



**Manchester Maccabi Community & Sports Centre,
Bury Old Road,
Manchester,
M25 0EG**

**On Behalf Of
iLEX Project Management.**

DRAINAGE STRATEGY

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1. INTRODUCTION

- 1.1 HBL Associates Ltd have been instructed by iLEX Project Management to prepare a Drainage Strategy for the residential development at Manchester Maccabi Community & Sports Centre, Bury Old Road, Manchester.

Table 1.1 Site Details.

SITE NAME	Manchester Maccabi Community and Sports Centre
PROJECT DESCRIPTION	Proposed construction of 4 Padel Courts, 1 pickleball courts plus Pavilion associated car park expansion works.
LOCATION	Manchester Maccabi Community & Sports Centre, Bury Old Road, Manchester, M25 0EG
NGR (APPROXIMATE)	385872, 403265
APPLICATION SITE (HA) - RED BOUNDARY LINE	0.999 HA
DEVELOPMENT TYPE	Brownfield
LOCAL PLANNING AUTHORITY	Bury Metropolitan Borough Council
LOCAL LEAD FLOOD AUTHORITY	Bury Metropolitan Borough Council
SEWERAGE UNDERTAKER IN THE AREA	United Utilities Group Plc.

- 1.2 Sources of flooding will be assessed as part of the Drainage Strategy for the proposed development in its current context.
- 1.3 This document is to be read in conjunction with all associated drawings, supported reports and documentation.
- 1.4 The report follows advice contained in the Department for Communities and Local Government's National Planning Policy Framework (NPPF) and Planning Practice Guidance, which provides advice to planning authorities, developers, the public and Environment Agency (EA) on development and flood risk.

- 2.1 The subject site, generally rectangular in plan and of area 1.075 hectares currently comprising of the Manchester Maccabi Community and sports club ('the site'), is located adjacent Bury Old Road, approximately 1.8 km to the south of Prestwich in Manchester. The postcode and National Grid Reference are M25 0EG and 385872, 403265.
- 2.2 The topography of the site comprises a steep downwards slope to the west towards Bury Old Road (A665), with the south eastern section of the site being approximately 3.0m higher than the western area. The surrounding area generally slopes towards the south.
- 2.3 The site boundaries are summarized below:
 - North: Commercial building/carparking, woodland and residential housing exists to the north of the site.
 - East: The eastern area of site is occupied by 2 artificial football pitches. The pitches are encased by metal fencing and accessed via a footpath from the community centre to the west.
 - South: Residential properties are present immediately to the south.
 - West: The site is predominantly occupied by a two-storey brick-built building named Manchester Maccabi Community & Sports Club with associated hardsurfacing car parking to the western and southern area of the site. A soft landscaping garden to the immediate east. There is another single storey commercial end use dwelling south of the Manchester Maccabi Community and Sports Club called the Ken Yu Kai Karate Club.
 - The Upper Peak Forest Canal and the River Goyt are located to the east of the A4005.
- 2.4 The site location, current site layout and red line planning area are shown in **Figure 2.1** and in Topographical Survey (to local datum) provided in **Appendix 1**.



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3. EXISTING GROUND CONDITIONS

Geology

- 3.1 The following British Geological Survey (BGS) records and other available information have been noted to determine the geology underlying the site:
- 1:50,000 Scale Geological Sheet 85, Manchester - Bedrock and Superficial
 - 1:50,000 Scale Geological Sheet 85, Manchester – Bedrock
 - BGS Records.
- 3.2 Made Ground:
- Made Ground is not indicated to be present beneath the site on the available geological maps. However, due to previous construction at the site, some Made Ground is anticipated.
- 3.3 Superficial Deposits:
- The site is indicated to be underlain by Devensian Glaciofluvial sheet deposits, this stratum characteristically comprises of sand and gravels.
- 3.4 BGS Records
- There are no available BGS records within 250m of the site boundary. The nearest available borehole is located approximately 320m north of the site and comprises silty gravelly clays underlying the site to 70m bgl with bands of gravel throughout. Bedrock was encountered at circa 70.0m bgl and comprised medium to coarse grained micaceous sandstone.
- 3.5 Soakaway testing was conducted by Groundtech Consulting Limited however the final report was not made available at the time of this report being produced. Provisional results were issued which are included within Appendix 4 along with a summary statement of the conclusions.
- 3.6 The summary of the soakaway testing noted the following:

Hydrogeology/Hydrology

- 3.7 The superficial glaciofluvial deposits in this area are classified by the Environment Agency as a Secondary A Aquifer (Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers).
- 3.8 The Manchester Marls bedrock deposits are classified by the Environmental Agency as a Secondary B Aquifer (Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers).
- 3.9 The Chester Sandstone Formation are classified by the Environmental Agency as a Principal Aquifer (Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers).
- 3.10 The soils beneath the site are indicated to be of high leaching potential but low bedrock vulnerability.
- 3.11 The nearest groundwater abstraction is an active license located 1297m southwest relating to direct spray irrigation at Prestwich Gold Club. There are no potable abstractions within 2km of the site.

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- 3.12 There are no surface water features within 1km of site. The nearest named watercourse is the River Irwell 1300m+ southwest of the site. As of 2019, the river was given an overall rating of moderate and a chemical rating of fail.
 - 3.13 Environment Agency information indicates that the site is outside a flood risk zone and is not at Risk of Flooding from Rivers and Sea (RoFRaS).
 - 3.14 United Utilities records indicate that an existing 225 diameter surface water sewer is present within Old Bury Road to the south of the site in addition it is understood an existing United Utilities foul water sewer is present within Old Bury Road.
 - 3.15 A CCTV survey has been undertaken within the site development to ascertain the condition and routes of the existing private internal site drainage. A copy of the CCTV survey plan has been provided within **Appendix 6**.

4. EXISTING DRAINAGE CHARACTERISTICS

- 4.1 Sewers within the area are managed by United Utilities, public sewers records are included within **Appendix 6**.
- 4.2 Generally the condition of the existing private sewers was noted as good with the majority of the site drained by existing gullies that tap into 100 diameter surface water sewers progressing into a 100 diameter combined water sewer that outfalls into the existing United Utilities network.
- 4.3 United Utilities records indicate that an existing 225 diameter surface water sewer is present within Old Bury Road to the south of the site in addition it is understood an existing United Utilities foul water sewer is present within Old Bury Road.
- 4.4 It is assumed that foul flows from within the site drain to the internal combined sewer before outfalling to the adoptable United Utilities sewer.
- 4.5 The CCTV has confirmed that the surface water flows from the site outfall to the United Utilities sewers within Old Bury Road via the existing on site gullies. See **Appendix 2** Existing Impermeable Plan depicting the existing drain location within the application site boundary.

5. PROPOSED DEVELOPMENT DETAILS

- 5.1 A copy of the latest proposed site plan has been included within **Appendix 3**.
- 5.2 Application site proposed contributing areas have been calculated and are summarised in Table 5.1, to be read in conjunction with 'Proposed Site Contributing/ Impermeable Areas Plans' included in **Appendix 5**.

TABLE 5.1 Proposed site areas

Area	m ²	ha
Application Site Area Total	9989	0.999
Total Proposed contributing areas positively drained within application site	4518	0.451
Percentage Impermeable (PIMP) proposed within application site	45%	

- 5.3 Comparison of existing and proposed site areas presented in Table 5.2 indicates an increase in impermeable areas post development.

TABLE 5.2 Existing and Proposed site areas comparison.

Area	m ²	ha
Application Site Area Total	9989	0.999
Existing Impermeable areas within application site	2545	0.254
Percentage Impermeable (PIMP) – Existing	25 %	
Proposed Impermeable areas within application site	4518	0.508
Percentage Impermeable (PIMP) - Proposed	45%	
Increase in Impermeable Areas	1985	0.198

6. CONSULTATION AND DATA REVIEW

Water Authority

- 6.1 Consultation was undertaken with United Utilities, which is the Water Authority for this area, and a copy of its response (reference 05268523, dated 16th February 2024).
- 6.2 It is noted that development of the site should take place with separate systems for foul and surface water drainage.
- 6.3 In respect of surface water, reference is made to Requirement H3 of Building Regulations 2000 and Sustainable Drainage Systems. This establishes a hierarchy of surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration and watercourse, in that priority order, before connection to sewers will be considered.
- 6.4 United Utilities was asked to comment on a proposed Surface Water connection to the existing surface water sewer located within Old Bury Road. United Utilities confirmed in accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.
- 6.5 Once evidence is provided as outlined above, United Utilities will consider a connection to the 225mm diameter public surface water sewer within Bury Old Road located West of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 3.5l/s.
- 6.6 With regards to the Foul Water connection initial commentary United Utilities advised that a connection for any waster water should be made to the existing public Foul Water sewer within Bury Old Road.

Lead Local Flood Authority

- 6.7 At the time of the production of this report no response was provided by Bury Metropolitan Borough Council in relation to the specific of this site and discharge rates. General guidance from within the Lead Local Flood Authorities guidance has been followed based on the below.
- 6.8 The guidance confirms that the LLFA will require surface water discharge to follow the prescribed hierarchy of surface water disposal, with infiltration techniques to be investigated before a connection to any watercourse or sewer is considered.
- 6.9 In the case of a connection to a watercourse or sewer network, the LLFA require runoff from minor brownfield developments to be reduced by a minimum of 30% compared to the present-day rate of surface water discharge from the site, and runoff from major brownfield developments to be reduced by a minimum of 50%. For runoff from 'greenfield' sites, or in the case where an existing brownfield discharge cannot be proven, the discharge is to be attenuated to greenfield equivalent rates.
- 6.10 The proposed drainage strategy should incorporate the inclusion of meaningful SuDS rather than solely hard engineered storage solution. All major applications should incorporate the inclusion of SuDS in the drainage scheme in order to achieve the four pillars of SuDS which are to manage water quantity, water quality, amenity and biodiversity.

Climate Change

- 6.11 NPPF requires that the projected impacts of climate change are taken into account over the lifetime of a development. Studies have projected that the Global Sea level will continue to rise and there will be an increase

in river flows and rainfall intensity across the country, with the degree of change depending on greenhouse gas emissions and the sensitivity of the climate system.

- 6.12 Impact on Rainfall Intensity - In accordance with the current guidance, for a design life of at least 100 years the impacts of the “upper” climate change scenario (90th percentile of potential scenarios) should be considered with respect rainfall intensity. Within this Management Catchment, this is predicted to lead to an increase in rainfall intensity of up to 40% in the 1 in 30 year (3.33% annual exceedance probability) rainfall event, and up to 45% in the 1 in 100 year (1% annual exceedance probability) rainfall event.
- 6.13 As per the requirements of the current national and local guidance, the above allowances will be considered in the design of the surface water drainage systems for the new development. On this basis the capacity of the surface water drainage system would be expected to remain robust over the lifetime of the development and will not lead to an increase in flood risk in the future.

7. EXISTING RUNOFF RATE

Greenfield Runoff Rate

- 7.1 An assessment of the greenfield runoff rates has been undertaken using the IH124 UK SuDS online tool and ICP SUDS calculation module within Micro Drainage and IH124 Methodology and the results are summarised below. Calculations are included within **Appendix 8**.

