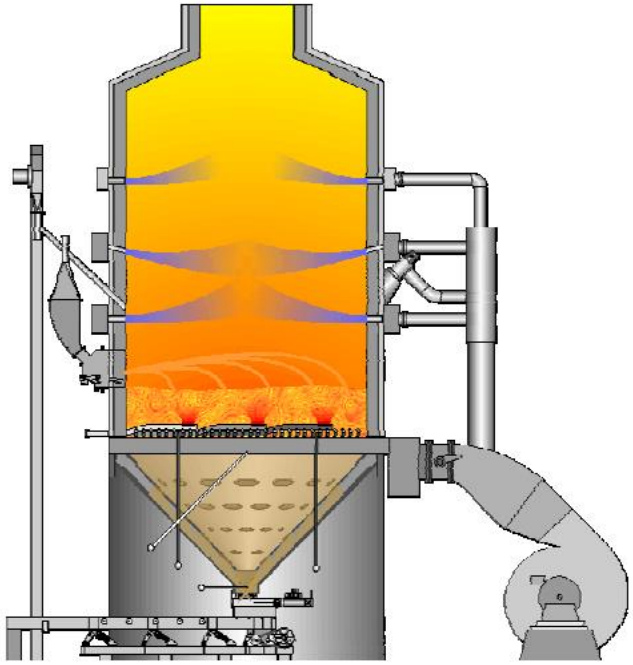

Fig. 3 Fluidised bed reactor

The following section will now describe the technology utilised within the proposed Houghton Main TRRC.

150,000 tonnes per annum of prepared timber biomass will be fed into the fluidised bed gasifier. The resulting syngas is then consumed within the combustion chamber, to generate heat. The heat from this is then passed to the boiler to produce steam for the generation of electricity. The plant will be designed to export heat.

Environmental control is ensured by the well proven multiple stage gas clean up including cyclones, bag house filters and scrubbers. Cleaned flue gas is released through a 45 metre stack controlled and monitored to meet the tightest environmental standards required by the Environment Agency.

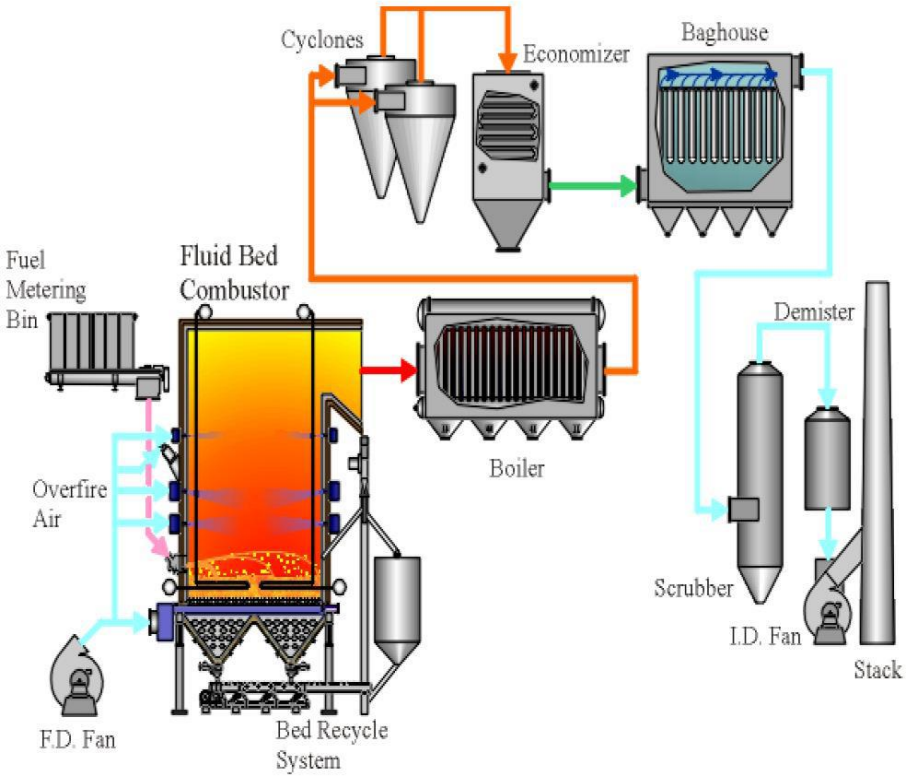

Fig. 4 Process flow diagram

2.4 Administration and Amenity Accommodation

The TRRC Processing Facility and the AD Facility each have their own dedicated administration and amenity accommodation.

Located along the eastern side of the Turbine enclosure, the TRRC accommodation block is spread over three floors. It is beneficial to maintain a clean environment for the offices and control room so the layout is organised accordingly with such 'clean' areas segregated on separate floors from 'dirty' areas such as the staff canteen and changing rooms. A lift enables wheelchair access to the first and second floor, whilst on the ground floor you would be able to escape to the outside directly from the lift lobby in the event of a fire. Wheelchair provision will be catered for throughout including specific shower and changing areas. Visitor centre, offices, storage and some specialised process areas such as compressor rooms will comprise the other areas.

The AD accommodation is located within the AD Facility's larger Process Building. Located solely on the Ground Floor direct access to the outside assigned staff car park is provided and wheelchairs are again catered for in terms of WC and shower provision. The layout will be zoned by locating the various room types appropriately by keeping the offices and control room opposite each other whilst grouping the shower / change facilities and staff mess towards the other end of the block.

2.5 Gatehouse and Weighbridges

The weighbridge gatehouse will function as a general security point and weighbridge control for the AD site. The weighbridge will weigh all incoming HGV's and where necessary weigh the out bound journey. A by-pass lane to the exit weighbridge is available for vehicles for which the tare weight is known.

The gatehouse will be a prefabricated off-the-shelf booth. There are four weighbridges allowing two for incoming vehicles and two for outgoing vehicles. These will provide two each for the separate facilities. There is sufficient space for 6 HGVs in queuing lanes before the weighbridge.

2.6 Car Parking and Bicycle Storage Shed

Staff and visitor car parking is syphoned off from the process related vehicle movements and is split into two locations in accordance with the accommodation areas that they serve as described above.

One car park containing 10 standard bays and 2 accessible bays serves the TRRC Administration and Amenity accommodation. The accessible parking bays are located closest to the access door.

A separate car park would serve the AD Administration and Amenity accommodation and contains 9 standard parking bays and two accessible bays. Here the accessible bays are again located in closest proximity to the entrance and a pedestrian zebra crossing provides a safe route to the south linking the car park directly to the its site entrance and that of the TRRC.

One covered bicycle storage shelter will be provided at the western end of the TRRC's parking bays with another located similarly in respect to the AD car park. This provision links in with the shower and changing facilities within the respective Administration and Amenity blocks and will help to encourage and promote sustainable transport to and from the work place.

2.7 Site Fencing

A secure 2.7m high steel palisade security fence will be erected around the site following the line indicated on the proposed site layout. Further palisade fences will serve to divide the site into its separate AD and TRRC areas.

Secure vehicular and pedestrian gates would be provided at both the AD and TRRC entrances at the south of the site. These gates would be locked outside of operational hours.

2.8 External Lighting

Suitable site lighting that follows CIBSE guidance would be installed and provide for personnel safety and operational use. This would consist of column mounted lights and lights attached to the various process buildings where necessary. The lights will only be used during operational hours and will be downward pointing to provide focussed personal safety and security without leading to light pollution; avoiding jeopardising landscape character at night, or impacting negatively on wildlife.

