Environment Agency

A17/2d - Volume 2d: Technical Report: Outline Site Waste Management Plan

Transport and Works Act 1992

Boston Barrier Order

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Quality Assurance

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Approvals

Name	*Title*	*Date*	*Version*
SM	*Waste Management Practice Lead*	*12/08/2016*	*1*
EL	*EIA Project Director*	*12/08/2016*	*1*

EIA Quality Mark

This Environmental Statement, and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development, was undertaken in line with the EIA Quality Mark Commitments.

The EIA Quality Mark is a voluntary scheme, operated by the Institute of Environmental Management and Assessment (IEMA), through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

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EIA Content
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Contents

Chapter	Title	Page
1	Administration and planning	1
1.1	Introduction	1
1.2	Location	1
1.3	Access	2
1.4	Project description	2
1.4.1	Barrier structure	2
1.4.2	Barrier control building and Wet Dock Entrance control building	2
1.4.3	Left bank flood wall and retaining wall	2
1.4.4	Right bank flood wall	3
1.4.5	Wet Dock Entrance	3
1.4.6	PoB access gates	3
1.4.7	Dredging requirements	3
1.5	Project information	4
2	Minimisation, reuse and recycling of C&D waste	5
2.1	Waste hierarchy	5
2.2	Proposed materials resource efficiency measures	5
2.2.1	Demolition materials	7
2.2.2	Excavated materials	7
2.2.3	Unacceptable material	7
2.2.4	Concrete	7
2.2.5	Tarmac	7
2.2.6	Metal	7
2.2.7	Vegetation	8
2.2.8	Hazardous waste	8
2.2.9	Imported material	8
2.2.10	Packaging	9
2.2.11	Fit out material	9
2.3	Initial review of anticipated waste arisings	12
3	Waste management	17
3.1	Waste segregation	17
3.2	Colour-coded skips	18
3.3	Contaminated land	18
3.4	Reuse of construction materials	18
3.5	Waste disposal characterisation	19
3.6	Forecasting and planning the reduction, reuse and recycling of waste	19
3.7	Disposal and treatment options	22
3.8	Waste controls and handling	23
3.8.1	Duty of care compliance	23
3.8.2	Responsibility for waste management	23
3.8.3	Site security	24

4	SWMP implementation	25
4.1	Register of waste carrier licences and permits	25
4.2	Training and communication	28
4.3	Monitoring and waste records	28
4.4	SWMP implementation checklist	30
4.5	Updating the SWMP	30
5	SWMP review and audit	33
5.1	Post-construction review	33
5.2	Estimate of cost savings	34
5.3	Relevant signatures	34

Tables

Table 1.1:	Project Information	4
Table 2.1:	General material resource efficiency measures to be considered for the proposed Boston Barrier	6
Table 2.2:	Summary of proposed and recommended resource efficiency measures	10
Table 2.3:	Anticipated waste arisings (examples, for information, from other sites)	13
Table 3.1:	Forecasted waste types and quantities during the construction works	21
Table 3.2:	Lincolnshire potential disposal and re-use sites	23
Table 3.3:	Waste management responsibility	24
Table 4.1:	Waste carrier licences and Environmental Permit	26
Table 4.2:	Record of waste removed from site to ensure Duty of Care compliance	29
Table 4.3:	SWMP checklist	30
Table 4.4:	Further actions required	30
Table 4.5:	SWMP revisions	31
Table 5.1:	Post construction review declaration	33
Table 5.2:	Relevant signatories to the SWMP	34

1 Administration and planning

1.1 Introduction

This outline Site Waste Management Plan (SWMP) has been produced for the Boston Barrier Project, located in Boston, Lincolnshire. The outline SWMP (OSWMP) has been produced using the information currently available at the time of issue.

This OSWMP has been produced to support sustainable development and the management of waste appropriately for this Project. The OSWMP aims, to ensure that all construction waste is managed, stored and disposed of in an appropriate manner by appropriate contractors in accordance with all relevant legislation.

This OSWMP has been compiled to reflect the original legislation and regulation (now rescinded), guidance documents produced by Defra, and other documents produced by Government, Envirowise, WRAP and the industry in general.

This document is a live document and requires updating regularly as the Project progresses (refer to text in red for items to be completed by the contractor following appointment).

The Project scope is subject to change and the OSWMP would be updated to reflect any changes as necessary.

The purpose of this OSWMP is to enable the waste generation to be dealt with in a structured and auditable manner, from the commencement of the Project through to construction and operation.

Waste minimisation should be emphasised from the outset, during all Project phases, commencing at outline design, through to construction. This is to ensure that the waste produced during the construction phase is dealt with in accordance with the relevant Duty of Care legislation and principles outlined within the Waste Hierarchy (reduction, reuse, recovery and recycling).

Best practice suggests that the SWMP approach should be applied from the very early design stages through the concept of Designing for Resource Efficiency and carried forward and revised throughout the Project delivery process. This ensures cost savings are maximised by considering waste minimisation initiatives and identifying opportunities to reduce, reuse or recycle waste materials in the scheme, and improve resource efficiency during the design stage through to construction.

1.2 Location

The Project is located to the west of central Boston, Lincolnshire. It includes a stretch of the Haven, between Black Sluice and Maud Foster Sluice. The Project will take place on both the left and right banks of the River. The total site area, including land and water is 19.2ha.

1.3 Access

Access to the Project Area for works on the left bank would be provided from St John's Road and would follow the current access route used by the Port of Boston (PoB). Access to the Project Area for works on the right bank would be provided off Marsh Lane. If needed, either road would be strengthened during construction and would be 'made good' once construction has finished. Either access may be used for works within the channel.

1.4 Project description

The Project would consist of the construction of a barrier structure within the Haven, with land-based flood risk management structures that tie into the barrier structure and into existing flood risk management structures in order to provide a continuous tidal flood defence level of 7.55mAOD. Construction of the Project is anticipated to commence in late 2017 and to be completed by the end of 2019.