TABLE 7.1. IH124 Greenfield run off rate for range of return periods

Return Period (Yr.)	Runoff Rate (l/s) Application Site (0.999 ha)
QBAR (rural)	6.6
Q1 Y (100%)	5.7
Q30 Y (3.33%)	11.1
Q100 Y (1%)	13.6

Greenfield Runoff Volume

- 7.2 An assessment of the greenfield runoff volume has been undertaken using Micro Drainage and the results are summarised below. Calculations are included within **Appendix 8**.

TABLE: 7.2. Greenfield volume for 100yr return period 360min storm duration.

	Application Site (0.999 ha)
Percentage Runoff (%)	13.56%
Greenfield Runoff Volume (m ³)	84.595

Brownfield Runoff Rate

- 7.3 Pre-development (Brownfield) Runoff Rates have been calculated using The Modified Rational Method tab within Causeway Flow software.
- 7.4 The Rational Method can be defined by the following statement “A storm duration which is equal to the time of concentration for a particular area is the one which causes the greatest run-off from the area”.
- 7.5 The unattenuated pre-development site run-off rates have been calculated for the site and are presented in **Table 7.3** below.

TABLE: 7.3 Existing brownfield run-off rates.

	YR 1 (100% AEP)	YR 30 (3.33% AEP)	YR 100 (1% AEP)
Existing Brownfield Peak Runoff from impermeable areas Q (litres/sec)	16.3	40.0	52.2

Brownfield Runoff Volume

- 7.6 Pre-development (Brownfield) Runoff Volume was calculated using The Modified Rational Method calculations within Causeway Flow software based on 26% of impermeable areas within application site.
- 7.7 The unattenuated pre-development site run off volume has been calculated for the site and is presented in **Table 7.4** below.

TABLE: 7.4. Brownfield volume for 100yr return period 360min storm duration.

	Application Site (0.999 ha)
Percentage Runoff (%)	25%
Brownfield Runoff Volume (m ³)	156

8. PROPOSED RUNOFF DESTINATION

Proposed Runoff Rate

- 8.1 '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'. (**S3 NSTSSD 2015**)
- 8.2 The proposed development will introduce an additional 1973m² of impermeable/contributing areas positively drained, taking it from 2545m² to 4518m².
- 8.3 The comparison of greenfield, brownfield and proposed runoff rates has been included within the table below.
- 8.4 It has been proposed to control the discharge from the proposed developed to a maximum of 3.5l/s by United Utilities for all rainfall events up to and including 100YR event with 45% climate change.

TABLE: 12.1. Greenfield, Brownfield and Proposed run-off rate.

	YR 1 (100% AEP)	YR 30 (3.33% AEP)	YR 100 (1% AEP)
Greenfield Runoff Rate Q (litres/sec)	5.7	11.1	13.6
Brownfield Peak Runoff Rate Q (litres/sec)	16.3	40.0	52.2
Betterment	50%		
Brownfield Peak Runoff Rate Q (litres/sec) reduced by 50%	8.1	20.0	26.1
Proposed Discharge rate	3.5	3.5	3.5

Proposed Runoff Volume

- 8.5 '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.' **(S5 NSTSSD 2015)**
- 8.6 The comparison of greenfield, brownfield and proposed runoff volumes has been included within the table below.

TABLE 12.2. Greenfield, Brownfield and Proposed run-off volume - YR 100 (1% AEP) 6-hour rainfall event.

	Application Site (9989m ²)
Proposed impermeable/contributing areas (m ²)	4518
Existing Brownfield Runoff Volume impermeable areas (m ³)	156.0
Proposed Runoff Volume from proposed impermeable areas (m ³)	317.0
Difference in Runoff volume post development (m3)	Increase by 161.0
Proposed Runoff Volume including 40% Climate Change factor	444.0
Difference in Runoff Volume post development (m³) including 40% Climate Change Factor	Increase by 127.0

- 8.7 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body to brownfield runoff volume, S6 NSTSSD 2015 states that the runoff volume must be discharged at a rate that does not adversely affect flood risk.
- 8.8 The proposed discharge rate 3.5l/s. is considered meeting the above standard.

9. PROPOSED SURFACE WATER RUNOFF DESTINATION

- 9.1 According to National Standards for sustainable drainage systems Part II Section A – the following order of preference must be considered in respect of the Surface Water Runoff destination:
- Discharge into the ground,
 - Discharge to surface water body,
 - Discharge to a surface water sewer, drain,
 - Discharge to a combined sewer,
- 9.2 Subject to complying with these National standards, different destinations may apply for different parts of the site.

Discharge into the ground - infiltration expectations

- 9.3 The proposed means of managing surface water runoff from the proposed development has been considered with respect to the hierarchy set out in Building Regulations Part H (2010) as follows.
- 9.4 Consideration of the proposed means of surface water drainage should firstly be given to infiltration techniques (to ground). As discussed, at the time of the production of this report no site investigation information was available however as part of the investigation soakaway testing has been carried out by Groundtech consulting limited who provided initial ground condition observations.
- 9.5 For further information on the ground conditions refer to chapter 3.1 Geology however as a summary the provisions findings noted *“Brown to dark brown sandy clay occasionally with minor constituents of gravel and cobbles of sandstone, coal, brick, concrete, and wood lithologies was present within WS02, WS03, WS06, TP01, and TP02 from depths of between 0.35m and 1.3m bgl to depths of between 3.7m and 4.0m bgl”*.
- 9.6 Whilst the final testing results were not available at the time of this report the provisional findings carried out by Ground Tech have stated the following in relation to infiltration:
- “Evidence of very poor infiltration rates were observed during soil percolation testing and SuDS drainage is not likely to be considered feasible.”*
- 9.7 Based on the map information available to date, initial soakaway testing comments and ground investigation results of the site infiltration as a means of disposal is not recommended for this site.
- 9.8 Use of permeable surfaces should also be limited due to noted possibility of contamination within the made ground areas of the site however consideration to provide interception at source, pollution removal via catch pits, attenuation within storage layer with an overflow to next element of the Suds system should be considered.

Discharge to surface water body.

- 9.9 There are no surface water features within 1km of site. The nearest named watercourse is the River Irwell 1331m southwest of the site. As of 2019, the river was given an overall rating of moderate and a chemical rating of fail.
- 9.10 There are no other known surface water bodies around the site therefore discharge to a surface water body is not recommended for the site.

Discharge to Surface Water Sewer

- 9.11 United Utility assets have been identified within Old Bury Road to the south of the site. Consultation with United Utilities has also confirmed the presence of a 225 diameter Surface Water sewer and a Foul Water sewer. Evidence of this consultation has been provided within **Appendix 4**.

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- 9.12 The existing site drainage is known to drain to the existing foul sewer within Old Bury Road via a private combined sewer however consultation with United Utilities requested for the proposed Surface Water drainage to connect to the existing 225 diameter Surface Water sewer.
- 9.13 A gravity connection into the existing United Utilities 225 diameter Surface Water sewer is recommended as the point of discharge for Surface Water from the site.

10. SuDS COMPONENTS

10.1 It is policy for all surface water systems for development sites to be designed using SuDS wherever possible.

10.2 Initial assessment of the SuDS techniques is summarised in Table below.

TABLE: 14.1. Types of SuDS Components – Ciria SuDS Manual 2015.

Component Type	Description and Proposed Development Suitability	
Rainwater harvesting systems	Description	Rainwater is collected from the roof of a building or from other paved surfaces in an over ground or underground tank for use on site. Depending on its intended use, the system may include treatment elements. The system should include specific storage provision if it is to be used to manage runoff to a design standard.
	Suitability	Rainwater butts should be considered.
Green Roofs/ Blue Roofs	Description	A planted soil layer constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by the vegetation. Blue roofs store water at roof level, without the use of vegetation.
	Suitability	Not suitable - pitched roof construction.
Infiltration systems	Description	These systems collect and store runoff allowing it to infiltrate into the ground. Overlaying vegetation and underlaying unsaturated solid can offer protection to ground water from pollution risks.
	Suitability	Based on information available to date it is considered there are low opportunities for disposal via infiltration on site.
Filter Strips	Description	Runoff from impermeable area is allowed to flow across a grassed or otherwise planted area to promote sedimentation and filtration.
	Suitability	Shedding water to landscaped areas will be encouraged where site layout and external levels permit.
Filter drains	Description	Runoff is temporarily stored below the surface in a shallow trench filled with stone/gravel, providing attenuation, conveyance and treatment (via filtration).
	Suitability	Not suitable due to the development layout and soil infiltration properties.
Swales	Description	A vegetation channel is used to convey and treat runoff via shallow naturally landscaped channels that convey and/or infiltrate the runoff (via infiltration). These can be 'wet', where water is designed to remain permanently at the base of the swale, or 'dry' where water is only present in the channel after rainfall events. It can be lines, or unlined to allow infiltration.
	Suitability	Not suitable due to the development layout.
Bioretention systems	Description	A shallow landscaped depression allows runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils prior to collection or infiltration. In its simplest form it is often referred to as a rain garden. Engineered soils (gravel and sand layers) and enhanced vegetation can be used to improve treatment performance.
	Suitability	Small rain gardens could be incorporated within landscaping.

Trees	Description	Trees can be planted within a range of infiltration SuDS components to improve their performance, as root growth and decomposition increase soil infiltration capacity. Alternatively, they can be used as standalone features within soil-filled tree pits, tree planters or structural soils, collection and storing runoff and providing treatment (via infiltration and phytoremediation).
	Suitability	Existing trees will be retained where possible. See ecologist report for details.
Pervious Pavements	Description	Runoff is allowed to soak through structural paving. This can be paving blocks with gaps between solid blocks, or porous paving where water filters through the block itself. Water can be stored in the sub-base and potentially allowed to infiltrate into the ground.
	Suitability	Permeable surfaces with storage layer and/or infiltration to ground will be considered for all light trafficked areas to aid treatment and interception at source with possible partial infiltration.
Attenuation storage tanks	Description	Below ground voided spaces can be used to temporarily store runoff before infiltration, controlled release or use. The storage structure is often constructed using geocellular or other modular storage systems, concrete tanks or oversized pipes.
	Suitability	Attenuation storage tanks will be utilised as part of the drainage proposal. See attached Proposed Drainage Plan.
Detention Basin	Description	During a rainfall event, runoff drains to a landscaped depression with an outlet that restricts flows, so that the basin fills and provides attenuation. Generally, basins are dry, except during and immediately following the rainfall events. If vegetated, runoff will be treated as it is conveyed and filtered across the base of the basin. Naturally, vegetated depressions designed to store runoff temporarily.
	Suitability	Not suitable for the Proposed Development Layout.
Ponds and wetlands	Description	Features with a permanent pool of water can be used to provide attenuation and treatment of runoff, where outflows are controlled, and water levels are allowed to increase following rainfall. They can support emergent and submerged vegetation along their shoreline and in shallow. Marshy zones, which enhance treatment processes and biodiversity.
	Suitability	Not suitable for the Proposed Development Layout.

