

APPENDIX 6

PROPOSED APPROACH TO TREATMENT OF CONTAMINATED SILT



**Royal
HaskoningDHV**
Enhancing Society Together

York Potash Harbour facilities: Proposed approach to treatment of contaminated silt

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EXECUTIVE SUMMARY

The construction of the proposed Harbour facilities component of the York Potash Project (YPP) requires capital dredging of contaminated silt; sands and gravels; and geological material (Mercia mudstone).

The contaminated silt cannot be disposed in the marine environment due to elevated concentrations of contaminants. Therefore, a land-based solution for the management of the contaminated silt is required. There is no scope within the development proposals to dewater and/or treat the contaminated silt within the Harbour development footprint; therefore, the contaminated silt would be removed 'as dredged' (i.e. wet). It is proposed that the contaminated silt would be removed by barge to an off-site waste treatment facility.

This document is the third report in a feasibility study to investigate the requirements for managing the contaminated silt on land in accordance with the waste regulatory framework and the Waste Hierarchy. The previous two reports provided the hazardous waste classification assessment for the contaminated silt, ('York Potash Project - Sediment disposal – Hazardous Waste Assessment', Royal HaskoningDHV, (December 2014) 9Y0989-109-101/303852/Sed_Haz_assessment/PBoro); and a review of the legislative requirements for managing the contaminated silt on land ('York Potash Project: Contaminated silt disposal – Regulatory Options', Royal HaskoningDHV, June 2015, 9Y0989-109-101/303852/Sed_Regulatory Options/PBoro).

The conclusion of the hazardous waste assessment was that all of the sampling points from the proposed dredge area provided one or more sample that exceeded the hazardous waste thresholds. Therefore the silt should be dealt with as a hazardous waste. All movements of the silt from the dredge area to the receiving facility must be in accordance with the Hazardous Waste Regulations.

The regulatory options report document informs York Potash Limited (YPL) and any sub-contractors commissioned by them as to what the regulatory obligations are in relation to the management of contaminated silt on land. The report expands upon these obligations and provides a review of environmental permitting considerations; regulatory requirements for off-site disposal; treatment or recovery of the contaminated silt; and a review of the appropriate protocols, codes of practice or criteria, which would allow the material to be reused outside of the waste regulatory framework when put to beneficial use. The preferred option for the management of contaminated silt in accordance with both the Waste Hierarchy and the proximity principle would be to recover the contaminated silt after it has been dewatered by using it in the construction of the proposed closed quay configuration of the Harbour Facility, should this construction option be chosen. However, if this option is not chosen, the option to dewater and treat the contaminated silt so it can be put to beneficial use elsewhere (for example, use in construction at another development site; or use as a landfill restoration material) provides an equal status in terms of waste hierarchical options.

This third report focusses on the most practical options available in accordance with the Waste Hierarchy given the location of the proposed Harbour facilities; and constraints associated with the

proposed construction process. An outline methodology and indicative costs proposed by two waste management companies to receive and treat the contaminated silt is provided.

The recommended option for the contaminated silt is for it to be dewatered and treated at the site of a local landfill facility. The treated material would then be used for restoration purposes on the landfill site. This option would constitute recovery in accordance with the waste hierarchy. This recovery option has the same waste hierarchical status to use of treated silt in the solid quay option, but is of lower preference than use in the solid quay option in terms of the proximity principle. However, it does present several distinct advantages over use in the solid quay option, as follows:

- There is sufficient capacity within local landfill facilities to use all of the contaminated silt for restoration purposes after treatment.
- This option is simpler, with fewer steps in the process.
- This option would not involve any double-movement of the silt from the dredge area for treatment and then back to the site of construction of the quay and, therefore, transportation costs are likely to be lower.
- The treatment process is unlikely to require any element of stabilisation and is therefore likely to be cheaper.
- This option presents less risk to the Harbour facilities' construction programme.
- The reliance on the treatment option producing a material that is suitable for its intended use would be entirely retained by the treatment operator and the landfill operator. There would be no reliance or liability on YPL for its intended use as restoration material after treatment.

Furthermore, there are a number of disadvantages associated with use in the solid quay option compared to using the treated silt for landfill restoration, as follows:

- It is currently unclear where treated material would be stored pending use in the backfill operation at the solid quay, given the limited amount of available space at the location of the proposed Harbour facilities development.
- There is a risk that the treatment process may not be able to deliver treated material that consistently meets the required specification for use in the construction of the solid quay, which could interrupt the construction programme and cause potential legal issues associated with contractual guarantees relating to material quality.
- The backfill operation would be reliant on the treatment process being able to supply the treated material in time, and at a rate that is appropriate to the programme required for the construction of the solid quay option. If there are any problems associated with the treatment process, this would interrupt the supply of material and potentially impact the construction programme.
- The costs of treating the contaminated silt by stabilisation to a specification that is equivalent to a low-grade engineering fill are likely to be considerably more than the costs of purchasing an equivalent volume of secondary aggregate that meets the same specification.
- If the solid quay configuration is not selected there would be no option for the use of the treated material within the proposed Harbour facilities development.

The option to use the treated contaminated silt in another local development was ruled out as a practical recovery option because any development that would be under construction concurrently with

the Harbour facilities is likely to have already defined the source material for fill requirements. Furthermore, should any of the treated contaminated silt be considered unsuitable for use in either the solid quay option or as landfill restoration material, it is very unlikely that it would be suitable for use in a local development scheme, given the strict requirements of using material on another site.

Material that cannot be recovered in any of the proposed recovery options would be disposed of to landfill at the site where the dewatering and treatment was carried out.

Two waste management companies that operate locally to the proposed Harbour facilities site that would be capable of receiving the contaminated silt provided outline costs per tonne for basic dewatering and treatment of the contaminated silt. The costs provided were:

- Augean: £35 per tonne.
- Impetus Waste Management: £26 per tonne for a straight landfill option through to £54 per tonne for treatment.

An indicative fee range for the management of material from the open quay configuration based on the cost range provided by Impetus Waste Management is £10,823,800 to £22,480,200; and for the fee proposed by Augean is £14,570,500.

An indicative fee range for the management of material from the solid quay configuration based on the cost range provided by Impetus Waste Management is £3,946,800 to £8,197,200; and for the fee proposed by Augean is: £5,313,000.

These costs are unlikely to include any capital development costs of the infrastructure required to accommodate the dewatering and treatment process; any indirect costs associated with the berthing of the barges carrying the wet silt; and transfer of material into vehicles at the dock for transfer to the waste treatment facility.

The treatment process would require the development of containment facilities at the waste management site, which would require rigorous Construction Quality Assurance (CQA) testing and validation to obtain approval from the Environment Agency prior to being able to accept material.

To avoid significant risk associated with managing the contaminated silt in line with the dredging programme, there would need to be sufficient time for construction and CQA validation process. Therefore the tender award for the management of the contaminated silt needs to be as early as possible.

1 INTRODUCTION

1.1 Purpose of the report

1.1.1 The construction of the proposed Harbour facilities component of the York Potash Project (YPP) requires capital dredging of contaminated silt; sands and gravels; and geological material (Mercia mudstone). This document is concerned with the management of the contaminated silt.

1.1.2 The levels of contamination in the silt mean that it would be prohibited from disposal to sea. Therefore, the silt must be brought to land for disposal or recovery.

1.1.3 As part of the feasibility assessment for the management of contaminated silt as waste on land, the material is required to be treated to prepare it for recovery. Recovery has been demonstrated¹ to represent the best option in accordance with the waste hierarchy². Options for recovery include use of the treated contaminated silt:

- as low-grade fill in the solid quay configuration (if this option is selected) as part of the construction of the proposed Harbour facilities; or,
- as restoration material at a local landfill facility, at the site where the contaminated silt would be treated; or,
- as low-grade fill material in a local development scheme.

These options are described in **Section 2**.

1.1.4 The purpose of this document is to inform York Potash Ltd (YPL) on the options for treating the silt so it can be used in accordance with the most appropriate hierarchical option. An outline methodology and indicative costs proposed by two waste management companies to receive and treat the contaminated silt is provided in **Section 3**.

1.1.5 An overview of the research into whether there are any local waters' edge developments that could potentially use treated material is provided in **Section 4**.

