



## UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks  
and adjoining land, Bedford

**Environmental Statement** Volume 3

### **Appendix 12.2 - Water Strategy**

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# EXECUTIVE SUMMARY

This Water Strategy has been prepared in support of the planning proposal for the Proposed Development as described in **Chapter 2: Description of the Proposed Development (Volume 1)** of the Environmental Statement.

This report investigates the opportunity to implement water conservation measures, with a focus on water reuse and recycling interventions, to minimise the Site's water footprint. This is to ensure the Site's water strategy aligns with Universal Destinations & Experiences' (UDX's) environment policy, for which water conservation is a key area of sustainability and acknowledges regional water stress and local water and wastewater infrastructure constraints.

The water demand from the park is driven by:

- **Domestic water uses** – associated with guests' hospitality (including day and overnight stay) and employees welfare facilities; and
- **Non-domestic uses** – associated with irrigation and process water (park washdown and supply to water features other than fountains).

The study has identified that the water demand from the Site should be met through the combination of:

- Implementation of water efficient fixtures and processes in line with *The Building Regulations 2010 Part G*<sup>1</sup> and contributing to achieving LEED gold accreditation;
- A potable water supply (provided by Anglian Water). The potable water supply is to be used for domestic uses only; and
- A non-potable water supply, sourced from storage and treatment of rainwater harvested from the Site drainage water ponds' catchment, including water run-off generated by washdown activities on the Site. The non-potable water supply is sufficient to meet all non-domestic use water demand including irrigation, park washdown and supply to water features and attractions for the Opening Year and Full Buildout Phases. A localised closed-loop system should be installed to minimise water demand from the water features and attractions.

Furthermore, the water strategy proposes that any surplus of non-potable water is used to partially offset the potable water demand for water closet (WC) flushing, reducing it by 28% for the Opening Year Phase. Insufficient non-potable water surplus is available to offset any WC demand for the Full Buildout.

In agreement with Anglian Water, domestic foul water will be discharged to Anglian Water's sewer network alongside wastewater generated by the non-potable water treatment works and closed-loop systems. The domestic foul water drainage requirement is currently being assessed. Anglian Water anticipates providing connection point(s) to the foul water network and will continue to work with UDX regarding flow rates and loadings. Wastewater generated by the non-potable water treatment works will be subject to a Trade Effluent Consent between Anglian Water and UDX.

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<sup>1</sup> Ministry of Housing, Communities and Local Government (2010) *Building Regulation - Sanitation, hot water safety and water efficiency: Approved Document G*. Available at: <https://www.gov.uk/government/publications/sanitation-hot-water-safety-and-water-efficiency-approved-document-g> [Accessed: 16 June 2025].

# 1. INTRODUCTION (FOR INFORMATION)

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## 1.1. APPOINTMENT AND BRIEF

- 1.1.1. This Water Strategy has been prepared in support of the planning proposal for the Proposed Development as described in **Chapter 2: Description of the Proposed Development (Volume 1)** of the Environmental Statement (ES).
- 1.1.2. Although this report was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties. Section 4 of this report contains the embedded mitigation for water efficiency, reduction and re-use. Sections 1, 2, 3 and 5 labelled 'For Information' are intended to be informative only, as they contain an Introduction, Water Demand Baseline and Infrastructure Constraints, which are required to support the mitigation described in Section 4.

## 1.2. OBJECTIVE OF STUDY AND METHODOLOGY

- 1.2.1. This report investigates the opportunity to implement water conservation measures, with a focus on water reuse and recycling interventions, to minimise the Site's water footprint. This is to ensure the Site's water strategy aligns with UDX's environment policy, for which water conservation is a key area of sustainability and acknowledges regional water stress and local water and wastewater infrastructure constraints.
- 1.2.2. The following documents and standard have been reviewed to inform this report:
- Anglian Water's Revised Draft Water Resource Management Plan 2024<sup>2</sup>;
  - Anglian Water's Drainage and Wastewater Management Plan (May 2023) and associated tools<sup>3</sup>;
  - Environment Agency's Water stressed areas – final classification 2021 (Version 1.0)<sup>4</sup>;
  - British Standard BS EN 16941-1:2024: On-site non-potable water systems – Part 1: Systems for the use of rainwater<sup>5</sup>;
  - Estimated Utilities Loads (Revision 10) dated 22 April 2024 provided by UDX; and
  - Correspondence with Anglian Water with regards to water and wastewater infrastructure.
- 1.2.3. This report makes use of third-party information:

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<sup>2</sup> Anglian Water (2024) *Our Water Resources Management Plan 2024*. Available at: <https://www.anglianwater.co.uk/siteassets/household/corporate/wrmp24/wrmp24-main-report.pdf> [Accessed: 16 June 2025].