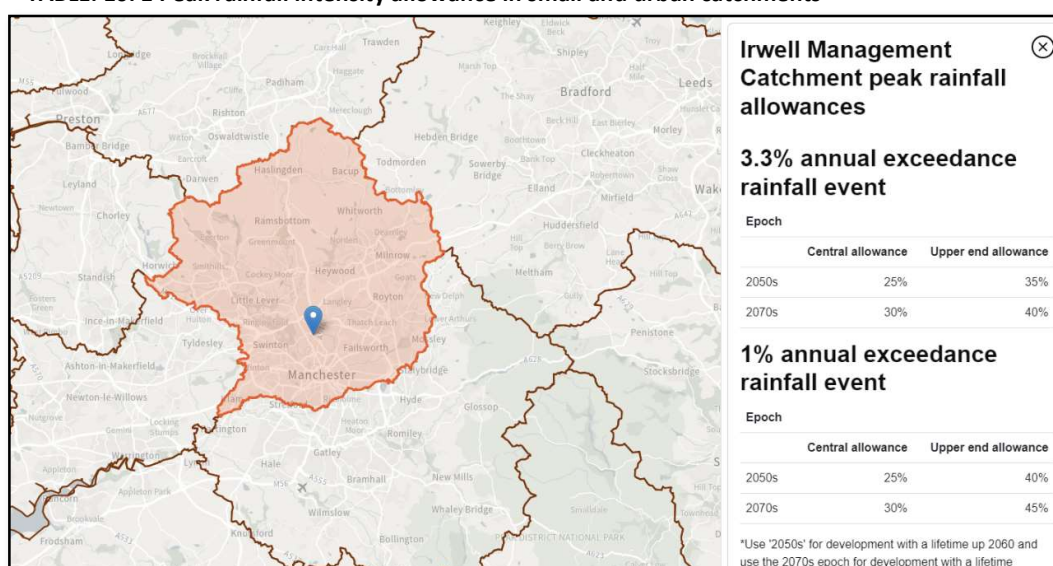
10.3 It is proposed to adopt appropriate SuDS throughout the new development wherever possible, with specific target areas being:

- Source Control SuDS techniques, such as rain gardens with broad leaves high water interception species, permeable surfaces with overflow to next stage of drainage system will be encouraged where possible.
- Site - control - reduction in peak flows to outfall, thereby not increasing flood risk downstream of connection.
- Improvement of water quality arriving at outfall (passive removal of pollutants), thereby reducing potential for pollution downstream of the connection point.

11. CLIMATE CHANGE ALLOWANCE

- 11.1 It is anticipated that climate change will bring an increase in rainfall intensity in the future and therefore an allowance for climate change should be included to help minimise vulnerability and provide resilience to flooding and coastal change in the future. Both the ‘central’ and ‘upper end’ allowance should be assessed to understand the range of impact.
- 11.2 The ‘Central’ allowance should be applied to the surface water drainage network/design to assess its performance and ability to contain critical events. The ‘Upper End’ allowance should be applied to assess the potential flood risk implications to the site and to ensure that flooding is wholly contained onsite.
- 11.3 The Environment Agency Guidance in Table 15.1 shows anticipated changes in extreme rainfall intensity across the country. Over the next 100 years, the increase in extreme rainfall intensity is expected to be between 30-45%.

TABLE: 10. 1 Peak rainfall intensity allowance in small and urban catchments



- 11.4 With an estimated design life of 100 years for residential development, any necessary onsite designs for drainage, soakaways or other suitable disposal methods limiting surface water disposal flows will incorporate rainfall intensities that have been increased by 45% to take account of the effects of climate change.
- 11.5 It is recommended that for the proposed development the drainage is designed to contain (without surface flooding) a 1 to 100 year 6-hour rainfall event with an ‘Upper End’ allowance included i.e., + 45% CC (Climate Change).

12. SURFACE WATER DRAINAGE STRATEGY

- 12.1 A preliminary drainage strategy has been undertaken to establish principles of the design for foul and surface water drainage for the proposed development.
- 12.2 All drained areas will be designed to meet the Statutory Requirements as follows:
- Source Control SuDS techniques such as rain gardens planted with broad-leaved shrubs/plants with high rainfall interception and water demand allowing interception of surface water runoff from adjoining surfaces.
 - Site control - All SuDS features will be designed for the critical 100-year (1%) rainfall event with an allowance for climate change and therefore there will be no risk of uncontrolled flooding on site for all rainfall events up to 100-year return with 45% climate change.
 - All exceedance flows beyond those for which the drainage system is designed will be directed through the site, as such that there will be no risk of flooding of vulnerable or critical areas.
- 12.3 Permeable surfaces will be encouraged throughout the development to provide interception and pollution removal, storage and disposal via partial infiltration at source with overflow from the sub-base storage layer to next element of drainage system i.e. attenuation structures.
- 12.4 All recommendations will be investigated/developed further during the detailed design stage.

Surface Water Network

- 12.5 All surface water runoff arising from the car park extension, padel courts, and access road (approximate contributing area of 4518 m sq.) will be directed by underground gravity pipes to geocellular attenuation storage tank (95% void) ref: T1.
- 12.6 Discharge from attenuation storage tank will be via flow control device at 3.5l/s discharge rate to proposed manhole FC1.
- 12.7 See attached Proposed Drainage Strategy Plan in **Appendix 7** and Drainage Calculations in **Appendix 8**.
- 12.8 Silt chambers must be provided upstream of the attenuation tank.
- 12.9 Proposed attenuation tank to be installed in strict accordance with manufacturers design and instructions. Attenuation tank to include maintenance access features and ventilation pipes.
- 12.10 In order to accommodate the 1 in 100 year plus 45% climate change event, approximately 227m³ of storage would be required. It is proposed that the majority of the attenuation will be provided within a Geocellular tank. The tank dimensions are approximately 14.2x10.0x1.6m providing 228.8m³ of storage. The attenuation tank will be provided under the proposed private car park expansion to the south of the site.

13. FOUL WATER DRAINAGE STRATEGY

Foul Water Network

- 13.1 Foul Water flows associated with the new pavilion installation will be directed into the on-site private drainage network. See attached Proposed Drainage Strategy plan in **Appendix 7**.
- 13.2 Any proposed private foul drainage will be designed in accordance with Building Regulations Document H1.

-
- 13.3 Following the consultation with United Utilities the foul network is to discharge into the existing public foul sewer located within Old Bury Road. Any connections are to be approved by United Utilities prior to any works being undertaken on the existing network.

14. DESIGN FOR EXCEEDANCE

- 14.1 The drainage system will be designed so that, unless an area is designed to hold/or convey water as part of the design, flooding does not occur on any part of the site for 1 in 100-year rainfall event plus 45% climate change.
- 14.2 The design has considered flows resulting from rainfall in excess of the 1 in 100-year rainfall event plus 45% climate change and site surfaces will be modelled so that flood flows generated on site from events beyond the stipulated drainage design criteria will be directed away from vulnerable areas and contained on site where possible.
- 14.3 Following measures where considered:
- Slope of footpaths/driveways to direct surface water away from houses,
 - Raised and dropped kerb details to direct flow,
 - Raised door threshold, dpc height 150mm around the units

15. WATER QUALITY

- 15.1 Runoff quality from various land use is classed as Very Low, Low, Medium, and High Hazard depending on its source.
- 15.2 Pollution hazard from residential roofs is classed as a **very low**. Removal of gross solids and sediments is required. Silt chambers to be installed upstream of attenuation tanks.
- 15.3 Pollution hazard from Individual property driveways, residential car parks, low traffic roads, (e.g. cul de sacs, home zones, general access road) is classed as **low** and simple index approach will be used to deliver adequate treatment.

Table 19.1. Minimum water quality management requirements for discharge to receiving surface waters and groundwater – Extract from [Ciria SuDS Manual 2015 \(Table 4.3\)](#)

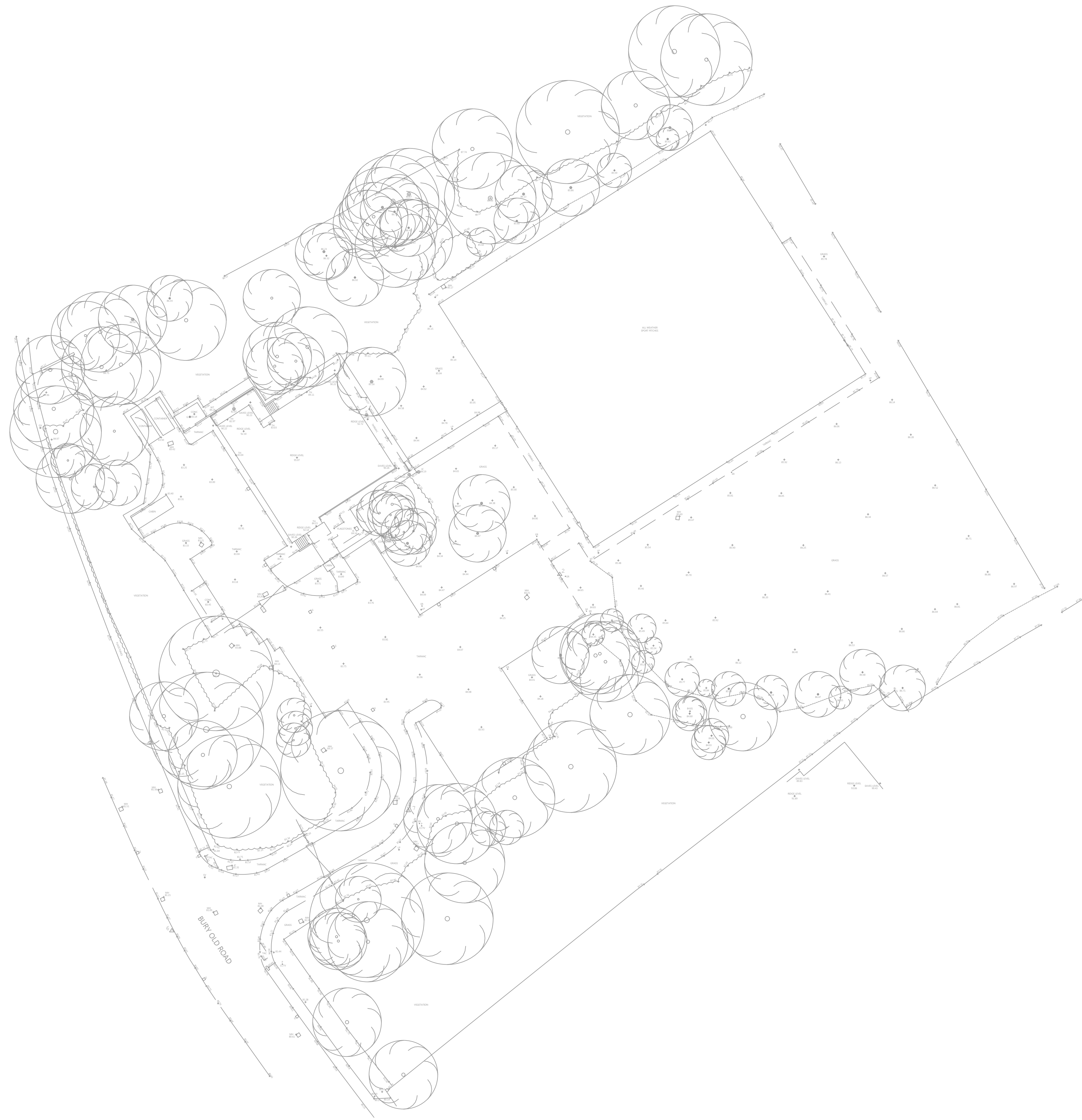
Land Use	Pollution hazard level	Requirements for discharge to surface water and groundwater
Residential roofs	Very low	Removal of gross solids and sediments only - Silt chambers
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads, (e.g. cul de sacs, home zones, general access road), non-residential car parking with infrequent change (e.g. schools, offices).	Low	Silt chambers and oil interceptor

- 15.4 Silt trap units or silt filters are specified for surface water inspection chambers throughout the system to minimize silt accumulation in the proposed drainage network.
- 15.5 Channel drains and road gullies will also be specified with silt sump units.