2.9 Site Security

The site security for the proposed REP will be independent for each of the two process areas with the AD and TRRC areas site security including CCTV provision at their site entrances and where necessary around their operational sites.

The TRRC cameras would have a direct live feed to monitors in the Control Rooms and will be managed by the operations team and control room operator. Here the video images would be stored for 1 month to provide a visual record of activities. The TRRC site will be manned 24/7 and a controlled access system would also be in use.

The AD site will have alarms and CCTV installed. The facility cameras would have feeds connected to the manager's control software in order to allow the AD facility to be monitored remotely. There will be systems in place such that any alarms for either operational or security issues automatically call the management.

All the security measures would work in conjunction with one another so that no area of the REP is left without appropriate protection.

2.10 Fire Fighting

The building would be designed and constructed so as to provide reasonable facilities to assist fire-fighters in the protection of life. The TRRC will also have its own dedicated fire suppression system designed specifically for the facility. Reasonable provision would be made within the building to enable fire-fighting appliances to gain access to the building. Overall the building design would conform to the requirements of Part B Volume 2 of the Building Regulations ensuring high standards of fire safety.

The site layout has been designed to afford direct emergency access to all parts of the REP with a perimeter road all the way around the TRRC. There is direct access to three sides of the AD Facility's main Process Building. This third eastern elevation of the AD's Process Building is easily accessed off from the road that surrounds the lowered area that contains the AD Facility's Storage and Buffer Tanks. Emergency services would use the main entrances off the western exit of the Houghton Main Colliery Roundabout.

Upon entering the site, fire fighting vehicles would be able to use the site in much the same way as the HGVs and staff and visitor cars that regularly circulate. The north-western part of the TRRC perimeter road would lead to the ACCs. The generous manoeuvring apron area to the west of the TRRC Reception Hall would allow easy access and space for fire fighting vehicles to reverse and turn around whilst also allowing a short direct route from parked emergency vehicles to the TRRC personnel entrance. In a similar manner the generous manoeuvring apron to the north of the AD's Process Building offers similar levels of flexibility to fire fighting vehicles.

Due to the size of the TRRC administration and amenity accommodation the escape distances are such that only one stair well and lift core is required for means of vertical circulation with all internal rooms adjoining one central corridor offering unobstructed routes to the exit or stairwell. A central unobstructed corridor provides simple circulation throughout the AD Facility's administration and amenity accommodation also. The administration and amenity accommodation blocks for both the TRRC and AD Facility have emergency exits onto each of their south elevations. Inside both accommodation blocks 1800mm by 1800mm passing places are provided for wheelchair users to pass each other and disabled refuge spaces would be provided on all stair landings above ground floor. Beyond planning a certified fire consultant would be appointed to formulate a detailed fire strategy for this REP.

3 The Proposed Design

3.1 Design Considerations

From the outset we have recognised that the Houghton Main site and the proposed REP have a number of design constraints which have been key drivers in developing the proposed site layout and architectural design.

Fig. 5 ASOS office opposite site

Fig. 6 Site from north east

Fig. 7 Site entrance

Fig. 8 Site from south east

Site Context

The site for the REP is located on brownfield land which previously formed part of the former Houghton Main Colliery and is adjacent to the ASOS Fulfilment Centre. However it also abuts the open parkland landscape formed as part of the restoration of the former colliery and the nearest residential area is approximately 800m from the application boundary. The interface between the proposed REP and these environments is an important consideration. How the proposed design responds to this is clearly a challenge, but one which, if embraced and carefully considered

throughout the design process, can lead to developing an appropriate architectural solution.

Site Layout

The locations of the AD and TRRC facilities forming the REP are in this instance very much dictated by the site's boundaries and in particular its triangular shape. However their siting is also influenced by having to ensure that the location and interrelationship of all of the buildings and external equipment together with the road infrastructure that serves them delivers an efficient and safe site layout. Furthermore the north western extremities of the site are affected by Flood Zone 2 and the development of the site layout has had to be mindful of this.

Access

Vehicle access will be taken from the existing spur on the Houghton Main Colliery Roundabout on the A6195 Park Spring Road, and the existing access will be improved as part of the proposed development and tailored to suit the development proposals. All REP traffic will use this entrance to access the site from the south; however within the site each facility will have its own on-site entrance, security gates and weighbridges.

Visual impact

The visual impact of the proposed facility has had to be addressed in both the development of the site layout and the architectural design. A number of key viewpoints have been considered from the outset and the design has been informed throughout its development by the use of 3D modelling and photomontages and the development of the Landscape and Visual Impact Assessment (LVIA).

Fig. 9 Viewpoint key and surrounding land use.

Fig. 10 Current view from viewpoint 1 (Ings Lane bridge, Little Houghton)

Fig. 11 Visual impact montage from viewpoint 1 (Ings Lane bridge, Little Houghton

Fig. 12 Current view from viewpoint 2 (New Park Spring Nature Reserve)

Fig. 13 Visual impact montage from viewpoint 2 (New Park Spring Nature Reserve)

Fig. 14 Current view from viewpoint 3 (Chapel Lane, Great Houghton)

Fig. 15 Visual impact montage from viewpoint 3 (Chapel Lane, Great Houghton)

Fig. 16 Current view from viewpoint 4 (north side of Darfield)

Fig. 17 Visual impact montage from viewpoint 4 (north side of Darfield)

Environmental impact

The process equipment dictates the minimum building envelopes required for the main building structures. The design of the facility and its different process related buildings are therefore largely process driven and this has determined their size and layout, and has also informed the relationship between the various buildings. The process requirements have also dictated the vehicular delivery and servicing requirements for each of the AD and TRRC facilities and have influenced the spacing between buildings and established the routes for vehicular access into and around them.

3.2 Design Development

Design Approach

For the REP we have sought to adopt a design approach which minimises the volume and massing of the facility and in so doing seeks to minimise its visual impact when viewed from distant and at times elevated views. The overall aim has been to develop a design which is contextual, compact, functionally efficient, and an environmentally responsible 'family' of buildings with a coherent and consistent design theme.

We have therefore adopted a 'form follows function' design approach; one which we believe is in keeping with our design strategy and one which we consider resonates with the industrial heritage of the site and the surrounding area, by creating a facility true to its function.

Our design approach therefore chooses to avoid unnecessary 'sculpting' of the form and mass of the buildings and in so doing avoid generating unnecessary height. For the same reason we have chosen to avoid the use of curved roof planes. We also decided to avoid generating building shadows at high level and to achieve this chose to use wall parapets to the perimeter of all buildings rather than over sailing roof eaves.

Site Layout and Massing

The development of the site layout has been informed by the constraints and opportunities offered by the site; the adopted 'form follows function' design approach; consideration of how to best mitigate the development's impact within its setting; and the requirement to ensure an operationally efficient state of the art renewable energy facility.

The triangular shape of the site and the requirement for it to be split into two distinct 'halves' to accommodate and maintain operational independence of both the AD and TRRC facilities, have been major influences in developing the overall site layout. These together with the design considerations identified previously, had to be addressed in developing the site layout:

- Developing the site layout such that it embraced the architectural design approach;
- Establishing a logical and efficient process layout for the AD and TRRC buildings within their allocated areas and in relation to each other;
- Ensuring that all proposed building areas meet process requirements;
- Providing intuitive and safe vehicle routes to enter and exit each of the independent process areas;
- Ensuring efficient traffic flows and avoiding conflict within each process area;
- Providing adequate queuing and manoeuvring space for all vehicles;
- Minimising the overall footprint of the facility, together with individual building sizes including their heights;
- Where possible segregating operational HGV traffic from staff and visitors cars;
- Providing safe pedestrian and disabled access onto the site and into the facility;
- Locating the noisiest elements such as the air cooled condensers away from sensitive receptors;
- Mitigating noise and visual ‘clutter’ from onsite plant and vehicles;
- Allowing the shared use of infrastructure;
- Establishing a coherent family of buildings on the site which relate to one another and whose various functions can be understood by those visiting the site.

