

To: MRWA Members
From: Jon Sanderson on behalf of Veolia
Subject: Southport private wire and district heating briefing report for MRWA members
Date: 21st August, 2024

Background

Southport Hospital is looking to decarbonise its current fossil fueled generation assets as part of the NHS commitment towards achieving net zero by 2040.

In 2023 Veolia was commissioned by the NHS to appraise a number of options to help them achieve this ambition which led to a 104 page feasibility report.

One of the preferred options identified from this report was to transform a 1990s (approx) redundant former landfill site owned by MRWA into a solar farm that can provide useful low carbon electricity generation via private wire. This low carbon private wire electricity would then be used to power the replacement generation assets proposed by Veolia and possibly a district heating network. The end goal being a significant reduction of utility costs and carbon for the NHS.

This report will cover the key relevant findings to MRWA, set up recommendations and the next steps for this whilst providing a high level view of the proposed route and high level costs of the project.

The address for the Hospital is Southport and Formby District General Hospital Town Lane, Kew, Southport PR8 6PN, United Kingdom. Below are some satellite images of the proposed site:



Figure 1.

Above: Southport hospital (left) and solar farm site (right) satellite views.

There are essentially four potential parts to the proposed solution:

- 1. Solar farm site works - PV Panels and battery storage**
- 2. Private wire and district heating route**
- 3. District Heating supply to the hospital**
- 4. Efficiency upgrades to the fabric of the hospital itself**

However, for the purpose of this report to the MRWA members, we will concentrate on the highlighted three items and associated landfill site for now. This will include the prime proposed location for the solar farm and any supplementary battery storage systems.

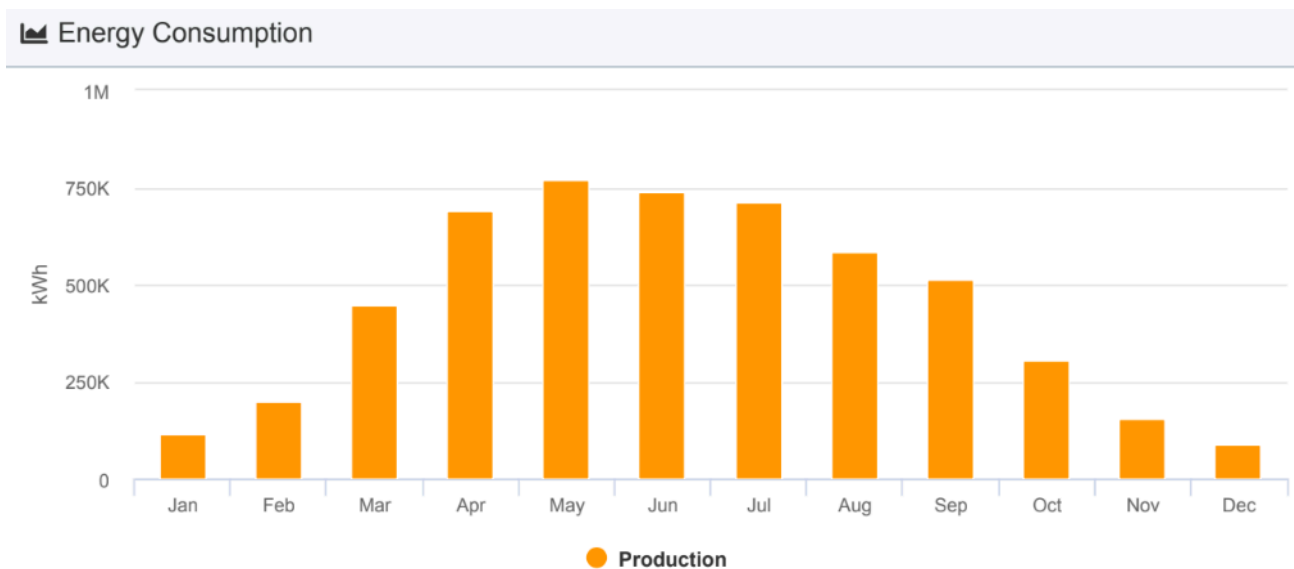
Solar Array Proposal:

See below image to demonstrate the use of solar panels on the landholding:



Installed power 5,400.7 kWp	Annual generation 5,253,650 kWh	Annual consumption NaN kWh
Performance ratio 81.8 %	First year savings £0	