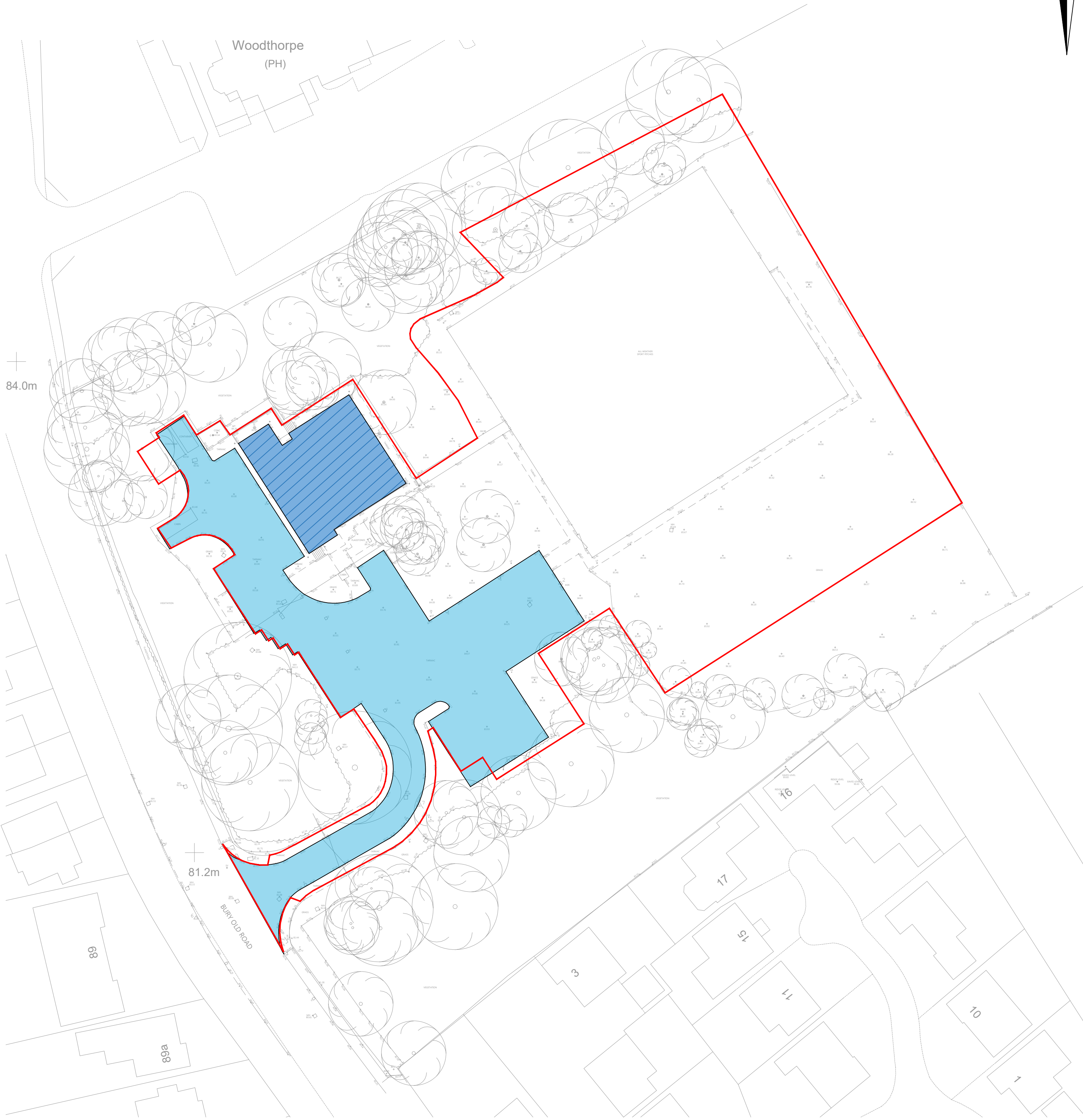
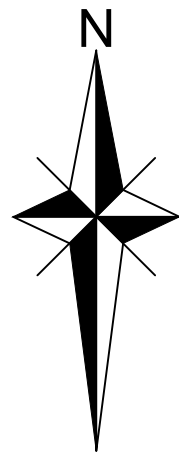
16. EXECUTIVE SUMMARY

- 16.1 The site development lies within Flood Zone 1, there is no requirement to satisfy either the Sequential Test or the Exception Test.
- 16.2 Sources of flooding have been assessed as part of the Drainage Strategy for the proposed development in its current context. Initial Flood Risk Overview established that the site is at low risk of flooding from all sources.
- 16.3 A surface water drainage strategy has been prepared for the site providing interception, attenuation, and controlled disposal for all rainfall events up to and including the 100-year critical rainfall event with an increase of 45% to allow for increases in rainfall intensities due to climate change.
- 16.4 Based on preliminary soakaway investigation and ground investigation of the site infiltration as a means of disposal is not recommended for this site.
- 16.5 It is proposed in accordance with the drainage hierarchy that surface water runoff will be directed to nearest adoptable sewer which in this scenario is the adoptable 225 diameter Surface Water sewer within Bury Old Road.
- 16.6 All surface water runoff arising from roof areas and hardstandings will be directed by underground gravity pipes to geocellular infiltration storage tanks ref: T1 (95% void,) providing total storage of approximately 184 m³. See attached Proposed Drainage Strategy Plan in **Appendix 7** and Drainage calculations in **Appendix 8**.
- 16.7 Discharge from attenuation tanks will be via vortex flow controls (Hydrobrake or similar approved) limiting the discharge rate to 3.5 l/s with 1.60m design head. Total pass forward flow rate from the development will be limited to 3.5l/s. for all rainfall events up to 100yr+45%CC.
- 16.8 Silt chambers will be installed upstream of attenuation tanks to prevent siltation of attenuation structures and downstream network. All channel drains will be installed with built-in sump units.
- 16.9 Drainage design considers flows resulting from rainfall in excess of the 1 in 100-year rainfall event plus 45% climate change. Site surfaces should be modelled so that flood flows generated on site from events beyond the stipulated drainage design criteria will flow away from buildings and other sensitive areas and will be contained on site as reasonably practicable.
- 16.10 Foul network flows will be directed to the on-site private drainage network which will discharge into the existing public foul sewer within Old Bury Road.
- 16.11 Any proposed on-site drainage will be designed and constructed in accordance with current best practice, Lead Local Flood Authority requirements and Building Regulations as appropriate.
- 16.12 All SuDS on site will be installed with full consideration for long term maintenance. Refer to Drainage Maintenance Schedule for details.

APPENDIX 1 – EXISTING SITE PLAN / TOPO



APPENDIX 2 - EXISTING SITE AREAS



EXISTING IMPERMEABLE AREAS
SCALE 1:200

KEY:

- APPLICATION SITE AREA - 10750 SQ M (1.075 HA)
 - EXISTING BUILDING FOOTPRINT - 461 SQ M (0.046 HA)
 - EXISTING HARDSTANDINGS - 2084.3 SQ M (0.208 HA)
- TOTAL EXISTING IMPERMEABLE AREAS - 2545.0 SQ M (0.254 HA)

