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PARK DESIGN GUIDE 2018

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CONTENTS

INTRODUCTION

CONTEXT

Occupying more than 100ha, Queen Elizabeth Olympic Park lies across the border of four East London boroughs: Hackney, Newham, Tower Hamlets and Waltham Forest, and is one of the largest regeneration projects in London's history. Queen Elizabeth Olympic Park won the Rosa Barba International Landscape Prize 2016. The Park will forever be synonymous with the London 2012 Olympic and Paralympic Games, and is now at a crucial development stage in becoming an integrated part of the wider urban grain of London.

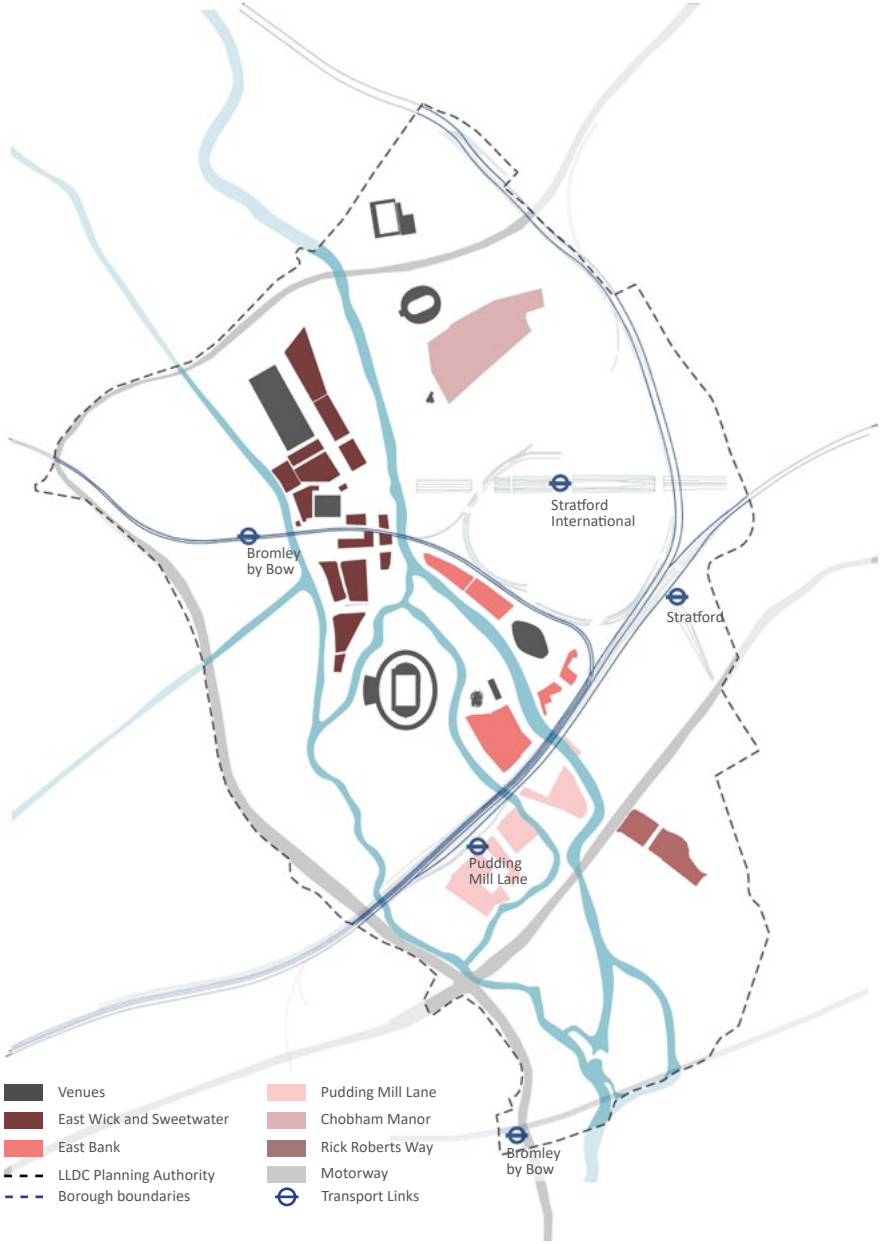
Attracting over six million visitors every year, the Park is already a huge draw for families, sports enthusiasts and a growing population of local residents and businesses, as a large Metropolitan park of national significance.

The London Legacy Development Corporation (LLDC) is the Planning Authority responsible for preserving the landscape quality of Queen Elizabeth Olympic Park Estate, whilst managing and maintaining the Park.

Queen Elizabeth Olympic Park Estate is made up of development plots which are defined by Legacy Communities Scheme (LCS).
The LLDC's priority theme of 'High Quality Design,' is to be applied to these plots and the remaining parkland areas, to maintain the design excellence seen through Games time, and provide a consistency of high quality, accessible public realm, biodiversity and play as a lasting legacy.

The neighbourhood and development plots include:
- Chobham Manor
- East Village
- East Bank
- East Wick and Sweetwater
- Hackney Wick
- Bromley By Bow
- Pudding Mill Lane
- Rick Roberts Way

This guidance sets out the expected standards for ensuring that good design and biodiversity is sustained across the open spaces of the Estate, whilst integrating place making principles as part of the ongoing management of the Park.



PURPOSE

The Queen Elizabeth Olympic Park Design Guide is primarily designed to provide third party designers, developers and land managers with:

- details on existing standards for the Park as a whole.
- the overarching design principles expected by the LLDC for developing plans associated with proposed neighbourhoods and landscape improvements.
- how to incorporate standards for new open space proposals within developments on Queen Elizabeth Olympic Park Estate.
- guidance on how the interface between new developments and parkland should be designed and managed.
- design parameters for selecting materials and products.
- high level guidance on implementation standards.
- sign posting to relevant policy and standards.
- documentation of the existing qualities of the Park and existing planning permissions, such as the Legacy Communities Scheme shown as Queen Elizabeth Olympic Park Estate on the adjacent plan.
- provision of supplementary design considerations for existing planning applications (to complement existing design codes).
- how design needs to fit with overall long term stewardship objectives of the Park

The Park Design Guide should be read in conjunction with other relevant planning permissions e.g. Legacy Communities Scheme (LCS), planning conditions and the Park Management Plan.

The map opposite highlights how this Guide relates to the LLDC's planning boundary.

AREAS OF INFLUENCE	PARK DESIGN GUIDE APPLICATION
LLDC zone of influence (Planning Authority)	Recommended for guiding wider neighbourhood public realm schemes
Queen Elizabeth Olympic Park Estate	Essential for informing open space design standards across the LCS neighbourhoods
Queen Elizabeth Olympic Park parkland	Essential for designing changes to the core parkland and for informing ongoing maintenance
Parkland outside LLDC management	Recommended for guiding public realm design improvements in these areas

USER GUIDE

OVERVIEW

The Guide, alongside the Park Management Plan, should be used to inform design decisions on the Park, Estate and wider areas (current planning area). In some cases other guides may be applicable such as the Canal Park or Lea River Park Design Manual.

Designers are expected to utilise the guidance set out in this document to justify the decision making process and the selected material palette. Where alternative design approaches are suggested by a third party designer, reasons for deviating from the standards set out in this guidance should be agreed with LLDC.

Depending on area of application, recommendations should not be seen as a prescriptive set of rules, but rather as best practice design parameters that still allow for some flexibility and individuality in designs coming forward. These parameters are needed to ensure a lasting coherence for the design aesthetic of the area as a whole.

The document is intended to be a live report and will need periodic review.

The document should also be read alongside LLDC's Inclusive Design Standards which focuses on recommendations to create genuinely inclusive and accessible environments for all Park users.

It must be recognised that the guidance set out in this document cannot replace the expert advice of LLDC professionals.

GENERAL APPLICATION PROCESS

1. Designers and project managers are to review the Park Design Guidance materials palette to justify the use of materials being considered.

2. A discussion with an LLDC Design Advisor should be organised, which could form part of a pre-planning application

3. An application is submitted.

4. Applicants may be required to attend and/or present at an LLDC Quality Review Panel meeting where the proposal will be further assessed.

5. Applicants will be informed of the outcome of their proposal within appropriate timescale of the review meeting.

6. Implementation of proposals.

7. Monitoring and post-installation inspection.

DESIGNER / APPLICANT PROCESS

This guidance supports the process for submitting and reviewing design applications through the planning system with an LLDC Design Advisor, depending on the nature of the proposal.

Specific products may be agreed for implementation on a trial basis to test the suitability of the product before Park-wide roll-out.

For projects on the Park the process should begin with a review of the long term sustainability and management objectives.

Stakeholder and community engagement should be embedded within the process.

LLDC QUALITY REVIEW PANEL

Comprising a range of built environment experts, the panel has been set up to support the Planning Authority with external professional input to ensure high quality design throughout the design process.

Any project can be brought forward by LLDC for review and it is recommended that this occurs at an early stage of design to ensure recommended changes can be incorporated effectively.

At an early stage (RIBA 1/2), the panel meets for a design workshop focusing on strategic decisions and initial design matters including accessibility requirements.

From RIBA Stage 3, a formal Design Review process is undertaken to provide technical advice to the client and concentrate on issues that do not meet an acceptable standard. A Quality Review Panel meeting may take place at application stage to ensure that suitable changes have been made to a proposal.

It is recommended that panel members are briefed with this design guide, before participating on the panel.

OTHER PANELS

- Built Environment and Access Panel (BEAP)
- Legacy Youth Voice
- Park Panel

1 STRATEGIC GUIDANCE

VISION

A LEGACY OF DESIGN EXCELLENCE

OLYMPIC LEGACY

The LLDC Vision for the future management of the Park is:

> "To take forward the legacy of landscape design and horticultural excellence, beauty and quality, community participation, sustainability and nature conservation created for the London 2012 Olympic and Paralympic Games".

Within a wider parkland context, the Lee Valley Regional Park Authority's Vision Statement is to provide:

> "A world class destination combining the best of open space, conservation and sporting excellence."

LIVE, WORK, VISIT AND INSPIRE

Working in partnership with the four London Boroughs surrounding the Park and the Mayor of London to support healthier lifestyles and develop successful neighbourhoods by:

- building diverse neighbourhoods and community centres
- creating jobs through a range of economic opportunities
- creating a landmark global destination for local residents and international visitors
- The Vision for Queen Elizabeth Olympic Park as a whole is to: "[create] a dynamic new metropolitan centre for London."

INVESTING IN QUALITY

The LLDC is committed to providing the highest standards of landscape design, sustainability, habitat provision and open space management. By prioritising quality in design, LLDC will maintain the Olympic Legacy ambition through the promotion of design best practice, and encouraging innovation as part of a process of landscape conservation and wider development.

BEYOND THE PARK

A diverse programme of public realm works have already been delivered around the fringes of the Park.

It is recommended that future fringe developments look to tie in with the character of the park edge, utilising elements listed in this Design Guide where appropriate to maximise the design quality and impact of new peripheral facilities.

GUIDING DESIGN PRINCIPLES

The following overarching design principles set out LLDC's commitment to:

- engage with local communities to accommodate their requirements
- plan high quality, durable public realm solutions that are fit for the future
- design usable spaces of adequate size and configuration to fulfil the intended purpose and meet long term management objectives
- utilise robust, low maintenance materials and street furniture that meet operational requirements
- specify sustainable materials and construction approaches
- enhance biodiversity by providing a range of habitat types
- accommodate and preserve heritage assets
- encourage active lifestyles and play by creating a range of safe and attractive spaces
- embrace inclusive design standards to maintain accessibility for all users
- integrate new layouts with the existing walking and cycling network and consider opportunities to link and further encourage use of public transport.

Multifunctional spaces for all in the South Park, with bespoke furnishings

Riverside walkways and terraced seating characterises the South Park - looking towards the combined heat and power (CHP) Energy Centre

INCLUSIVE DESIGN

ACCESSIBLE PUBLIC REALM

All areas of the Park are to be designed in accordance with LLDC's Inclusive Design Standards (LLDC, 2013). Public realm applications are to provide accessible pedestrian routes which comply with these standards.

DESIGNING FOR ALL

Inclusive design encapsulates more than physical infrastructure. It should also be considered as part of a process to encourage community involvement and participation.

Designing for the needs of all users is complex and requires careful consideration of disabled people, older people, families with young children and babies, as well as people from diverse cultural groups.

The design principles in chapter 2 and the standards in chapters 3 - 5 set out how this can be delivered in practice. The summary advice in this section identifies the processes that designers should undertake to deliver inclusive design.

BUILT ENVIRONMENT ACCESS PANEL (BEAP) CONSULTATION

Design teams are required to formally present their designs to the BEAP as part of the Design and Access Statement.

It is recommended to involve the group from an early stage so that designs can be progressed by considering the needs of all user groups.

Design teams should report back to the BEAP on how recommendations have been incorporated within the following design and delivery stages as part of a Design and Access Review BEAP:

EARLY STAGE
From RIBA Stage 1: Preparation and brief, designers are expected to consult with LLDC's Inclusive Design Principal and present proposals to the BEAP for review and feedback from an inclusive design perspective. This engagement will continue throughout the design stages.

↓

CONSTRUCTION STAGE
Operations managers need to ensure that appropriate re-routing strategies and diversions are in place to maintain adequate access for pedestrians during construction.

↓

POST COMPLETION
LLDC Design Advisors are expected to review the layout following installation to ensure that the facility has been delivered satisfactorily and performs as expected.

LOCAL INITIATIVES

The Park Mobility service, delivered by Our Parklife and Park Champion volunteers, runs from the Park's Information point opposite the London Aquatics Centre. The Park Mobility service includes hiring of mobility scooters and manual wheelchairs and a mobility (golf) buggy that runs on a predetermined route around the Park. Designers must consider any potential impact on this important park service and ensure clear routes are maintained as required.

APPLICATION OF DESIGN STANDARDS AND GUIDANCE

- consideration of unforeseen consequences
- careful consideration of space

KEY REFERENCES

- Equalities Act 2010
- Equality and Inclusion Policy (LLDC, 2012)
- Inclusive Design Strategy (LLDC, 2013)
- Inclusive Design Standards (LLDC, 2013)
- BS 8300

RELEVANT POLICIES AND GUIDANCE

PRIORITY THEMES

The LLDC's work is underpinned and defined by the following four priority themes, detailed in the related policy documents:

PROMOTE CONVERGENCE, EMPLOYMENT AND COMMUNITY PARTICIPATION

Reversal of pre-existing local trends of unemployment and lower educational attainment has been targeted by focusing on providing:

- cultural and sporting tourism and attractions at the retained Games venues and at Stratford Waterfront.
- new office, research and business quarters in Stratford and a technology and media hub at Here East.
- diverse employment clusters in emerging development zones of Fish Island and Sugar House Lane.

CHAMPION EQUALITIES AND INCLUSION

Working closely with developers and operators, the LLDC seeks to implement an inclusive design strategy to ensure the parkland and new developments are accessible to all users:

- planning strategies should consider how different communities can benefit from and be encouraged to use the Park, by providing a range of recreation spaces.
- the LLDC will look to foster relations between new residents and its existing neighbours through a programme of activities and through ongoing local engagement.
- the LLDC support an independent Built Environment Access Panel (BEAP) who review all LLDC development to ensure exemplar inclusive design solutions.

ENSURE HIGH QUALITY DESIGN

Site wide design codes for all the Planning Delivery Zones including high level landscape and public realm guidance set out the importance of responding to local context, while incorporating the highest quality of design standards:

- learning from exemplar projects as an important part of progressing quality and delivery success.
- heritage assets are to be sensitively accommodated to shape local identity and promote cultural awareness.
- local distinctiveness is to be promoted where it facilitates a greater sense of place and enhances the usability of the built environment.

ENSURE ENVIRONMENTAL SUSTAINABILITY

Parkland areas need to contribute to the green infrastructure network and look to meet the targets set out in the Biodiversity Action Plan by:

- protecting trees and areas of woodland to promote biodiversity.
- planning for green assets with a diversity of habitats as part of a network of public and private open spaces.
- maintaining the Blue Ribbon Network of waterways by preserving wetland habitats and managing surface water runoff to reduce flood risk.
- monitoring biodiversity targets.

Social-Economic Policy (LLDC, 2012)
Sport and Healthy Living Policy (LLDC, 2012)
Community Engagement Policy (LLDC, 2012)

Equality and Inclusion Policy (LLDC, 2012)
Inclusive Design Strategy (LLDC, 2013)
Inclusive Design Standards (LLDC, 2013)

Design Quality Policy (LLDC, 2012)
Legacy Communities Scheme: Revised Design Codes(LLDC, 2012)

Sustainability Guide 2030 (LLDC, 2012)
Revised Green Infrastructure Strategy (LLDC, 2012)
Queen Elizabeth Olympic Park BAP (2017)
Park Management Plan (2017)

STRATEGIC POLICY SETTING

THE LONDON PLAN (GLA, 2016)

London Plan Policy 2.4 The 2012 Games and their legacy - specifically sets out Queen Elizabeth Olympic Park as the most significant regeneration project in London for 25 years.

Policy 4.5 London's Visitor Infrastructure sets out Queen Elizabeth Olympic Park as an important Strategic Cultural Area with planning policy focused on stimulating economic growth.

OLYMPIC LEGACY SUPPLEMENTARY PLANNING GUIDANCE (GLA, 2012)

Supplements and applies London Plan Policy to the OLSPG area by setting out the Mayor of London's strategic priorities and long-term vision for Queen Elizabeth Olympic Park and its surrounding areas.

THE ALL LONDON GREEN GRID SPG (GLA, 2012)
Outlining the strategic significance of Queen Elizabeth Olympic Park as a green infrastructure resource and focal point for East London and its new communities.

LLDC LOCAL PLAN 2015 - 2031 (LLDC, 2014)

The core document detailing LLDC's planning commitments to deliver new mixed-use development, identifying policy objectives for ongoing sustainable development.

LOCAL AUTHORITY LOCAL PLANS / UNITARY DEVELOPMENT PLANS (UDP)

Key references to open space policies in the Local and / or Unitary Development Plan are listed below:

- LB Hackney's adopted Core Strategy Policy 26 states there will be "no net loss in open space" for developments in Hackney.
- LB Newham's adopted UDP policy S39, Leisure, Recreation and Open Space identifies the lack of open space across Newham and seeks to protect existing open space and provide new publicly accessible space where feasible.
- LB Tower Hamlets' saved UDP policy OS6 seeks to protect areas of Metropolitan Open Land (MOL) from development. OS7 states that any loss of open space will not be allowed except where the development is related to and promotes outdoor recreational use of the open space.
- LB Waltham Forest's saved UDP policy ENV1 outlines a policy to protect and provide new open spaces, with policies ENV4 and 5 protecting areas of MOL from development.

OTHER GUIDANCE

Other guidance documents which should be referred to for specific aspects of the design and layout of the Park and the wider area includes:

QUEEN ELIZABETH OLYMPIC PARK MANAGEMENT PLAN (LLDC, 2017)

QUEEN ELIZABETH OLYMPIC PARK BIODIVERSITY ACTION PLAN 2014-19 (LLDC, 2013)

CANAL PARK DESIGN GUIDE LCS-GLB-CON-APP-CPDG-001-V02 (LLDC, 2013)

LEGACY STREET TECHNICAL DESIGN GUIDE (LLDC, 2014)

LEA RIVER PARK DESIGN MANUAL (LLDC, 2016)

A full list of other relevant documents is provided in the References section of the Glossary and References, towards the end of this document.

KEY STAKEHOLDERS

The LLDC liaises with a wide range of stakeholders as part of the design process for developing Queen Elizabeth Olympic Park; the following list is not exhaustive but is illustrative of the breadth of organisations and people who need to be considered, reinforcing the importance of ongoing engagement:

- The Mayor of London, the Greater London Authority and Transport for London.
- The four London Growth Boroughs which are part of the LLDC's wider area: Hackney, Newham, Tower Hamlets and Waltham Forest.
- Local communities including the people who live in areas adjacent to the Park.
- Statutory agencies including the Canal and River Trust, Environment Agency, Lee Valley Regional Park Authority and Network Rail.
- Local developers and landowners, including Westfield, London and Continental Railways, and Lendlease.
- East Bank Partners including: Sadler's Wells, University of the Arts London (UAL), University College London (UCL), BBC and the Victoria and Albert Museum (V&A).
- Other existing partnerships: West Ham United Football Club, UK Athletics, E20 Stadium LLP, Vinci/LS185, East Village, Chobham Manor LLP, Places for People and Balfour Beatty, Here East, Greenwich Leisure Limited, Engie and the Camden Society.

GREEN INFRASTRUCTURE AND BIODIVERSITY

GREEN INFRASTRUCTURE PLANNING

Fundamental to maintaining the long term health and quality of life of sustainable communities, green infrastructure comprises all the public and private areas of open space that contribute to environmental and ecological processes. This section summarises the Revised Green Infrastructure Strategy (LLDC, 2012 LCS-GLB-ACC-GIS-002) and the key design considerations for the development of the green network as well as LES and ALGG objectives.

Across the Estate, the existing green infrastructure network includes a range of open space sub-types: allotments, amenity green spaces, civic spaces, green corridors, outdoor sports facilities, formal gardens and the waterways, as well as living roofs.

The layout of these spaces should be designed to achieve Natural England's targets for urban areas by providing green space of at least 2 hectares in size, no more than 300 metres (5 minutes walk) from home.

Improving connectivity with other green spaces through the provision of green corridors along new routes is vital for connecting with the wider green grid to provide a rich system of habitats. Diverse planting should be integrated within all new route designs.

Equally, improving the naturalness of green spaces by planting for biodiversity with overlapping habitat zones, is a key objective of LLDC's Biodiversity Action Plan (2013).

An ecologist should be consulted at an early stage where green spaces are to be designed, to make sure that the intended habitat is designed and maintained to offer optimal biodiversity value.

WATER ENVIRONMENT

The Park includes 6.5km of improved waterways - the blue network. The River Lea flows through the centre of Queen Elizabeth Olympic Park and is an attractive ecological asset to be preserved and enhanced.

Several rivulets diverge around Stadium Island and there are opportunities for further ecological enhancement on these waterways through additional embankment stabilisation.

CLIMATE CHANGE

Environmental performance standards have been set out to make the most of natural and built assets, including:

- adaptive management regimes conducted across the Park to provide resilience to climate change
- retention of green spaces and tree planting to mitigate against the localised effects of climate change.


1 Park Wetlands


2


3


4

BIODIVERSITY THROUGH HABITAT CREATION

HABITAT TARGETS

The Biodiversity Action Plan sets out the following habitat categories for the 49.1ha of habitat areas to be designed and managed across the parkland:

- built environment - 3.32ha - including man-made structures that intentionally or unintentionally provide habitat space
- parks, squares and amenity spaces - 3.0ha
- allotments - 2.1ha
- brownfield habitats - 4.2ha
- species-rich grasslands - 23.47ha
- trees and scrub - 9.9ha
- wet woodland - 0.9ha
- rivers - 0.3ha
- reedbed - 1.6ha
- ponds - 0.3ha

Key targets to comply with the Biodiversity Action Plan include:

- minimum 70% of selected species to be native.
- non-native species may be permitted where there is evidence of local wildlife benefits.
- a management strategy should be submitted alongside any new habitat provision.

HABITAT MONITORING

Designers of habitat spaces should be aware of the annual monitoring regimes in place to map and classify habitats and evaluate ongoing quality based on:

- BAP River and Pond Condition Monitoring Surveys
- BAP Species Monitoring Surveys
- Photographic Monitoring
- Annual Monitoring Report

It is also important to raise awareness of the importance of nature conservation in local communities and inspire individuals and families to become involved by providing information on habitats and engaging with residents (through Parklife CIC).

Monitoring data is to be submitted and evaluated in the Greater London Authority's Geographic Information System.

NATIONAL CHARACTER AREAS

The National Character Area Profile:112 Inner London (NE476) should be referred to when making decisions regarding the design of habitats and ecosystem services.

KEY REFERENCES

- Biodiversity Action Plan 2014-19 (LLDC, 2013 LCS-GLB-S106-APP-BAP-001-V01)
- Nature Nearby – Accessible Natural Greenspace Guidance (Natural England, 2010)
- National Character Area Profile:112 Inner London (NE476)
- Biodiversity Net Gain 2017
- Urban Greening Factor 2017

HERITAGE AND CONSERVATION

HERITAGE ASSETS

SETTING OF ASSETS

The original parkland layout and setting of events venues needs to be preserved.

Undeveloped sites may require a watching brief as archaeology artefacts may be found.

The Setting of Heritage Assets (Historic England, 2015) advice note provides details on assessing the effect of proposed developments on heritage assets.

KEY STRATEGIC VIEWS

As part of wider strategic landscape preservation requirements, key vistas are focused on preserving views of the Lee Valley VeloPark, London Aquatics Centre and ArcelorMittal Orbit, as well as long views down the River Lea. Planting should be managed to maintain these strategic views.

The London View Management Framework should be consulted for all major developments within the Park including the view from King Henry's Mound, Richmond Park.

CONSERVATION AREAS

There are four designated Conservation Areas within the wider area:

- Fish Island and White Post Lane
- Hackney Wick
- Sugar House Lane
- Three Mills

These areas have additional planning controls to ensure there is a sensitive treatment of the setting of existing heritage assets.

Conservation status does not necessarily restrict development, however it includes specific standards to mitigate against unsympathetic design.

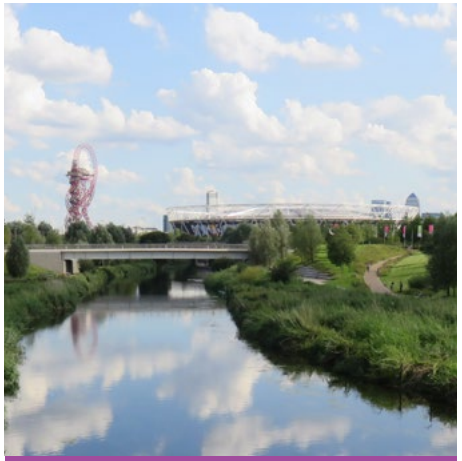
Tree Preservation Orders (TPOs) are designated across these areas, in particular there is a density of TPOs around the waterways, with the existing planting important for the character of the area.

ARCHAEOLOGY

Archaeological Protection Areas cover the majority of the Legacy Corporation Area.

Policy BN.12 of the Local Plan: Protecting archaeological interest, states that:

"Proposals for development will only be considered acceptable where they protect archaeological remains that will be affected by development on sites that include or have the potential to include archaeological interest."



KEY REFERENCES

- The Setting of Heritage Assets (Historic England, 2015)
- The London View Management Framework
- Local Plan: Protecting archaeological interest (LLDC, 2013)
- Queen Elizabeth Olympic Park Management Plan (LLDC, 2017)

VENUE MANAGEMENT

VENUES AND EVENTS

LLDC works with several partners to manage the operation and management of venues.

The table opposite provides a reference for the general operation and frequency of events for the permanent venues in the Park.

The public realm adjacent to main venues is to be maintained with formal tree planting and a linear arrangement of street furniture to minimise physical obstructions and pinch points.

A limited palette of durable surface materials is to be applied which can include integrated surface wayfinding features as appropriate.

All venues are open daily.

Note there are other outdoor event spaces such as Hopkins Field as well as those managed by other land managers such as International Quarter London, East Village and Here East.

VENUE	CAPACITY	EVENT FREQUENCY	OPERATING HOURS	MAIN ACCESS ROUTES	ADDITIONAL INFORMATION
ArcelorMittal Orbit	300	Daily for visitors; up to two events per week in the evenings	1000-1800 school holidays and weekends. 1100-1700 otherwise.	South Park Boulevard Thornton Bridge	Abseiling spring/summer/autumn weekends. Blue Badge and coach parking on Thornton Street.
Copper Box Arena	7,500	2-3 per week. Community use remainder of the time	0700-2200 (can be up to 2am for events)	Audiences enter on Eastcross Square, usually walking through Park via Mandeville Place or along Waterden Road	Car park is closed on event days because it is used by event personnel. Non-event entrance on Copper Street. Event access via Copper Street in some cases only.
Here East	1,000	3-4 per week	0800-2200	Waterden Road	Restaurants open daily. Non-event tenants include BT Sport, Loughborough, UCL, etc.
Lee Valley Hockey and Tennis Centre	Up to 10,400	Occasional major tournaments. Mainly community use	0600-2200	Essex Way	Car park to be operational at all times.
Lee Valley VeloPark	6,000	Occasional major tournaments. Mainly community use	0600-2300	Essex Way	Car park to be operational at all times.
London Aquatics Centre	3,500	Infrequent. Mainly community use	0600-2300	Audiences usually use Stratford Walk entrance	Car park to be operational at all times. Non-event entrance on the waterfront promenade.
London Stadium	57k for football Up to 80k concerts	Approx 35 major bowl events pa. 2-3 smaller corporate hospitality events each week	Subject to events	F10/Waterworks Place South Park Boulevard Thornton Bridge Mandeville Place Loop Road	Roads closed on major event days. Stadium open for tours on non-event days. Access to West Ham United shop and cage to be maintained at all times.
Podium	120 upstairs	2-3 per week	0900-1800 (can flex)	South Park Boulevard Thornton Bridge	Public café
Timber Lodge	100	2 per week	0900-1800 daily	Essex Way	Public café, Playground

SAFETY AND SECURITY

KEY PRINCIPLES

The safety of people in the Park is primarily the responsibility of LLDC, the Metropolitan Police and the Local Authority. Designers of public realm schemes also have a responsibility to ensure that the design and layout of schemes deters crime.

It is important to embed the principles of Secured by Design (2014) within all schemes:

- plan how the space will be used so that different competing uses will not conflict
- maximise opportunities for natural surveillance of open space with active frontages/kiosk or windows overlooking spaces
- provide convenient access points but ensure that these do not compromise wider security arrangements
- design the space to comfortably accommodate the anticipated degree of activity
- maintain areas well so as to provide a high quality environment.
- ensure designs that relate to security attain a Gold level Secured by Design rating.
- utilise street furniture that meets BSi PAS 68 and 69 guidelines, where vehicle security is required.

LIGHTING

Adequate lighting of routes needs to be matched with sufficient levels of natural surveillance from surrounding buildings to provide actual security benefits.

Overall lighting requirements to comply with the Environmental Zones set out in the ODA Lighting Strategy; see Lighting p72.

NIGHT-TIME ACCESS

Permanent park railings are provided around the North Park and restrict night-time access (North Park Secure Perimeter Design and Access Statement, 2013).

The Park Estate Facilities Management contractor provides 24 hour security, with venue security the responsibility of the individual operators. However during major events, coordination between these teams is required.

MAJOR EVENTS AND CROWDED AREAS

The Park Security Plan provides detailed guidance on the planning of major events. Counter-terrorist advice should be included in design in relation to events and crowded spaces.

High specification counter terrorism bollards are located around Stadium Island. The structural integrity of these installations should be inspected regularly.

Designers should consider how the placement and layout of features and projected plant growth support long-term security requirements as well as support crowd management, and avoid creating pinch-points on main walking routes.

ROAD SAFETY

Safety for all park users is especially important on roads where the potential for severe accidents is more likely than in other parts of the Park.

All new roads are to be assessed during the design and post-implementation phases of a project as part of a formal Road Safety Audit, to address issues of safety at the design stage.

Designers should be aware of the importance of the standards set out in the Design Manual for Roads and Bridges and the best practice guidance in Manual for Streets.

Collision statistics should be reviewed periodically, with conflict points designed out.

MONITORING

As part of contract monitoring requirements, contractors submit monthly review reports to LLDC.

These include safety inspections of Park facilities, as well as summary documentation of crime reports from the Metropolitan Police.

