Hillingdon Water Sports Facility and Activity Centre - Broadwater Lake

Circular Economy Statement

November 2023

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Revision	*Initial*	*Rev A*	*Rev B*	*Rev C*
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1. Executive Summary

Syntegra Consulting Ltd has been commissioned to undertake the Circular Economy Statement for **Hillingdon Water Sports Facility and Activity Centre (HWSFAC), Broadwater Lake.** This Circular Economy Strategy reviews the approaches and aspirations for the proposed scheme in accordance with City of London planning requirements and as derived from local policy, the proposed developments will be expected to meet the criteria of the 'Circular Economy Statement Guidance, March 2022'

Consideration has been given to the most appropriate Circular Economy strategic approaches based on the nature and predicted lifespan of the development.
Attention has been given to the planning policy and other requirements and a number of specific goals are proposed for the development. Key commitments include:

- 5% limit on site reuse in original waste to landfill.
- 95% reuse/recycling/recovery of non-contaminated construction waste reused or recycled onsite or offsite.
- 95% reuse/recycling/recovery of non-contaminated demolition waste reused or recycled onsite or offsite.
- <5% non-hazardous demolition waste to landfill.
- Achieve the Recycled Content Targets as per the Bill of Materials via the whole-life cycle carbon assessment
- Reduce site water consumption intensity (m3/100m2) / Reduce the carbon intensity of our site operations (CO2e/100m2) / Reduce the energy intensity of our site operations (kWh/100m2)
- Designing for reusability /recoverability /longevity /adaptability /flexibility will be considered on a layer-by-layer basis
- At least 65% municipal waste to be reused, recycled or composted by 2030
- Max. 25% of no recyclable or compostable waste either sent to landfill or to energy recovery centres.
- Overall, the design for the scheme will account for the overarching values of the Circular Economy including conserving resources, designing to eliminate waste and managing waste sustainably.

2. Introduction

This Circular Economy Statement has been prepared by Syntegra Consulting. The purpose of this statement is to demonstrate that the proposed development at for Hillingdon Water Sports Facility and Activity Centre has considered circular economy principles to:

- minimise embodied carbon.
- operate with a circular economy.
- maximising the value extracted from materials; and,
- prioritising the reuse and recycling of materials.

The aim of circular economy is to create buildings that are high quality, flexible and pay attention to the building lifespan, through appropriate construction methods and the use of appealing, robust materials which will withstand the changing climate with a long material life.

Furthermore, with the core intent to improve resource efficiency to keep products and materials at their highest value for as long as possible and promote waste avoidance and minimisation.

2.1 Proposed Development

Full planning permission is sought for the following development:

"Redevelopment of the site to create the Hillingdon Watersports Facility and Activity Centre including demolition of existing Broadwater Lake Sailing Club (BSC) clubhouse at the north of the lake and erection of a building to be occupied by HOAC and BSC including changing facilities, meeting rooms, storage, Workshop and seasonal worker accommodation (sui generis), activity shelters; installation of pontoons and concrete slipways; boat shed; equipment storage huts (north of lake and at entrance); boat parking and racking areas; camping area; outdoor activity areas; ecological enhancement throughout the site; new pedestrian routes through the peninsula; landscaping including new woodland, dense vegetation screens and boundary treatment; new access and access road; localised dredging and land reclamation; relocation of existing sailing area and creation of floating and fixed islands within the lake; coach drop off and turning area; vehicle parking; cycle parking; and associated works."

The Proposed Development comprises an outdoor activity centre which will provide a range of programs for sailing, rowing, woodland activities, camping and other water sports. The main components of the Proposed Development are as follows:

- Ecological mitigation and enhancement measures; ♣
- Demolition and relocation of the existing BSC clubhouse and associated car parking and boat parking from its existing location north of the existing lake; ♣ C
- Construction of a range of new fully accessible buildings including a two storey club house building (the 'Main Building') for use by HOAC and BSC (including changing facilities, meeting and training rooms, storage, Workshop and seasonal worker accommodation), seven activity shelters, a boat shed/ storage and Workshop/ sports stores;
- Three lake pontoons and two concrete slipways;

- Boat parking and racking areas;
- Localised dredging of the lake to create depths suitable for sailing and generate material to be re-used on-site, Partial land reclamation within the lake using dredged material to create a suitable platform for development on the peninsula;
- Removal of two islands and creation of new floating and fixed islands within the lake;
- Continued use of the lake for sailing and water based activities
- Facilities for outdoor activities including pedal karting, caving, archery, high level ropes, low level ropes, zip lines, big swing, general activities area, pond dipping and camping
- Staff car parking, cycle parking, coach drop off and turning area;
- Improvements to the existing unnamed access road to Broadwater Lake from the south; and

Landscaping including new woodland, dense vegetation screens and boundary treatment.

