

BAILEY

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CONSULTING ENGINEERS

CATALYST BICESTER, WENDLEBURY ROAD, BICESTER

SUSTAINABLE URBAN DRAINAGE (SuDS) MAINTENANCE & MANAGEMENT PLAN

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CATALYST BICESTER SUSTAINABLE URBAN DRAINAGE (SuDS) MAINTENANCE & MANAGEMENT PLAN

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APPENDICES

- A Drainage Layouts, Easements Plans and Maintenance Access Details (by BJH)
- B Drainage Material Specification and Checklist Log (To be added post Construction)
- C Landscaping Plans + Management & Maintenance Plan (by Re-form Landscaping)
- D Photographic Record File (Management use only)

1 Introduction

- 1.1 This document sets out the principles for the long-term management and maintenance of the Sustainable Drainage Systems (SuDS). This is a “Live Document” which currently includes; enabling works to the David Lloyd site and Phase 1 (units 1-4, estate road and s278 works). Later phases will be added to this report until completion of the entirety of Catalyst Bicester, Wendlebury Road.
- 1.2 SuDS are a new environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water. SuDS aim to:
- Control the flow, volume and frequency of water leaving a development area,
 - Prevent pollution by intercepting silt and cleaning runoff from hard surfaces,
 - Provide attractive surroundings for the community,
 - Create opportunities for wildlife
- 1.3 The purpose of this document is to set out the basis of the development SuDS Maintenance Plan and to ensure that the adopting management company is entrusted with a robust inspection and maintenance programme, ensuring the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development and to prevent the increased risk of flooding both on and offsite in accordance with the National Planning Policy Framework (NPPF).
- 1.4 A detailed Flood Risk Assessment (FRA) was undertaken in February 2020 by Bailey Johnson Hayes. Details of the existing drainage regime, proposed drainage strategy and risk assessment can be found online under planning application reference No. 19/01740/HYBRID & No. 19/01746/OUT.
- 1.5 The activities listed in this document are generic to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company as required. Specific maintenance needs of the SuDS elements should be monitored, and maintenance schedules adjusted to suit requirements.
- 1.6 All those responsible for maintenance should follow relevant Health and Safety legislation (Health and Safety at Work Regulations, 1999) for all activities listed within this report including lone working, if relevant, and risk assessments should always be undertaken.
- 1.7 Any contractor employed by the Management Company shall carry out periodic maintenance of all such SuDS in accordance with the schedules listed in this report. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.

2 Managing the SuDS Features

2.1 The surface water drainage strategy for the proposed development utilises SuDS features to intercept and convey all surface water runoff. The design of the system aims to only attenuate runoff. Unfortunately, the site is not considered suitable for infiltration. There are also flood compensation basins which are designed to store water in extreme river flooding events. These should be treated like SuDS features for maintenance and management purposes.

2.2 The proposed surface water system consists of the following SuDS components:

- Swales;
- Storage Basins;
- Pervious Pavements.

2.3 In addition to the storm water SuDS systems, the proposed flood water system consists of the following components:

- Flood Compensation Basins;
- Existing Ditches;
- Existing Watercourses.

2.3 There are three categories of maintenance activities referred to in this report:

- **Regular maintenance** (including inspections and monitoring).
Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.
- **Occasional maintenance**
Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).
- **Remedial actions**
Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

2.5 The following section will specifically address SuDS Management and Maintenance items for the Catalyst Bicester site.

3 Site Specific Drainage Features

3.1 Specific details of the Surface Water & Flood water drainage regime can be found in **Appendix A**. In accordance with the concept surface water drainage scheme, the SuDS at Catalyst Bicester have been designed for easy maintenance to comprise of:

3.2 Storage Basin (1) is in the south west corner of the site. This landscaped dry basin is approx. 170m long, 20m wide and 1.5m deep. It is designed with maximum 1:3 banks to encourage plants and wildlife to live and grow near water features. This basin services the run-off generated by Units 10-13 roofs, car parks and yards.

Flow routes from the car parks are via collection pipes which run under the car parks towards flow control devices before being discharged via headwalls into Basin 1. Roof water flows in traditional sealed pipes, close to buildings, are transmitted with unrestricted flows into Basin 1 via headwalls. Surface water collected in the yards is collected by large line drains or gullies which is then pre-treated in by-pass petrol interceptors, before discharge into Basin 1 via headwalls.

Surface water collected in Basin 1 then flows into a single, flow-control manhole, before outletting into an existing watercourse, adjacent to Promised Land Farm. An overflow facility is provided in failure conditions of the SuDS feature. Discharge limited to greenfield rates is into the tributary watercourse which conveyances the water into the larger Langford Brook river.