During the design development stage various alternative site layouts and configurations of the REP were developed and each reviewed against the above design requirements and the overall architectural design approach. Common to all of the layout studies, the AD and TRRC process sites are each served by separate vehicle accesses at the southern end of their sites with these locations dictated by their shared spur access from the Houghton Main roundabout. This constraint together with the triangular plan shape of each site restricted to a greater or lesser degree the availability of alternative layout designs.

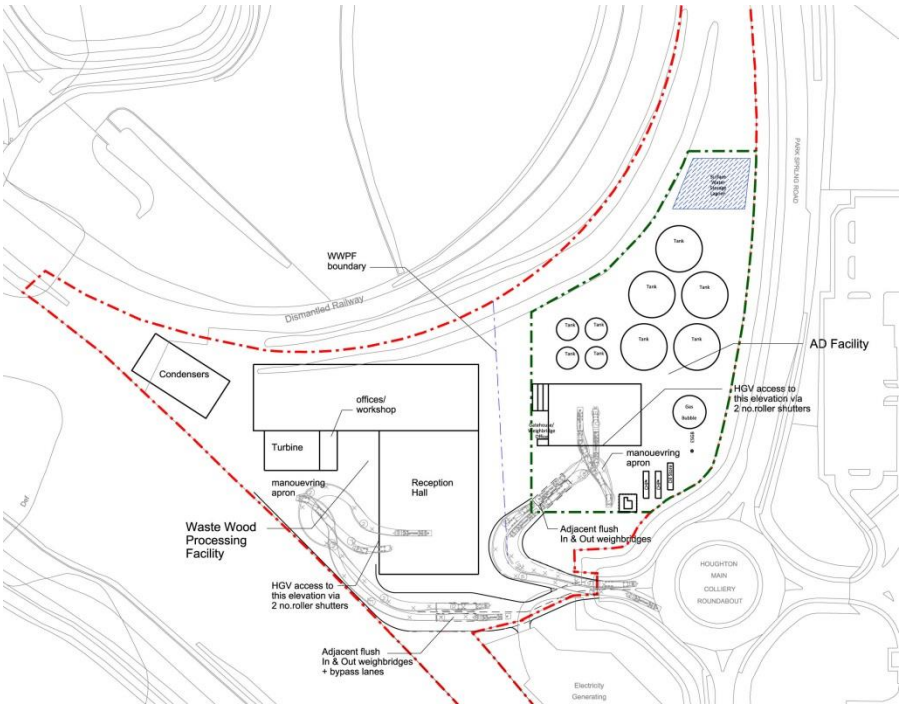

Fig. 18 Initial site layout

AD Facility

The varying size and number of operational components making up the AD facility has allowed for a wide range of layout options to be considered for its triangular site. A key issue for its operational efficiency and safety is the relationship between its process building and the associated HGV manoeuvring apron which together essentially needs to be treated as a single unit. In contrast, subject to maintaining the required operational clearances between them, the arrangement of the AD storage and buffer tanks offers more flexibility in terms of generating alternative layouts. Accordingly a number of layout configurations were developed to test alternative locations for the process building and the storage tanks and these are illustrated in Figures 19-21.

This exercise concluded that for a number of reasons positioning the AD process building and its manoeuvring apron towards the south of the site (Figure 21) offered the most optimised layout for the AD facility. It incorporated the following:

- Independent vehicle and pedestrian access on the south west corner of the site;
- Immediately upon entering the site and prior to reaching the weighbridges access is provided to a dedicated staff/visitor car park with spaces allocated for disabled parking, motorcycles, and with a covered bicycle storage shelter. All are located in close proximity to

the entrance to the administration block and maximise segregation of cars from HGV vehicles;

- A dedicated pedestrian path running alongside the road for staff and visitors leads to the main car park and covered cycle storage areas adjacent to the administration building;
- A generous vehicle queuing area for inbound operational vehicles in front of the gatehouse:
- A gatehouse with 1 no. entry and 1 no. exit weighbridges with an additional bypass lane on the entrance route;
- The AD process building is located in close proximity to the site entrance thereby allowing for efficient turnaround times. Its relationship to its external manoeuvring apron is optimised and ensures right hand down reversing;
- The AD building presents a frontage to the sites southern boundary and visually conceals site operations behind it from public views and offers the best opportunity to achieve ‘a family of buildings’ with the TRRC;
- The AD storage tanks along the site’s eastern boundary offers a visual screening of the sites internal operations;
- It achieves the required clearance zones around the buildings for construction and operation activities;
- It delivers an efficient, safe, and controlled access and circulation strategy for the AD facility.

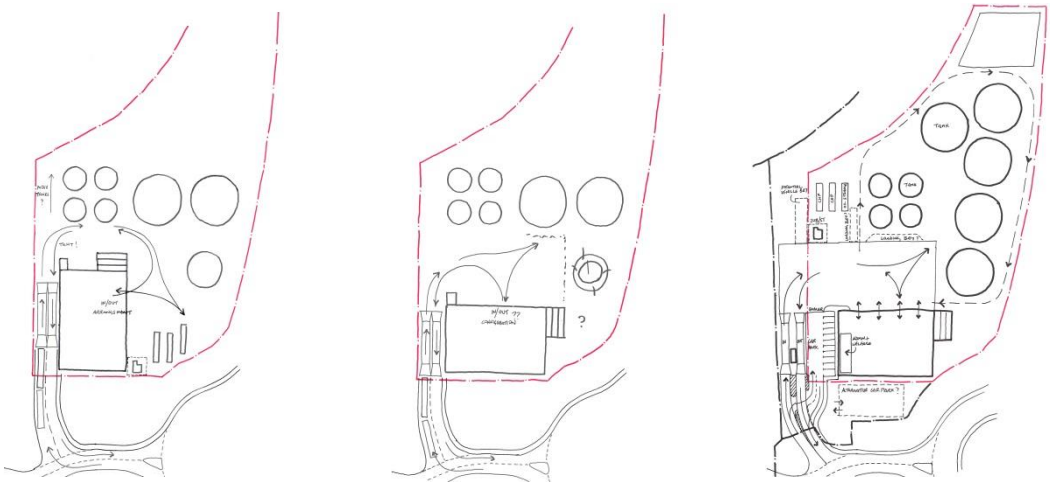

Fig. 19, 20, 21 AD layout design development

Further design development was then undertaken to further improve this preferred layout. This included further rationalisation of the layout of the storage tanks, refinement of the location and size of the electrical sub-station, and an adjustment to the layout of the storage tanks in order to allow a landscaped buffer zone in the

south east area of the site. The configuration and location of the ACC was also updated.

The final layout design of the AD facility ensures that the requirements of all of the site layout design requirements and the architectural design approach have been met. In so doing it delivers a safe and efficient site layout which contributes to mitigating as far as possible the visual impact of the AD facility without having to compromise its operational functionality.

TRRC Facility

In contrast to the AD facility the operational requirements and size of the buildings and external equipment forming the TRRC facility limited the range of layout options available for its triangular site.

A major constraint on the layout of the TRRC is the relationship between its linked buildings. Here process flow, efficiency and safety dictate the linear arrangement of its main Process Building as well as the size and location of its adjoining Reception Hall and Turbine Hall buildings. It also dictates the relationship between this building and the standalone Air Cooled Condensers (ACC) which is governed both by their proximity to, and physical connection with the Turbine Hall.