1.1.6 Recommendations are provided in **Section 5**.

1.2 Background

1.2.1 YPL proposes to develop Harbour facilities for the export of up to 13 million tonnes per annum (mtpa) of polyhalite bulk fertiliser (product). The proposed Harbour facilities would include a port terminal on the southern bank of the Tees estuary.

¹ York Potash Project 'Contaminated silt disposal – Regulatory Options Note' Royal HaskoningDHV (June 2015), Ref:9Y0989-109-101/303852/Sed_Regulatory Options/PBoro.

² The waste hierarchy is a legal requirement implemented by the Waste (England and Wales) regulations 2011

- 1.2.2 Two options are being considered for the quay construction – an open quay structure and a solid quay structure. In both cases, the development of the port terminal would be undertaken in two phases to provide the necessary export facilities that mirror the predicted increase in production from an initial 6.5mtpa to 13mtpa of product.
- 1.2.3 Capital dredging of the berth pocket (and approaches to the pocket) is required in order to allow the maximum design vessels access to the port terminal. This dredging would be undertaken in two phases and is linked to the phased construction of the quay.
- 1.2.4 The contaminated silt has been classified as a hazardous waste when dredged³. This classification only applies to the silt component of the dredged material.
- 1.2.5 The underlying sands and gravels below the silt layer represent the geological horizon and as such are unlikely to be contaminated as a consequence of anthropogenic influence. These sediments are not hazardous waste.
- 1.2.6 For Phases 1 and 2, it is proposed that dredging of the silts would be undertaken using enclosed grabs, due to the elevated concentrations of contaminants present within the silt. Approximately 181,000m³ of contaminated silt would require dredging by this method for the open quay configuration, and 66,000m³ for the solid configuration. However, a precautionary approach has been taken because of the hazardous waste classification of the silt layer to allow 181,000m³ silt + the top 15% of the material below the silts (i.e. a total of 208,150m³) for the open quay configuration; and 66,000m³ + the top 15% of the material below the silts (i.e. a total of 75,900m³) for the solid quay configuration, to be dealt with on land as contaminated silt.

1.3 Site constraints

- 1.3.1 Given space restrictions, there is no opportunity in the proposed development for the storage or treatment of the contaminated silt on land within the site boundary of the proposed Harbour facilities development. Therefore, all waste treatment options require an off-site solution.
- 1.3.2 The open quay structure option would not require the use of any dredged material for construction purposes.
- 1.3.3 None of the contaminated silt would be directly suitable for use in the open quay option, or for offshore disposal. However, if the solid quay option is progressed, treated contaminated silt could be used as part of the backfilling requirements for the construction of the solid quay, if it has been treated to a specification that meets the requirements for this use.

³ 'York Potash Project – Sediment disposal – Hazardous Waste Assessment', Royal HaskoningDHV, (2014). 9Y0989-109-101/303852/Sed_Haz_assessment/PBoro

2 APPROACH TO RECOVERY OF THE CONTAMINATED SILT

2.1 Proposed waste hierarchy recovery outcomes

2.1.1 There are three general approaches to the recovery of the contaminated silt, which are viewed in the following priority⁴ order:

- Treatment to an acceptable standard, followed by use in the solid quay configuration as a low-grade engineering material.
- Treatment to an acceptable standard, followed by beneficial use as restoration material by a local waste landfill operator.
- Treatment to an acceptable standard, followed by use as low-grade material in construction at a local development.

2.1.2 It is anticipated that any treated material that is not suitable for the above uses would require disposal.

2.2 Recovery in the solid quay option

2.2.1 Two options are being considered for the quay construction – an open quay structure and a solid (closed) quay structure. The choice of quay option has yet to be determined and is subject to a tender process between YPL and prospective contractors.

2.2.2 The proposed design of the open quay is that the quay and access bridge structures would be suspended deck structures comprised of a reinforced concrete deck supported by driven steel tubular piles. This option does not allow for the use of any treated silt as low grade fill material in the construction works.

2.2.3 The solid quay structure would be a combi-pile wall comprised of a line of steel tubular king piles linked by pairs of steel sheet piles. The king piles would connect via tie rods to a steel sheet pile anchor wall approximately 30 to 40m behind the berth line. The king piles would support a reinforced concrete cope beam onto which the waterside ship loader rails would be fixed. A piled beam would be required parallel to the cope beam to support the landside ship loader rails. The remaining area would be covered by a ground bearing concrete slab that would form the foundation for the conveying system.

2.2.4 The solid quay option requires reclamation behind the combi-wall and, therefore, represents a potential recovery option for using the contaminated silt where it has been treated to a specification that meets the engineering requirements for the reclamation process. The use of treated contaminated silt within the scheme from which it was derived represents the most favourable option in terms of both the waste hierarchy and the proximity principle, by using the material as close to the point of production as possible.

⁴ The priority is determined using a combination of the waste hierarchy and the proximity principle of managing the waste as close to the site of production as possible.

- 2.2.5 It is likely that the most appropriate regulatory mechanism for using treated silt in the solid quay configuration would be in accordance with the CL:AIRE Definition of Waste Industry Code of Practice ('CL:AIRE CoP'). Further details on the CL:AIRE CoP are provided in the York Potash Contaminated Silt Regulatory Options Note⁵.
- 2.2.6 The treatment process would be carried out at an off-site location as close to the site of the proposed quay as possible to minimise handling costs.
- 2.2.7 The Environment Agency would require an Environmental Permit to be in place for the treatment process to dewater and then reduce the concentration of, and/or stabilise, the hazardous contaminants. The contaminated silt would be exported 'as-dredged' from the dredging area to the waste management facility. The dredging contractor would be responsible for ensuring that the waste management facility has the necessary Environmental Permit that authorises the receipt of the contaminated silt before it is dredged and sent to that facility.
- 2.2.8 The treatment process for this option is likely to require the silt to undergo a stabilisation/solidification process to ensure that it would be processed to a specification that would allow it to be used in the solid quay reclamation. This process involves the material being loaded into a hopper and dosed with chemicals (which are determined by preliminary laboratory tests) so that contaminants would be bound into the stabilised material to prevent leaching. The end product would be a cured solid aggregate-type material to a defined engineering specification.
- 2.2.9 The treatment area would need to have an impermeable surface with adequate containment provided, possibly via small bund walls around the perimeter.
- 2.2.10 There would need to be a method statement, which would be prepared at the detailed design stage that provides the following:
- Acceptance criteria to define the scope of material that is suitable for the treatment process and a method for rejecting unacceptable 'contraries' (for example, debris in the silt).
 - A defined treatment method covered by an Environmental Permit.
 - A defined specification that the treated material must meet.
 - A sampling and testing methodology to assess the treated material against the defined specification.
 - Procedures to determine how out-of-specification treated material would be managed.
 - Contractual requirements to guarantee quantity and quality.
 - A Materials Management Plan to specify the placement of material in the proposed use.
- 2.2.11 After the dredged silt has been treated to meet the defined engineering specification, in accordance with the CL:AIRE CoP, it would no longer be considered as a waste when it is used for construction purposes. Therefore, an Environmental Permit would not be required for the proposed use, as long as the principles in the CL:AIRE CoP have been met.

⁵ See Section 4.9 of 'York Potash Project: Contaminated Silt Regulatory Options Note', Royal HaskoningDHV (2015), Ref: 9Y0989-109-101/303852/Sed_Regulatory Options/PBoro.

- 2.2.12 The Environment Agency and Redcar and Cleveland Borough Council must be consulted in accordance with the CL:AIRE CoP. A Materials Management Plan must be prepared and verified via an independent Declaration by a Qualified Person⁶.
- 2.2.13 Until the detailed design is undertaken, the amount of material required for backfill behind the combi-wall is not known. The reclamation for the solid quay option may not require the full amount of treated contaminated silt, potentially leaving a surplus to be managed.
- 2.2.14 Until the detailed design is undertaken, it is currently unclear where the treated material would be stored pending use in the backfill operation, given the limited amount of available space at the site of the proposed Harbour facilities development.
- 2.2.15 There is a degree of risk that the treatment process may not be able to deliver a treated material that consistently meets the required specification for use in the construction of the solid quay, which could interrupt the construction programme and potentially cause legal issues associated with contractual guarantees relating to material quality.
- 2.2.16 The backfill operation would be reliant on the treatment process being able to supply the treated material at an appropriate time in the construction programme and at a rate that is equivalent to the programme required for the construction of the solid quay option. If there are any problems associated with the treatment process, this would interrupt the supply of material and potentially impact the construction programme.
- 2.2.17 From a financial perspective, the costs of treating the contaminated silt by stabilisation to a specification that is equivalent to a low-grade engineering fill may be considerably more than the costs of purchasing secondary aggregate that meets the same specification. This is in itself not the single determining factor when considering the waste hierarchy. However, it is a material factor when comparisons with other appropriate recovery options are being made.
- 2.2.18 The most significant constraint to this option is the uncertainty regarding whether the solid quay configuration would be selected as the preferred option for the construction of the quay. If the open quay configuration is selected, there would be no option to use treated contaminated silt within the construction of the quay.