KEY REFERENCES

- North Park Secure Perimeter Design and Access Statement (LLDC, 2013)
- Resilient Design Tool for Counter Terrorism (2014)
- Secured by Design: New Homes (2014)
- Park Security Plan (LLDC, 2016)
- Design Manual for Roads and Bridges HD 19/03 Road Safety Audits
- Manual for Streets (DfT, 2007)
- Manual for Streets 2 (DfT, 2010)
- ODA Lighting Strategy (2009)

TRANSPORT INFRASTRUCTURE

STRATEGIC OVERVIEW

The convergence of multiple transport links at Stratford makes the eastern edge of the Park one of the best connected areas for public transport in the city. The contrast in proximity and accessibility to transport infrastructure across the parkland needs to be considered such that linkages are designed to accommodate different requirements based on the local context and onward connectivity.

HIGHWAY NETWORK

The Travel Plan Framework (LLDC, 2013) sets out the strategy for Queen Elizabeth Olympic Park access and travel across the wider parkland area. A sustainable transport hierarchy has been established prioritising modes in this order: walking, cycling, public transport, car share and the least sustainable option; single vehicle occupancy.

STREET HIERARCHY

Highway infrastructure layouts include the main roads within the Park and associated pedestrian and cycle routes. The road network provides linkages to the development platforms and the Park venues. The hierarchy of these roads is based on their function and scale:

- Primary roads - acting as district distributor routes
- Secondary roads - providing a local distributors function
- Tertiary roads - local connections which are subject to design alterations as part of the LCS package of works.

HEALTHY STREETS AND AIR QUALITY

The Mayor's Transport Strategy (GLA, 2017) and London Environment Strategy, Draft (GLA, 2017) set out a vision for promoting sustainable transport modes as part of the Healthy Streets agenda to improve air quality and provide long term social and environmental sustainability.

Air Quality Management Areas (AQMAs) are designated across the Park, requiring a holistic design approach to reduce air pollution by:

- promoting walking and cycling as the predominant transport mode across all areas of the Park
- facilitating greater public transport integration
- providing electric vehicle recharging points in residential neighbourhoods
- utilising green infrastructure to enhance air quality
- implementing Safer Routes to Schools in accordance with appropriate national guidance to encourage more walking.

The implementation of London Cycle Hire is anticipated to significantly increase the opportunity for leisure cycling in the Park.

KEY REFERENCES

- Mayor's Transport Strategy (GLA, 2017)
- London Environment Strategy, Draft (GLA, 2017)
- Travel Plan Framework (LLDC, 2013)
- London Sustainable Drainage Action Plan (GLA)

WALKING

Walking is the primary mode of transport within the Park and needs to become the go-to option for new residents in the area to support healthy journey choices and link in with public transport.

Some environmental and social barriers to walking that need to be overcome to encourage greater uptake of walking which can be achieved by designing more attractive, direct and comfortable paths and footways through residential areas to the parkland.

It is recognised that the Park will continue to evolve and there remains flexibility in how paths connect between their start and end points, but that each end position is fixed for strategic reasons.

KEY DESIGN PRINCIPLES

- Footpaths and formal crossings should cater for pedestrian desire lines, with sufficient width to accommodate future demand.
- Walking surfaces should be designed to minimise changes in gradient and provide appropriate design features to ensure routes are accessible for all users.
- Safety and security of pedestrians is of paramount importance and safety audits should be conducted for all schemes introducing new road layouts.
- Street furniture should be implemented to support walking, by providing signage and regular seating where it is most needed.
- Pedestrian routes across the Park should all be designed to be inclusive and accessible for all, with a hard-standing surface and with gradients minimised to keep routes flat or as shallow as possible. This is a key feature of the Park and in particular regarding the routes down to the waterways (see Inclusive Design Standards).

CYCLING

The Mayor's Vision for Cycling in London sets out clear objectives for increasing cycling provision as part of an Olympic legacy not just for the Park, but the city as a whole.

- Leisure cycling and considerate commuter cycling is permitted on all paths and hard surfaced areas across the Park.
- Cycling on grass and through other soft landscaped areas is not allowed and will be enforced by security teams.
- The Canal and River Trust's Greenway Code for Towpaths applies whereby considerate use of shared use areas should facilitate pedestrian priority.

KEY DESIGN PRINCIPLES

- No segregation of cycle routes to be provided across the main parkland areas.
- Cycle lanes on primary and secondary roads may be acceptable, subject to space availability.
- All cycle infrastructure to be designed in accordance with Transport for London's Cycling Design Standards (2014) and consider inclusive cycling requirements.
- Shared spaces on new residential streets may be considered where traffic flows are anticipated to be sufficiently low. See Legacy Street Technical Design Guidance for more information on shared space standards.

PUBLIC TRANSPORT

Public transport is crucial to the vision of a sustainable transport legacy. It is intended to form part of an accessible, legible and well-connected network alongside pedestrian, cycle and highway connections.

The Park edges are well-served by public transport, with bus, National Rail, London Underground, DLR services available at present, and Elizabeth Line services planned for Stratford Station by 2021.

Current Public Transport Accessibility Levels (PTAL) show high accessibility at the fringe, especially at Stratford Station, and it is anticipated that all development zones will have a PTAL of 3 or higher.

RAIL SERVICES

Queen Elizabeth Olympic Park is served by nine lines at four train and underground stations situated within the LLDC zone of influence, and several more beyond this area.

Stratford Station, Stratford International Station, Pudding Mill Station, Hackney Wick Station provide access to rail, London Underground, and Overground services. Key walking and cycling routes to and from rail stations in the LLDC's zone of influence should be supported.

PRIVATE VEHICLES

See Section 3I: Parking and Loading.

BUS SERVICES

Public transport nodes, including bus stops located within the Park, should be well-connected to the walking network.

There are currently four bus routes that run through the Park, and a total of 26 services that serve the park perimeter. Within the Park, bus stops are located on primary and secondary routes including Carpenters Road and Waterden Road. Additional bus stations are available at nearby hubs; at Stratford International Station and Stratford Underground Station.

Bus stops have been proposed on the Southern Loop Road in particular. The design of the bus stop environment should follow TfL's Accessible Bus Stop Guidance, to ensure acceptable access standards relating to the location and links to walking routes, kerb heights, passenger waiting area layout.

RIVER AND CANAL BOATS

- Leisure and working infrastructure.
- CRT / EA / Boating community.

AUTONOMOUS VEHICLES

Queen Elizabeth Olympic Park is a hub for sustainability with initiatives such as Digital (SMART) Park including trials for autonomous vehicles.

WATERWAYS

As part of the development of Queen Elizabeth Olympic Park, the waterways have enjoyed significant investment. They have been cleaned, repaired and restored with the potential of becoming world class waterways and an example of best practice for waterway-led regeneration.

RIVER USE AND AMENITIES

- passenger trip boats
- private boating
- day boat hire
- community and education boats
- trade bargets
- freight transport
- canoeing and Rowing
- angling
- ecology
- heritage
- waterways as an educational resource
- volunteering
- waterway events

Any proposals brought forward will need to obtain all necessary consents, including planning permissions, Water Framework Directive consent and operational licences as appropriate.

KEY REFERENCES

- Accessible Bus Stop Guidance, TfL
- The London Plan (GLA, 2016)
- The Mayor's Vision for Cycling in London (TfL, 2016)
- The Mayor's Transport Strategy (GLA, 2017)
- London Cycling Design Standards 2016
- Olympic Legacy Waterways Framework

BRIDGES

The Park is characterised by its numerous bridges, with a wide range of structures and materials already applied across 25 large scale road and rail bridges, and 16 smaller scale road and footbridges, located primarily at the park edge. Bridge proposals are put forward to increase connectivity primarily for walking and cycling, but also for bus and vehicular access.

KEY DESIGN PRINCIPLES

All bridges are required to satisfy the following public realm design requirements:

- Maintain a canal clearance height of minimum 2.4m.
- Satisfy Inclusive Design Standard requirements for all parts of the bridge design, including the approach, ramps and the affected area of towpath.
- Provide rest points at 50m intervals.
- Ensure sightlines of the water are maintained for all users when viewed from the bridge.
- Provide sufficient footway widths for comfortable pedestrian use, minimum 2m.
- Ensure all connections to adjacent properties are maintained.
- Material choice to be sensitive to the local setting.
- Surface materials and planting design on the approach to comply with this guidance.
- Abutment design typically to utilise Queen Elizabeth Olympic Park standard using filled 70mm stone gabion baskets.
- Consider opportunities to integrate steps and terracing as part of the retaining structure, to enhance access to and from the bridge and towpath.
- Preserve the setting of local heritage features by maintaining long vistas of the water and wider parkland.
- Bridges are key points for integrated wayfinding.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2 CHARACTER AREA DESIGN PRINCIPLES

QUEEN ELIZABETH OLYMPIC PARK

PARK CHARACTER OVERVIEW

PARK CHARACTER AREAS

Character areas are defined in Queen Elizabeth Olympic Park: Park Management Plan 2014-2019 (Jan 2017).

The three main character areas of Queen Elizabeth Olympic Park development boundary are:

- **North Park** – from Waterden Road to the A12
- **South Park** – from the Greenway to Waterden Road
- **Canal Park** – alongside the eastern bank of the Lee Navigation.

The park-wide design principles overleaf, outline the overarching parameters and recommended layout approach for implementing key features across the wider parkland area. Subsequent sections of this chapter set out the criteria and design approaches to be considered for each of the four character areas to fulfil site specific requirements.

CONNECTIVITY AND PERMEABILITY

Proposals aim to reduce the issues of severance, improving linkages across the River Lea and Lee Navigation with additional bridges, and by providing additional access improvements north-south across railways lines and the A12.

- Subsequent proposal needs to ensure that opportunities for additional access improvements are prioritised and do not hinder future development.
- Enhancing public riverside routes is especially important, linking with the long distance Leaway route, as well as the Hertford Union Canal.

MULTI-FUNCTIONALITY AND FLEXIBILITY

A fundamental design consideration is one of ensuring longevity and adaptability to local needs and requirements by ensuring designs are fit for purpose, now and in the future:

- Provide opportunities for recreation and natural play whilst delivering biodiversity through carefully considered landscape design and specification.
- Select and position products to fulfil several desired tasks, such as benches positioned to restrict vehicle access.
- Avoid selecting overly prescriptive furniture to encourage flexible use and be more inclusive of a range of users.
- Seek to reduce the clutter of street furniture e.g. minimise columns by combining lamp post with signages and CCTV.
- Consider proposals in terms of their cumulative impact over time; with an awareness that incremental change can have a detrimental overall effect.

NORTH PARK

CHARACTER AREAS WITHIN NORTH PARK

The main design objectives for the North Park relate to providing:

- large flexible open space for events
- continuation of parkland character north-east into Waltham Forest
- preservation of naturalistic landscape and waterside access
- dense woodland planting along northern perimeter

Riverbank gradients were reduced with a widening out of the river corridor to create an undulating landscape of open vistas.


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LANDSCAPE ROOMS AND EVENTS AREAS

To the western edge of North Park, this extensive area of lawn alongside Waterden Road is earmarked for development as part of the East Wick development. Preserving an expanse of lawn for local use is important, and there is a need to ensure sufficient green space is maintained between the cycle circuit and new housing.

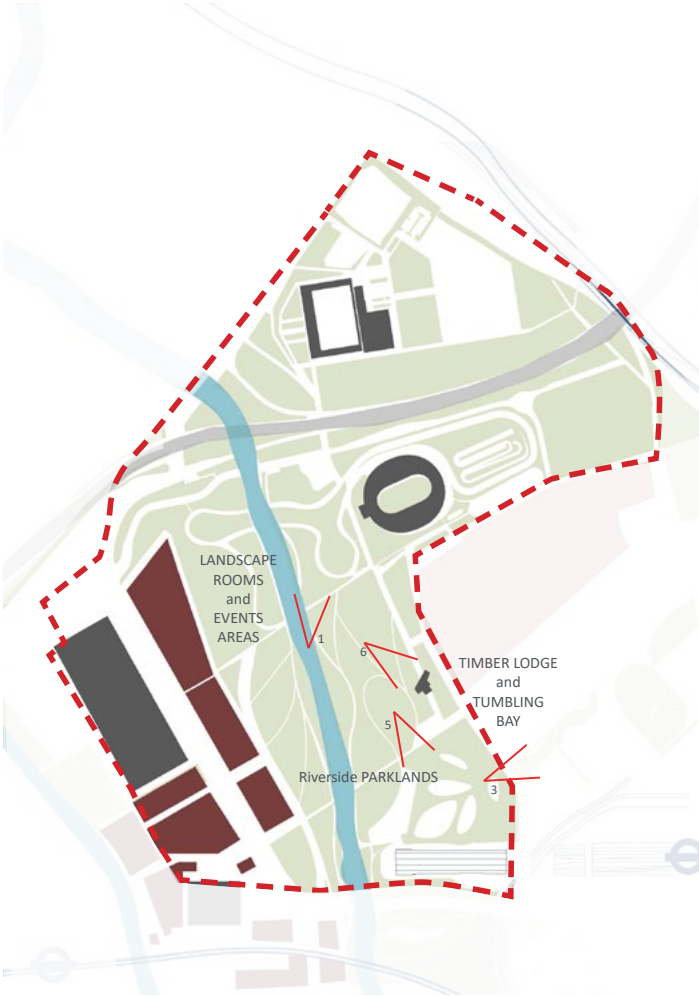
RIVERSIDE PARKLANDS

Forming the central spine of the North Park, the emphasis for this area is habitat creation with a mix of wetlands, woodland and meadows preserved as part of the sculpted landscape. Retention of key views towards the river and the Lee Valley VeloPark are the main focus for landscape maintenance in this area.

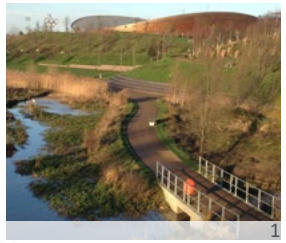
TIMBER LODGE AND TUMBLING BAY PLAYGROUND (winner of the 2014 Civic Trust Award for Universal Design)

At the eastern edge of the Park, a naturalistic approach to play space design has been incorporated into a range of environments and landforms. The pine forest comprises dense planting with high level walkways incorporated within the play area. The adjacent Succession Garden provides a richly planted sensory garden.

The Timber Lodge provides a café and events space, designed as an integral part of the woodland landscape.



North Park parkland and development boundary map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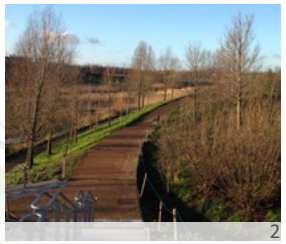
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SOUTH PARK

CHARACTER AREAS WITHIN SOUTH PARK

The South Park main design objectives relate to providing:

- a vibrant civic destination with an engaging programme of cultural events
- continued investment in landscaping to maintain a high quality attraction that draws on the Olympic legacy and supports the operation of the ArcelorMittal Orbit.
- tree lined avenues and prairie style planting to the south; and urban orchards and densely planted framed amenity spaces, creating a diverse mix of characters and contrasts. There is a focus on herbaceous perennials and ornamental grasses to provide bright colour and form.

The six defined character areas of the South Park are:

SOUTH PLAZA

As the central axis of the South Park, this area forms a tree lined promenade, with kiosks and play spaces adjoining the main route north-south. This area acts as an entry point from the Gateway route from the London Aquatics Centre and includes open expanses of hard landscaping including The Water Labyrinth feature (fountains) and bordered by curved seating. This area includes the Podium area and the café located near the ArcelorMittal Orbit.

CARPENTERS LOCK AND THE BELVEDERE

Towards the northern extent of South Park, Carpenters Lock comprises the waterside routes, linking with the main concourse by a stepped timber terrace and characterised by mirrored bridges. The Belvedere is the wide hard landscaped route linking the London Stadium to the North Park.

SOUTH EVENTS LAWN

The large lawn area south of the Hub building; it provides a flexible, open events space which can accommodate up to 30,000 visitors. Future UCL development is planned for this area.

FANTASTICOLOGY

This riparian bank facing the Bobby Moore Academy has a vibrant and biodiverse meadow intersected by sloped paths. The area is the largest colour segregated meadow in the country. Created as an art installation for Games time in annuals has been converted to perennial planting that has distinct colour zones due to density of the planting. http://www.wemadethat.co.uk/projects/view/fantasticology

THE SOUTHERN EDGES

Extensive woodland planting and open meadows wrap around the southern edge of Stadium Island and link to The Greenway.

South Park parkland and development boundary map


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CANAL PARK

CHARACTER AREAS WITHIN CANAL PARK

The Canal Park forms a continuous green corridor to the west side of Queen Elizabeth Olympic Park area.
It is designed to provide an effective transition from the rustic canal landscape and the wider industrial context. Ecological patchiness within a vision of the picturesque.

A Canal Park Design Guide (LCS-GLB-CON-APP-CPDG-001-V02) was prepared as part of the required planning conditions before developing a zonal masterplan. LLDC manages the Canal Park, while the canal and towpath are maintained by the Canal and River Trust.

- Completed in 2016, the Park is characterised by a continuous line of trees along its length and a mix of nature wet woodland, scrub and ruderals planting, swales and meadow grasses.
- The northern extent is described as providing a linear wetland area with meadow grassland. It includes a hub for outdoor seating and dining.
- The central section is defined by black poplars and species-rich meadow planting.
- The southern parcel has been designed to relate closely to the canal edge with bank side planting and play and recreation embedded in the design. It is characterised by the historic setting of Old Ford Lock.
- Any proposed changes to the design and access of moorings is to be delivered in consultation with LLDC and the Canal and River Trust.
- Biodiversity and play are integrated.
- There is a priority to provide sufficient space for all canal towpath users and the capacity will continue to be reviewed so as to manage and minimise potential conflict between different users.
- The Park is no narrower than 6 metres.
- Recommended 3.7m towpath widths to be maintained (minimum 2m), retaining verges with potential future towpath widening if required.
- No barriers are to be provided adjacent to the canal.
- A continuous 1m deep root barrier has been installed at the back of the towpath to minimise disturbance to the path surfacing.
- Tree and vegetation species have been selected based on their high biodiversity value with 70% native.
- Black Poplar is a priority species.
- Canal access for boats and maintenance through slipways, design for high loading should be retained.
- References are made to the historic area names.


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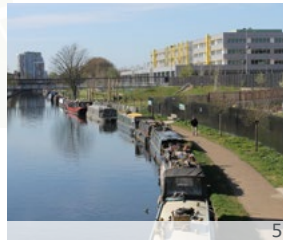
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KEY DESIGN PRINCIPLES

This section summarises the key design principles for the Park as a whole, as well as the specific features that need to be considered regarding maintaining the individual character of different parts of the Park. For some design features there is no variation recommended between different areas of the Park, while for others, each area has a preferred design approach that should be considered.

The section has been laid out to provide a quick reference point for all the main design features of the Park. More detailed information is provided in subsequent chapters for Surface Materials, Street Furniture and Landscape and Planting, Biodiversity and Play.

KEY REFERENCES

- ODA Lighting Strategy
- Inclusive Design Standards
- Lee River Park Design Manual
- Guidance on the provision of spending facilities for guide dogs and other assistance dogs (Guide Dogs for the Blind Association)

LAYOUT AND APPROACH

CONNECTIVITY AND PERMEABILITY

General

- Connections, such as footpaths, bridges and crossings, should be provided at regular locations to promote ease of access with good intuitive navigability.
- Hard surfacing for paths should be kept to a minimum to maximise permiability and maintain the green space.
- Design Codes set out the requirements for development plots.
- Connecting landscape corridors of the Lea Navigation and Waterways.

PARK EDGE TREATMENT

General

- Structural planting and/or trees to be incorporated alongside the building edge to soften the visual impact and better integrate developments with the parkland.
- Edges of the Park are to be clearly delineated with regular access points to be welcoming to visitors on foot or bicycle.

ACCESSIBILITY FEATURES

General

- Dog spend areas should be included in designs close to buildings (offices) to make them accessible for staff or visitors (in meetings for several hours) with guide dogs. See facility adjacent to the London Stadium, South Park.

SURFACE MATERIALS

FOOTWAYS AND FOOTPATHS

General

- A consistent treatment of resin bound golden gravel is to be used for most paths and footways. Other materials may be considered for specific performance requirements, such as around play areas or on heavily trafficked access routes.
- All paths to be designed to shared-use dimension standards across the Park, to allow for comfortable pedestrian and cyclist movements.
- An integrated water management plan should be proposed on all schemes to meet the GLA's London Sustainable Drainage Action Plan.

AMENITY AREAS AND PLAY SPACES

General

- Surface materials should be robust and appropriate for the type of amenity / play.

South Park

- Formal design of play areas lends itself to greater use of wet pour safety surfacing (red surfacing often used) and sand.

North Park / Canal Park

- Naturalistic materials are preferred including bark chips, grass, sand and recycled safety surfacing / mulch.

CARRIAGEWAYS

General

- Robust surface materials to be used with consideration for lighter coloured surfacing on lower trafficked routes to create more of a parkland character and reduce heat absorption.
- Crossing points to be defined with colour contrasting materials promoting pedestrian priority.

DRAINAGE

General

- Where possible, permeable surfaces or SuDS should be employed to accommodate surface run off.

South Park

- Flood risk zone means water attenuation is not possible. Permeable surfaces and positive drainage solutions are preferred.

North Park

- SuDS design such as swales are recommended to create a variety of habitats.

Canal Park

- Positive drainage for all hard surfacing to planting areas. Opportunities for SuDS and habitat creation should also be considered.

STREET FURNITURE

SEATING

General

- Seating is to be provided at intervals of no greater than 50m.
- Selected products may vary in style, but should complement the local setting and work together as a consistent family of furniture.
- All selected products should include features that provide accessibility benefits for a range of users.
- Maintenance considerations should be considered from the outset.
- See also Inclusive Design Standards (LLDC, 2013: IDS 04 – Seating).

South Park

- Furniture should be a refined appearance with chunkier timber section seating closer to the river/waterways.
- High capacity design solutions are preferred as this is the busiest area of the Park.

North Park

- Selected products to complement those of the South Park.

Canal Park

- Seating should be placed to minimise the creation of pinch points on footpaths.

PLAY EQUIPMENT

General

- Play products are to be multifunctional, non-perscriptive types, hard wearing and inspire a variety of play, such as active and creative play, across a wide range of age groups.
- See also Inclusive Design Standards (LLDC, 2013: IDS 17 – Inclusive Play).

South Park

- Surface materials such as red coloured safety surfacing and surface markings allow for low maintenance play features that reference the Olympic Legacy.
- Sand and water play elements create a diversity of play and high play value but require additional maintenance.

North Park

- Naturalistic, bespoke design features are preferred using timber and planting to create drama and adventure to deliver plant succession design concept.
- Sand and water play elements have been included in the existing designs and offer a high variety of play forms for all ages.

Canal Park

- Rustic timber and steel construction is preferred with play elements that utilise topography, while remaining sensitive to the canal setting and heritage.

BOUNDARY TREATMENTS

General

- Fencing, balustrades, knee rails and bollards are to be robust and fit for purpose.
- Powder coated metal or stainless steel is to be used in most locations, with timber applied in some locations.

South Park

- Generally stainless steel fittings are to be used, in-keeping with an urban park aesthetic.

North Park

- Use of powder coated / galvanised metal railings with some timber elements should complement the naturalistic character.

Canal Park

- Mostly timber and grey/galvanised steel to work with the urban fringe industrial aesthetic, linking with The Greenway palette of materials.
- Timber to have a non-machined form and finish, and should not be located next to the canal edge.
- CRT Design Guide - black and white finish to heritage features such as bollards.

PLANTERS

General

- Free-standing planters should generally be avoided unless there is a specific safety requirement or additional function that they need to serve, such as if planting cannot be achieved in the ground.

BOLLARDS

General

- The use of bollards should be carefully considered to minimise clutter while ensuring that they deter vehicle access and maintain pedestrian/cyclist permeability.
- All security bollards are to comply with BSi PAS 68 and 69 standards. Selected products should be appropriate for the location and considered in relation to the position of other street furniture.
- Other street furniture may be able to offer additional functional benefits while avoiding the need for bollards.
- See also Inclusive Design Standards (LLDC, 2013: IDS 07 – Street Furniture).

South Park

- PAS68 standard required to maintain safer areas of the Park.

North Park / Canal Park

- Management bollards required to prevent unauthorised vehicle access.

LIGHTING

General

- To comply with ODA Lighting Strategy with consideration of Environmental Zones to prevent over-lighting of sensitive areas.
- See also Inclusive Design Standards (LLDC, 2013: IDS 09 – Lighting).
- Dark Streets Standards

STREET FURNITURE

PUBLIC ART

General

- To comply with LLDC Arts and Culture Strategy 2014.
- To be appropriate and relevant to the location based on the Olympic or Paralympic Games, local history, and / or ecology.
- To be spectacular, innovative and accessible.

South Park

- Sculptural elements have been matched with off the shelf equipment.
- Fantasticology riparian meadow bank art installation provides a biodiverse and visually engaging area of the Park.

North Park

- Sculptural elements have added further interest.

WAYFINDING

General

- Directional signage is to be provided at all key decision points, avoiding gaps in wayfinding provision.
- The materials palette is to comply with the Park-wide product family as set out in Queen Elizabeth Olympic Park Wayfinding Strategy (Applied, 2013 / LLDC, 2017).
- See also Inclusive Design Standards (LLDC, 2013: IDS 17 – Inclusive Play).

CYCLE PARKING

General

- Cycle parking is to be provided adjacent to main venues, hubs, cafés/restaurant frontages. Sheffield stands and some extended stands are to be used as standard.

South Park / North Park

- Stainless Steel Sheffield Stands.

Canal Park

- In areas with low natural surveillance, Camden 'M' stands may be used, as they offer greater opportunity for more secure locking of bicycles.

REFUSE AND RECYCLING

General

- Bins are to be provided across the Park to fit in with the wider palette of street furniture.
- Bins should be robust, easy to maintain and meet manual handling requirements.
- They should be located to meet the demands of specific locations, such as adjacent to kiosks.
- They do not necessarily require a separate recycling container as litter separation occurs off site to meet recycling targets.

South Park

- A higher concentration of bins may be provided in South Park compared to elsewhere, to meet the high user demand.
- Use of temporary Euro bins are permitted in some circumstances to cater for events and especially busy days.

TEMPORARY AND MOVEABLE FURNITURE

General

- Temporary furniture may be implemented where it can be actively managed.
- Common temporary furniture includes fencing, seating and signage for events.
- Temporary use of chestnut pale fencing, rope and timber fencing or steel crowd management barriers may be implemented as appropriate, but require regular monitoring and maintenance.
- Café seating should be positioned so as to avoid obstructing main walking routes.
- Temporary wayfinding should be removed soon after the associated event.

South Park

- Large scale event management furniture including flags and fencing structures are regularly implemented and should be carefully monitored to ensure that structures are removed soon after events and stored safely.
- Café/restaurant furniture should be stored indoors overnight.

North Park

- Events and café furniture are permitted, but are generally less intensively used than South Park.

Canal Park

- Café/restaurant furniture is permitted but should be positioned to minimise damaging grassed areas.
- Temporary furniture and signage with moorings and community moorings.

LANDSCAPE AND PLANTING

PLANTING CHARACTER

General

- The original planting design intent should be conserved, while refining planting specifications to maintain successful application.
- Views of the venues and riverside are to be maintained and enhanced.
- Planting should respond to the Landscape Design Character of developments, considering scale, topography, microclimate and amenity.

South Park

- Fantasticology riparian meadow bank art installation provides a biodiverse and visually engaging area of the Park.
- Large scale prairie and herbaceous planting widely adopted.
- Themed planting in the South Plaza and 2012 Pleasure Gardens. Distinct avenues of trees provided on main walking routes and boulevards.
- Planting areas provide structure and help to create a human scale with amenity 'rooms'.

North Park

- Naturalistic planting preferred with floriferous interest and biodiversity value.
- Avenue and woodland tree planting provide structure and enclosure.

Canal Park

- Naturalistic urban fringe planting to be maintained.
- Key wetland species, such as Black Poplar and pollarded willow, to be carefully managed in collaboration with the community.

3 SURFACE MATERIALS

STANDARD MATERIALS PALETTE

SITE WIDE OVERVIEW

The following pages set out the existing and recommended surface material palette used throughout the Park.

The palette has been split into key character areas such as 'riverside paths' and 'play areas'. There are page number references above the site wide palette linking to detailed information for each of these sections.

Some materials currently used within the Park are not withstanding the test of time due to various factors including high pedestrian footfall. Within this guidance, existing issues are highlighted and suggestions made for recommended alternatives.

KEY OBJECTIVES (LAYOUT)

- Create a legible layout by ensuring paths link between key locations, such as event venues and park access points.
- Consider reconfiguration of footpaths by observing desire lines (informal pedestrian routes) where visitors are frequently crossing grassed areas. However it is important to recognise the overall strategy of maintaining green space as a priority.
- Ensure a seamless integration of materials by careful detailing alignments that minimise unnecessary technical complication.
- Ensure that all formal provision for walking and cycling is accessible, sustainable and inclusive.
- Provide sufficient capacity to accommodate all visitors comfortably, whilst attempting to minimise the area of hard surfacing.

KEY OBJECTIVES (MATERIALS)

- Select appropriate materials for the context: for example towpaths are expected to have high pedestrian and cyclist usage, so require durable surface materials.
- Paths should generally be smooth including where they transition to road crossings.
- Selected materials need to be robust, durable and appropriate for the context.
- Inconsistency of materials should be avoided by conforming to the standards.
- Patterns within the footpath can be perceived as a level change and bespoke surfacing should be carefully considered.
- Heritage materials should be retained and reused for community and heritage value.

SUSTAINABLE PROCUREMENT

- Materials to be responsibly sourced from local sources where possible.
- Whole life cycle of products to be considered.
- Concrete production and constituent materials to be certified to ISO 14001 / ISO 9001:2008 / BES 6001.
- Use materials with lower embodied carbon and recycled/secondary aggregates.

MATERIAL PALETTE

RIVERSIDE PATHS *(p40)*

ASPHALT
Black permeable asphalt or with surface dressing: 2-5mm yellow/gold coloured aggregate rolled in.

SELF-BINDING GRAVEL
'CEDEC' Gold or similar 50mm nominal depth of wearing course.

IN-SITU CONCRETE
Pale grey cement with 10-15mm round dark pebble aggregate. Exposed / brushed finish.

CONCRETE PLANKS
Pre-cast concrete planks. Pale grey cement with 6-10mm dark round pebble aggregate. Brushed finish.

PARKLAND PATHS AND CONCOURSES *(p42)*

RESIN BOUND GRAVEL
16-18mm depth Aggregate – Amber gold (Corn flint 1-3mm, Amber Gold 2-5mm)

RESIN BONDED GRAVEL
2-5mm gold aggregate surface dressing.
To be phased out.

SELF-BINDING GRAVEL
'CEDEC' Gold or similar 50mm nominal depth
Big issue for tree health.

BLACK ASPHALT
Permeable specification with 6mm nominal size aggregate.

PLAY SPACES

OVERVIEW

PLAY SPACES

Play spaces are to be accessible for all ages and abilities, to provide a range of opportunities for people to interact with each other.

They should be designed to enhance the local setting through the choice of materials and the style, scale and character of the layout. Parks and play can be used to tell a story of the place and reference natural elements to enhance the attractiveness of the facility.

Play space types include:

Doorstep open space

All doorstep play spaces shall be a minimum size of 100sq.m and be targeted at the ability level of children aged 0-5 years.

Local play space

All local play spaces shall be a minimum size of 300sq.m and provide for a range of activities targeted at the ability level of children aged 0-11 years, with the exception of local play spaces located within schools, which will instead focus on the age range of its pupils.

Neighbourhood play space

All neighbourhood play spaces shall be a minimum size of 500sq.m and provide for a range of activities targeted at the ability level of children aged 0-17 years.

Youth play space

All youth play spaces shall be a minimum size of 200sq.m, be targeted at the ability level of young people aged 12-17 years; and provide a variety of socialising areas, where young people can spend time without specifically engaging in play.