Below is a snapshot of the expected seasonal electrical production. As can be expected, it is weather related:



The Solar Photovoltaic (PV) system will provide a large proportion of the electrical power for the District Heating (DHN) energy centre, but there will still be shortfalls during the winter periods and low daylight periods/nighttime. Therefore a new 11kV connection will be required from SPN to provide the backup power to the heat pump systems. Early conversations with the Distribution Network Operator (DNO) around the

best way to approach this have stated the following:

1. Initial steps - Budget quotation with a high level assessment of the network and estimated cost. This does not provide a guarantee on available power but is a useful indication.
2. Second step - Firm proposal - Detailed assessment of the grid network for fault currents and available power within existing cable and substation constraints. This would offer a guaranteed available power as requested but will only be valid for 3 months.

Note: Subject to the network analysis, if the 2.5MVA is available within the existing 11kV network, cable and substation capacity then lead times on connection are estimated at 12 months.

If there is not enough capacity on the local network then the 33kV network will need to be modified to provide the additional power and fault allowances. This extends the lead time out for connection to 2-3 years. This would put the programme at risk for the Public Sector Decarbonisation Scheme at only 2 years for total completion.

We have also examined the scope for including battery storage on the site to supplement the PV installation. The inclusion of a storage solution offers the scheme a number of advantages including better management of energy use, minimising the loss of generated energy, and offering the opportunity to better manage energy pricing across the day.

The inclusion of battery storage will be subject to the same processes as the PV element, with planning consent and connection to the grid required. We would also propose to examine the opportunity to scale up the battery storage sizing should there be available capacity to further enhance the value of the scheme to the Hospital. However, it should also be noted that battery storage adds significant additional cost to the project.

