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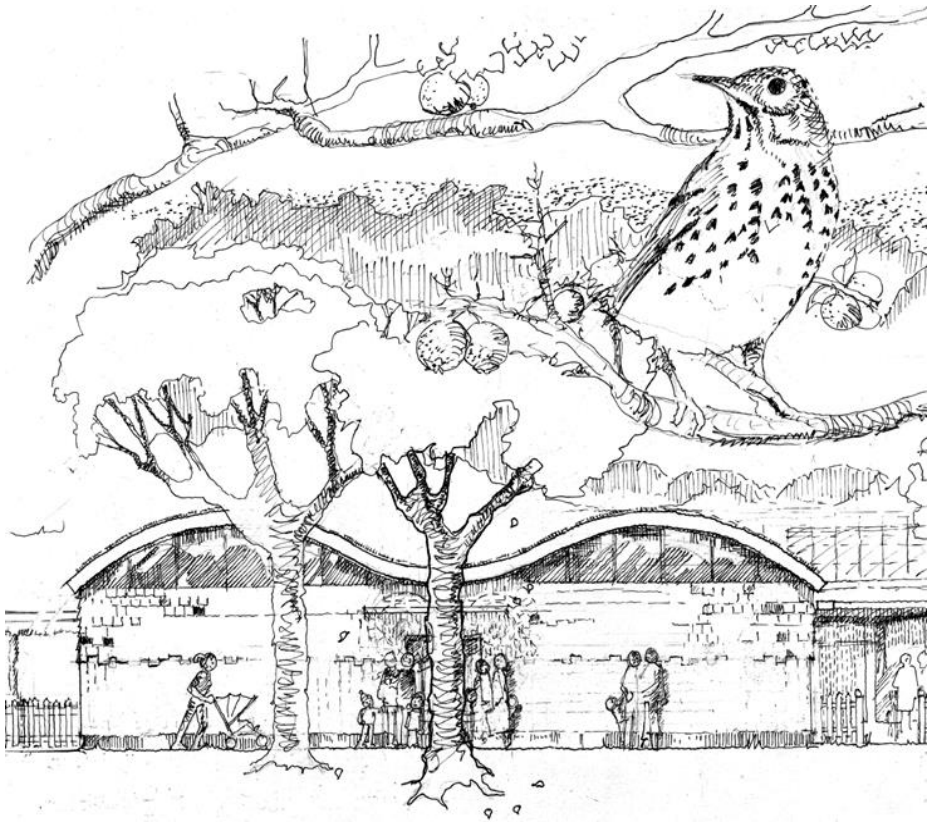

Marble Hill Playcentres – New Development

New Building Sustainable Drainage Statement

December 2020

Rev 01 – FOR CONSULTATION

Contents

1. Introduction

1.1.1 The Marble Hill Playcentres (MHPC) development aims to completely redevelop the current site for the ongoing use by Marble Hill Playcentres and other local charities.

1.1.2 The ultimate objective of this project is to provide a new community centre supporting local children and their parents & carers.

1.1.3 The existing building was built in the 1960's and is of traditional brickwork construction, with no insulation and few modern mechanical or electrical services. Due to the cold nature of the existing buildings, it is not feasible to operate the services throughout the winter months. The current building can only stay open circa 6 months of the year. The current buildings are expected to be demolished and replaced with a new modern playcentre.

1.1.4 This is a Planning Application supporting document, which details the Sustainable Drainage design intent for the new building.

2. Location

2.1.1 Marble Hill Playcentres is located to the northeast corner of Marble Hill Park, which is on the north-bank of the River Thames. The full address is Marble Hill Playcentres, Marble Hill Park, Richmond Rd, Twickenham TW1 2NL.

