



Sustainability Statement for Palmer Park Leisure Centre





Sustainability Statement for Palmer Park Leisure Centre
at
Wokingham Rd, Reading
RG6 1LF
on behalf of
Greenwich Leisure Limited (GLL)

27/11/20

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1.0 Introduction

The current leisure centre provides a range of activities associated with the extensive sports pitches on the site and incorporates a 49 station health and fitness suite. The facility has been described as very good quality, light, spacious and well-kept. A strategic review identified this site as a replacement for Arthur Hill Swimming Pool, and that a community swimming pool would be best located at Palmer Park, as this would deliver significantly improved pool capacity and quality of provision for residents in the east of the borough.

The intent is to therefore extend the current facility adding a high quality swimming pool and additional health and fitness suites, whilst retaining the current facilities. An attractive entrance plaza and community hub is included in the design. This combines the sustainability advantages of re-use of existing buildings whilst creating a vibrant new Leisure Centre.

This development represents an opportunity to provide a high quality sustainable facility which meets the needs of the current and future generations, without compromising the need to address the climate change challenge.

This report sets out how sustainability has been addressed in the design so far and will be addressed as the scheme progresses. It sets out how Reading Borough Council's Sustainability Policy has been met, and how a BREEAM Excellent will be achieved.

This report contains the sustainability statement and BREEAM pre assessments.

2.0 Planning Guidance

2.1 National Planning Policy

The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs⁴.

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities’ health, social and cultural well-being; and

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

The intent of this sustainability statement is to set out how this development will be pursued in a positive way and actively deliver a sustainable development which meets the above objectives.

The national policy has been developed further by Reading Borough Council as outlined in the following section.

2.2 Local Planning Policy

Reading Borough Council has declared a Climate Emergency, and set out its commitment to working to achieve a carbon neutral Reading by 2030. The Council has stated that it needs to consider carefully how Reading adapts to a changing climate, the impact that its built space has on its own natural resources and habitats as well as pollution of its ground, water and air.

The National Planning Policy Framework (NPPF, February 2019) states in Paragraph 148:

“The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure”.¹

The Reading Borough Local Plan was adopted in November 2019, and this responds to the Climate Emergency by setting out ambitious but achievable standards for sustainable design and construction. It is vital that residential and non-residential schemes are built in a way that minimises their use of energy and harmful emissions, reducing and mitigating other environment impacts.

Everyone has a role to play in achieving the objectives of minimising pollution. This includes reducing carbon dioxide emissions, other greenhouse gases and ensuring our lifestyles are as sustainable as possible. The design of the built environment has a significant role to play in the impact that individuals have.

There is a clear role, and indeed expectation, within national and local planning policy for planning to contribute towards achieving environmental objectives.

This sustainability statement addresses the requirements of the SPD, and details how the development will meet the objectives.

3.0 Strategic Priorities

The strategic priorities identified in the SPD are as follows:-

- Energy supply – reduce electricity consumption, develop heat supply networks to deliver low carbon heat in Reading and increase the amount of energy generated locally using renewable technologies;
 - Low carbon development – buildings in Reading to be built to high standards of energy efficiency incorporating on-site renewable energy where possible, retrofit energy efficiency measures into Reading's buildings, minimise the 'embodied carbon' incorporated in construction projects and continue to develop planning policies that support the reduction of greenhouse gas emissions directly and indirectly from the Borough and reduce the risks of climate change to the communities of Reading;
 - Natural environment – improve the quality and connectivity of natural habitats;
 - Water supply and flooding – Manage demand for and supply of water to reduce the expected impact of water shortages on consumers and on wildlife and reduce the risk of damage due to flooding;
 - Transport – develop a transport infrastructure which supports more low carbon travel options for people in Reading and encourage non-car travel for all sectors of the population; and
 - Purchasing, supply and consumption – reduce waste by supporting the re-use and repair of products and materials.
- This development seeks to address each of these strategic priorities through
- Demand reduction
 - Use of onsite generation
 - Efficient systems
 - Reduction of embodied carbon
 - A holistic approach to the landscaping and ecology of the development
 - Water efficient design
 - Mitigation of surface water
 - Sustainable transport measures
 - Construction waste avoidance, design to avoid waste and sustainable procurement.

The development uses the BREEAM Excellent requirement as a framework to deliver these outcomes, applied in a holistic integrated design approach where benefits of different credits are compared, and the overall benefit maximised. A Life Cycle Costing exercise has been undertaken allied to a Life Cycle Analysis model which looks at the Whole Life Cost of the construction options.

This statement addresses the following policies:-

- CC2 – the project will achieve a BREEAM Excellent rating at post construction review stage, with a an interim certificate which will be obtained to demonstrate that the development is on track at the completion of design.
- CC3: Adaptation to Climate Change
There is a specific report which has been produced which addresses the issues of adaptation to climate change and how the building is designed to be resilient in the face of climate change
- CC4: Decentralised Energy
There is a specific report which has been produced which addresses the issues of adaptation to climate change and how the building is designed to be resilient in the face of climate change
- CC5: Waste Minimisation and Storage
Waste is considered in terms of construction waste minimisation, design for adaptability to meet changing needs to avoid redevelopment, material efficiency in terms of avoiding use of materials which may enter waste streams, storage of recyclable waste and durability to minimise future refurbishment and replacement. Specific reports have been produced to consider use of demolition materials, adaptability, and material efficiency
- EN18 – Flooding and Sustainable Drainage systems
This development is on a site of an existing leisure centre and the site has been selected in accordance with Reading Borough Council's strategic review of sports and recreation facilities. Later sections detail how flooding and sustainable drainage is being managed.
- EN16: Pollution and Water Resources
The development will have measures to protect surrounding areas from pollution during construction and to prevent harmful run off during occupation.

4.0 Do we need to build? Where to Build?

In sustainability terms, the first question is always to determine whether to build or refurbish, and if to build, to select the most appropriate site. In this case, it has been established through comprehensive survey and evaluation that there is a need for a new building, as discussed in the Design and Access Statement, and in the Reading Strategic Outcomes Model December 2019, that the new Swimming Pool should be located at Palmer Park. The development will be an extension to an existing building and therefore can be classified as brownfield development. This is a sustainable site selection.

5.0 Energy efficiency and carbon emissions of the building

An energy statement has been prepared for this development by Thornley & Lumb on behalf of Greenwich Leisure Limited. It is submitted as a separate document but is intrinsic to this statement and can be summarised as follows:-

The building fabric first design philosophy and efficient building services analysis are combined with the available Low and Zero Carbon LZC technology to provide a methodology for achieving a sustainable low energy use development and exceed a BREEAM rating of 'Excellent'. The low carbon building design process is illustrated by following the Energy Hierarchy which details the measures included at each stage. The Energy Hierarchy helps qualify the carbon emissions due to various measures by reporting the emission reductions at each stage.

Be Lean Measures

- Low external envelope u-value
- Low air permeability
- Low energy LED lighting & BMS
- Mechanical ventilation with heat recovery MVHR

Be Clean Measures

- Same as Be Lean

Be Green Measures

- Air Source Heat Pump ASHP space heating to Gym, Studios, Offices, Café, and associated areas
- High efficiency Air to Water CO2 Air Source Heat Pump ASHP hot water services
- Solar Photovoltaic panels generating on site zero carbon electricity

This Energy Strategy therefore confirms that the overall development's carbon emissions will be reduced 46% below the Part L 2013 baseline, with the percentage carbon reduction increasing to 72% using the current electricity grid carbon factors as per the Government's SAP10 proposal for updated Part L electricity grid carbon factors.