⁶ Royal HaskoningDHV can provide a Qualified Person for this activity.

2.3 Recovery as restoration material

- 2.3.1 The use of the contaminated silt as restoration material at the landfill site where the waste treatment would take place would constitute a favourable recovery option in terms of the waste hierarchy. This option has a lower preference than use in the solid quay configuration in terms of the proximity principle, because the treated sediment would be used away from the point of production.
- 2.3.2 This option requires that the contaminated silt is received at a waste management facility for treatment, which would include dewatering and chemical treatment to reduce or remove contamination to a level that would be acceptable for use as restoration material. The treatment facility would be preferentially located at the site of a landfill.
- 2.3.3 The waste management (treatment) facility would need to hold an Environmental Permit that allows for treatment at the site (or an appropriate mobile treatment facility with an authorised deployment form). Furthermore, the facility would also require that the conditions of the landfill permit authorised the use of the treated material as restoration material. It would be the responsibility of the landfill operator to ensure the conditions were met when using the treated material as restoration material.
- 2.3.4 There would need to be a method statement to be prepared at the detailed design stage, which provides the following:
- Acceptance criteria to define the scope of material that is suitable for the treatment process and a method for rejecting unacceptable 'contraries' (for example, debris in the silt).
 - A defined treatment method covered by an Environmental Permit.
 - A defined specification that the treated material must meet.
 - A sampling and testing methodology to assess the treated material against the defined specification.
 - Procedures to determine how out-of-specification treated material would be managed.
 - Procedures to use the treated silt as restoration material in accordance with the conditions of the landfill permit.
- 2.3.5 Although this option is of lower preference in accordance with the proximity principle than use in the solid quay option, it does present several advantages over use of the material in the quay construction, namely:
- There is sufficient capacity within local landfill facilities to use all of the contaminated silt for this purpose after treatment.
 - This option is simpler, with fewer steps in the process.
 - This option would not involve any double-movement of the silt from the dredge area for treatment and then back to the site of construction of the quay and, therefore, transportation costs are likely to be lower.
 - The treatment process is unlikely to require any element of stabilisation and is, therefore, likely to be cheaper.
 - The process would not require the use of the CL:AIRE CoP.

- This option presents less risk to the Harbour facilities construction programme.
- The reliance on the treatment option producing a material that is suitable for its intended use would be entirely retained by the treatment operator and the landfill operator. There would be no reliance or liability on YPL for its intended use as restoration material after treatment.

2.3.6 Two waste management companies (Augean plc and Impetus Waste Management) that operate landfill and treatment facilities close to the waters' edge of the River Tees, within the vicinity of the proposed Harbour development, were approached to provide an outline method regarding how they would manage the treatment and proposed recovery of the contaminated silt. Their responses are provided in **Section 3**.

2.4 Recovery for use on an alternative development

2.4.1 Research into the potential availability of suitable local schemes has been carried out (see **Section 4** for further information).

2.4.2 The use of treated material for construction purposes at another local development would be facilitated in accordance with the Hub and Cluster arrangement of the CL:AIRE CoP.

2.4.3 There would have to be a demonstrable need in terms of design, quantity and a specification for the sediment to ensure it would be suitable for use and that the use of such material would be replacing the use of virgin raw material.

2.4.4 This is considered to be the least preferential option in terms of the proximity principle; however, assessment of the potential for this option is required to fulfil the waste hierarchy. The discussions held with waste management companies indicate that there would be adequate capacity at local landfill facilities for using the treated contaminated silt for restoration purposes.

2.4.5 Should any of the treated contaminated silt be considered unsuitable for use in either the solid quay option or as landfill restoration material, it is very unlikely that it would be suitable for use in a local development scheme, given the strict requirements of using material on another site in accordance with the CL:AIRE CoP.

3 OUTLINE AND INDICATIVE COSTS FOR TREATMENT AND RECOVERY

3.1 Introduction

3.1.1 There are two waste management companies that operate large-scale waste management facilities close to the waters' edge of the River Tees which have the capacity, available space and the relevant permissions to be able to receive, store and treat contaminated silt. These are Augean plc and Impetus Waste Management Ltd. They were contacted to provide a high level overview and an indicative overall cost for each stage of managing dredged contaminated silt from the River Tees on land, incorporating the following:

- Receipt of wet silt from the barges.
- Transport of wet silt to a suitable facility for dewatering.
- Outline method and permitting and engineering (Construction Quality Assurance (CQA) arrangements for the dewatering facility.
- Transfer of dewatered material to location for treatment.
- Treatment options for the dewatered silt to facilitate beneficial recovery (or disposal where justified), including any permitting and engineering required for containment.
- Options for treated material to be used beneficially, e.g. landfill restoration, low-grade engineering fill material.
- Options for material that is not suitable for use.

3.2 Augean plc

3.2.1 Augean operate the Port Clarence landfill facility, which is less than 5km up-river from the location of the proposed Harbour facilities.

3.2.2 Augean's Port Clarence facility has a hazardous waste landfill, a separate cell for asbestos waste and a non-hazardous landfill. The site operates a treatment facility and a soil washing facility at the landfill site, which uses a self-contained physico-chemical treatment process to remove the contaminants of soils and similar materials leaving a clean fraction that can be reused or used for engineering on the landfills.

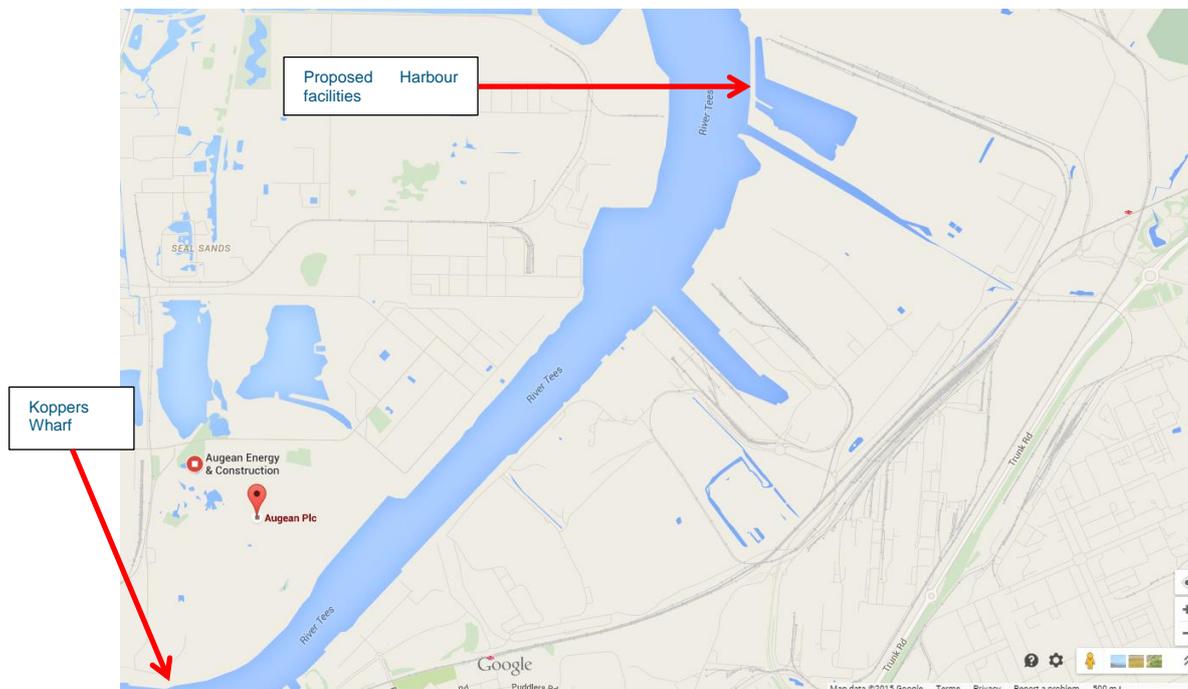
3.2.3 A summary of the Augean plc response is provided below. The full response, which was provided by email, is provided in Appendix 1.