The major components of this Project are the:

- Barrier structure;
- Control building and Wet Dock Entrance control building;
- Left bank flood wall and retaining wall;
- Right bank flood wall and retaining wall;
- Wet Dock Entrance widening and installation of vertical sector gate(s);
- PoB access gates; and
- Dredging requirements.

1.4.1 Barrier structure

The barrier structure would be constructed in the Haven, approximately 100m downstream of Black Sluice, adjacent to the Starch Berth (on the Port of Boston (PoB) estate - left bank) and existing residential properties (along Wyberton Low Road - right bank). It comprises a 25m wide U shaped structure with a rising sector gate approximately 10m high, spanning part of the channel on the right hand side. The barrier structure would tie in with the proposed left and right bank tidal protection structures.

1.4.2 Barrier control building and Wet Dock Entrance control building

It is anticipated that a control building, associated car parking and HGV layby area would be constructed on the left bank directly adjacent to the barrier structure. The site is currently occupied by a small structure, the PoB's buoy repair shop. The Wet Dock control building is proposed on a location adjacent to the Wet Dock Entrance to allow for its operation.

1.4.3 Left bank flood wall and retaining wall

On the left bank, the proposed flood wall extends from the barrier structure along the waterfront of the PoB, across the Wet Dock and terminates at Maud Foster sluice, approximately 830m downstream. The entire

reach follows the existing quay (until it deviates from the quay at the load relieving platform and at the knuckle and is developed using continuous sheet piling along the front of the existing quay wall). A 2m high concrete flood wall is set back between 9 and 15m from the quay edge in order provide adequate defence against flooding up to a level of 7.55mAOD.

1.4.4 Right bank flood wall

From the barrier structure the right bank anchored sheet pile wall would extend approximately 430m in the downstream direction and 110m long in the upstream direction (toward Black Sluice).These embankment would carry a light vehicle maintenance and access roadway and raise the flood defence level from approximately 6mAOD to 7.55 mAOD.

1.4.5 Wet Dock Entrance

The Wet Dock Entrance channel would be widened from 15.3m to 18m. New vertical gates would be installed at the location of the existing inner Wet Dock Gate. These would be hydraulically operated and would function by opening inwards.

1.4.6 PoB access gates

Access gates are required on the flood wall from the Wet Dock Entrance to Maud Foster sluice in order to allow the passage of the PoB's vehicles during normal operation. These gates would be manually operated, double leafed gates which are 3-5m each in width resulting in a total gate width of 6 - 10m. Eight gates are currently envisaged. However, the location and number of gates would be confirmed with the PoB during detailed design.

1.4.7 Dredging requirements

The total volume of material to be dredged has been currently estimated at 38,300m^3. There is a presumption against disposal to sea of the capital dredging as it has been assumed that much of this material would be appropriate for beneficial re-use, most likely at licensed landfill sites. At this stage the preferred disposal of dredged materials would be on land for use as a restoration or capping material (subject to permitting and planning requirements and the suitability of materials).

1.5 Project information

Table 1.1 below summarises the key Project information.

Table 1.1: Project Information

Employer	Environment Agency
Principal Contractor	TBC
Name of person in charge of Project	TBC
Author of SWMP	Christopher Carter
Project title/ reference	Boston Tidal Barrier
Project location	West of central Boston, Lincolnshire at National Grid Reference (NGR) TF 32836 42822
Project cost (estimated)	£97 million
Footprint (ha)	Circa. 34 ha
Start date	20 March 2018
Completion date	20 November 2019
Description of Project scope	See development description in Section 1.4. Works would involve excavation and construction.
Waste Management Champion	TBC
Person responsible for SWMP	TBC
Document Controller	TBC
Version number and date	Version 0 – 22/07/2016
Location of SWMP	Site office

Source: Mott MacDonald 2016

2 Minimisation, reuse and recycling of C&D waste

2.1 Waste hierarchy

The objective of this plan is to ensure the waste hierarchy is implemented as set in order of preference; the highest options would be adopted where reasonably practicable, but usually a combination of options would be appropriate.

The SWMP has been used to record any early decisions, design changes, construction methods or material specifications which have helped to minimise potential waste arisings.

Waste minimisation is at the top of the waste hierarchy and this should continue to be a priority throughout the Project, not just at the early stages.

Waste from the Project would arise mainly from site clearance, excavation[1] and any unavoidable construction waste. The proposed scheme would require specific construction materials (predominantly concrete) to be imported to the site. A Bill of Quantities would be provided once the planning has been approved and Project is able to progress. This would be used to identify the potential types and quantities of materials produced from this Project.

2.2 Proposed materials resource efficiency measures

Table 2.1 highlights the various resource efficiency measures to be undertaken during the life of the Project and apportions a responsibility to designated personnel to ensure the measures are undertaken. It demonstrates the components and decisions involved, ensuring a reduction in the amount of waste and surplus materials being produced by any works on site. This has the effect of minimising the amount of material which would traditionally be sent to landfill and to ensure a cradle to cradle approach[2].

1 Excavation in the context of this Report includes dredging activities.

2 Products and systems that eliminate the concept of waste.

Table 2.1: General material resource efficiency measures to be considered for the proposed Boston Barrier