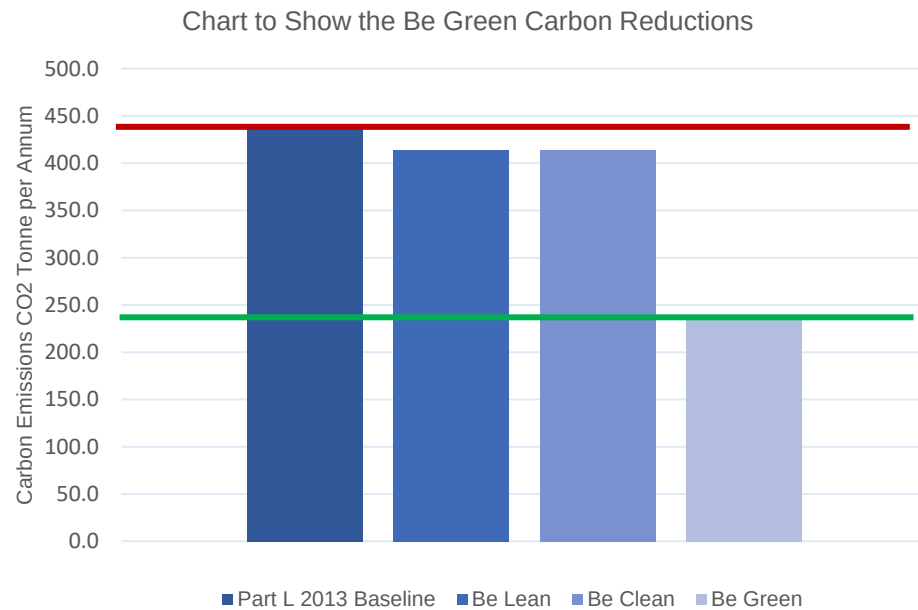


Chart to show the overall carbon reductions of the proposed development

A lifecycle costing exercise has been undertaken to assess the viability of the measures considered, which is contained in the energy statement and of the viable measures, it has been calculated that the effect of each is as follows: -

- Air Source Heat Pump ASHP space heating to Gym, Studios, Offices, Café, and associated areas (carbon reduction = 6%)
- High efficiency Air to Water CO2 Air Source Heat Pump ASHP hot water services (carbon reduction = 39%)
- Solar Photovoltaic panels generating on site zero carbon electricity (carbon reduction 2%)

The overall carbon reductions across all measures to be implemented are shown below. Regulated and Unregulated Energy has been provided, although the savings are assessed on regulated energy.

Carbon Dioxide Emissions Per Annum for non-domestic Buildings

	Regulated CO ₂ Tonnes CO ₂ per annum	Unregulated CO ₂ Tonnes CO ₂ per annum
Baseline Part L (2013)	436.2	90.8
Including Be Lean Measures	413.7	90.8
Including Be Clean Measures	413.7	90.8
Including Be Green Measures	235.2	90.8

Regulated Carbon Dioxide Savings Per Annum for non-domestic Buildings

	Tonnes CO ₂ Per annum	Percentage Reduction %
Savings from Be Lean Measures	22.5	5.2
Savings from Be Clean Measures	0	0
Savings from Be Green Measures	178.5	43.2
Reduction Compared to Baseline	201	46.1

Unregulated energy has been estimated as a baseline of 2,573,899 kWh/annum. This is largely a result of the energy use of the swimming pool, and to a lesser degree, catering and plug in loads.

Following an analysis of a similar leisure centre, the unregulated energy is dominated by the energy usage for swimming pool heating and energy used for the swimming pool hall ventilation system. The unregulated energy usage for swimming pool heating and swimming pool hall ventilation represented 97% of the total unregulated energy usage. It is proposed that the swimming pool includes a movable floor pool cover which will reduce the unregulated energy usage significantly, enabling a 19% reduction in unregulated energy.

An analysis of energy saving measures has been made, and in line with the BREEAM credit Ene 08, savings will be made to the uses representing the highest energy use. This will be achieved using pool covers and moveable floors. In addition, the pool hall temperature will be maintained within 1°C of the pool water temperature. These measures have been shown to maximise pool energy savings by reducing heat loss and losses due to evaporation. Catering equipment will be selected in accordance with the recommendations of CIBSE TM50, and office equipment with Energy Star ratings.

This results in an estimated 19% savings in Unregulated Energy, meaning that the estimated Unregulated energy is 2,074,562 kWh/annum

	Baseline Unregulated Energy kWh per Annum	With Measures Unregulated Energy kWh per Annum	Percentage Reduction %
Energy Rate	2,573,899,485	2,074,562,985	19%

Unregulated and regulated energy will be managed through metering and monitoring, and operational energy will be compared with design predictions to see where use is occurring, actively managed to ensure emissions are minimised.

The combination of the measures indicates that the BREEAM score for Ene 01 is 7 credits. The minimum required for the Excellent rating is 4, and this building achieves the performance required in energy terms for a BREEAM Outstanding Building.

The BREEAM score uses Energy Performance Ratio for New Constructions. This is a metric that is unique to BREEAM and is a ratio that defines the performance of a BREEAM-assessed building in terms of its regulated operational heating and cooling energy demand, primary energy consumption and CO₂-eq emissions. This measure of performance is used to determine the number of Ene 01 credits a building achieves in the BREEAM assessment. It is weighted so that the building fabric is given priority over systems, to encourage efficient buildings.



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Is space heating provided by a district (network) heating?

No

Is hot water provided by a district (network) heating?

No

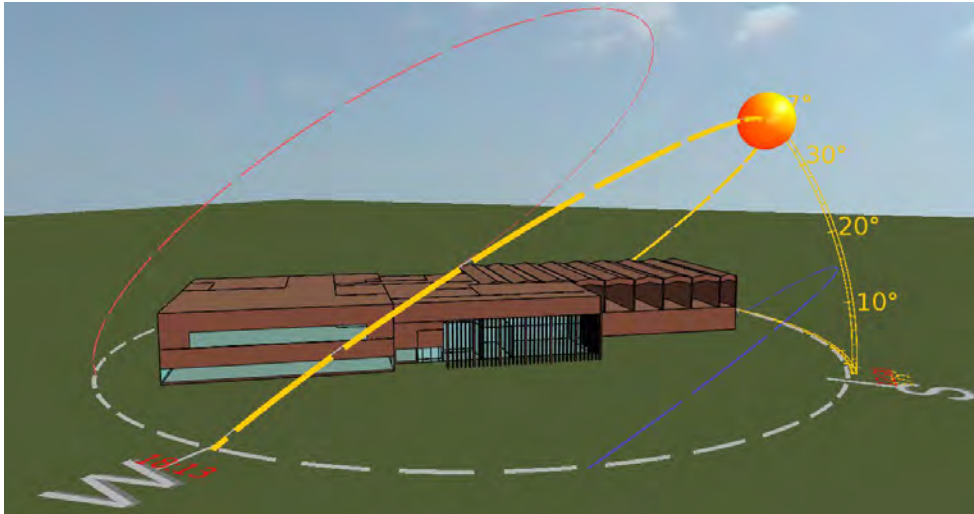
Energy performance - Building score

Methodology used	Alternative	
Total BREEAM credits achieved	7.0	
Heating and cooling demand energy performance ratio (EPRdem)	0.135	
Primary consumption energy performance ratio (EPRpc)	0.292	
CO ₂ -eq energy performance ratio (EPRco2-eq)	0.29	
Overall building energy performance ratio (EPRnc)	0.717	
% improvement BER/TER	71.8	%

Calculate score

Clear

passive design exercise has been undertaken to optimise the building design to reduce demand and to make best use of natural daylight, thermal mass, insulation. The building has been modelled as indicated below:-



It can be seen that the major glazing shading has been included so that the key areas benefit from natural light without increasing glare and solar gain to an unacceptable degree. The orientation of the building is largely fixed as it is an extension of an existing facility.