Receipt and transfer of wet silt

3.2.4 Augean propose to receive the barges carrying wet silt at Koppers' wharf, which has a private road access into the Port Clarence facility.

3.2.5 The silt would be transported using sealed high sided 8 wheel tippers. There would be no need to use the public highway.

Figure 1 Location of Augean Port Clarence facility



Dewatering and treatment

- 3.2.6 Augean are currently permitted to wash, centrifuge, filtration / separation and stabilise dredging wastes at their Port Clarence facility, which is permitted to operate 24 hours a day 7 days a week.
- 3.2.7 The proposed treatment options are washing, stabilisation and separation / filtration (via centrifuge), which would ensure Best Available Techniques are provided to promote potential reuse. Augean would look to potentially engineer purpose-built sealed cells to allow treatment and recovery. Any unsuitable material would remain within the purpose built contained permitted cell.
- 3.2.8 All treated silt would be tested using Augean's in-house UKAS accredited laboratory and assessed to identify suitability for use in landfill restoration or landfill engineering. Further treatment would be carried out such as bio remediation if required to ensure suitability for use.
- 3.2.9 Any material not suitable for re-use by Augean would be disposed of at the treatment site in the hazardous or non-hazardous landfill, as appropriate, depending upon the waste classification after treatment. The waste would be sentenced once full waste classification has been carried out post treatment / dewatering of the silts.

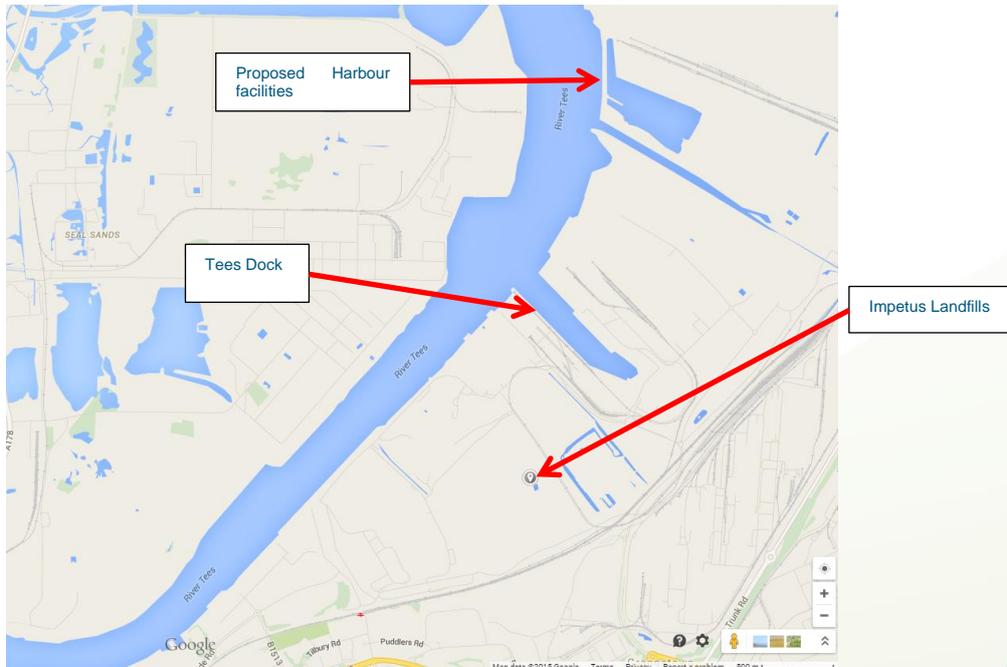
Proposed costs

3.2.10 For transportation from the wharf to their treatment facility, then pre-treatment and re-use / disposal, Augean propose an indicative cost of £35.00 per tonne inclusive of any relevant landfill tax.

3.3 Impetus Waste Management

3.3.1 Impetus operates the ICI No. 2 Landfill (non-hazardous) and the ICI No. 3 Landfill (hazardous), and a treatment facility at their facility which is adjacent to Tees Dock, less than 2km up the River Tees from the location of the proposed Harbour facilities.

Figure 2 Location of Impetus Waste Management facility



3.3.2 A summary of the Impetus Waste Management response is provided below. The full response, which was provided by email, is provided in Appendix 2.

Receipt and transfer of wet silt

3.3.3 The proximity of the treatment and disposal facilities to PD Ports' Tees Dock means that the facility is in close proximity to the project and allows access without entering the public highway networks. Their facility has the capacity to deal with all of the expected material within the outline programme supplied, and could accept quantities above the projected figures if necessary.

3.3.4 The silt would be received at the Dock transferred onto dump trucks with appropriate containment for transport to two containment areas within the ICI No 3 (Teesport) Landfill for dewatering. These containment areas would be developed to the same standards as a hazardous waste landfill.

Dewatering and treatment

3.3.5 Material would be placed in a pre-formed area with gravel drainage blanket to assist drainage. The characteristics of the material would need to be assessed to see if additives or physical treatment is required to speed up the dewatering process, given that an initial review of data suggests that permeability is in the region of 1×10^{-6} to 10^{-7} m/s, which means the silts are unlikely to be free draining.

3.3.6 Treatment options would be dependent upon the physical and chemical constituents of the waste material. Impetus' opinion following a review of the initial data is that there will be some materials that would require treatment to meet landfill acceptance criteria, along with material which may be suitable for reuse.

3.3.7 Their treatment facility allows for:

- Physical treatment to produce an engineering fill or restoration material.
- Stabilisation to produce engineering fill or restoration.
- Bioremediation to produce a restoration material.
- Pre-treatment for landfill disposal if required could also be carried out (i.e. WAC failing Wastes).

3.3.8 These processes can be specified to deliver the following options:

- Preparation of engineering fill for reuse in the project –subject to knowing the required engineering specification.
- Restoration material for use in the restoration of the ICI No 2 (Teesport) Landfill and ICI No 3 (Teesport) Landfill in accordance with the permit conditions.
- Landfill daily cover material.

3.3.9 Material not suitable for use would be deposited in either the ICI No 2 Teesport Landfill or the ICI No 3 Teesport Landfill dependent upon constituents and pre-treatment requirements.

Risks

3.3.10 Impetus provided an indication of potential high-level risks based on current information. The most significant risks they identified were:

- Material Quality - Chemical testing needed to assess quantum of treatability.
- Physical handling - Physical testing/ field trial data needed.
- Data - More information would needed on materials to comply with acceptance procedures.
- Third Parties - PD Ports etc. - Liaison needed regarding logistics availability etc.

- Programme - Tight programme given overall requirements. As permits are in place, this should mitigate some risk, however, an early decision to permit infrastructure to be in place for the start of the project is required. This should allow for infrastructure to be built summer 2016.

Proposed costs

- 3.3.11 The cost would be a function of the option required, i.e. straight landfill may provide the most cost effective solution. The level and type of treatment may add significantly to the cost.
- 3.3.12 Based on a minimum of 300,000 tonnes of materials costs are expected between £26 per tonne for a straight landfill option through to £54 per tonne for treatment. It should be noted that there is an element of capital cost which would be incurred under any options considered therefore a reduction in tonnage would not be apportioned on a linear basis.

4 REVIEW OF PROPOSED WATERS' EDGE DEVELOPMENTS

4.1 Overview

4.1.1 This section presents a review of the investigation of local planning applications to identify whether there are any local waters' edge developments that could be in a position to use treated silt. This research is required as part of the waste hierarchy to demonstrate that relevant practical recovery options have been considered for the contaminated silt after it has been treated.

4.1.2 It is likely that the most appropriate regulatory mechanism for using treated silt in another development would be in accordance with the Hub and Cluster arrangement provided in the CL:AIRE CoP. Further details on the CL:AIRE CoP are provided in the York Potash Contaminated Silt Regulatory Options Note⁷.

4.1.3 Determination of the actual planning status of any proposed scheme has not been undertaken at this stage.

4.2 Approach

4.2.1 An investigation was undertaken to identify planned developments within the search area which falls under the collective responsibility of four local authority planning areas:

- Hartlepool Borough Council;
- Borough of Stockton-On-Tees;
- Borough of Middlesbrough; and
- Borough of Redcar and Cleveland.