Another major constraint is the triangular shape of the site and ensuring that the various buildings are laid out to satisfy their process relationships but also ensure that a vehicle access and circulation layout can be developed which allows all HGV delivery and service vehicles to efficiently and safely enter, circulate and finally exit the site.

Initially a number of studies were undertaken to explore how the process buildings and traffic circulation might be best configured on the triangular site, but it quickly became clear that there was only one layout that satisfied both of these major constraints. It was therefore concluded that the only viable option was to locate the largest Process Building running east to west along the site's northern boundary, with its Reception Hall and Turbine Hall extending from its southern face, and the ACC located to the west of this building group. This preferred site layout incorporated the following:

- An independent vehicle and pedestrian access on the south east corner of the site;
- A dedicated pedestrian path running alongside the access road for staff and visitors and leading to the administration building;
- A generous vehicle queuing area for inbound operational vehicles in front of the 'in' weighbridge:
- An additional vehicle bypass lane provided on the entrance route;
- The required clearance zones between buildings and the site boundaries and a clockwise vehicle circulation route is provided for around the entire facility which minimises the requirement for reversing vehicles but at the same time offers efficient service access.

This ensures that an efficient, safe, and controlled access and circulation strategy is achieved;

- An ‘out’ weighbridge located on the eastern side of the buildings and a return loop for vehicles to re-circuit the site;
- The largest component of the facility, the 30m tall Process Building, running east to west alongside the site’s northern boundary best reduces the visual width of this tallest building when viewed from elevated viewpoints in the east and south west of the site;

Fig. 22 Elevated visual impact montage from Great Houghton

- The Reception Hall is located in the south east portion of the site and close to the site entrance allowing for efficient turnaround times. Its relationship to its external manoeuvring apron is optimised and ensures right hand down reversing;
- The Turbine Hall is located in the south west face of the Process Building maintaining its process relationship to the internal plant of the Process Building;
- The ACC is located in close proximity to the Turbine Hall thereby maintaining operational connectivity and efficiency but also allowing it to make good use of the ‘narrowing’ north west corner of the site.
- With the north west corner of the site being in Flood Zone 2 the ACC is the most appropriate component to be sited here as being set above the ground level on ‘stilts’ it is unlikely to be affected by, nor adversely affect the flood plain within this area of the site;
- The location of the Reception Hall presents a frontage to site’s southern boundary visually concealing operations behind it from public views and from the south together with the Turbine Hall reduces the overall scale of the 30m tall Process Building. This best relates it to the scale of the adjoining AD facility thereby contributing to the architectural development of ‘a family of buildings’.

Further design development was then undertaken to further improve this layout. This included further rationalisation of the layout with:

- Ash storage silos being located 'out of sight' on the northern face of the Process Building;
- The widening to two lanes of the northern service road to cater for these;
- The location of firewater tank and fuel storage in the north west corner of the site;
- Following feedback from the public exhibitions the site layout was adjusted to widen the landscaping strip along the south western boundary in order to increase the planting mitigation in this area and respond to specific concerns raised by nearby residents.

The final layout design of the TRRC facility ensures that the requirements of all of the site layout design requirements and the architectural design approach have been met. As a result the design of the REP's TRRC facility offers a safe and efficient site layout which in combination with the adjoining AD facility contributes to mitigating as far as possible its visual impact without compromising its operational functionality.

3.3 Architectural Design

The architectural design for the Houghton Main Renewable Energy Park (REP) has been the outcome of a lengthy and detailed design development process which from the outset has included the development of 3D models to allow proposed design solutions to be tested in photomontages from key views. This design stage ran in parallel with the site layout design development work as the location of the building and the layout of the site had obvious links and implications to us delivering the overall design strategy. Whilst recognising that the design of the REP is in many ways inevitably driven by its process, a particular focus has been considering solutions which would contribute to best mitigating the visual impact of the facility.

In seeking to develop a contextually appropriate architectural design we recognised from the outset that the setting of the site, and the fact that it would be impossible to make a facility of this size 'disappear', would each have to be carefully considered in developing the architectural design. We also recognised that the design development work should seek answers to a number of key questions:

- How strictly should the design adhere to the adopted 'form follows function' approach;
- What design 'cues', if any, should the design take for the adjacent ASOS Fulfilment Centre;
- Should the design seek to blend with its visual context and mitigate its visual impact, or should it showcase itself;

- How do we ensure that the overall REP is read as a ‘family of buildings’.

Stage 1 Design Development

This stage of design development sought answers to the above questions and considered alternative designs for the building forms and colour palettes and tested in photomontages from three key viewpoints.

Building Form Studies

Two options were initially developed to consider alternative design approaches for the form and massing of the REP’s largest building, the 30m high and 102m long TRRC Process Building.

Option 1 explored a ‘stepped massing’ where the ‘form follows function’ approach is strictly adhered to, and where the varying and changing heights required by its internal process equipment are reflected in the form of the building. Whilst this offered the most volumetrically efficient design and reduced the extent of the 30m high roof plates, it also produced a visually fractured and somewhat random appearance, particularly if seen from nearby viewpoints and read against a backdrop of sky. When tested in the photomontages the stepped profile proved to be less successful in reducing the overall scale of the building than at first thought, as from many viewpoints the building is viewed obliquely resulting in the tallest roof plates remaining the most dominant.

Fig. 23 Option 1 – Basic stepped massing

Fig. 24 Option 2 – Consolidated massing

Option 2 took a different approach and unified all of the TRRC Process Building under a single 'consolidated massing' with its single height set by the highest required internal requirement. This did stray to some degree from the 'form follows function' approach and in so doing generated a less efficient building volume, but by establishing a singular height it appeared to offer a less fussy, cleaner lined, and more visually controlled deign. On the whole we considered this to offer a more refined aesthetic and be more in keeping with the long horizontal roof lines and scale of the adjacent ASOS Fulfilment Centre. We considered that in photomontages it did not significantly increase the visual impact of the REP development and that it some ways actually drew less attention to itself.

It was therefore concluded that on balance the refined 'consolidated massing' design offered the best opportunity to help mitigate the visual impact of the REP and that this design would therefore be the basis upon which alternative colour studies would be tested.

Building Colour Studies

Having determined a preferred form and massing for the TRRC Process Building, we then explored how colour might be used to reinforce the development as a 'family of buildings' and assist in mitigating the visual impact of the facility from both nearby and distant views. We also considered colour matching the REP with the adjacent ASOS Fulfilment Centre and what positive or negative impacts this might have. Four options were developed.

Option A incorporated a single colour tone for the entire REP development and adopted a light grey colour which matched that used in part on the adjacent ASOS Fulfilment Centre and assisted in creating a visual tie between them. Its consistent use across the REP ensured a common approach and supported the aspiration to create a 'family of buildings'. From some viewpoints the light grey would help to blend the tallest REP structures against a backdrop of sky, and this was proved successful in some of the photomontages tested from the north and south of the site. However from more elevated viewpoints such as from Great Houghton in the east the REP is read against a background of landscape and in the light grey proved to make it highly visible and very much in keeping with the adjacent ASOS Fulfilment Centre.

Fig. 25 Option 2A – Light monotone consolidated massing

Fig. 26 Visual impact of Option 2A from Great Houghton

Option B considered using two colours and added the dark grey/green colour which is also used on the ASOS Fulfilment Centre to establish a darker plinth for the REP buildings, but leaves the AD storage tanks and the upper part of the TRRC Process Building in the light grey. When tested this offered no significant improvement on how the REP would be seen from any of the selected views, but it was clear that from nearby views it would help to blend the lower buildings to the ground and horizontally fracture the overall mass of the TRRC.