Planning waste minimisation during construction	Waste minimisation decisions taken	Resource saving	Responsibility	Start date
Design	Enabling the purchase of materials in shape/dimension and form that minimises the creation of off-cuts/waste. Consideration should be given to the use of pre-fabricated units where possible. Specifying materials and producing the resulting Bills of Quantities that allow wastage to be minimised. Due to potential contamination, chemical testing would need to be undertaken to determine composition of the material and subsequent opportunities for re-use or remediation.	Minimal waste would be produced.	Project Manager	From the design outset
Construction methods	Sequencing the works such that re-use of materials can be undertaken. Consider whether previous or subsequent phases produce or require material considered not to be required for that phase that can be reused in later phases.	Minimal waste produced.	Project Manager/ Site Manager	During design and planning stages and implemented during the construction.
Materials	Consider whether previous or subsequent phases produce or require material considered not to be required for that phase that can be reused in later phases. Assess the quantities of materials required on site. Just in time delivery (as needed basis) to prevent over supply Secure storage to minimise the generation of damaged materials/ theft. Keeping deliveries packaged until they are ready to be used. Inspection of deliveries on arrival Increase the use of recycled content; this could include traditional use of recovered material such as crushed concrete demolition waste and by procuring mainstream manufactured products with higher recycled content than their peers. Quick win areas of the Project in which to implement this for could be concrete frames, flooring and brick/block work.	Prevents lost time in re-ordering of damaged equipment, reduces need for storage if over ordering takes place. An increase in the demand for such products would reduce the quantity of waste going to landfill. Recycled material use results in a reduction in demand for extraction of virgin materials and subsequently a reduction in the projects carbon and environmental footprint.	Project Manager/ Site Manager	During construction planning and throughout the Project construction. During design and throughout the procurement/ construction stages of the Project

Source: Mott MacDonald 2016

2.2.1 Demolition materials

Material arising from the demolition of existing building on the left bank shall be carefully stored in segregated piles for reuse on site if possible. If any material deemed acceptable from the enabling works is produced e.g. good quality topsoil, this should be stored and re-laid, within the Project. If this is not possible, the material should be sent for composting or reuse elsewhere.

2.2.2 Excavated materials

Excavated materials (which in the context of this Report includes dredged material), such as soils should be carefully stored in segregated piles for subsequent reuse on the site, where possible. These excavated materials should be reused as deposition material for infilling or landscaping. Any surplus materials should be removed from site for either direct beneficial use elsewhere (such as land remediation projects) or for recycling or recovery at an appropriately permitted off-site facility. If the material is contaminated then it should be kept separate from the clean material and sent for either recycling or recovery, where appropriate, or disposal at appropriately permitted facilities.

The Project would examine the potential re-use and disposal options for excavated material produced as part of the Project, and in particular re-use options for clay, glacial sand and gravel. Where re-use is not possible there would be a requirement to dispose of excavated material, by licensed carriers, to permitted landfill sites and handled in accordance with the Environmental Permitting Regulations 2010 as amended.

2.2.3 Unacceptable material

Other unusable Construction, Demolition and Excavation (C, D&E) waste materials would be collected in receptacles with mixed C&D waste materials, for subsequent separation and disposal at an off-site facility.

2.2.4 Concrete

Concrete would be taken up and should be source segregated, for recycling either as fill/capping on site and/or removed to an off-site facility.

2.2.5 Tarmac

Tarmac would be taken up and reused on site for either tarmac hard-standing, capping or for sub base.

2.2.6 Metal

Any metal material arising on site would be reclaimed and re-used on site. Such uses could be in the construction of the new building e.g. support structures or for fencing, signage. Any metal that cannot be utilised on site would be sent off-site for recycling at an appropriate site.

2.2.7 Vegetation

In order for construction to take place, areas of vegetation comprising mainly of grassland with some mature trees and hedges would require clearance. Any vegetation removed should be sent for composting. If landscaping is part of the scheme (to be agreed at a later date) then any vegetation could be turned into mulch or compost to be reused back in the scheme.

If any material deemed acceptable from the enabling works is produced e.g. good quality topsoil, this should be stored and re-laid within the Project, or if this is not possible, should be sent for composting.

2.2.8 Hazardous waste

Hazardous wastes including any contaminated soil materials would be identified, removed and kept separate from other C&D waste materials in order to avoid further contamination. The waste would be disposed of in accordance with the Hazardous Waste (England and Wales) Regulations 2005 as amended in 2009.

Asbestos based materials are understood to be present in low quantities. However, should more asbestos or other hazardous contaminants be encountered, they should be managed by a qualified asbestos or other hazardous waste removal contractor. All hazardous wastes, including asbestos should be removed off site in accordance with legislation and disposed of in an appropriately permitted site by a licensed contractor in accordance with all appropriate regulations. More detail on managing these wastes is provided in Section 0 and can be obtained from the Environment Agency[3].

2.2.9 Imported material

Surplus or waste materials arise from either the materials imported to site or those generated on site. Imported materials are those which are brought on to the Project for inclusion into the permanent works.

Where possible consideration should be made for the reuse of material back into the Project however the proposed scheme would require specific materials to be imported to the site.

Any waste produced through the importation of materials needs to be monitored and included in the SWMP under construction works. Where possible consider the use of recycled imported material such as concrete, which has a higher recycled content. However, due to the integrity of the material required for the structure, this may not be considered a suitable method.

Waste from imported material is likely to come from the packaging and spillages but these are difficult to quantify at this stage.

3 Contact the EA's Environmental Management Team at Waterside House, Waterside North, Waterside, Lincoln LN2 5HA (0370 850 6506) for further advice and information.

2.2.10 Packaging

Any packaging waste should be source segregated for recycling or returned to suppliers. If feasible the use of pre-fabricated material should be used and imported to site. In certain circumstances this would reduce the amount of packaging required. Standardisation/use of modular sizes is also recommended in order to reduce off cuts.

2.2.11 Fit out material

Final fit out of the infrastructure should be done in conjunction with the Environment Agency and not to an assumed design specification in order to reduce wastage of materials. The suggested waste minimisation measures outlined above are limited to best practice with regard to material ordering and storage. Further benefits could be made through material reuse, which should be incorporated into the Project design. It is anticipated that the contractor(s) (once appointed) would endeavour to reuse or recycle materials on the Project where possible.

Table 2.2 shows a summary of proposed and recommended resource efficiency measures. These should be adhered to in order to appropriately reuse or recycle waste produced on site during the excavation and construction of the Project.