6.0 Water conservation

Water conservation is a key factor when designing leisure centres. The following features will be included:-

- Use of pool covers and moveable floors to pools which reduce evaporation typically by 15% of pool water consumption which can amount to 1000 litres per pool per day
- Optimisation of backwashing of pools based on filter pressure which typically reduces pool water use by 550m³ per annum
- These two measures typically reduce pool water use by 11.6%
- Water use further occurs in changing areas. In these areas, we have calculated using the BREEAM water calculator that our choice of sanitary fittings will amount to a 25% reduction in baseline. This equates to an estimated consumption of around 4 litres per person per day based on approximately 944 visitors per day.
- We have included in our design measures to ensure leakage is detected and prevented in both the external and internal areas of the buildings.
- We intend to design landscapes and planting that do not need permanent irrigation beyond initial establishment and rely on precipitation.
- Catering equipment will be selected on the basis of water efficiency

7.0 Flood risk and drainage strategy

The flood risk is contained in the Flood Risk Assessment by Furness Partnership. appended to the planning application. The flood risk for Palmer Park Leisure Centre indicates that the site and buildings are all low risk from the sources considered.

The design has addressed EN18 as follows:-

EN18: FLOODING AND SUSTAINABLE DRAINAGE SYSTEMS

Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change.

- The development is located on a low risk site

It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.

- The flood risk assessment includes consideration of flooding from all the above sources and the design does not impeded the current floodplain. The attenuation proposals will reduce flood risk.

All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects.

SuDS has been incorporated into the design as follows:

Discharge of surface water has been considered in accordance with the Ciria SuDS Manual discharge hierarchy. The soil investigation report by Soils Ltd includes results from soakaway tests and advises that infiltration to the gravel layer is feasible. Therefore the drainage strategy will be to discharge surface water to a 30 x 10 x 1.2m deep cellular soakaway tank situated 1m below ground level in the new car park area (more than the minimum 5m away from any building foundations). Existing retained hardstanding/car park areas will continue to drain to the existing drain network (additional drainage survey works to be carried out.) Required storage may increase if areas of the existing site need to be included in the proposed drainage design following the drainage survey. Small areas of low risk car parking will be drained into areas of permeable paving to provide the 2-stage treatment required to remove pollutants prior to discharge, in accordance with Environment Agency and Ciria SuDS Manual guidance.

- Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.

The boundary of the site offered to the contract is limited to the immediate surroundings including buildings, carparking and a limited amount of landscaping meaning that there is limited potential to include extensive open SuDS. However, this will be reviewed in the detail design phase.

Further consideration was given to the use of a green or blue roof. The structural spans that are required clear of columns for the pool hall and sports hall meant that this was prohibitively costly, due to the weight of such measures.

In summary, the flood mitigation and sustainable drainage solutions offered represent an improvement on the current situation, and address within the site constraints, the policy intent.

8.0 Community impacts

The need for this development arose from a strategic review of the indoor sports facilities in the Reading Borough which was undertaken in 2015¹ by The Sports Consultancy. The project brief required that the indoor sports facility assessment should look at the age, quality, size, accessibility, community use, opening hours and type of management of each existing facility. In doing so, the assessment focused on providing the following:

- A clear understanding of the current and future supply and demand issues for key sporting facilities in terms of quantity, quality and location.
- Identification of recommendations and priorities to assist the authority and key stakeholders in the delivery of sporting outcomes for the area
- Development and delivery of a facility strategy that is capable of formal adoption by the Council to shape its investment and facility priorities. In particular, this should consider the amount and configuration of swimming pool water (including diving) and sports hall space.

The assessment was prepared in accordance with Sport England's guidelines (Sport England's Assessing Needs and Opportunities Guidance July - 2014) to reflect current best practice at the time for the provision of indoor sports facilities. An audit of current facilities and extensive consultation with stakeholders recorded in the cited report resulted in a range of recommendations for sport and recreation facilities in the borough. The aim of the development is the benefit of the local community and on which the local community has, and will continue to be consulted on.

The research in the report concluded that the population of Reading is growing and that at the time the report was written, in comparison to its neighbouring authorities, Reading had a high percentage of inactivity and low percentage of frequent adult participation in sport and active Recreation.

¹ READING BOROUGH COUNCIL
Indoor Sports Facilities Needs Assessment
November 2015

The analysis of supply and demand for swimming pools, sports halls, fitness suites and other sports facilities across the borough resulted in identification of key objectives to meet the needs of the community which are:-

Objective 1 – Protect and maintain strategically important existing facilities

Objective 2 – Improve access to meet demand

Objective 3 – Effective and sustainable programming

Objective 4 – Provide new facilities

Objective 5 – Improve viability of facilities

Objective 6 – Utilise strategically valuable sites and maximise revenue generation

Objective 7 – Improve co-ordination of delivery between stakeholders

Evaluation of these objectives has identified the need for this development.