CHARACTER AREAS

Within the Park there are distinctly different forms of play surfaces and equipment:

- South Park – informal 'play rooms' segregated with planting; primarily using off-the-shelf equipment with red rubber wet pour safety surfacing.
- North Park Tumbling Bay play area – naturalistic play space using timber, stone, sand and bark with bespoke equipment.
- Canal Park – play equipment used creatively with off-the-shelf materials embedded within the rolling topography. Natural play integrating play and biodiversity e.g. retain willow (large) as play feature.

SAFETY STANDARDS

All playground surfacing materials and equipment must comply to British Standards.

ROSPA GUIDANCE AND INSPECTIONS

Amenity areas should be reviewed and maintained regularly to ensure that facilities are safe and performing as intended. All play surfaces and equipment must comply with the Royal Society for the Prevention of Accidents RoSPA guidance.

Any new play elements require a post installation RoSPA inspection prior to usage.

RoSPA's publication "Routine Inspection of Playgrounds" should be followed and weekly (minimum) inspections, by an LLDC contractor are required to ensure the safety of all play surfaces.

An in-depth annual inspection is required for all play spaces. This should be carried out by a specialist not connected with the playground operator or manager, preferably RoSPA, but playground manufacturers or insurance companies may also be suitably qualified.

Community play spaces, in the new residential zones, guidance states:

All play spaces shall:

- offer play opportunities accessible to disabled children
- be accessible by safe pedestrian routes in accordance with GLA Play Strategy
- have natural surveillance and a maximum distance from a dwelling to a play space of: 100m for children aged under 5 years; 400m for children aged 5-11; 800m for young people aged 12-17
- houses with private gardens are excluded from this code for children aged under 5 years
- be non-prescriptive about usage by children of specific age groups, but will aim to challenge primarily the ability level of the target age range
- contain demonstrative features that allow young children to identify and claim the space as theirs
- provide seating and picnic benches within view of play equipment
- have species-rich grass
- have an element of loose fill natural play surfaces (such as sand, bark chip, grit or similar) in areas with medium expected usage

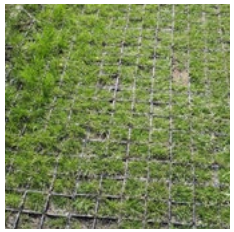
Where there is potential to integrate play for all with the natural landscape this should be done with a variety surfaces and have bound 'wet-pour' surfaces only for wheeled play and general high-speed games areas.

KEY REFERENCES

- BS EN 1176: Playground Equipment and Surfacing
- BS EN 1177: Impact Attenuating Playground Surfacing and determination of Critical Fall Height
- BS 7188: Impact Absorbing Playground Surfaces: Performance requirements and Test Methods
- GLA Supplementary Planning Guidance for Play
- Fields in Trust Guidance for Outdoor Sports and Play

PLAY SPACES PALETTE

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
RUBBER CRUMB / MULCH WET POUR Playtop® coloured rubber pebbles mixed with Nike Grind  TigerMulch® Brown Mix®	■ Crumb to be 45% base red, 45% modified red with 10% Nike grind ■ Cushion course to be a mixture of recycled SBR rubber tyres ■ To South Park play room areas within critical fall zone ■ Depths and build up to manufacturer's recommendation	■ Long lasting, very durable ■ Efficient material and high impact absorbency ■ Accessible for wheelchair users	■ Expensive ■ Difficult and time consuming to lay ■ Potential issues with matching exact colours with replacement if different supplier is required ■ Low play value	High	Medium
RED ACRYLIC SEAL 2-5mm surface dressing over asphalt 	■ South Park play rooms ■ Not for use as a safety surface surrounding play equipment ■ Use surrounding critical fall zones to tie in with wet pour safety surfacing	■ Robust and durable surface ■ Easy replacement when required ■ Accessible for wheelchair users	■ Not as high quality finish as rubber crumb ■ Cannot be used as a safety surface ■ Low play value ■ not environmentally friendly	Medium	Medium
BARK CHIPPINGS Play grade bark chippings to match existing 	■ North Park and Canal Park play spaces ■ Depths and build up to manufacturer's recommendation ■ Use within critical fall zone as required	■ High play value - loose parts play ■ Naturalistic feel and finish ■ Cheap to source and install	■ Regular maintenance required to top up and keep within required zones ■ Can cause splinters ■ Chippings can degrade in quality over time ■ Drainage issues when wet	Low	Low - Medium
SAND Play sand varies depending on location. Tumbling Bay has a 75% Very Course sand mixed with finer sand graded in. South Plaza play fine white beach sand specification.  T-Bay®	■ Sand play pits within all play areas ■ Maximum particle size 1.25mm ■ Potential use as safety surface within critical fall zone as required	■ Very high play value ■ Replacement is easy when required ■ Soft surface ■ Good for younger children	■ High amount of maintenance - regular topping up, raking and forking required ■ Sand will also require regular disinfectant treatment ■ Not accessible for wheelchairs	Low	Medium - High

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
ARTIFICIAL GRASS SHORT Short dense pile height. Specification to be agreed with LLDC 	■ Surrounding feature benches outside the Here East development ■ To MUGA pitches as per the required specification for the sport	■ Hard wearing and robust	■ If laid with rubber granuals, regular topping up and maintenance is required ■ Often looks unrealistic next to real grass / planting ■ Joints can peel up and form trip hazards	High	Medium - High
REINFORCED GRASS to LDA-H Specification 	■ ArcelorMittal Orbit and South Events Lawn ■ Small areas along access to the canal	■ Protects grass from heavy footfall ■ Can be used for light vehicular overrun ■ Cheap product to install	■ Becomes patchy over time ■ Low quality aesthetic	Low - Medium	Medium
TIMBER DECKING 195 x 2000 x 46mm board on battens on suitable sub-base 	■ South Park - Great British Garden ■ All timber decking features ■ Slip resistant strips ■ Timber to be free of screws, nails or other fixing holes, loose knots, splits, gouges and otherwise and in good condition throughout	■ Relatively cheap product ■ High quality and naturalistic finish that blends in with planted areas	■ Can degrade, split and rot over time ■ Likely to become slippery in wet conditions ■ Time consuming installation ■ Needs a visibility strip to define a step edge	Medium	Medium - High

FOOTPATHS

RIVERSIDE PATHS

KEY OBJECTIVES (LAYOUT)

- Create a legible layout by ensuring paths are located along the water edge, with either a green verge or restraint barrier to restrict access to the water.
- Ensure consistency in the use of materials to tie in with the wider parkland character and the towpath network.
- Form a seamless integration between changes of materials - align joints in a harmonious way.
- Where appropriate ensure that the path width is sufficient for the use of both cyclists and pedestrians.
- Designs should accommodate the needs of wheelchair and mobility scooter users, which can require relatively large spaces in which to turn.
- Narrow paths / ramps leading to the water's edge are acceptable in exceptional locations, such as to the floating pontoons in the North Park.
- See also Inclusive Design Standards Ch5 Walking Surfaces (IDS05; LLDC, 2013).

KEY OBJECTIVES (MATERIALS)

- Select appropriate materials for the riverside context: towpaths have high pedestrian and cyclist usage, so require durable materials that do not become rutted.
- Reflect the industrial character of the canal by utilising recycled materials where appropriate heritage materials to be retained in-situ to maintain authentic character.
- Maintain consistency of materials beneath bridges.
- Footpaths to comprise materials fitting for the character of the riverside setting and the wider parkland character area.

PERFORMANCE REQUIREMENTS

- Footpaths to comprise firm and slip resistant surface materials.
- Loose surfaces such as self binding gravel may be considered for flat areas of footpaths which do not operate as major walking and cycling routes.
- Unbound gravel not to be applied on sloped footways greater than 1:50.
- Edge treatments to act as an appropriate containment for loose material and to provide structural support as required.
- It is recommended that main paths are at least 3m wide. Where verges are provided, a 2m path may be sufficient.
- Maximum acceptable cross fall on footpaths to be a 1:40 gradient.
- 10mm Stone Mastic Asphalt base binder layer to be specified.
- The towpaths along the canal are managed by the Canal and River Trust and designs must comply with the Canal Park Design Guide (LCS-GLB-CON-APP-CPDG-001-V02).

Mechanically scarified concrete in the North Park

RIVERSIDE PATHS PALETTE

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
ASPHALT Black permeable asphalt or with surface dressing: 2-5mm yellow/gold coloured aggregate rolled in 	■ Appropriate for long stretches of parkland riverside paths ■ Can also be used for towpaths if tying into existing in the specific area	■ Hard wearing ■ Suitable for wheelchairs and pushchairs ■ Low maintenance	■ Low quality aesthetic ■ Can crack due to freezing and thawing ■ Patchwork repair due to colour fade	Low - Medium	Low
SELF-BINDING GRAVEL 'CEDEC' Gold or similar 50mm nominal depth of wearing course 	■ Flat paths near the water edge where a softer character is desired ■ To be phased out where possible, with alternative permeable surfaces preferred	■ Generally better for drainage than bound surfaces ■ Good impact absorbency ■ Loose surface avoids a 'patchwork' repair ■ Soft and natural character	■ Medium level of maintenance for regular topping up ■ Not as good for wheelchairs ■ Leaves and debris more difficult to brush off ■ Vulnerable to erosion	Medium	High
IN-SITU CONCRETE Pale grey cement with 10-15mm round dark pebble aggregate. Exposed / brushed finish 	■ Towpaths ■ Under benches to create hard wearing surface ■ Parkland riverside paths ■ Canal side slipways	■ Very hard wearing ■ Limited UV colour fade ■ Good for wheelchair users ■ Brushed finish good slip resistance for ramps / slopes	■ Quality control can become difficult ■ Installation is weather dependent due to long curing time	Medium	Very Low
CONCRETE PLANKS Pre-cast concrete planks. Pale grey cement with 6-10mm dark round pebble aggregate. Brushed finish 	■ Use for small informal paths and level changes ■ Lay within soft areas as a decorative feature ■ Play bridges over linear wetland	■ Creates a distinct character ■ Allows for creative design and layout ■ Quick and easy to install	■ Only suitable for small character areas ■ Stains and discolours fairly easily ■ Need to ensure it does not constitute a trip hazard over time	Medium	Medium

PARKLAND PATHS AND CONCOURSES

KEY OBJECTIVES (LAYOUT)

- Ensure path layouts are intuitively legible by avoiding sinuous paths for main parkland routes.
- For large areas of concourse, consider using contrasting sections of surface colour to help visually break up the space and lessen the visual impact of a patchwork of repairs.
- Temporary or permanent patterns could be applied but will be carefully scrutinised for scale, abstract and colour toned to be in character to the concourses as art or for play.
- Large open concourses to be provided near event venues to accommodate crowd flows.

KEY OBJECTIVES (MATERIALS)

- Utilise materials that celebrate the legacy of the Games, using vibrant colours adjacent to major venues. Colour selection should be careful scrutinised.
- A seamless integration between changes of materials - align joints in a harmonious way.
- Footpaths to comprise materials fitting for the character of the setting, which is expected to have high pedestrian flows.
- Resin bound gravel to replace resin bonded gravel to increase durability.

PERFORMANCE REQUIREMENTS

- Footpaths to comprise firm and slip resistant surface materials.
- Utilise materials that are durable and robust, capable of accommodating heavy vehicle overrun and high pedestrian flows.
- Footpaths to comprise materials fitting for the character of the setting.
- Unbound gravel not to be applied on sloped footways greater than 1:50.
- Footpaths to comprise materials that have a high albedo rating that mitigates against localised hotspots.
- Provide sufficient widths for very high footfall. Minimum path width should be 3m on main routes and 2m on secondary routes
- Maximum acceptable cross fall on footpaths to be a 1:40 gradient.
- 10mm Stone Mastic Asphalt base binder layer to be specified.
- Heritage materials need special consideration to balance heritage benefit with other performance requirements.

Resin bound gravel and asphalt - South Park

PARKLAND PATHS AND CONCOURSES PALETTE

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
RESIN BOUND GRAVEL 16-18mm depth Aggregate – Amber gold (Corn flint 1-3mm, Amber Gold 2-5mm) 	■ Suitable on park-wide concourse areas ■ Most commonly used material for footpaths and footways throughout the Park	■ Robust and durable ■ Wheelchair friendly ■ Less maintenance and replacement required	■ Not as free draining as unbound gravel ■ Higher cost to install	High	Medium
RESIN BONDED GRAVEL 2-5mm gold aggregate surface dressing 	■ To be replaced with resin bound gravel (large areas to be replaced at one time to avoid a mismatch of colouration)	■ Cheap to install ■ Generally better for drainage than bound surfaces	■ High maintenance due to fast surface wear ■ Repair often causes a low quality 'patchwork' effect due to de-colouration	Medium	Medium - High
SELF-BINDING GRAVEL 'CEDEC' Gold or similar 50mm nominal depth 	■ On smaller flat areas - 1000mm perimeter organically bound, to ODA accessibility requirements ■ To create a softer character (e.g. wetlands parkland areas)	■ Free draining ■ Good impact absorbency ■ Loose surface avoids a 'patchwork' repair	■ Medium level of maintenance for regular topping up ■ Not as good for wheelchairs ■ Leaves and debris more difficult to brush off ■ Vulnerable to erosion	Medium	Medium
BLACK ASPHALT Permeable grade with 6mm nominal size aggregate 	■ Should not be used for large open areas within the Park ■ For features only and breaking up large areas of resin bound gravel with dynamic forms, as shown in the picture p36	■ Hard wearing ■ Suitable for wheelchairs and pushchairs ■ Low maintenance ■ Permeable	■ Can crack due to freezing and thawing ■ Patchwork repair due to colour fade ■ Permeable grade unsuitable for high vehicle flows	Low - Medium	Low - Medium

FOOTWAYS

PARK EDGE STREETS

KEY OBJECTIVES (LAYOUT)

- Create a legible layout including locating tactile paving and uncontrolled crossings on desire lines (refer to Carriageway section for further details).
- Designs should accommodate the needs of all users including wheelchairs and mobility scooter users, which can require relatively large spaces in which to turn
- Ensure a seamless integration between changes of materials - align joints in a harmonious way through detailed design and avoid creating slivers and unnecessary cuts.

KEY OBJECTIVES (MATERIALS)

- Consider utilising surfacing materials that have more of a parkland character than conventional urban streets to help create a sense of pedestrian priority.
- Provide consistency in the use of materials such that footways tie together visually, even when different units are used adjacent to one another.
- Minimise the number of different materials used.
- Monitor workmanship quality to ensure that materials are being utilised as per the construction standards set out in this guidance.
- Use appropriate construction depths to accommodate vehicle overrun adjacent to the kerb edge.

PERFORMANCE REQUIREMENTS

- Urban footways must comply with the Legacy Streets Technical Design Guide and DMRB Volume 7.
- Footways to comprise firm and slip resistant surface materials.
- Paving units to be laid firm and flush with surrounding units to minimise risk of trip hazards.
- Maximum joint size between units to be 10mm.
- Units not to be cut down smaller than 1/4 of their original size.
- Depth of units and sub-base to be suitable for occasional vehicular overrun / use in carriageway as required.
- It is recommended that main paths are at least 3m wide. Where verges are provided, a 2m path may be sufficient. Where this is not possible because of physical constraints 1.5m could be regarded as the minimum acceptable width over a maximum 6m length of footway.
- All paving build ups and beddings to conform to BS 7533.
- All products must conform to the following British Standards: Concrete flags - BS EN 1339; Concrete blocks - BS EN 1338; Concrete kerbs - BS EN 1340; Stone setts - BS EN 1342.
- See also Inclusive Design Standards Ch6 Tactile Paving (IDS06; LLDC, 2013).
- Trees in footways, need to demonstrate adequate growing medium, drainage, soil structure to support full development of large tree species.

Resin bound aggregate on park edge streets stretch the parkland character out into the wider public realm.

KEY REFERENCES

- Inclusive Design Standards (IDS06; LLDC, 2013)
- Legacy Streets Technical Design Guide
- DMRB
- BS 7533
- BS EN 1339
- BS EN 1338
- BS EN 1340
- BS EN 1342
- Trees in Hard Landscapes (TDAG; 2014)

FOOTWAYS PALETTE

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
ASP PAVING Concrete flag paving, silver grey, textured finish 	■ Suitable for urban streets and industrial areas including Here East and the approach to Westfield	■ Standardised rectangular / square form is versatile and ties in with the wider urban realm street palette ■ Cheaper than natural stone ■ Can use high recycled content	■ Larger units are prone to cracking and rocking ■ Generally not as durable or robust as natural stone ■ Not as attractive as other surface materials	Low - Medium	Medium
RESIN BOUND GRAVEL 16-18mm depth Aggregate – Amber gold (Corn flint 1-3mm, Amber Gold 2-5mm) 	■ Standard surface for where footway is considered to be part of the Park Estate	■ Attractive finish consistent with the park footpath character ■ Smooth surface for cycling	■ Needs careful maintenance to avoid patchwork effect ■ Can become visually disrupted by utilities covers ■ Relatively expensive to implement	High	Medium
NATURAL STONE PAVING Variable specification to be considered on a site by site basis 	■ Generally not used within Queen Elizabeth Olympic Park boundary ■ Potential use in new residential areas and cultural hubs to create a high quality aesthetic	■ Large range of materials to choose from to reflect the character of the architecture ■ Can be suitable for vehicular overrun depending on depth and sub-base	■ Variable performance characteristics need to be carefully considered depending on the context ■ Issue of sustainability for products coming from abroad	High	High
TACTILE PAVING (BLISTER / CORDUROY) Contrasting grey Pre-cast concrete 	■ To conform with Guidance on the use of tactile paving surfaces (DfT, 2007): contrasting grey blister paving for all controlled and uncontrolled crossings; corduroy paving for shared use footway demarcation and segregated cycle tracks	■ Ensures adequate accessibility requirements for all road users	■ Can be uncomfortable for people with impaired mobility including users of buggies ■ Creates visual clutter when implemented poorly	Low - Medium	Low - Medium

CARRIAGEWAYS

OVERVIEW

KEY OBJECTIVES

- Ensure consistency in the use of carriageway materials to help define the street hierarchy and send a clear message to motorists about the character of the road and the expected behaviours associated with its use.
- Promote pedestrian movements through the use of materials and colour palettes that reference footway materials.
- Reinforce speed limits through traffic calming measures including vertical deflections and perceptual narrowing, as appropriate.

PERFORMANCE REQUIREMENTS

- Select materials that are robust and suitable for the anticipated levels of traffic.
- All asphalts to comply with shall comply with BS EN 13043: Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.
- Highly permeable asphalts are only suitable for low trafficked routes.
- Unbound surfacing is not suitable for carriageways.
- All road markings to comply with the Traffic Signs Regulations and General Directions (TSRGD 2016) with thermoplastic road marking material or paint in accordance with BS EN 1871: Road marking materials.
- 50mm wide Conservation standard markings are preferred.

PEDESTRIAN CROSSINGS

- Locate formal controlled crossings on major pedestrian desire lines.
- Uncontrolled dropped kerb crossings are to be provided at all minor side roads.
- Raised table crossings generally preferred for main roads (as per image of Waterden Road).
- Controlled crossings are required on main walking routes to support the needs of blind and partially sighted people.
- Coloured anti-skid is generally not to be used on crossings.

CYCLE INFRASTRUCTURE

- Consider the need for delineated space for cycling on carriageways as part of a wider cycling strategy.
- The cycle lane will generally be delineated with thermoplastic markings and be comprised of the same surfacing material as the adjacent carriageway vehicle running lane.
- Refer to cycling consultees as appropriate.

Raised tables and surface materials, help to prioritise pedestrian movements across main roads.

CARRIAGEWAYS PALETTE

ASPHALT Black asphalt or with surface dressing: 2mm - 5mm yellow/gold coloured aggregate rolled in 	■ Appropriate for all main roads and selected tertiary routes ■ To be utilised on Zebra crossings to ensure sufficient visual contrast	■ Hard wearing ■ Low maintenance	■ Correct binder type and quantity is essential to achieve the stated service life	Low - Medium	Low - Medium
GRANITE SETTS 100 x 100mm, mid grey, cropped 	■ Ramps to raised tables / junctions in conjunction with granite kerb, to provide a robust vertical transition	■ Hard wearing paving units ■ Good impact absorbency ■ Help to visually delineate crossing points	■ Prone to subsidence if the sub-base is inadequate ■ Relatively expensive ■ Variable skid resistance ■ Poor riding surface for cyclists	Medium - High	Medium
RESIN BOUND GRAVEL 16-18mm depth Aggregate – Amber gold (Corn flint 1-3mm, Amber Gold 2-5mm) 	■ Flat section of raised tables / junctions where pedestrian crossing movements are to be promoted	■ Creates sense of pedestrian priority by mirroring footway materials ■ Limited UV colour fade ■ Good for wheelchair users	■ Shows wear and oil stains more than asphalt ■ Patchwork repairs can reduce overall visual quality	High	Medium
ASP SETTS Pre-cast concrete setts, 200 x 100mm, silver grey, textured finish 	■ Inset parking bays adjacent to paved footways	■ Permeable options available ■ Suitable for vehicle turning movements	■ Only suitable for urban / residential character areas ■ Stains and discolours fairly easily	Medium	Medium

KERBS AND EDGING

KEY OBJECTIVES (EDGING)

- The type, surface finish and product specifications for all kerbs and edgings where applicable, shall match those already installed.
- Edge treatments are to act as an appropriate containment for all loose material to reduce the likelihood of it being washed out and to provide structural support as required.
- In certain locations a linear drainage system may form a suitable edge restraint in place of a formal edging or kerb.
- The edging system specified must be suitable for the material it is containing in terms of being beneficial aesthetically and in terms of durability.
- Edging or kerbs are required at all changes in material and adjacent to all grassed and planted areas.
- Where possible finished soil levels should fall away from the path edge to assist with drainage.

KEY OBJECTIVES (KERBS)

- Road kerbs (with an upstand) should act as a barrier or demarcation between road traffic and pedestrians or verges, providing a physical 'check' to help prevent vehicles leaving the carriageway.
- Raised kerbs can be used to form a channel along which surface water can be drained towards gullies.
- Flush kerbs can be used to visually delineate footways and carriageways in 'shared space' situations. All proposed shared space layouts must be reviewed by LLDC's Inclusive Design Principal and BEAP.
- A lowering of the kerb to the carriageway level (dropped kerb) to aid crossing by disabled persons, or cyclists, should be applied where private vehicular entrances, footpaths, and cycle tracks gain access to the carriageway.

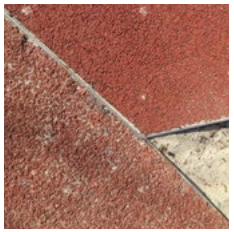
PERFORMANCE REQUIREMENTS

- Raised kerbs adjacent to carriageways to have a 100mm upstand in most instances. Up to 125mm may be acceptable in some circumstances.
- In tertiary streets a lower 60mm high kerb may be considered acceptable, with the final height agreed with LLDC and the Built Environment Accessibility Panel.
- Dropped kerbs should be flush with surrounding materials in most instances. If a water check is required to a dropped kerb this should be limited to maximum of a 12mm upstand.
- Generally, kerb heights between 13mm and 59mm are considered a trip hazard and should be avoided.
- Kerb construction and layout must conform with the Design Manual for Road and Bridges (DMRB) and the LLDC's Legacy Street Technical Design Guide.
- Kerb units not to be cut smaller than 50% of manufactured length.
- Where different types of kerb abut, the Contractor shall use suitable proprietary transition units.

In-situ cast concrete edging - South Park

Pre-cast concrete (PCC) raised kerb and flush kerb at carriageway edge - North Park edge

KERBS AND EDGING PALETTE

TIMBER EDGING Nominal 38 x 150mm deep Treated softwood edging Back board fixing		■ For rustic applications ■ Use between informal planted areas, grass and gravel footpaths and on minor footpaths ■ Not for use between two hard surfaces or to edge paved areas	■ Relatively cheap, readily available product ■ Fast and simple installation process ■ Naturalistic finish that blends in with planted areas	■ Degrades quickly and required regular checks and replacement ■ Can look low quality aesthetically ■ Likely to split or break	Very Low	Medium
METAL EDGING 3 x 125mm galvanised edging set in concrete haunch. Proprietary product e.g. 'EverEdge ProEdge'		■ Predominant edging for park-wide landscaping ■ For use between any changes in hard surfacing. Suitable for all main paths, play spaces and planted areas ■ Refer to 'Trees' section for metal edging specification for tree pits	■ High quality finish ■ Very narrow width creates clean seamless transitions ■ Good structural strength for retaining a range of materials ■ Useful for curves	■ Higher initial product cost compared to other edging ■ More difficult to replace compared to timber or concrete	High	Low - Medium
CONCRETE PIN KERB Grey, 50 x 150 x 915mm		■ Generally used in more informal areas adjacent to planting ■ To be laid flush between hard surfaces or with a small (5-10mm) up-stand adjacent to planted areas ■ Not appropriate for main thoroughfares or near key venues	■ Cheap product ■ Simple installation ■ Many manufacturers produce the same product	■ Low quality aesthetic ■ Cannot be used for curves ■ Liable to crack	Low	Low
IN-SITU CAST CONCRETE EDGING To match existing / as bespoke		■ Suitable for use surrounding the feature lawns within the northern concourse of the South Park ■ May be considered as a bespoke feature in landmark schemes	■ Forms a distinctive bold boundary treatment ■ Robust and hard wearing ■ Requires minimal maintenance	■ Relatively expensive and time consuming to install ■ Quality control can be challenging ■ Installation is weather dependent due to long curing time	Medium	Low

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
PRE-CAST CONCRETE KERBS Grey, 600 x 200 x 100mm 	■ Appropriate for straight sections of formal footpaths and primary pedestrian routes, particularly adjacent to grass lawns ■ 400mm wide kerbs are suitable in some locations such as at the river edge. To match key features such as bespoke walls in the South Park	■ Formal high quality edging ■ Relatively fast to install ■ Robust and durable for use between most surfaces ■ Minimal maintenance required	■ Higher cost than pin kerbs ■ Large units are more difficult to install ■ Potential for deformation where poorly constructed	Medium - High	Low - Medium
PRE-CAST CONCRETE KERBS Grey, 300 x 200 x 100mm 	■ Appropriate for gentle curves of formal footpaths and primary pedestrian routes ■ 400mm wide kerbs are suitable in some locations ■ Radial units required where joints would exceed 10mm	■ Formal high quality edging ■ Relatively fast to install ■ Robust and durable for use between most surfaces ■ Minimal maintenance required	■ Higher cost than pin kerbs ■ Potential for rocking or deformation where poorly constructed	Medium - High	Low - Medium
CONCRETE ROAD KERB (And dropped kerbs) Grey, 150 / 255 x 125 x 915mm 	■ Park-wide standard carriageway edging ■ Standard raised kerbs (255mm H) to be used to delineate carriageways and footways ■ Dropped kerbs and flush kerbs (150mm H) to be used for crossing points and for parking delineation	■ Wide availability from many different suppliers, including a range of profiles to suit different applications ■ An economic and durable solution for carriageway edging	■ Not as high quality finish as granite ■ Colour more likely to stain and be affected from UV fade than natural stone	Medium - High	Low
WIDE GRANITE ROAD KERBS (And dropped kerbs) Grey, 150/300mm x 300mm x varying length 	■ Granite only to be used where high quality materials are being specified as part of a specific bespoke palette ■ Raised kerbs to edge carriageways, flush kerbs for crossings and parking delineation	■ Creates a high quality aesthetic ■ Very robust and durable ■ Minimal maintenance required	■ High initial cost ■ Issue of sustainability for products coming from abroad	High	Low

SLOPES, RAMPS AND STEPS

OVERVIEW

KEY OBJECTIVES

- Provide an accessible environment for all users.
- Provide consistency in the palette of materials for all slopes, ramps and steps to ensure they are instantly recognisable.
- Use landings for ramps and steps as set out in LLDC Inclusive Design Standards Ch1 Graded Routes, Ch2 Ramps, Ch37 Steps (IDS01 / 02 / 37, LLDC, 2013).
- Maintain desire lines where possible, whilst providing accessible routes.
- Throughout the Park any footpath steeper than 1:21 is a formal ramp. Any footpath between a gradient of 1:21 and 1:30 is defined as a slope.

PERFORMANCE REQUIREMENTS

- Steps and ramps must comply with all relevant standards and guidance including BS8300, Part M building Regulations and LLDC IDS.
- Where possible changes in level should be dealt with using slopes (with a gradient shallower than 1:21), meaning no handrails or tactile pavings are required.
- Slopes must be laid in a contrasting material (colour and texture) to its surroundings. This must be fully slip resistant with no loose aggregate.
- Edges and steps should be designed to facilitate mooring.
- Handrails and tactile paving must be provided to all steps and ramps as per LLDC 'IDS' and DfT 'Guidance on the use of Tactile Paving Surfaces'.
- Steps and ramps should be a minimum of 2m width with an minimum unobstructed width between handrails of 1.8m. Where wider steps than 2m are required, a central handrail will need to be provided (maximum width between handrails 2m).
- Exceptions to the above rule regarding width between handrails may be considered if the design intent is clear and an accessible route with handrails is also provided. Bespoke details of this nature will need to be agreed with LLDC.
- It is recommended that slopes along main paths are at least 3m wide. Where verges are provided, a 2m path may be sufficient.
- Cross falls must be no steeper than 1:50.
- Steps that taper are a trip hazard and should generally be avoided.
- Steps must have a colour contrasting nosing strip.

OTHER CONSIDERATIONS

- Where possible, changes in level should be dealt with using planting / greenery or feature stepped terraces. Retaining walls should only be used when no other option is available.

Pre-cast concrete steps with visibility band

SLOPES, RAMPS AND STEPS PALETTE

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
PRE-CAST CONCRETE STEPS Non-slip texture, anti-graffiti coating. Contrasting grey band on nosing 	■ Steps are used primarily along the banks of the river where the level changes are most dramatic ■ In-situ brushed concrete surface finish for landings between steps ■ Grit blasted non slip surface ■ Contrasting black carborundum non-slip band on nosing	■ Manufactured off site ■ Relatively fast installation ■ Cheaper than natural stone	■ Not as hard wearing as natural stone	Medium	Low
HAZARD WARNING PAVING Concrete Corduroy tactile paving 	■ To top and bottom of steps and ramps if over 1:21 gradient ■ Must comply with DfT 'Guidance on the use of tactile paving surfaces' ■ Colour must contrast surrounding surface material	■ Provides a safe warning of potential hazards ■ Compliance with standards	■ Not as hard wearing as natural stone ■ Units prone to cracking ■ Finish may not tie in with surrounding materials	Medium	Medium
ASPHALT SLOPE Black asphalt slope with 14mm 'Somersham' or similar approved aggregate rolled in 	■ To slopes within the parkland which are between and 1:21 and 1:30 gradient ■ Contrasting texture and colour to surrounding materials to clearly delineate	■ Cheap to install ■ Robust and durable surface ■ Better for wheelchair users than formal ramps	■ Change in surface material creates an inconsistent layout (though essential for safety)	Low - Medium	Low
IN-SITU CONCRETE Pale grey with fly ash cement - 5mm deep angle grooved finish 	■ To slopes in the Canal Park which are between and 1:21 and 1:30 gradient ■ Must comply with Canal Park Specification ■ Canal, waterway	■ Very hard wearing ■ Better for wheelchair users than formal ramps ■ Brushed finish good slip resistance for ramps / slopes ■ Limited UV colour fade	■ Quality control can become difficult ■ Installation is weather dependent due to long curing time	Medium	Very Low

DRAINAGE

DRAINAGE STRATEGY

The Olympic Park Water Management Plan and Borough Surface Water Management Plans detail the proposed surface water drainage policy.

This section outlines preferred surface materials and drainage infrastructure that supports the objectives of the Surface Water Management Plans.