Table 2.2: Summary of proposed and recommended resource efficiency measures

Summary of proposed and recommended minimisation measures		
Use of prefabricated elements	Recommended	It is recommended that as much of the construction as possible would be carried out off site, with prefabricated materials preferred. Some elements such as kerb stones/access ramps, and drainage pipes can be pre-fabricated offsite to minimise on-site waste arisings and associated vehicle movements. These units would generate less on-site waste through off-cuts and storage damage. Units should be sourced from a supplier that recycles off-cuts and materials at the pre-fabrication site, otherwise, this measure simply shifts the waste problem from one location to another.
Excavation	Proposed	Excavation is likely to be for temporary roads and strengthening or improvement of existing site roads (and the laying of the porous car parking) and foundations of the flood walls. It is anticipated that any waste produced through the construction of these roads and foundations would be cut and fill and be reused elsewhere on site. Surplus excavated materials including clay, soils, gravels and man-made fill can potentially generate the largest quantities of all the waste streams with significant implications on disposal costs if it cannot be reused on site. Where material is required to be excavated; it is proposed that this material, where appropriate, would be stored for re-use as landscaping material or infilling.
Minimisation of vegetation clearance at the design phase	Recommended	As the site is potentially grass with some shrubs, clearance of vegetation has the potential to be insignificant due to the nature of the area as an existing footpath. Identify, during the design phase, ways to minimise the loss of vegetation on site. Where minimisation is not possible, composting or mulching the vegetation should be considered for reuse in landscaping within the scheme.
Minimisation of contaminated land arisings	Recommended	Where possible, contaminated land should be remediated and reused on site, or, if found to pose no risk to receptors (e.g. groundwater and human health) should be left undisturbed. The latter can minimise potential transport and disposal costs. This approach should be standard practice among designers and contractors.
Contractor targets	Recommended	The Principal Contractor should consider setting off-cut/surplus targets for sub-contractors with a positive incentive scheme for on-site waste champions. Good practice suggests that 3% wastage rate based on the total amount of construction material handled on site is achievable.
Avoiding over-purchasing and accurate delivery times	Recommended	Over-purchasing can lead to significant wastage and should be avoided in the first place. Ensuring materials are ordered for delivery shortly before they are used on the Project would also avoid possible damage and therefore wastage.
Use of take back schemes	Recommended	Some suppliers offer a take back scheme, which should be utilised where practicable, particularly for packaging and pallets.

Summary of proposed and recommended minimisation measures		
Monitoring and review	Recommended	The Principal Contractor should use the waste data provided from the waste removed from the Project and the periodic review process (required as part of the SWMP) to their advantage to assess whether the waste objectives are being met, and if not to review procedures to steer the Project towards achieving them. This would require clear responsibilities to be identified, supported with authority and incentives to act on any deviations from the SWMP.
Education and awareness	Recommended	Waste minimisation must be underpinned by education and awareness throughout all levels of the Project team, from the design team to site contractors who handle the construction materials via site inductions and monthly toolbox talks which all contractors and site workers would be expected to attend.
Consideration of End of Life materials	Recommended	Consideration should be given to what would happen to the materials specified, when they reach the end of their useful life. Where possible, elements should be designed for repair, modular repair, recycling at the end of life or safe disposal. The use of hazardous materials, in particular, should be minimised.

Source: Mott MacDonald 2016

2.3 Initial review of anticipated waste arisings

An initial review of the Bill of Quantities is required to identify potential and expected waste arisings required for this Project. The aim of this review is to identify the waste streams anticipated to be encountered during the Project, and consider the possible management options for these materials (which would include identification of suitable local waste management or disposal sites that can accept the waste).

This initial waste review should consider the recycling and reuse potential of each waste stream anticipated and identifies some indicative benchmark recycling targets which could be used to steer the detailed SWMP as the Project develops.

As there is currently no information available to identify all the possible waste streams that could be expected, information has been used from similar projects experienced by the Project team.

Table 2.3 shows the anticipated waste arisings.

Table 2.3: Anticipated waste arisings (examples, for information, from other sites)

Activity	Anticipated waste stream	Anticipated volume	Recovery potential	Overall priority for recovery	Indicative recovery target	Management options
Site clearance	Green waste	High	High	High	50%	Some green waste is likely to arise from the excavation and removal of the grass covering the land on the right bank along the Macmillan Way. The removal of some mature trees and hedges may also be required in order to commence the construction of the development. Arisings removed from the scheme should be collected in skips and stockpiled on site. If it cannot be reused in the Project it would need to be sent off-site for processing. A local merchant composting facility would be the most practicable treatment solution, but consideration could also be given to the use of council owned composting facilities if there is one available and it has sufficient capacity available to accept the waste. Timber arisings from any trees or hedges removed could be reused on site by chipping the material down for landscaping.
	Metal	Medium	High	High	100%	Any metal produced from site clearance including lighting columns, pedestrian barriers, piling etc., have the potential to be recycled off site. Lighting columns are to be replaced with new more efficient ones but the whole column has the potential to be sent for recycling.
Earthworks	Topsoil	High	High	High	75%	Undisturbed topsoil has excellent potential for reuse. Opportunities for reuse in landscaping should be identified
	Excavated natural ground	Medium	Medium	High	50%	Opportunities for the reuse of material (particularly clay from the dredging activities) as infill or as a base for any access routes should be explored. If the material is low grade subsoil there is potential to reuse this as a landscaping or infill material prior to the laying of topsoil.
	Excavated man-made ground	Low	Low	Low	5%	Due to the properties of man-made fill, opportunities to reuse the material compared to natural or topsoil are more limited. As the proposed development is on an existing site, the opportunities to recycle or reuse some of the excavated fill may be possible if permitted.
	Contaminated soil	Low	Low	Low	0%	A contaminated land site investigation has been carried out and some evidence of contamination has been found. Soil extracted would be subject to contamination testing (totals and leachability testing) for a suite of contaminants to assess levels of contamination present in the soil and suitability for reuse. Measures to manage these wastes on site should be identified as part of the SWMP. Adequate assessments of whether materials are appropriate or not for re-use and potential types of re-use on site should be included.

