

Chapter 4 Assessment of Main Alternatives

4. Assessment of Main Alternatives

Introduction

4.1 As explained in Chapter 1, the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2012 identify the matters for inclusion in an Environmental Statement at Schedule 4.

4.2 Parts 1 (2) and 2 (4) seek:

'an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects'.

4.3 The EIA Directive and the EIA Regulations do not expressly require an applicant to study alternatives although the nature of certain developments and their location may make the consideration of alternative sites a material consideration.

4.4 arc21, as the umbrella waste management organisation for the 11 District Councils, has been engaged in a procurement process to seek a partner to develop a residual waste facility that meets the objectives identified within their Waste Management Plan.

Alternative sites

4.5 As part of that process it conducted two land assembly exercises in 2007 and 2009 with the aim to identify possible sites for MBT facilities and for an EfW facility on potential sites in private, public or local authority ownership. The initial exercise attracted seven expressions of interest relating to the following sites:

- Dargan Road, Belfast;
- Lands south of Harryville Ward, Ballymena;
- Hightown Quarry;
- Glenside Quarry, Belfast;
- Drum lough Landfill, Hillsborough;
- Bruslee Hill, Newtownabbey; and
- Doagh Rd, Ballyclare.

4.6 A second land assembly study was initiated by arc21 in 2009 which attracted expressions of interest for a total of 22 sites across the arc21 region. These included:

- Budore, Sycamore Road, Dundrod;
- Carr, Comber Road, Carryduff;
- Former Tannery complex, Clarkhill Road, Castlewellan;

- Former Tannery complex, Shrigley Road, Killyleagh;
 - Mullaghglass Road, Lisburn;
 - Knockmore, Moira Road, Lisburn;
 - Blaris Road, Lisburn;
 - Aghnatrisk Road, Culcavy;
 - Glevavy Road Business Park, Moira;
 - Mullaghcarton Road, Maghaberry;
 - Ivy Hill, Lisburn;
 - KH1, Knockmore Hill, Lisburn;
 - Cockhill Road, Maze, Lisburn;
 - CES Quarry, Crossgar Road, Saintfield;
 - Belshaws Quarry, Money broom Road, Lisburn;
 - Moscow Road, Belfast;
 - Pattons Land, Ballymena;
 - Land at Sprucefield, Lisburn;
 - Nutts Corner, Antrim;
 - Antrim Road, Mallusk (1);
 - Antrim Road, Mallusk (2); and
 - Kilroot, Carrickfergus
- 4.7 The sites were assessed against threshold criteria including the size of the site, consideration of the risk of flooding and performance against prevailing planning policy.
- 4.8 The MBT and EfW have a site size requirement of 5 hectares each. Sites which could not meet this were discounted from further consideration.
- 4.9 In terms of flood risk each site was assessed and one site was discounted due to its constraints.
- 4.10 A number of planning considerations were identified against which the remaining sites were assessed. This included:
- Development plan status;

- Planning policy notably PPS11;
- Nature conservation designations;
- Archaeological and built heritage status;
- Landscape character and designations;
- Planning history; and
- Compliance with arc21 Waste Management Plan and the Northern Ireland Waste Management Strategy.

4.11 The site assessment undertaken by arc21 provided a list of sites that could accommodate the MBT and EfW on separate sites or alternatively co-locating on one site.

4.12 A list of sites was made available to the consortia bidding to develop the new facilities. They were not obliged to utilise any of the sites identified through the arc21 exercises and had the option of proposing alternative sites under their control as part of their detailed submissions for evaluation. For location of the MBT Facility the following sites passed the criteria:-

- Budore, Sycamore Road, Dundrod;
- Nutts Corner, Antrim;
- Antrim Road, Mallusk (2);
- Kilroot, Carrickfergus;
- Dargan Road, Belfast;
- Hightown Quarry, Ballyutoag.

4.13 For location of the EfW Facility the following sites passed the criteria:-

- Antrim Road, Mallusk (2);
- Kilroot, Carrickfergus;
- Hightown Quarry, Ballyutoag.