<sup>3</sup> Anglian Water (2023) *Our Drainage and Wastewater Management Plan*. Available at: <https://www.anglianwater.co.uk/siteassets/household/about-us/dwmp/dwmp-1.pdf> [Accessed: 16 June 2025].

<sup>4</sup> Environment Agency and Department for Environment, Food and Rural Affairs (2021) *Water stressed areas – 2021 classification*. Available at: <https://www.gov.uk/government/publications/water-stressed-areas-2021-classification> [Accessed: 16 June 2025].

<sup>5</sup> British Standards Institution (2024) *BS EN 16941-1:2024 – On-site non-potable water systems - Systems for the use of rainwater*. UK: British Standards Institution.

- Department for Environment Food and Rural Affairs' (DEFRA's) Hydrology Data Explorer<sup>6</sup>; and
- Met Office UK climate averages (Bedford Aerodrome)<sup>7</sup>.

- 1.2.4. This report is to be read in conjunction with **Appendix 12.1: Flood Risk Assessment (Volume 3)** and **Appendix 12.3: Drainage Strategy (Volume 3)**.
- 1.2.5. Where reference is made to agreements with the Environment Agency and Anglian Water these discussions and agreements are captured in the Summaries of Agreed Position (SoAP) (Appendix 4 of the **Planning Statement (Document Reference 6.1.0)**).

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<sup>6</sup> Department for Environment Food and Rural Affairs (2024) *Hydrology Data Explorer*. Available at: <https://environment.data.gov.uk/hydrology/explore> [Accessed: 16 June 2025].

<sup>7</sup> Met Office (n.d.) *Location-specific long-term averages*. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/gcr9j7q0s> [Accessed: 16 June 2025].



## 2. WATER BALANCE BASELINE (FOR INFORMATION)

### 2.1. WATER DEMAND BASELINE

- 2.1.1. The water demand conceptual load estimates were developed using analysis of existing UDX properties across various geographies and climates, and historical metered data from other UDX developments. The loads have been adjusted to account for climate and operational differences between UDX developments of similar size and scale.
- 2.1.2. The water demand from the Site was estimated for each of its components, including the Theme Park, the visitor accommodation, the multi-purpose centre, and facilities supporting the operation of the park (car park, logistic area, train station, etc) for the following Phases:
- **Opening Year** – Water demand post-delivery of the Primary Phase; and
  - **Full Buildout** – Water demand post-delivery of the Full Buildout .
- 2.1.3. This estimates the range of water demand between the Opening Year Phase of the Site to the public and once it is fully developed (at Full Buildout Phase).
- 2.1.4. The water demand from the Site is driven by:
- **Domestic water uses** – associated with guests' hospitality (including day and overnight stay) and employees welfare facilities; and
  - **Non-domestic uses** – associated with irrigation and process water (park washdown and a top-up supply to water features other than fountains and attractions).
- 2.1.5. A summary of the estimated water demand for each domestic and non-domestic use is provided in **Table 2-1**. The water demand is mainly associated with domestic uses – respectively 81% and 88% of the total water demand for Opening Year and Full Buildout Phases.

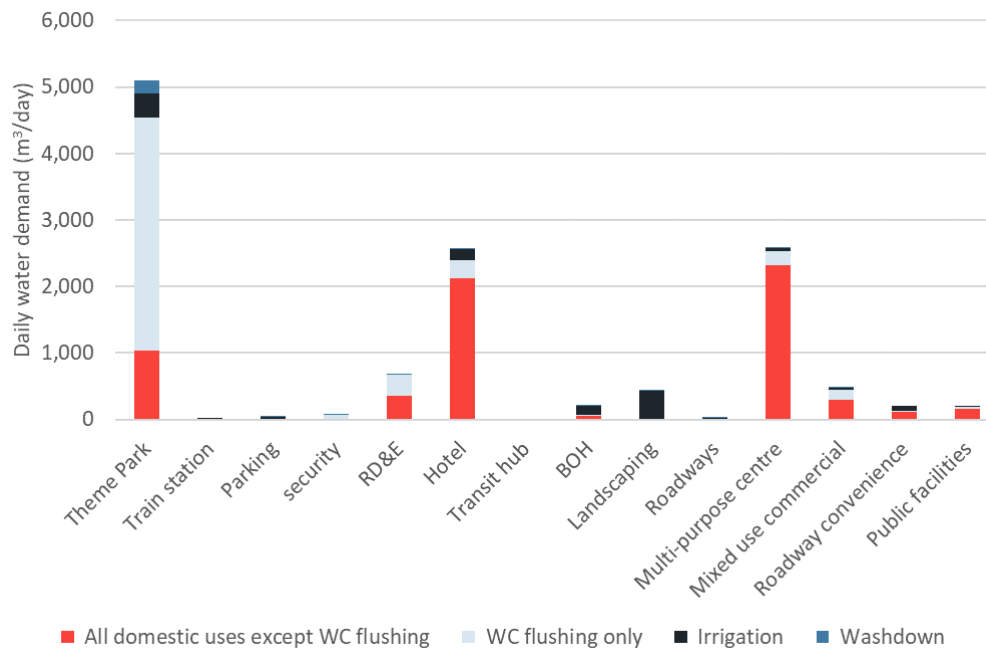
**Table 2-1 - Estimated Water Demand Summary.**