Activity	Anticipated waste stream	Anticipated volume	Recovery potential	Overall priority for recovery	Indicative recovery target	Management options
						Hazwaste online software can be used to determine whether the soil would be classified as hazardous, potentially hazardous and non-hazardous and further WAC testing (compliance testing) undertaken on those samples that indicate that the soils would require landfilling, to identify the appropriate landfill. All soil extracted (whether contaminated or not) would need to be stockpiled at the site.
Construction General Site Waste	Concrete, bricks and mortar, slates	Low	High	High	100%	It is planned that much of the construction would be carried out off site, but there would be elements that need to be done on site such as foundations. This could potentially create waste through damage to bricks and paving slabs and spillages of cement. Any arisings (including liquid spillages, wash-down and cement wash liquors, etc.) should be contained in an appropriate manner (within a designated area, controlled using bunding, skips, etc.) to be sent for off-site reprocessing.
	Concrete drainage, kerbs and walls	Low	High	High	100%	Small quantities may arise, although pre-casting of the components prior to arrival on the site would reduce wastage in the first place. Any arisings should be placed in the skips and sent to a local recycling facility for crushing down and subsequent reuse on other projects.
	Hazardous waste (paints, resins etc.)	Low	Medium	Medium	50%	These waste streams should be segregated from other waste streams in secure and bunded storage cupboards for subsequent identification and removal for treatment off-site at appropriate hazardous waste facility or facilities.
	Packaging waste (plastics, wood, film, metal and cardboard	Low	Low	Medium	50%	This waste would predominantly consist of plastic sheeting, shrink-wrap, wooden pallets, metal strips (binding). Segregate each waste stream into colour-coded skips, contain to prevent wind-blown transfer (e.g. to the Haven) and remove off-site to an appropriate local facility for recycling. Opportunities should be explored for supplier packaging take back schemes.
	Mess waste (comprising of food waste but also mixed waste)	Medium	Medium	Medium	50%	Likely to comprise food waste and non-recyclable materials. Consideration should be given for providing separate bins for the collection of food waste, newspapers and non-recyclable materials. Food waste can be sent to an in-vessel composting facility, whilst non-recyclable (residual) waste would require landfilling. Another opportunity to be explored is to send the non-recyclable waste to an energy-from-waste facility.
	Office waste (comprising of paper, cardboard, plastics and non-recyclable mixed	Medium	Medium	Medium	50%	Likely to comprise paper, cardboard, metal cans and plastic bottles. All materials can be recycled. Offices should be equipped with bins to segregate each waste stream for collection and future recycling off-site. Consideration should be given for the use of a local material recycling facility, which would recover those waste streams for onward recycling.

Activity	Anticipated waste stream	Anticipated volume	Recovery potential	Overall priority for recovery	Indicative recovery target	Management options
	waste)					
	Welfare facilities waste (sewage sludge)	Medium	Low	Low	0%	Limited options to recover waste arising from on-site welfare facilities. Sewage sludge from the toilet facilities would be pumped out and sent to an appropriately licensed treatment plant. Other wastes such as paper towels, etc. are likely to require landfilling.

Source: Mott MacDonald 2016

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3 Waste management

3.1 Waste segregation

It is essential that all construction related activities are carried out closely with the waste management contractors, in order to determine the best techniques for managing waste and ensure a high level of recovery of materials for recycling.

A specific area shall be laid out and labelled to facilitate the separation of materials, where possible, for potential recycling, salvage, reuse and return. Stockpiling areas for, for example green wastes, soils for re-use would be clearly identified and managed, including covering or dampening down to control wind-blown dust, seeds, etc.

Recycling and waste bins are to be kept clean and clearly marked in order to avoid contamination of materials. Skips for segregation of waste identified currently are:

- Mixed inert (e.g. concrete and rubble);
- Plastics (sheet, offcuts, containers, etc. for recycling);
- Green (e.g. mature trees, shrubs, grass);
- Hazardous (e.g. asbestos, Poly Chlorinated Bi-phenols – all hazardous materials to be stored appropriately, separately if required);
- Mixed non-hazardous (biodegradable waste, welfare waste, general waste);
- Metal (e.g. copper and iron);
- Wood (e.g. fencing/hoarding);
- Food (canteen waste);
- Paper and cardboard (office waste);
- Used aerosol cans to be stored separately; and
- WEEE: Waste Electronic and Electrical Equipment (e.g. cables, lighting).

Management of drainage and spills from all waste storage areas would need to be addressed. Successful recycling relies upon early planning, educating teams, clear responsibility and space within a compound for segregation and storage. Shelter may be needed to prevent some materials such as cardboard and paper from deteriorating while being sorted or awaiting collection.

Discussions would be required between the Employer and the Principal Contractor to identify space requirements within the compound to accommodate skips and storage of reusable materials.

For all waste management options on the site compound, consideration would need to be given for identifying whether waste exemptions or permits are required to enable the storage and treatment of waste materials.

Waste management options would be supported by the identification of appropriately permitted waste management and recycling facilities in close proximity to the site compound.

3.2 Colour-coded skips

Skips should be placed on an impermeable hard-standing base. Skips should be covered, in good condition and regularly removed to ensure no waste is blown around or accessible by the public. Different coloured skips should be used (with sufficiently clear labelling, including appropriate EU waste codes) to ensure that construction workers are clear about where to put each type of waste. This reduces the levels of contamination in the skips and increases the likelihood that a load would not subsequently be rejected once the waste stream has been sent off-site for reprocessing. In cases where the load is rejected, the likely destination would be landfill (which would increase the costs of the Project).

3.3 Contaminated land

The cost of hazardous waste treatment and disposal is significantly higher than treatment or disposal of non-hazardous or inert waste. Through identifying areas of contamination early on, the Project layout and construction methods to be adopted could be amended to minimise the handling of such materials, potentially reducing the Project costs. A contaminated land site investigation needs to be carried out to identify any areas that could potentially comprise of contaminated soils and gravels. Any soils unsuitable for reuse and destined for landfill would be subject to a WAC (Waste Acceptance Criteria) test to determine the type of landfill.