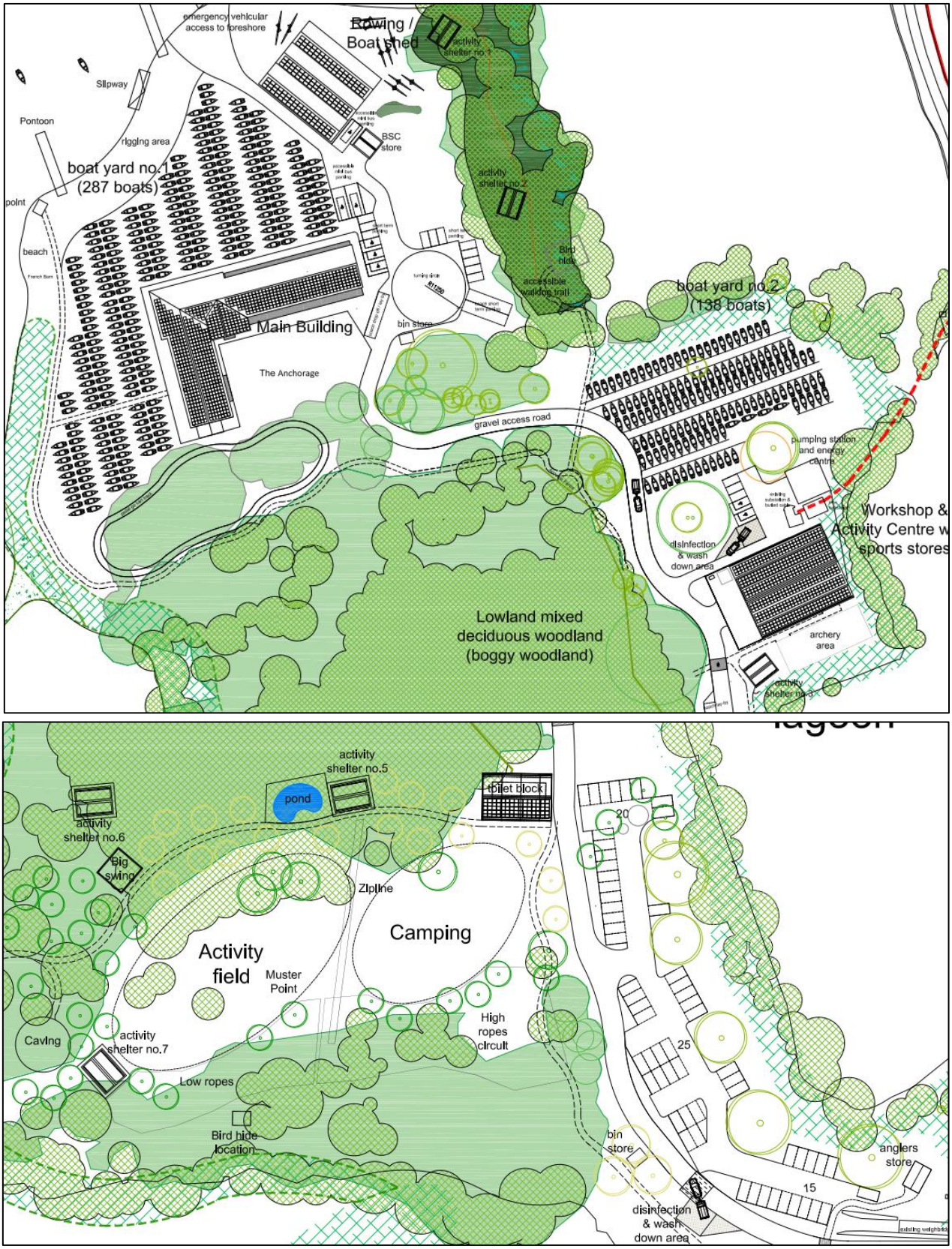

Figure 2.1: Site Masterplan Layouts

2.2 London Plan 2021

Policy SI2 Minimising greenhouse gas emissions

A) Major development should be net zero-carbon. This means reducing greenhouse emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1. be lean: use less energy and manage demand during operation.
2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly.
3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.
4. be seen monitor, verify and report energy performance.

B) Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C) A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

1. through a cash in lieu contribution to the borough's carbon offset fund, or
2. off-site provided that an alternative proposal is identified, and delivery is certain.

D) Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E) Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

F) Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Policy SI7 Reducing Waste and supporting the Circular Economy

Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

Section A:

- Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible.
- Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products.
- Ensure that there is zero biodegradable or recyclable waste to landfill by 2026.

- Meet or exceed the municipal waste recycling target of 65 per cent by 2030.
- Meet or exceed the targets for each of the following waste and material streams:
    - Construction and demolition – 95 per cent reuse/recycling/recovery
    - Excavation – 95 per cent beneficial use
- Design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

Section B:

Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

1. How all materials arising from demolition and remediation works will be re-used and/or recycled.
2. How the proposal's design and construction will reduce material demands and enable building materials, components, and products to be disassembled and re-used at the end of their useful life.
3. Opportunities for managing as much waste as possible on site.
4. Adequate and easily accessible storage space and collection systems to support recycling and re-use.
5. How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy.
6. How performance will be monitored and reported.

3. Circular Economy Principles

The implementation of Circular Economy principles has been fronted by a need for a fundamental shift in the way resources are consumed.

There are three types of economies involved, a circular economy keeps products and materials circulating through the system for as long as possible, through recycling, re- use, `refurbishment and remanufacturing.

Previously the system was a linear economy (take, make, dispose) which leads to resource management inefficiencies in the system.