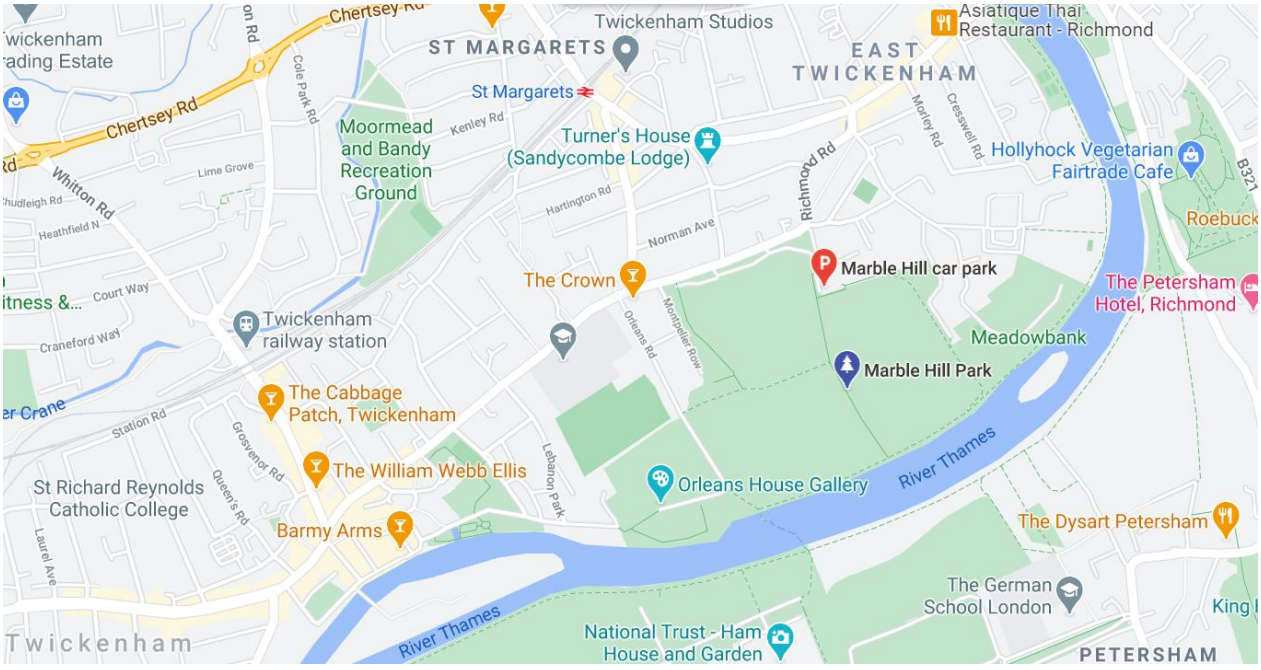

Fig 1: Location

3. Environment

3.1.1 The nearest Met Office Station is located in Kew Gardens, approximately 2 miles away. The most recent set of average rainfall data available covers the 1981 – 2010 period, see below tables.

3.1.2 The key statistics from this data is:

(a) Average annual rainfall is approximately 622.5mm per year.

(b) Peak average rainfall within a single month (October being the wettest) are circa 69.7mm per month.

Station: Kew Gardens, 1981-2010

Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed at 10 m (knots)
January	8.2	1.8	9.7	59.8	57.2	11.6	6.3
February	8.7	1.7	10	79.9	41.9	9	6.3
March	11.6	3.4	5.2	118.2	42.8	10	6.1
April	14.4	4.7	2.5	173.3	45.3	9.1	6.1
May	18	7.9	0.3	205.3	48.8	9	5.5
June	21	10.8	0	203.6	49.3	8.5	5.3
July	23.5	13	0	218.4	46.8	7.7	6
August	23.2	12.7	0	211.1	51.2	8.1	4.6
September	20	10.3	0.1	146.4	52.2	8.5	4.4
October	15.8	7.4	1.2	117.2	69.7	10.7	4.5
November	11.3	4.1	5.6	70.6	60.6	11.1	4.9
December	8.5	2.1	10.1	49.6	56.6	10.6	5.2
Annual	15.4	6.7	44.8	1653.3	622.5	113.7	5.4