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT**
- NOTES**
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED. ALL MEASUREMENTS SHOULD BE VERIFIED ON SITE PRIOR TO WORKS BEING UNDERTAKEN. DO NOT SCALE FROM THIS DRAWING.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED DRAWINGS AND SPECIFICATIONS
 - THE DRAINAGE CONTRACTOR IS RESPONSIBLE TO MAKING AN APPLICATION TO ANY SEWERAGE UNDERTAKER PRIOR TO CONSTRUCTION OF ANY CONNECTION INTO A PUBLIC MANHOLE
 - THE ENGINEER IS TO BE NOTIFIED OF ANY DISCREPANCIES TO THE DETAILS SHOWN ON THE DRAINAGE AND ANY UNRECORDED CONNECTIONS NOT SHOWN ON THE DRAWINGS.
 - THE CONTRACTOR IS RESPONSIBLE FOR CHECKING DIMENSIONS AND LEVELS AND FOR CONFIRMING THE GIVEN LEVEL OF OUTFALL INTO PUBLIC SEWER, WATERCOURSE OR OTHER OUTFALL PRIOR TO CONSTRUCTION WORKS COMMENCING.
 - UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT AUTHORITIES ALL DRAWINGS ISSUED ARE AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK.
 - TO PROTECT THE DRAINAGE SYSTEM FROM CONSTRUCTION SITE DERBIES, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS/ DRAINAGE HAS BEEN COMPLETED.
 - THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (E.G. ARCHITECT AND M&E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.
 - NEW DRAINS AND SEWERS TO BE AS FOLLOWS:
 - CONSTRUCT AND MATERIALS OF PRIVATE SURFACE, FOUL & COMBINED WATER SEWERAGE SYSTEM TO BE IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
 - CONSTRUCTION AND MATERIALS OF PUBLIC SURFACE, FOUL & COMBINED WATER SEWERS TO BE IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER
 - MINIMUM PIPE SIZE FOR ADAPTABLE SURFACE WATER DRAINAGE IS 150mmDN
 - 100mmDN AT MIN 1:100 FOR 10 DWELLINGS OR LESS
 - 150mmDN AT MIN 1:150 FOR GREATER THAN 10 DWELLINGS
 - MINIMUM PIPE SIZE FOR ADAPTABLE FOUL WATER DRAINAGE IS 100mmDN
 - 100mmDN 1:40 WHERE 10 DWELLINGS OR LESS AND NO WC
 - 100mmDN 1:80 WHERE GREATER THAN 10 DWELLINGS AND AT LEAST 1 WC
 - ALL ROAD GULLY PIPEWORK SPURS TO BE 150mmDN UNLESS OTHERWISE SPECIFIED
 - LOAD CLASS SELECTION TO COMPLY WITH BS EN 124:
 - LOAD CLASS A15 - AREAS INACCESSIBLE TO MOTOR VEHICLES
 - LOAD CLASS B125 - FOOTWAYS, PEDESTRIAN AREAS ETC
 - LOAD CLASS D250 - GULLY TOPS IN KERBSIDE CHANNELS OF ROADS
 - LOAD CLASS D400 - CARRIAGEWAYS OF ROADS (HEAVY DUTY)
 - LOAD CLASS E600 - AREAS IMPOSING HIGH WHEEL LOADS
 - LOAD CLASS F900 - AREAS IMPOSING PARTICULARLY HIGH WHEEL LOADS
 - ALL FOUL DRAINS BENEATH BUILDINGS AND FROM SOIL VENT PIPES, GULLIES AND WC CONNECTIONS BE 100mmDN AT A GRADIENT NOT LESS THAN OF 1:40.
 - ALL FOUL CONNECTIONS TO BE FULLY TRAPPED AND EACH FOUL CONNECTION TO A BRANCH DRAIN TO HAVE FULL RODDING ACCESS (E.G. LOW LEVEL RODDING ACCESS).
 - RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND.
 - WHERE DRAINAGE IS COMBINED A "P" TRAP MUST BE PROVIDED ABOVE PROPOSED FLOOR SLAB LEVEL.
 - MINIMUM DEPTH OF COVER TO THE CROWN OF GRAVITY PIPES WITHOUT PROTECTION SHOULD BE AS FOLLOWS (IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C")
 - 350mm - DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS
 - 500mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
 - 900mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
 - 900mm - AGRICULTURAL LAND & PUBLIC OPEN SPACE
 - 1200mm - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLE WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
 - BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE FREE DRAINING READILY AVAILABLE COMPACTABLE MATERIAL FREE FROM RUBBISH, ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 250mm THICK
 - A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO THE OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT. COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENTS OF THE JOINT. LENGTH OF THE NEXT PIPE (ROCKER PIPE) IS TO BE IN ACCORDANCE WITH THE TABLE BELOW
 - 150-400mmDN - 600mm LONG ROCKER PIPE
 - 601-750mmDN - 1000mm LONG ROCKER PIPE
 - 751mmDN AND ABOVE - 1250mm LONG ROCKER PIPE
 - PIPE CROSSOVERS TO HAVE MINIMUM OF 300mm CLEARANCE BETWEEN OUTSIDE TOP OF THE LOWER PIPE AND OUTSIDE BOTTOM OF THE UPPER PIPE, WHERE THIS CANNOT BE ACHIEVED A SEPARATION, CONCRETE SURROUND IS TO BE FORMED WHICH WILL EXTEND NOT LESS THAN 1000mm EACH SIDE OF THE CROSSING POINT. THE EXTENT OF THE CONCRETE SHOULD BE WITHIN 150mm OF A FLEXIBLE PIPE JOINT. THE CONCRETE SPECIFICATION SHOULD BE IN ACCORDANCE WITH THE STANDARD DETAILS FOR PIPE BED AND SURROUND AS ISSUED BY THE ENGINEER.
 - CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8500-1:2006. ALL CONCRETE TO BE SULPHATE RESISTANT. CONTRACTOR SHOULD ALLOWANCE FOR CARRYING OUT TESTING ONSITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION.
 - ALL PRIVATE MANHOLES AND INSPECTION CHAMBERS TO BE CONSTRUCTED IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
 - ALL MANHOLES AND INSPECTION CHAMBERS TO BE ADOPTED TO BE CONSTRUCTED IN ACCORDANCE WITH "IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER.
 - CITY SURVEY OF ALL THE DRAINAGE SHOULD BE CARRIED OUT ON COMPLETION OF THE BUILDING WORKS AND PASSED ON TO THE CLIENT.
 - ANY EXISTING DRAINAGE INFRASTRUCTURE TO BE RETAINED TO HAVE NEW COVERS AND FRAMES TO SUIT NEW LEVELS AND SURFACING.
 - WHERE DRAINAGE RUNS PASS BELOW FOUNDATIONS, PIPES TO BE ENCASED IN MIN 100mm CONCRETE SURROUND AND SURROUND WRAPPED IN 50mm COMPRESSIBLE MATERIAL (TOP & SIDES) PIPE SLEAVED THROUGH FOUNDATIONS AND FITTED WITH ROCKER PIPE. FOUNDATIONS ADJACENT TO DRAIN RUN TO BE DEEPENED LOCALLY TO INVERT OF DRAINAGE PIPE TO AVOID SURCHARGE LOADING.
 - WHERE DRAINAGE RUNS PASS ABOVE FOUNDATIONS, PROVIDE 65mm DEEP PRE-STRESSED CONCRETE LINTELS e.g. "NAYLOR" Ref. P100

P01	FEB24	RJ	ISSUED FOR COMMENTS	RJ	RJ
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	

FOR INFORMATION

S2

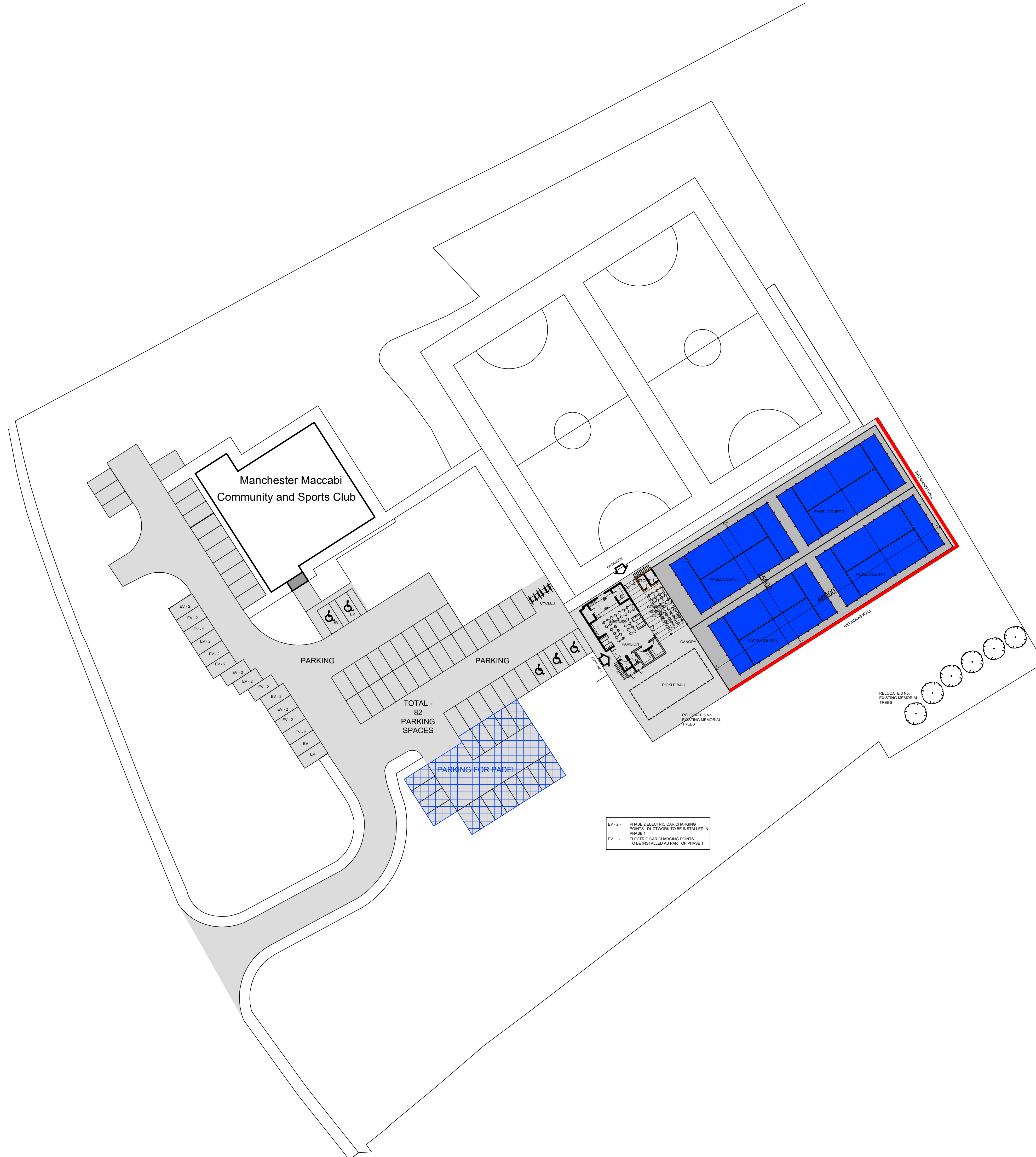


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Consulting Civil & Structural Engineers



PROJECT				MANCHESTER MACCABI PADEL COURTS	
DRAWING TITLE				EXISTING IMPERMEABLE AREAS	
CLIENT				iLEX PROJECT MANAGEMENT	
HBL REF.	10585	DATE	FEB 2024	SCALE(S)	1:200
DRAWN	RJ	CHECKED	RJ	APPROVED	RJ
DRAWING No.				10566-HBL-XX-XX-DR-D-0002	
				REV.	P01

APPENDIX 3 – ARCHITECT'S PROPOSED SITE PLAN



APPENDIX 4 – DRAINAGE CONSULTATIONS

Ryan Jones

From: seweradoptions@uuplc.co.uk
Sent: 16 February 2024 10:06
To: Ryan Jones
Subject: RE: 05268523 10585 Manchester Maccabi - Padel Courts [Filed 28 Feb 2024 15:57]

Categories: Filed by Mail Manager

Warning: This email was sent from outside the organisation.

Good morning Ryan,

Pre Development Enquiry for: Manchester Maccabi Community & Sports Centre UU Reference Number : 05268523

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where

feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 225mm diameter public surface water sewer within Bury Old Road located West of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 3.5l/s.