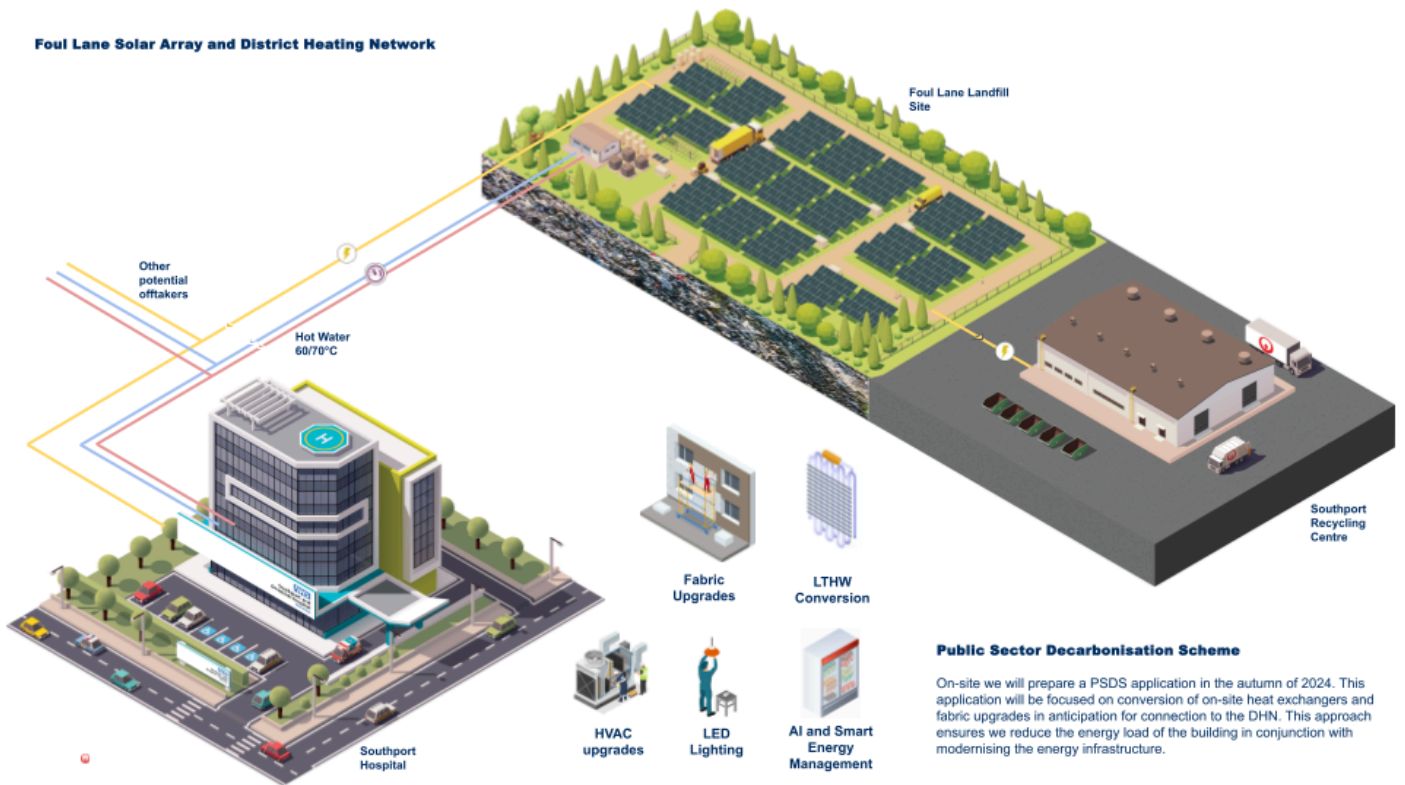
Private Wire scope

The Private Wire scope will cover the connection from the panel at the hospital, the route on the highway or road to the solar farm boundaries and the final connection to the solar farm 11kV connection. Below a satellite view of the location of both sites can be seen:



Above: Satellite view showing location of 11kV room at the hospital (red square), the solar farm (yellow boundary) and the 11kV board at the solar farm (blue square).

The Private wire route will be on the side of the road joining both blue and red squares. A pictorial representation of the complete solution is shown below:



This illustration clearly shows the value of the MRWA site and the important part it could play in providing the hospital with decarbonised energy, whilst also freeing up vital land space at the hospital site that can be repurposed into car parking and other important NHS delivery assets.

District Heating Network

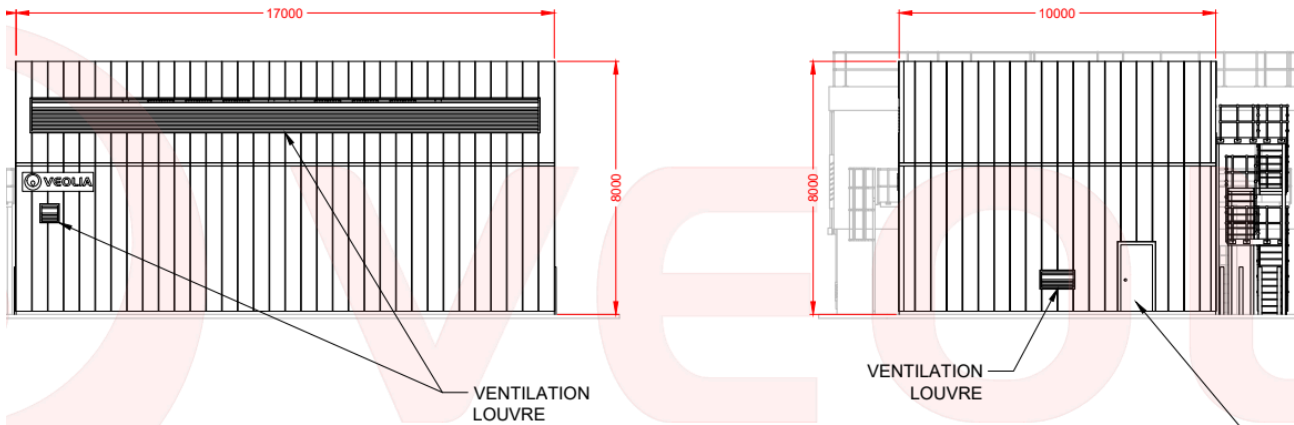
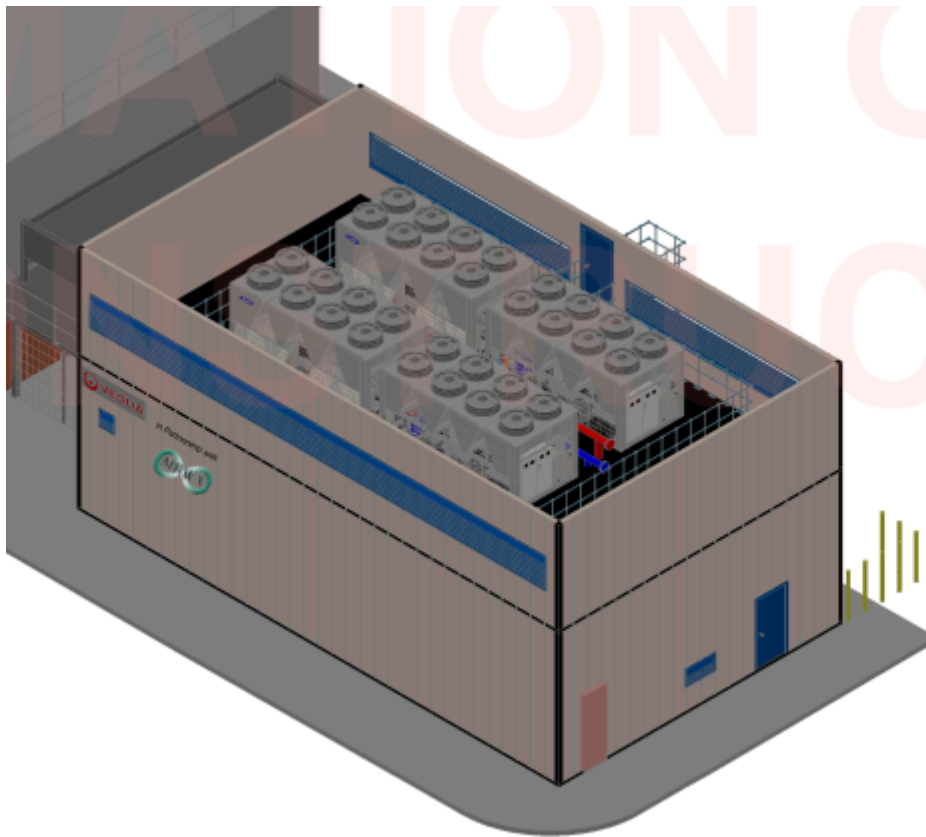
District Heating (DH) is where a central energy source (known as the Energy Centre - see below diagrams) distributes heat by using hot water supplied through a series of pipes. In this case, the heat would be transferred to the Hospital where it would replace high carbon fossil fueled assets. In this example, we are proposing a low temperature ambient loop and “waterfall” arrangement of air source heat pumps to supply the Hospital facility.