Figure 2: Kew Gardens average weather statistics

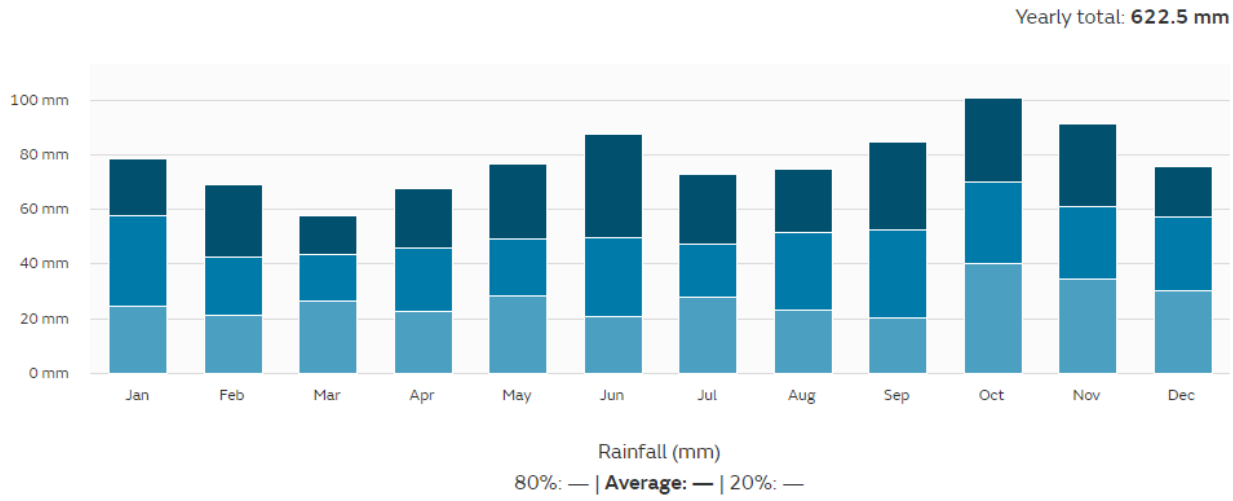

Figure 3: Average Rainfall

3.1.3 When compared to the national averages, Kew Gardens, and London generally, have significantly less rainfall that other locations in the UK.

(a) In February 2020, 209 millimetres of rainfall fell in the United Kingdom

(b) 2008 to 2017 experienced longer wet spells and fewer dry spells

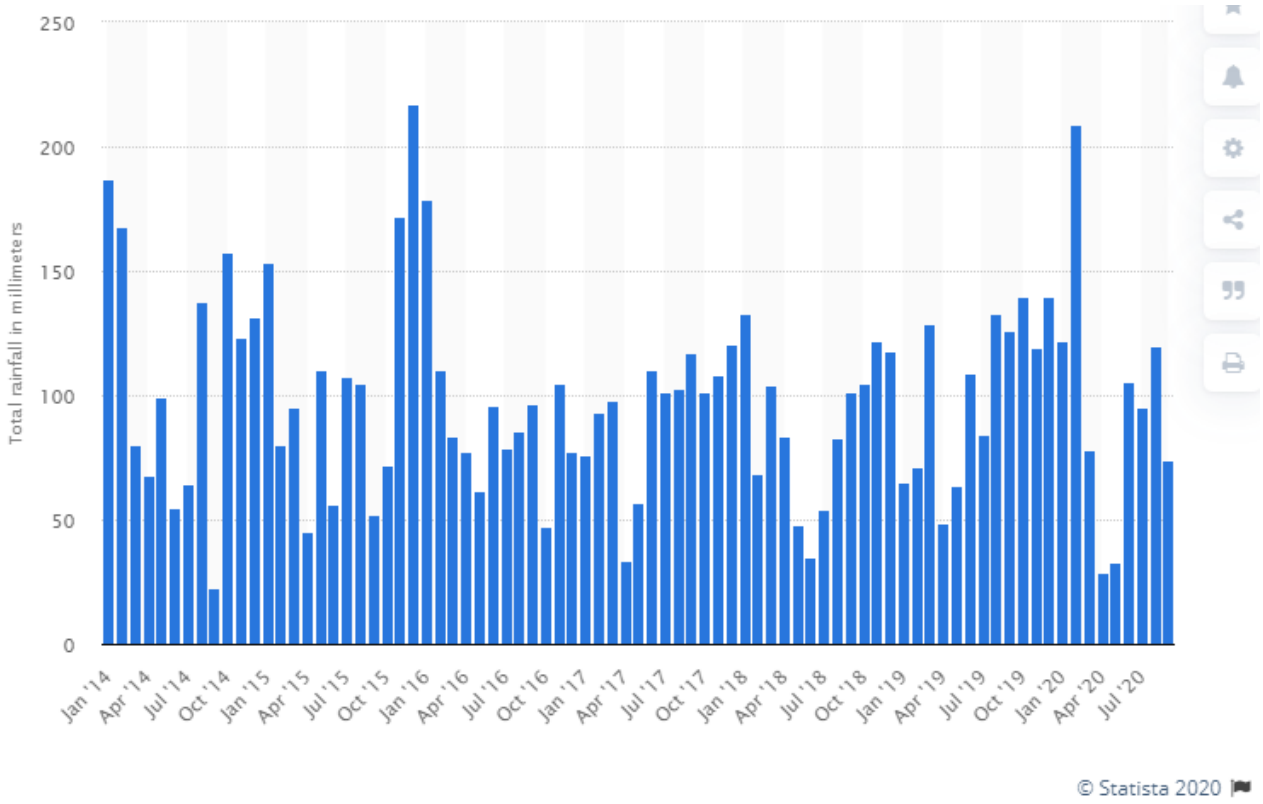

Fig 5: National Rainfall.