Please note the given discharge rate is based on the full site area as the specifics of the area being developed are not yet clear. If there are significant areas of the site that will not be developed, the discharge rate should be reduced accordingly. (Delete as appropriate)

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your

works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/sewerage-sector-guidance-approved-documents/>

Many thanks and kind regards,



James Darlington
Developer Engineer
Developer Services & Metering
M: 07917096253
unitedutilities.com

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----- Original Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 15/02/2024 13:50

To: ryan.jones@hbl.ltd

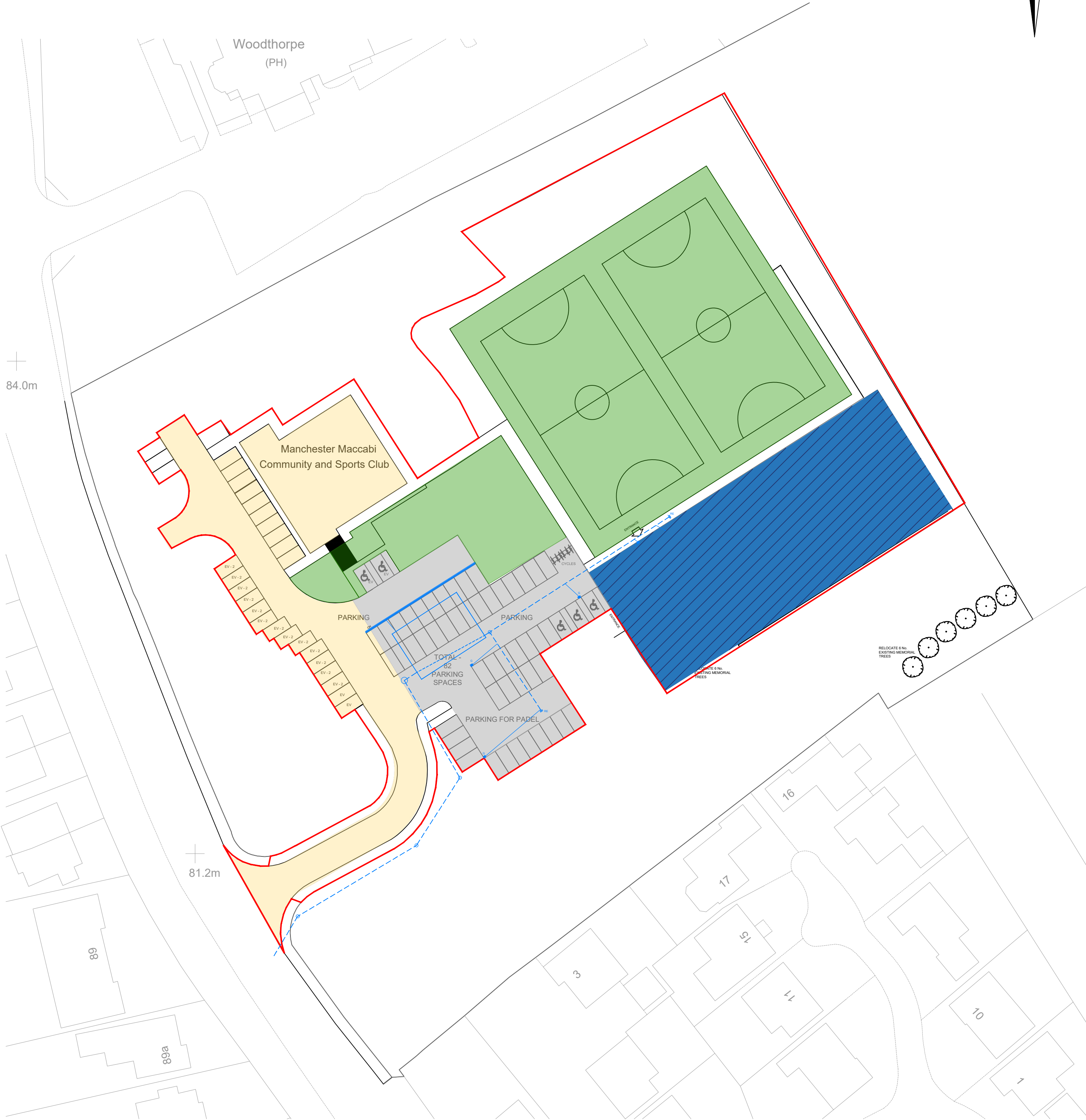
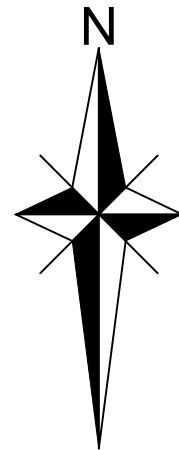
Subject: RE: 05268523 10585 Manchester Maccabi - Padel Courts

Hi Ryan

Thank you for the location plan

Kind regards Jill

APPENDIX 5 - PROPOSED SITE AREAS



KEY:

- EXISTING IMPERMEABLE AREA - 1631.4 SQ M (0.163 HA)
(TO BE DRAINED BY EXISTING PRIVATE SYSTEM)
- PROPOSED HARDSTANDINGS (TARMAC) - 1246.3 SQ M (0.125 HA)
- PROPOSED PERMEABLE COURTS - 1641 SQ M (0.164 HA)
- TOTAL PROPOSED CONTRIBUTING AREAS - 4518.7 SQ M (0.452 HA)
- LANDSCAPED AREAS - 3461 SQ M (0.34 HA)

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT
- NOTES
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED. ALL MEASUREMENTS SHOULD BE VERIFIED ON SITE PRIOR TO WORKS BEING UNDERTAKEN. DO NOT SCALE FROM THIS DRAWING.
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 - THE CONTRACTOR IS RESPONSIBLE FOR CHECKING DIMENSIONS AND LEVELS AND FOR CONFIRMING THE GIVEN LEVEL OF OUTFALL INTO PUBLIC SEWER, WATERCOURSE OR OTHER OUTFALL PRIOR TO CONSTRUCTION WORKS COMMENCING.
 - UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT AUTHORITIES ALL DRAWINGS ISSUED ARE AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK.
 - TO PROTECT THE DRAINAGE SYSTEM FROM CONSTRUCTION SITE DERBIES, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS/ DRAINAGE HAS BEEN COMPLETED.
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 - NEW DRAINS AND SEWERS TO BE AS FOLLOWS:
 - CONSTRUCT AND MATERIALS OF PRIVATE SURFACE, FOUL & COMBINED WATER SEWERAGE SYSTEM TO BE IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
 - CONSTRUCTION AND MATERIALS OF PUBLIC SURFACE, FOUL & COMBINED WATER SEWERS TO BE IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER
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 - 100mmDN AT MIN 1:100 FOR 10 DWELLINGS OR LESS
 - 150mmDN AT MIN 1:150 FOR GREATER THAN 10 DWELLINGS
 - MINIMUM PIPE SIZE FOR ADAPTABLE FOUL WATER DRAINAGE IS 100mmDN
 - 100mmDN 1:40 WHERE 10 DWELLINGS OR LESS AND NO WC
 - 100mmDN 1:80 WHERE GREATER THAN 10 DWELLINGS AND AT LEAST 1 WC
 - ALL ROAD GULLY PIPEWORK SPURS TO BE 150mmDN UNLESS OTHERWISE SPECIFIED
 - LOAD CLASS SELECTION TO COMPLY WITH BS EN 124.
 - LOAD CLASS A15 - AREAS INACCESSIBLE TO MOTOR VEHICLES
 - LOAD CLASS B125 - FOOTWAYS, PEDESTRIAN AREAS ETC
 - LOAD CLASS D250 - GULLY TOPS IN KERBSIDE CHANNELS OF ROADS
 - LOAD CLASS D400 - CARRIAGEWAYS OF ROADS (HEAVY DUTY)
 - LOAD CLASS E600 - AREAS IMPOSING HIGH WHEEL LOADS
 - LOAD CLASS F900 - AREAS IMPOSING PARTICULARLY HIGH WHEEL LOADS
 - ALL FOUL DRAINS BENEATH BUILDINGS AND FROM SOIL VENT PIPES, GULLIES AND WC CONNECTIONS BE 100mmDN AT A GRADIENT NOT LESS THAN OF 1:40.
 - ALL FOUL CONNECTIONS TO BE FULLY TRAPPED AND EACH FOUL CONNECTION TO A BRANCH DRAIN TO HAVE FULL RODDING ACCESS (E.G. LOW LEVEL RODDING ACCESS).
 - RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND.
 - WHERE DRAINAGE IS COMBINED A "P" TRAP MUST BE PROVIDED ABOVE PROPOSED FLOOR SLAB LEVEL.
 - MINIMUM DEPTH OF COVER TO THE CROWN OF GRAVITY PIPES WITHOUT PROTECTION SHOULD BE AS FOLLOWS (IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C")
 - 350mm - DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS
 - 500mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
 - 900mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
 - 900mm - AGRICULTURAL LAND & PUBLIC OPEN SPACE.
 - 1200mm - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLE WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
 - BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE FREE DRAINING READILY AVAILABLE COMPACTABLE MATERIAL FREE FROM RUBBISH, ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 250mm THICK
 - A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO THE OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT. COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENTS OF THE JOINT. LENGTH OF THE NEXT PIPE (ROCKER PIPE) IS TO BE IN ACCORDANCE WITH THE TABLE BELOW
 - 150-400mmDN - 600mm LONG ROCKER PIPE
 - 601-750mmDN - 1000mm LONG ROCKER PIPE
 - 751mmDN AND ABOVE - 1250mm LONG ROCKER PIPE
 - PIPE CROSSOVERS TO HAVE MINIMUM OF 300mm CLEARANCE BETWEEN OUTSIDE TOP OF THE LOWER PIPE AND OUTSIDE BOTTOM OF THE UPPER PIPE. WHERE THIS CANNOT BE ACHIEVED A SEPARATION, CONCRETE SURROUND IS TO BE FORMED WHICH WILL EXTEND NOT LESS THAN 1000mm EACH SIDE OF THE CROSSING POINT. THE EXTENT OF THE CONCRETE SHOULD BE WITHIN 150mm OF A FLEXIBLE PIPE JOINT. THE CONCRETE SPECIFICATION SHOULD BE IN ACCORDANCE WITH THE STANDARD DETAILS FOR PIPE BED AND SURROUND AS ISSUED BY THE ENGINEER.
 - CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8500-1:2006. ALL CONCRETE TO BE SULPHATE RESISTANT. CONTRACTOR SHOULD ALLOWANCE FOR CARRYING OUT TESTING ONSITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION.
 - ALL PRIVATE MANHOLES AND INSPECTION CHAMBERS TO BE CONSTRUCTED IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
 - ALL MANHOLES AND INSPECTION CHAMBERS TO BE ADOPTED TO BE CONSTRUCTED IN ACCORDANCE WITH "IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER
 - CITY SURVEY OF ALL THE DRAINAGE SHOULD BE CARRIED OUT ON COMPLETION OF THE BUILDING WORKS AND PASSED ON TO THE CLIENT.
 - ANY EXISTING DRAINAGE INFRASTRUCTURE TO BE RETAINED TO HAVE NEW COVERS AND FRAMES TO SUIT NEW LEVELS AND SURFACING.
 - WHERE DRAINAGE RUNS PASS BELOW FOUNDATIONS, PIPES TO BE ENCASED IN MIN 100mm CONCRETE SURROUND AND SURROUND WRAPPED IN 50mm COMPRESSIBLE MATERIAL (TOP & SIDES) PIPE SLEEVED THROUGH FOUNDATIONS AND FITTED WITH ROCKER PIPE. FOUNDATIONS ADJACENT TO DRAIN RUN TO BE DEEPEDED LOCALLY TO INVERT OF DRAINAGE PIPE TO AVOID SURCHARGE LOADING.
 - WHERE DRAINAGE RUNS PASS ABOVE FOUNDATIONS, PROVIDE 65mm DEEP PRE-STRESSED CONCRETE LINTELS e.g. "NAYLOR" Ref. P100

P02	MAR24	RJ	LAYOUT AMENDED AND IMPERMEABLE AREAS REVISED	RJ	RJ
P01	FEB24	RJ	ISSUED FOR COMMENTS	RJ	RJ
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	

FOR INFORMATION

S2



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Consulting Civil & Structural Engineers