It is imperative that there is a transition from linear to circular economies. As 60% of total UK waste is generated from construction, demolition, and excavation (Defra and Government Statistical Service, 2019)

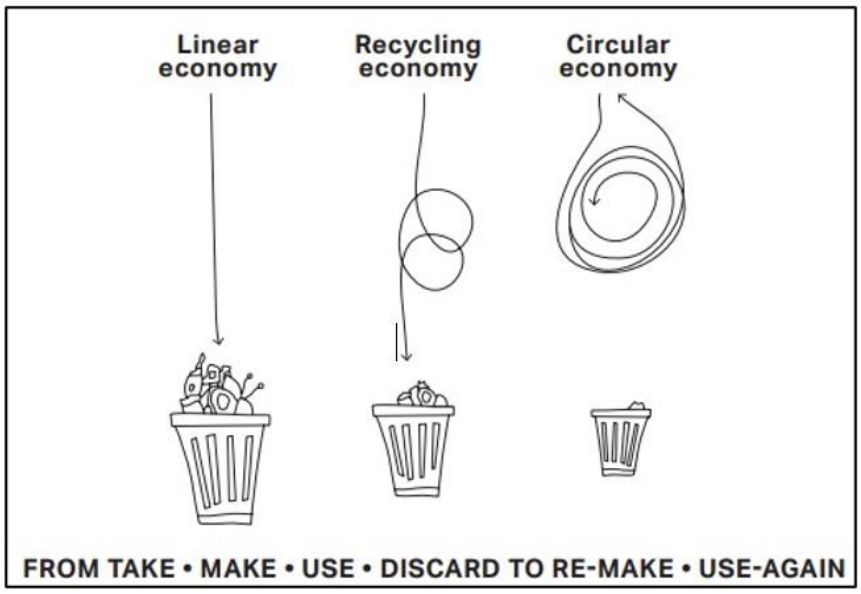

Figure 3.1: Linear, Recycling and Circular Economies (GLA, 2019)

To reduce the volume of waste that London produces and must manage; implementation of circular economy principles can make a significant impact. An effective method of achieving this will be through incorporating circular economy principles into the design of developments, these principals are as follows:

- Building in layers – Ensuring that different parts of the building are accessible and can be maintained and replaced where necessary. To support reuse and recycling, the different layers should be independent, accessible and removable whilst maintaining their value, where possible. This is especially important for layers that may need more frequent replacement, such as building services and internal fit-outs. CE design approaches will be applicable to each layer depending on its function and expected lifespan
- Designing out waste – Ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials

- Designing for longevity. Is designing to avoid a premature end of life for all components through considering maintenance and durability.
- Designing for adaptability or flexibility. A building that has been designed with thought of how it might be easily altered to prolong its life, for instance by alteration, addition, or contraction, to suit new uses or patterns of use. Often used interchangeably with flexibility; however, it relates more to building structural changes. And a building that has been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants. Often relates to floorplates rather than structural changes
- Designing for disassembly. Is designed to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component
- Using systems, elements or materials that can be reused and recycled. Is designing so they can be deconstructed and reconstructed to allow components and materials to be salvaged for reuse or recycling, whilst maintaining their economic and environmental value.

The design team will consider the Waste Hierarchy, to optimise reuse, recycling, and recovery opportunities for the purpose of minimising waste as far as possible. For the following development stages:

- Existing site
- New Development
- Development in Use
- End of life

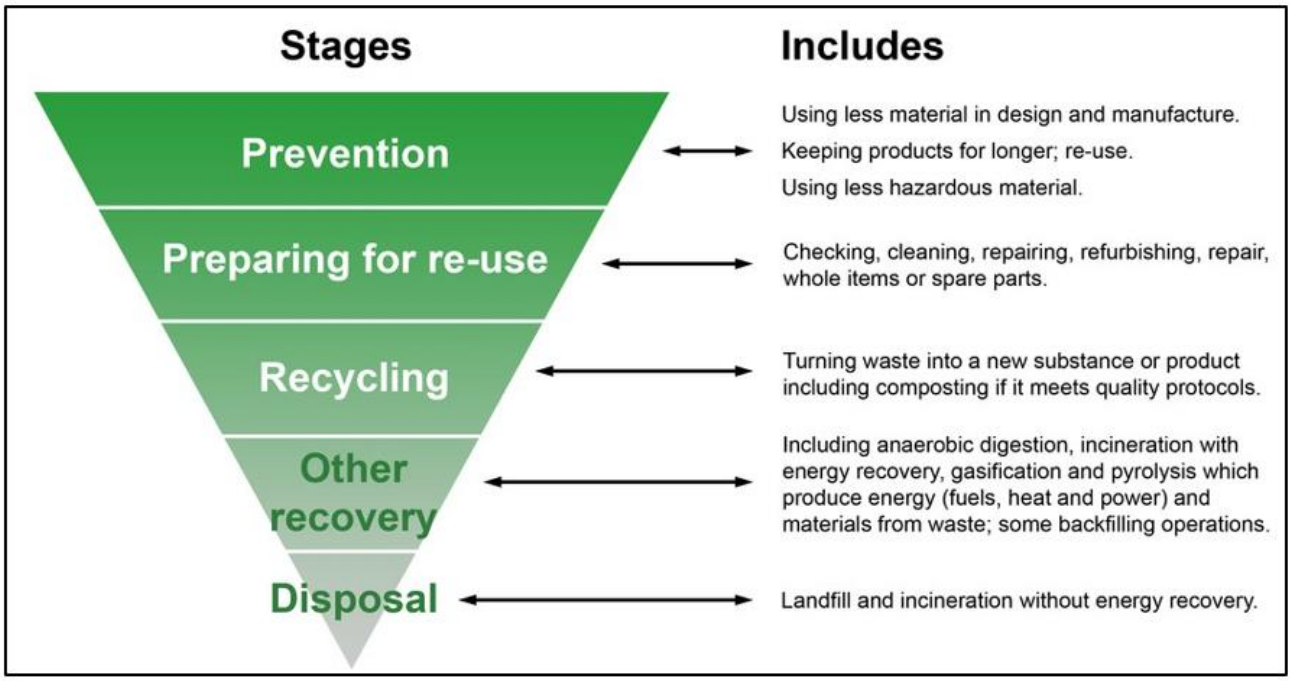

Figure 3.2: The Waste Hierarchy, Defra 2011

4. Strategic Approach

In order to apply circular economy principles most effectively, consideration of high-level strategic opportunities as early in the development process as possible is most beneficial.

This section aims to identify the high-level strategy and approaches to the circular economy. Relevant policy requirements are referenced in order to identify which supporting information is required to facilitate circularity economy.

Table 4.1, below, demonstrates the different options for a development's circular economy strategy. A combination of the most appropriate methods will be applied and will be the starting point for each project target, supplying the foundation for the development of the overall Circular Economy Strategic Approach for this project. As desired by any circular economy statement, the primary option used was a retention and refurbishment strategy. This is demonstrated in Table 4.2.

Steering Approach Options	Descriptions
Demolish and recycle	Traditional demolition, with elements and materials converted into new elements and materials and objects for use on the site or on another site nearby.
Design approaches for existing structures	
Retain and retrofit	The vast majority of the building's fabric is retained, with the building refurbished for the same or new uses through restoring, refinishing and future-proofing. This also encompasses retrofitting, where new technology or features are added to existing buildings to make them more efficient and to reduce their environmental impacts.
Partial retention and refurbishment	Significant quantities of carbon-heavy aspects of the building are retained in place, such as the floors and substructure, with replacement of some elements of the building, such as walls or roofing. More significant refurbishment can involve adding floors or extensions
Disassemble and reuse	Disassemble sections of a building and enable their direct reuse ideally on the site or, where this is not possible, off site (with nearby sites preferred). This approach also includes careful selective deconstruction of the building and material types i.e. taking apart each layer and material type as much as possible, minimising damage to parts and maintaining their value, and then reusing those elements and materials. If reuse is not possible, materials may be carefully and selectively separated for processing and recycling into new elements, materials and objects

Demolish and recycle	Traditional demolition, with elements and materials converted into new elements and materials and objects for use on the site or on another site nearby.
CE design approaches for new buildings	
Building relocation	Designing to allow the whole building to be used on a different site, either by moving as a whole or disassembling into large modules.
Component or material reuse	The use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose. Materials can be reused as a whole; redeployed as modules; or reused as a kit of parts on one or more different sites.
Adaptability	A building that has been designed with thought of how it might be easily altered to prolong its life, for instance by alteration, addition, or contraction, to suit new uses or patterns of use. Often used interchangeably with flexibility; however, it relates more to building structural changes.
Flexibility	A building that has been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants. Often relates to floorplates rather than structural changes
Replaceability	Designing to facilitate easy removal and upgrade, and ideally to be reused, remanufactured or recycled on a part-by-part basis.
Disassembly	Designed to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component.
Longevity	Designing to avoid a premature end of life for all components through considering maintenance and durability.