Phase	Domestic Water Demand (m <sup>3</sup> /day)		Non-Domestic Water Demand (m <sup>3</sup> /day)		Total (m <sup>3</sup> /day)
	All uses except WC flushing	WC flushing only – whole Site	Irrigation	Washdown and water features	
Opening Year	1,086	2,059	575	146	3,865
Full Buildout	6,498	4,575	1,330	238	12,641

- 2.1.6. **Image 2.1** below shows that by Full Buildout most of the water demand will be associated with the operation of the Theme Park itself (40%), followed by the demand from the visitor accommodation (20%) and the multi-purpose centres (20%). At Opening Year, water demand from the theme park represents 65% of the total water demand, followed by the demand from the visitor accommodation (12%).

- 2.1.7. Water demand for WC flushing is the main contributor to the domestic water demand from the Site at Opening Year (65%). Once fully built out, water demand for WC flushing represents 41% of the domestic water demand. The WC flushing water demand is mainly driven by the theme park operation (1,786 m<sup>3</sup>/day on opening day; 3,501 m<sup>3</sup>/day once fully built out) with the remainder associated with the visitor accommodation, multi-purpose centre and other Site infrastructure.

**Image 2.1: Daily Full Buildout Water Demand Per Use from Each Commercial Typology**



## 2.2. FOUL WATER DISCHARGE BASELINE

- 2.2.1. The foul water conceptual load estimates were developed using analysis of existing UDX properties across various geographies and climates, and historical metered data from other UDX developments. The loads have been adjusted to account for climate and operational differences between UDX developments of similar size and scale.
- 2.2.2. The foul water generated on-Site is estimated at 3,095 m<sup>3</sup>/day at Opening Year and 10,941 m<sup>3</sup>/day at Full Buildout Phases. This corresponds respectively to 80% and 87% of the total water demand for Opening Year and Full Buildout Phases, with “loss” associated with irrigation, process water for washdown, and guest and employee consumption (e.g., drinking tap water, cooking activities, etc).

### 3. INFRASTRUCTURE CONSTRAINTS (FOR INFORMATION)

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#### 3.1. POTABLE WATER SUPPLY

- 3.1.1. The water provider for this area is Anglian Water<sup>8</sup>. The Site is located within the Ruthamford South water resource zone (WRZ) which, as part of the Anglian Water (East Anglia) region, has been designated as seriously water stressed by the Environment Agency (EA)<sup>4</sup>. An area is identified as seriously water stressed when the current or future household water demand is/will be a high proportion of the effective rainfall available to meet that demand<sup>9</sup>.
- 3.1.2. Under Section 55 of the *Water Industry Act 1991*<sup>10</sup>, Anglian Water does not have a duty to provide a water supply for non-domestic applications. Anglian Water has agreed to provide water supply for domestic use only as stated in the SoAP appended to the **Planning Statement (Document Reference 6.1.0)**. Consequently, the water demand from non-domestic uses should be met using an alternative water source.
- 3.1.3. As recorded in the SoAP, Anglian Water will provide a domestic potable water supply. UDX is currently assessing the phased potable water requirements for the ERC however, as a cautious worst case assessment it has been assumed that the water demands are as follows:
- 3.1 ML/d for Primary Opening Year.
  - 11.1 ML/d for Phase 2 Full Buildout.

#### 3.2. FOUL WATER DISCHARGE

- 3.2.1. Anglian Water is the wastewater provider for the region. Part of the Site (southeast of the Core Zone) sits within the Bedford water recycling catchment, although there is no existing connection between the Site and the local sewer (see **Image 3.1**).
- 3.2.2. As part of its Drainage and Wastewater Management Plan (DWMP), Anglian Water has assigned a high resilience risk score to the Bedford water recycling catchment, with risks to be mitigated through increasing plant capacity and obtaining new permits in the medium term.
- 3.2.3. Under Section 118 of the *Water Industry Act 1991*<sup>10</sup>, a trade effluent consent should be obtained from Anglian Water before discharging any non-domestic wastewater into the sewer. Anglian Water anticipates providing connection point(s) to the foul water network and will continue to work with UDX regarding flow rates and loadings. The final point of connection location and connection strategy is awaiting further investigation and design development.
- 3.2.4. The domestic foul water drainage requirement is currently being assessed. However, for a cautious worst case scenario the forecast for domestic foul discharge requirements to the existing Anglian Water network will be:

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<sup>8</sup> Market Operator Services Limited (n.d.) *Water Resource Zones (WRZs)*. Available at: <https://mosl.co.uk/market-insight/market-performance/environmental-impact/water-resource-zones-wrzs> [Accessed: 16 June 2025].