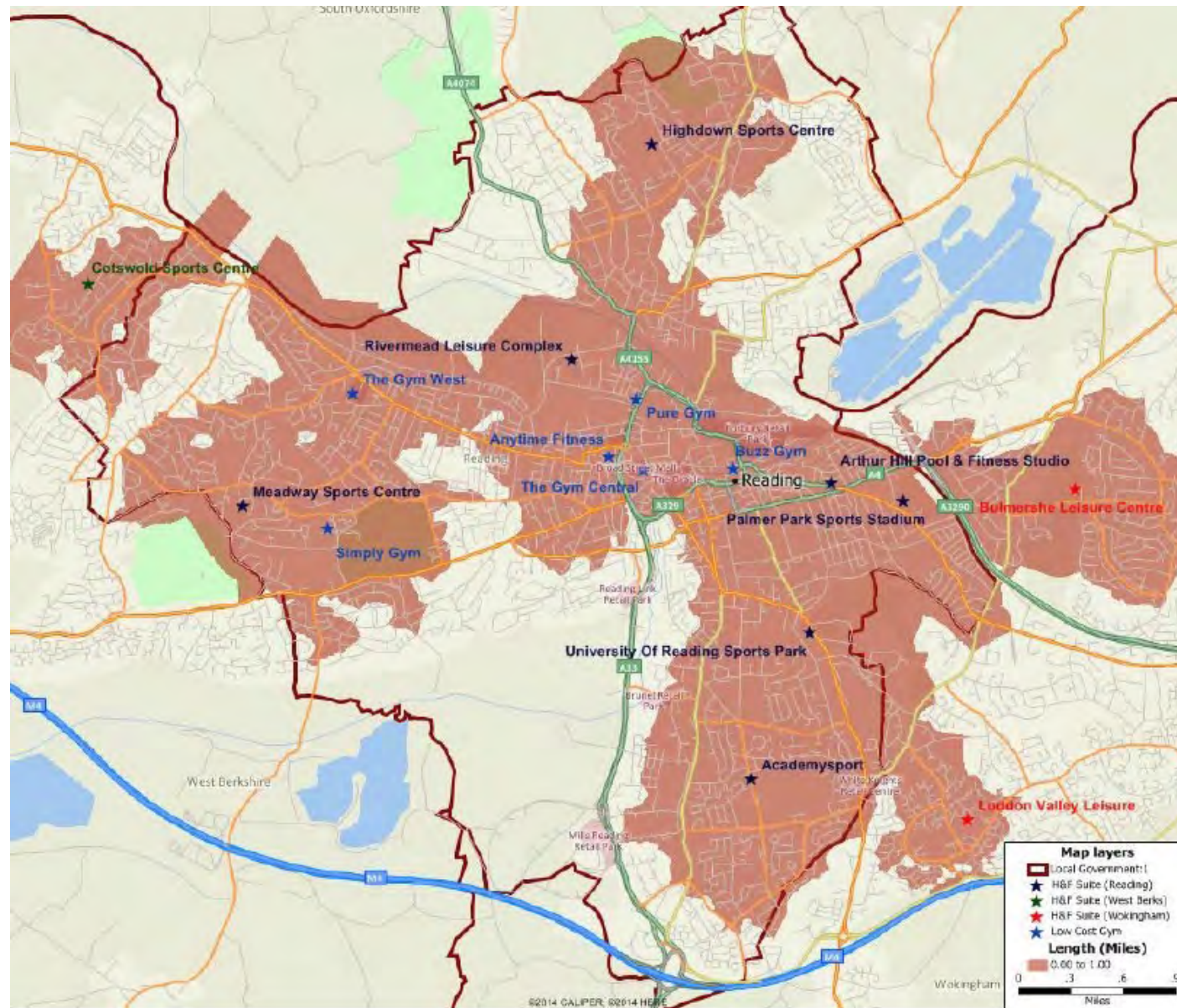
A Strategic Outcomes Planning Model – Reading Borough Council² was produced by Max Associates in 2019 which built on the earlier research, undertook further and updated research and evaluated local and national health and social priorities.

This report contains substantial demographic and strategic research, and records community consultation including public consultations to gather insight from Reading residents, in particular underrepresented Groups.

This report evaluated in detail the needs of the catchment of this Leisure Centre, and identified it as a priority for redevelopment to benefit the health and well being of the local residents.

The map below shows the relative adjacency of the Arthur Hill Pool which Palmer Park is replacing

² READING STRATEGIC OUTCOMES PLANNING MODEL December 2019



Map of Leisure Facilities in the Reading Area

The cited report concludes that as the pool will be within the densest population areas of Reading, the majority of residents likely to use it will be able to walk to Palmer Park Leisure Complex within 20 minutes.

The report summarises that the community believes that after not having enough time due to work commitments the other equally most cited reason for Reading residents not exercising is a lack of convenient and accessible facilities. At 20%, this is significantly higher than the 1% from the national benchmark. Notably, facilities not being of a good enough quality is the reason most often picked (23%) by those in Reading for not currently using or considering using the centres around them.

The development addresses this issue by providing a convenient, accessible and high quality leisure facility.

The operator for the new facility has completed an equality impact assessment which includes commitments to:-

- Pricing and programming scheme aimed at priority groups which will actively improve health and wellbeing and reduce health inequalities
- Providing local economic benefit and developing skills
- Supporting a safe and inclusive neighbourhood
- Promoting Community Cohesion
- Educating, protecting and providing opportunities for young people
- Supporting and caring for vulnerable adults and older people

The council has furthermore provided a brief for the development which includes the sports facilities, but also includes use of the building as a community hub, and will promote social integration, education and inclusive access to facilities in the borough.

The two single greatest steps that can be taken to increase participation in all groups, including older and disabled people, is a step change in quality and accessibility of facilities plus range of offer. These are the largest elements of changes that will be delivered through the Leisure procurement which includes the replacement of Palmer Park Leisure Centre.

An increase in use by sections of the community is anticipated, over 40% across the board. As illustrated earlier in this document, a significant range of targeted initiatives are being included to more effectively increase participation in key groups.

A social value calculator is being developed by the operator along with Sheffield Hallam University and 4 Global to assess the financial value of participation of different groups in physical activity. This will be used to further guide the development of plans. The first full assessment of the success of the plans will be at the end of the 1st year of contract with interim assessments being undertaken.

Overall, this facility will promote Reading Borough Council's Strategic objectives and increase community participation and engagement.

9.0 Transport

The transport impact has been assessed by the transport consultant, Hydrock. They have undertaken a transport assessment and travel plan with the aim of incorporating measures to reduce car usage.

The community involvement section above discusses how the development has been chosen in this location to be within walking distance for a significant proportion of residents.

The travel plan contains information on the local amenities and Accessibility Index which has been used in the BREEAM pre-assessment.

The design has then addressed the local environment for walkers and cyclists to provide a safe and accessible facility as follows:-

- The proposed development site is surrounded by a network of local on and off-road cycle routes which provide a link to local residential areas.



Figure 3-1 Abstract from: Reading BC Cycling Map

- NCN Route 4 is provided adjacent to the River Kennet approximately 850m north of the site and is directly linked to the site by the East Reading and Woodley local cycle route.
- NCN Route 4 is a long distance cycle route linking London to Fishguard in west Wales via Reading, Bath and Bristol.
- Locally NCN Route 4 provides a traffic free route west into central Reading and east to the residential areas to the east of the A3290.
- The site is located within an existing public park and is bound on three sides by residential areas with an existing network of footways and footpaths that permeate the area within the immediate vicinity of the site.

Once on the site, there will be safe, well-lit and waymarked routes suitable for all abilities between paths, car and cycle parking and the building entrance. Level access will be provided for staff and visitors using mobility assistance such as wheelchairs, electric scooters and for carers with buggies. The site will be dementia friendly in terms of wayfinding and natural points of entry, and tactile signs and surfaces will be provided for users with visual impairment.

The site is accessible by those with disabilities with local footways and crossing point incorporating facilities for those with mobility and visual impairments.

A security needs assessment has been undertaken, which contains recommendations which safeguard the safety of staff and building users on and around the site.

There are bus services within the vicinity of the site which provides access to key destinations including Reading town centre and the surrounding residential areas. This offers a realistic potential for multimodal journeys to local and regional destinations.

The BREEAM public transport AI has been calculated to be 4.04 for the site.

The choice of travel options within the vicinity of the site offers a realistic potential for trips to and from the site to be made via non-car modes. The accessible location will, therefore, encourage and promote sustainable travel behaviour.