Table 4.1: Circular Economy Strategic Approach Options

Location	Steering Approach	Supporting Narrative	Explanation - London Plan Policy incl.
Circular economy approach for the existing site & Circular economy approach for the new development - Existing building retained New build when removing 7/8 and building 9/10	Component or material reuse	Preparation will be made for the new materials for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose. Materials will be selected with a priority to be reused as a whole at EOL; redeployed as modules; or reused as a kit of parts on one or more different sites. Building materials chosen in new build are highly recyclable. See WLCA end of life scenarios. At the buildings EOL the concrete in the floor slabs and foundations can be crushed, screened, and graded for suitable re-use in various applications such as fill materials, backfilling to retaining structures etc. In addition, the façade will be reviewed with regard to extracting materials at end of life for recycling and reuse, in particular, any metal componentry or sheets. Steelwork can be recycled at the end of its life and reused in other buildings. Formwork is anticipated to be reused for different structures. Construction techniques implemented to maximise demount-ability and reuse. Re-used or recycled material to be chosen, achieving at least 20% of material by value of material An end of life deconstruction plan will be completed at a later stage of design when material information is more advanced and will plan for the end of life of the building including checking, cleaning or repairing materials so that they can be used again for their original purpose offsite.	Policy SI7 B1: “How all materials arising from demolition and remediation works will be re-used and/or recycled” Maximise reuse of existing material components on-site or off-site. Maximise recycling, without downcycling, where possible. As part of the tendering process, demolition contractors will be required to demonstrate how they plan to remove waste. Facilitate maximum reuse and recycling at end-of-life through material identification and disassembly features. Knowledge of material composition can enhance future use. Selection of recyclable materials reduces future waste. Facilitating disassembly enables reuse and reduces maintenance.
	Adaptability	The small buildings are not a bespoke design, so that it can be adaptable to tenants needs as they evolve over time. This makes the space adaptable to future tenants or future change of tenants and use. Major refurbishment for this building is considered feasible. All finishes as well as any equipment used could be removed since no permanent equipment is installed. Extra space has been provided for future changes in plant. Specification of services to allow for future expansion e.g. facilities for additional connections on distribution boards. The open Activity Shelter is open elements with only 2 walls. This allows for multi options for adaption.	
	Flexibility	All the buildings been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants or change of use. Aside from the Water sports Main Building, the buildings are open plan with limited internal walls, allowing for flexibility for change of use. The Main building usable space is multi purpose open plan on the ground floor and partially multi purpose on the first floor. it is adaptable to accommodate different uses such as open-plan and cellular office layouts, or any combination thereof. The central core is regularised throughout the floors to maximise overall building efficiencies. The accommodation rooms and toilet cubicles allow can have a change of use or internal wall re-arrangement to suite a change of use. It seems structural infeasible to adding many more floors without conducting additional modification of existing superstructure/ substructure. If the building were extended over the central portion (inboard of the sloped façade) then it may be possible that another floor could be added without needing to strengthen. Further redundancy for future height increase has not been considered as this add possibly redundant embodied carbon into the project. Due to the location, the main options for flexibility in the building use is a change of use to serve a different facility of the same Water Sports Centre.	
	Replaceability	Materials such as plasterboards, furniture, lighting, floor finishes (e.g. carpets, etc.) with a planned short life span will be prioritised to be selected with manufacturers with take back schemes or that are procured through a service agreement. The layered design of the building has ensured that it enables independent layers to be upgraded and replaced. The plant replacement strategy is such that normal periodic plant maintenance activities and minor equipment replacement can be carried out using normal access routes such as the lifts and staircases.	

	Disassembly	An end-of-life deconstruction plan will be developed to address this strategy directly and in depth. A disassembly guide will be developed to address techniques for prolonging the life of the building and reducing operational construction, demolition and excavation waste. Disassembly is facilitated with the access space in the building to replace components. Layer independence design will be adopted which helps with removal, adjustment or replacement of some elements Numbers of fasteners and connectors will be minimized to increase speed of disassembly. Joints and connectors will be designed to withstand repeated assembly and disassembly to allow for adaptation and for the connectors to be reused. Other measures to maximize disassembly include: Carpet tiles Material choice avoids poured and welded connections which are likely to harm components and prevent disassembly. bolted connections commitment Structurally, the Main building can potentially be vertically or horizontally extended with more floors added in the future Use a standard structural grid to allow for standard sizes of recoverable materials The new workshops, sheds and shelter buildings are simple small structures with uniform shapes. This allows for repetitive constructions and thus deconstruction strategies.	
	Longevity	Longevity to be key when selection of structure and skin and, to a lesser extent, services, space and stuff (although other factors may dominate here) Structure to be designed to last >60yrs. Prioritising bolted connections over welded connections without incurring material inefficiency. See Bill of Materials for reference to lifespan of materials. Extended life materials will be selected. Materials will be selected to meet long-term needs, be robust, durable and resilient to climate change. The new construction will be designed to avoid a premature end of life for all components through considering maintenance and durability. Services designed to be efficient and long service life.	

Table 4.2: Strategic Approach and Supporting Narrative

5. Circular Economy Commitments

As the Strategic Approach section established, the starting point for developing a Circular Economy Strategy is by means of identifying the high-level aims and targets, however, this section aims to demonstrate the direct implementation of the strategy. In order to do this, a deeper and more complex understanding of the feasible and technical challenges posed by the development is required in order to capitalise on the opportunities related to the policy requirements and targets.

The following table 5.2 summarises how the six Circular Economy principles can be applied to each building "layer". The contents of the table will be refined and updated as the design progresses. The commitments listed below are only those that hold the greatest opportunities, representing the strongest commitments that go above and beyond standard practice.