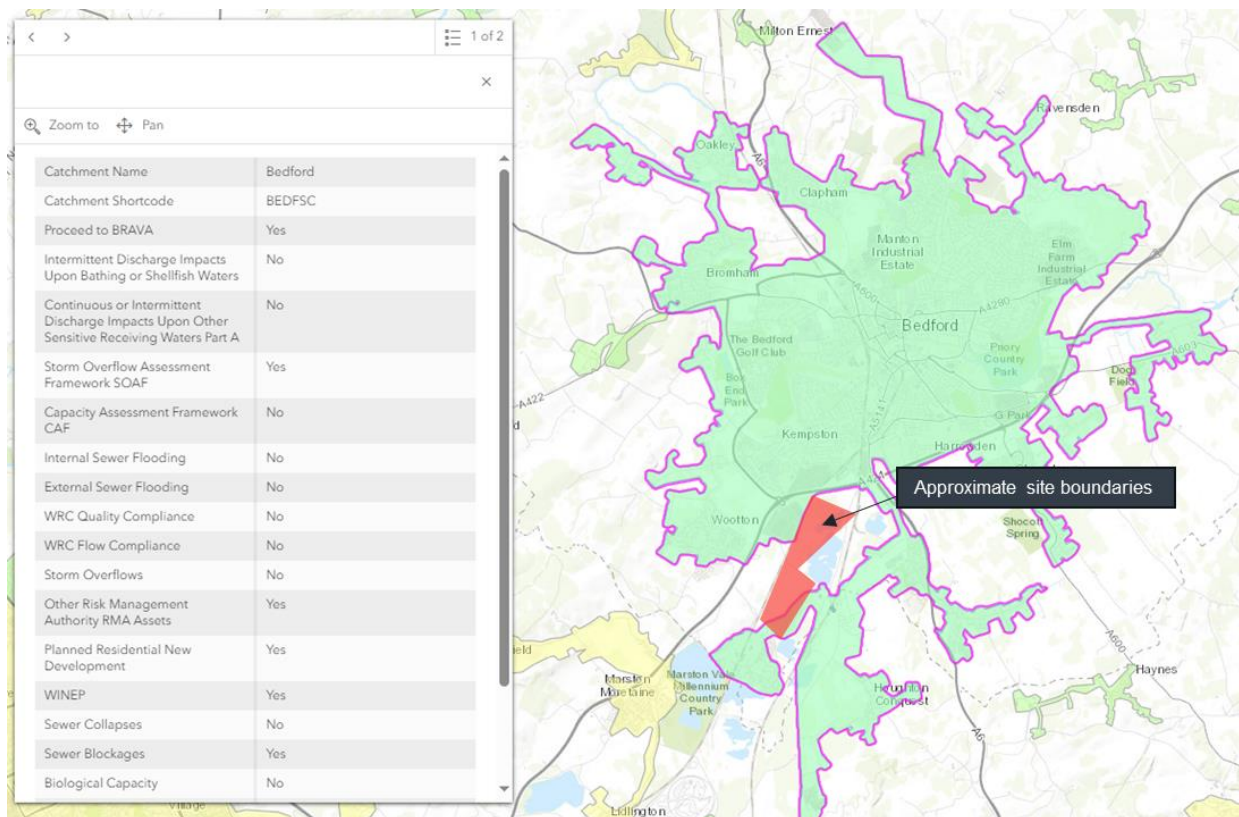
<sup>9</sup> Environment Agency and Natural Resources Wales (2013) *Water stressed areas – final classification*. Available at : [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/244333/water-stressed-classification-2013.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/244333/water-stressed-classification-2013.pdf) [Accessed: 16 June 2025].

<sup>10</sup> HM Government (1991) *Water Industry Act 1991*. Available at: <https://www.legislation.gov.uk/ukpga/1991/56/contents> [Accessed: 16 June 2025].

- 0.15 ML/d Temporary Building Supply for Construction Stage for end 2025, to a nearby local connection.
- 3 ML/d for Phase 1 Opening to the infrastructure point of connection in advance of the Primary Opening Year.
- 10.6 ML/d for Phase 2 Full Buildout to support the growth of the development.