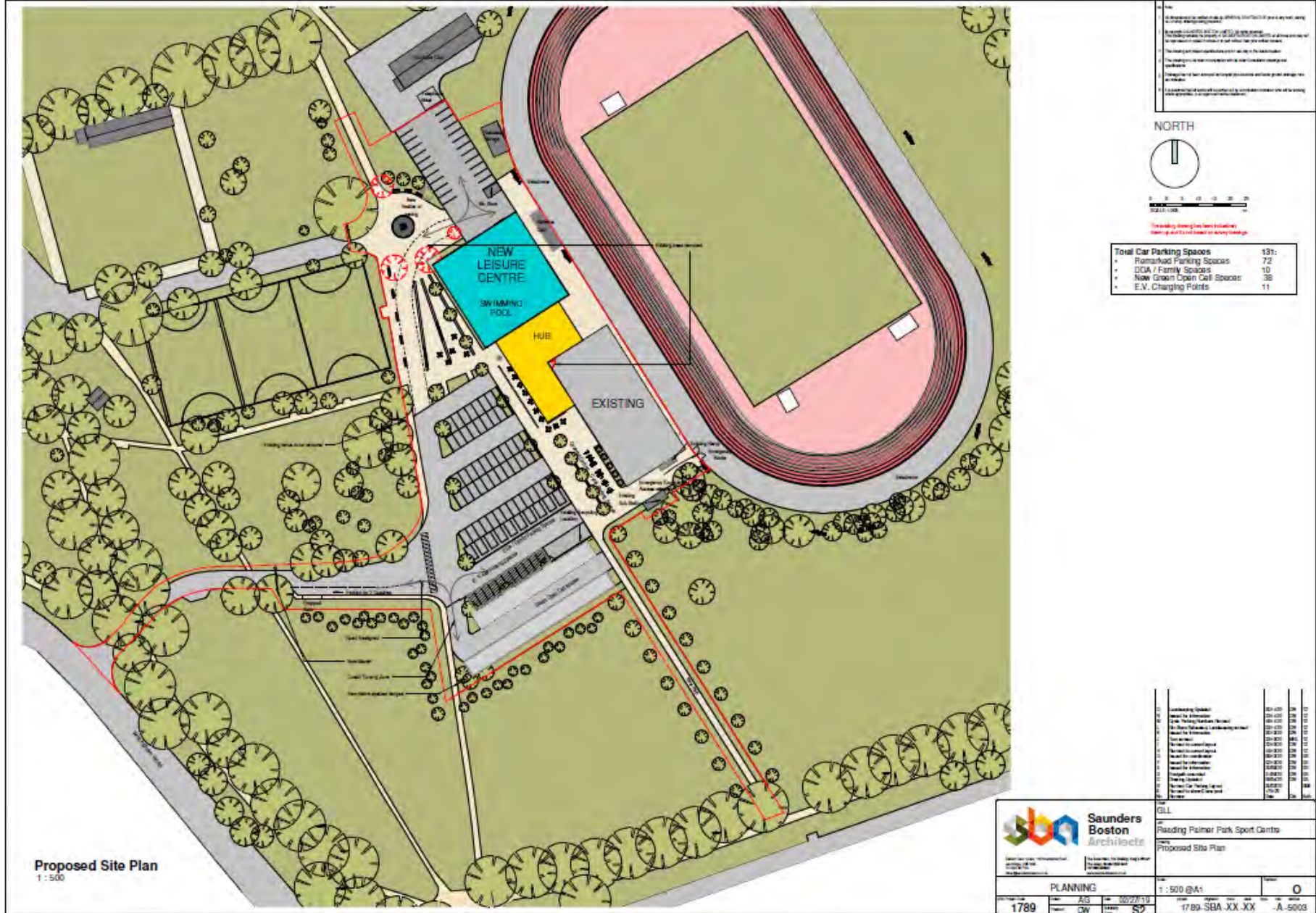
The site is accessible by those with disabilities with local footways and crossing point incorporating facilities for those with mobility and visual impairments.

Service vehicles would access the site from the Palmer Way vehicular access and continue north through the main car park and across the area of shared surface to the bin store in the overflow car park before exiting the site via the same vehicular access.

The recycling store would also be serviced via Palmer Way with refuse vehicle entering and leaving the main car park in a forward gear.

This allows deliveries to be made in a sustainable manner avoiding conflict with pedestrians and cyclists, and pollution from vehicles undertaking difficult manoeuvres.

There are a range of sustainable travel measures proposed. The electric car charging and cycle storage provision is indicated on the site plan submitted for planning as follows:-



In addition, there will be a travel information point, changing, showers and storage for cyclists (and general users), and staff and user information on lift and car share schemes. The Readibus will be available to provide transport on demand for users who cannot access the building using the main bus services.

10.0 Health and Wellbeing including daylighting analysis and thermal comfort

The health and wellbeing of users is intrinsic to this development and is considered across a number of issues, correlating to the BREEAM assessment as follows:-

10.1 Visual comfort

The development has been designed with a high level of visibility from both inside and outside to promote the access to daylight, and retain a sense of wellbeing for staff and users. Connection to the outside, to see changing weather and views of nature promote a sense of well-being.

There is a balance to be struck between the size of windows and curtain walling which allows daylight but if too large, increases heat loss, cooling loads and embodied carbon when compared to opaque elements, therefore uniform daylight to meet BREEAM targets will not be met. However, the quality of daylight to key areas will be good.

Glare control provision will be made to key areas and shading incorporated to allow views whilst limiting glare and solar gain.

The internal and external lighting will be designed for comfort and amenity, with control given to occupants in relevant building areas as defined by BREEAM.

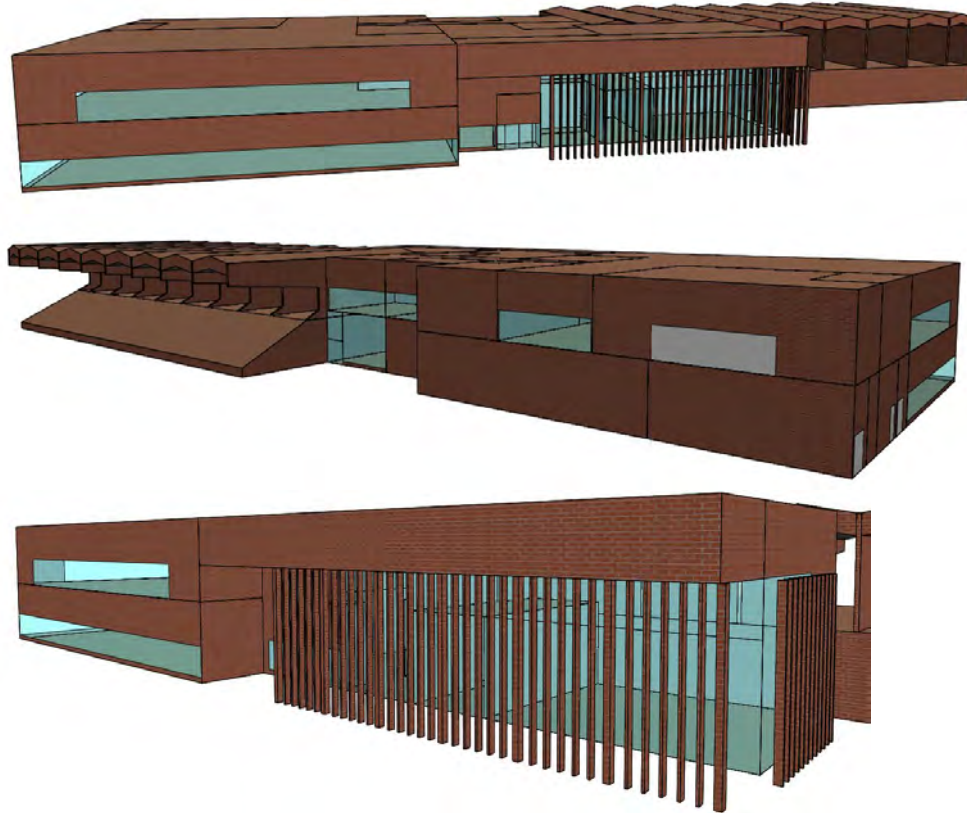
10.2 Indoor Air Quality

The procurement and construction will be guided by an indoor air quality plan which will seek to address the following:

- Limits on the emissions of Volatile Organic Compounds (VOC) and other harmful substances used in the construction process
- Avoidance of the ingress of polluted or vitiated air through ventilation systems
- Construction practices which limit air pollution and diffusion of particulates which may impact workers
- Protection of ventilation systems and materials to avoid ingress of contaminants and mould growth

10.3 Thermal Comfort

Dynamic modelling has been undertaken to develop the design and includes the consideration of future climate change scenarios to ensure the comfort of occupants both now and in the future. The model confirms that the occupied areas of the building, when measured according to PMV and PPD criteria, will be comfortable in current and projected future climate change scenarios.