4.2.2 For each local authority planning area, a search was undertaken to identify firstly the relevant wards that are within close proximity to the waters' edge; and secondly specific developments which could potentially use the dredged material. A shortlist of such developments could then be used as a basis for future investigation if required.

4.2.3 To identify planned developments, searches were undertaken using the planning websites for the four local planning authority areas and correspondence sent to the respective planning teams. Planning authority websites are designed to enable targeted searches primarily by reference to a specific planning application number or address. Conducting wider searches that are not targeted on a particular development, but are instead looking to see which applications are within the planning system are more difficult and require searching across a wide range of planning application categories to identify any that may be of interest. Also, each of the four planning authorities' websites operates in a different way, which means it is not possible to apply the same search strategy consistently across the four planning portals.

⁷ See Section 4.9 of 'York Potash Project: Contaminated Silt Regulatory Options Note', Royal HaskoningDHV (2015), Ref: 9Y0989-109-101/303852/Sed_Regulatory Options/PBoro.

4.2.4 A common sense approach was taken to searching through the online portals, thereby ensuring a thorough but efficient approach. Undertaking a broader search meant a range of criteria was entered (where possible) in an attempt to identify all relevant projects without having to read through every submitted planning application in the system.

4.2.5 A summary of the findings in terms of the four planning authorities is set out below.

Borough of Redcar and Cleveland

4.2.6 Redcar and Cleveland is home to extensive industrial development including Redcar Steel Works and PD Teesport. The site of the proposed Harbour facilities is located in the Borough and, therefore, any developments that could potentially receive material in this area could be advantageous in terms of transfer logistics and costs and the proximity principle.

4.2.7 Redcar and Cleveland Borough Council (RCBC) has an online planning portal which allows users to search for planning application by number, location, category, name of applicant and date.

4.2.8 RCBC categorise their planning applications in terms of 'large-scale major applications' (floor space above 10,000m²), 'all other small-scale major' (floor space between 10,000m² and 1,000m²), and 'all other minor developments' (less than 1,000m² floor space). Under these headings a standard list of development types follows; 'offices/R&D/light industry', 'retail distribution and servicing', etc. 'All other minor developments' covers applications listed as 'minerals processing', 'listed building consent' and 'change of use'.

4.2.9 In total, 29 different categories of application are listed. Fortunately, any planned developments which are likely to be of interest would be located in one ward - Dormanstown – as this ward forms the boundary of the River Tees across the Borough. This helped to reduce the overall search criteria; however locations were still individually checked (using the postcode information associated with the planning application) to see if they were located at the waters' edge. Those developments on or adjacent to the waters' edge are provided in Table 1 below.

Table 1 Shortlisted developments in Redcar and Cleveland Borough

Development	Location	Comments
Breagh Project, 6km long 20" natural gas pipeline	Coatham Sands to River Tees (Bran Sands)	Reference R/2011/0850/FFM
Teesport Waste Treatment Facility	Grangetown	Reference R/2013/0608/FFM
Landscaping in relation to container terminal development (Northern Gateway) at Teesport	Grangetown	Reference R/2012/0605/RMM
Northern Gateway Container Terminal	Grangetown	Reference R/2012/0764/RMM

South Bank Wharf – Teesport site & TATA site (part of the Teesport Enterprise Zone)	Sites with direct water access to Tees Dock and/or the River Tees.	Two sites with a combined area of 80.7ha for redevelopment (focus on renewable energy & advanced engineering).
PD Teesport – wider (non-specified) development	PD Teesport estate	Direct liaison with PD Teesport could identify potential opportunities.

4.2.10 The planning applications provided above are all full planning applications rather than outline applications.

Borough of Middlesbrough

4.2.11 The existing waters' edge activity within the Borough comprises light industrial and retail units, warehouses and storage facilities. Middlesbrough Borough Council's online planning portal permits a search function only in relation to parish and to undertake a search using no other field returns over 1,300 applications. Information can be typed into the fields 'reference', 'location', 'postcode' and 'applicant' but is only useful if the user has application details beforehand. Their portal does not facilitate a wide search as required here.

4.2.12 Correspondence with Middlesbrough Borough Council (see text below) provided useful information in relation to developments which may be able to receive the dredged material, both within and outside the local authority boundary.

“Given the anticipated commencement of works being March 2017, it is very difficult to advise what might be constructed simultaneously with the proposed dredging works. The only schemes that might be in development at this time are likely to be any future developments on Teesside Advanced Manufacturing Park (former Southwest Ironmasters site) and potentially at various sites across Middlehaven (though we are not in a position to provide any details at this advanced stage).

However, even the above projects may not have direct access to the river. The most likely avenue for this is the Redcar & Cleveland developments at South Bank Wharf (though 2017/18 might be too early for this scheme) and Teesport, or Air Products 2 on the northern edge of the River.”

Table 2 Shortlisted developments in the Borough of Middlesbrough

Development	Location	Comments
Teesside Advanced Manufacturing Park	Land at the southern end of Riverside Park Road, north of A1032 (Newport Bridge) and west of A66, Middlehaven	Proposed new Enterprise Zone (13ha site) with a focus on advanced manufacturing and engineering, chemicals & renewable energy. Access to the Tees.

Borough of Stockton-On-Tees

- 4.2.13 The Borough of Stockton-On-Tees includes the land on the north of the River Tees from Seal Sands in the east, through Stockton town centre and west beyond the extent of the study area. The ward of Billingham South encompasses extensive industrial development including ConocoPhillips' oil terminal, SABIC Petrochemicals, Corus Steel and INEOS (BASF) Chemicals. It lies adjacent to the location of the proposed Harbour facilities and, therefore, offers (proposed developments pending) a potentially sensible destination for the dredged material in accordance with the proximity principle.
- 4.2.14 Stockton-On-Tees Borough Council has a comprehensive online planning portal through which planning application searches can be made. The portal's standard/simple search function is useful if the user knows the specific planning application reference. For others, an advanced search function is used which is extremely comprehensive but also relatively complex due to the sheer volume of criteria (and therefore possible outcomes) which need to be checked. The portal allows a user to search by application type (73 sub-groups), ward, parish, agent, status (34 sub-groups), decision (55 sub-groups), appeal status, appeal decision and date.
- 4.2.15 A shortlist of fields was selected to ensure capture of potential projects within a realistic timescale. Searches were conducted in terms of (firstly) 'ward' (those at the water's edge; namely Billingham South, Stockton Town Centre and Norton South), then 'application type' (full application, Local Authority full planning, Local Authority outline application, revised application), and finally 'status' (pending consideration, approved, and approved with conditions). Such was the volume of 'approved with conditions' applications that these then had to be filtered using a realistic timeframe (June 2013 – present) to provide a workable list of results.
- 4.2.16 Table 3 below details those planned developments worthy of further consideration.

Table 3 Shortlisted developments in the Borough of Stockton-On-Tees

Development	Location	Comments
Improvements to existing flood defences	Billingham South (north bank of the River Tees)	Stabilisation of River Tees embankment, increasing embankment height and other repairs. Reference 14/2761/FUL
Construction of rail link and sidings	Vopak Terminal, Seal Sands (north bank of the River Tees)	Development to facilitate loading of petrol and diesel; rail link, sidings, access tracks and roads, spillage storage lagoons. Reference 12/0494/REV
Air Products Renewable Energy Facility	Land adjacent to Huntsman Drive, Billingham South.	Two proposed plasma-gasification energy from waste plants though timescales for completion are unclear and potentially conflicting (further investigation needed). Not at the waters' edge but relatively close.

Hartlepool Borough Council

- 4.2.17 The boundary between Stockton-On-Tees Borough Council and Hartlepool Borough Council follows the southern edge of the Seal Sands Site of Special Scientific Interest (SSSI) and Greatham Creek. The Borough includes industrial works at Graythorp, adjacent oil storage depot and Hartlepool nuclear power station all situated along the north bank of the River Tees. In addition, it includes land around Hartlepool Dock.
- 4.2.18 Hartlepool Borough Council's planning webpages have a comprehensive planning application search into which one or more known parameters must be entered. It is not possible to search against pre-determined criteria (i.e. by ward, application type, status, etc.); however, the website does list those major developments currently being considered by the Council. The major developments page has been checked and there are currently no suitable developments listed. Correspondence with Hartlepool Borough Council was initiated to request information that may help to identify suitable developments, however no response was received.