Fig. 27 Option 2B – Two tone consolidated massing

Fig. 28 Visual impact of Option 2B from Great Houghton

Option C takes that established on Option B but expanded the use of the darker colour to include the AD storage tanks and this proved successful in blending the REP with the landscape when seen from elevated views from Great Houghton.

Fig. 29 Option 2C – Two tone consolidated massing with dark tanks

Fig. 30 Visual impact of Option 2C from Great Houghton

Option D tested the implications of applying the darker colour across the entire REP and this proved to have clear advantages and disadvantages. On the one hand this approach significantly reduced the visual impact of the REP from elevated views where it is read against a landscaped backdrop. However being darker coloured it potentially increased the buildings visual impact when seen from viewpoints where the REP is seen against a backdrop of sky. It also strayed further from colour blending with the adjacent ASOS Fulfilment Centre.

Fig. 31 Option 2D – Dark monotone consolidated massing

Fig. 32 Visual impact of Option 2D from Great Houghton

Fig. 33 Option 2D – Darker monotone consolidated massing

Running in parallel to the Stage 1 Design Development work was the preparation of the Landscape and Visual Impact Assessment (LVIA). This was being used to inform the development of the architectural design and towards the end of the Stage1 studies it became clear that views from the south and south west would be of key importance in considering the visual impact of the REP. Therefore an initial photomontage was prepared viewing the site from Darfield. This highlighted that due to the topography surrounding the site that from the south the REP buildings would be seen against a backdrop of hills.

Fig. 34 Option 2D – Initial visual impact montage from Darfield

Upon completing the Stage 1 Design Development work it was clear that we had found answers to the questions raised at the start of this stage of work and established a clear design direction to be explored in the next stage of design development.

In summary we concluded that:

- The ‘consolidated massing’ design study proved that there were benefits in straying slightly from the adopted ‘form follows function’ approach to allow us to achieve a more refined aesthetic;
- There appeared to be no benefit in repeating any of the design or colour features of the adjacent ASOS Fulfilment Centre into the REP design as it needed to develop its own unique design to best mitigate its visual impact and be true to its function as a REP;
- The LVIA work had established that it was critical to seek a design which best mitigated the visual impact of the REP and that to do so the facility would have to blend with its surroundings rather than be a contrasting architectural statement;
- The scale of the lower components of the TRRC related well with those of the AD facility and this together with colour commonality would enable the REP to be successfully read as a ‘family of buildings’.

Before proceeding with the second stage of design development work we considered this to be an appropriate time to review with others the design process we had just undertaken and to hopefully help validate our conclusions and the direction in which we intended to develop the design. This input included a review with the Barnsley Urban Renaissance Design Advisory Panel, and was quickly followed by the presentation of the design proposal to local residents and other interested parties via public information days.

Design Review

On the 4th March 2014 we presented the Houghton Main Renewable Energy Park project to the Barnsley Urban Renaissance Design Advisory Panel, an independent design panel who offer advice to designers to help develop schemes into those with a high design quality that may be supportable for planning approval in design terms. We welcomed the opportunity to present the REP project to the Panel, and found the review process to be supportive and informative.

The Panel were presented with the design development process undertaken and agreed that the adopted ‘form follows function’ design approach was appropriate. The majority of panellists also supported the ‘consolidated massing’ design being developed. However, the Panel considered that seeking to blend the building into its surroundings to help mitigate its visual impact was not necessarily the most appropriate approach and advised that we should consider making more of an architectural statement, and one which confidently celebrated the purpose of the facility. The final report recording the Panel’s review identified a number of recommendations:

- Design a simple, celebratory expression of what is going on inside the buildings and structures; express as much as possible as a linear process;
- Study new ‘closer up’ views and look at how the development meets the edge and the levels to help inform the design;
- Study the glimpse views from Doncaster Road to help inform the design;
- Consider off site planting to foreshorten views if defence in depth is required;
- In the precedent studies include research into local industrial architecture, both present day and historical;
- Consider the involvement of an artist to help open up ideas and extend experience of the sculptural expression of the development.

These were taken forward by the team into Stage 2 Design Development work and were reviewed as part of that process and our responses to these advisory comments is covered under that section of this Design and Access Statement.

Fig. 35 Site layout at end of Stage 1 Design Development

Public Engagement

On the 12th and 13th March 2014 Public Information Days were held at the Sandhill Golf Club, Middlecliff Lane, in Little Houghton. The purpose of the information days was to offer local people the opportunity to view the proposals for the REP and to raise any questions or concerns they might have with Peel and their appointed consultants. Unsurprisingly for a project of this scale, there was a lot of interest in the design of the REP and concerns were raised in relation to its visual impact on the surrounding area. Much of the 3D design development work was made available and this was used to assist in responding to the specific concerns raised by the members of the public, and how the facility would be designed to best mitigate its visual impact when viewed from Great Houghton in the east, and from Darfield and surrounding areas in the south and south west, was a key issue for local residents. In fact in all cases the preference from those that attended the information days would be for us to seek to 'camouflage' the REP. It was also clear that from these viewpoints the REP would in the most part be read against a landscape background rather than one of sky. All of this was very much reflected in the conclusions of the Landscape and Visual Impact Assessment (LVIA).

Stage 2 Design Development

The first priority upon commencing this final stage of architectural design development was to collate the advice given by the Design Advisory Panel, the feedback received at the Public Information Days, and review this alongside our own findings from the Stage 1 work in order to determine the preferred design approach to be taken forward.

Contrary to the advice offered by the Design Advisory Panel's it was decided that the design of the REP should be developed to:

- best mitigate its visual impact as opposed to making an architectural statement, as this was still considered to be the most appropriate approach to take on board the findings of the LVIA work and the concerns of local residents, and to respect the setting of the site;
- take forward the 'consolidated massing' design as it offered a refined aesthetic as this was considered to be more appropriate to mitigating tis visual impact;
- undertake further colour studies to explore how the building's appearance might be further softened in the landscape.

In order to ensure that the final design would answers concerns raised by some local residents additional photomontage views were generated as part of this stage of work to further test the developed design.

Fig. 36 Current view from viewpoint 5 (private property in Great Houghton)

Fig. 37 Visual impact montage from viewpoint 5 (private property in Great Houghton)

Fig. 38 Current view from viewpoint 6 (private property in Edderthorpe)

Fig. 39 Visual impact montage from viewpoint 6 (private property in Edderthorpe)

Building Form

At this stage the process design of the TRRC was being developed in parallel with that of the architectural design and a range of changes were made to the building form of the TRRC to reflect that development. These included:

- a slight increase in the height and width of the Turbine Hall;
- a reduction in height of the Reception Hall;
- the addition of ash storage silos to the northern façade of the Process Building;

- the incorporation of high level louvre banks on both north and south facades of the Process Building to provide the necessary natural ventilation to cool the building.

Fig. 40 Site elevations

The 3D model was regularly updated to incorporate these changes, but otherwise the building shape remained in principle as the 'consolidated massing' design developed during Stage 1. Further development visually concealed the shallow pitched roofs of TRRC building behind raised perimeter parapets which also conceals from view low level rooftop plant on the roof of the Process Building, and offers perimeter guarding for personnel accessing the roofs. To maintain a 'family of buildings' the same approach is adopted on the Reception Hall and Turbine Hall of the TRRC. The AD process building is similarly treated to achieve this aesthetic consistency. The use of these parapets also ensures that no shadows are cast by projecting roof eaves on walls at high level and thereby maintains the refined planar appearance on all of the facades.