A Building Management System will be used, under the control of the building operator to monitor and maintain temperatures at comfort levels.

10.4 Acoustics

A bespoke set of acoustic criteria will be developed, in line with BREEAM guidance for this building type, to guide the design to ensure acoustic comfort for occupants, speech intelligibility and privacy where required.

10.5 Safe Environment

The sites are existing and access arrangements such that compete segregation of visitors and deliveries is not possible, however the design and landscaping will address safe access to and from the development, a safe environment from public roads, pathways, car and cycle parking for users and staff of all abilities.

In line with the BREEAM credit, a pleasant accessible outdoor amenity space will be provided for staff and users.

10.6 Biophilia

The landscaping will be designed to promote biodiversity and enrich ecology, with the joint aim of connecting users to nature and providing views of nature from within the building.

10.7 Social, Health and Economic

The social, health and economic well-being of the staff and users is intrinsic to the development and has been discussed in the community involvement section.

11.0 Material usage, wastage, responsible sourcing and environmental impact, including embodied carbon

This section considers the specific measures that are being undertaken to minimise the impacts of materials generally, in line with BREEAM commitments.

This scheme has been registered with BRE as a 2018 BREEAM New Construction, other buildings. BREEAM 2018 gives great emphasis to early design decisions which are holistic and which promote an efficient and sustainable design. Many actions need to be undertaken prior to completion of Concept Stage 2, so that the planning process and decision does not impede changes to the design which are beneficial.

A sustainable procurement plan has been produced which is being used to steer the design and will be used during procurement and construction. The design team, operator and main contractor have all contributed to the following studies.

11.1 Material Efficiency,

The key measures to be implemented are:-

- The design minimises mass and volume, thereby reducing material use
- A simplified structure reduces steel quantities
- Use of natural ventilation where possible avoids building services plant
- The proposed Kingspan Quadcore allows for off site fabrication and use in certain internal areas, avoiding secondary internal layers
- Use of proprietary curtain walling systems such as Comar will allow repetition of building elements
- Detailed cut and fill exercise to minimise removal of excavated material from site
- Detailed design exercises with cladding fabricator to ensure minimal cuts /wastage
- Design of pre-fabricated concrete elements for staircases, dive tower and spectator seating to pool hall
- Inclusion of systemised fixtures and fittings such a spectator seating (pool hall and bleacher) and cubicles and lockers

11.2 Life Cycle Analysis

The LCA Exercise has considered options for the cladding, sub structure and hard landscaping. This has resulted in the selection of the lowest overall impact of these elements and guided the design, for example to substituting concrete block paving in place of asphalt which has a significant saving in embodied carbon. The report has been produced and the results submitted to BRE. Our LCA is third party certified to ensure validity and consistency, and will align with our life cycle costing exercise to provide a compete decision making process.

The embodied energy for the development in absolute terms across a range of impacts is:-

Characterised Impacts Absolute		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
 Global Warming Potential, GWP	kg CO2 eq	1.14e+6	4.22e+5	15000	0	1.60e+6
 Ozone Depletion Potential, ODP	kg CFC-11 eq	0.12	0.14	0.0036	0	0.27
 Acidification Potential for Soil and Water, AP	kg SO2 eq.	6730	3160	87	0	10000
 Eutrophication potential, EP	kg PO4---eq	2426	1180.1	370	0	4000
 Photochemical Ozone Creation Potential, POCP	kg ethylene	939	398	15	0	1300
 Abiotic Depletion Potential - Elements, ADPE	kg antimony	31.383	2.72	0.014	0	34
 Abiotic Depletion Potential - Fossil Fuels, ADPF	MJ	1.65e+7	1.32e+7	3.10e+5	0	3.00e+7

Characterised Impacts Absolute		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Additional Indicators						
BRE 15804 EcoPoints (UK)	BRE EP	10030	3153.7	950	0	14000

Table 1: Summary of Results

The proposed adopted options are therefore:-

- Composite cladding
- Vibro Compacted Piled foundations
- Asphalt to road areas, and concrete block paving to parking bays and pathways

Overall, this combination is the lowest combined EcoPoints and GWP of the options studied, 4.89EcoPoints per m2 and 1,4000,000kgCO2eq respectively.

11.3 Environmental Product Declarations

Inclusion of Environmental Product Declarations (EPD) in the procurement process will enable the preferential selection of products from manufacturers who have an EPD which will further lower the embodied carbon predicted as manufacture's with EPDS have better reporting and are taking action to lower the carbon footprint of their product.

11.4 Pre Demolition Audits

Pre Demolition Audits which identify the key materials that will arise from necessary demolition, and seek uses for the materials according to the waste hierarchy. This development is on a car park and is an extension to an existing building. Demolition is very limited, however the pre demolition audit will identify the best use of any recovered materials.

11.5 Site Waste management

Site waste management targets will be set and strategies put in place to minimise waste arisings and to recycle as much as possible unavoidable waste. This will be contained in the SWMP and correlate to the material efficiency report and the pre demolition audit. Design team discussions will be held with the Principal Contractor on selection of products / systems / specialist sub-contractors with the aim of reducing waste in the supply chain

11.6 Sustainable Procurement Plan

The sustainable procurement plan, and auditing of the scheme by the BREEAM assessor, will ensure that all timber products are from certified sources, and that preference is given to products with responsible sourcing certification such as BES6001. Where possible, local suppliers and subcontractors will be used.

11.7 Design for Disassembly and Adaptability Wst 06

Wastage arises in operation when buildings are not designed for future flexibility, maintenance and component replacement. We have therefore prepared a BREEAM compliant report considering the options for disassembly and adaptability. Design exercises to be carried out at the next stage are as follows:

- Potential infill and reuse of the pool
- Recladding of the steel frame
- Use of non welded construction techniques that allow for reuse and reconfiguration
- Provision for future replacement of major plant and equipment without the need for disassembly of building components or bespoke equipment, such as level access to pool plant and removeable louvres to mechanical plant areas.
- Replacement of all components which may have a life cycle replacement interval within overall service life of the building.

11.8 Durability and Resilience Mat 05

Further wastage can occur if the building is not durable or maintainable and components need rapid replacement. We have therefore prepared a BREEAM compliant report considering the options for durability and maintenance provisions. Provisions will be made for easy access to the roof along with the relevant fire escape routes from the roof. This will allow safe maintenance access to the roof covering and any roof mounted mechanical plant and solar panels.

Provisions will be made for routine maintenance of the façade without the need for one off contracts for specialist equipment. A range of specifications for the building will be made in line with best practice for durability.

The interior finishes and building elements have been designed for longevity in the swimming pool environment.