The overall water management plan aims to minimise the flow of surface water directly to drains, to reduce flood risk. Much of the drainage across the Park is designed to work as part of a sustainable urban drainage system (see Ch5: SuDS).

The design for surface water drainage need to attain borough adoptable standards.

Conventional road gullies and combined kerb drainage collection systems have been used on primary and secondary roads:

- The combined surface water and foul sewer network generally only collects runoff and drainage discharges in the primary roads.
- Consultation with Thames Water is required to agree any new connection arrangements to the existing sewer network.
- Infiltration drainage is limited across much of the site due to the capping of contaminated land.

LINEAR CHANNEL DRAINS

Drainage within the Park is largely comprised of a sustainable urban drainage system, linked with linear drainage channels to manage overland runoff, draining to catchpits.

High capacity integrated kerb drainage solutions may be specified where high surface water run-off is expected. Avoid utilising adjacent to unbound materials which can clog the drain.

During construction a geotextile barrier is recommended to capture excessive construction debris as per the 'Silt prevention for road surface water drainage' technical note.

IRRIGATION

Irrigation systems are delivered through a combination of non-potable, borehole and potable water supplies, managed through the EFM Contract.

The London 2012 Gardens and the Great British Garden are the only two areas that require permanent irrigation - see Ch5 Landscape and Planting for more details.

DECOMPACTION

Refer to Soil and Earthwork Section p.112
The porosity of Soil is considered and maintained as part of drainage strategy.

LINEAR GRATING TYPE 1
Low capacity
12mm slot
Cast iron
Park-wide

HIGH CAPACITY CHANNEL
Standard grey reinforced concrete
250x430

GULLY GRATING
450x450
Cast iron
Park-wide

KERB AND DRAINAGE BLOCK
Standard grey concrete
500x430

LINEAR GRATING TYPE 2
Low capacity
10mm hole
Galvanised steel
South Park

KEY REFERENCES

- GLA LES
- GLA Suds Action Plan
- Park Management Plan

PERMEABLE SURFACES

PERMEABLE ASPHALT
Permeable grade with 6mm nominal size aggregate

RUBBER CRUMB / MULCH WET POUR
Playtop® coloured rubber pebbles mixed with Nike Grind or TigerMulch®

BARK CHIPPINGS

Permeable surfaces allow water to pass through to the underlying sub-structure which is especially useful for managing runoff in large areas of hard surfacing such as the Park concourse.

- The open texture of permeable asphalt makes it less suitable for carriageway surfaces where there is heavy turning traffic.
- Other permeable surfaces such as porous wet pour surfacing or bark chippings should be considered for larger areas of play spaces.
- Bark can quickly matt together to create a relatively impermeable surface. It therefore needs to be turned regularly as part of the maintenance regime.

KEY REFERENCES

- Olympic Park Water Management Plan (2009)
- Flood Risk within the Legacy Corporation Area (Hyder Consulting, 2013)
- Surface Water Management Plans (SWMP) – LB Tower Hamlets / LB Waltham Forest
- Silt prevention for road surface water drainage – Learning Legacy note (LLDC, 2013)
- Hackney Wick Central Surface Water Drainage Statement (LLDC, LB Hackney, 2016)

PARKING AND LOADING

CAR PARKING

PARK PLANNING POLICY

No car parking is permitted on the majority of through routes across the Park.

There are no dedicated car parking facilities for park visitor use.

There is a presumption in favour of no further surface level car parking being provided across the Park.

No additional car parking is to be built across the Park.

Existing parking for venues can be retained.

DESIGN STANDARDS

- On-street parking bay widths shall be 1.8 - 2m wide, and generally 4.8m in length.
- Where carriageway widths are less than 8.4m, parking is to be provided on one side of the street only.
- See Inclusive Design Standards for more details (IDS 10 – Parking for General Public, LLDC 2013).

'BLUE BADGE' ACCESSIBLE PARKING

The table to the left sets out the existing provision of accessible 'Blue Badge' parking across the site.

- Standard dimensions are 2.7m x 6.3m.
- A section of dropped kerb should be allowed for to provide wheelchair access as per the Inclusive Design Standards (LLDC, 2013).

MANAGING UNAUTHORISED PARKING

Enforcement of unauthorised car parking on unadopted routes is conducted by LLDC.

Designing out unauthorised parking can best be managed by implementing comprehensive waiting restrictions which apply to the entire width of the public highway.

Bollards (at 1.5m spacings) may be considered as a last resort on hard standing spaces to block unauthorised vehicle access.

For grass verges, timber posts interspersed with trees are preferred to bollards.

Venue	Parking	Blue Badge parking	Total
London Aquatics Centre	96	15	111
Copper Box Arena	42	24	66
Lee Valley Hockey and Tennis Centres	159	20	179
ArcelorMittal Orbit	0	8	8
Parkland	0	0	0
South Park Hub	0	9	9
London Stadium	Staff only	47	47+
Timber Lodge	0	3	3
Lee Valley VeloPark	211	13	224

Bespoke kerb lines permitted in new developments with 1.5m external radius.

1m buffer zones required adjacent to 'Blue Badge' bay parking.

CYCLE PARKING SEE SECTION 4

LOADING

CONTEXT

Most loading within the Park occurs at the venues where there are dedicated loading bays.

DESIGN STANDARDS

- On-street loading bay widths shall typically be 2.7m wide.
- Loading bays to be delineated with white 10mm thermoplastic lines.
- Bays may be delineated with flush granite kerbs where designed as part of an on-footway loading pad.

Typically all primary roads are to restrict loading at all times with double yellow blip markings.

ROAD MARKINGS

- Double yellow blip markings are to be used to indicate a loading restriction is in place.
- Days and times for when loading is restricted shown be provided as per The Traffic Signs Regulations and General Directions 2016 TSRGD standards.
- Double yellow blip markings to be provided where loading is not allowed at any time.

Bespoke surface signage at Here East requires vertical signposts to be legally enforceable.

UTILITIES

OVERVIEW

Any works which impact on infrastructure below ground level are subject to the New Roads and Street Works Act 1991. The Act sets out a code of practice for the coordination of works and should be followed by any agency or contractor involved in the design, reinstatement and maintenance of utilities.

Existing utility owners, which may be subject to change:

- Thames Water (Foul, Potable Water, Surface Water and Non-Potable Water)
- Fulcrum Connections (Gas)
- National Grid Gas (Gas)
- UKPN (EHV, HV and LV Power)
- BT (Telecoms)
- Colt/K-Comm (Telecoms)
- EU Networks (Telecoms)
- Zayo (Telecoms)
- Engie (District Heating and Cooling)
- There are also private utilities which are owned by venues or the LLDC

The Utilities Statement describes the existing and proposed utilities network, including network drawings for each utility. Utilities information is also held in LLDC's Utilities GIS system.

LAYOUT OF UTILITY COVERS

The position of utilities access points and the design of covers for manholes are the main design considerations relating to the remit for this guidance. Utility changes should be coordinated in a manner that will result in the fewest number of disruptions possible.

- Access points should be arranged for practical access requirements and should generally not be located within carriageway areas.
- Access points should be located with due consideration for existing utilities access and arranged in consistent rows where technically feasible.
- Layouts should include ducting for future phases of work.
- Covers should be aligned perpendicular to the main footpath alignment.
- Where feasible, covers should not break a kerb line or cross over a change in surfacing material.
- Placement of utilities access covers within areas of paving should be positioned to minimise the number of cuts required and avoid creating small sections of paving that are more likely to break.
- Tree roots adjacent to utilities should be contained as per the Integrating Trees and Utilities learning note (ODA, 2011).

DESIGN OF UTILITY COVERS

- Manhole covers located within footpath areas of parkland and on footways should be designed to minimise visual clutter.
- Recessed covers that include the same material as the adjacent surfacing are encouraged, however the surface maintenance liability will usually then be the responsibility of the LLDC.
- Covers located within grassed areas are recommended to have standard covers, but designers should note the access issues associated with locating manholes in areas of grassland.

KEY REFERENCES

- New Roads and Street Works Act 1991
- Utilities Statement and its Addendum (LCS-GLB-ACC-UTL-001 / LCS-GLB-ACCUTL-001A)
- Integrating Trees and Utilities learning note (ODA, 2011)

SURFACE MATERIALS MAINTENANCE

OVERVIEW

Implementing the correct maintenance procedure for any parkland project is vital for ensuring the longevity and appearance of a scheme. Due to the vast quantity of hard landscaping across Queen Elizabeth Olympic Park, surface areas in particular require continued attention.

MAINTENANCE OBJECTIVES

- Maintain a high quality and visually attractive landscape appropriate to the high profile nature of the public realm.
- Maintain a high quality setting that is comfortable and accessible for site users.
- Ensure a high level of cleanliness/tidiness throughout the site.
- Maintenance issues are to be dealt with quickly to prevent degradation of the area or negative perceptions.
- Promote a cost-effective management strategy which demonstrates value for money.
- Ensure compliance with all statutory duties and demonstrate use of best practice.
- Demonstrate a flexible management approach which responds to landscape change and user requirements.
- Adopt a transparent management approach which informs and engages all users of the Park.

PROCEDURES AND BEST PRACTICE

The structural strength of the existing path should always be assessed prior to maintenance works, in order for the predicted design life of the path to be achieved and value for money obtained.

Patchworks are cheap to implement but can compromise surface longevity and create a poor quality of finish. Look to minimise patchwork surface treatment repairs by patching the sub-base issue, and then applying a consistent surface treatment across the full width of the path.

Any pot hole, crack in the paving or area of fretting which exceeds a depth of 10mm, is deemed to constitute a trip hazard. A risk assessment is then required to determine whether remedial action is required. All cracking other than hairline cracking is detrimental to the structural strength of the surface and should be monitored, particularly on trafficked roads.

Always consult an arboriculturist when considering maintenance regimes that will impact on the root system. Severing roots can inhibit nutrient uptake and make the tree unstable.

All unplanned graffiti should be quickly removed to prevent negative perceptions of the area. This should be done using a propriety chemical or soda blasting system, taking necessary safety precautions as detailed by the supplier.

GENERAL MAINTENANCE REGIMES

As set out in the Park Management Plan, general maintenance of surface materials should include:

- Regular evaluation of all surface materials and their existing condition in terms of aesthetics and safety implications.
- Regular sweeping and removal of litter and debris.
- Removal of chewing gum from all paved surfaces.
- Weeds to be removed if growing through hard surfaces.
- Regular inspection of surfaces for cracks, damage and rocking units. Units to be replaced with new units of the same size, colour, layout and specification.
- Units should be re-laid and compacted to avoid undulations in the surface and future failures.
- Sand joints to be topped up as required and on a yearly basis to maintain a smooth and consistent finish.
- Stabiliser to be applied over sand joints.
- Sample area to be provided prior to repair to try to avoid a ‘patchwork’ of colours and finishes.
- Material should be topped up around edge restraints which are used adjacent to self binding gravels, to minimise the risk of creating a trip hazard.
- Timber edging has an approximate lifespan of up to 25 years and should be replaced where it has failed or creates a trip hazard.
- Defects in the existing surface need to be carefully reviewed when resurfacing, with regular inspections by the Facilities Manager or Highways Engineer.
- Where there is deformation in the binder and / or base course, new materials are to be specified that remove and replace the defective areas of sub-base.
- Repairing surface damage with like for like materials.
- Regular clearing of drainage channels and culverts.

4 STREET FURNITURE

STREET FURNITURE OVERVIEW

DESIGN

Street furniture is vital for catalysing the use of parkland areas and streets by providing distinct products that support the amenity value of the public realm.

The preferred Park palette is presented across this chapter, which sets out the design criteria for selecting park furniture to fulfil sufficient design life and maintenance requirements.

- Preferred furniture across the Park tends to follow a contemporary design, with some allowances for more naturalistic features in specific areas.
- Off-the-shelf furniture is generally preferred to bespoke, although bespoke may be considered for exceptional locations.
- The preferred products share a simplicity of form to ensure good durability.
- Furniture should be in keeping with the character of the area and enhance the ambience through consistency and subtlety.
- Timber provides a tactile warmth that can be more comfortable than metal for some applications.
- All selected furniture should comply with LLDC's Inclusive Design Standards and British Standards.
- Existing heritage furniture on tow path or canal path refer to relevant design guide such as Canal Park Design Guide.
- Damage from inappropriate uses such as skateboarding should be considered.

COLOUR

The preferred colour palette reflects the hard-wearing, industrial aesthetic of the parkland.

The preferred finish for most metalwork across the Park is a matt powder coated steel which offers good consistency between products. Bright stainless steel may be used in more contemporary settings such as the South Park.

All timber to be Forest Stewardship Council (FSC) certified with a preference for hardwoods in a natural finish.

RAL 9007
Matt powder coated steel

Bright stainless steel

Timber (FSC-Cumaru / Brazilian teak hardwood)

PLACEMENT

Effective distribution of furniture across the park is essential for promoting active use of facilities.

- Designers should avoid creating overly cluttered spaces by providing adequate space around furniture as per the Inclusive Design Standards.
- The number of items provided should be consistent with anticipated demand.
- Insufficient provision of furniture can impact on the usability of the space, reducing accessibility and safety.
- Aligning furniture in zones along the long profile of a path can help to reduce clutter.
- The arrangement of furniture should consider social and interactive behaviour patterns.

MAINTENANCE

The Estates and Facilities Management Contractor provide maintenance of all furniture.

- Daily inspections of all signage and furniture are required as part of the Park Management Plan.
- Minor repairs and cleansing are to be carried out in-situ as required.
- Damaged items of furniture are to be removed and replaced.

Rough and Ready curve bench

SEATING

OVERVIEW

KEY OBJECTIVES

Seating should be chosen to suit the setting and may employ an off-the-shelf, bespoke or terraced style depending on localised requirements. It can help to encourage active use of a space and promote a range of activities that may not be as attractive without seating, such as performance and play spaces.

Seating should be provided at least every 50m to ensure that the parkland is accessible for people who require regular rest points.

The following design considerations should be used to help in the selection and placement of seating within existing parkland areas and new residential areas.

OFF-THE-SHELF

Off-the-shelf seating provides cost-effective tried and tested seating solutions - which reduces the risk for the client by being easy to maintain and replace.

It is preferable to use street furniture ranges that have product 'families' as this allows for a more thematic and cohesive palette, helping to create a stronger sense of place and character.

TERRACED

Terracing enables additional functionality within the topography of the site by adapting to changes in ground level.

Terraced seating should be designed to be adaptable to the requirements of the space, taking into account the character of the site.

Terraces can be employed as a placemaking device and can inherently provide seating for a large number of people, so are effective as part of a performance space.

BESPOKE

Bespoke seating can be an effective way of creating a statement landmark for wayfinding or artistic character.

Bespoke seating should be employed strategically within a site and should be used sparingly - preferably in showcase locations only.

It should be noted that the process of designing bespoke furniture is more expensive and can be difficult to maintain in the long run. Therefore designs should be produced locally with replacement materials readily available.

PERFORMANCE REQUIREMENTS

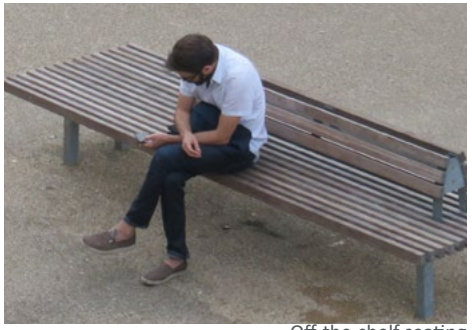
- Seating should be durable and use natural and sustainable materials.
- Seating should be able to withstand harsh environments relating to both human and climatic influence.
- Selections should be resistant to corrosion/ degradation.
- Designs should consider a wide range of user requirements and comply with Inclusive Design Standards, including providing armrests and backrests at intermediate points.
- Designers should be aware that the placement and design of seating can promote anti-social behaviour depending on the arrangement and level of natural surveillance.
- See Inclusive Design Standards for more details (IDS 04 – Seating / Rest Points, LLDC 2013).

SUSTAINABLE PROCUREMENT

- FSC Hardwood should be sourced from sustainably managed forests with a preference for local FSC hardwoods over tropical sources.
- Concrete production and constituent materials to be certified to ISO 14001 / ISO 9001:2008 / BES 6001.
- Use of materials with lower embodied carbon and use of recycled/secondary aggregates are preferred.
- All products should not cause damage to the environment or wildlife.
- Specifiers are encouraged to source from local suppliers.

MAINTENANCE

- Seating should be monitored regularly for surface cracking / scaling / splintering / flaking / spalling and shrinkage.
- Manufacturers' maintenance requirements are to be followed.



Off-the-shelf seating

Terraced seating

Other bespoke seating

SUMMARY OF SEATING MATERIALS

SURFACE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
TIMBER 	■ Timber seating is multi-functional and adaptable to a variety of settings: urban, parkland or riverside - depending on the style and design. ■ It complements other materials well so is often used as cladding. ■ Timber seating provides a relatively warm and tactile surface that is good for exposed locations. ■ It blends well with planting and has a naturalistic aesthetic so works well against soft landscaped spaces.	■ Timber products are cost-effective and can be customised and adapted to create themes running through a site. ■ Timber does not become overly warm in the sun and is comfortable to sit on. ■ Timber is relatively light and quick to install. ■ Adaptable and naturalistic. It is an attractive addition to a parkland or riverside setting.	■ Timber can become worn with time and is liable to splintering and staining. ■ More contemporary designs may appear 'dated' with time. ■ Arm rests and 'finer' components may be more susceptible to damage. ■ Designs produced internationally can be difficult to source materials for maintenance purposes - meaning that furniture can be out of action for extended periods of time.	Low - Medium (dependent on off-the-shelf vs. bespoke)	Medium (dependent on off-the-shelf vs. bespoke)
CONCRETE 	■ Concrete designs can be both informal and formal - making their application suitable for a variety of spaces. ■ Better suited to more urban environments or can be used as linear features within areas of more industrial character. ■ Timber cladding and other surface treatments can be employed to 'soften' the visual impact of concrete.	■ Concrete is generally a robust, durable and long-lasting material. ■ It can be adapted to a variety of settings and can be designed for informal and formal spaces, depending upon the design intent and desired character. ■ A variety of shapes and forms can be created to create different visual effects. ■ Shapes can be stark, rigid and architectural, or sinuous, soft and organic.	■ Variance in durability of concrete depending on the design. For maintenance reasons it can be better in the long run to avoid more intricate embellishments. ■ Concrete can be cold to sit on and is not especially comfortable unless it is formed into an ergonomic shape. ■ Concrete can be liable to staining if not treated effectively. ■ Long runs require studs to discourage skateboarding.	Medium (dependent on off-the-shelf vs. bespoke)	Low - Medium (dependent on off-the-shelf vs. bespoke)

OFF-THE-SHELF SEATING

TIMBER PRODUCT 1 STREETLIFE: LONG AND LEAN TIMBER BENCH South Park		■ Hardwood horizontal and vertical timber slat bench and backrest (various lengths of backrest and bench are available). ■ Stainless steel arm rests (optional). ■ Stainless steel comb fixing system.	■ This bench is capable of being adapted and customised (length, arm rest and backrest length can all be individually dimensioned or removed completely) - which means that it can be adapted within an environment to provide a varied and less homogeneous collective appearance. ■ This bench is slightly more contemporary and elegant in appearance and would be more appropriate for an urban, streetscape or event space setting. Stainless steel features and contemporary design suit a more architectural and 'designed' hard space.
TIMBER PRODUCT 2 Canal Park		■ Horizontal timber hardwood slatted bench and backrest. ■ Galvanised stainless steel arm rest. ■ Metal fixing system.	■ The simplistic and 'rugged' solid appearance make this product more suited to less formal areas. ■ Can be used in a more naturalistic setting and less heavily 'designed' location. ■ Due to the durable and robust materials - it would be appropriate to use this seating in a more exposed location where it would be able to effectively tolerate the elements.
TIMBER PRODUCT 3 ARC PROMENADE 'CHAISE' South Park		■ Horizontal hardwood timber slats. ■ Flat galvanised steel brackets. ■ Concealed metal comb fixing system.	■ Use of street furniture in a non-traditional sense, such as these comfortable loungers can further engage people to enjoy public space in different ways. ■ Loungers are suitable for positions in the sun or set within a relaxing natural location - such as a riverside setting, a courtyard or a place to enjoy the view.

OFF-THE-SHELF SEATING (CONTINUED)

EXAMPLE		MATERIAL / FINISH	APPLICATION
TIMBER PRODUCT 4 North Park / Here East		■ Solid concrete pre-cast base. ■ Hardwood timber slat cladding envelops the concrete body. ■ Galvanised stainless steel arm rests and foot supports. ■ Metal fixing/anchoring system.	■ Semi-circular modular seating provides for flexible and adaptable seating options. ■ The semi-circular design creates an intimate setting and this style of seating would be appropriate for a space more conducive to interaction and relaxation. ■ Seating with an organic form, can be more inviting than strong and rigid lines. Suited for informal areas or a campus setting where people may stop for a little while.
TIMBER PRODUCT 5 South Park		■ Pre-cast concrete body. ■ Hardwood timber slat cladding envelops the concrete body. ■ Galvanised stainless steel arm rests and foot supports.	■ Seating with organic forms can create a more comfortable and contemporary design that is more conducive to a space where people may want to stay for longer. ■ Can be set within a square or outside of an event space - slightly away from the main activity. ■ Contemporary seating more suited to a wide open space or hard streetscape/urban public realm setting.
TIMBER PRODUCT 6 STREETLIFE: ROUGH AND READY CURVE BENCHES South Park		■ Hardwood transverse modular timber beams and optional timber backrests. ■ Mounted on self-supporting metal comb fixing system. ■ Option stainless steel arm rests.	■ A flexible and adaptable seating option that can be customised to suit the location. ■ Recommended for edge treatment and where there are spatial constraints - curved linear nature means it can be readily accommodated within a variety of settings. ■ Suitable for urban, parkland or riverside settings or where the landscape design has a degree of curvature that the designer might want to echo.

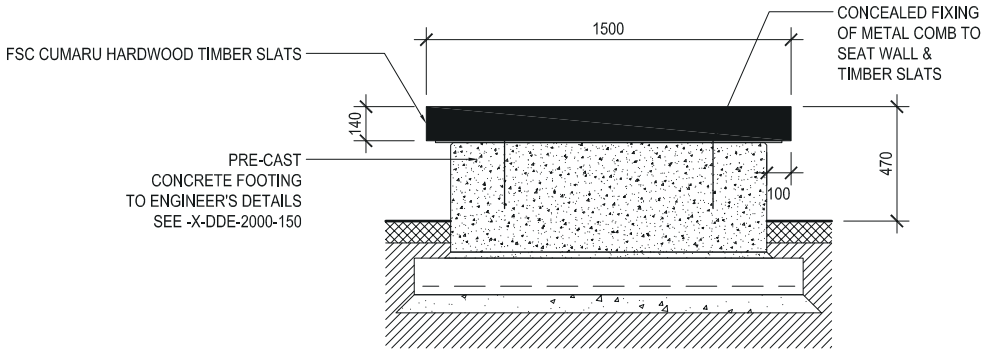
TERRACED SEATING

EXAMPLE		MATERIAL / FINISH	APPLICATION
TIMBER CLAD STEPPED SEATING South Park		■ In-situ concrete steps. ■ Resin-bonded intermediate level areas. ■ Hardwood timber clad seating edge.	■ Recommended use for a public urban space. In proximity to an event space or in an area where spectators or large crowds are likely to gather. ■ Potential to incorporate into a play park, allowing parents to overlook and observe their children from an elevated position.
PARK SEATING TERRACES North Park		■ In-situ concrete substrate. ■ Clad with hardwood timber slats to match S1 concourse bench slats. Risers and bench slats are bespoke.	■ To be employed in locations where seating backs onto a rising embankment. ■ Naturalistic timber seating lends itself perfectly to parkland and riverside settings. ■ Can be employed by designers as an effective retaining wall for planting areas and the soft landscape and natural timber work in unison in retaining the naturalistic character and setting.
TIMBER SEATING STEPS South Park		■ In-situ concrete substructure/base. ■ Horizontal hardwood timber slat cladding. ■ Integrated lighting.	■ Naturalistic form of the terracing is suitable for an area where there are fairly sudden level changes. By introducing terracing and steps, it allows for seating and access. ■ Stepped terraced seating is appropriate for a parkland or riverside setting - set amongst planting. ■ Designers can adapt terraced areas to feature backrests, making spaces more multi-functional and enclosed or intimate.

TERRACED SEATING (CONTINUED)

EXAMPLE		MATERIAL / FINISH	APPLICATION
TIMBER AMPHITHEATRE SEATING South Park		■ In-situ concrete substructure/base. ■ Horizontal hardwood timber slat cladding. ■ Stainless steel and reinforced glass handrail/screen.	■ Amphitheatre seating can be useful for an educational setting or for an event space, allowing people to watch and observe performances. ■ A recommended option for a play park or a public space where activity and lively activities are anticipated.
STAGGERED CONCRETE SEATING WALL North Park		■ Pre-cast concrete seating wall. ■ Hardwood timber slat cladding providing a seating top.	■ Use of linear stepped seating is effective in working with the topography of a site. ■ Recommended use for formal or parkland edge treatment, where level changes and traditional walling may not be appropriate. ■ Linear concrete walls create elegant formal features, suiting a site where the soft landscape works somewhat to soften the starkness and formality of the concrete.
SINUOUS TERRACED SEATING South Park		■ Hardwood vertical timber slatted terrace seating (various lengths of backrest and bench are available). ■ In-situ concrete retaining wall and substructure.	■ Sinuous terraced seating can be used as an edge treatment or retaining wall for planted areas. ■ This seating type can be used at a variety of scales and is particularly useful for larger-scale open spaces. ■ Can be used in a naturalistic or more urban hardscape setting. Adaptable and natural design lends itself to both settings alike.

TERRACED SEATING DETAIL



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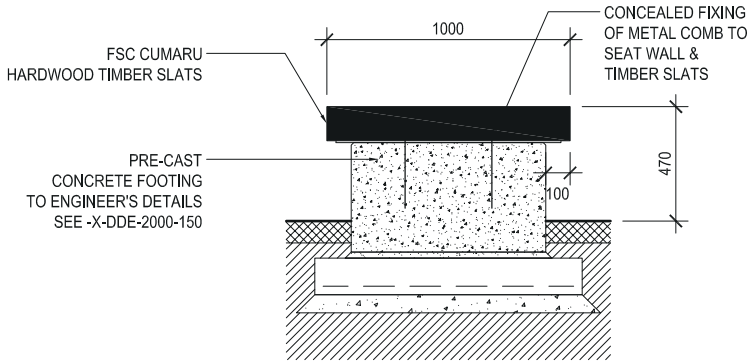

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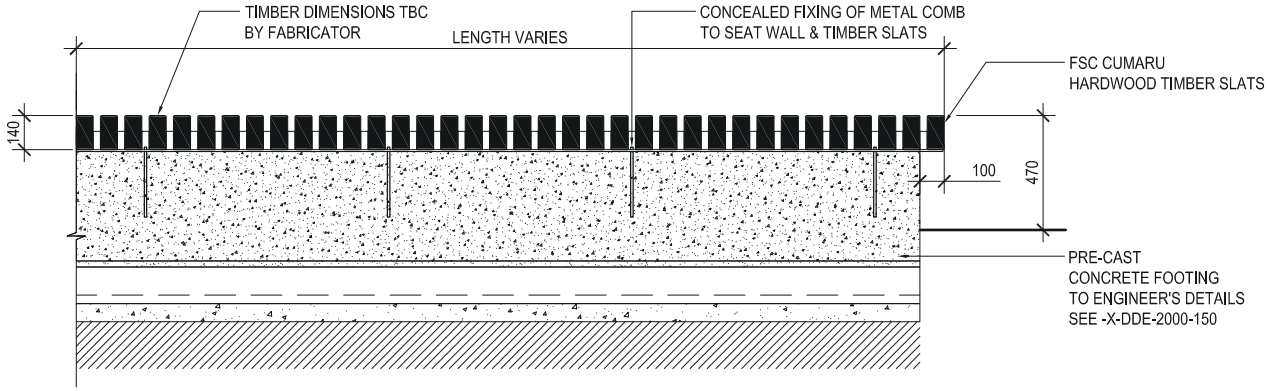


TYPICAL ELEVATION/ SECTION

BESPOKE SEATING

EXAMPLE		MATERIAL / FINISH	APPLICATION
OLYMPIC WAVE BENCH South Park		■ Hot-dip galvanised steel supports. ■ Hardwood timber slat prefab modules. ■ Mounted on metal comb fixing system and anchored to underground bases.	■ Designed as a bespoke piece of furniture for the Queen Elizabeth Olympic Park and now available as an off-the-shelf product. There are possibilities for designers to collaborate with street furniture manufacturers to devise off-the-shelf products reducing costs for future schemes. ■ Bespoke linear designs with backrests are particularly useful for busier spaces or where a narrow design is required by a designer for the accommodation of wider pedestrian areas.
LINEAR SEATING AREA South Park		■ Hardwood timber slat backrest and base. ■ Metal fixing and anchoring system.	■ Linear seating can be employed by designers to effectively channelise visitors, useful for the approach to major events venues. ■ Bespoke seating can be employed to form physical barriers between spaces, offering a more informal alternative to standard barriers, creating a less hostile environment.
SUSPENDED 'SWING' SEAT South Park		■ Hardwood timber frame and slats to seat and backrest. ■ Pre-cast reinforced concrete base. ■ Metal fixing and suspension cables. ■ To be phased out.	■ Playful furniture creates a sense of fun and helps to enliven a space. ■ Designers can use informal bespoke seating to set the character of a space - the swing here implies a relaxed, family-friendly space. ■ However this particular model has experienced several issues relating to the moving parts - moving seats are high maintenance and generally not recommended.

BESPOKE SEATING (CONTINUED)

EXAMPLE		MATERIAL / FINISH	APPLICATION
SCULPTURAL SEATING AREA		■ Pre-cast modular concrete bench assembled in- situ.	■ Architectural sculpted designs provide landmark features within the landscape. ■ By creating sinuous forms with concrete, the structure helps to soften the stark nature of the materials. ■ Through using such materials, designers can create both an artistic statement and a functional space for people to gather and relax. ■ Can be used to provide a focal point and as an effective placemaking device.
INFORMAL CIRCULAR SEATING AND PERFORMANCE AREA South Park		■ Hardwood horizontal and vertical timber slat cladding. ■ Concealed concrete substructure.	■ Multi-functional seating can be employed in urban and more naturalistic environments. ■ It is important to provide diverse, informal spaces that have dual purposes - i.e. a stage for organised/impromptu street performances or seating areas.

PLAY FURNITURE

PLAY STANDARDS

KEY OBJECTIVES

Consider the dynamics of play - some facilities can be just as stimulating for children when designed as a quiet and contemplative space, not just an active one.
Always consider users with specific needs and aim to provide for a range of abilities and ages.

- Risk taking and challenge is an important element of play and a balance needs to be struck between safety and fun.
- Allow for convenient changes to be made to the layout not just for maintaining and replacing furniture, but so as to be able to swap or provide new facilities that keep children interested.
- Play spaces within the Park are not to be fenced off so as to create permeable facilities that blend in naturally with their surroundings.
- Design play spaces and use equipment that will be inclusive for all users.
- Community consultation and engagement is greatly encouraged for the design of any new play spaces.
- Provide imaginative play elements for both individual and social play.
- Create facilities that encourage a range of different forms of play including climbing, spinning, swinging, sliding and role play. All at a variety of difficulty and heights above ground.
- Seating and tables should be provided to enable parents / carers to sit nearby while children play.
- Informal play is encouraged through the use of natural materials such as large stones and rolling topography outside of the more formal play spaces.
- It is important that designs encourage natural play and contact with nature.