Once the architectural solution for the main buildings had been established, the form of the stack was considered. It was decided that a simple streamlined stack would not only best mitigate its visual impact but also reflect the refined architectural aesthetic which had been achieved throughout the REP.

Building Colour

In order to blend the colour of the building where seen against a landscape backdrop a number of additional colour studies were developed and employed a wider range of viewpoints to test these. These studies focussed on using darker colours with greys, greens and browns all being considered. The use of tonal colouring techniques was rejected in favour of applying a consistent colour to the TRRC building; the ACC; the AD building and its outdoor storage tanks. This assisted in establishing a 'family of buildings' for the REP.

It was also concluded that in contrast to the principle building colour, the single stack would be coloured a light grey, as in all views it is read against the sky and if in the same darker colour of the buildings would not best mitigate its visual impact.

Fig. 41 Aerial perspective of final scheme

Design Review Response

Throughout the second stage of design development we have repeatedly considered the advice offered to us by the Barnsley Urban Renaissance Design Advisory Panel and detail below our responses to the recommendations given.

- Design a simple, celebratory expression of what is going on inside the buildings and structures; express as much as possible as a linear process;

  We consider the final REP design to achieve a fine balance between architecture which celebrates its function and also one that respects the setting of the site by best mitigating its visual impact, and embraces much of that advised by the Panel. As stated elsewhere we have in the most part adhered to our 'form follows function' design approach and this has generated what we believe to be a refined and simple expression of the REP's function, and we have maintained this refined aesthetic in its detailing. We have developed the design of the largest scale TRRC Process Building to read as a simple cubic form, where parapet roof edges ensure its clean lines are uninterrupted by roof eaves or high level shadows, and in its simplicity is an expression of its linear process. Consideration was also given to making some areas of the building transparent through the use of large areas of glazing or similar to offer views of the internal process equipment. This was rejected for operational reasons, as a major operational concern within the TRRC Process Building is the removal from the building of unwanted internal heat generated by the process equipment, and that to glaze areas would only increase this problem. Furthermore it was concluded that due to the 24 hour operation of the TRRC any glazing would prove to be a source of unwanted night time light pollution within the landscape.

From closer views the dark olive green colour of the buildings facades will contrast with the sky and appear clean and crisp, reinforcing the refined aesthetic of the building forms. The repetitive alignment of the AD storage tanks along the boundary with Park Spring Road offer a distinct contrast of form and scale to the linearity of the main TRRC building, and are an honest expression of a key part of the AD process.

- Study new 'closer up' views and look at how the development meets the edge and the levels to help inform the design;

  Views from sensitive receptors from Park Spring Road and Ings Lane have been fully considered as part of the Landscape and Visual Impact Assessment, from which it is accepted that the REP would be clearly visible.

  The nature of these close up views mean that the development would form a substantial element in any view and could not be screened from view. To this end the mitigation proposed has been designed to celebrate the development through the selection of building materials and colour palette, which ensures that the facility is sympathetic to its surroundings.

  In contrast to the site's northern and western boundaries, the landscape mitigation proposed for this eastern boundary would be more human scale, with the use of low level shrubs and groundcover and ornamental trees. The exception to this is where the eastern boundary runs alongside the AD tanks and where no planting is proposed to encourage glimpse views into the sites operational area from Park Spring Road.

- Study the glimpse views from Doncaster Road to help inform the design;

  Views from sensitive residential receptors from the vicinity of Doncaster Road have been fully considered as part of the Landscape and Visual Impact Assessment, from which it is accepted that the facility would be visible above the surrounding landscape.

  Whilst it is accepted that a development of this nature cannot be screened by conventional landscape mitigation, the location of the REP adjacent to an existing and much larger structure [ASOS], as well as the careful selection of building materials and colour palette have ensured that the facility would, as far as possible, be sympathetic to its surroundings. Furthermore, the retention, improvement and replacement of landscape boundary treatments would provide screening of low level activities such as vehicle movements and lights etc. as well as softening the development with the introduction of a landscape framework.

- Consider off site planting to foreshorten views if defence in depth is required;

  Careful consideration has been given to the use of off-site planting to further mitigate the visual impact of the REP and there is potential,

with land owner's agreement, to provide additional mitigation in the form of additional or improved field boundary treatments and the planting up of redundant, poor quality or uneconomic areas of land. However considering the scale of the buildings and the number of distant views available it is debatable as to whether or not there are instances where such off site planting would be effective.

- In the precedent studies include research into local industrial architecture, both present day and historical;

  The proposed site for the Houghton Main REP has a rich industrial heritage. For decades it formed part of the former Houghton Main Colliery, where coal was mined to power the region, and the former agricultural landscape was dominated by coal mining and its associated industrial architecture. With the closure of the mine the site has been landscaped and much of its industrial buildings and structures demolished.

  Our adoption of a 'form follows function' design approach for the REP is one which we consider to be appropriate for both the development of the architectural aesthetic for this 'new-age' industrial building type, and to reflect the industrial heritage of the site. The proposed design is true to this approach. Its scale and form celebrates its function as far as possible without compromising its operational efficiency. However its functional expression is somewhat restricted by the requirement to keep the main TRRC Process Building equipment in a weather tight and naturally ventilated enclosure leading it to being expressed as a refined cubic form. Nevertheless where possible the external expression of the buildings function has been celebrated with the Air Cooled Condensers and associated pipework offering a visual hint of the power generating purpose of the TRRC facility. As for the AD facility its outdoor tanks are openly expressed and offer a dynamic functional frontage to Park Spring Road.

- Consider the involvement of an artist to help open up ideas and extend experience of the sculptural expression of the development;

  The architectural design of the REP develops as far as practical the structural expression of the development through the use of an appropriately refined 'form follows function' aesthetic which satisfies the strict operational and safety requirements of both the TRRC and AD facilities, and this achieves the required balance between an architecture which celebrates its function and also one that respects the setting of the site by best mitigating its visual impact. It is therefore considered unnecessary to develop further the structural expression of the development through the involvement of an artist, but there is the potential to include some form of art installation as part of the development, be it sculptural or informative, which would celebrate the site's current and former uses.

Conclusion

The architectural design of the REP has been the result of a detailed design development process which has been contributed to by a number of external parties and which has continually tested alternative designs in photomontages. The proposed design offers a dynamic architectural response which in its form and colour treatment seeks to contextually and subtly blend the facility with its landscaped setting.

The adopted 'form follows function' approach has been in the most part adhered to, and the design distributes a series of refined 'boxes' of varying scales along the site's southern boundary. The larger 30m high TRRC Process Building acts as their backdrop and to which some of the functionally related lower buildings are physically engaged. There is therefore a distinct increasing of scale from south to north across the site. The AD storage tanks are evenly distributed along the sites eastern boundary and their repetitive arrangement supports the refined aesthetic of the buildings whilst spaces between them offer glimpses of the sites internal operations behind.

The choice of 'olive green' as the colour for the majority of buildings and structures has been determined to best mitigate its visual impact from distant views from where it is read against a landscaped backdrop. In contrast form nearby views, this dark colour also allows the REP to be read crisply against the sky and celebrates its refined functional form.

In both form and colour the design of the Houghton Main Renewable Energy Park sets it apart from the other industrial and distribution centres in the surrounding area, and in so doing confidently states its presence as something functionally different.

The overall design solution is the result of a well thought out site layout, and an architectural design and treatment which is appropriate for its purpose and context, employing high quality materials that will stand the test of time.