3.4 Reuse of construction materials

Uncontaminated material would be reused where possible within the proposed improvement works for site levelling and fill. It is likely that there would be a requirement for importation of additional bulk fill materials for the Project.

Any contaminated materials, which would not be re-used on-site, would be treated in accordance with all relevant legislation and best practice guidelines or at an alternative suitable site prior to disposal.

If applicable, surplus inert excavated materials with some engineering strength (e.g. stone, bricks, clay, rubble, rock) can be suitable for reuse in land reclamation projects, if one were proceeding at the same time as the proposed scheme. This would require compliance with the criteria and thresholds for an exemption (U1 or U11 may be applicable) or it may require a permit under the Environmental Permitting Regulations 2010 as amended.

The CL:AIRE Code of Practice (CoP) may also be applicable for the reuse of this material. The material could be reused in other phases of the Project or other schemes in the surrounding area, if one were proceeding at the same time, to avoid disposal at landfill and its associated impacts and costs, but would need to meet current legislative requirements.

3.5 Waste disposal characterisation

Under the Landfill (England and Wales) Regulations 2002 (as amended), waste is classified as Inert, Non-Hazardous and Hazardous. In order to determine the suitability of the landfill for the waste material being sent to it a WAC test would be required.

Hazardous waste cannot be re-used on site and may require additional treatment prior to disposal. There is a statutory requirement under the Landfill Directive (1999/31/EC as amended) to pre-treat any waste (including hazardous waste) prior to disposal off-site. Pre-treatment may reduce the cost of disposal by rendering the waste non-hazardous. Responsibility for the basic classification of waste rests with the Producer and Landfill Operator.

3.6 Forecasting and planning the reduction, reuse and recycling of waste

This section details expected waste arisings from the Boston Barrier.

Table 3.1 and Table 3.2 details that waste expected to arise from both the enabling/demolition and construction works (respectively) and segregates the approximate amounts of waste into different waste streams. The overall aim is to prevent cross-contamination of waste types and to maximise reuse and recycling opportunities.

Material quantities are an approximate guide for efficient waste management best practice; the contractor should independently verify the quantities of waste materials likely to be produced during the works. Waste quantities specified within the SWMP are also subject to programme and design change.

It should be noted that at this stage, limited information is held regarding the Project and the likely construction activities. The information in this SWMP is based on publicly available data and professional judgement relating to predicted construction and operational effects.

This section should be completed once quantities of waste materials across the whole Project along with a greater understanding of the foundation depths have been quantified.

Table 3.1: Forecasted waste types and quantities during the enabling works

Type	Materials	Forecast Estimated Quantities (m3)	Trade Contractor Package	Waste Minimisation Opportunities	On-site Reuse/ recycling	Off-site reuse/ recycling	Recovery	Disposal
Inert	Unacceptable (U1 or U2) excavated material	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Concrete	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Rubble	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Soils (e.g. topsoil/ natural)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
Non-hazardous	Soils (moderate contamination-suitable for reuse onsite)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Bricks and Blocks	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Green waste/ vegetation	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Mixed waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Metal (inc. lighting columns)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Timber	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Plasterboard	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Packaging	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Glass		TBC	TBC	TBC	TBC	TBC	TBC
	Food waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Sanitary waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Office waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Other	TBC	TBC	TBC	TBC	TBC	TBC	TBC
Hazardous	Contaminated soil – unsuitable for reuse	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Paints and chemicals e.g. paint tins, line markers, mastic	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Other (e.g. used aerosol cans)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
TOTAL								

Table 3.1: Forecasted waste types and quantities during the construction works

Type	Materials	Forecast Estimated Quantities (m3)	Trade Contractor Package	Waste Minimisation Opportunities	On-site Reuse/ recycling	Off-site reuse/ recycling	Recovery	Disposal
Inert	Unacceptable excavated material	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Concrete	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Rubble	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Soils (e.g. topsoil/ natural)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
Non-hazardous	Soils (moderate contamination-suitable for reuse onsite)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Bricks and Blocks	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Green waste/ vegetation	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Mixed waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Metal (inc. lighting columns)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Timber	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Plasterboard	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Packaging	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Glass	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Food waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Sanitary waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Office waste	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Other	TBC	TBC	TBC	TBC	TBC	TBC	TBC
Hazardous	Contaminated soil – unsuitable for reuse	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Paints and Chemicals e.g. paint tins, line markers, mastic	TBC	TBC	TBC	TBC	TBC	TBC	TBC
	Other (e.g. used aerosol cans)	TBC	TBC	TBC	TBC	TBC	TBC	TBC
TOTAL								

3.7 Disposal and treatment options

Table 3.2 highlights a number of disposal and re-use facilities within a reasonable proximity of the site. This is a guide and the appointed waste contractor for the site should contact the Environment Agency directly to determine the most appropriate waste transfer station to handle the waste material being produced. The transfer station would then send it off for final disposal at an appropriate landfill site.

The Landfill (England and Wales) Regulations 2002 require that disposal sites are classified into one of three categories dependent on the chemical composition of the material; these are hazardous, non-hazardous and inert. Prior to disposal, if material does not meet the hazardous landfill WAC criteria it must be treated.

For excavated soils, where soil testing and analysis has determined that the soil does not contain elevated concentrations of contaminants in accordance with comparison against human health screening values such as the EA Soil Guideline Values (SGVs) then there are a number of reuse and recycling opportunities. The SGVs assess the risk to human health in relation to residential (with and without home grown produce) and commercial end use. The excavated soils may then be suitable for use as infill, bunding and landscaping (as long as the soil contamination testing does not exceed the residential SGVs) on the site.

Further uses for excavated materials could be for construction or maintenance of pavements, footings for fencing etc. Material produced could also be used in the laying of roads around the site or stored for later use, providing there are adequate storage areas and the material is adequately managed to minimise dust and run off.