MATERIALS

Timber and steel are the preferred materials to be used throughout the Park. There should be a limited colour palette to ensure consistency - primarily this should be the natural colour of the material such as timber or stone etc. Natural materials also enhance learning through smell and touch, such as playing with sand and water.

BESPOKE VS. OFF-THE-SHELF

Off-the-shelf equipment is generally preferred to bespoke, although bespoke elements may still be considered as statement features in exceptional locations. Bespoke equipment can add a strong sense of excitement and individuality to the play space. However off-the-shelf products are generally easier to maintain and replace parts as required.

STANDARDS AND GUIDANCE

All play equipment within the Park is expected to receive very high usage. Design and maintenance must comply with both Queen Elizabeth Olympic Park Management Plan and RoSPA guidance and inspections.

All play equipment must comply to British and European Safety standards. Refer to the Amenity Areas and Play Spaces section, p50.

The Legacy Community Scheme Design Codes should be followed for new play spaces within these areas.

Refer to South and North Park Specification Appendices for off-the-shelf equipment specifications.

See also Inclusive Design Standards (IDS 17 – Inclusive Play, LLDC 2013).

Olympic themed play


'Play Room' - South Park 2012 Gardens

PLAY CHARACTER AREAS

SOUTH PARK

The South Park consists of two main play zones, the Play Room and The Water Labyrinth.

The Play Room features red safety surfacing which links a range of equipment, including swings, climbing structures, slides and sand and water play. There is also a climbing wall located above City Mill River. Swings and seats are located along the arc promenade.

The Water Labyrinth, located in the 'Civic Room', is a sinuous line of water jets and fountains of continuously changing force and height.

It is encouraged to utilise Olympic themed elements such as on ground thermoplastic / painted graphics representing Olympic events.

Both seating and planting should be used to frame the play rooms.

Individual play features and fitness equipment should be strategically positioned outside of the formal play spaces to provide incidental play opportunities.

NORTH PARK

North Park play is mainly based around the Tumbling Bay play areas. These provide a range of opportunities for children of all ages to explore, challenge themselves, play and learn, which mirror the successful themes within the landscape.

The Tumbling Bay play areas are split into two main spaces, the sand and water area and the pine forest area.

Natural play and exploration are encouraged for all with planting designed to stimulate the senses of touch, smell, site and sound.

Off-the-shelf product use should be minimised to retain a bespoke feel, however, equipment should be sourced where possible that can retain the informal and naturalistic character.

Grass and wood chip should be used as the main surfacing materials.

Play features should be visible and open in some areas, yet enclosed within dense planting in others to form a sense of privacy and adventure.

CANAL PARK

There is one main play space within the Canal Park adjacent to Gainsborough Fields and East Wick.

Play elements and their materiality should reflect the industrial nature of the canal, using rustic and naturalistic features.

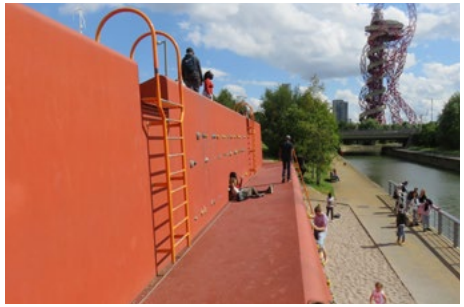
Play features should utilise the existing rolling topography, embedding equipment within it to tie in naturally.

A wild character should be created, with an informal layout with bespoke timber features encouraged at key locations.

All layouts, materials and equipment must comply with the Canal Park Design Guide and the Canal and River Trust should be consulted on all proposals.

Off-the-shelf swing - South Park

Water play - North Park



Feature Play Wall - South Park

Tumbling Bay Play Area - North Park

Canal Park

Naturalistic features - North Park

BOUNDARY TREATMENTS

FENCING

SITE WIDE

Throughout the Park, fencing is used as minimally as possible. There is a consistent design of metal parapet that should be used for all raised platforms, bridges and some waterways.

NORTH PARK

The North Park is provided with powder coated mild steel railings and gates to create a secure boundary at all times. Gates are to be locked outside of park opening hours. The fencing alignments allow the permitted 24 hour lit routes to be managed after dark.
The 'North Park Secure Perimeter Design and Access Statement' (January 2013), sets out the required locations for fencing.

SOUTH PARK

There are no boundary railings surrounding the South Park, to allow pedestrian access at all times. Weldmesh security fencing is used to protect key locations such as the ArcelorMittal Orbit.

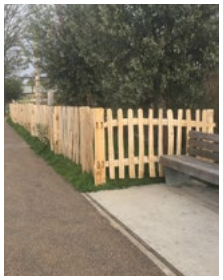
CANAL PARK

Canal Park and Greenway/Southern loop road barriers or fences require a more rustic approach to fit with the naturalistic setting. Non-machined timber constructed using traditional rural methods should be employed.

OTHER FENCING

Other forms of temporary fencing (chestnut pale, rope and post, Heras or tape) are used to protect new planting, for areas under repair, to restrict car parking, and for safety reasons during major events.

MATERIALS PALETTE

	PRODUCT	FINISH	APPLICATION
	Mild steel estate railings and swing lockable gates	Powder coated light grey to match existing	North Park - whole park with lockable gates to all entrances
	Metal Parapet 3000mmW x 1400mmH Straight and curved sections	Powder coated mild steel uprights, galvanised leaner and stainless steel rail	Park-wide Parapet used for bridges, water edges and raised areas 1no. bay to include leaner, cycle rail, 2no. posts and 70º mesh infill panel, fixing rails and galvanized grating as necessary
	Weldmesh security fencing. Height and density of mesh to match existing	Powder coated dark grey to match existing.	Located around the ArcelorMittal Orbit. All the fences are planted with Parthenocissus tricuspidata 'Veitchii' or Boston ivy, intended to act as a screen to the fence
 	Timber post and rope 'knee rail' fencing Rustic Timber Fence	Timber and rope Non-machined timber constructed using rural methods	To be used at key locations to stop pedestrians accessing planted / grassed area, as required and dictated by high visitor pressure or to avoid conflict

WALLS

GENERAL WALLING PRINCIPLES

- Walling may be used not just as a device to deal with level changes, but can act as a decorative feature, a focal point or usable element, such as a seat.
- In-situ and pre-cast concrete walling is used site wide and creates a consistent materiality and industrial character throughout the Park.
- Bespoke in-situ concrete / timber seat walls are suitable for use site wide. There are also a range of off-the-shelf products available such as Streetlife 'RoughandReady Topseats'.
- Timber is also a suitable material for use as a cladding or coping.
- Walling can be used as a retaining edge for soil and planted areas. A suitable geotextile should be used in these situations.
- Low walling should be designed to frame spaces.
- Design, finish, maintenance and specifications must comply with the North and South Park Specifications as well as the Queen Elizabeth Olympic Park Management Plan.

SEAT WALLS

Use of linear stepped seating is effective in working with the topography of a site.

Linear concrete walls create elegant formal features, suiting a site where the soft landscape works somewhat to soften the starkness and formality of the concrete.

Timber provides more warmth and comfort as a coping material if a wall is intending for seating.

It is recommended to use a 'formal' or 'parkland edge' treatment where level changes and traditional walling are considered inappropriate.

Refer to the terraced seating section for a detailed review of seat integrated walling on p70.

RETAINING WALLS

- Design of retaining walls and their build up and foundations must be designed and approved by a qualified structural engineer.
- Where possible it is preferable for soft landscape to be used to traverse level changes as a more cost effective and cheaper solution to hard landscaping.
- The high retaining walls adjacent to bridges throughout the Park use crushed concrete gabions with a square welded grid mesh.

POTENTIAL USES

PCC SEAT WALL
Smooth dark grey concrete seat wall set at varying heights for added interest

PCC LOW WALL / EDGING
Undulating extra-wide wall used as a dramatic edging feature

GABION RETAINING WALL
Crushed rock gabion forming an industrial character

IN-SITU CONCRETE WALL
Utilising topography to create a viewing platform to the river

IN-SITU CONCRETE WALL
Clad with timber. Dynamic form creates a impressive terraced focal point

HANDRAILS AND BALUSTRADES

KEY OBJECTIVES

Handrails are to be provided at key locations and on bridge parapets in order to provide safe access for park users.

Where possible the park-wide parapet within the fencing section is preferable over a heavy duty alternative.

A consistent material palette of galvanised stainless steel should be provided for all elements, unless matching an existing powder coated finish.

Handrails must be provided for all steps and formal ramps.

PERFORMANCE REQUIREMENTS

- Any drop higher than 500mm must have a balustrade, guardrail or another form of restraint approved by LLDC.
- Handrail design and positioning must comply with all relevant standards and guidance including BS8300, Part M building Regulations and LLDC Inclusive Design Standards.
- Handrails should always be stainless steel.
- Throughout the Park any footpath steeper than 1:21 is a formal ramp and will therefore require a handrail. Any footpath between a gradient of 1:21 and 1:30 is defined as a slope.

PHOTO	PRODUCT	FINISH	APPLICATION
	Central stair handrail and cantilevered edge handrail	Single upright - all elements stainless steel Two uprights - Galvanised uprights with stainless steel rail	Steps and formal ramps throughout the Park Bridge H04 stairs and steps adjacent Water Feature Plant Room to have closed loop handrail with horizontal top and bottom returns nom. 260mm W x 2000mm
	Balustrade guardrail with handrail	Powder coated (light grey to match existing) mild steel uprights with a cantilevered stainless steel handrail	Along raised edge adjacent to the London Aquatics Centre
	Bespoke balustrade / fence with handrail	Stainless steel	Angled bespoke design used for Bridge F06 only
	Metal Guard railing (heavy duty)	Galvanised steel and weldmesh	Generally not to be used unless absolutely necessary The park-wide parapet within the fencing section is the preferred alternative where possible for continuity throughout the Park

PLANTERS

KEY PRINCIPLES

There are a small number of raised planters used throughout the Queen Elizabeth Olympic Park. These are mostly temporary timber planters within the North Park.

The current timber planters on site are degrading rapidly. No further timber planters should be specified as they are difficult to maintain. The design of the planters were intended to be movable, however, the base has often failed during operations.

Raised planters should only be specified where they can provide a secondary usage; such as planters designed to act as a physical restraint in place of bollards. Usage should generally be avoided where possible.

When using planters for trees, species must be carefully selected to ensure they receive sufficient soil volume to enable the tree to thrive. Drainage requirements need to be considered and appropriate for planting.

Raised planters may be acceptable in exceptional circumstances or within specific developments such as Here East. LLDC advice and permission must be sought.

Concrete retaining walls are used in various locations to contain planted / grassed areas. These are encouraged, especially when they can be combined as seating elements. Refer to the Walls section p79.

Canal Park / Here East timber planter

Bespoke concrete planter wall

Existing timber planters - not to be specified

Stainless steel planters and benches used as physical separation between main concourse and the London Aquatics Centre.

BOLLARDS

STANDARD DESIGNS

PLANNING GUIDANCE

The use of bollards across the Park should be minimised so as to reduce clutter.

Events venues already have an established line of bollards and this should be maintained as part of ongoing security measures.

New residential areas should be designed to minimise the need for bollards to restrict vehicle encroachment.

In most locations, multi-functional street furniture positioned to achieve the same barrier effect as a line of bollards would be preferable.

DESIGN INTENT / USE

There are two main uses for bollards in the Park:

- Management: to minimise unlawful vehicle parking on footways. To prevent unauthorised parking, bollards should be spaced at intervals of between 1.3m.
- Security: to provide hostile vehicle mitigation protection through the Park, bollards should be positioned as per BSi PAS69 guidance.

REQUIRED STANDARDS

- Security bollards are to be tested to PAS 68 standards. Installation to comply with PAS 69 standards.
- Bollards should be at least 650mm in height to ensure adequate visibility. Black visibility bands are recommended to enhance visual definition.
- Bollards must be set a minimum of 450mm from the kerb edge and avoid creating physical pinch-points.

MATERIALS / FINISH

- Brushed, satin or bright stainless steel finishes permitted.

OTHER CONSIDERATIONS

- Domed tops can be beneficial in areas with high pedestrian flows as it stops litter being left on the bollard.
- Open sections of footways should have bollards or other street furniture positioned at least every 40m so as to restrict hostile vehicle movements.

Hostile vehicle mitigation bollards used within the South Park

MATERIALS PALETTE BOLLARDS

	MODEL	FINISH	APPLICATION
	Standard 'Zenith' Range by Furnitubes International or equivalent Typically c115mm diameter	Brushed or Satin Stainless Steel	To be applied as standard across parkland routes.
	Removable 'Zenith' Range by Furnitubes International or equivalent	Brushed or Satin Stainless Steel	Locked access for parkland areas which only require intermittent access, such as for monthly maintenance schedules.
	Mitre top	Bright Stainless Steel	To be applied as standard across new residential areas. Shown with black visibility band.

	MODEL	FINISH	APPLICATION
	Medium level security bollard	Bright Stainless Steel	To be applied as part of the 'Ring of Steel' for main events areas. Shown with black visibility band.
	Automatic rising bollard	Brushed or Satin Stainless Steel	Remote controlled events access on main service vehicle routes.
	High level security bollard (2m)	Bright Stainless Steel	For high profile processional route protection. To be used sparingly due to the high visual impact and associated cost. To be phased out.

LIGHTING

LIGHTING STRATEGY

Lighting is to be designed as per the ODA Lighting Strategy (2009) and LCS Lighting Strategy (2013), complying with the requirements of the Inclusive Design Standards (LLDC, 2013), with layouts to be provided based on an appreciation of:

- the character of different areas of the parkland and neighbourhoods
- ensuring a consistent quality of light in each character area
- preventing over lighting of environmentally sensitive areas
- the use of appropriate contemporary equipment
- creating secure walking environments

Designers are encouraged to adopt these principles when setting out lighting plans with particular consideration for the interface between new developments and open parkland. A warmer colour temperature of 2700K is to be used on tertiary streets and a more neutral warm colour temperature of 3000K is to be used on primary and secondary routes (see Legacy Streets Technical Design Guidance for more details).

ENVIRONMENTAL ZONES

The Park is subdivided into lighting zones as per the ODA Lighting Strategy (2009), guided by standards set out by the Institution of Lighting Engineers for Environmental Zones:

E1: Preserved dark landscape; generally unlit (habitat corridors)

E2: Outer urban low lighting levels (most of North Park)

E3: Urban residential middle brightness levels (most of South Park)

E4: Urban commercial high brightness levels (generally not widely used in the Queen Elizabeth Olympic Park). Light pollution is to be minimised by means of implementing directional, capped lighting units.

LIGHTING STANDARDS

- All luminaries to be selected to provide sufficient optical performance for the setting, and to limit light pollution and glare.
- Accessories such as louvres and filters to control lighting may be positioned as required.
- Lighting columns to be positioned as part of a utility corridor and aligned to wider street furniture layout.
- Existing lighting equipment is to be retained or relocated as appropriate.
- Lighting design to comply with the principles set out in *Bats and Lighting in the UK* (Bat Conservation Trust, 2009).
- See also Inclusive Design Standards (IDS 09 – Lighting, LLDC 2013).

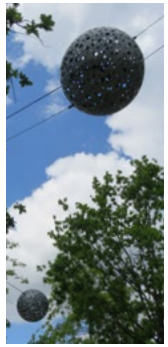
LCS Lighting Strategy (LLDC, 2012)

MATERIALS PALETTE - LIGHTING COLUMNS

CONCOURSE AND PATHWAY COLUMNS

	MODEL	FINISH	APPLICATION
	Medium height 6m concourse column - post top	Galvanised steel columns painted RAL 9007	Standard column for use across concourse area and main walking routes
	Low height 3m columns - with cylindrical luminaire	Galvanised steel columns painted RAL 9007	Low level column for riverside paths within Queen Elizabeth Olympic Park
	High height 8m column - with single shaft	Galvanised steel columns painted RAL 9007	Standard column for use across primary and secondary roads

BESPOKE FEATURE LIGHTING

	MODEL	FINISH	APPLICATION
	Bespoke circular formed 'Memory Mast' with halo lights and micro wind turbines - 32m (36m with turbine)	Galvanised steel columns painted RAL 9007	South Park - Event Civic Room
	Bespoke Catenary Minimum 4.8m height light height / mounted on 6.5m columns	Painted galvanised steel sphere	South Park - Arc Promenade
	Low height 3m narrow post - for spotlight attachments	Galvanised steel columns painted RAL 9007	Non-standard narrow column with capacity for spotlights For use on tertiary streets and urban areas

- A common procurement route is recommended to ensure coordination of luminaries, lanterns and additional provisions such as CCTV.
- Inclusive design contrasting visibility bands to be provided on all columns at 1.5m height, 150mm wide; colour: Pearl grey BS 22B15.
- The 24 hour primary access route through the North Park is lit with overhead 6m concourse lighting.
- The South Park is lit with additional uplighters in the woodlands and across the Water Labyrinth. Amenity lighting is provided across the South Park to encourage evening use.
- Venue lighting is provided during hours of operation with some additional security lighting.

KEY REFERENCES

- ODA Lighting Strategy (2009)
- LCS Lighting Strategy (2013)
- Inclusive Design Standards (LLDC, 2013)
- Legacy Streets Technical Design Guide (2014)

PUBLIC ART

DESIGN INTENT

Queen Elizabeth Olympic Park is home to series of carefully commissioned artworks (including ArcelorMittal Orbit) that celebrate both the distinctive character of the immediate area and the wider local context of the Park. These artworks draw on wide-ranging themes including the Park's industrial heritage, local culture, the waterways and the Olympic and Paralympic legacy and as a collection demonstrate how art can be successfully embedded into large scale developments from the start.

Art in the public realm is encouraged to:

- establish and reinforce a distinct character to an area
- animate a space and promote related activity through events and regular updates
- embrace creative use of meanwhile spaces
- enable local artists to exhibit their work and to continue to support a wide network of the art community
- engage the local community in educational activities and promote skills and knowledge sharing.

The maintenance for each of the permanent artworks is set out in the Park Management Plan (LLDC, 2017).

Refer to the Site Wide Public Art and Cultural Events Strategy (LLDC, 2015) for more information.

London's tallest sculpture - Sir Anish Kapoor and Cecil Balmond's ArcelorMittal Orbit attracts upwards of 200,000 visitors each year

'Run' by Monica Bonvicini, provides a strong association to the Olympic Games;

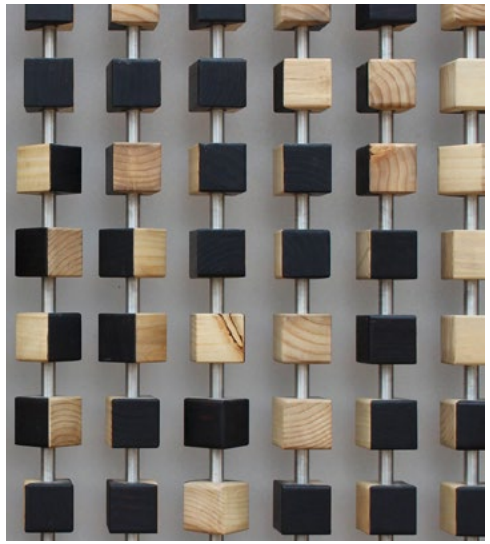
Future developments are encouraged to embed new public art through the following means:

- integrating public art into streetscapes and public spaces
- appointing artists to design teams
- involving artists in wayfinding strategies and delivery
- through Interim Uses

Any future art commissions should include a range of artists and organisations who will deliver projects through open, fair and competitive processes. The Park will not accept unsolicited proposals.

The maintenance for each of the permanent artworks is set out in the Park Management Plan (LLDC, 2017). Refer to the LLDC Arts and Culture Strategy 2014, Site Wide Public Art and Cultural Events Strategy (LLDC, 2015) and the Art in the Park Field Guide (2015)

"Public art is not an art form. It is a principle whereby the involvement and activities of artists contribute to the identity, understanding, appreciation, and enhancement of public places. This is best achieved through collaboration with artists in the conception, design development and implementation of changes to the built and managed environment." Ixia, national public art think tank (formerly Public Art Online)



Pixel Wall - integrated into South Park Hub
By artist and design collective Tomato

REFUSE AND RECYCLING FACILITIES

LITTER BINS

KEY PRINCIPLES

The Park Waste Management Plan sets out the strategy for removing waste from the site and treating it locally. The Cleansing and Waste management chapter of the Park Management Plan sets out the approach for ensuring adequate cleansing and inspection requirements of litter bins.

- The Estate Facilities Management Contractor manages all operations relating to waste management.
- Any changes to standard products used across the Park needs to consider the ongoing operations efficiency for all contractors.

LOCATION

Stand alone bins are to be provided at park entrances and adjacent to kiosks.

Avoid placing small litter bins on main venue walking routes as these will quickly become overly full.

DESIGN

Material/colour/finish: Powder coated stainless steel with automatic key and lock
British/EU Standard: BS EN 840 Parts 1-6: 2004

Dog waste disposal to be provided on units at park entrances.

TRIALS

The existing prevalent bin type (Metalwork 50l capacity) has had issues relating to limited capacity and cleansing.

Relabelling bins to indicate that all waste goes for recycling is being trialled along with deploying 1100L bins in key locations (14No.)

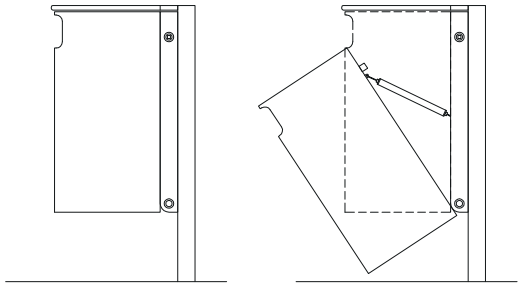
EVENTS

During major events (often occurring every week) large bins may be utilised to accommodate high levels of litter. 1100l wheelie bins manufactured and tested to EN840 may be deployed in the South Park as required and should be secured to a permanent structure such as fencing or bollards.

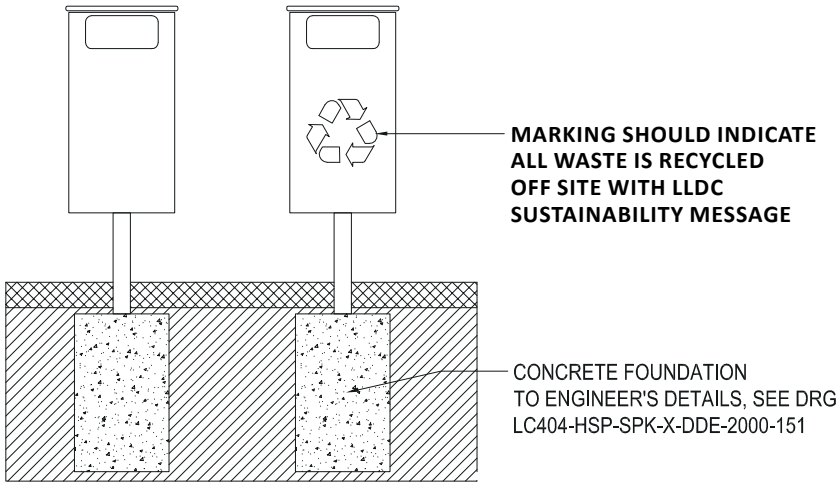
RECYCLING

There is an agenda for no waste to go directly to landfill by 2030 by increasing recycling and minimising waste production. Between April 2016 and March 2017, 94% of waste from the parkland was recycled or reused as compost.

Bins do not require a separate recycling section as all recyclable material is sifted from the general waste after collection.



SIDE ELEVATION



SECTION

WAYFINDING

VERTICAL SIGNAGE

DESIGN INTENT / USE

- Vertical wayfinding signage is to comply with the Queen Elizabeth Olympic Park Wayfinding Strategy (Applied, 2013). Minimised well designed and integrated for constant visitor enjoyment of the park.
- Park totems and fingerposts to be used at key decision points.
- Signs to be positioned so as to maintain required footway width standards.
- The location of signposts should be planned to enable effective maintenance.

MATERIALS / FINISH

- Concrete standard sign for Queen Elizabeth Olympic Park.
- Vitreous enamel panels and shot peened stainless steel for Legible London.

OTHER CONSIDERATIONS

- Map content will be updated regularly as development plots open up.
- All proposed new wayfinding products should be reviewed by the LLDC Built Environment Access Panel (BEAP).
- Sentence case lettering (capital first letter, then lower case) is recommended as most people, especially people with visual impairment, recognise words by their shape.
- See also Inclusive Design Standards (IDS 09 – Signage, LLDC 2013).
- Low level repeater signage is being used as part of a trial for step free route marking.
- Environmental graphics are encouraged as part of boundary treatments and wider architecture designs to provide a navigation aid without the need for additional signposts.
- Moveable variable message signs (VMS) may be used in exceptional circumstances during major events. More permanent VMS solutions are being designed to minimise the adverse impact of temporary signs.
- Other signage systems in the local area include Westfield, Victoria Park and Lea Valley Greenways which use a contrasting style of fingerposts. Designers should check content and signing strategy to link effectively between systems.

PRIMARY SIGN TYPES

PARK-WIDE MAP-BASED TOTEMS
Concrete

LOW LEVEL STEP FREE ROUTE SIGNAGE
Powder coated steel

QUEEN ELIZABETH OLYMPIC PARK BRANDED FINGERPOSTS
Powder coated steel

LOW LEVEL REPEATER SIGNAGE
Wooden post

INFORMATION BOARDS TYPE 1
Powder coated steel

VARIABLE MESSAGE SIGNS
Temporary

INFORMATION BOARDS TYPE 2
Powder coated steel

ENVIRONMENTAL GRAPHICS

PRODUCT FAMILY 1: OLYMPIC PARK

DESIGN INTENT / USE

- Queen Elizabeth Olympic Park branded totems to be used on main park walking routes.
- Gateway totem to be provided at Park entrances.
- Vertical wayfinding signage is to comply with the Queen Elizabeth Olympic Park Wayfinding Strategy (Applied, 2013 / LLDC, 2017).

MATERIALS / FINISH

- Contrasting concrete totem with acrylic glass panels
- Powder coated steel fingerpost (shown overleaf)

PRODUCT FAMILY 2: LEGIBLE LONDON

DESIGN INTENT / USE

- Legible London branded totems to be used on primary and secondary streets and not within parkland areas.
- Vertical wayfinding signage is to comply with the Queen Elizabeth Olympic Park Wayfinding Strategy (Applied, 2013 / LLDC, 2017).
- Signs to be positioned so as to maintain required footway width standards.

MATERIALS / FINISH

- Vitreous enamel panels and shot peened stainless steel

OTHER CONSIDERATIONS

- There is a preference for Park branded fingerposts within the Queen Elizabeth Olympic Park boundary area.

PRODUCT PLACEMENT MAP

The map opposite shows the placement of existing wayfinding products across the Park, not including LCS zones.

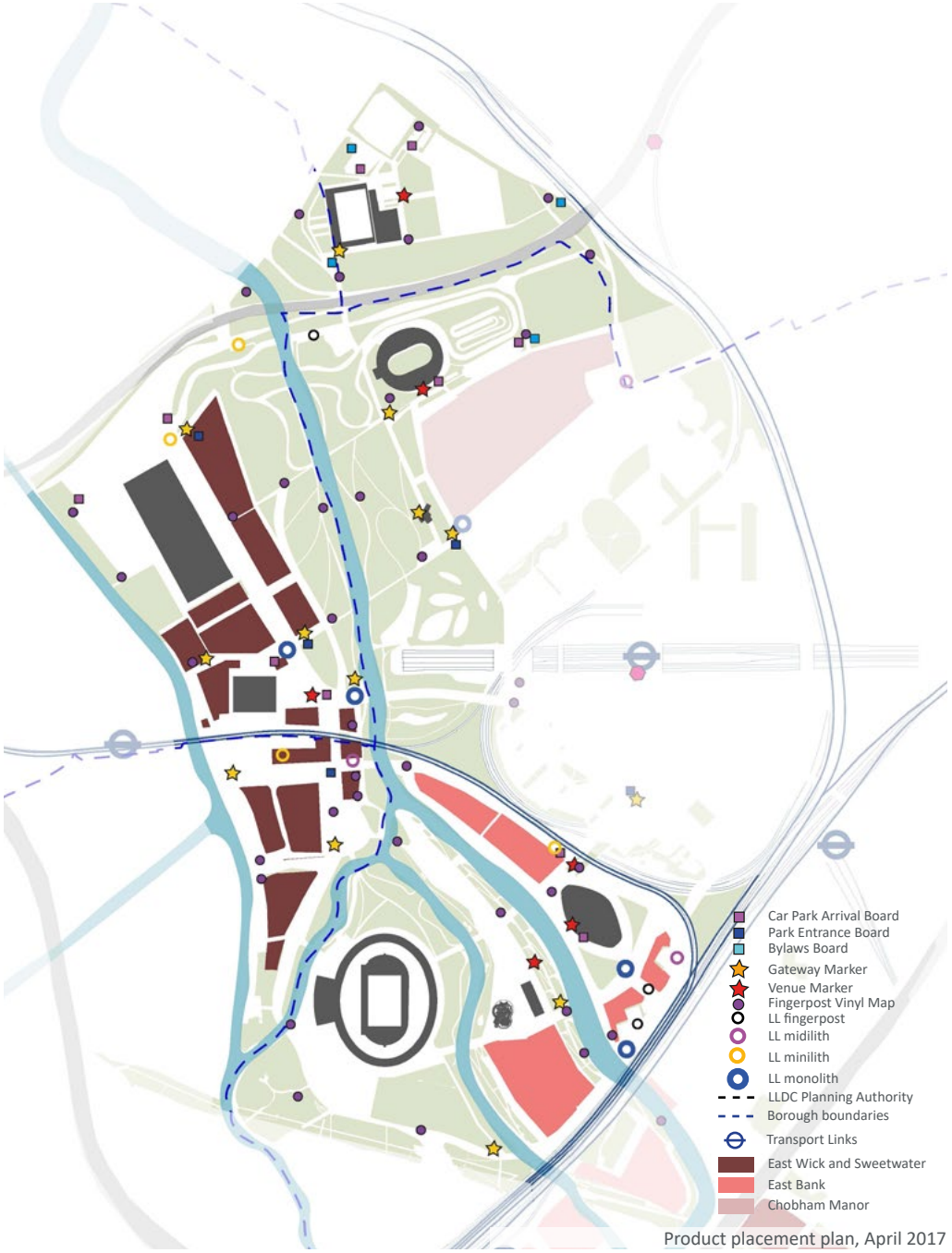
GATEWAY MARKER TOTEM
Concrete

LEGIBLE LONDON TOTEM
'Monolith'
Vitreous enamel

QUEEN ELIZABETH OLYMPIC PARK BRANDED FINGERPOST
Powder coated steel

MAP BASED INFORMATION BOARD / BYELAWS BOARD
Powder coated steel

VENUE MARKER
Powder coated steel



Product placement plan, April 2017

OTHER SIGNING SYSTEMS

Within the LLDC's zone of influence a range of other signage systems are already utilised, including:

- Here East bespoke interactive signage
- Westfield shopping centre signage
- Canal and River Trust
- Department for Transport (DFT) Traffic signs for walking and cycling
- Legible London (used by the International Quarter London)
- Future developments such as UCL East and Stratford Waterfront may have their own brand identity.

These signs are designed and maintained by the respective managing organisation.

An uncoordinated range of signage systems can create confusion for users through inconsistent information, naming conventions and overall strategy.

It is vital that designers consider the signing strategy across the different product types and signing systems so as to maintain a consistency in journey information.

HERE EAST
Interactive totem

CANAL AND RIVER TRUST MAP
Information board

DFT TRAFFIC SIGNS
Walking and cycling network signage

SURFACE SIGNAGE

Surface signage may be considered in exceptional circumstance to supplement the main vertical signage system.

Painted markings on bound surfaces may be considered on key walking routes, particularly for referencing main venues, in providing Olympic Legacy information or for play.