Becon Consortium Approach

4.14 A key objective of the Becon Consortium's approach was to co-locate both MBT and EfW facilities on one site as it was considered that the co-location approach would result in a number of advantages as follows:

- Significant reduction in transport of waste between facilities (resulting in decreased transport costs and fewer vehicle emissions);
- Reduction in planning/permit fulfilments;

- Anticipated reduction in overall environmental impact;
 - Common management;
 - Workforce efficiencies;
 - Reduction in need for equipment;
 - Shared infrastructure; and
 - Improved value for money solution to overall benefit of arc21 Councils and their ratepayers.
- 4.15 As a consequence of this the three sites identified above for location of the EfW Facility were considered further.
- 4.16 As part of further evaluation of these for co-location of EfW/MBT an indicative layout of the land take requirements for the proposed facilities was developed to assess the likely footprint required for the facilities. This established that a minimum of 7.5 hectares would be required for a co-located facility to meet the requirements of arc21.
- 4.17 Against this requirement the Antrim Road, Mallusk site was discounted as with a site area of 5.6 hectares it was of insufficient size to cater for the development required.
- 4.18 This narrowed the sites to two – Hightown Quarry and Kilroot.
- 4.19 These two remaining sites had been the subject of assessment by arc21 which considered a range of potential environmental effects of locating the co-located facilities on these sites.
- 4.20 The criterion against which each was considered was wide-ranging. It included consideration of potential environmental effects including population, flora and fauna, water, odour, air, dust, material assets, architectural and archaeological heritage, landscape and visual impact, soil and site conditions, transport and noise. The two sites are compared against these criteria in the table below:

Table 4.1 Comparative Assessment between Hightown Quarry and Kilroot

Criterion	Hightown Quarry	Kilroot
Population	19 properties within 1km.	In total some 287 properties within 1km of the site boundary
Fauna and Flora	Not within any designated sites of nature conservation importance. Within an existing working quarry which is extracting and recycling aggregate. The majority of the quarry is devoid of vegetation where ecological impact is considered to be	Not within any designated site of nature conservation importance, with the exception of the Kilroot Stream SLNCI. This stream feeds into Belfast Lough which is protected by RAMSAR and Natura designations.

Criterion	Hightown Quarry	Kilroot
	capable of being limited to the site boundary. Flush River is located within close proximity to the site and connects into the Six Mile Water, a salmonid river.	
Water	Site assessed in terms of the potential for facilities to affect the natural infiltration rates within the surrounding landscape and the run-off potential from the site and risk of accidental discharge occurring into existing watercourses. Considered that surface water can be contained within the site with SUDs Lagoon and no impact or risk associated with pollution potential.	Site assessed in terms of the potential for facilities to affect the natural infiltration rates within the surrounding landscape and the run-off potential from the site and risk of accidental discharge occurring into existing watercourses. Considered that can be contained at source.
Odour/Air/Dust	Preliminary assessment carried out on potential impact on neighbouring receptors in terms of odour and air quality. Any EfW facility would be compliant with the requirements of the Industrial Emissions Directive, meeting stringent requirements on emissions and odour. Waste reception areas will be enclosed and during operation, the facility will benefit from negative air pressure ventilation and filter systems to prevent the escape of dust particles into the environment.	Preliminary assessment carried out on potential impact on neighbouring receptors in terms of odour and air quality. Any EfW facility would be compliant with the requirements of the Industrial Emissions Directive, meeting stringent requirements on emissions and odour. Waste reception areas will be enclosed and during operation, the facility will benefit from negative air pressure ventilation and filter systems to prevent the escape of dust particles into the environment.
Architectural/ Archaeological Heritage	Two archaeological sites occur in close proximity to the site. SMR reference ANT 056:073 (field system and settlement site) is within 250m of the site boundary. SMR reference ANT 056:024 (Neolithic court tomb) is within 500 m.	One archaeological site is located within the boundary of the site, a disused bleach mill site (industrial heritage reference 0727000000 / grid reference J44268964). Castle Dobbs Historic Garden and Demesne bounds the northern