3.1.4 In summary, the site is located in a dry part of the UK, however with ongoing climate change affecting the UK, there remains a potential for large downpours, which are likely to affect the drainage design.

3.1.5 The site is largely surrounded by Marble Hill Park, where the topography tapers south towards the River Thames. Although the site is close to the River Thames, the area is not deemed to be a flood risk.

4. Existing Building

4.1.1 The current building comprises of small brickwork rooms of single story. There are toilets and wash-sinks available which feed into a shared drainage system.

4.1.2 The existing roofs have rainwater downpipes discharging into the same below ground drainage system.

4.1.3 The existing system is in good condition, and there is no evidence of leakage or blockages, though this will be examined further in later design stages.

4.1.4 It is noted that the building is currently lightly used, and that the new design with a greater volume and capacity for increased visitor attendance will probably command additional water and drainage requirements.

5. Design Strategy

5.1.1 The policy is to greatly improve the environmental sustainability of the new premises, and the capture and use of rainwater is highly important to the long-term sustainable plan for the scheme.

5.1.2 This project has every intention to demonstrate that the development will comply with local and regional requirements, and will target meeting higher level sustainable drainage standards, through the policy of quality design and integration of new technologies.

5.1.3 The location of this site is not in a flood risk area.

5.1.4 The proposed building is less than 1000sqm, and therefore a Flood Emergency Plan is not required.

6. Design Regulation & Guidance

6.1 LONDON BOROUGH OF RICHMOND UPON THAMES LOCAL PLAN (JULY/2018)

6.1.1 The below is some of the regulation and guidance which the project will be delivered under.

6.1.2 Policy LP 20 Climate Change Adaption

(a) The Council will promote and encourage development to be fully resilient to the future impacts of climate change in order to minimise vulnerability of people and property.

(b) New development, in their layout, design, construction, materials, landscaping and operation, should minimise the effects of overheating as well as minimise energy consumption in accordance with the following cooling hierarchy:

1. minimise internal heat generation through energy efficient design

2. reduce the amount of heat entering a building in summer through shading, reducing solar reflectance, fenestration, insulation and green roofs and walls
3. manage the heat within the building through exposed internal thermal mass and high Ceilings
4. passive ventilation
5. mechanical ventilation
6. active cooling systems (ensuring they are the lowest carbon options).

(c) Opportunities to adapt existing buildings, places and spaces to the likely effects of climate change should be maximised and will be supported.

6.2 Policy LP 21 Flood Risk and Sustainable Drainage

6.2.1 All developments should avoid, or minimise, contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater and flooding from sewers, taking account of climate change and without increasing flood risk elsewhere. Development will be guided to areas of lower risk by applying the 'Sequential Test' as set out in national policy guidance, and where necessary, the 'Exception Test' will be applied. Unacceptable developments and land uses will be refused in line with national policy and guidance, the Council's Strategic Flood Risk Assessment (SFRA)

6.2.2 In Flood Zones 2 and 3, all proposals on sites of 10 dwellings or more or 1000sqm of non-residential development or more, or on any other proposal where safe access/egress cannot be achieved, a Flood Emergency Plan must be submitted.

6.2.3 Where a Flood Risk Assessment is required, on-site attenuation to alleviate fluvial and/or surface water flooding over and above the Environment Agency's floodplain compensation is required where feasible.

(a) The Council will require the use of Sustainable Drainage Systems (SuDS) in all development proposals. Applicants will have to demonstrate that their proposal complies with the following:
1. A reduction in surface water discharge to greenfield run-off rates wherever feasible.
2. Where greenfield run-off rates are not feasible, this will need to be demonstrated by the applicant, and in such instances, the minimum requirement is to achieve at least a 50% attenuation of the site's surface water runoff at peak times based on the levels existing prior to the development.