The UK Government is very supportive of DH generally and is supporting such initiatives with grant funding. It is a well proven solution that has been used successfully across other European countries for decades.

The Southport project was identified via the Veolia feasibility study to be a prime candidate to apply for this funding and gain the necessary political, social and economic support to deliver a viable scheme.

We believe that a Southport DH initiative makes for a great news story, especially when combined with the other proposed energy solutions.

Energy Centre Drawings:



The Energy Centre would be built on a preferred area of the former landfill site (see our RFI question 4 below).

Stakeholder Benefits of the Southport Scheme

Scheme Benefits for the NHS

The solar farm alone would provide a significant reduction in carbon for the NHS as summarised below:

The energy generated by your installation is equivalent to:



It is also expected that the private wire electricity will provide a utility cost saving of 15-20% when compared to a traditional grid supply arrangement.

A project update meeting was held with the NHS board on 12th August. They remain very committed to developing this scheme together and the re-purposing of the landfill is very high on their wish list because it makes a great local community energy story for all concerned. They do have alternative NHS land holding that could be used for PV allocation, but this remains a last resort solution.

Benefits for MRWA

The key benefit for MRWA would be the use of the redundant land, with Veolia proposing a fair reimbursement, either by leasing, freehold purchasing, or even a joint venture. These were proposed in a meeting held in June. But it was suggested that this be first discussed between the MRWA members.

There is also a significant PR benefit of being part of the scheme which will attract a lot of local interest and support. The transformation of a former landfill site into a decarbonised energy course makes a great story!

Estimated costs of the scheme:

We believe the scheme in its entirety will require an investment of more than £15m. This will come from a combination of grant funding and private investment that would also need to be applied for. In the first instance we will look to secure any additional investment from Veolia itself, although we are also offering MRWA to express any interest. Alternatively, a private investor will be approached.

The landfill proposed commercial arrangements require support from MRWA to make the project viable and build the necessary business case.

In addition, we would like to ask MRWA to provide a Memorandum Of Understanding (MOU) in support of the project. We have letters of intent and MOU's from the NHS so far and yours would prove valuable towards progressing the initiative.