Criterion	Hightown Quarry	Kilroot
		boundary of the site. In addition there are 3 SMRs within 500m of the site boundary.
Landscape and Visual Impact	The site's active quarry status makes it an already degraded landscape. Given the topography and nature of the site development of MBT on this site will be read in the context of the quarry face which it will integrate with. The development of the EfW requires a chimney stack and its presence will result in increased visual impact of the facility.	The MBT facility is considered to be capable of being accommodated on the site with limited detrimental impact. The EfW chimney stack and its presence will result in increased visual impact.
Soils/Site Conditions	No change to soil condition anticipated. Ground conditions considered suitable to develop buildings without excessive foundation works	No change to soil condition anticipated. Ground conditions considered suitable to develop buildings without excessive geotechnical works although piling would be required due to heavy loading anticipated.
Transport	Improvement considered necessary to Boghill Road and Hyde Park Road/Boghill Road junction. No other junction improvements considered necessary across the wider network.	Additional improvements to the local road network considered unnecessary.
Noise	Four residential properties within 500m of the site boundary with further 15 within 1km. Nearest receptor to site is 340m from the site boundary. Noise from the facilities considered to be capable of appropriate attenuation to ensure no unacceptable impact	Four properties within 500m of site boundary with total of 287 within 1km. Noise from the facilities considered to be capable of attenuation to ensure no unacceptable impact.

4.21 The Becon Consortium further considered the information relating to site assessment collected by arc21 and assessed the merits of the Hightown Quarry and Kilroot sites. It did so by evaluating each against a number of factors with reference to the proposed outline solution and preferred technology, including:

- Proximity to residential and commercial properties;
- Site layout optimisation and potential for additional land take;
- Waste arising proximity;
- Compliance with planning policy;
- Connection to the grid; and
- Aviation safety.

4.22 Site visits were undertaken to both locations and an evaluation of the merits of each site were explored in a workshop session attended by the Consortium and representatives from a range of its project advisors.

4.23 The following comparative assessment was made:

Table 4.2 Comparative Assessment Following Workshop Session

Criterion	Hightown Quarry	Kilroot
Proximity to Properties	19 properties within 1km.	287 properties within 1km.
Site layout optimisation	Preliminary Layouts co-locating EfW and MBT facilities were prepared for both sites. Hightown site offers significantly more development potential with site area extending to 62 hectares. Large open areas at Hightown Quarry and partially prepared terracing which is suitable to accommodate the proposed facilities. MBT, EfW, IBA Plant, Visitor Centre and car park can be accommodated and the option of additional land is available if required. This provides greater scope for land necessary for construction activities.	Preliminary Layouts co-locating EfW and MBT facilities were prepared for both sites. The pond towards the north of the site is designated as a SLNCI and was regarded by the Consortium as not available for development. It was considered that this localised development restriction and limitations on circulation space would not provide an optimised site layout. It was also considered that there was no additional land immediately available if required to deliver the technical solution.
Proximity to source of waste	Consortium was keen to identify a site which would minimise the distance that would need to be travelled for the delivery of waste from each of the Council waste	Hightown outperformed Kilroot on this criterion both in terms of transport and environmental impact.

	sources, given environmental benefit arising from reduced travel time. Considered that there were significant advantages with Hightown site given its closer proximity to/and accessibility from the wider arc21 Council waste haulage routes.	
Planning Policy Compliance	Site considered appropriate in planning policy terms.	Site considered appropriate in planning policy terms.
Connection to Electricity Grid	Grid connection available.	Grid connection available.
Aviation safety	Site presents reduced obstacle risk to aircraft as stack height can be integrated with existing electricity pylons.	Higher risk in comparison to Hightown as chimney would be within the approach surface to runway at Belfast City Airport.

- 4.24 Taking all of the above considerations into account the Becon Consortium decided that the site at Hightown Quarry represented a more favourable and environmentally sustainable location for the co-location of the proposed EfW, MBT, IBA facilities and Visitor Centre.