Circular Economy Principles
Building In Layers
Designing Out Waste
Designing For Longevity
Designing For Adaptability Or Flexibility
Designing For Disassembly
Using Systems, Elements Or Materials That Can Be Reused And Recycled

Table 5.1: Circular Economy Principles

Circular Economy Principles	Circular Economy Commitments
Building In Layers	• Refer to Circular Economy Design Principles by Building Layer Table In CES excel
Designing Out Waste	• The whole-life cycle carbon assessment and circular economy workshop demonstrates the efficient design and has allowed for the quantity of materials to be reduced. • Efficient design and site management will allow for minimising resource use as well as imposing requirements on the main contractor and promoting efficient resource use to tenants. • Elements of the WLC Assessment and Circular Economy Report will assist the procurement team's selection of suppliers of materials. • Produce a sustainable procurement plan • Source materials locally • Existing items such as M&E and insulation will be offered on marketplace recycling. • Refer to Operational Waste Management Plan • Refer to 'Energy Strategy Report' for energy reduction measures in use based on Be Lean, Be Clean, Be Green • Waste materials will be recycled offsite for use on different developments • Refer to WLC to see final end of life scenario for various construction materials
Designing For Longevity	• Designing for Longevity will be achieved by considering harsh environmental conditions and specifying durable materials where possible, all while balancing the Embodied Carbon effect associate. • See Bill of Materials for reference to lifespan of materials. Extended life materials will be selected. • Materials will be selected to meet long-term needs, be robust, durable and resilient to climate change. The new construction will be designed to avoid a premature end of life for all components through considering maintenance and durability.
Designing For Adaptability Or Flexibility	• This will be achieved by prioritising easily adaptable design options such as mechanical (and thus reversible) connections and designing services for future change in use.

	• Designing for reusability / recoverability / longevity / adaptability / flexibility will be considered on a layer-by layer basis. • Utilising standardised and off-site purpose made design elements. • The small buildings are not a bespoke design, so that it can be adaptable to tenants needs as they evolve over time. This makes the space adaptable to future tenants or future change of tenants and use.
Designing For Disassembly	• Develop an end-of-life deconstruction plan • This will be done by prioritising products that can be easily disassembled, mechanical fixtures, and using material passports where possible to document products designed for disassembly • Disassembly is facilitated with the access space in the building to replace components. • Layer independence design will be adopted which helps with removal, adjustment or replacement of some elements • Numbers of fasteners and connectors will be minimized to increase speed of disassembly. Joints and connectors will be designed to withstand repeated assembly and disassembly to allow for adaptation and for the connectors to be reused.
Using Systems, Elements Or Materials That Can Be Reused And Recycled	• Careful selection of materials in the early stages will allow for a high recycle rates at the end of life. • Use demolition audit to determine the existing materials and choose the re-use, recycling route for waste categories • Maximise re-use of existing materials either onsite as aggregates or offsite to recycling centres.

Table 5.1: Circular Economy Key Commitments

The Circular Economy Commitments full descriptions are provided in the accompanying CES GLA excel within the Circular Economy Design Principle Layer by Layer Table. The GLA's Key Commitments, provides confirmation of the development's proposals by means of the setting out of each approach for each building layer, in order to ensure that circular outcomes are satisfied. The table offers numerous strategies, challenges, counteractions and the "Plan for Implementation".

6. Bill of Materials

Under the guidance of the 'Circular Economy Statement Guidance, March 2022', developments are required to demonstrate consideration of opportunities to conserve resources. A 'Bill of Materials' has been produced in which this information can be presented. For a Detailed Circular Economy Statement to be compliant, a completed Bill of Material must be included, in which the following quantities can be estimated:

- Quantity of material used in each 'layer' of the building (kg)
- The material intensity (kg/m2 GIA)
- Targets for the minimum amount of recycled content to be used (% by value)

The Bill of Materials has been completed using building information provided by the design team. All figures in the table are deemed as estimates and changes are expected at post construction stage, when quantities will be finalised. At post construction stage, a comparison will be made between the design stage and the as-built Bill of Materials. The current design stage Bill of Materials provides a 'rough guide' to the recycled content targets which are the focus of the section for EoL.

The Whole Life Cycle Assessment and CES template provides the Bill of Materials and all the information for Building Weight Calculations (building load take-down) & Reused or recycled content calculations for the new construction materials and is an extract from the Whole Life Cycle Assessment.

This process allows for the identification of opportunities for the use of reused or recycled materials and the design team have set individual targets of at least 20% of material by value.

The approach behind the recycled content of new construction materials is to target percentages which will provide a 'Good' rating (WRAP Materials Tool) across the entire material list wherever feasible and meet the GLA target of 20%. The percentages chosen provided a good rating across all materials

WRAP Tool Recycled Content Grades	Definition
Standard Recycled Content	The likely level of recycled content in each specification if no request is made for recycled content
Good Recycled Content	A higher level of recycled content which is better than that for standard products but is still readily available in the marketplace at no additional cost. Although better than standard, the recycled content of these products may not necessarily be as high as current technology or market conditions allow
Best Recycled Content	Defined as the highest recycled content currently available in products on the UK market

Table 6.1: Recycled Content Guidance

7. Recycling and Waste Reporting

See Greater London Authority - Circular Economy Statement template

In order to ensure that the proposals consider any opportunities to design out waste over the duration of the development's life span and meet London Plan targets for managing waste and material streams, variables related to excavation, demolition, construction, municipal waste and industrial waste (where relevant) are presented. The accompanying Operational Waste Management Plan and Demolition Audit shows an estimate of the total amount of waste arising and indicates of how much will be reused or recycled onsite, how much will be reused or recycled offsite, and the residual waste that will be sent to landfill.

An updated version of the Waste and Recycling Reporting table shall be provided post-completion, including actual figures, indicating the differences compared to those provided during the planning stage. Confirmation of the actual destination and amount of waste and excavated material managed shall also be provided

The following section explores the opportunities and targets identified for designing out waste generation from all possible sources, as listed above.