11.9 Adaptation to Climate Change Wst 05

If the building is not resilient to future climate change, it may not remain in use for the predicted service life and need replacement or relocation. We have therefore prepared a BREEAM compliant report looking at the risks and mitigations needed for a range of future climate change scenarios.

We have addressed flooding in the context of future climate change in section 7, and future temperatures in section 10.3.

The building will be designed to withstand future predicted extreme weather events such as high winds and intense temperatures. Heat Island effect is to be mitigated by reducing the amount of asphalt and substituting a material with lower heat absorption.

Furthermore, the stormwater and surface water drainage systems will be designed to accommodate increased intensity of rainfall events.

11.10 Operational Waste Wst 03

The design will include adequate storage and facilities for the predicted waste streams that will be produced by the building. It is expected that the food offering will be pre-packaged therefore composting is not proposed, however this will be kept under review as the design progresses.

11.11 Transport of Waste

Local waste carriers will be used to minimise the distance waste is transported.

12.0 Pollution issues, low NOx, low global warming potential (GWP), reducing need for mechanical cooling

Pollution occurs from a number of potential sources and in line with BREEAM, the following has been considered:-

- Emissions from refrigerants will be minimised by the choice where possible of the new generation of lower GWP refrigerants such as R32

- It is proposed that most of the space heating and hot water generation will be met by electric heat pumps reducing the emissions from gas fired plant. Where gas is adopted as a top up or back up, ultra-low NO_x plant will be selected where available in the market.
- A study has been undertaken of the local air quality. The development is in an AQMA, having been found to exceed the annual mean NO₂ objective. Therefore, both the pollution from construction and in operation need to be considered to minimise the impact on pollution in this sensitive area. It should be stressed that these measurements are roadside, and as such are not representative of the site which is 160m, from the road. Recommendations will be implemented which include dust monitoring and mitigation during construction, control of site and delivery vehicles and control of trackout. Future emissions were analysed and found that the effect of the development on local air quality will be negligible and that the short term NO₂ objective is unlikely to be exceeded. Based on the assessment results, air quality factors are not considered to be a constraint to planning consent for the development.
- An external noise impact assessment has been completed and indicates that the development is unlikely to give rise to any complaints resulting in building services noise from the development.

13.0 Ecological aspects to enhance the proposed developments for flora and fauna

The Leisure centre is located within a park. The surroundings offer significant benefit of staff and buildings users and the biodiversity of the area; however, the park is not within the contracted area for the development.

The contracted site area is relatively small and the enhancement within the boundary of this application is limited to the immediate surrounds.. Within the boundary of the contracted site, priority will be given to native planting, to providing as much soft landscaping as possible and to provision of appropriate bat and bird boxes, and insect hotels.

A suitably qualified ecologist (as defined by BREEAM) has been appointed and their recommendations will be implemented. Consultation on the best way to enhance and manage the site is ongoing with the Council and Operator.

14.0 Best practice management of the site.

The appointed contractor, Pellikaan will manage the site in accordance with best practice and to achieve the BREEAM credits associated with good management.

Specifically, these include the following measures:-

- The main contractor is third party certified, to ISO 14001: 2015
- A BREEAM AP will be involved to monitor construction progress against the performance targets agreed under criterion
- throughout all stages where decisions critically impact BREEAM performance and proactively identify risks and opportunities related to the procurement and construction process and the achievement of the BREEAM Excellent rating

- Pellikaan will undertake responsible construction management in line with the BREEAM Credit
- Pellikaan will undertake monitoring of constructions impacts (energy and water) in line with the BREEAM Credit
- The commissioning, handover, training, aftercare and documentation will all meet BREEAM criteria to ensure that a fully functioning, efficient and manageable facility is handed to the operator.

15.0 The Sustainability Checklist

Category		Question	Response to be provided by
Management	1	Will guidance for the non-technical building user be provided so they can understand and operate the building efficiently and understand how the design reduced the overall environmental impact of the building and raise environmental awareness?	This is required for BREEAM and in accordance with the 2018 NC manual, this will be technical and not technical, and supported by user training
	2	What consideration has been given to resource use, energy consumption and pollution in terms of the construction site impacts?	The BREEAM 2018 checklist will be used and targets set for emissions. Best Practice pollution prevention will be undertaken, and resource efficiency in terms of minimising waste and reducing materials has been described in section 11
	3	Will site investigation and appropriate remedial action be undertaken?	Site investigation has been undertaken in terms of ground contamination, soil characteristics and stability. The findings are that the site has not areas of concern requiring remediation.
	4	Will the community and stakeholders be involved in the design process encouraging flexibly designed buildings which cater for shared use with the local community?	There has been extensive consultation which is described in section 8.0 and the scheme has been designed to include a fully inclusive community hub.
	5	How has the building been designed to reduce the opportunity for and the fear of crime?	A security needs assessment has been undertaken by a Suitable Qualified Security consultant, as defined by BREEAM. This identified the security threats and risks, and recommended a range of measures such as CCTV, lighting, access control, visibility, intruder alarms, specification on doors and windows, panic button, vehicle barriers and operational processes, all of which will be adopted in the final design.
	6	What consideration has been given to the maintenance of the building?	The study undertaken for BREEAM Credit Mat 05 and Wst 06 outlined in section 11 has identified key

			measures which will be implemented to ensure that the building can be maintained and adapted
Health and Well-being	7	How has the development been designed to ensure users have sufficient daylight, an external view, adequate and appropriate lighting, ventilation, air quality and drinking water?	Visual comfort is addressed in section 10.1, which considers daylighting, views and lighting. Air Quality is addressed in section 10.2. Free chilled mains fed drinking water will be provided at key points in the building.
Energy	8	How has the building been designed to minimise CO2 emissions associated with their operational energy consumption?	Section 5.0 considers this in detail. In addition, metering of major energy uses will be provided, with an associated monitoring system so that operational energy consumption can be managed, and minimised
	9	How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?	The building has been orientated to benefit from natural light and shading fins included so that the building and occupants can benefit from solar warming without excessive gain or glare. Given the nature of the building, mechanical ventilation is necessary to areas where controlled temperatures are required such as the pool hall and areas of high heat gain such as the gym. Existing accommodation has natural ventilation to many areas.
	10	How will the design of the building make efficient use of energy? (e.g. use of thermally massive materials, levels of insulation and use of green/brown roofs etc.).	The passive design analysis report that has been undertaken indicates the optimum use of insulation and air tightness. This is also contained in the Energy Statement. Green, brown, and blue roofs have all been considered but discounted owing to the weight and the need to provide large clear structural and for the pool hall and sports hall. Overall, the building has been designed to BREEAM outstanding level in terms of energy. Section 5 provides more detail.
	11	Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?	Section 5 and the Energy Statement provide more detail. Renewable energy sources in the form of PV and Air Source Heat Pumps will be provided for a significant part of the energy demand for the building.