3.2.5. Anglian Water has stated that any wastewater produced during wastewater treatment or from a water recycling plant could be discharged into its sewer network. A trade effluent consent for this wastewater should be gained from Anglian Water by UDX before any disposal occurs. As indicated in the SoAP, Anglian Water has confirmed that a Trade Effluent Consent will be agreed with UDX under the Water Industry Act 1991 prior to flows being discharged to the receiving public network.

**Image 3.1: Site Location with Regards to Nearest Wastewater Catchment**



## 4. WATER CONSERVATION OPPORTUNITIES

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### 4.1. LEED CERTIFICATION

- 4.1.1. The Site will be developed to achieve Leadership in Energy and Environmental Design (LEED) Gold certification for Cities and Communities for the entire Site, and LEED Building Design and Construction for specific buildings. LEED is globally recognised certification which provides a framework for sustainable design, construction and operation of buildings, and includes energy efficiency, water conservation, selection of materials and environmental quality.
- 4.1.2. To meet the requirements for the LEED Gold certification for each type of development, a total of 60 to 79 points (over a total of 110 points) must be achieved by earning them through demonstrating suitable strategies, appliances, fittings and metering, in addition to a certain number of prerequisites. Points associated with water efficiency account for 10% of the total number of points available. In order to achieve LEED status a review of the building is conducted which includes pre-certification, construction, and post construction stages.

#### LEED CERTIFICATION FOR CITIES AND COMMUNITIES

- 4.1.3. The water prerequisites to achieve the LEED certification for Cities and Communities are:
- Provision of an integrated water management strategy in the shape of a water balance statement. The statement should include a water availability assessment, a water demand baseline and identify sources of water supply; and
  - Provision of equitable access to clean water and sanitation services, including drinking water quality, treated wastewater quality and stormwater quality.
- 4.1.4. Up to 12 points can be obtained through the implementation of water efficiency interventions including:
- Smart water metering (up to 2 points);
  - Stormwater management (up to 5 points) – three options are available for which points are awarded based on the percentile of rainfall retained in the community or by preserving pre-development to post-development run-off conditions or providing a percentage of land area with designated stormwater infrastructure; and
  - Wastewater management (up to 5 points). Points are awarded based on the percentage of wastewater reused.

#### LEED CERTIFICATION BUILDING DESIGN AND CONSTRUCTION (NEW CONSTRUCTION)

- 4.1.5. The water prerequisites to achieve the LEED Certification Building Design and Construction as set out in the **Sustainability Statement (Document Reference 6.8.0)** are:
- Reduction of outdoor potable water consumption by at least 30% from the calculated baseline for the Site's peak watering month;
  - Reduction of indoor potable water consumption, including reducing building water use by 20% from the baseline and installing appliances, equipment and processes meeting the specified requirements in the guidance; and

- Installation of water meters at building level.

4.1.6. Up to 12 points can be obtained through the implementation of water efficiency interventions including:

- Further reducing the outdoor potable water consumption (up to 2 points) – based on the percentage reduction in potable water consumption for irrigation requirements;
- Further reducing the indoor potable water consumption (up to 6 points) – based on the percentage reduction in potable water consumption and the requirement to install appliances, equipment and processes meeting the specified requirements in the guidance;
- Optimisation of process water use (up to 2 points) by minimising water use for cooling tower, evaporative condenser, and process water; and
- Provision of sub-metering for at least two water subsystems (1 point).

## 4.2. BEDFORD BOROUGH COUNCIL – LOCAL PLAN REQUIREMENTS

4.2.1. In its Local Plan 2030 (adopted plan)<sup>11</sup>, Bedford Borough Council (BC) acknowledges that the area is classified by the Environment Agency as an area of serious water stress. This is reflected in its planning policies:

- Policy 50S – Water resources, with a requirement for new development to “*not adversely affect the quality, quantity and flow of both ground and surface water*”; and
- Policy 52 – Water demand, requiring new development to minimise the use of water. The policy specifies that for new residential developments the Building Regulations water consumption standard of a 110 litres per person per day should be achieved unless it makes the development unviable.

## 4.3. REDUCE

4.3.1. As far as practicable, water efficient fittings and appliances are to be used throughout the Site to reduce water consumption from the guests and the workforce. The minimum level of water efficiency will comply with the requirements of planning policies 50S and 52 and will contribute to achieving LEED gold certification. Final water efficiency measures will be in accordance with Table 4-1 and will be delivered during future detailed design.

4.3.2. **Table 4-1** provides a comparison between the LEED and BREEAM accreditation (baseline water consumption) and the Building Regulations. This permits determination of the minimum requirements for the Site in terms of water efficiency. In terms of water efficiency, LEED tends to be more stringent than BREEAM in terms of minimum requirements for obtaining the accreditation (i.e., without accounting for further water efficiency). As mentioned previously, a pre-requisite for LEED accreditation is to reduce indoor use by 20% compared to baseline and this will be applied unless the Building Regulations require higher efficiency (e.g., for WCs).

