Lighting the way for sustainable energy in Midlothian

A new Recycling and Energy Recovery Centre for Edinburgh and Midlothian celebrates a positive vision for sustainable energy, successfully integrating a large piece of energy infrastructure into a challenging and changing landscape to provide added amenity for the surrounding communities.
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Background

Proposals for a new Recycling and Energy Recovery Centre (RERC) were procured by Zero Waste: Edinburgh and Midlothian, a major joint project between the City of Edinburgh and Midlothian Councils to deliver, through private sectors, dedicated facilities for the processing of residual, or ‘black bag’ waste.2

The facility will be located on the site of the former Millerhill Marshalling Yards in Midlothian, on the border of Edinburgh and East Lothian. The site has an industrial heritage, having been part of railway marshalling yards in the 1960s-80s. Located between currently active railway marshalling yards and the former Monktonhall Colliery immediately to the west, the site is now being redeveloped as Shawfair, a significant planned new town development.

In an earlier project a section to the north of the site has been developed with an anaerobic digestion facility to deal with food waste. Significant developments are planned in the near and medium term around the site and across the three authorities. This emerging context created a dynamic environment that both influenced, and was influenced by, designs for Millerhill. Being located on the border of the three local authorities, the project also provided the opportunity to develop the potential for partnership working between the different councils.

FCC Environment was appointed as preferred bidder to design, build and operate the RERC for the initial 25 years, after which it will revert to local authority ownership – to either run or tender for a new operator. A number of economic and quality criteria, developed by a cross-party group of elected members from both councils, helped shape the brief for the project. The councils were keen for a solution that capitalised on potential for use of waste heat generated by the facility for local benefit, and particularly for the proposed Shawfair community (to the west of the site).
Vision, narrative and design approach: embracing a large piece of infrastructure in the landscape

The project takes a positive approach for dealing with a large piece of infrastructure within a prominent landscape setting. Located along a main arterial route into Edinburgh, the facility will be visible against the backdrop of the city skyline and Arthur’s Seat. With the development of Shawfair directly adjacent (to the west), and other planned emerging development to the east, the project also needed to address potential impacts of a large facility on the immediate landscape and the relationship with nearby (existing and planned) communities.

The successful design is underpinned by a strong, shared vision that seeks to celebrate the positive aspects of the facility as a source of future sustainable power for the area. The team’s design approach was driven by pragmatic considerations, in terms of how the facility will function efficiently and effectively, and by how it will be experienced, both at a micro level (relating to the human scale and the immediate environment) and macro level (impact on distant views and the wider landscape). This is articulated through a concept of creating a heavier ‘plinth’ at lower level, developed as an object that sits in and opens up to the landscape, with a translucent box above forming a ‘lantern’ in the landscape.

“Having decided to adopt a form follows function design approach - how do we then celebrate such a functional approach? How do we enhance it? How can we ensure it will communicate with people? How will it appeal to those far away or to those closer to the building, or even those using the building? How do we simply and effectively deliver a timeless design as well?”

– Garry Stewart, GSDA
Conclusion

The site for the proposed Millerhill RERC is located on brownfield land associated with the former Millerhill Railway Marshalling Yards. It is sited with an area undergoing significant change which is, in part, due to the development of the Shawfair new town and the new Borders Railway link to the west.

The overall design solution is the result of a well-considered site layout, which, together with the adoption of a contextually appropriate architectural treatment and the use of high quality materials, ensures that the proposed RERC is a high quality, state of the art renewable energy facility for Edinburgh and Midlothian area.

Whilst a ‘form follows function’ approach has been underlying the design of the buildings, it has not stifled creativity where creativity has been needed. Where necessary we have strayed from being strictly volumetrically efficient to ensure that we have delivered a refined and dynamic architectural design. A design which embraces the site’s setting and celebrates the duality of the roles it has to play in recognising how best to mitigate its impact upon its neighbours, but also how it celebrates itself within the broader context lying on the southern gateway to Edinburgh.

By carefully considering the visual quality, robustness, lifespan, and affordability of materials, and by employing a limited palette, we have ensured that the overall development creates a cohesive architectural statement and which in its materiality, form and massing presents itself as a family of buildings.