Alternative Development Options

- 4.25 The final design layout for the proposed residual waste management facilities, as set out in Chapter 3 of this ES, is the culmination of an iterative design process as the project brief and dialogue with arc21 has evolved.
- 4.26 As part of the design evolution a number of alternative layouts for the site have been considered as part of the iterative assessment in shaping the final layout and form of the wider residual waste management facility.
- 4.27 There have been a number of adjustments and revisions to the layout in the period since 2010 which are summarised below and shown in the site layout iterations overleaf.
- 4.28 The original concept (Revision A) anticipated a 100MWth EfW facility and a MBT plant with three mechanical lines with a capacity of 256,000 tonnes per annum. At that stage it was also proposed that Incinerator Bottom Ash would be partially treated on site.
- 4.29 In Revision B, the number of biodrying tunnels was reduced following dialogue with the Authority and definition on the biological treatment requirements. The EfW reception hall layout was updated to facilitate improved vehicle flow. The bottom ash treatment area was expanded to include a maturation area and storage area. The MBT building was repositioned on the upper terrace to provide a more efficient foundation design solution and the site circulation roads revised accordingly. The Administration and Visitor Centre was altered in shape and

location to improve site security and provide an improved visitor experience. The SuDS lagoon was altered in shape and location accordingly.

- 4.30 Adjustments were also made to the layout of equipment in the MBT facility to achieve a higher quality of recycled product.
- 4.31 In Revision C, the layout of the SuDS lagoon was updated to accommodate the anticipated flows from storm run-off and additional car parking was provided for visitors and operational staff.
- 4.32 Minor amendments were made to the layout in Revision D including indication of the site boundary. This drawing was for internal reference only and was not formally issued and therefore is not included at Appendix 4.1. For Revision E the EfW layout was adjusted to reduce excavation quantities and the need for retaining structures.
- 4.33 In Revision F, the site circulation roads were improved through provision of a right turn lane into the EfW facility. This would allow vehicles going to the MBT facility to pass safely and reduce turnaround times for delivery vehicles.
- 4.34 To accommodate reduced waste tonnages from the Constituent Councils comprising arc21 the EfW sizing was reduced to 68MWth and the MBT capacity to circa 240kta capacity. As such Revision G indicates significantly different layouts from earlier revisions with reduced footprints for the EfW and MBT facilities. The site circulation system was updated to provide two way rather than one way flows and the layout of the MBT reception hall modified for the receipt of waste. The IBA treatment plant was removed from the proposed layout and, to improve turnaround times, an additional weighbridge added at the entrance to the site.
- 4.35 In Revision H, the overall 3D site model was modified to adjust levels on the circulation and access roads around the EfW facility to achieve a more environmentally sustainable solution in relation to cut and fill earthwork quantities.
- 4.36 Following review of operational requirements, the IBA processing facility was reintroduced to the site on lands to the rear of the proposed Visitor Centre, with an enclosed RDF Bale Storage area introduced on the upper terrace adjacent to the MBT facility to provide capacity for storage during essential maintenance periods. The IBA facility was positioned in an enclosed area of the existing quarry to provide screening to the building and maintain the existing screening in the vicinity of the EfW facility (the location proposed in earlier site layouts). By choosing this location the landscape and visual impact is minimised. The car parking was adjusted to accommodate the IBA building. These changes are shown in Revision I.
- 4.37 In Revision J, modifications were made to address noise attenuation issues associated with the IBA processing facility. In addition, in order to minimise environmental impact from runoff from the bale store area, a building was provided with a dedicated drainage system to collect any spills or leachate.

- 4.38 In response to engagement with NIEA IPRI as part of the PAD process further design adjustments were made to increase the height of the chimney stack and to introduce a stack to the MBT Biofilter. Both these measures enhance the environmental operation of the proposed facilities. These modifications are shown in Revision K.
- 4.39 The iteration of the design layout and associated plans are provided at Appendix 4.1.

'Do-nothing' Scenario

- 4.40 In the absence of the proposed development, 241,319 tonnes of Authority waste and 23,879 of third party waste would still need to be managed at an appropriate facility. An absolute 'do nothing' scenario would see the arc21 region with no processing facility, which would result in the continuation of landfilling with all the associated environmental impact and the burden of very substantial financial penalties across the arc21 councils for not achieving landfill diversion targets.
- 4.41 Under these circumstances the Cottonmount landfill facility and those at Mullaghglass and Drumnakelly would be expected to receive the current or potentially increased levels of waste throughput.
- 4.42 This scenario has significant practical, environmental and economic disadvantages and as such the 'do-nothing' option was not considered in detail by the applicant.