PROJECT

MANCHESTER MACCABI
PADEL COURTS

DRAWING TITLE

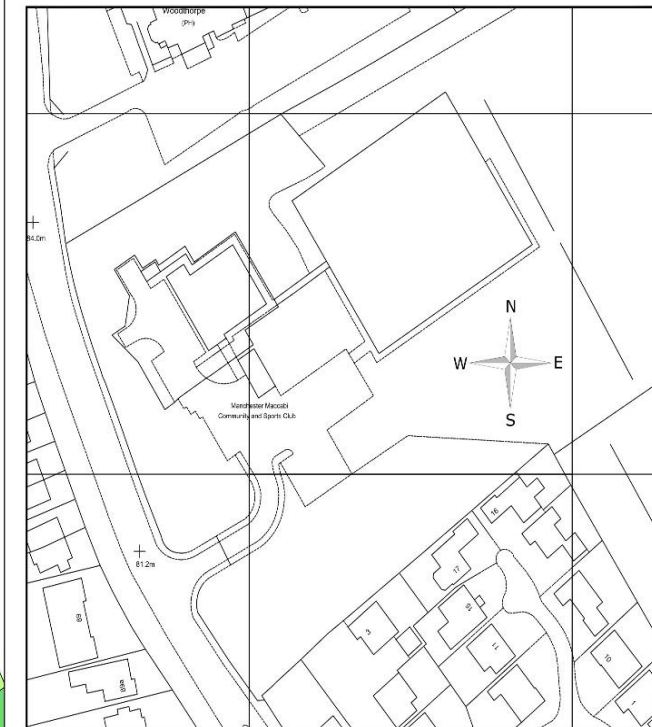
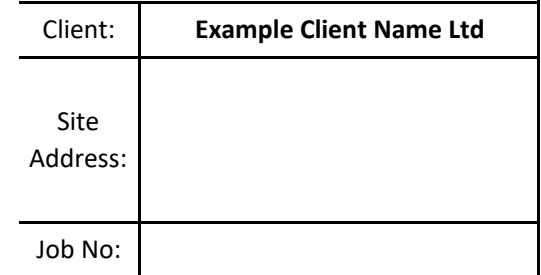
PROPOSED IMPERMEABLE AREAS

CLIENT

iLEX PROJECT MANAGEMENT

HBL REF.	10585	DATE	FEB 2024	SCALE(S)	1:200	A1	
DRAWN	RJ	CHECKED	RJ	APPROVED	RJ		
DRAWING No.	10566-HBL-XX-XX-DR-D-0001					REV.	P02

APPENDIX 6 – SEWER MAPS & CCTV SURVEY REPORT



LOCATION PLAN 1:1250

MACCABI, MANCHESTER

PROPOSED SITE PLAN OPTION 1

1:500 at A2 DWG No: 01



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All levels and dimensions to be checked on site by contractor prior to commencement; Any variations to be reported to the Art Design Services Ltd. This drawing is to be read in conjunction with all others relating to the project and all information delivered accordingly; any amendments to be reported to the Art Design Services Ltd. Do not scale from this drawing. Unfigured dimensions only. Work shown on this drawing to be carried out in accordance with current British Standards and Codes of Practice.

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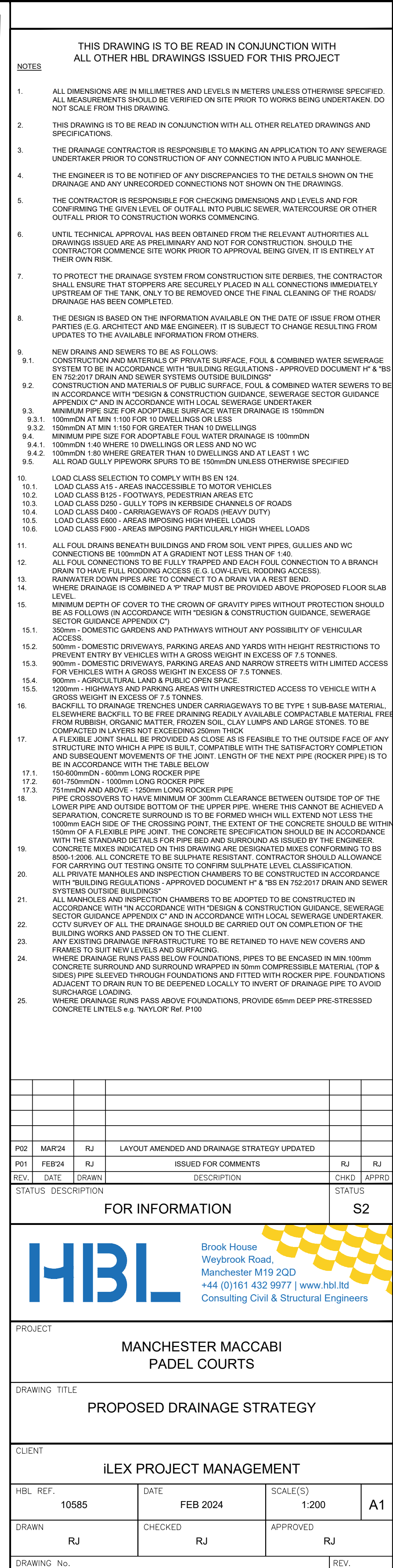
- This drawing is not to scale and is only intended to show assumed drainage assets and layout.
This is not a topographical drawing.



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Authorised by:
Lanes Head of HSEQ, Head of HR Services
& MD of Utilities and Depot Network
FO_CCTV_Blank Drawing Template_017_2023_Rev3

APPENDIX 7 – PROPOSED DRAINAGE STRATEGY PLANS



APPENDIX 8 – CALCULATIONS

Greenfield Runoff Rate

HBL Associates		Page 1
Brook House		
Weybrook Road		
Stockport, M19 2QD		
Date 07/03/2024 15:34	Designed by ryan.jones	
File 10585_1.100YR+4S%CC.SRCX	Checked by	
Innovyze	Source Control 2020.1.3	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.999	Urban	0.000
SAAR (mm)	986	Region Number	Region 10

Results 1/s

QBAR Rural	6.6
QBAR Urban	6.6
Q100 years	13.6
Q1 year	5.7
Q30 years	11.1
Q100 years	13.6

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APPENDIX 7 – PROPOSED DRAINAGE STRATEGY PLANS

APPENDIX 6 – SEWER MAPS & CCTV SURVEY REPORT

APPENDIX 5 - PROPOSED SITE AREAS

APPENDIX 4 – DRAINAGE CONSULTATIONS

APPENDIX 3 – ARCHITECT'S PROPOSED SITE PLAN

APPENDIX 2 - EXISTING SITE AREAS

APPENDIX 1 – EXISTING SITE PLAN / TOPO

16. EXECUTIVE SUMMARY

- 16.1 The site development lies within Flood Zone 1, there is no requirement to satisfy either the Sequential Test or the Exception Test.
- 16.2 Sources of flooding have been assessed as part of the Drainage Strategy for the proposed development in its current context. Initial Flood Risk Overview established that the site is at low risk of flooding from all sources.
- 16.3 A surface water drainage strategy has been prepared for the site providing interception, attenuation, and controlled disposal for all rainfall events up to and including the 100-year critical rainfall event with an increase of 45% to allow for increases in rainfall intensities due to climate change.
- 16.4 Based on preliminary soakaway investigation and ground investigation of the site infiltration as a means of disposal is not recommended for this site.
- 16.5 It is proposed in accordance with the drainage hierarchy that surface water runoff will be directed to nearest adoptable sewer which in this scenario is the adoptable 225 diameter Surface Water sewer within Bury Old Road.
- 16.6 All surface water runoff arising from roof areas and hardstandings will be directed by underground gravity pipes to geocellular infiltration storage tanks ref: T1 (95% void,) providing total storage of approximately 184 m³. See attached Proposed Drainage Strategy Plan in **Appendix 7** and Drainage calculations in **Appendix 8**.
- 16.7 Discharge from attenuation tanks will be via vortex flow controls (Hydrobrake or similar approved) limiting the discharge rate to 3.5 l/s with 1.60m design head. Total pass forward flow rate from the development will be limited to 3.5l/s. for all rainfall events up to 100yr+45%CC.
- 16.8 Silt chambers will be installed upstream of attenuation tanks to prevent siltation of attenuation structures and downstream network. All channel drains will be installed with built-in sump units.
- 16.9 Drainage design considers flows resulting from rainfall in excess of the 1 in 100-year rainfall event plus 45% climate change. Site surfaces should be modelled so that flood flows generated on site from events beyond the stipulated drainage design criteria will flow away from buildings and other sensitive areas and will be contained on site as reasonably practicable.
- 16.10 Foul network flows will be directed to the on-site private drainage network which will discharge into the existing public foul sewer within Old Bury Road.
- 16.11 Any proposed on-site drainage will be designed and constructed in accordance with current best practice, Lead Local Flood Authority requirements and Building Regulations as appropriate.
- 16.12 All SuDS on site will be installed with full consideration for long term maintenance. Refer to Drainage Maintenance Schedule for details.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.500	Minimum Backdrop Height (m)	1.000
Ratio-R	0.340	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
RE1	0.164	5.00	85.600	450	385920.780	403295.290	0.800
CP01			84.250	450	385887.910	403274.190	1.650
RE2	0.042	5.00	85.400	450	385913.470	403275.490	1.300
J1			85.300	450	385906.490	403286.120	1.584
RE3	0.042	5.00	84.200	450	385897.310	403259.870	1.150
T1	0.040	5.00	83.950	1200	385886.940	403273.580	2.350
T2			84.000	1200	385874.360	403266.710	2.472
FC1			83.950	1200	385872.110	403265.250	2.500
PPIC1			83.950	450	385882.390	403247.220	2.708
PPIC2			83.400	450	385874.340	403234.690	2.407
PPIC3			81.200	1200	385852.360	403221.550	1.450
OUTFALL			80.750		385847.980	403214.260	1.400

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	RE1	J1	16.979	0.600	84.800	83.716	1.084	15.7	225	5.09	50.0
1.001	CP01	T1	1.146	0.600	82.600	82.550	0.050	22.9	225	5.27	50.0
2.000	RE2	J1	12.717	0.600	84.100	83.791	0.309	41.2	150	5.13	50.0
1.001_1	J1	CP01	22.080	0.600	83.716	82.600	1.116	19.8	225	5.26	50.0
3.000	RE3	CP01	17.130	0.600	83.050	82.600	0.450	38.1	150	5.17	50.0
1.002	T1	T2	14.334	0.600	81.600	81.528	0.072	200.0	225	5.53	50.0
1.003	T2	FC1	2.682	0.600	81.528	81.500	0.028	95.8	300	5.55	50.0
1.004	FC1	PPIC1	20.755	0.600	81.450	81.242	0.208	100.0	150	5.90	50.0
1.005	PPIC1	PPIC2	14.893	0.600	81.242	80.993	0.249	59.8	150	6.09	50.0
1.006	PPIC2	PPIC3	25.608	0.600	80.993	79.750	1.243	20.6	150	6.28	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.322	132.1	22.2	0.575	1.359	0.164	0.0	62	2.483
1.001	2.744	109.1	33.6	1.425	1.175	0.248	0.0	86	2.427
2.000	1.573	27.8	5.7	1.150	1.359	0.042	0.0	46	1.240
1.001_1	2.955	117.5	27.9	1.359	1.425	0.206	0.0	74	2.431
3.000	1.636	28.9	5.7	1.000	1.500	0.042	0.0	45	1.272
1.002	0.921	36.6	39.0	2.125	2.247	0.288	0.0	205	1.026
1.003	1.606	113.5	39.0	2.172	2.150	0.288	0.0	121	1.461
1.004	1.005	17.8	39.0	2.350	2.558	0.288	0.0	150	1.023
1.005	1.303	23.0	39.0	2.558	2.257	0.288	0.0	150	1.327
1.006	2.229	39.4	39.0	2.257	1.300	0.288	0.0	122	2.531