Contrasting aggregates are harder wearing than surface paint and may be preferred where a long term signage strategy is required.

Inset alloy information panels may be considered as part of an arts strategy, but are not part of the park-wide palette due to the relatively high production and maintenance costs.

SURFACE GRAPHICS
Marking paint

INSET SURFACE PANEL
Cast copper

KEY REFERENCES

- Lea River Design Manual
- Queen Elizabeth Olympic Park Wayfinding Strategy

CYCLE PARKING

SHEFFIELD STANDS: TYPE 1

KEY PRINCIPLES

All cycle parking to comply with standards set out in the London Plan Addendum to Chapter 6 - cycle parking.

Short-stay cycle parking for park visitors to be recognised as having different requirements from that of longer-stay staff and residential parking.

LOCATION

Stands are primarily to be located outside main venues and adjacent to retail areas.

Secure hub parking to be provided next to major employment zones and within residential areas.

Spacing of stands to be laid out as per TfL London Cycling Design Standards (2014).

DESIGN

Sheffield 'Standard' Stand

- 50mm diameter steel tube
- Brushed or Satin finished Stainless Steel
- Single bar and cross-bar types may be used acceptable

INSTALLATION

- Submerged fixing preferred

SHEFFIELD STANDS: TYPE 2

KEY PRINCIPLES

Elongated Sheffield 'Extra' stands may be utilised where space permits to provide for larger bicycle types, such as cargo bicycles, recumbent bicycles and trailers, as well as adapted cycles as used by some disabled people.

LOCATION

Larger stands should be implemented less frequently than standard sized Sheffield stands, generally specifying one extended stand for every five standard.

Where there is demand for a long run of cycle stands, the preference is to position all 'Extra' stands together and close to the anticipated main trip attractor entrance. This is so that less able-bodied users can benefit from using this cycle parking in the most convenient location possible.

DESIGN

Sheffield 'Extra' Stand

- 50mm diameter steel tube
- Crossbar provided for additional rigidity and security
- Brushed or Satin finished Stainless Steel

INSTALLATION

- Root fixed equipment preferred.

CAMDEN M STANDS:

KEY PRINCIPLES

Designed to improve security by providing opportunity to double lock.

LOCATION

Canal Park and more remote locations.

DESIGN

- 50mm diameter steel tube
- M shaped to facilitate double locking
- Brushed or Satin finished Stainless Steel
- Galvanised steel or gray RAL 9007

INSTALLATION

- Submerged fixing preferred

Sheffield Stand Type 1

Sheffield Stand Type 2

CaMden M Stand

CYCLE HIRE DOCKING STATIONS

EXISTING PROVISION

The London Cycle Hire Scheme expanded to Queen Elizabeth Olympic Park in 2016, with 8 docking stations now located around the Park:

- Aquatic Centre - 63 spaces
- VeloPark - 43 spaces
- Podium at ArcelorMittal Orbit - 39 spaces
- Timber Lodge - 35 spaces
- East Village - 34 spaces
- Copper Box Arena - 33 spaces
- Here East North - 28 spaces
- Here East South - 28 spaces

There are two further stations within the wider LLDC zone of influence:

- Stratford Station - 28 spaces
- Monier Road, Hackney Wick - 27 spaces

LEGACY COMMUNITIES SCHEME

It is anticipated that there will be further roll-out of the scheme within the new planning development zones, to achieve a comparable density of stations to the Phase 2 extension of the scheme in east London.

Locations are to be identified at reserved matters stage.

All proposed docking stations are to comply with the standards set out in Transport for London's Developer Guidance for Santander Cycles (TfL,2015).

Each docking station should consist of at least one terminal and should have a minimum of 27 docking points.

The minimum space requirements for implementing a station are 2m wide by 25m, with a vertical clearance of 2.8m.

The preferred method of installation with each docking point having an individual concrete foundation; this allows for continuity of surface materials.

Where there is limited depth for foundations, an inset steel plate is permitted.

TEMPORARY AND MOVEABLE FURNITURE

TEMPORARY SPACES

MEANWHILE USES

Applicants of meanwhile use leases are encouraged to uphold the LLDC's commitment to design quality in the planning and delivery of temporary spaces. Access arrangements should be clear and consistent with the wider permanent layout of the Park, with inclusive design considerations implemented across the leased site.

Access requirements for construction and maintenance vehicles to any temporary facility are to be discussed with the Park Operations and Venues team prior to implementation.

OUTDOOR TEMPORARY SEATING

Additional outdoor seating may be provided upon agreement with LLDC for operators and licensed restaurants, where there is demonstrable value to the pubic realm and amenity of the proposed setting. The license application will specify the location requirements of the seating which will typically require:

- a footway clear width of 2m to be maintained at all times.
- details of the maintenance regime for the outdoor seating to ensure customer safety.
- products to comply with European Standard EN 581-2:2015 Outdoor Furniture.

- See also Inclusive Design Standards (IDS 59 – Spectator Services (Incl. Temporary Events), LLDC 2013).

EVENTS

Temporary infrastructure associated with major events should be implemented where appropriate, including:

- Temporary wayfinding signage, with the position and design of wayfinding for pedestrian routes agreed in advance with LLDC.
- Moveable infrastructure such as flagpoles to act as supplementary wayfinding to key venues, as required.
- Additional temporary infrastructure such as cycle parking to be positioned to maintain access requirements and inclusive design standards. Permanent upgrades of cycle parking to be considered where there is a demonstrable need for additional facilities.
- Protective measures for vulnerable infrastructure.

Other protective measures may be required such as the temporary fencing off of protected habitat areas to minimise disturbance and maintain BAP habitat areas, and to reduce noise and light pollution in sensitive areas including the wetlands, waterways and woodlands.

TEMPORARY SIGNAGE

DESIGN CONSIDERATIONS

- All temporary signage should comply with the LLDC's Venue Branding design guidelines.
- Temporary signage can easily become damaged and all assets should be inspected weekly to ensure that the provision remains legible and structurally sound.
- Large totems may be considered for areas within the South Park, where crowding may occur with visitors needing high level directional signage. Totems are to be positioned at major decision points, ensuring a physical pinch-point is avoided, to help manage large crowds safely the use of Variable Messaging Sign (VMS) should be considered carefully.

TEMPORARY FENCING

CROWD CONTROL BARRIERS

- Crowd control barriers may be utilised as part of a Crowd Management Plan.
- Temporary fencing should be removed within 24 hours of an associated event.
- Storage to be arranged with venue operators and maintained by EFM team.

CONSTRUCTION SITE SECURITY FENCING (HOARDING)

- A perimeter fence should be provided around all major construction sites to prevent unauthorised access.
- Fences are recommended as being a minimum height of 2.4m and structurally stabilised to withstand strong winds.
- Flat-sided solid hoardings are suggested to discourage climbing, obstruct views of the site and mitigate against noise and dust.
- Branding and marketing material may be used on some hoardings and should be designed to reflect the character of the proposed construction.
- Regular inspection of the hoarding is required by the contractor to ensure structural integrity and removal of graffiti as required.
- Proposals should refer to the existing planning permission for the LCS and Park area.

OTHER MISCELLANEOUS FURNITURE

DRINKING FOUNTAINS

KEY PRINCIPLES

As part of a park-wide strategy to encourage people to reuse rather than dispose of water bottles, water fountains are being considered for further roll-out across the Queen Elizabeth Olympic Park.
Fountains should be accessible to all, with due consideration for wheelchair users.

LOCATION

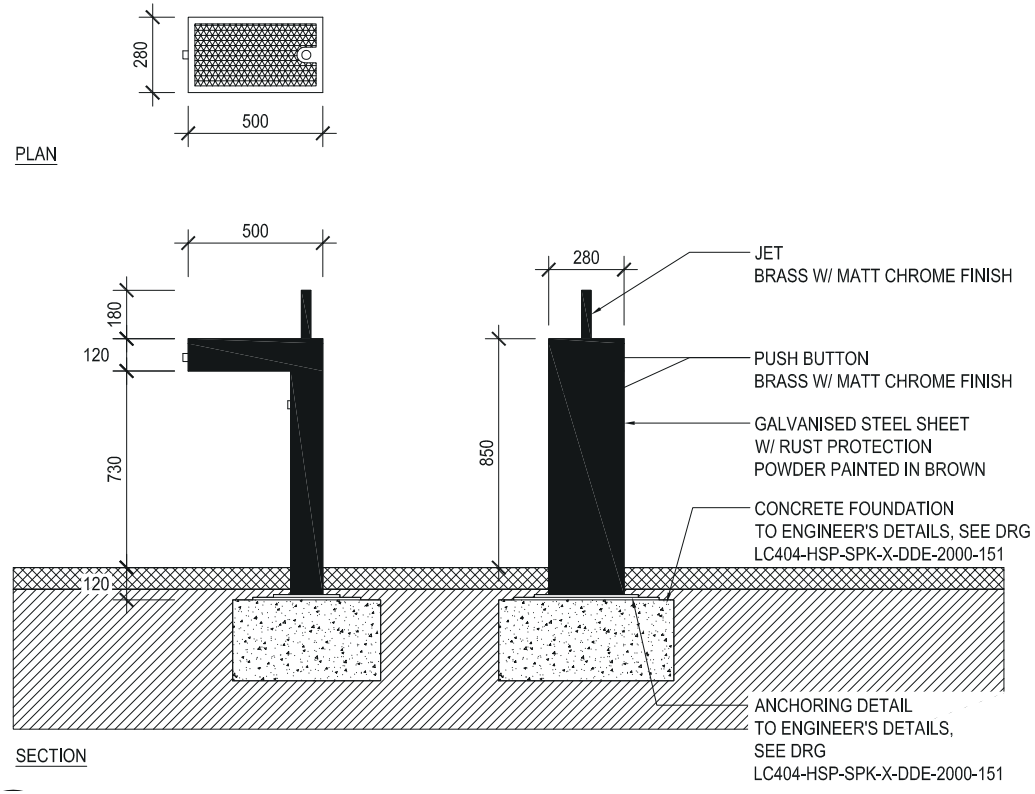
- to be mounted within area of bound surfacing
- suggested to be located in areas which have natural surveillance, such as near amenity space, as they are susceptible to vandalism

DESIGN

- powder coated steel preferred
- product shown below: Atlántida drinking fountain

INSTALLATION

- to include integrated linear trench drain.
- to meet water quality design requirements of Thames Water
- WRAS Approved fittings



FLOATING PONTOONS

The Olympic Legacy Waterways Strategy (2013) identifies the planned use of the watercourses through a managed layout of pontoons, moorings and platforms.

Pontoons should enable a convenient and accessible pedestrian link between the surface footpath network and water level. They should also fulfil the operational requirements for a commercial mooring and, where appropriate, allow for private leisure vessels to moor.

- Pontoons to be constructed of robust, corrosion resistant materials such as galvanised steel for the gangway and plastic for the floating system.
- Where piling is required, the engineer shall assess soil conditions to ensure adequate structural strength.
- The access gangway should have handrails running along its length to comply with Inclusive Design Standards.
- The walkway is to have a minimum 1.5m unobstructed width, with no trip hazards.
- Management regimes will typically be provided by the operator of the pontoon and should include daily inspections when in use.

OTHER WATER FEATURES

Water can be used in a range of ways to enhance amenity value; from enabling play to providing acoustic benefits for relaxation. However bespoke water features demand costly maintenance regimes.

The existing riverside and canal areas offer distinctive water features without the need for additional products. Designers are encouraged to maximise access and amenity value of these areas before considering additional bespoke water features within the Park.

- Water features typically require weekly checks of functionality and monthly control pump checks.
- Additional water features may be considered where a clear drainage and maintenance strategy is set out.
- It should be noted that one of the main attractions for families to the South Park is the Water Labyrinth; a ribbon of 195 jets inset into the bound surface, which are remotely controlled to offer a range of fountain heights. See Park Management Plan for maintenance requirements.
- Tumbling Bay also incorporates creative water play elements, including hand pumps and river channels. Annual full service of water pumps are required.
- ‘Swims’ - places for fishing as a community activity.

EXTERNAL LIFTS

External lifts provide a step free arrangement for people with mobility issues and are important for ensuring convenient access where there are significant changes in levels.

In Queen Elizabeth Olympic Park, external lifts are provided in exceptional locations where there are significant topographic changes (greater than 2m) and where the surrounding landscape arrangement makes positioning a ramp especially problematic.

Direct, graded routes are preferable, to provide non-mechanical access throughout the Park. A signage system is included on the Park to identify graded route options for routes that may not be as direct as desirable.

External lifts are not commonly implemented in outdoor environments as they are expensive to maintain and are prone to being vandalised.

For these reasons, the following guidance should be considered when specifying the use of an external lift:

- A ramp design solution is preferred in most locations and it should be demonstrated before specifying the use of a lift, that any ramp in a particular location would be unsatisfactory.
- All layouts are to conform to the passenger lift requirements set out in the Inclusive Design Standards (LLDC, 2012).
- Capacity requirements and expected user demand should be considered when locating and specifying lifts.
- Lift failures can often be attributed to loose gravel becoming trapped in the doors. Unbound surfaces should therefore not be located directly adjacent to lifts.
- Appendix 13 of the Park Management Plan sets out the maintenance schedule for existing lifts in the Park.

5 LANDSCAPE AND PLANTING

LANDSCAPE SPECIFICATION GUIDELINES

PLANTING THEMES

OVERVIEW

- The landscape and planting design for Queen Elizabeth Olympic Park has been highly designed and carefully planned, despite the naturalistic aesthetic.
- The design approach focussed upon the creation of rich and varied habitats, with ecology being the driving force behind these unique areas and spaces. The Park's overall character can be broadly defined by referring to the north and the south of the Park accordingly.

NORTH PARK

- The North Park is strategically richer in terms of biodiversity and native planting, with native trees, shrubs and perennial meadows, extensive wetland areas, swales, frog ponds and reed beds, with a variety of different habitats catered for in what is essentially a 'wilder' more ecological area.

KEY OBJECTIVES:

- Focussed upon ecological principles.
- Encouraging biodiversity and wildlife.
- Creation of wetland and woodland.
- For schemes requiring low-maintenance.

SOUTH PARK

- The South Park is a much more active urban space than the North Park, and therefore the soft landscape design is functional and more decorative - including the 2012 Gardens - a unique element to the overall park. Despite its naturalistic appearance, it is the most horticultural and garden-led parkland feature.
- The 2012 Gardens have separated plants into four regional growing zones with distinct aesthetics and each drawing upon the ecological character of habitats found in the wild. These climatic zones are: Europe / North America / Southern Hemisphere / Asia.
- The South Park Plaza contains a herbaceous ribbon planting design by the Dutch horticulturist, Piet Oudolf.

KEY OBJECTIVES:

- To create an ornamental theme.
- To showcase world flora in the creation of public gardens.
- To provide schemes with allowance for a higher maintenance regime.
- To create active and passive spaces.

CANAL PARK

- Refer to Canal Park Design Guide

North Park - Naturalistic planting

PROPOSED PLANTING DESIGN

KEY OBJECTIVES

Designs to be underpinned by ecological principles as set out in the Biodiversity Action Plan - creating distinctive and cohesive plant communities.

- Planting should be designed for biodiversity and for attracting wildlife.
- Continue showcasing ecological planting, with a wide variety of plants within urban environments and challenge perceptions of the familiar and unfamiliar.
- In order to avoid presenting an unkempt appearance, planting designs need to balance both formal and informal elements. This can be achieved by ensuring that planting matrices allow for year-round seasonal interest and that colour is an overriding feature and principle.
- Having some degree of order within the 'wild' can assist in creating a more positive public perception of the design. Allowing for blocks of planting or mono-strips in places, contrasted against informal planting, is an effective way of balancing the ecological design against human aesthetic concerns.
- Soils designed and maintained to ensure planting thrives.
- To be high impact and sustainable regarding maintenance.
- Biosecurity is an essential factor in the creation or adaptation planting scheme. The introduction of new planting material should be carefully considered with good horticultural hygiene practices, quarantining options, especially large tree stock.

South Park - South African planting theme

PROCUREMENT

- An early procurement strategy is advised, as it allows for selecting and securing plants in good time so as to ensure stock is available in the right quantities and at the right quality and cost .
- With urban post-industrial sites it is imperative that the landscape architect's team includes and integrates specialist horticultural, ecological, soil science, river and drainage engineering, garden and irrigation design expertise from the offset.
- There needs to be a comprehensive maintenance strategy in place that deals with short-term and long-term maintenance objectives.
- Production of a Biodiversity Action Plan (particularly for large sites) is imperative to successfully driving the landscape and planting design in and ecological and meaningful manner.
- Engage with local communities to form volunteer groups involved in taking care of public spaces, parks and gardens. This helps to bring people together and encourages people to take pride in their communities and local areas.
- Plants are to be UK grown and comply with BS 3936: Nursery Stock.

NORTH PARK

PLANTING PALETTE

KEY OBJECTIVES

- The biodiverse and native nature of the North Park can be seen in the parkland - meadows and fields. Providing colour, texture and valuable natural habitats.
- A mosaic of ecological habitats run along the river corridors and throughout the parkland. There are a variety of woodland, wetland and meadow planting mixes employed across the site - including: meadows and lawns, various types of woodland and wetland. Species are specific to these ecological types and it creates a diverse range of habitats to support a variety of flora and fauna.
- Hopkins' Field is a four-acre meadow sown with a species rich mix containing native and nectar-rich species. These mixes are encouraged as they provide biodiversity and can accommodate recreational functions.

DESIGN FEATURES

- Indigenous planting predominates.
- Naturalistic approach.
- Calm visual quality.
- Meadows and wild-flowers.
- Species typical - trees / shrubs.
- Open lawn areas for sitting.

PLANTING PALETTE - MEADOWS AND LAWNS

Thymus polytrichus - Wild thyme

By Mike Pennington

Leucanthemum vulgare - Oxeye daisy

By Trish Steel

Leontodon hispidus - Rough Hawkbit

By User:Tigerente

Trifolium pratense - Red clover

By H. Zell

Deschampsia cespitosa - Tufted Hair Grass

By James Lindsey at Ecology of Commanster

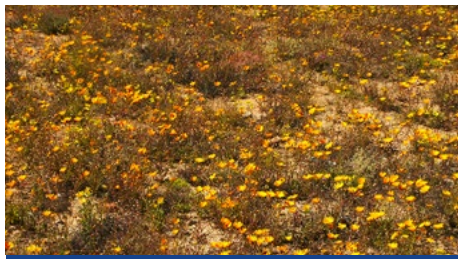
Chrysanthemum segetum - Corn Marigold

By User:Tigerente

Coreopsis tinctoria - Plains coreopsis

By C.Maylett assumed (based on copyright claims)

Dimorphotheca sinuata - Glandular Cape marigold



By Winfried Bruenken (Amrum)

Centaurea cyanus - Bachelor's buttons

By David Wright

PLANTING PALETTE - WOODLAND

Carex sylvatica - Wood-sedge

By Franz Xaver

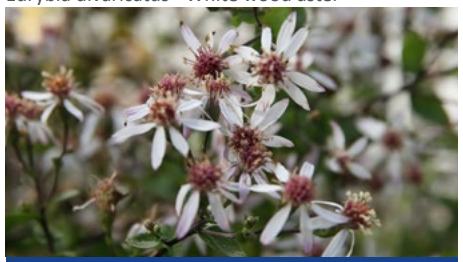
Carex flacca - Glaucous sedge

By Stefan.lefnaer

Vinca minor - Lesser periwinkle

By H. Zell

Eurybia divaricatus - White wood aster



By David J. Stang

Convallaria majalis - Lily of the valley

By H. Zell

Primula veris - Common cowslip

By Isidre blanc

Stellaria holostea - Greater stitchwort

By Rasbak

Osmunda regalis - Royal fern

By Radomil

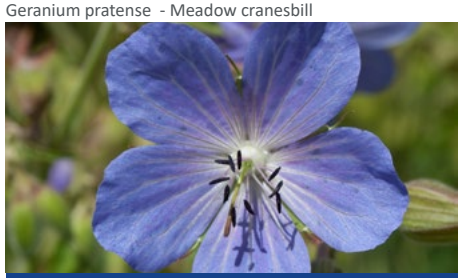
Stachys officinalis - Betony

By Aroche assumed (based on copyright claims)

Eupatorium cannabinum - Hemp agrimony

By Frank Vincentz

Geranium pratense - Meadow cranesbill



By Julie Anne Workman

Origanum vulgare - Bachelor's buttons

By Isidre blanc

PLANTING PALETTE - WETLANDS

Phragmites australis - Common reed

By Isidre blanc

Lythrum salicaria - Purple loosestrife

By I, Manfred Heyde

Carex pendula - Pendulous sedge

By Kurt Stüber

Glyceria maxima - Reed sweet-grass

By Rasbak - Own work

Phalaris arundinacea - Reed Canary grass

By Michael Becker

Iris pseudacorus - Yellow iris

By Jörg Hempel

Potentilla erecta - Erect cinquefoil

By H. Zell

Ranunculus acris - Meadow buttercup

By Christian Fischer

Galium palustre - Common marsh bedstraw

By Franz Xaver

Filipendula ulmaria - Meadowsweet

By SEWilco

Lysimachia vulgaris - Garden loosestrife

By Udo Schmidt

SUMMARY OF PLANTING - NORTH PARK

PLANTING TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
MEADOWS 	■ Can be used at a variety of scales - although visually most successful in large open spaces or adjacent to long linear routes. ■ Effective boundary edge planting to paths or adjacent to hard paving. ■ It is an informal form of planting design - formality can be imposed by strips of mono planting or rhythmic repetition of plants - lending to a tidier, more designed appearance.	■ Plant diversity creates floral interest and attracts a variety of fauna. ■ Ephemeral nature - with the right selection of plant species the meadows can be constantly changing and providing year-round seasonal interest. ■ Connects people to nature and creates an urban oasis. ■ Highly attractive and leads to the creation of unique and evocative places. ■ Relatively low maintenance.	■ If too naturalistic and wild in appearance, they can be deemed 'scruffy' and frowned upon by local communities. ■ Long-term management strategies need to be in place and a commitment to looking after the space. ■ They require appropriate site conditions in order to be implemented - soil depth, nutrient status etc. ■ Wild-flower seed is more costly than grass seed.	Medium	Low - Medium
WOODLAND 	■ Generally wilder, quieter areas, and locations set aside for nature. ■ Used around the perimeters of developments or spaces. ■ Designed on a larger scale, incorporating public access through designated footpaths. ■ Variety of woodland types including wet woodland, pioneer woodland and dry woodland.	■ Provides a variety of valuable habitat types. ■ The woodland aesthetic is widely enjoyed by all. ■ Provides opportunities for recreation. ■ Environmental benefits - tree planting improves air quality, can assist with flood management and urban cooling. ■ Can be applied at a variety of scales.	■ Woodlands can be isolating, leaving people more vulnerable to crime. ■ They can also be appealing to those engaging in criminal activity or anti-social behaviour such as drug taking. ■ Initial planting costs can be high. ■ Requires a maintenance strategy and effective woodland management and monitoring.	Medium	Low - Medium

PLANTING TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
LAWNS 	■ Provides contrast with wilder areas. ■ Appropriate for busier / open areas where people are likely to stop for a picnic / recreation or relaxation. ■ Lawns are useful for passive recreation. ■ Species rich lawns should be used to meet BAP targets (such as on Hopkins' Field). ■ For more formal areas. ■ Lawns specification should consider idensify of use	■ Mown lawns and edges create the sense of a 'maintained' landscape and this is a useful measure when placed adjacent to wilder or more naturalistic planting, as it can help to foster a more positive public perception. ■ An important feature for multi-functional green spaces.	■ Can require additional maintenance to maintain good coverage and keep at an acceptable length. ■ Generally single species swales reduce biodiversity compared to other seed mixes.	Medium	Medium
WETLAND 	■ Implemented where there are drainage issues. ■ Suitable for a variety of different locations including brownfield sites and urban sites (depending upon site conditions - e.g. surrounding land use, hydrological and ecological connectivity to similar habitats). ■ Wetlands work best when located near or next to an existing or remnant area of the same type. ■ Part of Sustainable Urban Drainage Systems (SUDS). ■ A full system (SUDS) is more successful rather than pipe plus pond solutions.	■ Provide people with contact to nature and opportunities for recreation. ■ Can provide complex urban biodiverse ecosystems. ■ Assists with flood management and with the correct plant species can work as a phytoremediation measure. ■ Opportunities to educate local communities and involve them in the decision-making process, as well as forming volunteer groups for long-term management.	■ Careful management is required to control the increased risk of colonisation by invasive non-native species. ■ The naturalistic and 'wild' appearance can lead to a negative public perception - which in turn gives rise to anti-social behaviour, litter and pollution. ■ Poor water quality can lead to eutrophication and excessive algae growth.	Medium - High	Low - Medium

PLANTING PALETTE

SOUTH PARK

- The 2012 Gardens pay tribute to Britain's horticultural history and to exploration, trade and plant collecting in an updated and contemporary manner.
- The gardens feature 70,000 plants from 250 different species across the world. We will explore each of the four climatic zones in turn.
- The gardens are different to traditional gardens and are planted entirely randomly and in a way that is more in-keeping with natural habitats found in the wild. Groupings and colours change throughout the year.

DESIGN FEATURES

- Herbaceous planting.
- Children's play.
- Slightly experimental approach to ecological plantings.

EUROPE

- This climatic zone is focussed on the planting of the European hay meadows. Overall it has the softest character and ambience of the four zones - with transparent grasses and intense bursts of colour creating a billowing effect.

PLANTING PALETTE - 2012 GARDENS: EUROPE

Achnatherum calamagrostis - Spear grass

By Daderot

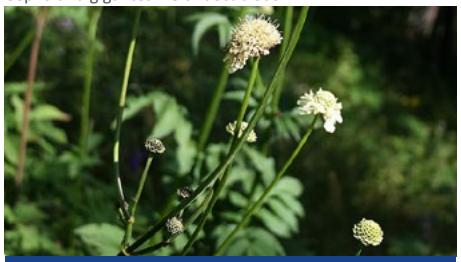
Euphorbia palustris - Marsh spurge

By Karelj

Campanula lactiflora - Milky bellflower 'Pritchard's variety'

By Franz Xaver

Cephalaria gigantea - Giant Scabious



By Franz Xaver

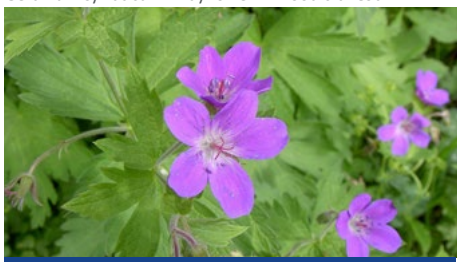
Deschampsia cespitosa 'Gold Veil' - Tufted hair grass 'Gold Veil'

By David J. Stang

Centaurea dealbata 'Steenbergii' - Mealy centaury 'Steenbergii'

By Dominicus Johannes Bergsma

Geranium sylvaticum 'Mayflower' - Wood cranesbill

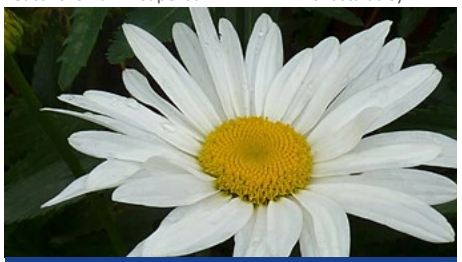


By Teemu Mäki

Leucanthemum vulgare - Oxeye daisy

By Trish Steel

Leucanthemum x superbum 'T.E. Killin' - Shasta daisy



By Jamain

Lychnis chalcedonica - Maltese cross

By Wouter Hagens

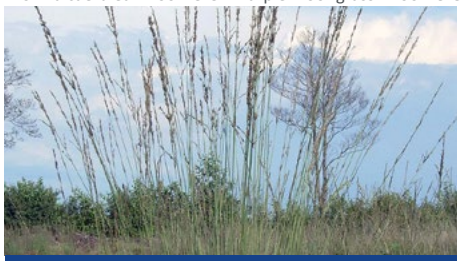
Lythrum salicaria - Purple loosestrife

By I, Manfred Heyde

Lythrum virgatum ‘Dropmore purple’ – Loosestrife ‘Dropmore purple’

By Franz Xaver

Molinia caerulea ‘Moorhexe’ - Purple moor grass ‘Moorhexe’



By Elke Freese

Sanguisorba officinalis - Great burnet

By Karelj

Succisa pratensis - Devil’s bit scabious

By Hajotthu

Telekia speciosa - Buphthalmum speciosum

By Hardyplants

Trollius europaeus – Globeflower

By Isidre blanc

NORTH AMERICA

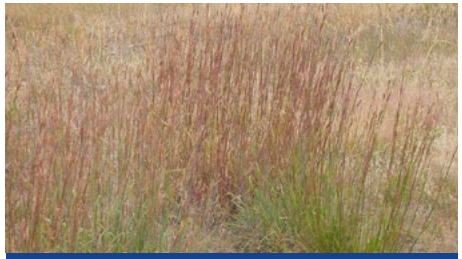
- This climatic zone is focussed on the planting of the North American prairies. Plant collecting from North America was at its height in the 1800s and these plants are still a key component for summer flower colour in British gardens today.
- The planting is soft and the grasses have an airy quality, combining effortlessly with echnicaeas and other scrambling flowers. The colour palette consists of purples, hot pinks, pale pinks and intense yellows. Creating a blur of floating colour in space. The bright colour scheme helps to engage people with the unfamiliar and feel moved by the collections.
- Provides good summer and autumn colour and interest.