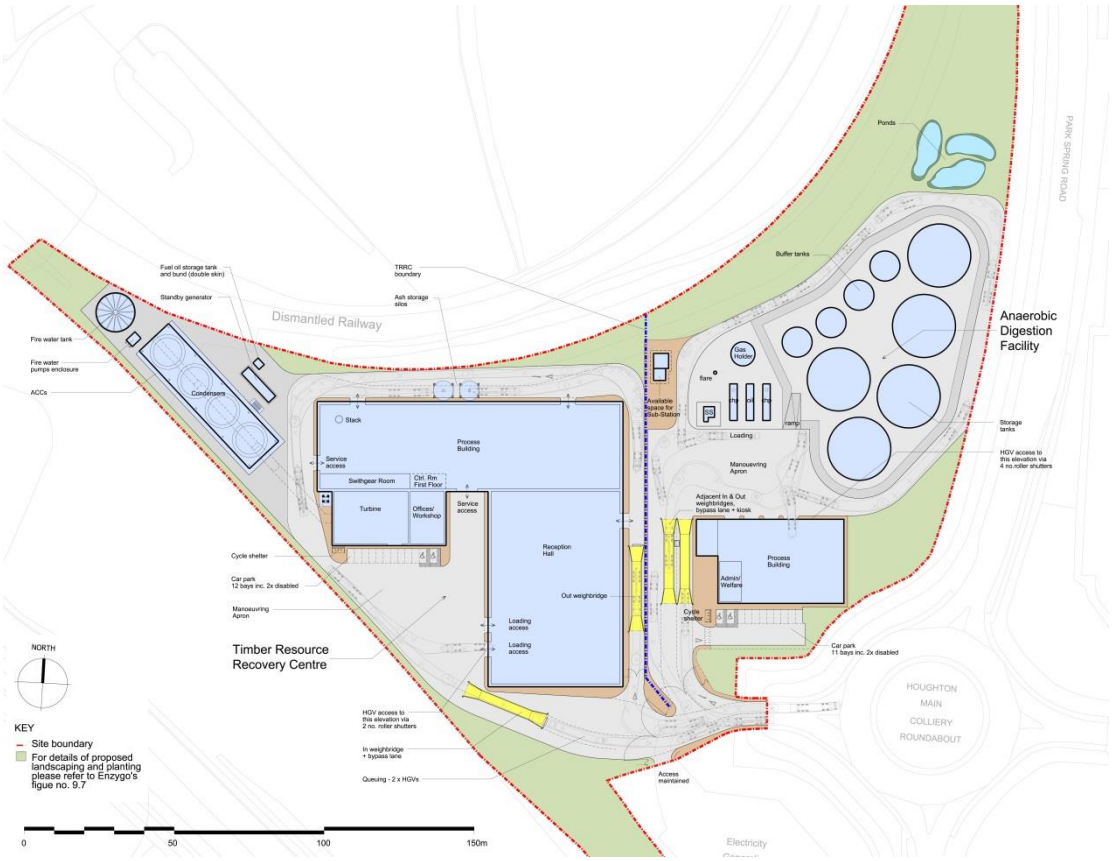

Fig. 42 Final site layout after Stage 2 Design Development

4 Sustainability

Sustainability is a key element of the REP as the purpose of the scheme is to generate renewable energy form organic and biomass material that would otherwise be sent to landfill and in so doing contribute towards delivering a sustainable renewable energy and waste management solution for the area and this section of the Design and Access Statement describes the sustainable design components of the scheme.

Materials with high recycled content have been sourced that are highly durable and have a long life expectancy. In terms of the cladding and roofing materials, at the end of their lifespan the high glass, steel and aluminium content means they can be continually recycled. It is these qualities that enable them to achieve an A and A+ rating in the British Research Establishment's (BRE) Green Guide to material specification ensuring that the materials used meet suitable environmental and

sustainability standards. This, in turn, assists the REP as a whole in achieving a BREEAM (British Research Establishments Environmental Assessment Method) rating of 'Very Good'. The materials chosen would be decided in appraisal of the balance of life span, ease of maintenance, environmental impact through embodied carbon content and their renewable sources of production.

The design of the office and welfare accommodation areas will conform to the requirements of the appropriate Building Regulations ensuring high standards of energy efficiency.

The introduction of energy saving design would be of particular importance in the design of the administration and office spaces. At these locations energy efficiency would be achieved through the use of high insulation materials, glazing and use of power saving measures such as intelligent lighting systems etc.

In addition, the following features have been considered as part of the sustainable agenda for the design and construction of the REP and serve to emphasise the sustainability credentials of the project:

- Increased employment opportunities for local people, helping to promote social inclusion and well-being;
- To maximise areas for ecological enhancement the building footprint of the development has been minimised, as has the extent of hard standing areas around the site to minimise surface water runoff;
- Day lighting of the operational areas has been maximised through the incorporation of rooflights;
- The REP has been designed to be volumetrically efficient thereby minimising the amount of structural and cladding materials that would otherwise be used in its construction, as well as the amount of energy which would be required to service any unnecessary building volume that might be created;
- Provision of a wetland area and ponds providing landscape and ecological betterment for the site and the adjacent Dearne Valley Country Park
- The implementation of rainwater harvesting to reduce the demand for mains water supply for use in the processes;
- The use of sustainable materials will be maximised in the construction of the REP and will include the use of recycled building materials where possible, and the use of materials requiring minimum ongoing and future maintenance will be maximised;
- Site waste management plans would be required from the contractors to demonstrate that waste is being minimised and sustainable practices are being followed during construction.

5 Appearance, Materials and Landscaping

5.1 Buildings

Approach to materials

When considering materials to be used for the cladding and architectural treatment of the design we have reviewed their selection against the criteria of visual quality, durability, and sustainability.

The chosen design approach to develop a 'form follows function' form, allows us to employ standard off-the-shelf cladding materials as well as allowing simplification of the buildings' principal structure. This improves the overall robustness of the design, and makes the buildings easier to construct, maintain, and to replace any damaged components in the future. Ensuring that the visual quality of the building can be maintained over its service lifetime is a key requirement and the refinement and standardising of the cladding ensures that this exercise, if required, will be easier to execute and will impact less on the ongoing operation of the REP.

Anaerobic Digestion (AD)

Main AD Building

The AD building will be clad in vertically orientated trapezoidal steel cladding as shown on the elevation drawings.

Its shallow pitched roof will be constructed of trapezoidal steel cladding panels and where indicated will incorporate 11 rooflights at regular intervals across the length of the roof to provide daylight to the spaces below. Rainwater will fall to perimeter eaves gutters which are concealed behind upstanding perimeter wall parapets which will have PPC aluminium coping flashings to match the colour of the wall cladding.

Vehicle access doors will be galvanised steel roller shutter doors and personnel access doors and windows will be PPC aluminium.

Site wide building elevations are shown on figure 40 and this drawing along with individual elevations of the various buildings accompany the Planning Application.

AD Gatehouse

Due to its small size the AD gatehouse or booth will be a standard off-the-shelf prefabricated structure and its materials and finishes will be in accordance with the chosen manufacturer's specifications. Aluminium is a common standard material choice for such prefabricated booths.

Site wide building elevations are shown on figure 40 and this drawing along with individual elevations of the various buildings accompany the Planning Application.

AD Tanks

The AD tanks will be steel clad as shown on the elevation drawings and coloured to match that of AD building. Edge perimeter railings with be galvanised steel.

Site wide building elevations are shown on figure 40 and this drawing along with individual elevations of the various buildings accompany the Planning Application.