The reporting of the final destination of all waste streams (beyond the Materials Recycling Facility) should be provided as soon as possible once a contractor has been appointed. The table of waste reporting and site waste management plan be updated with the relevant information once the contractors have been appointed.

During construction, we shall maintain records of the source of all waste arising and monitor using a waste management tool (SmartWaste). An end-of-life (and next-life) plan for the elements of the building will be provided with a calculation of the percentages of waste that can be reused or recycled at end of life.

All waste materials arising will be sorted or treated during each phase to maximise the potential for the reuse of materials on-site.

Demolition Waste

Approach

The demolition contractor would be required to undertake a pre-demolition audit to maximise the recovery of materials in line with the following waste hierarchy:

- Reuse in-situ
- Reuse on site
- Reuse off-site
- Recycling
- Other (e.g., energy) recovery
- Dispose

The audit will ensure it will implement demolition strategies, segregating materials and conducting analysis / monitoring of waste flows to maximise reuse and reclamation.

Commitments

- 95% reuse/recycling/recovery of non-contaminated demolition waste reused or recycled onsite or offsite.
- <5% non-hazardous demolition waste to landfill.

Potential Challenges

The EU waste hierarchy may not be fully adhered to.

Lack of specialist knowledge of demolition material via a demolition contractor

Ensure the Waste guidance is adhered to

Counteractions

As part of the tendering process, demolition contractors will be required to demonstrate how they plan to remove waste in line with the waste hierarchy.

Plans for Implementation

A demolition contractor will need to be appointed by the main contractor to undertake an extensive pre-demolition audit to evaluate how material recovery can be maximised in line with the hierarchy noted above.

They should also maximize opportunities to use local sites to manage materials and waste where practical. With facilities which can provide information on how the material will be used, distinguishing between uses that maintain or improve the value of a material, and uses that reduce the value of a material. Furthermore, when it is intended to send waste to landfill, the receiving landfill has the capacity to deal with the waste over the lifetime of the development.

Excavation Waste

Approach

A dedicated space for storing and segregating excavation waste will be provided on site and its location will be identified by the pre-construction manager. Permitted sites that are defined as 'landfill' by the Environment Agency can be included in the definition of 'beneficial use' will be prioritized. Otherwise, the material will be used in ways such as for landscaping or to find markets for the products produced from it.

Commitments

Maximise material recovery from the existing development in line with the EU waste hierarchy.

- <5% non-hazardous excavation waste to landfill.
- 95% beneficial use of non-contaminated excavation waste onsite or offsite.

Potential Challenges

A lack of understanding of existing materials and their quality at the pre-planning stage impacts potential reuse opportunities, such as insurance and guarantees. It can also be technically difficult to re-use or recycle this waste stream type.

Counteractions

As part of the tendering process, demolition contractors will be required to demonstrate how they plan to remove waste in line with the waste hierarchy.

SMARTWaste champion will be appointed and undertake their role

Plans for Implementation

An earthworks contractor will need to be appointed by the main contractor to undertake a pre-demolition/excavation audit to evaluate how material recovery can be maximised. As part of this exercise excavation waste could be, where applicable, used as a resource within the construction of the proposed development in accordance with the Definition of waste Code of Practice (DOWCoP).

The materials already on-site should be reviewed for their potential retention and inclusion into the proposed scheme before off-site options are considered. To maximise the potential for the reuse of materials on-site, an area for the potential processing and storing of these materials will be identified on or close to the development site by the contractor.

Construction Waste

Approach

Development of a resource management plan and undertaking material efficiency workshops. A dedicated space for storing and segregating construction waste will be provided on site and its location will be identified by the preconstruction manager. Waste not segregated on site will be processed at a material recovery facility.

Commitments

- 3.4 tonnes of on-site construction and dedicated off-site manufacture/fabrication per 100m2 of GIFA. (This also applies with the BREEAM Assessment guidance).
- 5% limit on site reuse in original waste to landfill.
- 95% reuse/recycling/recovery of non-contaminated construction waste reused or recycled onsite or offsite.

Potential Challenges

The waste hierarchy may not be fully adhered to.

Ensure the Waste guidance are adhered to.

Counteractions

The main contractor will be required to demonstrate how they plan to remove waste in line with the waste hierarchy.

A site team member will be appointed and undertake their role, recording site waste data and electing the most suitable path for reuse/recycling/recovery.

Plans For Implementation

The main contractor will be required to develop a Resource Management Plan to estimate anticipated construction waste and identify opportunities for minimising waste generation. The Resource Management Plan will also identify opportunities for maximising material recover in line with the waste hierarchy.

The main contractor will also be required to report these figures at the 'As Built' stage.

Municipal waste

Approach

The municipal waste strategy for both commercial and residential will be based on GLA required targets. As the more stringent method, GLA recommended the BS 5906:2005, Waste management in buildings - Code of practice, 2005 calculation was used to provide an estimate.

Please note that for Waste collection for the commercial units will be the responsibility of individual occupiers. Waste will be stored internally and taken away from individual units either by occupiers' vehicle fleet or by a preferred, individually contracted commercial waste operator.