Table 3.2: Lincolnshire potential disposal and re-use sites

Site Name	Suitability	Additional Notes
Brauncewell Quarry	Active site	Inert
Harmston Quarry	Active site	
South Witham Quarry (East)	Active site	
Colsterworth Landfill	Active site	
Kirkby on Bain Landfill	Active site	Disposal only.
Whisby Quarry	Active site	Not currently receiving wastes.
South Thorestby Quarry	Active site	Recycling of soils and clean clays.
Creeton Quarry	Active site	CL:AIRE protocol, clean soil placement.
Longwood Quarry	Active site	Clean wastes recycling.
South Witham (West)	Active site	Clean soils only.
West Deeping Quarry	Proposal	Not yet implemented.
Boston Landfill	In Closure	Potential use for restoration.
Middlemarsh Landfill	In Closure	Potential use for restoration.

Source: LCC Consultation and Mineral Plans (Waste Needs Assessment), July 2014[4]

3.8 Waste controls and handling

3.8.1 Duty of care compliance

One aim of the SWMP is to reduce the levels of fly-tipping generated from construction projects.

One requirement is to incorporate an auditable system that identifies:

- The person responsible for removing the waste from site; and
- Keeping copies of all duty of care documentation (waste transfer notes and hazardous waste consignment notes).

All reputable waste contractors would have systems in place to ensure that all the duty of care requirements are met prior to the waste being collected.

Various information sources are available to enable the Principal Contractor to identify local waste management facilities for both recycling, recovery and disposal.

3.8.2 Responsibility for waste management

Table 3.3 identifies the typical primary waste streams that would arise from the activities at the site and whose responsibility it is to control and monitor the amounts of waste produced.

[4] NB. The ability for materials to be deposited at these sites will be dependent on the availability of void space, capacity and the conditions imposed on the sites through the relevant licence/permit. This list is not exhaustive and there may be other facilities in the vicinity of the site that can be used

Table 3.3: Waste management responsibility

Site Activity/ Sub-contractor Work Package	Primary Waste Stream	Who is responsible for waste management
Demolition and site clearance	TBC	TBC
Groundworks	TBC	TBC
Foundations, Piling	TBC	TBC
Structure	TBC	TBC
Brick & Blockwork	TBC	TBC
Mechanical Electrical	TBC	TBC
Trades - (Joinery, Painting, Plastering, Rendering, Plumbing, Heating etc.)	TBC	TBC
Removal of Site Offices, Temporary Works & Final Clear Away	TBC	TBC

3.8.3 Site security

Both Employer and Principal Contractor would take reasonable steps to ensure site security measures are in place to prevent illegal disposal of waste at the site.

4 SWMP implementation

4.1 Register of waste carrier licences and permits

Table 4.1 below gives information on the waste management contractors, their waste management licenses, waste carrier licenses and exempt site licenses that have been checked and verified for use on this Project.

The Landfill (England and Wales) Regulations 2002 also require that waste is described by European Waste Catalogue (EWC) codes on Transfer Notes required under the Duty of Care Regulations. The EWC categorises wastes into 20 main groups and approximately 900 codes. The EWC also identifies hazardous wastes, and these are dealt with by the Hazardous Waste Regulations.

Table 4.1: Waste carrier licences and Environmental Permit

EWC Waste description*	EWC5	Origin	Waste carrier			Disposal site	
			Name	Licence number	Expiry date	Name	Licence number/ exemption ref.
Concrete	17 01 01	From excavation of made ground known to be uncontaminated	TBC	TBC	TBC	TBC	TBC
Bricks	17 01 02	From demolished pavements	TBC	TBC	TBC	TBC	TBC
Mixtures of concrete, bricks, tiles and ceramics other than those in 17 01 06	17 01 07	From excavation of made ground known to be uncontaminated and separation of material is not possible	TBC	TBC	TBC	TBC	TBC
Wood	17 02 01	From construction/ demolition of defence structures	TBC	TBC	TBC	TBC	TBC
Bituminous mixtures containing coal tar	17 03 01* (M)[6]	From excavation of Made Ground and potential historical contamination	TBC	TBC	TBC	TBC	TBC
Bituminous mixtures other than those in 17 03 01*	17 03 02	From excavation of Made Ground known to be uncontaminated	TBC	TBC	TBC	TBC	TBC
Mixed Metal	17 04 07	Removal of barriers and lighting columns	TBC	TBC	TBC	TBC	TBC
Soils and stones	17 05 04	From excavation of Made Ground	TBC	TBC	TBC	TBC	TBC
Soils and stones other than those in 17 05 03*	17 05 04	From excavation of Made Ground known to be uncontaminated	TBC	TBC	TBC	TBC	TBC

5 EWC code categorised from the Lists of Wastes pursuant to Article 1(a) of Directive 75/442/EEC on waste and Article 1 (4) of Directive 91/689/EEC on hazardous wastes

6 (M) mirror entry – Hazardous only if dangerous substances are present above threshold concentrations (coloured blue) (A) Absolute entry – Hazardous waste regardless of any threshold concentration (coloured red)

EWC Waste description*	EWC5	Origin	Waste carrier			Disposal site	
			Name	Licence number	Expiry date	Name	Licence number/ exemption ref.
Other construction and demolition waste (including mixed wastes) containing dangerous substances	17 09 03* (M)	From excavation of Made Ground known to be contaminated	TBC	TBC	TBC	TBC	TBC
Mixed construction & demolition waste	17 09 04	From excavation of Made Ground known to be uncontaminated	TBC	TBC	TBC	TBC	TBC
Paper and cardboard	20 01 01	Packaging materials	TBC	TBC	TBC	TBC	TBC
Plastics	20 01 39	Packaging materials e.g. pallet wrap	TBC	TBC	TBC	TBC	TBC
Wood	20 01 38	Packaging materials e.g. pallets	TBC	TBC	TBC	TBC	TBC
Biodegradable kitchen and canteen waste	20 01 08	From canteen and mess rooms	TBC	TBC	TBC	TBC	TBC
Mixed municipal waste	20 03 01	General site waste	TBC	TBC	TBC	TBC	TBC
Septic tank sludge	20 03 04	Welfare facilities	TBC	TBC	TBC	TBC	TBC
Other, as applicable							
Other, as applicable							
Other, as applicable							

*This is not an exhaustive list and may be required to be extended to include wastes not mentioned that are produced on site.