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.007	PPIC3	OUTFALL	8.505	0.600	79.750	79.350	0.400	21.3	150	6.34	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.007	2.193	38.8	39.0	1.300	1.250	0.288	0.0	125	2.490

Pipeline Schedule

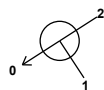
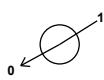
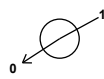
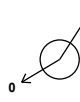
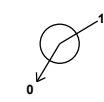
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	16.979	15.7	225	Circular	85.600	84.800	0.575	85.300	83.716	1.359
1.001	1.146	22.9	225	Circular	84.250	82.600	1.425	83.950	82.550	1.175
2.000	12.717	41.2	150	Circular	85.400	84.100	1.150	85.300	83.791	1.359
1.001_1	22.080	19.8	225	Circular	85.300	83.716	1.359	84.250	82.600	1.425
3.000	17.130	38.1	150	Circular	84.200	83.050	1.000	84.250	82.600	1.500
1.002	14.334	200.0	225	Circular	83.950	81.600	2.125	84.000	81.528	2.247
1.003	2.682	95.8	300	Circular	84.000	81.528	2.172	83.950	81.500	2.150
1.004	20.755	100.0	150	Circular	83.950	81.450	2.350	83.950	81.242	2.558
1.005	14.893	59.8	150	Circular	83.950	81.242	2.558	83.400	80.993	2.257
1.006	25.608	20.6	150	Circular	83.400	80.993	2.257	81.200	79.750	1.300
1.007	8.505	21.3	150	Circular	81.200	79.750	1.300	80.750	79.350	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	450	Manhole	RE	J1	450	Manhole	RE
1.001	CP01	450	Manhole	PPIC	T1	1200	Manhole	PPIC
2.000	RE2	450	Manhole	Adoptable	J1	450	Manhole	RE
1.001_1	J1	450	Manhole	RE	CP01	450	Manhole	PPIC
3.000	RE3	450	Manhole	RE	CP01	450	Manhole	PPIC
1.002	T1	1200	Manhole	PPIC	T2	1200	Manhole	PPIC
1.003	T2	1200	Manhole	PPIC	FC1	1200	Manhole	Adoptable
1.004	FC1	1200	Manhole	Adoptable	PPIC1	450	Manhole	PPIC
1.005	PPIC1	450	Manhole	PPIC	PPIC2	450	Manhole	PPIC
1.006	PPIC2	450	Manhole	PPIC	PPIC3	1200	Manhole	Adoptable
1.007	PPIC3	1200	Manhole	Adoptable	OUTFALL		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RE1	385920.780	403295.290	85.600	0.800	450				
CP01	385887.910	403274.190	84.250	1.650	450	0	1.000	84.800	225
							3.000	82.600	150
						2	1.001_1	82.600	225
RE2	385913.470	403275.490	85.400	1.300	450	0	1.001	82.600	225
							2.000	84.100	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
J1	385906.490	403286.120	85.300	1.584	450		1 2.000 83.791 150 2 1.000 83.716 225 0	1.001_1 83.716 225	
RE3	385897.310	403259.870	84.200	1.150	450		0	3.000 83.050 150	
T1	385886.940	403273.580	83.950	2.350	1200		1	1.001 82.550 225	
						0	1.002 81.600 225		
T2	385874.360	403266.710	84.000	2.472	1200		1	1.002 81.528 225	
						0	1.003 81.528 300		
FC1	385872.110	403265.250	83.950	2.500	1200		1	1.003 81.500 300	
						0	1.004 81.450 150		
PPIC1	385882.390	403247.220	83.950	2.708	450		1	1.004 81.242 150	
						0	1.005 81.242 150		
PPIC2	385874.340	403234.690	83.400	2.407	450		1	1.005 80.993 150	
						0	1.006 80.993 150		
PPIC3	385852.360	403221.550	81.200	1.450	1200		1	1.006 79.750 150	
						0	1.007 79.750 150		
OUTFALL	385847.980	403214.260	80.750	1.400			1	1.007 79.350 150	

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.500	Drain Down Time (mins)	240
Ratio-R	0.340	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node FC1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	81.450	Product Number	CTL-SHE-0080-3500-1600-3500
Design Depth (m)	1.600	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node T1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	81.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	115.0	0.0	1.600	115.0	0.0	1.601	0.0	0.0

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m³)	
Full Bore Velocity	✓		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	84.859	0.059	20.2	0.2528	0.0000	OK
15 minute winter	CP01	10	82.716	0.116	30.1	0.0185	0.0000	OK
15 minute winter	RE2	10	84.145	0.045	5.2	0.0365	0.0000	OK
15 minute winter	J1	10	83.786	0.070	25.1	0.0112	0.0000	OK
15 minute winter	RE3	10	83.093	0.043	5.2	0.0381	0.0000	OK
120 minute winter	T1	94	81.787	0.187	12.5	20.7137	0.0000	OK
120 minute winter	T2	90	81.789	0.261	4.7	0.2947	0.0000	OK
120 minute winter	FC1	92	81.787	0.337	7.1	0.3814	0.0000	SURCHARGED
120 minute winter	PPIC1	92	81.281	0.039	3.0	0.0062	0.0000	OK
120 minute winter	PPIC2	96	81.021	0.028	3.0	0.0045	0.0000	OK
120 minute winter	PPIC3	96	79.779	0.029	3.0	0.0326	0.0000	OK
120 minute winter	OUTFALL	96	79.378	0.028	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	J1	20.0	2.122	0.152	0.1604	
15 minute winter	CP01	1.001	T1	29.7	1.794	0.272	0.0191	
15 minute winter	RE2	2.000	J1	5.1	1.176	0.185	0.0556	
15 minute winter	J1	1.001_1	CP01	25.0	1.611	0.212	0.3443	
15 minute winter	RE3	3.000	CP01	5.2	0.694	0.178	0.1608	
120 minute winter	T1	1.002	T2	4.7	0.591	0.128	0.5380	
120 minute winter	T2	1.003	FC1	7.1	0.570	0.062	0.1797	
120 minute winter	FC1	Hydro-Brake®	PPIC1	3.0				
120 minute winter	PPIC1	1.005	PPIC2	3.0	1.020	0.131	0.0443	
120 minute winter	PPIC2	1.006	PPIC3	3.0	1.293	0.076	0.0596	
120 minute winter	PPIC3	1.007	OUTFALL	3.0	1.292	0.078	0.0198	35.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	84.898	0.098	49.4	0.4167	0.0000	OK
15 minute winter	CP01	10	82.820	0.220	73.9	0.0350	0.0000	OK
15 minute winter	RE2	10	84.175	0.075	12.7	0.0606	0.0000	OK
15 minute winter	J1	10	83.831	0.115	61.6	0.0182	0.0000	OK
15 minute winter	RE3	10	83.119	0.069	12.7	0.0616	0.0000	OK
180 minute winter	T1	176	82.225	0.625	22.2	69.2295	0.0000	SURCHARGED
180 minute winter	T2	176	82.231	0.703	3.7	0.7950	0.0000	SURCHARGED
180 minute winter	FC1	180	82.224	0.774	7.9	0.8749	0.0000	SURCHARGED
15 minute summer	PPIC1	70	81.281	0.039	3.0	0.0062	0.0000	OK
30 minute summer	PPIC2	143	81.021	0.028	3.0	0.0045	0.0000	OK
30 minute winter	PPIC3	177	79.779	0.029	3.0	0.0326	0.0000	OK
30 minute summer	OUTFALL	144	79.378	0.028	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	J1	49.0	2.661	0.371	0.3131	
15 minute winter	CP01	1.001	T1	73.0	2.180	0.669	0.0367	
15 minute winter	RE2	2.000	J1	12.6	1.477	0.452	0.1081	
15 minute winter	J1	1.001_1	CP01	61.2	1.932	0.521	0.6609	
15 minute winter	RE3	3.000	CP01	12.6	0.855	0.436	0.2188	
180 minute winter	T1	1.002	T2	3.7	0.579	0.102	0.5701	
180 minute winter	T2	1.003	FC1	7.9	0.576	0.070	0.1889	
180 minute winter	FC1	Hydro-Brake®	PPIC1	3.0				
15 minute summer	PPIC1	1.005	PPIC2	3.0	1.020	0.131	0.0443	
30 minute summer	PPIC2	1.006	PPIC3	3.0	1.293	0.077	0.0597	
30 minute winter	PPIC3	1.007	OUTFALL	3.0	1.292	0.078	0.0198	46.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	11	84.966	0.166	92.6	0.7081	0.0000	OK
15 minute winter	CP01	11	83.132	0.532	130.2	0.0845	0.0000	SURCHARGED
15 minute winter	RE2	11	84.552	0.452	23.7	0.3640	0.0000	SURCHARGED
15 minute winter	J1	11	84.317	0.601	109.0	0.0956	0.0000	SURCHARGED
15 minute winter	RE3	11	83.464	0.414	23.7	0.3683	0.0000	SURCHARGED
360 minute winter	T1	344	82.982	1.382	25.5	152.9716	0.0000	SURCHARGED
240 minute winter	T2	232	82.982	1.454	4.2	1.6445	0.0000	SURCHARGED
360 minute winter	FC1	344	82.978	1.528	9.5	1.7282	0.0000	SURCHARGED
360 minute winter	PPIC1	344	81.284	0.042	3.4	0.0066	0.0000	OK
360 minute winter	PPIC2	344	81.023	0.030	3.4	0.0048	0.0000	OK
360 minute winter	PPIC3	344	79.781	0.031	3.4	0.0347	0.0000	OK
360 minute winter	OUTFALL	344	79.380	0.030	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	J1	89.9	2.816	0.680	0.6047	
15 minute winter	CP01	1.001	T1	130.1	3.272	1.192	0.0455	
15 minute winter	RE2	2.000	J1	22.1	1.582	0.797	0.2239	
15 minute winter	J1	1.001_1	CP01	107.9	2.712	0.918	0.8781	
15 minute winter	RE3	3.000	CP01	22.4	1.271	0.774	0.3016	
360 minute winter	T1	1.002	T2	3.7	0.578	0.102	0.5701	
240 minute winter	T2	1.003	FC1	9.9	0.544	0.087	0.1889	
360 minute winter	FC1	Hydro-Brake®	PPIC1	3.4				
360 minute winter	PPIC1	1.005	PPIC2	3.4	1.058	0.149	0.0486	
360 minute winter	PPIC2	1.006	PPIC3	3.4	1.342	0.087	0.0654	
360 minute winter	PPIC3	1.007	OUTFALL	3.4	1.341	0.088	0.0217	106.3