PLANTING PALETTE - 2012 GARDENS: NORTH AMERICA

Allium ‘Summer Beauty’ - German garlic

By Adamantios

Andropogon gerardii - Big bluestem



By Matt Lavin

Asclepias tuberosa - Butterfly weed

By User:SB_Johnny

Aster azureus - Sky-blue aster

By USchick

Eurybia divaricartus - White wood aster

By David J. Stang

Verbena hastata ‘Rosea’ - Pink vervain

By Dominicus Johannes Bergsma

Aster oblongifolius - Aromatic aster

By David J. Stang

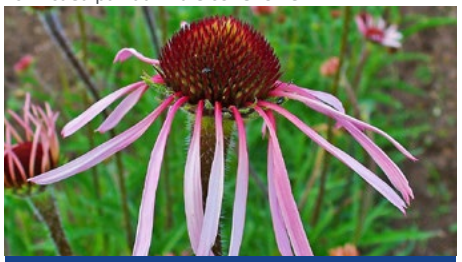
Callirhoe bushii - Bush’s poppy mallow

By peganum

Coreopsis verticillata ‘Zagreb’ - Coreopsis threadleaf

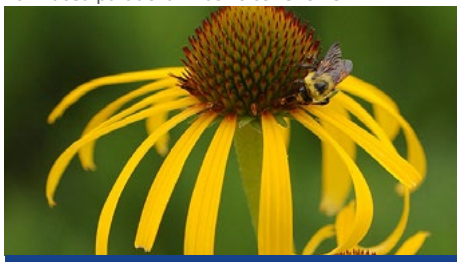
By Tortie tude

Echincaea pallida - Pale coneflower



By Llez

Echinacea paradoxa - Bush's coneflower

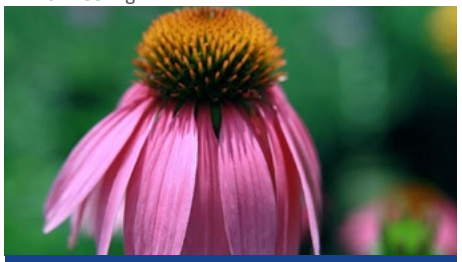


By Derek Ramsey (Ram-Man)

Sporobulus heterolepsis - Northern dropseed

By Daderot

Echinacea purpurea 'Kim's knee-high' - Coneflower 'Kim's knee-high'



By David J. Stang

Parthenium integrifolium - Wild quinine

By SEWilco

Eremurus 'Shelford hybrids' - Foxtail lilies

By Traumrune

Eryngium yuccifolium - Button snake-root

By Kurt Stüber

Geum triflorum – Prairie smoke

By Walter Siegmund

Gillenia trifoliata – Bowman's root

By A. Barra

Heuchera villosa – Maple-leaf alumroot

By Derek Ramsey (Ram-Man)

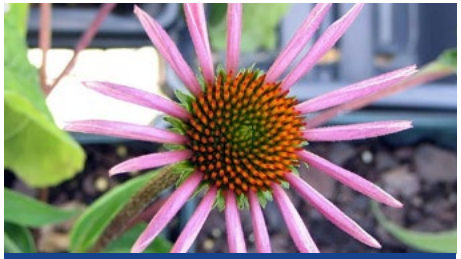
Liatris aspera – rough blazing star

From the Great Lakes Image Collection

Oenothera macrocarpa – Evening primrose

By Tangopaso

Echinaea purpurea ‘Rubinstern’ - coneflower rubystar



By David J. Stang

Panicum virgatum ‘Heavy metal’ - Switchgrass ‘Heavy metal’

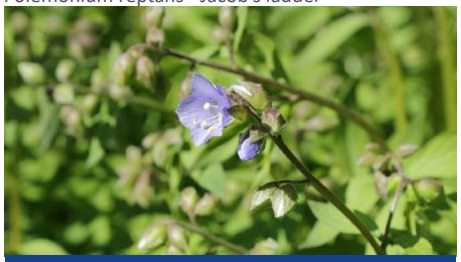
By David J. Stang

Penstemon barbatus - golden beard penstemon

Phlox divaricata - Wild blue phlox

By Хомелка

Polemonium reptans - Jacob’s ladder

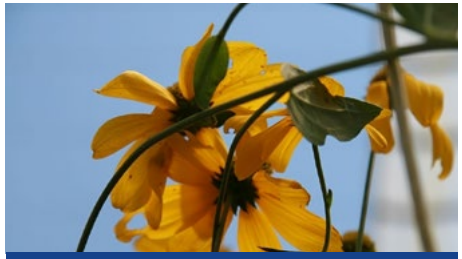


By C T Johansson

Rudbeckia fulgida var. deamii - Deam’s coneflower

By Krzysztof Ziarnek

Rudbeckia maxima - Great coneflower



By David J. Stang

Ruellia humilis - Wild petunia

By IveGoneAway

Schizachyrium scoparium - Little bluestem

By Chris Light

Solidago caesia - Wreath goldenrod

By Chris Light

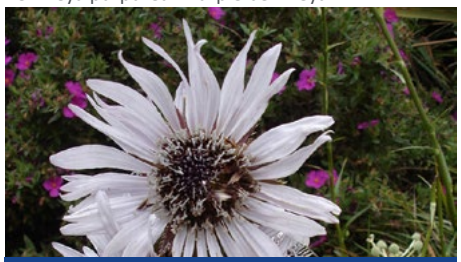
SOUTH PARK

SOUTHERN HEMISPHERE

- This climatic zone is inspired by South Africa's Drakensburg range. The flora from this region is dramatic in both colour and form.
- The planting comprises of low tussocky grasses, strong leafless stems with daisies, thistles and tubular kniphofias. Collectively the most exotic looking planting zone of the gardens.
- This mix is the most exuberant, colourful and exotic in appearance.

PLANTING PALETTE - 2012 GARDENS: SOUTHERN HEMISPHERE

Berkheya purpurea - Purple berkheya



By I, Epibase

Eucomis bicolor - Pineapple lily

By Jean-Jacques

Agapanthus inapertus - African lily

By Andrew Massyn

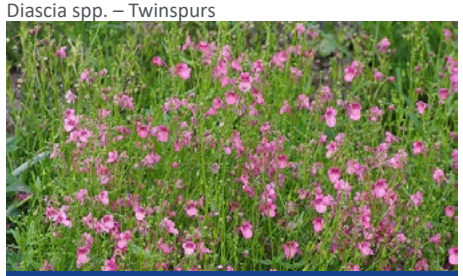
Carex testacea - Orange New Zealand sedge

By chuck b.

Chondropetalum tectorum - Cape thatching reed

By Andrew massyn

Diascia spp. – Twinspurs



By © El Grafo

Dierama pulcherrimum - Angel's fishing rods

By Jim Linwood

Eragrostis curvula - Love grass

By Daderot

Galtonia candicans - Galtonia

By Keith Edkins

Watsonia pillansii - Bugle lily

By Andrew massyn

Gladiolus papilio ‘Ruby’ - Autumn gladiolus

By peganum

Haplocarpha scaposa - False gerbera

By Dick Culbert

Helichrysum aureum - Everlasting golden strawflower

By JMK

Kniphofia rooperi - Red-hot poker

By Raffi Kojian

Kniphofia thomsonii - Torch lily

By Claude Humbert

Kniphofia triangularis ‘Cameron’ - Red-hot poker

By Michael Wolf

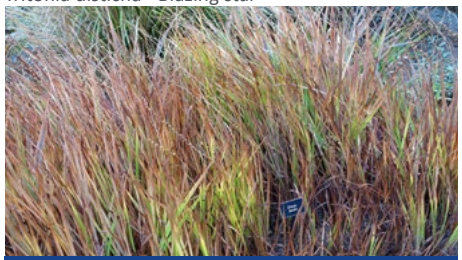
Kniphofia uvaria - Red-hot poker

By KENPEI

Themeda triandra - Red grass

By Dalgial

Tritonia disticha - Blazing star



By Daderot

SOUTH PARK

ASIA

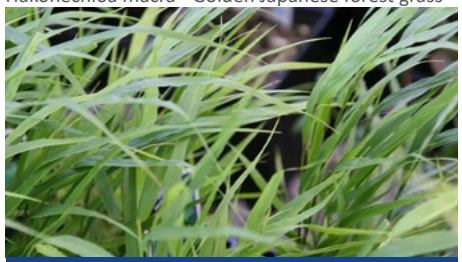
- This climatic zone is inspired by the structure and foliage of the perennials and herbaceous plants of the edgelands of Asian woodlands and forests.
- The planting is calm, lush and leafy in nature. With a subtle and subdued colour palette focussed on greens, pale pinks, whites, pastels and inky purples. The mix relies on relatively few species.
- This mix was particularly successful in terms of overall ground coverage and colour.

PLANTING PALETTE - 2012 GARDENS: ASIA

Anemone hupehensis - Japanese anemone

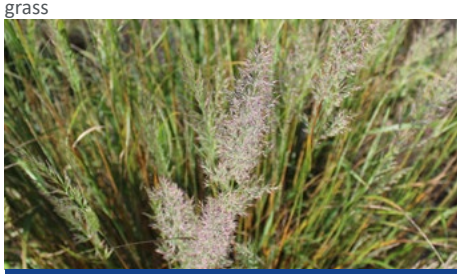
By Kuruman

Hakonechloa macra - Golden Japanese forest grass



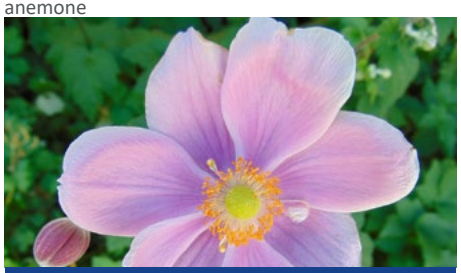
By David J. Stang

Calamagrostis brachytricha - Korean feather reed grass



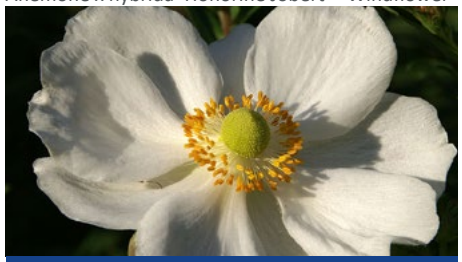
By AfroBrazilian: Aleksandrs Balodis

Anemone × hybrida ‘Königin Charlotte’ - Japanese anemone



By Nadiatalent

Anemone x hybrida ‘Honorine Jobert’ - Windflower



By Patrick Heusser

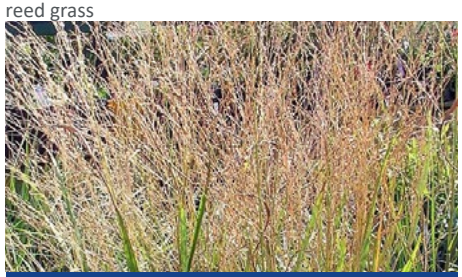
Anemone x hybrida ‘Prinz Heinrich’ - Windflower

By Nadiatalent

Thalictrum delavayi ‘Album’ - Mountain rue

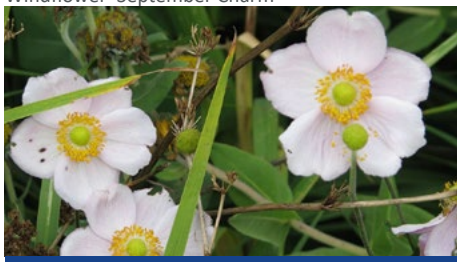
By peganum

Calamagrostis x acutiflora ‘Karl Foerster’ - Feather reed grass



By David J. Stang

Anemone x hybrida ‘September Charm’ - Windflower ‘September Charm’



By peganum

Hosta spp. - Plantain lily

By Nova

Iris chrysographes ‘Black Knight’- Black knight iris

By Peganum

Lilium speciosum var. rubrum - Red Japanese show lily

By Dmitriy Konstantinov

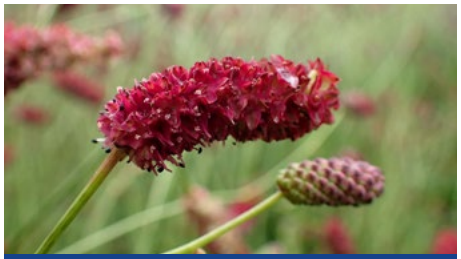
Lilium tigrinum - Sweet surrender tiger lily

By David J. Stang

Miscanthus sinensis ‘Gracillimus’ - Maiden grass

By I, KENPEI

Sanguisorba tenuifolia - Japanese Burnet’



By Krzystof Ziarnek

Narcissus ‘Thalia’ - Triandrus daffodil

By David J. Stang

Persicaria amplexicaulis - Red bistort

By Forestowlet

Persicaria amplexicaulis ‘Firetail’

By J.C. Raulston

SOUTH PLAZA

HERBACEOUS RIBBON PLANTING

In conjunction with James Corner Field Operations, Piet Oudolf designed a herbaceous garden within the South Plaza.

Piet is renowned for his naturalistic approach to planting and his designs are underpinned by robust perennials and grasses that he has grown and analysed in his own garden - planting things together in the right communities to ensure they grow successfully together.

DESIGN

- Focussed upon tried and tested groupings of plants.
- Characterised by seasonal changes.
- Plants are chosen for their year-round interest - including winter forms.
- Naturalistic design.
- Thematic - use of repetition throughout the borders.
- Sinuous design linking the event rooms of the Pleasure Gardens.
- Grasses and perennials are used in easily maintainable groupings.

PLANTING PALETTE - HERBACEOUS RIBBON DESIGN

Echinops ‘Taplow Blue’ - Globe Thistle

By Mike Peel

Eupatorium purpureum - Grass root

By H. Zell

Bupleurum spp. - Shrubby hare’s ear

By Convallaria majalis

Origanum spp. - Oregano

By Ivar Leidus

Crambe cordifolia - Flowering sea kale

By Rasbak

Achillea spp. - Common yarrow

By Yerpo

Persicaria amplexicaulis ‘Firetail’

By J.C. Raulston

Veronica spp. - Speedwell

By Walter Siegmund

Monarda spp. - Bergamot

By NellsWiki

SUMMARY OF PLANTING - SOUTH PARK

PLANTING TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
2012 GARDENS 	■ Suitable for more public locations. ■ Showcase planting can be used on a smaller or larger scale depending upon spatial constraints and the overall effect wanting to be achieved. ■ Can be used in parkland settings or within more urban locations with a higher footfall. ■ Varied application - the degree of formality and informality can be played around with through plant usage. ■ Possible to reinstate planting habitats and communities specific to the site and location.	■ Striking and engaging planting designs - creating unique spaces and helping to defining the character of a space. ■ Different ecological planting communities can be created. ■ Provides people with access to natural environments - although not explicitly quantifiable, this can have a beneficial impact upon the well being of visitors to such sites. ■ Aesthetic and biodiverse - attracting a variety of different fauna. ■ Potential to preserve and enhance local species and populations. ■ Potential to engage local communities to form volunteer groups to aid in caring and managing for the site. ■ Creates an interest in horticulture and people may be inspired to grow similar plants in their own gardens.	■ There can be a negative public perception if designed in a way that is too 'naturalistic', leading to anti-social behaviour or poor treatment of the site. ■ Will require an ongoing maintenance regime to ensure the continued success of the planting. ■ Plants must be carefully selected and when opting for non-natives, great care must be taken to ensure that these species are not invasive and likely to cause damage further afield. ■ Suitability is dependent upon the condition of the site, its location, soil and surrounding habitats. ■ Some sites may already contain species listed under protective legislation and it is up to the manager of the site to ensure that these species are protected from harm - including the introduction of species that may out compete those already present.	Medium	Low - Medium

SUMMARY OF PLANTING – SOUTH PARK

PLANTING TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
HERBACEOUS RIBBON PLANTING 	■ For a showcase location - where public interest is likely to be high. ■ Adjacent to public realm or next to busier spaces with high footfall. ■ Can also be a standalone location - where people visit an area to simply admire the park /open space. ■ Can make an effective backdrop for mown lawn/large grassed areas. ■ Sinuous design that can break up the uniformity of an area through the application of careful repetition and contrast of planting species.	■ Plant groupings have maintenance borne in mind and it is much more easily managed than the 2012 Gardens due to this logic. ■ A tourist attraction in its own right. ■ Creates a soft design full of complex colours and architectural forms. ■ Uses long-lived clump forming perennials that do not tend to spread around or aggressively root or seed and as such retain their distinct mono-species groupings - this helps to lower the overall maintenance requirements through clever combinations.	■ Seasonal interest could be longer - perhaps further addition of longer flowering perennials could aid in achieving this outcome. ■ Needs expert maintenance and photography guidance for staff to maintain. ■ Tendency for some of the larger blocks of species such as monarda to spread too much, but overall these tie in with the larger clumps of grasses. ■ Requires some maintenance and monitoring of the design to ensure long-term success.	Medium	Low - Medium
FANTASTICOLOGY 	■ A free draining and dry soil conditions, hot and dry sloped location ■ High impact and low maintenance ■ High biodiversity value due to nectar sources ■ Long seasonal interest in terms of colour, flowers and seed heads	■ Inexpensive to install and maintain ■ Dramatic and unique (largest colour divided meadow in the UK) ■ Link to heritage ■ Biodiverse ■ Seasonal interest throughout the year	■ See meadows ■ Needs expert design implementation	Low	Low

MAINTENANCE REQUIREMENTS

KEY REQUIREMENTS

- In order to ensure the long-term success of a planting area, resources and skills are allocated or factored into the maintenance process from the outset.
- A comprehensive landscape management and maintenance plan was produced during the design phase. This plan is adaptable and tailored to the site as it matures and develops over time.
- If an area is not maintained, eventually the landscape will look uncared for and could adversely impact on the public's perception of the site.
- Without appropriate human intervention, competition and single-species dominance is likely to eventually arise.
- Engagement of local communities and volunteer groups, has been a successful method in bringing people together and ensuring additional resources are employed towards maintaining the site.
- Plant selection takes into consideration the eventual heights/spreads, relative vigorousness of plants.
- Grass selection should focus upon tussocky grasses to avoid a 'suffocating' carpeting effect. Use of low-fertility soil has helped in preventing this swamping of adjacent plants.

DESIGN

- Planting soils and landscapes are living and dynamic and require reinvigoration and tending to - for example more competitive plants are likely to take over (grasses, competitive perennials) such natural competition needs to be managed. Soil design, plant selection, and maintenance plan manages this.
- Generally, ecological planting schemes based on plant communities are designed to be reduce maintenance.
- Planting densities are often high, with 12 plants / m^2 in some locations, which reduces weeding requirements.
- Soil design and maintenance is an important aspect of the success of the planting design.

South Park - North American planting theme

STREET TREE PLANTING STRATEGY

OVERVIEW

A comprehensive tree planting strategy was employed across Queen Elizabeth Olympic Park, with more than 6,000 trees being planted.

Tree planting provides numerous benefits: aesthetically it gives the parkland structure, identity, seasonality, enhanced biodiversity and also provides shade. Trees also provide numerous environmental benefits relating to flood management, urban cooling, remediation and air quality.

The approach to tree planting within the Park can be broadly defined as being informal and formal.

Trees in landscape design considerations relating to significant growing medium, compaction issues, drainage, irrigation and porosity.

Tree species diversity is important for resilience to pests and climate change.

Biosecurity when sourcing and nursing plant material is crucial for sustainability of tree stock within the Park and regionally.

Tree pit design is key to the success of the tree.

FORMAL

Formal tree planting refers to linear planting alongside footpaths or spectator lawns and is generally located along north-south streets through the Park and across public open spaces adjacent to venues.

- Utilise tree species typical of hard surfaced urban streets and make root zone conditions reasonable for trees to reach full potential.
- Trees to be single stemmed.
- Planted individually and with equal spacing.
- Use high and wide canopy species such as London Plane trees. Trees can be more ornamental in appearance and can be feature trees, utilising different techniques such as pleaching or espalier for effect.
- The use of mature and specimen trees from the outset helps to create a more established and mature feel to a location, but should be balanced with successful establishment in harsh conditions of the Park.

INFORMAL

Informal tree planting is generally located on east-west streets leading to areas of parkland and the waterways.

- Generally multi-stemmed specimens to be used.
- Preference for species native to the Lea Valley.
- Arrange in groups to promote informal, naturalistic character.
- Informal planting is more suited to the creation of habitat areas - such as the creation of varying types of woodland.
- Trees can be of varying sizes and it may be more appropriate to use smaller specimens in less formal settings, which can also be a cost effective approach.

Location: North Park - Formal road planting

For ref see : Trees in Hard Landscape (TDAG; 2014) and SuDs Guidance

EXISTING TREES

TREE PRESERVATION

The following conditions apply:

Protection and retention of tree and habitats – condition LTD.1.8 (Protection of trees and habitats) of the Olympic, Paralympic and Legacy Transformation Planning Permissions (07/90010/OUMODA) requires specific trees to be maintained and safeguarded across the Park.

Condition LTD. 1.9 (Replacement of Trees) describes that for any existing tree removed or damaged during construction, the tree is to be replaced as part of the scheme.

All existing trees have a unique reference number recorded in the Park Tree Matrix. This management system includes information on species and stem girth at the time of planting, and should be updated to include all new tree planting. The unique reference number is used to track the health and rigour of the tree, maintenance and risk management.

KEY OBJECTIVES

Arboricultural and ecological surveys will assist in determining the health and value of the existing trees and help to guide the proposed tree strategy to suit the existing requirements - looking at the type(s) of habitat that are already in existence and also to determine which species are thriving on site, so as to help determine successful species selection.

It is advised that designs seek to work by integrating into the existing landscape and ensuring that there is adequate distance between existing trees and built structures.

Existing trees should be protected in accordance with BS 5837:2012 Trees in relation to design, demolition and construction recommendations.

North Park - Existing and proposed trees are successfully combined

SUMMARY OF TREE PLANTING WITHIN QUEEN ELIZABETH OLYMPIC PARK

TREE PLANTING TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
FORMAL 	■ In public areas, along avenues, key routes or in hard landscaped or well-maintained spaces. ■ Appropriate for where a maintained appearance is vital to the overall effect and character of a space. ■ Linear mono-species or similar habit species planted at even spacings. ■ Predominantly clear-stem standard specimens. ■ Avoid monocultures for long-term planting.	■ Formal planting creates structure and provides a sense of maturity. ■ Use of semi-mature trees can create an established effect and help to finalise a scheme. ■ Tree plantings create order and a tidy appearance - people tend to respond more positively to a managed landscape.	■ Costly to acquire and replace semi-mature trees. ■ Can create a forced appearance that does not look natural and therefore may appear slightly at odds within the landscape. ■ Usually more intensive to consistently maintain the appearance of a formal tree - pollarding, pruning etc. ■ Tree pits can be constrained leading to loss of rigour in trees. ■ Installation of large tree stock can cause establishment problems due to shock.	Medium-High	Medium
INFORMAL 	■ Can be used effectively in informal ornamental planting areas. ■ They are particularly useful for wilder areas - where a rugged, more natural appearance is required/more appropriate. ■ Trees are often smaller specimens or multi-stemmed. ■ Clumps.	■ Suitable for a natural setting. ■ Can be more cost effective to use smaller specimens. ■ Less maintenance is required to maintain the appearance of an informal tree. ■ Can be associated or placed concidering.	■ Smaller specimens may be more susceptible to damage in their younger years. ■ A more naturalistic appearance can lead to a negative public perception and increase in negative behaviour.	Low-Medium	Low-Medium
EXISTING	■ Providing the existing trees are in good health - they form a vital and valuable part of the landscape. ■ Designs should be tailored to fit around valuable existing features.	■ Existing habitat and ecological benefits. ■ They are often mature features within the landscape and provide form and structure.	■ Surveys determine and monitor tree health. ■ Will also require protection during construction works.	No cost	Low

TREE PIT DESIGN

OVERVIEW

The success of tree planting is down to the design of the tree pit, it is important that the tree pit is designed to suit the size and species of the specific tree to be planted and that a one-size fits all approach is avoided. It is important that the right tree is used for the right space and that spatial, light and soil structure constraints are taken into consideration when selecting appropriate trees.

It is also imperative that appropriate drainage measures are employed to avoid anaerobic conditions and flooding of tree pits.

KEY OBJECTIVES

- Tree pits need to be designed taking into account the available root space and the minimum required soil volume to ensure the success of that tree.
- If trees are to be planted in hard surfaced areas then practical considerations need to be borne in mind - such as permeable paving or proprietary gravel and the use of structural soil modules.
- New plantings in hard surfaces required drainage to a sump or piped away, to ensure tree pits do not hold excessive moisture and air is available for the roots.
- Root management may need to be employed in relation to paved surrounds or utilities nearby.
- Irrigation must be factored into the design (as per the Park - whereby an irrigation system has been installed for use during the establishment period) and is a key component in the design to ensure that new trees receive enough water and nutrients. Footpaths can be profiled to fall towards tree trenches maximising availability of water for trees.
- Monitoring of soil moisture at depth in the tree pits is vital in all waterings undertaken.
- Tree pit design should include a means of allowing air supply below ground.
- Trees need to be supported - either above ground or underground. Staking and tying requires more maintenance than the underground anchoring systems and leads visual differ and potential damage of the tree, especially in windy conditions.
- A trial pit should be undertaken to establish the quality of the topsoil, any drainage issues and the presence of any underground services.
- An impenetrable root barrier should be provided where there is concern that adjacent services might be affected.
- Stakeholder engagement may be required with utility companies in order to mitigate against any perceived risks.
- Tree pits should be linked in trenches or to adjacent planting area.

South Park - Tree in a hard landscaped setting with porous CEDEC proprietary gravel

MAINTENANCE

KEY REQUIREMENTS

In order to ensure the success of new tree planting an effective maintenance strategy needs to be in place.

NEW TREES

- Newly planted trees need watering for up to 10 years and at the beginning of the growing season and regularly throughout the summer.
- New trees will need weeding and mulching so as to prevent competition for water and nutrients.
- Trees should be protected from external forces - such as dogs, mowers, strimmers and vandalism.
- Extra watering is required during dry weather or periods of drought and these occurrences should be factored into the maintenance plan.
- The larger the tree is when it is planted, the more after-care it will require.
- Bare-rooted trees need more after-care than container grown trees because many of their roots are lost during lifting and transportation.
- Trees require monitoring - look out for symptoms of drought (unusually small leaves, few leaves, yellow/brown leaves, dropping or brittle leaves, blistered or cracking bark).
- In the establishment period trees may need to be fertilized particularly in area where leaf litter can not add nutrients to the soil.
- Monitoring is required to check for pests and diseases.
- Underground guying is preferred to staking and tree guards on the Park due to the associated maintenance and monitoring requirements, and aesthetics.

North Park - Formal tree planting

SOIL AND EARTHWORKS

INSTALLATION OF NEW PLANTING

SOIL TESTING

It is important to know what soil conditions and potential hazards are present prior to developing a space.

Once the condition of soil is known, then appropriate treatment can be applied in order to achieve the best end result for sustainable greenspaces.

Soil maintenance has taken place on Queen Elizabeth Olympic Park due to the former industrial use of the site, with contaminated soil cleaned and re-purposed. Cleaned soils are normally 600mm - 1000mm depths in the Park.

Many soils have been manufactured for a purpose such as structural soils for areas under tarmac or low nutrient mixes for meadow areas.

OVERVIEW

Soil quality is vital for any successful planting scheme. Soil and plant selection work hand in hand have a significant impact on the establisment and maintemance. Soil can be imported, manufactured, existing or enhanced existing. Soil handling is also very important to maintain or create good soil structure biological function.

- Chemical analysis is advised - despite the high initial cost, it is better to employ this method from the outset rather than later on when problems may arise.
- Through quantifying soil nutrient levels through laboratory analysis - prescriptive application nutrients through mineral fertiliser application or soil amendments such as composts can be employed.
- It is important to have a suitably qualified experienced practitioner (soil expert) to provide a professional interpretation of results and to provide a key role in the design process to ensure sustainable establishment of vegetation.
- Soil testing can also determine and quantify important hazards. Soil contaminants can pose a significant threat to life.
- Parameters that should be tested for horticulture include: texture, density, stoniness, pH, electrical conductivity, nutrients, organic matter content and carbon/nitrogen ratio.

South Park - Soil remediation has led to the flourishing of a number of ecological communities

LANDSCAPE SOIL QUALITY

OVERVIEW

Soils are vital to the success of landscape and planting design. They control the quality and quantity of water flow, store carbon and support valuable habitats and species. Soils also serve as an important part of many contamination remediation strategies, including that on the Park, as they form the 'Clean Cover System' over contaminated ground.

Soils need to be appropriate for their specific function, the environmental conditions (climate, shade, exposure) and the selected species in order to provide all of these benefits. A soil's quality is defined as its ability to carry out its functions and encompasses the physical, chemical and biological properties of soil.

Refer to the Learning Legacy – Olympic Park Soil Strategy, which details the role of soils in the creation of the Park's landscape.

For urban spaces to be sustainable, the soil quality must be able to support both soil communities and vegetation.

Urban soils are often disturbed and soil is of poor quality, with low organic matter content, poor structure and often containing contaminants - all of these elements combined may limit ecosystem functioning.

Poor management of soils can have major long-term effects on its ability to sustain life, impacting also on water and air quality.

To inform management, the subsoil monitoring is ongoing to assess areas with depleted nutrient levels and understand localised drought issues.

Refer to DEFRA's Soil Strategy, which details the role of urban greenspace in the protection of soils in the built environment.

KEY OBJECTIVES

- Soils should be selected and specified for the specific end-use. Ensure the appropriate team of professionals are employed to advise on soil design, specification and management, for example soil scientists, ecologists, landscape architects.
- All soils imported to the Park should be fully tested against the relevant specification, including both 'horticultural' and 'human health' criteria.
- Ensure that soils are not compacted, with effective ground preparation and cultivation techniques during landscape construction and during the on-going maintenance of the landscape.
- If necessary, incorporate soil amendments which will aid in the development of healthy soils over time.
- Maintain vegetation cover to prevent soil loss.
- Topsoil used for soft landscape areas to be in accordance with BS 3882:2015.
- Subsoil used for soft landscape areas to be in accordance with BS 8601:2013 Specification for subsoil and requirements.

All soils on the Park have been manufactured for their location and purpose.

Refer to Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009) for guidance on the handling, management and preparation of soils for landscape.

KEY REFERENCES

- Olympic Park Soil Strategy
- DEFRA Soil Strategy
- DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)
- BS 3882:2015
- BS 8601:2013

CONTAMINATION STRATEGY

OVERVIEW

The Queen Elizabeth Olympic Park site was used historically for industry and transport, as a result the ground and soil was significantly contaminated with glass, hydrocarbons, heavy metals, asbestos and even overrun with Japanese knotweed.

In order to create the parkland, site-wide remediation was required, which involved washing and processing some of the site soils for re-use for civil engineering purposes - all of the landscape soils and growing media had to be imported, as the existing and treated soil was not fit-for-purpose.

As part of the remediation strategy a geotextile 'human health' layer was placed over the final landform grade - with the sub and topsoils then spread over the top of this to a depth of approximately 500-600mm for hard paved areas, 800mm for soft landscape areas and 1m in allotments.

KEY OBJECTIVES

- In the case of any concern of contamination, a risk-based approach should be adopted in line with Part 2A (Amended) of the Environmental Protection Act 1990 and related documentation.
- Contaminants should be assessed against generic assessment criteria, such as the Soil Guideline Values published by the Environment Agency.
- Ensure that the appropriate team of professionals and experts are employed to assist in remediation works, for example: engineers, ecologists, landscape architects and soil scientists.
- Soil washing allows for the reuse, re-purposing and recycling of soil and material at the site - which reduces carbon footprint.
- Advice should be sought as to the most appropriate form of or combination of remediation techniques: bioremediation, soil washing, chemical and it is important to have a suitably qualified experienced practitioner (soil expert) to provide a professional interpretation of results, and to provide a key role in the decision process for sustainable establishment of vegetation.
- Depth of soil to be increased significantly in allotment areas to offset the increased risk of contamination.

Marker Layer Installation

SUSTAINABLE DRAINAGE SYSTEMS (SUDS)

SUDS

OVERVIEW

The original design intent for the North Park was to open up the river channel which enabled better surface water management resulting in 4,000 residential homes being removed from flood risk. For the North Park and Canal Park areas, SuDS components are to be fully integrated into the public realm design where technically feasible and are generally preferred to traditional urban drainage methods. This does not apply for most areas of the South Park due to additional flood risk management requirements.

SuDS components include:

- Rain gardens
- Swales
- Open rills and runnels
- Gravel filter strips
- Detention ponds
- Wetlands

Benefits of SuDS include:

- Reduced surface water flood risk.
- Improved water quality through reduced runoff of polluted water.
- Increased water resources through groundwater and aquifer recharge.
- Provide attractive settings through planting features.
- Increases biodiversity whilst ensuring adaptation to climate change.

KEY DESIGN OBJECTIVES

- Soil type is important, as sandy soils have lower runoff coefficients than slower infiltrating soils such as clay.
- Trees, vegetation and soil aid in water interception, storage and infiltration.
- A combination of techniques is an effective method of alleviating pressure on traditional underground drainage systems.
- Ponds should be made as 'natural' in appearance as possible.
- Marginal vegetation and appropriate planting adjacent to SuDS is important.
- Use of native species to promote biodiversity.
- Planting to be used as a 'natural barrier' to manage perceived safety risks around waterbodies.
- Opportunities to turn SuDS sites into places where people picnic or come to enjoy the area - implementation of seating and play areas should be considered.

North Park – a combination of SuDS techniques used as part of a comprehensive SuDS strategy

KEY REFERENCES

- CIRIA
- The SuDs Manual
- GLA London Sustanable Drainage Action Plan
- Mayor's Transport Strategy

FLOOD RISK MANAGEMENT

Flooding includes any cases where land not naturally covered by water becomes covered in water. For the LLDC area this can include tides waters from the Thames as well as surface water flood. Surface water flooding - flooding from sewers, drainage, ground water and run off from land, small water courses and ditches that occur as a result of heavy rainfall.