4.2 Training and communication

The intention is to develop a culture of promoting best practice and increasing knowledge and awareness through education on waste management issues at the site and to maximise the opportunities available for the management of waste in an appropriate (and compliant) manner.

The waste management plan as well as the procedures to be followed would be given to all contractors and subcontractors at site induction and key measures reinforced through the use of ”toolbox” talks. “Toolbox” talks would be carried out every month on waste issues and all subcontractors should be expected to attend. It is hoped that these values can be transferred from this site to the next, promoting adoption of sustainable waste management practices on a wider scale.

This decision would ultimately need to be made between discussions between the Employer and Principal Contractor.

4.3 Monitoring and waste records

The Principal Contractor would receive a waste transfer note (or consignment note if the waste is hazardous) from the waste disposal company showing the exact amount of waste materials removed from site. This sheet also identifies how much material went to landfill and how much went for recycling.

Whenever waste is removed from the site, the Principal Contractor must record the actions in Table 4.2 to ensure compliance with the Duty of Care requirements, which includes documenting the name of the company removing the waste and details of the site where the waste is being transferred to for each waste type.

All skips need to be monitored to ensure that cross-contamination of segregated skips does not occur. The “toolbox” talks shall focus on how the waste management system is working and identify the extra costs associated with contamination.

The principal contractor shall continually review the type of surplus materials being produced and change the site set up to maximise on site reuse or recycling; landfill should be the last option.

This plan should be included as an agenda item at the weekly construction meetings. In addition, the plan would be communicated to the whole team (including the Employer) at the monthly meetings. This shall include any updates from the last version.

Table 4.2: Record of waste removed from site to ensure Duty of Care compliance

Date removed	Waste type	Identity of the person removing the waste	Site the waste is being taken to and whether licensed or exempt	Waste carrier and registration number*	Confirmation of delivery*	Waste management route (reuse on/offsite, recycled on/offsite, recovery, landfill, other
TBC	TBC	TBC	TBC	TBC	TBC	TBC

4.4 SWMP implementation checklist

Table 4.3 is a checklist, which is to be filled out by the principal contractor to ensure the SWMP is fully implemented from the outset of the Project. Further actions required to accompany the checklist should be identified in Table 4.4.

Table 4.3: SWMP checklist

Checks (please tick)	Y	N
Have terms and commercial rates been agreed with the waste management contractor(s)?		
Have data reporting procedures been agreed with waste management contractor(s)?		
For offsite waste management or disposal- Are all the waste destination details correct?		
Has a waste segregation/ collection area been prepared?		
Has the waste management area been adequately sign posted?		
Has the SWMP planning meeting been set?		
Has the waste management document control/ filing system been set up?		
Have all necessary staff and contractors read and signed the SWMP?		
Have all the SWMP training/ briefing requirements for staff been met?		
Have all the SWMP training/ briefing requirements for contractor(s) been met?		
Have all the waste management targets been set?		
Has the SWMP been approved by the Project Manager?		
Has the SWMP been finalised?		

Table 4.4: Further actions required

Comments/ Further Actions:
1. Excavated material to be tested for contamination prior to reuse and/or disposal
2. Waste Contractor to be assigned
3. Storage areas for waste to be decided upon
4. Frequency of waste removal from the site to external storage areas or waste transfer station to be decided upon
5. TBC
6. TBC

4.5 Updating the SWMP

The plan must be updated as often as necessary, to accurately record information on progress, or at least every six months if there is little change during the Project.

Updates to the plan would give a current picture of how work is progressing against the waste estimates contained in the plan. Therefore, for waste that is re-used or recycled on site, the SWMP should be updated to describe how much of the estimated volume or tonnage has been processed. For waste that is removed from the site the SWMP must be updated to record the

identity of the person removing the waste, the type (and quantity) of waste and the site to which it has been taken.

Whenever waste is removed from the site, the principal contractor must record the actions in Table 4.2 above. Revisions of the SWMP are recorded in Table 4.5.

Table 4.5: SWMP revisions

Nature of revision	Date of revision	Author of revision
[waste records updated]	TBC	TBC

The latest version of the SWMP would be kept in the site office and be available for viewing by the Environment Agency or other interested parties.

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5 SWMP review and audit

5.1 Post-construction review

This section of the SWMP is a post construction review and is designed to ensure the SWMP is monitored throughout the lifetime of the Project and then signed off at its closure (see Table 5.1). The aim is to:

- highlight the benefits of completing a SWMP; and
- identify the amounts of waste reduction and resource efficiency achieved.

This is achieved by adhering to the principles outlined at the beginning of the SWMP, in addition to realising the cost benefits associated with the SWMP if it has been carried out correctly.

At the end to the Project, both the Employer and Principal Contractor are responsible for reviewing, revising and refining the SWMP as necessary within three months of completion to identify if lessons could be learned for the next time a similar Project is undertaken. This review would identify and conclude the following:

- Confirmation that the SWMP has been monitored and updated within the defined timescales;
- An explanation of any deviation from the original plan;
- A comparison of the estimated quantities of each waste type against the actual quantities generated;
- An action plan to address the lessons that have been learnt from the Project that could be implemented for the next Project; and
- An estimation of the cost savings (if any) that have been achieved through the measures undertaken to minimise, reuse, recycle or recover waste arisings rather than just sending it to landfill.

Table 5.1: Post construction review declaration

This plan has been monitored on a regular basis to ensure that work is progressing according to the plan and has been updated to record details of the actual waste management actions and waste transfers that have taken place.		
Signatures	Employer	Principal Contractor
Date		

5.2 Estimate of cost savings

[Enter text here]

5.3 Relevant signatures

Table 5.2: Relevant signatories to the SWMP

Principal Contractor:	Date:
Employer:	Date:
SWMP Author:	Date:

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