“Opportunities for school children to do an apprenticeship here is really important for the Council as a whole, looking at positive destinations for children. Just having something on your doorstep that you could go to and get an engineering apprenticeship or some other apprenticeship is a real positive.”

– Joyce Learmonth, Midlothian Council Planning

Relationship to the immediate context: creating an asset for the community

The potential for the RERC to provide district heating to the local communities through the waste heat generated by the facility was seen as a major source of potential benefit of the project (for example in providing heat for housing, commercial, community or education uses within Shawfair, for Queen Margaret University, or as a back up system for Edinburgh Royal Infirmary at Little France). Beyond heat output, the key considerations for the project team were opportunities for minimising the industrial footprint of the facility, maximising the rest of the site in terms of landscape amenity, and links into the surrounding areas.

A positive interface between the facility and the proposed neighbouring community was achieved through the team’s willingness to pull the line of security fencing close to the facility, and in some cases using the edges of the building (eg. the admin building/visitor facilities and bale storage) to form a secure boundary. This allows the south west part of the site to be opened up to provide an increased level of landscape amenity space for the adjacent community, staff and visitors, and better connectivity through the site via a multi-user path.

The relationship between the RERC and the planned development at Shawfair was particularly significant during design development. Housing is proposed in a triangular shaped piece of land along the western edge of the site as part of the approved masterplan for Shawfair. Initial mitigation proposals for tree planting and an earth bank along this edge - to help mitigate noise and reduce impact of the facility - were later amended. Though dependent on complicated land ownership issues, changes may be proposed to the Shawfair masterplan that would allow this part of the site to be re-allocated for a new community and education campus, putting the school at the heart of the community and allowing co-location of education, leisure, retail and business next to a new station on the Borders Railway line. In conjunction with enhanced path networks through the RERC site to the national cycle route and to Queen Margaret University, access to increased landscape amenity, and the RERC visitor centre, this change could offer opportunities for better links with higher education, industry, and encouraged use of the site as added landscape amenity for the community.
Articulation of built form: grounding the building in the landscape

In guiding quality criteria for the project, the cross-party group sought a simple and cost-effective solution without any unnecessary ‘architectural enhancements’. The design team adopted a ‘form follows function’ approach, led by the technical requirements of the facility and the site. The building design was heavily influenced by the size of the plot and visual impact, but underpinned by technical issues – vehicle movements, process arrangements, building configurations.

Designs for energy from waste facilities can vary considerably depending on their context. The lead designers, GSDA, have been involved in the design of several of these types of buildings - Millerhill RERC is quite special due to its location next to Shawfair. GSDA worked in three dimensions, as well as two dimensions – testing the designs through photomontages, specific street views agreed with the Shawfair team to show views into the site from their key development areas on the land to the West, and physical modelling to assess different options. This was particularly helpful during the design development process in bringing the building to life, and in testing scale, massing, form, material choice and colour - as well as in community consultation.

The whole building has been reduced to simple forms, manifested as two major volumes - a plinth at lower level with a light transparent box above, to avoid a fragmented visual impression and to help ground the building in the surrounding landscape. A darker colour will be applied to the lower plinth, to help break down the mass of the building. Tying back to the vision for the project, the concept of creating a subtle lantern in the landscape is being expressed through the treatment of the upper portion of the building, allowing light from within the plant to emanate out through areas of a translucent skin. In daytime the colours and materials will work quite differently to allow the large building to reflect and blend in with the landscape and sky.

There was initially an ambition to create a 360-degree lantern effect around the whole of the upper portion of the RERC, however this met with difficulties on the Shawfair edge due to technical issues for attenuating the potential for noise from the operation of the plant through the double layer translucent skin. Moving the proposed housing away from this edge would help alleviate acoustic issues on the west façade. However issues around timing between the RERC and Shawfair are likely to have precluded this being addressed within the current designs. Notwithstanding, there could be future potential for lighting this facade creatively, for example as part of an art strategy for the project/wider area.
“It’s important to understand not just the building and its immediate surroundings and landscape analysis, but the context of land uses. With this development, Shawfair’s ever changing, ever moving forward, so we needed to understand Shawfair, the relationship with East Lothian, the relationship with Edinburgh, and take from that the opportunities that we could. At the beginning I was not convinced about opening footpaths here, because it’s not exactly the most attractive environment, but then you see the opportunities to link to national cycle route one and Queen Margaret University.”