Refer to the LLDC flood risk model prior to undertaking any works that may impact on the drainage or the watercourse.

Planning applications that impact on earthworks or riverside paths typically require approval by the Environment Agency.

Flood risk management to be in line with the overarching policies within the National Planning Policy Framework 2012 (NPPF).

Reference should be made to the objectives of the LLDC Local Plan and in particular Policy S.8: Flood risk and sustainable drainage measures.

Refer to Surface Water Management Plan Technical Guidance (March 2010)

KEY OBJECTIVES

- New developments are to incorporate SuDS.
- All developments greater than 250m^2 which lead to an increase in impermeable areas are to include at least one SuDS measures.
- Safe access and egress should be considered.
- Any development greater than 0.1 hectares on brownfield land are required to reduce existing runoff and runoff should be no greater than the equivalent for a Green Field site.
- Evacuation procedures should be established with Flood Zones 2 and 3.
- River wall structures are to be updated where required.
- Flood risks to towpaths to be managed through warning signs.
- Floodplain management should be considered as a sustainable method of reducing flood risk.
- Development proposals must be designed to reduce vulnerability to climate change.
- Buffer strips should be located adjacent to watercourses to allow access for flood risk maintenance and biodiversity and adequate space for sustainable drainage techniques.
- SuDS measures that have benefits for water quality, storage, habitat and landscapes should be fully considered before all other options.
- All drainage systems discharging to a watercourse must include anti-pollution measures that are easily accessible and maintainable.

North Park - Linear swales are an integral part of the SuDS strategy at Queen Elizabeth Olympic Park

SUDS WITHIN QUEEN ELIZABETH OLYMPIC PARK

SUDS TYPE	SITE PHOTO	DESIGN	APPLICATION
SWALES North Park		■ Swales are grassed or vegetated channels with sloped sides and flat bases. ■ Use plant species to help give a clear visible understanding of the swales' function. ■ Plant species suited to rain gardens (winter wet and summer drought) are appropriate. ■ Swales can be under drained as required with the use of a perforated pipe.	■ Used to provide a network of linear SuDS components. ■ A variety of cross sections can be employed to suit different urban situations. ■ They can also be retrofitted in dense urban environments.
WETLANDS North Park		■ Planting can be pre-established on vegetated coir pallets/rolls. ■ Species selection to be determined based on site conditions and taking into consideration zonal planting principles. ■ To be densely vegetated to provide treatment of surface water runoff.	■ They should be the last stage of the SuDS treatment networks (unless upstream treatment is incorporated) - with other mechanisms in place before hand to avoid excessive silting. ■ Can be constructed for a variety of scales - forming part of the streetscape or as natural areas that can be incorporated successfully into greenspaces.
RETENTION PONDS North Park		■ Retention points can act as important habitat features when planted with appropriate vegetation and landscape features to attract specific fauna. ■ Provide underground storage (geocellular tanks) for detention purposes.	■ They should be the last stage of the SuDS treatment networks (unless upstream treatment is incorporated) - with other mechanisms in place before hand to avoid excessive silting. ■ More appropriate for a natural urban setting - within a parkland or other green open space.

SUMMARY OF SUDS WITHIN QUEEN ELIZABETH OLYMPIC PARK

SUDS TYPE	APPLICATION	ADVANTAGES	DISADVANTAGES	COST (INSTALLATION)	COST (MAINTENANCE)
SWALES 	■ Used in public areas adjacent to paths and linear routes. ■ Cross sections can be adapted to suit a range of urban environments. ■ Opportunity to retrofit into dense urban environments - due to the flexibility of their use.	■ Can be incorporated easily into the landscape. ■ Effective in the removal of pollutants. ■ Assists in flood management through reducing runoff rates and volumes. ■ Easy to see when any pollution or blockages have occurred.	■ Unsuitable for steep areas. ■ Unsuitable for areas adjacent to roadside parking. ■ Can cause blockages in connecting pipe work. ■ Maintenance is required and repair of eroded or damaged areas may need to be factored in.	Low-Medium	Low-Medium
WETLANDS 	■ Used in residential areas or on commercial/industrial land. ■ Suitable for contaminated sites or sites above vulnerable groundwater, providing that a liner is used.	■ Effective in removing urban pollutants. ■ Used in contaminated and vulnerable groundwater sites if suitably lined. ■ Generally receive a positive perception from the public. ■ Biodiverse and aesthetic feature.	■ Can require a lot of land in order to implement. ■ Unsuitable for steeps sites. ■ Ongoing maintenance is required to prevent the colonisation of invasive non-native species. ■ Can be prone to high sedimentation. ■ Limited depth range for flow attenuation.	Medium-High	Medium
RETENTION PONDS 	■ Used in a variety of urban situations - however generally most suited to a quieter site. ■ Can be used in places of groundwater vulnerability (when lined).	■ Effective in removing urban pollutants. ■ Biodiverse and aesthetic feature. ■ Has been shown to add value to local properties.	■ Anaerobic conditions can occur. ■ Unsuitable for steep sites. ■ Ongoing maintenance is required to prevent the colonisation of invasive non-native species.	Low-Medium	Low-Medium

WATERWAYS

OVERVIEW

Waterways provide important green routes for local communities. They are multi-functional spaces used by people for cycling, dog walking, recreational walking and for boat owners and anglers.

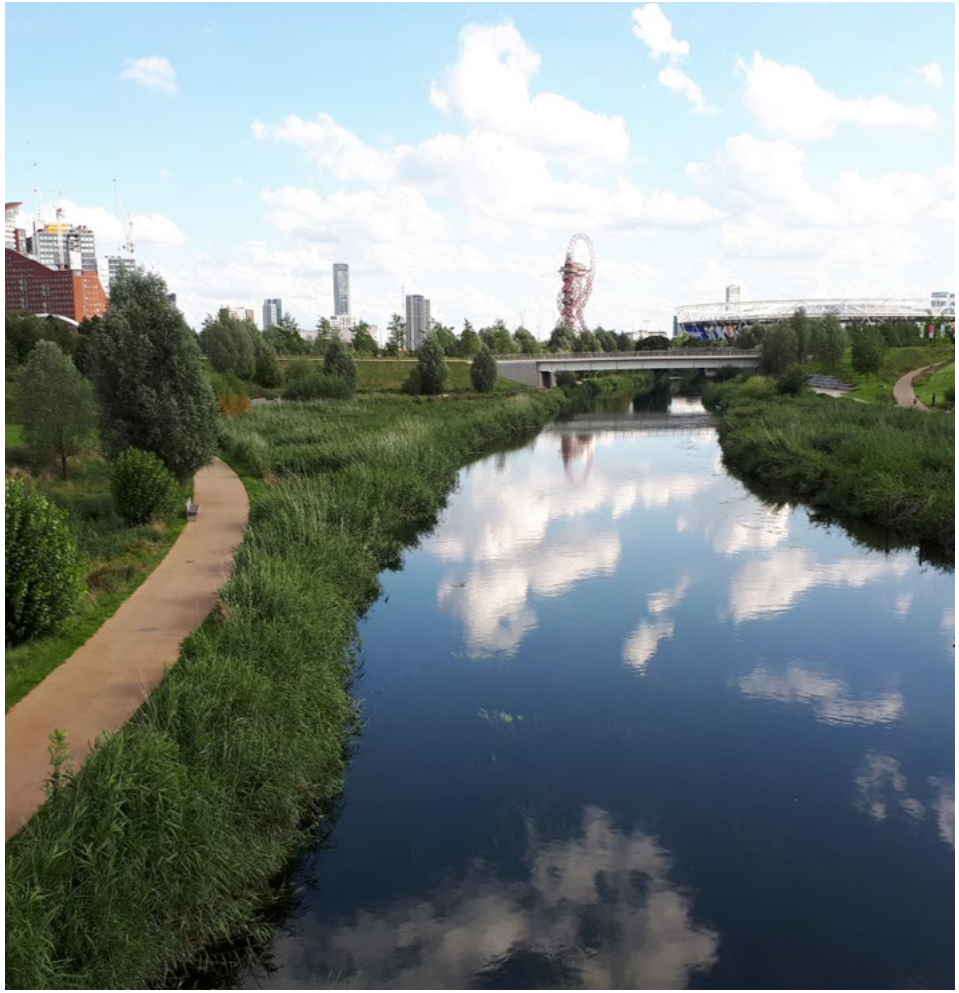
They are a key element in successful place-making and in restoring a positive perception of an area within local communities, providing a variety of social, environmental and economic functions.

Reference should be made to the objectives of the LLDC Local Plan and in particular to Policy BN.2: Creating distinctive waterway environments.

Lea River and Lea Navigation towpaths managed and maintained by CRT.

KEY OBJECTIVES

- Waterways should be factored into the design process – they should be improved and enhanced – through cleaning, repair or restoration
- Support and reference should be given to the aims of the Thames River Basin Management Plan.
- Resurface or create footpaths using appropriate materials to the setting.
- Prevent disruption to the movement of passengers and freight.
- Promote the use of boating along the waterways.
- Provide meaningful connections to local spaces – parks, transport hubs, residential areas etc. to encourage people to use the waterways.
- Encourage the creation and enhancement of habitats alongside and adjacent to waterways – becoming a haven for wildlife.
- Encourage volunteering within local communities – fosters community spirit and sense of pride in a space, brings people together and is an educational experience.
- Ensure the design/improvement of the waterways is reflective of the character and spirit of a place.
- Waterways should not be designed/ improved in isolation and thought should be given to the wider implications of development along waterways - masterplanning and an understanding of the site on a larger scale is appropriate.
- Potential in higher density urban locations to incorporate floating commercial uses, provide boat trips and potential for mooring communities, as a means to enlivening spaces.
- Maintenance is required to remove blanket weed and control algae.
- The boating community activity use the waterways which are maintained for individual and leisure use.



North Park - Waterways feature softened banks and dense vegetation.

NAVIGATION

TOWPATHS

Refer to the Waterways Towpath policy 1990 and CRT management and guidance for instructions.

Towpaths provide people access to waterways and their upkeep and design are integral to the use and success of waterways.

Reference should be made to the objectives of the LLDC Local Plan and in particular Policy T.10: Using the waterways for transport.

KEY OBJECTIVES

- Development proposals should provide new and improved access to the waterways.
- Where there is no continuous towpath along a canal edge, designers should consider creating a series of new public spaces providing the public access to the water.
- Towpaths should seek to create informal connections between bridges, streets, passages or yards in order to maximise access.
- Access to towpaths should be improved – through surface design, wayfinding and informal and formal linkages.
- Natural surveillance along towpaths is an important aspect of their design and development should in places respond accordingly.
- New walking and cycling routes should be connected to towpaths (providing that the cycle route is suitable and safe for the rider and that it does not compromise the safety and enjoyment of other users).
- Towpaths should provide opportunities for informal recreation.
- Fencing and barriers should not be installed between the canal and towpath other than for public safety or operational reasons.
- Seating and other appropriate street furnishings should be provided along routes.

North Park - Towpath adjacent to the River Lea.

BRIDGES

OVERVIEW

Bridges provide a vital link in improving connections and access to waterways.

Reference should be made to the objectives of the LLDC Local Plan and in particular Policy T.10: Using the waterways for transport.

KEY OBJECTIVES

- Bridges can form key locations for public activity and local amenities.
- Provision for cycle-paths is an important design element that should be considered.
- Bridges should connect to towpaths in a logical manner and be strategically located along waterways to provide the best use and ease of logical connectivity.
- Bridge design should be in keeping with the character of the place and the height and relative scale of the bridge should be in relation to the immediate context.
- Lighting should be incorporated into the bridge design both above and below the deck where there is access under the bridge and should be appropriate to the setting.
- Landings for bridges should be incorporated sensibly into the existing landscape and transitions between the towpath and the landing should be seamless and appropriate.
- New bridges should serve to link surrounding and disconnected communities to the waterways.
- Existing bridges should be improved where required.
- Emphasis should be placed on encouraging and maximising walking and cycling within the local communities.
- Bridges are important features in overcoming the physical severance imposed by the waterways and help to defragment route networks - encouraging more sustainable modes of transport.
- Bridge design should be related to the delivery of new and enhanced green spaces at key intersections and locations.
- Ensure that the head height between the bridge and the towpath is appropriate and does not leave people vulnerable to crime or anti-social behaviour.

South Park - Vegetated bridge within a more developed and urban area of the Park.

RETAINING WALLS

OVERVIEW

Retaining walls are a basic type of flood embankment. They should only be used when a natural slope cannot be planted and their design should provide habitat where possible.

Reference should be made to the objectives of the LLDC Local Plan and in particular Policy T.10: Using the waterways for transport.

Refer to Chapters 5 and 9 of the Environment Agency's - Fluvial Design Guide.

KEY OBJECTIVES

- Existing structures need careful investigation if they are to be upgraded or refurbished.
- When installing gabion walls use with vegetated coir matting for biodiversity purposes and to better blend into the natural environment.
- Materials used to fill gabion walls should be chosen to be in keeping with the surrounding environment.
- Where appropriate, conserve historic wall elements.
- Materials should be resistant to vandalism.
- Use recycled materials where possible.
- It is important that any cladding used is fixed firmly to the underlying wall structure so that it does not become detached.
- Sheet piling should have strength for driving, have durability, strength in-situ, be resistant to corrosion and other forms of deterioration, be resistant to impact damage and should not be unsightly.
- In the absence of specific guidance, adopt a crest width 2m wider than the maximum width of plant that will be used on the crest.
- Where possible materials should be locally sourced.
- If vegetated areas are to be maintained, ensure that suitable access is allowed for and that a landscape maintenance scheme is within the long-term cost planning of the scheme.

South Park - Vegetated gabion walls

ACCESS TO WATER AND SAFETY

KEY OBJECTIVES

- Provision should be made for life saving equipment along the stretch of waterway.
- Slip-resistant surfaces should be allowed for on any pontoons and walkways adjacent to water. Edges should be demarcated with contrasting colours and tactile surfaces.
- Design should factor in the potential for crime, vandalism and to enhance personal safety.
- Where possible buildings should be designed to overlook the waterways allowing for natural surveillance.
- Encourage long-term and residential moorings.
- Ensure that key areas of the waterway are lit (where pedestrian activity is high and ambient lighting is low).
- Waterside car parks should be sufficiently close to the waterside without creating unattractive views from the waterway.
- A poorly maintained or derelict site may be perceived as dangerous and therefore avoided by potential site users.
- Ensure that the waterway user has full visual surveillance and awareness of the waterway corridor.
- Create waterside spaces and environments that are user friendly and which inspire confidence and comfort.
- Create a sufficient number of clearly marked or visible bridges and access points.
- Ensure that schemes such as neighbourhood watch / boat watch are in effect.
- Community and volunteer groups are an important element in engaging local communities and enhancing local ownership as a means to potentially reduce the levels of criminal activity.
- Land uses adjacent to waterways should be considered.
- Careful selection of site furniture and materials can help to improve the appearance of waterways and minimise negative behaviour.
- Ease of access to local facilities.

South Park - Natural surveillance provided by moorings and buildings overlooking the waterway.

6 CONSTRUCTION DESIGN AND MANAGEMENT

PARK OPERATIONS AND DESIGN MANAGEMENT

OPERATIONS

- The Park Management Plan (LLDC, 2017) forms the key document guiding the management and operation of Queen Elizabeth Olympic Park.
- The LLDC Park Operations and Venues team manages this document and the ongoing coordination of park operations.
- Delivery of park operations and buildings management are provided by the Estate Facilities Management Contractor (Engie Services Ltd. From 2014 to 2024).

EVENTS VENUES

- Venue management is covered by the respective Business Plan for each venue, with operations undertaken by several operators and overseen by the Park Operations and Venues team.
- Major events are managed by a wider Park Programming Coordination Group including LLDC, London Boroughs and venue operators.
- Venue operators are responsible for the organisation and management of events.
- Operators are required to utilise Appendix 3 of the Management Plan which sets out a checklist for mitigation measures associated with planning events.
- Events may be held anytime between 0900 and 2230 Monday to Sunday upon agreement with the LLDC.

DESIGN PROCESS

All projects should set out to aspire to the LLDC's Guiding Design Principles as set out in the Vision statement of this guidance and the Design Policy.

Creating a clear project brief which outlines all project priorities is fundamental to the design success of a scheme or intervention, and all brief documents should provide detailed objectives and measurable performance related criteria for informing the designer's remit.

Designers are required to respond to the project objectives by demonstrating how propositions add value, balance risk and consider deliverability and design life as part of the proposals. These aspects are described in detail within this chapter.

A strong overall design concept to inform the strategic direction of the project is vital from the outset.

In most projects, the design process will need to accommodate stakeholder needs and expectations. Consultation is expected in line with the extent of works and the impact that a project is anticipated to have on stakeholders, with designers documenting how the design has been changed to accommodate requests.

LLDC's Quality Review Panel should be consulted as appropriate to ensure a robust review process is included as part of the design development.

TRIALS

The use of new products in controlled trials is encouraged as part of a strategy of testing efficiencies in the design and delivery process.

The basis for considering future roll-out of a product should ultimately tie in with a robust set of design objectives and management criteria to determine whether it meets LLDC requirements.

A phased implementation schedule can further help to identify site specific issues.

VALUE MANAGEMENT

LLDC's long term objective to be financially self-sustaining by 2025 will require due consideration for the ongoing design and management of the Park, by working closely with designers, partners and operators.

DEFINING 'VALUE FOR MONEY'

Demonstrating 'value for money' in the design and specification of proposed layouts and products is required as part of the design process. The LLDC advocates utilising high quality products and processes that may not necessarily be the cheapest option at the outset, but have demonstrable value in the long term in terms of performance.

Design teams should outline how the proposal will perform in terms of:

- reflecting the project priorities and stakeholder expectations
- designing simple, innovative solutions that have a clear function and a robust form
- providing known performance specifications for the product
- ensuring a reliable supply chain for replacement parts
- demonstrating additional benefits in terms of sustainability, deliverability and construction efficiencies.

KEY REFERENCES

- Park Management Plan (LLDC, 2017)
- Events Management Coordination Framework (LLDC, 2014)
- Park Events Application Pack: http://queenelizabetholympicpark.co.uk/work-with-us/stage-an-event
- Events Impact Assessment and Mitigation Plan (EIAMP)

RISK MANAGEMENT

HEALTH AND SAFETY

Designers and project managers should acknowledge the importance of risk management across all stages of design. The Health and Safety Executive (HSE) defines 'risk' as the likelihood of someone becoming harmed by a hazard, and the expected impact.

There are numerous potential hazards in the public realm that are a by-product of design decisions: should a barrier be put next to a body of water; is the amenity space safe for children of different ages etc.

This section identifies the importance of providing an evidence base to inform decision-making.

Designers are encouraged to design for normal use, and not to second guess exceptional behaviours that would cause harm.

Manual for Streets suggests that an over-cautious approach to design does not necessarily create high quality environments and designers are therefore encouraged to look at ways of minimising risk while ensuring the delivery of a strong design concept.

In this respect, risk can be managed in the design process based on evidence. Sharing learning outcomes from existing projects is an effective approach for contributing towards a better understanding of site specific risk.

CDM REGULATIONS

The Construction (Design and Management) Regulations 2015 should be followed by all members of the project team to ensure projects are carried out with adequate planning of health and safety issues.

Designers and clients should review their responsibilities in relation to CDM, with the client appointing a Principal Designer at project inception to ensure overall coordination and risk appreciation of different disciplines.

RISK ASSESSMENT

The HSE recommends that a proportionate approach to risk assessment and management is undertaken:

- Identify the hazards that could cause injury.
- Anticipate who might be most impacted by the hazard
- Evaluate the risks and decide on design measures to minimise risk.
- Consider whether a hazard can be eliminated completely through design.
- Reduce the potential for the hazard to cause harm through design iteration, such that the risk is reduced satisfactorily.
- The definition of 'satisfactory' should be based on evidence, with a balance struck as part of a considered risk strategy.
- Document known risks in a project risk register, creating an audit trail for the decision-making process.
- Maintenance is a fundamental factor in reducing risk and long term upkeep of any proposed product or space should be considered from the outset.

LIABILITY

Careful consideration needs to be given to how identified risks impact on liability arrangements. The scope of services and the terms of the appointment are fundamental in outlining liability arrangements during design and construction. The procurement process requires the expertise of insurance managers within both the LLDC and contract organisation(s).

Anticipated claim numbers and the cost of claims to the LLDC will be evaluated based on the risk assessment. It should be noted however that: "Most claims against an authority are for maintenance defects, claims for design faults being relatively rare" (Manual for Streets, 2007); therefore an adequate management regime is vital.

The limited materials palette and advice in this guidance can help to ensure that maintenance defects are minimised, thereby reducing the likelihood of a claim. However liability cannot be avoided by copying this guidance.

New commercial ventures with alternative liability arrangements is one avenue to be explored. One such example is the "High Ropes Adventure Park" designed to provide a high level challenging activity course that is pay to use. In this instance the management and liability lies within the concession contract for the new facility.

RISK MANAGEMENT

Project managers and designers are encouraged to:

- be risk aware such that the LLDC principles of high quality design are fulfilled while taking a considered approach to risk minimisation
- involve the general public in the design processes to understand wider perceptions of risk
- manage risk in an effective and proportionate manner with a clear auditing trail
- involve suppliers of materials in risk and design discussions from the start
- manage risks responsibly as part of an ongoing maintenance programme

KEY REFERENCES

- Manual for Streets, 2007
- Construction (Design and Management) Regulations 2015 (HSE, 2015)
- Living with risk: Promoting better public space design (CABE, 2007)
- Health and Safety Executive: Risk Management http://www.hse.gov.uk/risk/index.htm

CONSTRUCTION PLANNING AND MITIGATION

PLANNING

Contractors are required for any major works to submit appropriate plan documents as per the LLDC's Code of Construction Practice (LCS-GLB-CON-APP-COCP-001-V02, 2013), to include:

- Construction Transport Management Plan - setting out how to organise the construction site so that vehicles and pedestrians can move around safely
- Construction Waste Management Plan - identifying how resources will be managed and waste controlled across all stages of construction
- Water Management Plan - to measure, monitor and manage use of water during construction and post-implementation
- Ecology Management Plan - providing details of practical measures to minimise adverse effects on biodiversity during the construction process
- Pollution Incident Control Plan - to identify and monitor the risks of pollution and contamination
- Environmental Management Plan - identifying measurable objectives and targets as part of a strategy for the long-term management of the site
- Project Environmental Plan - setting out the procedures for ensuring risks during construction are eliminated or minimised.

The Code of Construction document should be used as the primary guidance note for all engineering and construction activities. The LLDC will assess the robustness of the proposals on a site specific basis.

The following information provides a high level checklist for contractors working on Queen Elizabeth Olympic Park.

LAND REMEDIATION

The Park is located on brownfield land which historically was used extensively for industrial use. The heavily contaminated land has been covered with a geosynthetic layer, with cleaned subsoil and manufactured topsoil placed on top to form a surface planting layer of approximately 0.8 - 1.0m depth.

Designers should seek to minimise construction depths where possible to avoid potential disturbance of the geosynthetic barrier.

MITIGATION

Mitigation measures should be considered at the design stage to minimise the adverse impact of construction on visitors, local inhabitants and wildlife in Queen Elizabeth Olympic Park, and conform with the standards set out in the Sustainable Design and Construction Supplementary Planning Guidance (SPG)
London Plan (GLA, 2014).

Construction mitigation measures as part of the Construction Phase Plan are expected for the Planning Development Zones.

For smaller park-based schemes, the following recommendations should be utilised to ensure that implementation works are appropriately planned and managed:

A notice of proposed construction activities and project contact information should be provided to local residents sufficiently in advance of works commencing.

- Suitable access arrangements are in place to maintain standards set out in the Inclusive Design Standards (LLDC, 2013).
- Ongoing site monitoring is required to ensure that debris is swept as required and access maintained during construction.
- Any damaged surfacing is repaired in a timely manner following completion of the core works.

TRANSPORT

Construction logistics should be carefully considered, particularly:

- Management of construction vehicle traffic routes and hours for loading.
- Providing construction personnel with dedicated off-site parking.
- Providing additional transportation services for construction personnel to access the site.

NOISE, LIGHT AND AIR POLLUTION

Mitigation measures to reduce construction related pollution should include:

- Adequate screening or fencing of the construction site.
- Implementation of noise reduction methods such as sound barriers.
- Restricted work hours, with a preference for avoidance of night-time working, especially for audibly disruptive activities.
- Construction works should comply with government air quality standards (Air Quality (England) Regulations 2000 and Air Quality Limit Values Regulations 2001).
- Contractors should refer to The Control of Substances Hazardous to Health (COSHH) Regulations - to protect against the risks from hazardous dusts associated with construction.
- Implementation of air pollution reduction methods should be used, such as dust and emissions control and the use of clean fuels.

ASSET MANAGEMENT

ASSETS

All surface public realm features, except for utilities covers and borough adopted roads within Queen Elizabeth Olympic Park, comprise assets managed by the LLDC.

The collection of data as part of LLDC's asset management processes informs life cycle planning and asset valuation, which is in turn used to review materials and furniture across Queen Elizabeth Olympic Park.

Condition surveys are to be conducted regularly as per the Park Management Plan (LLDC, 2017) to ensure that park furniture is maintained to a satisfactory safe standard. The Estate Management Strategy sets out the management and maintenance regimes for high quality elements of the public realm. Coordination of management processes with the EFM Contractor and Friends Groups is required to ensure that the LLDC Park Manager can maintain all assets across the Park.

PLANTING MANAGEMENT

As part of the EFM contract, annual Tree Condition Reports and BAP Monitoring are required to ensure the long term maintenance of habitats. A Landscape and Horticultural Maintenance Plan and a Pest and Invasive Weed Management Plan are also required to inform subsequent landscape management operations.

WATERWAYS MANAGEMENT

- The Waterways Management Plan sets out permitted activities and management regimes on the waterways.
- Canal and River Trust own 6km of canals and rivers - including Old River Lea, Bow Back River, City Mill River, and Waterworks River.
- North Park River Lea west bank is leased to LLDC by Lee Valley and LB Hackney (LVRPA cover the east bank).

PLAY SPACE MANAGEMENT

The British and European safety standard BS EN1176 Playground Equipment, requires an annual inspection of play facilities as part of an assessment of risk. Accredited practitioners are required to prepare a report on whether replacement or upgrading is required.

DESIGN LIFE

The "design life" of a material is its expected lifetime following first installation, after which it is no longer fit for purpose.

A key part of any design life cycle plan is understanding how long relative material options will last. Inherently this will depend on the location and the level of exposure to the elements and human use.

DELIVERY

Maximising full life cycle potential can be achieved by:

- Designing to the standards set out in this guidance, particularly selecting the right material for the right location.
- Planning for an ongoing supply chain of replaceable parts.
- Ensuring pre-construction requirements are implemented such as raising of ironworks when resurfacing.
- Ensuring contractors are certified and can demonstrate workforce competency.
- Mitigating known issues which will adversely impact on the life of a product such as enabling good drainage of hard surfacing.
- Avoiding construction practises which may compromise implementation quality such as night works, construction during inclement weather, incorrect application.
- Decommissioning at end of design life.

The cumulative impact of poor implementation and inappropriate material selection can significantly reduce the anticipated life of a product – as much as a 75% reduction in service life in some instances (Association of Directors of Environment, Economy, Planning and Transport (2016).

AUDITING

Designers and planners are recommended to consider the following approach to inform evidence based product selection decisions and ongoing asset management strategies:

- Suppliers should be prompted to provide expected design life cycles for their products.
- An ongoing review of existing products used in the Park will help to verify supplier quoted service lives and inform future maintenance and product selection decisions.
- Long-term performance records should be catalogued as part of an ongoing life cycle plan for all assets within the Park.
- There are ambitions to integrate this with a live GIS based asset management system for the Park.

A PARK FOR THE FUTURE

SUSTAINABILITY

The landscape of the Park will need to change and adapt, requiring the trialling and refinement of products, layouts and attractions to ensure the Park remains fit for purpose.

The ongoing sustainable design principles are key to ensuring the long term success of the Park:

- sourcing materials locally to minimise environmental impact
- encouraging sustainable lifestyles and healthy transport choices
- managing energy and water across the parkland through technological advances, including meeting Zero Carbon targets.

As a Smart Sustainable District, Queen Elizabeth Olympic Park is one of the first parks to trial innovative sustainability solutions coordinated by the EU's main climate innovation initiative: Climate-KIC. The non-potable water network used for irrigating the parkland is one such initiative with the LLDC and Thames Water trialling the use of bio-membrane technology to treat sewage to use it in the non-potable network.

Only through the trialling of new technologies can innovative solutions be found to maintain the environmental and social resilience of the Park.

TECHNOLOGY

Technological advances will continue to shape the operations and design of the Park, creating additional efficiencies in management while enhancing the visitor experience. Free Wi-Fi internet is already provided across the Park and there are ever advancing ways to the engage with visitors including the use of mobile applications and augmented realities, as well as the potential for new forms of art and social interaction.

Interconnected devices embedded in the public realm will increasingly be implemented across the Park as part of 'The Internet of Things'. Designers are encouraged to provide integrated design approaches that will allow for data collection within everyday objects.

'Big data' has the potential to inform various management elements of the public realm including:

- smart crowd management
- environmental condition sensing and irrigation
- street lighting design
- waste production and energy usage
- traffic management
- asset management
- personalised wayfinding systems
- control of our electricity infrastructure

Here East brings together business, education and technology in the pursuit of innovation

PLACEMAKING

Good open spaces are flexible and capable of responding to the ongoing changes of the surrounding urban environment.

As the legacy developments come forward it will be important to acknowledge the changing role of different parts of the parkland. While some of this can be planned in advance, such as acknowledging the need to design a successful relationship between the architectural built form and the wider landscape, other factors need to be monitored and adapted for accordingly, particularly how people use the Park over time and how spaces evolve.

- A strategy of inclusion will continue to underlie the work of the LLDC.
- A combination of 'top-down' and 'bottom-up' placemaking is advocated such that the legacy of design excellence will continue to be fostered through strong leadership at the LLDC, while the design process will become increasingly informed by the requirements of the local communities establishing themselves around the Park.
- It is vital to facilitate engagement throughout the design process so that a plan for people and place is truly integrated with the ongoing design and management of the open spaces.
- With the anticipated growth in public institutions and cultural attractions in the local vicinity of the Park, there is a continued importance in providing a diversity of spaces to fulfil different civic activities.
- Despite the grand scale of the parkland, the ongoing strategy is to consider designing for the human scale.
- It is essential that there continues to be an appropriate and managed density of activities provided with additional facilities created as appropriate to contribute to the vitality of the new neighbourhoods and the Park as a whole.


Breakfast Club

7 ACKNOWLEDGEMENTS
GLOSSARY
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REFERENCES

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GLOSSARY

TERMS

- Code of Construction Practice

LLDC's standards for managing the environmental impact of construction projects.

- Legacy Communities Scheme

Masterplan development of Queen Elizabeth Olympic Park comprising residential, cultural and retail buildings.

- The London Legacy Development Corporation

Public sector not-for-profit local planning authority.

- Olympic Delivery Authority

Statutory corporation responsible for delivery of the infrastructure for the 2012 London Olympic Games.

- Planning Delivery Zone

Separate development plots as part of the Legacy Communities Scheme.

ABBREVIATIONS

APA Archaeological Priority Area

BAP Biodiversity Action Plan

BS British Standard

CDM Construction Design and Management

EA Environment Agency

ECMP Ecological Management Plan

EFM Estate and Facilities Management Team

GLA Greater London Authority

HSE Health and Safety Executive

LPA Local Planning Authority (LLDC PPDT)

LCS Legacy Communities Scheme

LLDC London Legacy Development Corporation

LLDC PPDT London Legacy Development Corporation Planning Policy Decisions Team

LVRPA Lee Valley Regional Park Authority

ODA Olympic Delivery Authority

PDZ Planning Delivery Zone

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