Local Planning Authority

Veolia's internal planning department has initially reviewed the proposed scheme and so long as any new building or substation ect is constructed on a non landfilled piece of land at the site, there isn't initially any reason a DHN scheme isn't feasible from a planning perspective. Veolia would need to review the plans of the site to confirm if there is a suitable area of land that isn't landfilled.

DNO Electrical Supply/ Export

Initial inquiries with SP Energy Networks, the regions electric Distribution Network Operator (DNO), have found that it may be possible to get a new grid connection and export facility, however this subject to a detailed study of their network to confirm.

Building an energy centre and distribution network on a landfill site:

It is possible to install solar arrays on landfills with the appropriate design and care during installation, but there are a number of constraints. The key ones include preserving the integrity of the landfill cap and any infrastructure that controls leachate and landfill gas. Undeveloped areas of the landfill are likely to be minimal compared to the landfill footprint itself. Below is a picture of another similar Veolia project where the Ockendon landfill has been redeveloped into a solar farm:



Due to the Southport scheme being on a former Landfill site, Veolia will need to ensure that the building for the new Energy Centre is constructed on land that was not “landfill”. This is to ensure both design risks are mitigated from a civils perspective but also from a planning and permitting perspective. This should reduce the risk of planning with a typical period of up to 12 weeks (subject to the local authority). We will need to carry out noise assessment, flood risk assessment due to the close proximity to Fine Janes Brook. We will also need to carry out Biodiversity Net gain (BNG) due to the size of the building design. The solar will also require planning permission and would need on top of the prior: Planning Statement, Statement of Community Involvement, Design and Access Statement, Landscape and Visual Assessment, Heritage Assessment, Archaeology and Visual Assessment, Archaeology Phase 1 Desktop Report including above ground heritage, Arboricultural Assessment, Agricultural Land Classification Report, Phase 1 Habitat Survey and Preliminary Ecological Appraisal, Drainage Strategy, Transport Statement (with particular reference to the construction phase).

As this scheme will coincide with the Public Sector Decarbonisation Scheme (PSDS) for Southport Hospital, the programme for total completion would be March 2027. Allowing an estimated 6 months for design and planning and the remainder for installation of each element of the scheme.

Building on an old landfill presents unique challenges, risks and opportunities, particularly when considering environmental, structural, and biodiversity factors. For MRWA, here is a summary of the key points Veolia would consider:

Environmental and Structural Considerations

- Thorough site assessment and remediation
- Management of methane gas and settlement issues if required
- Special foundation and building designs where needed
- Regulatory compliance and long-term monitoring
- Potential insurance requirements

Biodiversity and Wildlife Considerations

- Habitat assessment, restoration, and creation
- Use of native species in landscaping
- Creation of wildlife corridors and diverse ecosystems
- Water management and soil quality improvement
- Support for pollinators and various wildlife species
- Minimisation of light and noise pollution

Nature-Friendly Development Strategies

- Green infrastructure (e.g., green roofs, sustainable drainage)
- Creation of diverse habitats
- Installation of wildlife-specific features (bird boxes, insect hotels)
- Sustainable landscaping practices
- Community engagement and education if requested

Long-term Management

- Ongoing monitoring of environmental factors and wildlife populations
- Adaptive management strategies
- Aim for biodiversity net gain

By carefully addressing these aspects, building on this heritage landfill can transform a degraded site into a valuable asset for both human use and wildlife conservation. This approach can create sustainable developments that contribute positively to local ecosystems while meeting human needs.

In the UK, there are several specific regulations and guidelines to consider. Here's an overview of the key UK-specific regulations we at Veolia would work with and alongside:

1. Environmental Protection Act 1990:
 - Provides the framework for waste management and contaminated land
2. Contaminated Land Regulations 2006 (as amended):
 - Sets out the regime for the identification and remediation of contaminated land
3. Environmental Permitting (England and Wales) Regulations 2016:
 - Covers operational landfills and some aspects of closed landfills
4. Planning Act 2008:
 - Governs the planning process for major infrastructure projects
5. National Planning Policy Framework (NPPF):
 - Provides guidance on sustainable development, including brownfield sites
6. Part 2A of the Environmental Protection Act 1990:
 - Specifically addresses contaminated land issues
7. Building Regulations 2010:
 - Includes requirements for building on contaminated land (Part C)
8. Construction (Design and Management) Regulations 2015:
 - Covers health and safety aspects of construction projects
9. Town and Country Planning Act 1990:
 - Governs land use planning
10. Environment Act 2021:
 - Introduces biodiversity net gain requirements for new developments
11. Wildlife and Countryside Act 1981:
 - Protects wildlife and habitats
12. Conservation of Habitats and Species Regulations 2017:
 - Implements the EU Habitats Directive in UK law
13. Landfill (England and Wales) Regulations 2002:
 - Sets standards for landfill design, operation, and aftercare