– Joyce Learmonth, Midlothian Council Planning

Technical and process aspects: challenges in the planning context

Waste treatment facilities are very complicated in terms of contractual requirements with more equity needed than in other building types, and with greater risks – and hence a different model of contract was required, based on a variant of a tried and tested model developed for similar types of projects in England. Zero Waste were responsible for building the roads and preparing the site, rather than the contractor.

The design was developed under tight timescales following approval of preferred bidder, and within an emerging planning context involving the three local authorities. It was important for Midlothian Council planning to understand the building in its immediate context, not only in terms of analysis of its setting in the landscape, but also in terms of the surrounding context of land uses and opportunities beyond the boundaries of the site across the local authorities - trying to pull this all together was one of the challenges of the project from a wider planning and placemaking perspective.

The role of interactions with public and stakeholders

Zero Waste put significant effort into public consultation ahead of the application for planning permission in principle, aimed at securing acceptance for the involved technologies on the site. Extensive interactions with other stakeholders took place during the design development period, but further public consultation was not undertaken until proposals were ready to be submitted for planning. Building confidence in the proposal helped to lower the risk involved in the planning process – and potential penalty costs to the client in the event of an unsuccessful application.

There were few objections to the proposal when submitted for detailed planning permission, testament to extensive consultation with external stakeholders and a spirit of collaboration between client, contractor and planning department.

This positive spirit of collaboration and engagement will continue through a community liaison group, an all-encompassing group including the local community councils and various others - chaired by one of the elected members from Midlothian.

“It’s how you talk people through it. If you’re open and honest about what you’re trying to achieve you’ll get a lot further than you will by just trying to be glossy and not give them the answer they want”

– Dave Molland, FCC Environment
Key learning points and success of the project:

**Procuring Client:**
- **Planning process** - "Getting the planning permission in place early was helpful in terms of smoothing the process and in mitigating the Council's risk on the project. Getting through a planning process with no public objection is the biggest thing by miles."
- **Sharing and building on experience and knowledge** - "One difficulty with Local Authorities procuring big contracts like RERC is that the they are always a one-off and those involved have to learn a lot on the job. But then many go back to their day job or do something else and the built up knowledge and experience is easily lost. Zero Waste try to keep that knowledge within the councils moving forward to other projects and moving forward into the contract management team."
- **Local solutions bring benefits** - "One thing that stands out substantially that came out of the whole process that I'm probably most proud of is the fact that it's a local solution...it brings so many other opportunities round about in terms of use of the heat and other potential business springing up round about it. There was a willingness to create an effective local solution, this was driven by a cross party group of councillors who were adamant that they wanted to do this because of additional benefits of potential to use the heat locally."
- **Managing perceived conflicts** - "One of the aspects Zero Waste had to manage during the process was a perceived conflict between the planning authority and project team acting for Midlothian and Edinburgh - the project team, which effectively sits outside the two councils, were working with the bidder to get planning permission from Midlothian Council. We were used to doing things like that anyway, so we had just to make sure that any meetings we were there on behalf of the client rather than being the planning authority at all."

From the Contractor/Developer:
- **Integrating district heating** - "I've been doing a lot of work on the district heating and how it integrates with everything else that's happening around the site. It's very important that people realise it's theirs, and its part of their development. It's part of their life, in effect, moving forward, because it will be hopefully generating heat for them. So that was quite an important part of the process to see how we integrated it."
- **Cost and affordability** - "Cost is quite a big element of the whole project. My job was to balance that with trying to deliver something and that's the difficult part, balancing the cost and the affordability for the authority."
- **Opening the site up** - "Every site is different, it depends where you are but in general minimising the industrial footprint and maximising the rest of the site in terms of landscape or how it links into the area is a thing which we will look to do in other projects."
- **Consulting with the community** - "If you're open and honest about what you're trying to achieve you'll get a lot further than you will by just trying to be glossy and not give them the answer they want."
- **Boundaries and integrating with wider area** - "How people, more locally, view the site – so it's not hidden behind a big fence. How we can try and bring them closer to it and integrate it is key. Rather than hiding it, how we open it and integrate it into the wider area, because more and more these facilities are going to be linked to the wider area for the outputs from it. So that was a big learning curve for me and I think it'll help steer what we do on others."
- **Using the edges of the building as a secure boundary** - "We've pulled the security line right in. You're right up to the edge of the building more or less. It's probably the closest people get to any of our sites...it changes their perception of what the site is about. Because what are you hiding? They come up close to it, they can't hear it, it's clean."