Timber Resource Recovery Centre (TRRC)

Main TRRC Building

The TRRC building will be clad in vertically orientated trapezoidal steel cladding as shown on the elevation drawings. Where indicated linear banks of ventilation louvers will be incorporated within the building's elevations and will be PPC aluminium and match the colour of the wall cladding.

The shallow pitched roofs will be constructed of trapezoidal steel cladding panels and where indicated will incorporate 51 rooflights at regular intervals across the length of the roof to provide daylight to the spaces below. Rainwater will fall to perimeter eaves gutters which are concealed behind upstanding perimeter wall parapets which will have PPC aluminium coping flashings to match the colour of the wall cladding.

Vehicle access doors will be galvanised steel roller shutter doors and personnel access doors and windows will be PPC aluminium.

Site wide building elevations are shown on figure 40 and this drawing along with individual elevations of the various buildings accompany the Planning Application.

Air Cooled Condensers (ACC)

The ACC will be clad in vertically orientated trapezoidal steel cladding to match the TRRC building as shown on the elevation drawings.

5.2 Appearance and Finishing

Table 2 is an External Finishing Schedule for the proposed main process buildings.

Table 2 – External Finishes Schedule

Material	Locations	Colour / Finish
Engineering Brick	500mm plinth to all TRRC and AD process enclosures 500mm plinth to TRRC Offices / Workshop 250mm plinth to AD Admin / Welfare	Colour – Grey
Trapezoidal steel cladding – vertically orientated	External walls of: TRRC process building TRRC reception hall TRRC Turbine enclosure TRRC Offices / Workshop Air Cooled Condensers AD Process Building AD Admin / Welfare	Olive Green (RAL 100 30 20)
Metal roller shutter doors	All buildings	Colour – Grey (RAL ref TBC)
PPC Aluminium louvres	North and south elevation of the TRRC process building	Olive Green (RAL 100 30 20)
PPC Aluminium	Personnel doors	Merlin Grey (RAL 180 40 05)
PPC aluminium framed double glazed units	All accommodation areas	Merlin Grey (RAL 180 40 05)
Galvanised Steel	External stairs, walkways and gantries	Finish – galvanised
Aluminium flashings	Copings and edges of metal cladding	Colour to match cladding
Trapezoidal steel cladding	Roofing of: TRRC process building TRRC reception hall TRRC Turbine enclosure TRRC Offices / Workshop AD Process Building	Pure Grey (RAL 000 55 000)

In-Plane Polycarbonate rooflight system	Roofs of: TRRC process building TRRC reception hall AD Process Building	Clear
Painted metal sheeting	Stacks	Oyster (RAL 7035)
Painted metal sheeting	Fire water tank AD storage tanks AD buffer tanks	Olive Green (RAL 100 30 20)
Note: All materials, finishes and colours will be as stated or similar approved.		

5.3 Landscaping

In addition to the text provided below detailed information on the proposed landscaping strategy is included in the Environmental Statement that accompanies the planning application.

As previously stated the proposed Houghton Main REP is of considerable size and from the outset we have recognised that it would always be impossible to make it completely disappear. However through a refined and uncluttered architecture and a contextually sensitive colour palette we have sought to blend the REP against the local landscape in order to best mitigate its visual impact.

All of our visual impact montages have assumed a worst case scenario of year zero in terms of proposed landscaping growth. Therefore over time the intention is for the proposed landscaping and planting to further mitigate the REP's visual impact above and beyond what is already achieved by the contextually sensitive approach to the architecture.

The provision of immediate, close proximity, visual screening of the REP will be achieved through the following measures:

- Retaining boundary hedgerows, wherever possible;
- Ornamental tree and shrub planting along the 'urban' southern and eastern boundaries fronting Park Spring Road.

When the landscaping matures partial long distance screening of the REP will be achieved through the following measures:

- Woodland, tree, shrub and grassland planting to the 'rural' northern and western boundaries, mirroring the existing linear planting along the former railway lines associated with the former colliery workings;
- The retention of hedgerow trees, wherever possible.

Other measures that should specifically help preserve and benefit onsite ecology and biodiversity include:

- Provision of a ponds and wetland areas in the north east corner of the site;
- Maintain, wherever possible, the existing topography of the site;
- On site and off site planting should provide habitat linkage between the local habitat enhancement initiatives taking place outside our site. Examples of these include the New Park Spring Nature Reserve 137m to the north of the site, the RSPB Dearne Valley Old Moor wetlands nature reserve 5km to the south of the site and Dearne Valley Park 5km to the west.

Together these measures should help soften the REP's appearance from both long and short distances thereby mitigating it's visual and landscape impact whilst simultaneously providing a green and pleasant setting for the staff and visitors that will use the REP.

6 Access

6.1 Human Access

A dedicated pedestrian path runs alongside the vehicular access road for staff and visitors and leads to the main car park area and covered cycle storage areas adjacent to the administration and visitor building.

A range of measures have been included in the design of the facility to ensure its buildings are fully accessible. The Administration building will be fitted with ramps to the entrance way and corridors and doors are designed to be fully accessible. Accessible toilet and changing facilities are provided for and in both male and female toilets ambulant disabled toilet cubicles are included. Lifts will give access to the first floor level for wheelchair users and others with restricted mobility.

Reception desks and kitchen areas are designed to accommodate wheelchair users.

An induction loop at the visitors' reception desk will cater for those with hearing impairment and through careful consideration of contrast in colour and textures the building will cater for visually impaired visitors and staff.

6.2 Vehicular Access

The site itself is easily accessible by road being connected to Houghton Main roundabout on the A6195 Park Spring Road.

Vehicular, pedestrian and cycle access to the Application Site will be gained from Park Spring Road (A6195) where a single access point is proposed to serve the REP. Its location in the southern part of the site and the need to segregate and provide separate controlled access to the AD and TRRC facilities has had a significant impact on the development of the proposed layout.

Whilst the single access onto the site from the Houghton Main roundabout is shared by all vehicles, on immediately entering the site a separate vehicular access route is provided for each of the AD and TRRC facilities.

Staff and visitors heading to the Administration and Visitor block are provided with car parking with spaces allocated for the disabled, coaches, and motorcycles, as well as a covered and secure bicycle storage shelter, all located in close proximity to the entrance to the administration block.

Access for operational vehicles into the site is controlled by a gatehouse with 2 no. entry and 2 no. exit weighbridges together with an additional bypass lane on the entry route for the AD Facility. From here easy access is gained to both the TRRC Reception Hall and the AD Process Building allowing for efficient turnaround times and ensuring that the number of vehicles entering into the 'heart' of the site is minimised.

7 Conclusion

The site for the proposed Houghton Main Renewable Energy Park is located on brownfield land formerly part of the Houghton Main Colliery and adjacent to ASOS Fulfilment Centre on the A6195 Park Spring Road.

The overall solution is a result of a well thought out site layout, which together with the adoption of an architectural treatment and high quality materials which are appropriate to its context ensures that the proposed REP is a state of the art renewable energy facility for Houghton Main and the wider Barnsley area.

Whilst the buildings have been designed to a 'form follows function' approach to be both robust in construction and to withstand the strains of managing 210,000 tonnes of organic and biomass fuel per annum, their form and architectural treatment have been sensitively designed to mitigate as far as possible their visual impact.

The buildings making up the REP employ between them a consistent palette of materials, ensuring that the overall development creates a cohesive architectural design which in its materiality, form and massing presents itself as a family of buildings.

Fig. 43 Eye level view of proposed facility from northbound A6195 Park Spring Road