			A study has been undertaken on the availability of district energy in the area and no viable connection is available, however, space is available in the plant room to facilitate a connection, should this become available in the future.
Transport	12	How has the design and layout incorporated measures to reduce the need to travel, especially by car, and promote alternative and sustainable modes of transport such as walking, cycling and the use of public transport?	The transport section 9.0 considers this, and provision has been made in the form of cycle parking, a good pedestrian environment for all users, and a travel information point providing information on public transport.
	13	How have public transport networks been considered in terms of the location of the development and proximity to local amenities?	The public transport is an existing provision to the current location of the leisure centre and this will not change. The accessibility Index is 4.04, which is average for areas outside the immediate centre of Reading. Emphasis is therefore on encouraging alternative means of travel and use of low emission vehicles.
	14	How have deliveries and the manoeuvring of delivery vehicles been considered?	A service vehicle will enter and exit the site in a forward gear. This allows deliveries to be made in a sustainable manner. The existing single access to and from the site means that some crossover is inevitable. However dedicated routes on and off the site for pedestrians and cyclists have and will be provided.
Water	15	How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic m per year per person for office developments? (or the most appropriate benchmark for other types of development).	Section 6 provides detail on water consumption. The annual water per person per year is expected to be around 1.5m ³ per person per year, excluding swimming pool water consumption which will be minimised through a range of water saving measures as described in section 6.0.
	16	Will the development and access to and from it such as roads and paths be located away from areas of potential flooding?	There are no areas of potential flooding.
	17	How will the development incorporate harvesting and re-use of rainwater?	It is not proposed to harvest and reuse rainwater owing to the life cycle cost and maintenance burden

	18	Does this development meet the requirements of EN18?	Section 7.0 provides a discussion on how the design has addressed the requirements of EN18
Materials	19	How will the selected materials help retain local character, ensure long life and ensure a low environmental impact, including consideration of embodied energy?	The Design and Access Statement accompanying this application describes the response to the local character and appearance. The building will consist of three volumes in a perpendicular and rectangular form, responding to the uses of the building and providing a natural “advert” to the building drawing users in and encouraging use. The surrounding existing buildings are predominantly unremarkable industrial types and therefore there is an opportunity to introduce a high quality design that will set the aesthetic tone for future development. The selected materials have been modelled in accordance with BREEAM Mat 01 to determine the Life Cycle Impact of the choices, and options appraised for the superstructure, sub structure and hard landscaping. This is detailed in section 11.2 and can be summarised as follows:- The proposed adopted options are: • Composite cladding • Vibro Piled foundations • Asphalt to road areas, and concrete block paving to parking bays and pathways Overall, this combination is the lowest combined EcoPoints and GWP of the options studied, 4.89EcoPoints per m2 and 1,4000,000kgCO2eq respectively This type of building is not currently benchmarked, but represents a low embodied carbon compared to other similar buildings studied, and an optimisation against other possible design solutions. Use of products with EPDs will further lower the predicted embodied carbon.

			The studies undertaken, as described in sections 11.1,11.7, 11.8 and 11.7 address longevity, resilience, maintainability, adaptability and efficiency and demonstrate that the concept design has been carefully considered to address circular economy and optimise across a range of considerations to provide a building which will continue to be useful, maintainable and affordable beyond an average service life.
	20	What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?	The sustainable procurement plan, and auditing of the scheme by the BREEAM assessor, will ensure that all timber products are from certified sources, and that preference is given to products with responsible sourcing certification such as BES6001. Where possible, local suppliers and subcontractors will be used. The existing building is reused with minimum demolition other than to provide a linkage to the new extension. As such this represents the most sustainable choice of development available to achieve the required outcome.
Waste	21	Has an audit of the materials present on the site been conducted with an assessment of the extent to which materials could be re-used?	Pre Demolition Audits which identify the key materials that will arise from necessary demolition, and seek uses for the materials according to the waste hierarchy. This development is on a car park and is an extension to an existing building. Demolition is very limited, however the pre demolition audit will identify the best use of any recovered materials.
	22	How will the development make the maximum use of construction, demolition waste and recycled materials?	Site waste management targets will be set and strategies put in place to minimise waste arisings and to recycle as much as possible unavoidable waste. This will be contained in the SWMP and correlate to the material efficiency report and the pre demolition audit. Design team discussions will be held with the Principal

			Contractor on selection of products / systems / specialist sub-contractors with the aim of reducing waste in the supply chain. Where possible recycled content of specified materials will be monitored. This will be possible where materials are specified which has Environmental Product Declarations. Section 11.1 further describes measure to avoid or re-use waste materials
	23	How will provision be made for the storage and recycling of waste for all users of the site?	The design will include adequate storage and facilities for the predicted waste streams that will be produced by the building. It is expected that the food offering will be pre-packaged therefore composting is not proposed, however this will be kept under review as the design progresses. The scheme will comply with BREEAM credit Wst 03.
Land Use and Ecology	24	How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?	The contracted site area is relatively small and the enhancement within the boundary of this application is limited to the immediate surrounds. Within the boundary of the contracted site, priority will be given to native planting, to providing as much soft landscaping as possible and to provision of appropriate bat and bird boxes, and insect hotels. A suitably qualified ecologist (as defined by BREEAM) has been appointed and their recommendations will be implemented. Consultation on the best way to enhance and manage the site is ongoing with the Council and Operator.
	25	What consideration has been given to not using previously undeveloped land?	The building is located on the current car park.
	26	What consideration has been given to the removal of contamination from the land?	There is no significant contamination.

Pollution	27	What measures have been incorporated to ensure that noise and light pollution plus pollution transported through surface water runoff or infiltration will be minimised through the development?	An external noise impact assessment has been completed and indicates that the development is unlikely to give rise to any complaints resulting in building services noise from the development. Pollution via run off is mitigated through infiltration in accordance with best practice SuDS design.
	28	What measures have been incorporated to ensure that light pollution will be minimised through the development?	All external fittings will be cut off type and time controlled in accordance with BREEAM Pol 04. Consideration will be given, if recommended by the ecologist to external lighting which does not disrupt the activities of bats.
	29	What consideration has been given to reducing refrigerants and minimising nitrogen dioxide emissions?	Emissions from refrigerants will be minimised by the choice where possible of the new generation of lower GWP refrigerants such as R32. It is proposed that the majority of the space heating and hot water generation will be met by electric heat pumps reducing the emissions from gas fired plant. Where gas is adopted as a top up or back up, ultra low NOx plant will be selected.
	30	How has the development been sited to minimise the impact of flooding?	The development is in an area of low flood risk.
	31	How has the design considered the use of sustainable drainage systems (SuDS) and how will they be incorporated within the development?	This is described in section 7.0. SuDS has been incorporated into the design as follows: Discharge of surface water has been considered in accordance with the Ciria SuDS Manual discharge hierarchy. The soil investigation report by Soils Ltd includes results from soakaway tests and advises that infiltration to the gravel layer is feasible. Therefore the drainage strategy will be to discharge surface water to a 30 x 10 x 1.2m deep cellular soakaway tank situated 1m below ground level in the new car park area (more than the minimum 5m away from any building foundations). Existing retained hardstanding/car park

			areas will continue to drain to the existing drain network (additional drainage survey works to be carried out.) Required storage may increase if areas of the existing site need to be included in the proposed drainage design following the drainage survey. Small areas of low risk car parking will be drained into areas of permeable paving to provide the 2-stage treatment required to remove pollutants prior to discharge, in accordance with Environment Agency and Ciria SuDS Manual guidance.
Innovation	32	What consideration has been given to innovative sustainability measures in terms of a procurement strategy, design feature, management process or technological	BREEAM exemplary credits are being targeted as follows which demonstrate the innovative sustainability measures: - Alignment of life cycle costing and life cycle analysis to maximise decision making benefit - Third party certification of Life Cycle Analysis which ensures consistency and robustness of results has been undertaken - Occupants will be able to dim and adjust lighting levels in offices and other relevant areas - It is intended to apply for SABRE certification to verify the security of the site - Overall 5 credits in the innovation category of BREEAM are targeted.