14. Groundwater (England and Wales) Regulations 2009:
 - Protects groundwater from pollution
15. Environmental Impact Assessment Regulations 2017:
 - Requires assessment of environmental impacts for certain developments
16. CL:AIRE Definition of Waste: Development Industry Code of Practice:
 - Provides guidance on the reuse of materials on development sites
17. Local Authority guidelines:
 - Specific requirements set by individual local councils
18. NHBC Standards:
 - Provides guidance for new home construction, including on brownfield sites
19. Environment Agency guidance:
 - Various documents on land contamination risk management
20. BS 10175:2011+A2:2017:
 - Investigation of potentially contaminated sites - Code of practice

On another connected point, Veolia also undertakes aftercare of landfills for local authorities and we therefore believe that there may be an opportunity to offer this when appropriate to do so.

Publicly promoting the scheme

As mentioned earlier, there is a huge potential to publicly promote this scheme. Reclaiming former (and redundant) landfill land and transforming it into a hub providing low carbon energy for the NHS makes a great story. We would expect a great deal of public support for this project, but any external communications must be carefully managed as proposed below:

To include, but not limited to: Press release to trade and local publications. Veolia to lead in writing the message and sending to press given our existing key relationships with media but all stakeholders to have full approvals before anything is published:

- Supporting social media plan to promote the project with the opportunity to update at project milestones.
- In-house production of high-quality video at no additional cost to the customer, showing the project timeline from point of mobilisation to completion with interviews from key stakeholders.

To help MRWA visualise, below is an example of a previous Veolia (France) press release based around our intentions to transform landfill sites closely related to this very initiative and by way of an example:

<https://www.veolia.com/en/our-media/press-releases/local-decarbonizing-energy-veolia-transforms-its-landfills-solar-power#:~:text=Veolia%20plans%20to%20launch%20the,300%20MW%20of%20renewable%20energy>

It may be possible to extend this scheme to other local offtakers in the future, but this remains a low priority for now. The primary ambition of this scheme is to sole supply the NHS establishment at this stage. .

MRWA Request for Information Topics from Veolia

1. Schematic showing areas that are landfilled/ areas that have not been subjected to waste fill.
2. Any plans showing the waste layers / materials and profile?
3. Details of the waste depth/ cap depth & construction
4. Suggestions for any land areas that have not been subject to landfill that might offer a more solid grounding for an energy centre build?
5. MRWA's advice with regards to applying for a lease / license to operate?
6. MRWA's ability to help reduce the cost and risk of securing an electrical connection at the site?
7. Offer from MRWA to JV / lease / freehold purchase the site based on preferential arrangement?
8. What might we need to consider in terms of access rights?
9. Any fee can either be a fixed fee or a profit share situation. Depends on MRWA's view on risk

10. Thoughts on security necessary to protect the assets?
11. How could legal costs and responsibilities be shared between Veolia and MRWA?
12. We would like to ask MRWA to provide a Memorandum Of Understanding in support of the project.
We have letters of intent and MOU's from the NHS so far and yours would prove valuable towards progressing the initiative

MRWA Commercial (indicative and subject to board approval) offers for the landfill site:

Option 1:

Flat annual fee / payment for use of the land each calendar year

£30,000 Per annum - Based on restricted land use and no risk, no MRWA investment methodology. Over the 25-year term that's £750,000.

Option 2

Percentage share of the electricity generated sold using model below. We believe this approach whilst

Annual saving projection for the power used at £379,000 and 10% of that?

So that's an estimate @ around £37,900 per annum

Option 3

We would be open to the outright purchase of the land for this activity. Due to the nature of landfills and valuations varying due to location and potential future uses we would only be able to put a value on the land with the support of MRWA.

Should you have any further questions, please feel free to contact myself in the first instance:

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