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<sup>11</sup> Bedford Borough Council (2020) *Local Plan 2030*. Available at: <https://www.bedford.gov.uk/media/4011/download?inline> [Accessed: 16 June 2025].



**Table 4-1 - Comparison Between LEED and BREEAM Baseline Water Consumption and the Building Regulations for Various Fittings**

Water Fittings	Units	LEED Baseline (public facilities)	BREEAM Baseline	Building Regulations Part G <small>Error! Bookmark not defined.</small> (Table 2.2)	Minimum Requirement to be Applied
WC	l/flush	6	6	4/2.6	Building Regulations
Shower	l/min	9.5	12	8	LEED pre-requisite or Building Regulations
Bath	l	Not specified	200	170	Building Regulations
Basin Taps	l/min	1.9	10	5	LEED pre-requisite
Sink Taps	l/min	8.3	10.30	6	LEED pre-requisite or Building Regulations
Dishwasher	l/rack	3.4 to 6 (depends on type of appliance)	8	1.25 l/place setting	LEED pre-requisite
Washing machine	l/kg	EU A Label	14	8.17	LEED pre-requisite

## 4.4. REUSE AND RECYCLE

- 4.4.1. As the Site is located in a seriously water stressed area with existing constraints on the water and wastewater infrastructure, this study assessed whether rainwater harvesting, alongside recycling of process water use for park washdown, attractions and water features could meet the non-potable water demand from non-domestic uses (irrigation and process water) and where possible non-potable water from WC flushing. It should be noted that the LEED certification requires that the use of potable water for irrigation is reduced by at least 30% as a pre-requisite, with up to 2 points available when reduced to zero.

### NON-POTABLE WATER DEMAND

- 4.4.2. Water demand associated with non-domestic uses and with some of the domestic uses, such as WC flushing, does not require to be of potable water quality. UDX has gained experience in using non-potable water for non-domestic uses from operating its other theme parks.
- 4.4.3. Two scenarios were assessed:
- **Scenario 1** – As a minimum, water demand associated with non-domestic water uses (irrigation, park washdown and supply to water features) is supplied with non-potable water; and
  - **Scenario 2** – As per scenario 1, with any additional non-potable water supply used for WC flushing.
- 4.4.4. Non-potable water demand as stated in 2.1.1 per use and per scenario is summarised in **Table 4-2**.

**Table 4-2 - Non-Potable Water Demand**

Phase	Irrigation (m <sup>3</sup> /day)	Park Washdown and Water Features (m <sup>3</sup> /day)	WC Flushing (m <sup>3</sup> /day)	Total Demand – Scenario 1 (m <sup>3</sup> /day)	Total Demand – Scenario 2 (m <sup>3</sup> /day)
Opening Year	575	146	2,059	721	2,780
Full Buildout	1,330	238	4,575	1,568	6,143

### NON-POTABLE WATER SOURCES

#### Rainwater Harvesting

- 4.4.5. As defined in **Appendix 12.3: Drainage Strategy (Volume 3)**, rainwater from the Site will be collected via the surface water drainage system before being discharged into the drainage ponds, either directly (Lake Zone) or indirectly via the ordinary watercourse flowing through the Core Zone. As the drainage ponds reach a defined high level, the water would be pumped to the Elstow Brook. Pollution control mitigations will be provided as stated in Section 5 of the **Appendix 12.3: Drainage Strategy (Volume 3)**, to avoid any contaminants being released to the environment (water course, drainage ponds and Elstow Brook) in line with surface water management best practice.



- 4.4.6. To provide a non-potable water supply for non-domestic uses, it is proposed to abstract water from the drainage ponds and treat it to fit-for-purpose non-potable water quality standards, reducing the requirement to discharge water into the Elstow Brook. The non-potable, process water supply which will be stored within the existing clay pits relies solely on rainwater harvesting. As all surface water runoff from Core Zone and Lake Zone routes through the pits, water levels will be re-charged periodically, this will be more so in winter as the wetter period of the year and as the drawdown on process water would potentially be less. During the summer months there is a higher likelihood the recharge time would be longer as the frequency and intensity of rainfall would be less. The minimum water level will be 20.50 metres above ordnance datum and always maintained to support the aquatic life in the pits. In the event there was a sustained period of dry weather greater than 35 days drought and/or should the water in the pits drop to this level then all non-domestic or process water use will be suspended, such as irrigation and washdown. Toilet flushing will be fed from the potable, domestic, water supply.
- 4.4.7. Using the methodology specified in British Standard BS16941-1:2024<sup>5</sup>, daily rainwater yield was calculated for each of the stage of the development. The British Standard states that a typical dry period is 18 days with no rainfall, however a 35-day period has been allowed for in the below calculations based on Site demands.
- 4.4.8. Assumptions used to estimate the rainwater yield are the following:
- Annual average rainfall (1991-2020): 609 mm/year;
  - Surface yield coefficient: 0.8;
  - Hydraulic treatment efficiency coefficient: 0.9; and
  - Catchment areas are summarised for the Opening Year (**Table 4-3**) and Full Buildout Phases (**Table 4-4**), which are based on catchment areas shown on drawing 320-1000-P-CE100 in **Annex 2** of the **Appendix 12.3: Drainage Strategy (Volume 3)**.