4.3 Findings

- 4.3.1 The purpose of the research was to shortlist potential schemes that could have the potential to use the treated material. A number of developments that could potentially receive the dredged material have been identified. Further investigation into each scheme would be required to identify whether there was a need within that scheme for treated silt as low-grade engineering material, should the options of using treated material in the solid quay configuration or using treated material as landfill restoration material be unsuitable.
- 4.3.2 It is noted that for full planning applications that require a large volume of fill material and which will be under construction concurrently with the Harbour facilities, the development design is likely to be sufficiently advanced that such a source of fill is likely to have already have been identified.
- 4.3.3 The discussions held with waste management companies indicate that there would be adequate capacity at local landfill facilities for using the treated contaminated silt for restoration purposes. Therefore, it is unlikely that the option of using the treated silt in another development would be required.
- 4.3.4 Should any of the treated contaminated silt be considered unsuitable for use in either the solid quay option or as landfill restoration material, it is very unlikely that it would be suitable for use in a local development scheme, given the strict requirements of using material on another site in accordance with the CL:AIRE CoP. Therefore, this option can be discounted at this stage in preference to use in either the solid quay option or as landfill restoration material.

5 RECOMMENDATION

5.1 Preferred option

5.1.1 Based on the current understanding, the recommended option for the contaminated silt would be for it to be dewatered and treated at the site of a local landfill facility. The treated material would then be used for restoration purposes on the landfill site. This option would constitute recovery in accordance with the waste hierarchy.

5.1.2 Considering the proximity principle, this recovery option is of lower preference than use in the solid quay option; however, it does present several advantages over use in the solid quay option, as follows:

- There is sufficient capacity within local landfill facilities to use all of the contaminated silt for restoration purposes after treatment.
- This option is simpler, with fewer steps in the process.
- This option would not involve any double-movement of the silt from the dredge area for treatment and then back to the site of construction of the quay and, therefore, transportation costs are likely to be lower.
- The treatment process is unlikely to require any element of stabilisation and is therefore likely to be cheaper.
- The process would not require the use of the CL:AIRE CoP.
- This option presents less risk to the Harbour facilities construction programme.
- The reliance on the treatment option producing a material that is suitable for its intended use would be entirely retained by the treatment operator and the landfill operator. There would be no reliance or liability on YPL for its intended use as restoration material after treatment.

5.1.3 The use of treated contaminated silt as backfill in the construction of the solid quay would be the theoretically preferred option, accommodating both the waste hierarchy and the proximity principle. However, there are a number of disadvantages associated with this option compared to the option for using the treated material for restoration, as follows:

- It is currently unclear where treated material would be stored pending use in the backfill operation, given the limited amount of available space at the location of the proposed Harbour facilities development.
- There is a risk that the treatment process may not be able to deliver treated material that consistently meets the required specification for use in the construction of the solid quay, which could interrupt the construction programme and cause potential legal issues associated with contractual guarantees relating to material quality.
- The backfill operation would be reliant on the treatment process being able to supply the treated material in time, and at a rate that is appropriate to the programme required for the construction of the solid quay option. If there are any problems associated with the treatment process, this would interrupt the supply of material and potentially impact the construction programme.

- The costs of treating the contaminated silt by stabilisation to a specification that is equivalent to a low-grade engineering fill may be considerably more than the costs of purchasing the equivalent volume of secondary aggregate that meets the same specification.
- If the solid quay configuration is not selected there would be no option for the use of the treated material within the proposed Harbour facilities development.

5.1.4 Use in a local development has been ruled out as a practical recovery option because:

- For full planning applications that require a large volume of fill material and which will be under construction concurrently with the Harbour facilities, the development design is likely to be sufficiently advanced that such a source of fill is likely to have already been identified.
- There would be adequate capacity at local landfill facilities for using the treated contaminated silt for restoration purposes.
- Should any of the treated contaminated silt be considered unsuitable for use in either the solid quay option or as landfill restoration material, it is very unlikely that it would be suitable for use in a local development scheme, given the strict requirements of using material on another site in accordance with the CL:AIRE CoP.

5.1.5 Material that cannot be recovered in any of the proposed recovery options would be disposed of to landfill at the site where the dewatering and treatment was carried out.

5.1.6 Given that the major landfill operators that are local to the proposed Harbour facilities development operate both hazardous class of landfills and non-hazardous class of landfills at each of their facilities, it is not anticipated that any treated material that is unsuitable for recovery would need to be removed from the landfill facility.

5.2 Indicative costs

5.2.1 Both potential operators have provided outline costs per tonne for basic dewatering and treatment of the contaminated silt. The costs are unlikely to include any capital development costs of the infrastructure required to accommodate the dewatering and treatment process, any indirect costs associated with the berthing of the barges carrying the wet silt and transfer of material into vehicles at the dock for transfer to the waste treatment facility. The costs provided are:

- Augean: £35 per tonne.
- Impetus Waste Management: £26 per tonne for a straight landfill option through to £54 per tonne for treatment.

5.2.2 These costs are based on mass (£/tonne). To identify indicative costs based on the volume dredged requires a conversion factor. The density of the contaminated silt has not been measured. Therefore, an indicative assumption on costs has been provided below based on an assumed conversion factor of 2 tonnes per cubic metre.

5.2.3 The current estimated volumes of contaminated silt are:

- 208,150m³ for the open quay configuration; and,
- 75,900m³ for the solid quay configuration.

5.2.4 An indicative fee range for the management of material from the open quay configuration based on the cost range provided by Impetus Waste Management is £10,823,800 to £22,480,200; and for the fee proposed by Augean is £14,570,500.

5.2.5 An indicative fee range for the management of material from the solid quay configuration based on the cost range provided by Impetus Waste Management is £3,946,800 to £8,197,200; and for the fee proposed by Augean is: £5,313,000.

5.3 Contractual risk

5.3.1 The treatment process would require the development of containment facilities at the waste management site, which would require rigorous CQA testing and validation to obtain approval from the Environment Agency prior to being able to accept material.

5.3.2 To avoid significant risk associated with managing the contaminated silt in line with the dredging programme, there would need to be sufficient time for this construction and CQA validation process. Therefore the tender award for the management of the contaminated silt needs to be as early as possible.

Appendix 1 – Augean plc response

Gary Bower

From: Jason Mockett <jasonmockett@augeanplc.com>
Sent: 19 June 2015 11:48
To: Gary Bower
Subject: Dredging works project

Gary,

Further to our recent meeting and telephone conversations, please find below our indicative proposal and costs for this project.

Budget costs:

The above is for transportation from the wharf to our treatment facility, pre-treatment and re-use / disposal.

£35.00 per tonne inclusive of any relevant landfill tax

If the project moves forward we would like to meet up and discuss in more detail so we can prepare a full exact costing for you. This would take a lot of time and resource but if the project is going to happen we are more than happy to provide this to you and your client. Currently the price is indicative and as you are aware but we hope its attractive.

Receipt of wet sediment from the barges:

We have spoken to Koppers who operate a wharf that has a private road access into our Port Clarence facility and they have indicated that subject to agreement they principally agree to allow us to use the facility

Transport of wet sediment to a suitable facility for dewatering

The transportation will be carried out using high sided 8 wheel tippers that are sealed and contain the sediment preventing spillages. We use this method for transportation by road and are fully confident this is safe secure and efficient.

Outline method; and permitting and engineering (CQA) arrangements for the dewatering facility

We are currently permitted to wash, centrifuge (filtration / separation and stabilize dredging wastes at our Port Clarence facility. We have a purpose built treatment area operating 24 hours a day 7 days a week if required. We also have some innovative ideas that could be more cost effective that we are happy to discuss further at a later date

Transfer of dewatered material to location for treatment

This activity will be carried out within the same permitted treatment area as the dewatering activities. This may change due to expansion / infrastructure requirements but we would provide all permits and planning consents required.

Treatment options for the dewatered sediment to facilitate beneficial recovery (or disposal where justified), including any permitting and engineering required for containment

The treatment options we would consider to ensure BAT and to enhance re-use options for the sediments are washing, stabilization and separation / filtration (Centrifuge). We are already permitted to carry out these activities

at our Port Clarence facility. We would need to increase yearly volume of waste we can accept but this is not a concern to us as we have more than enough capacity within planning to allow this. We would look to potentially engineer purpose built landfill cells to allow treatment and recovery with any unsuitably material being left within the purpose built contained permitted cell.