Commitments

- At least 65% municipal waste to be reused, recycled or composted by 2030
- Max. 35% of non-recyclable or compostable waste either sent to landfill or to energy recovery centres.

Potential Challenges

Ensuring that the tenants within the development participate within the recycling process could be challenging.

Counteractions

Development of non-technical building user manuals and include incentives for promoting dedicated property management personnel to track and manage waste management to encourage meeting the commitments.

Plans for Implementation.

The following are the minimum waste provisions provided for the different areas of the building, meeting the minimum requirement to have least three waste streams, general waste, dry recycling and food waste/composting. Once the tenants are in occupation, any further breakdown of recyclable streams will be determined by them, and the waste plan coordinator based on the use.

Building Area	Recycling	General Waste	Food Waste
Workshop and Boat Store Offices	X2 Small bin	X2 Small bin	X2 Small bin
Main Building Accommodation	X2 Eurobins	X1 Eurobins	X1 240l Bin
Main Building (Leisure Centre)	X1 Eurobins	X1 Eurobins	X1 240l Bin

Table 7.3: Recycling and Waste Bin Size Requirements

These are deemed sufficient to meet the estimated waste totals from the Recycling and Waste Reporting Table. It also provides enough bin volume to meet the '65% municipal waste to be reused, recycled or composted by 2030' commitment.

The appointed property management team will review opportunities for encouraging tenants to minimise waste generation and maximise recycling. Clear communication with the end user will be key to facilitate recycling during operation. This will be in the form of simple-to-use non-technical building user manuals, as well dedicated property management personnel. The Building User Guides will incorporate a Municipal/Operational Waste Management Plan which will be in line with the waste hierarchy. This will be managed by a waste plan coordinator within the occupier's business who will promote the waste targets using the methods above, produce monitoring reports and progressing actions accordingly.

To ensure that the commitment for "at least 65% municipal waste to be reused, recycled or composted by 2030" will be achieved, the above waste plan coordinator measures along with the bin size allocations will be implemented.

As per the 'London Plan Section 3.3.18' and the specific guidance of 'Policy 7.2.1 Increase recycling rates to achieve a 65 per cent municipal waste recycling rate by 2030' of 'London Environment Strategy 2018'. the main dry recycling materials will be collected separately. Thus, it is intended that the following six types will be required to be collected separately:

- Paper
- Card
- Metal
- Glass
- Plastic bottles
- Mixed rigid plastics

The Building User Guides will incorporate a Municipal/Operational Waste Management Plan which will be in line with the waste hierarchy. This plan will be developed once the facilities management team have been appointed.

To ensure that the Operational Waste Management Plan is achieving its targets a monitoring report and a review of the existing Operational Waste Management Plan will be carried out annually over the five-year period by the waste plan coordinators. Where monitoring reveals problems, the monitoring process provides an opportunity to review the plan and take remedial action.

8. End of Life Strategy

The table provided by the GLA notes how each building layer will be designed so as to facilitate best practise circularity, as appropriate to the elements building design life.

A material inventory will be developed during the design stages in order to support the end of life / deconstruction plan. The aim of this is to keep the value of materials, products and components as high as possible over time and identifies waste as a material without an identity.

Material inventories will also aim to create incentives for suppliers to produce healthy and circular materials/building products and facilitates reversed logistics indirectly. This will help promote an increase in supplier take back schemes.

An "as-built" version of the end of life / deconstruction plan and material inventories will be established. This will be included within the Operation and Maintenance manual and will be a requirement to undertake.

Building information concerning material selections will form part of the hand-over documentation. This will be in the form of a materials inventory and material passporting during the building's life to facilitate disassembly and identify any key challenges. This will support the recovery of components and materials at the end of the life of the building.

Specific end-of-life strategies will vary depending upon the nature of the material and will include:

- Steel recycling
- Concrete crushed to aggregate (sub-base layers)
- Plastic based material incineration
- Cement / mortar used in a backfill
- Brick / stone crushed to aggregate (sub-base layers)
- Wood incineration
- Gypsum recycling
- Landfilling (for inert materials)
- Rebar separated (2%), concrete to aggregate
- Backfilling (for inert materials)
- Glass-containing product recycling (80% glass)

A significant proportion of the building material is likely to be concrete. Whilst this material can be used as a sub-base layer, a key challenge facing the construction industry will be whether there are better alternative means of recovering this material.

It is anticipated that the materials sector will undergo significant transformation over forthcoming years, and it would be sensible to re-evaluate option again at the appropriate time as there may be better options at this point to improve the circularity.

9. Post Completion Report

This update to a Circular Economy Statement identifies targets and actual outcomes achieved and is to be filled out post planning/completion. The structure and content will therefore mostly be specific to each individual area.

The project team shall produce a Post-completion Report that sets out the predicted and actual performance compared against all numerical targets and provide updated information/tables on all the sections above. This is a minimum requirement.

Where there have been any variations, and a target has either been exceeded or not been met, the design team shall clearly indicate these and justify why they occurred.

Evidence and supporting documents will also be provided as appendices to support the final confirmed information. These could include, but are not limited to:

- Evidence of audits
- Written agreements or correspondence
- Drawings or photos
- Specifications
- Performance and test certificates