**Table 4-3 - Rainwater Harvesting Catchment Area for Opening Year on the first day of operation (within Site boundary only)**

Catchment	Catchment Area (ha)	Percentage Impermeable	Impermeable Area (ha)
Core Zone	87	90%	78
Manor Road Improvement Works	5	90%	5
Lakes Self Area	23	100%	23
Lake Zone Construction Compound	10	90%	9
<b>Total</b>	<b>125</b>	<b>n/a</b>	<b>115</b>

**Table 4-4 - Rainwater Harvesting Catchment Area at Full Buildout Construction Stage (within Site boundary only)**

Catchment	Catchment Area (ha)	Percentage Impermeable	Impermeable Area (ha)
Opening Year Phase (Catchments Areas Table 4-3)	125	n/a	115
Lake Zone	6	90%	5
<b>Total</b>	<b>131</b>	<b>n/a</b>	<b>120</b>

- 4.4.9. The average annual and daily rainwater yields are summarised in **Table 4-5** for each stage of the development.

**Table 4-5 - Average Annual and Daily Rainwater Yield**

Phase	Annual Rainwater Yield (m <sup>3</sup> )	Daily Rainwater Yield (m <sup>3</sup> /day)
Opening Year	504,252	1,381
Full Buildout	526,176	1,442

### Process Water Recycling

- 4.4.10. Beyond irrigation, process water is used for park washdown and to provide a water supply to water features (other than water fountains) and attractions.
- 4.4.11. It is proposed that water consumption from the water features and the attractions is minimised by implementing local closed-loop systems in the Core Zone, with the non-potable water supply used as a top-up facility to mitigate losses occurred through the closed-loop system.
- 4.4.12. Park washdown activities include mainly footpath and street cleaning. As such, water used during this activity will be captured through the drainage system feeding into the drainage water ponds.
- 4.4.13. The average annual and daily process water recycling yield are presented in **Table 4-6**. To calculate this yield, it is assumed that 80% of the process water used for park washdown (volume provided in **Table 2-1**) will be captured and stored in the drainage ponds, in line with the surface yield coefficient used previously (Paragraph 4.4.8). A hydraulic treatment efficiency coefficient of 0.9 is used.

**Table 4-6 - Average Annual and Daily Process Water Recycling Yield**

Phase	Annual Process Water Recycling Yield (m <sup>3</sup> )	Daily Process Water Recycling Yield (m <sup>3</sup> /day)
Primary Opening Year	38,369	105
Full Buildout	62,546	171

## NON-POTABLE WATER TREATMENT AND DISTRIBUTION

- 4.4.14. Water from the drainage ponds will be abstracted and pumped to the non-potable water treatment plant. Screening will be provided at the intake pumping station to protect the pumps and downstream treatment from large items such as sticks, leaves and other debris. The abstracted water will be treated to achieve fit-for-purpose reclaimed water standards. The standards are defined based on UK regulatory requirements and gained experience from the use of non-potable water in other UDX theme parks.
- 4.4.15. The proposed treatment consists of the following process:
- Coagulation, flocculation, and clarification;
  - Dual media filtration (sand/charcoal); and
  - Conditioning and disinfection.
- 4.4.16. Sludge from the clarification steps will likely be stored before being tankered to an Anglian Water site, however, alternative options will be considered. It is estimated that up to three tankers per week would be required.
- 4.4.17. Backwash water from the filtration process will be discharged into the on-Site sewerage system.
- 4.4.18. The non-potable water will be supplied through two circular distribution networks reducing the risk of water stagnation.

### SUMMARY

- 4.4.19. **Table 4-7** summarises the non-potable water demand for scenarios 1 and 2 and the estimated non-potable water supply for each stage of the Proposed Development.