Options for treated material to be used beneficially, e.g. landfill restoration, low-grade engineering fill material

All waste sediment once dewatered would be tested using our in-house UKAS accredited laboratory and assessed if suitable for our landfill restoration requirements or landfill engineering. Further treatment maybe carried out such as bio remediation if required to deem the material suitable. Augean always considers re-use ahead of direct landfill to reduce environmental impacts and to ensure we not comply with the waste hierarchy.

Options for material that is not suitable for use.

Any material not suitable for re-use by Augean would be disposed of into our own on site hazardous and non-hazardous landfills. The waste would be sentenced once full waste classification has been carries out post treatment / dewatering of the sediments. There is an option for Augean to de-water the material and return to site for the client to re-use as engineering fill. We are open for discussions on this should this be an option.

Summary

Augean PLC has the capacity within its Port Clarence site to complete a project on this scale. Not only are we do we have the largest hazardous waste consent in the UK we also have the backing of our PLC board to ensure our commitment to this project. We have our own expertise in planning, permitting and operational excellence to ensure your client that we can we offer the service they require along a full compliant process offering not only value for money but recovery and re-use where ever possible.

For us to ensure we can meet your clients requirements and to satisfy the regulators we would like early engagement with the client. We would be like to be offered preferred waste management service provider and feel that by meeting early we can define the project more accurately and provide a firm commitment to prices and services.

We trust you find the above to your satisfaction and look forward to hearing from you in due course. In the meantime should you have any questions on the above or would like to arrange a meeting to discuss further with the Augean team please do not hesitate to contact us.

On a final note Augean would like to explore the potential to offer a product from waste treatment that can potentially be used for the backfilling of the mine once the minerals have been extracted. We have worked with other potential mines on this and feel confident it has good potential to explore further and offer commercial benefits to both parties. Again we would be happy to sign an NDA with regards to this.

Best Regards

Jason Mockett
Commercial Manager

Augean PLC
Energy & Construction
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Appendix 2 – Impetus Waste Management response

**Impetus Waste Management
York Potash Project
Teesport Options**

1 Receipt of Wet Sediment From the Barges.

The proximity of the IWM treatment and disposal facilities is shown on Figure 1. The facility is in close proximity to the project and allows access without entering the public highway networks.

We have available at our Teesport Site

- Treatment of Hazardous and Non Hazardous materials at the Waste Treatment Facility at ICI No 3 (Teesport) Landfill Site - Permit EPR/JP3534VK
- Non Hazardous Waste Disposal or use for restoration materials at ICI No 3 (Teesport) Landfill Site – Permit No BV1984.
- Hazardous Waste Disposal or use for restoration materials at ICI No 3 (Teesport) Landfill Site – Permit No BV1917

The sites have capacity to deal with all of the expected material within the outline programme supplied, and could accept quantities above the projected figures if necessary.

Figure 2 details the location of these facilities.

2 Transport of Wet Sediment to a Suitable Facility for Dewatering.

It is assumed that sediments would be received at PD Ports and materials transferred onto dump trucks with appropriate containment to be transported to the IWM Teesport Facilities.

Transferred materials would be taken to two containment areas within the ICI No 3 (Teesport) Landfill for dewatering. Given the materials are hazardous these would be developed to the same standards as a hazardous waste landfill. Figure 2 details the proposed cells.

3 Outline method; and permitting and engineering (CQA) arrangements for the dewatering facility.

Material would be placed in a pre-formed area with gravel drainage blanket to assist drainage.

Characteristics of the material would be required to be assessed to see if additives or physical treatment is required or is dewatering will take place over a period of time. Initial review of data suggested permeability's in the region of $1 \times 10^{-6} - 10^{-7}$ m/s which are unlikely to be free draining.

4 Transfer of dewatered material to location for treatment.

Dewatered material would be excavated and transported by dump truck to the treatment area which is adjacent to the dewatering area – see Figure 2. Again there would be no need to utilise public highways.

5 Treatment options for the dewatered sediment to facilitate beneficial recovery (or disposal where justified), including any permitting and engineering required for containment.

Treatment options would be dependent upon the physical and chemical constituents of the waste material. Review of the initial data suggests there will be some materials that would require treatment to meet landfill acceptance criteria, along with material which may be suitable for reuse.

Our treatment facility allows for

- Physical treatment to produce an engineering fill or restoration material
- Stabilisation to produce engineering fill or restoration
- Bioremediation to produce a restoration material
- Pre-treatment for landfill disposal if required could also be carried out (i.e. WAC failing Wastes)

6 Options for treated material to be used beneficially, e.g. landfill restoration, low-grade engineering fill material.

Options will depend from composition of materials and treatability. This may include

- Preparation of engineering fill for reuse in the project – this would be subject to knowing required engineering properties.
- Restoration material for use in the restoration of the ICI No 2 (Teesport) Landfill and ICI No 3 (Teesport) Landfill
- Landfill cover material

7 Options for material that is not suitable for use.

Material not suitable for use would be deposited in either the ICI No 2 Teesport Landfill or the ICI No 3 Teesport Landfill dependent upon constituents and pre-treatment requirements.

8 Risks.

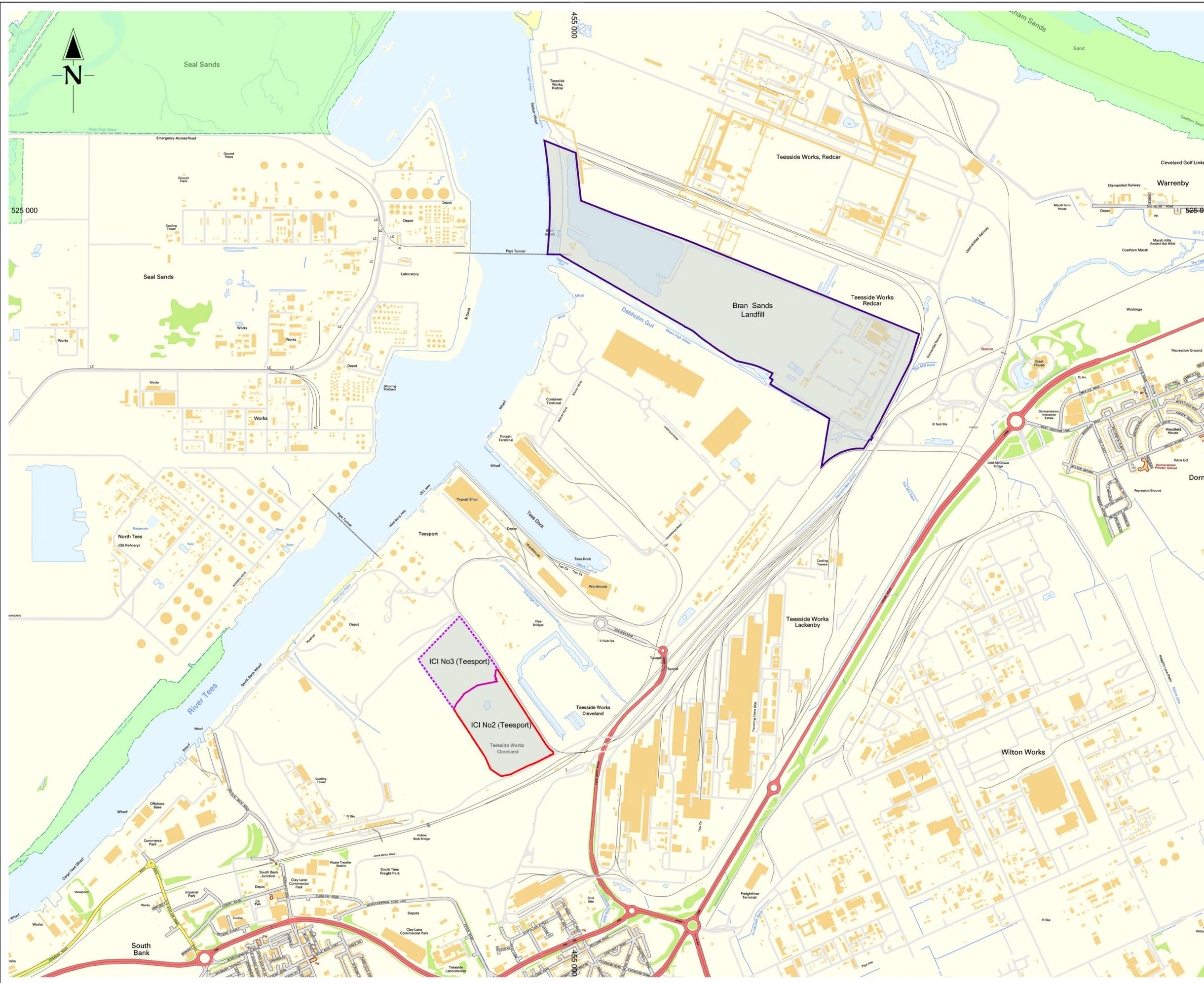
Potential risks identified from initial data are:

Item	Risk	Comments
Material Quality	High	Chemical testing needed to assess quantum of treatability
Physical handling	High	Physical testing/ field trial data needed
Regulator - Permit	Low	Permits in place, minor variations may be required but this should be relatively straightforward.
Regulators – Planning for treatment/ Disposal	Low	Planning in place for landfill and treatment
Data	High	More information needed on materials
Third Parties – PD Ports etc.	High	Liaison needed regarding logistics availability etc.
Programme	High	Tight programme given overall requirements. As permissions are in place, this should mitigate some risk, however, an early decision to permit infrastructure to be in place for the start of the project is required. This should allow for infrastructure to be built summer 2016.

9 Outline Costs

The cost would be a function of the option required, i.e. straight landfill may provide the most cost effective solution. The level and type of treatment may add significantly to the cost.

Based on a minimum of 300,000 tonnes of materials costs are expected between £26 per tonne for a straight landfill option through to £54 per tonne for treatment. It should be noted that there is an element of capital cost which would be incurred under any options considered therefore a reduction in tonnage would not be apportioned on a linear basis.



NOTES

1. Contains Ordnance Survey Data © Crown Copyright and Database Right 2014.
2. Accuracy of Map Image Not Guaranteed Due to Reproduction Methods.

Legend:-

- Installation Boundary ICI No2 (Teesport) Non Hazardous Waste Site
- Installation Boundary ICI No3 (Teesport) Hazardous Waste Site
- Installation Boundary Bran Sands
- Teessmuth and Cleveland Coastal Special Protection Area

0	First Issue -	-	-	-	-
Rev	Description	Drawn	Chk'd	App'd	Date

Project: **York Potash Project**

Title: **Area Plan**



Impetus Waste Management
 Wynyard Park House
 Wynyard Avenue
 Billingham
 Stockton on Tees
 TS22 5TB

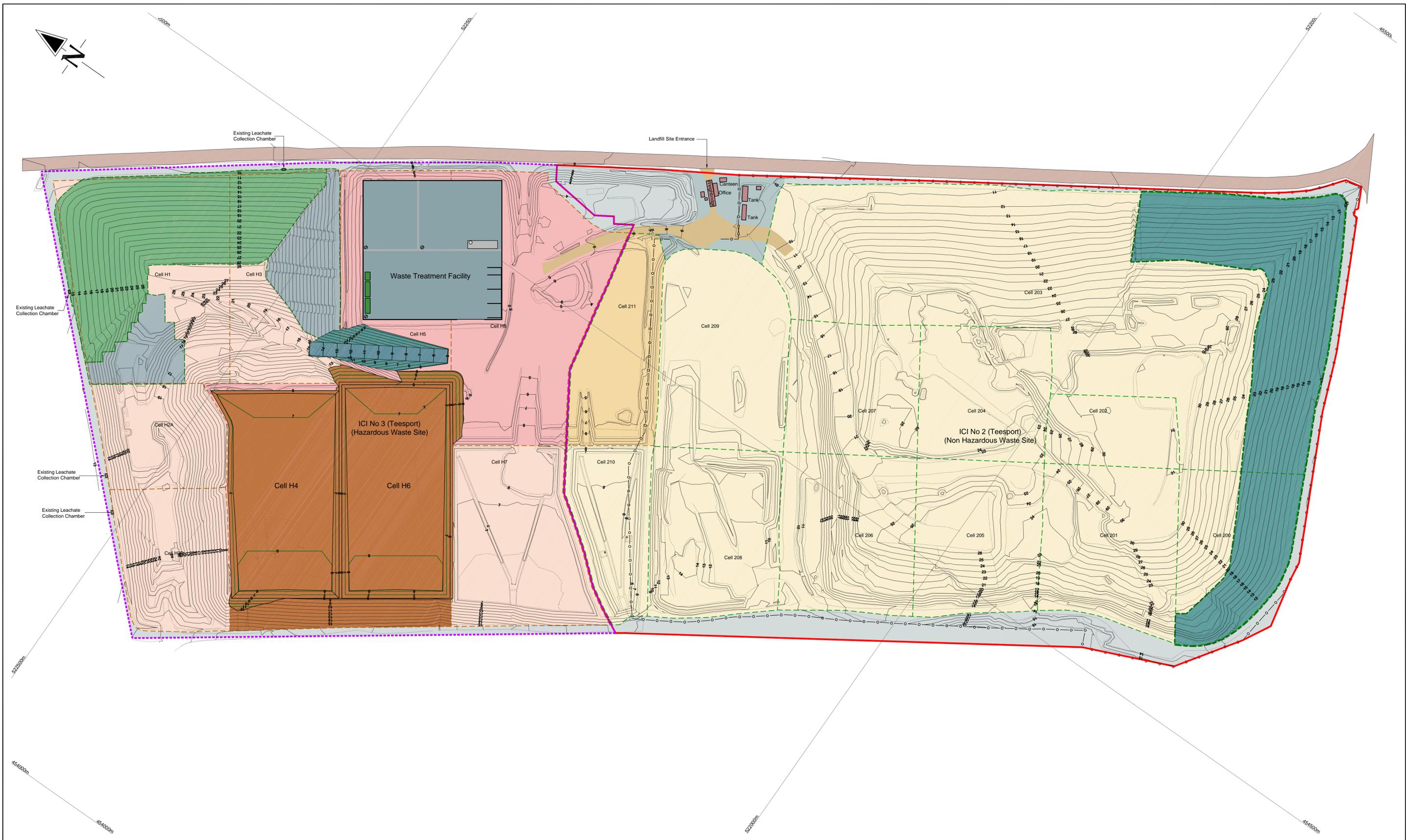
Telephone: 01740 661216
 E-Mail: enquiries@impetuswaste.com
 Web: www.impetuswastemanagement.com

Drawn	Checked	Approved
SBA	IMD	PC
Date	Date	Date
June 2015	June 2015	June 2015

Drawing Scale: 1: 10 000 Original Drawing Size: A1 841x594

Drawing No: **Figure 1** Revision: **0**

Status: **Working Drawing**



NOTES

1. Existing Topography Based on Survey Information Supplied by Messrs "MSurv" Dated 20/01/14, and January 2015.

Legend-

- Installation Boundary ICI No2 (Teesport) Non Hazardous Waste Site
- - - Installation Boundary ICI No3 (Teesport) Hazardous Waste Site
- - - Hazardous Waste Cell Boundaries
- - - Non Hazardous Waste Cell Boundaries
- Existing 5m Contour
- Existing 1m Contour
- ○ ○ Existing Fencelines

Legend- (Cont)

- Installation Area
- Site Entrance and Welfare Area
- Existing Industrial / Commercial Premises
- Existing Infill Area - ICI No 2
- Future Infill Area - ICI No 2
- Existing Infill Area - ICI No 3
- Future Infill Area - ICI No 3

Legend- (Cont)

- Existing Permanent Capping Area
- Existing Temporary Capping Area
- Existing Area Prepared for Capping
- Existing External Roads
- Existing Site Haul Roads

Project

ICI No 2 and ICI No 3 Teesport

Grangetown
Middlesbrough
Cleveland

Title:

**Existing Topographic Survey
January 2015**

Showing Future Cells H4 H6 and
Waste Treatment Facility Area

Rev	Description	Checked	Drawn	Chk'd	App'd	Date
0	First Issue					
Drawn	SBA	IMD		Approved	PC	
Date	June 15	Date	June 15	Date	June 15	
Drawing Scale:	1:1250	Original Drawing Size:	A1 841x594			
Drawing No :	Figure 2		Revision:	0		
Status:	Working Drawing					

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