**Lead Designer:**
- **Creating an asset for the community** - "A facility of this type could offer opportunities for the region and area, which could be beneficial to the public and others around. Rather than it just being seen as a negative, it was a positive contribution. We're familiar with the schemes in Scandinavia and various other countries where energy from waste facilities are seen as an intrinsic part of the urban landscape, partly, because they are delivering heat to communities and businesses."
- **Adopting a holistic design approach** - "A great deal of work was put in by everyone to reduce the planning risk and in this case that included a holistic approach to design, finding a common vision and a lot of consultation and visualisations - really showing people what it would or wouldn't look like."
- **Opportunities for open-mindedness** - "There are advantages in bringing involved parties closer together [including planning authority and Client] in an understanding of what the benefits of a project could be for everyone. In this case I thought everybody embraced the opportunity and I think the best solution, the most optimised, creative solution came out of that."

“What would I take from this? I would take more confidence that we can build a consensus, a positive consensus within stakeholders generally.”

— Garry Stewart, GSDA
• Don’t shy away from what’s inside the building - "There is an initial reaction from some people to put a curved roof on it, make it curvy! I find there’s support for architectural honesty in these facilities – it comes down to materiality, transparency and quality of the building as much as the shape. Being extravagant doesn’t necessarily make it a quality piece of architecture that’ll stand the test of time, and perform the specific function that is required of these buildings. A quality ‘form-follows-function’ approach to architecture is appropriate, celebrating functionalism rather than concealing the building in a form that doesn’t represent anything of what it does."

• Bringing in the secure fencing line – "This doesn’t happen normally - generally you secure the perimeter and then you can go through one opening. We don’t want to put people in harms way, there’s a lot of vehicle movement and all sorts of stuff going on. But there has been the opportunity to accept bringing in the security line and making it more of an amenity, not just to the people around it, but I also think it’s for the people that are using it. It actually is a place to escape, if you want to have a ten-minute break. There’s always a lot of nervousness, people allowing access into the attenuation pond areas because sometimes they’re full, sometimes they’re not...but I think it was just accepting that, well its no different to a park. You can still put fencing around it, it just doesn’t need to be 2.4m high security fencing. You can stop people and protect people from going into certain areas, and discourage people and still give them the openness to it."

Planning Authority:

• Make the wider visual impact [of the building] a positive one that works for the setting. Make the immediate experience a positive one that works for the community.

• Capitalise on opportunities for district heating

• Physical models can help demonstrate a proposal – "Not everyone understands how a design will look in 3 dimensions, therefore bringing that out so people can actually get a much more hands on feel for what was being proposed was very helpful."

• Links into the industrial heritage – “One of the local council members reflected on the industrial heritage of the areas, the coal mines etc. There was until literally a few decades ago some really big industrial buildings and dirty industry here, and this is using waste to create energy where we used to take coal from under the ground, so I think that made people think. This is the next step forward in terms of energy production."

Summary

Through collaboration and with an open mind-set the involved parties achieved:

• A co-ordinated vision and narrative for the project - celebrating the positive aspects of the facility as a state of the art source of energy for Edinburgh and the Lothians.

• Effective articulation of the vision into built form set in the landscape - as perceived from near and distant views.

• A positive interface between the facility and the surrounding area - pulling in the security line to create a more usable and open landscape setting and amenity space for staff, visitors, and neighbouring communities, with an improved sense of arrival and better connectivity through the site.

• Partnership working between different local authority areas.

• Swift planning permission with few objections, benefitting all project stakeholders.

This learning piece is based on interviews carried out by A&DS with Zero Waste: Edinburgh and Midlothian [Client], FCC Environment and GSDA [Developer and Lead designer], and Midlothian Planning Authority in October 2016. A&DS facilitated a series of three Design Forum workshops advising on the proposals for Millerhill RERC between January and April 2015, which involved A&DS panel members, the Project Team, representatives from Midlothian and East Lothian Planning Authorities and Scottish Natural Heritage.