**Table 4-7 - Summary of Non-Potable Water Demand and Supply**

Phase	Non-Potable Water Demand – Scenario 1 (m <sup>3</sup> /day)	Non-Potable Water Demand – Scenario 2 (m <sup>3</sup> /day)	Non-Potable Water Supply* (m <sup>3</sup> /day)
Opening Year	721	2,780	1,486
Full Buildout	1,568	6,143	1,614

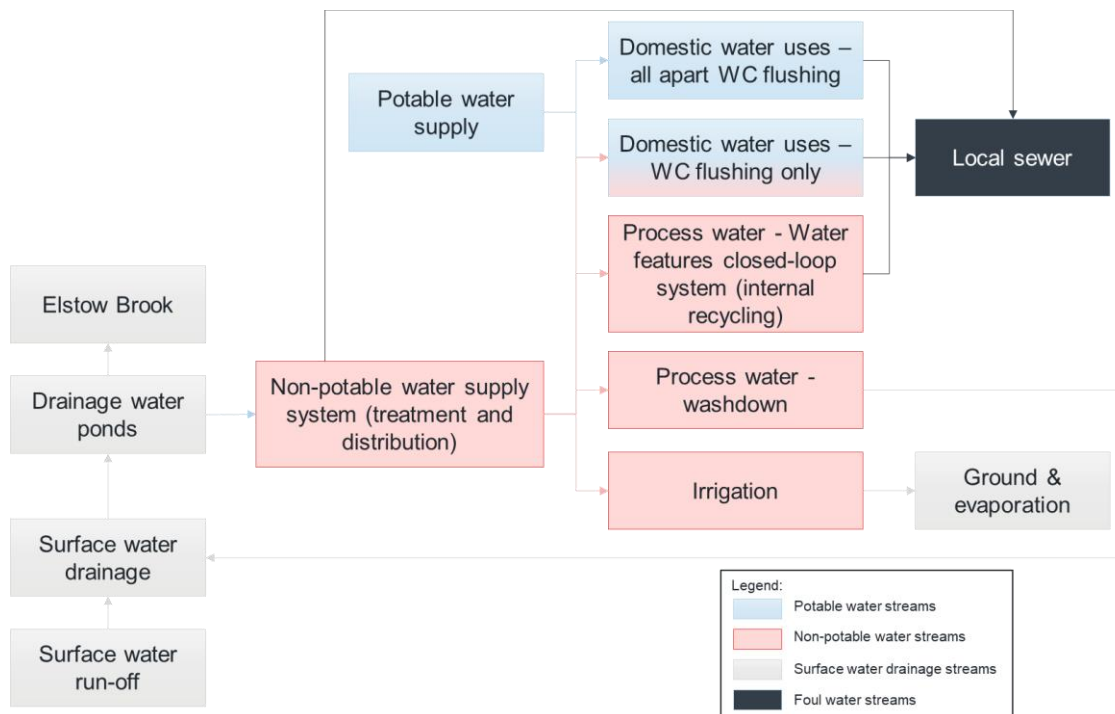
\*Sum of the non-potable water yields from rainwater harvesting (**Table 4-5** and **Table 4-6**)

- 4.4.20. The non-potable water supply is sufficient to fulfil the non-domestic water demand (Scenario 1) for the Opening Year and Full Buildout Phases.
- 4.4.21. With regard to Scenario 2, excess non-potable water is available only at Opening Year, when the water demand associated with the Theme Park's WC flushing can be partially (28%) met by using non-potable water demand. At Full Buildout Phase, Theme Park's WC flushing water demand will be met using potable water supply.

## 5. WATER STRATEGY – SUMMARY (FOR INFORMATION)

- 5.1.1. The water strategy is summarised in **Image 5.1** below.
- 5.1.2. Water demand (domestic and non-domestic) will be reduced by implementing water efficient fixtures and processes. The minimum level of water efficiency has been defined to comply with the Building Regulations and Policies 50s and 52 of the Bedford BC's Local Plan 2030, and align with the requirements to achieve LEED Gold accreditation.
- 5.1.3. Water demand from Site will be met through the combination of:
- A potable water supply (provided by Anglian Water); and
  - A non-potable water supply, sourced from the storage and treatment of rainwater harvested from the Site's drainage water ponds' catchment, including water run-off generated by washdown activities on the Site.
- 5.1.4. The non-potable water supply is sufficient to meet the non-domestic uses water demand for process water (irrigation, park washdown and water feature supply) for the Opening Year and Full Buildout Phases. The non-potable water supply could also partially (28%) address the demand from WC flushing (Scenario 2) at Opening Year.
- 5.1.5. In agreement with Anglian Water, domestic foul water will be discharged to Anglian Water's sewer network alongside wastewater generated by the non-potable water treatment works and closed-loop systems. The latter will be subject to a Trade Effluent Consent between Anglian Water and the UDX.

**Image 5.1: Water Strategy**





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