6.3 Policy LP 22 Sustainable Design and Construction

(a) Developments will be required to achieve the highest standards of sustainable design and construction to mitigate the likely effects of climate change. Applicants will be required to complete the following:

1. Development of 1 dwelling unit or more, or 100sqm or more of non-residential floor space (including extensions) will be required to complete the Sustainable Construction Checklist SPD. A completed Checklist has to be submitted as part of the planning application.
2. Development that results in a new residential dwelling, including conversions, change of use, and extensions that result in a new dwelling unit, will be required to incorporate water conservation measures to achieve maximum water consumption of 110 litres per person per day for homes (including an allowance of 5 litres or less per person per day for external water consumption). 3. Proposals for change of use to residential will be required to meet BREEAM Domestic Refurbishment 'Excellent' standard (where feasible). Reducing Carbon Dioxide Emissions

(b) Developers are required to incorporate measures to improve energy conservation and efficiency as well as contributions to renewable and low carbon energy generation. Proposed developments are required to meet the following minimum reductions in carbon dioxide emissions:

1. All new major residential developments (10 units or more) should achieve zero carbon standards in line with London Plan policy.
2. 2. All other new residential buildings should achieve a 35% reduction.

(c) This should be achieved by following the Energy Hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

(d) High standards of energy and water efficiency in existing developments will be supported wherever possible through retrofitting. Householder extensions and other development proposals that do not meet the thresholds set out in this policy are encouraged to complete and submit the Sustainable Construction Checklist SPD as far as possible, and opportunities for micro-generation of renewable energy will be supported in line with other policies in this Plan.

6.4 Policy LP 24 Waste Management

6.4.1 The Council will ensure that waste is managed in accordance with the waste hierarchy, which is to reduce, reuse or recycle waste as close as possible to where it is produced. The Council will require the following:

1. All developments, including conversions and changes of use are required to provide adequate refuse and recycling storage space and facilities, which allows for ease of collection and which residents and occupiers can easily access, in line with the guidance and advice set out in the Council's SPD on Refuse and Recycling Storage Requirements.

2. All developments need to ensure that the management of waste, including the location and design of refuse and recycling facilities, is sensitively integrated within the overall design of the

scheme, in accordance with policies on Local Character and Design.

6.5 Non-Statutory SuDS Technical requirements

6.5.1 Non-statutory technical standards have been produced by Defra for England and the Welsh Government for Wales. There's an expectation that SuDS will be designed and constructed in accordance with these standards that are also consistent with the SuDS Manual. A number of local authorities have produced their own policy and guidance, the Local Planning Authority should be contracted with regards to their local requirements at the earliest opportunity.

6.5.2 The below sets out non-statutory technical standards for sustainable drainage systems, for the project, and will be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance.

6.6 Flood risk outside the development

6.6.1 S1 Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply.

6.7 Peak flow control

6.7.1 S2 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

6.7.2 S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

6.8 Volume control

6.8.1 S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

6.8.2 S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

6.8.3 S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer

or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

6.8.4 S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

6.8.5 S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

6.8.6 S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

6.9 Structural integrity

6.9.1 S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

6.9.2 S11 The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

6.10 Designing for maintenance considerations

6.10.1 S12 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

6.11 Construction

6.11.1 S13 The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.

6.11.2 S14 Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.

7. Proposed Sustainability Measures

7.1 External Landscaping

7.1.1 All eternal non-covered areas will have soft child friendly play surfaces, which will be natural and porous. The lack of large areas of hard paving will help natural drainage and will avoid large run-off areas.

7.2 Rainwater

7.2.1 A green-roof is proposed for this scheme. This roof will help capture rainfall through natural soil and vegetation soakage. However downpipes will be provided to capture rainwater following saturation of the greenroof.

7.2.2 Rainwater harvesting will be utilised on this scheme. Rainwater will feed into large storage tanks for use in the landscaping / garden areas. Any rainwater storage tanks/butts will be kept away from children areas to avoid the risk of children touching stale or contaminated water.

7.2.3 Excessive rainwater will be diverted via overflows into an underground attenuation tank, which will help reduce the flow rate of water to the sewer/common system

7.2.4 The attenuation tank will then feed into an underground soakaway.

7.3 Waste water

7.3.1 Waste water from handbasins, WC and floor gully's will feed via underground drainage to the existing system. Grey-water storage tanks will not be used.

7.4 Construction

7.4.1 The construction process can often cause environmental issues, the highest level of management process will be expected on this project, the means for managing the construction process ensuring all environmental and sustainable drainage needs is captured within the Construction Management Plan.

7.5 Design Development

7.5.1 The current design and proposed sustainability measures will be developed further in following design phases.

8. Sustainable Construction Checklist

8.1.1 Final Infiltration rates are to be confirmed following the undertaking of further geo-logical surveys, the SuDS Drainage Proforma and the Sustainable Construction checklist will be completed and submitted for approval prior to Construction.