3.3 Storage Basin (2) is in the center of the site and considered the main SuDS feature. This landscaped dry basin is approx. 200m long, 30m wide and 1.7m deep. It is designed with maximum 1:3 banks to encourage plants and wildlife to live and grow near water features. This basin services the run-off generated by Units 1-9 roofs, car parks, yards, estate roads and landscaping. Additionally, it is designed to take a maximum restricted outflow from the David Lloyd site of 60 litres / sec.

Flow routes from the car parks are via collection pipes which run under the car parks towards flow control devices before being discharged into Basin 2 via headwalls. Roof water flows in traditional sealed pipes, close to buildings, with unrestricted flows into Basin 2 via headwalls. Surface water collected in the yards is collected by large line drains or gullies which is then pre-treated in by-pass petrol interceptors, before discharging into Basin 2 via headwalls. A large common drainage run from the David Lloyd site via Units 1-4 underneath the estate road collects run-off from the road via gullies or kerb drains.

Surface water collected in Basin 2 then flows into a single, flow-control manhole, before outletting into an existing ditch to the east of the site. An overflow facility is provided in case of failure of the SuDS feature. Discharge limited to greenfield rates flows into the tributary ditch which conveyances the water into the larger Langford Brook river.

- 3.4 Car parks are to be either fully or partially constructed out of pervious block paving. Surface water will be directed toward porous blocks where it will infiltrate into underlying open graded stone, attenuating and treating run-off to reduce contamination and create storage volume. It is collected by porous pipes and transferred to flow-controlled manholes creating smaller sub-catchments.
- 3.5 All yards are constructed out of normal reinforced concrete and therefore are considered non-porous hard standing. These are drained traditionally via underground pipes into common drainage corridors.
- 3.6 Flood compensation basins are to be created in order to provide additional flood storage volume on-site as detailed in the Flood Risk Assessment (FRA). These are to be constructed in a similar manor to attenuation basins with, maximum 1:3 banks to encourage plants and wildlife to live and grow, enhancing biodiversity, while providing practical flood storage. Landscape banks are constructed to raise the development above the 1 in 100 + climate change level. These building pads are to be provided in order to protect the development and direct surface water into landscape areas away from the development.

4 Off-Site Drainage Features

- 4.1 The following items are to be adopted by the local authority (Cherwell District Council) and will be subject to separate management and maintenance regime:
- A new roundabout where storm water is intercepted by gullies or kerb drains. Storm water conveyance is then into an existing ditch adjacent to Wendlebury road and discharged at greenfield runoff rates via flow control.
 - In the event of large rainfall events water is stored in attenuation creates or a dry swale. Flow is normally through the attenuation creates with off-line storage available in the swale for extreme events.
 - A new 3m wide footpath adjacent to Wendlebury Road and the A41. Run-off generated by the new footpath will drain into existing ditches locally via new gullies fitted during Section 278 works.
 - A new entrance/exit bell mouth for the David Lloyd development drained via gullies into the existing ditch adjacent to Wendlebury Road.
- 4.2 The following items are to be solely managed and maintained by David Lloyd:
- All drainage infrastructure for surface water runoff generated by the car park, roofs and tennis courts. Any attenuation features required in exceedance events above the 60 litres / sec agreed outlet into the wider Catalyst development.

5 Traditional Drainage – Maintenance Schedule

- 5.1 The drainage elements are designed to cater for 1 in 30-year storm conditions without any flooding. In order to ensure that no contamination enters the water courses, silt traps and petrol interceptors are provided at appropriate positions. The main SuDS features have been designed to cater for the 1 in 100-year storm conditions with overland flows directed away from buildings. In designing the System due reference has been given to the CIRIA SuDS Manual, 2015.
- 5.2 **Gullies** - Inspect and de-sludge at least once a year.
- 5.3 **Line Drains** – Inspect and de-sludge silt boxes as necessary. Maintain strictly in accordance with the Manufacturer’s instructions but at least once a year. Check slotted grating for any blockages removing as necessary.
- 5.4 **Kerb Drains** – Inspect and de-sludge silt boxes as necessary. Maintain strictly in accordance with the Manufacturer’s instructions but at least once a year. Check openings for any blockages removing as necessary.
- 5.5 **Catch Pits** - Inspect and de-sludge at least once a year.
- 5.6 **Petrol Interceptors** – Maintain strictly in accordance with the Manufacturer’s instructions but at least once each year. Major refurbishment should be considered on a 15-year cycle, if required.
- 5.7 **Pipe Works** – Inspect and jet clean as necessary but at least once each year.
- 5.8 **Headwalls/Outlets** – These must be inspected and cleaned as necessary but at least twice each year. All gratings/screens and fixings should be checked and secured as necessary.
- 5.9 **Landscaping** – The landscaping is to be planted/managed/maintained as attached Re-Form Management & Maintenance Plan in **Appendix C**, as agreed with Oxfordshire County Council and attached.

6 Swales – Maintenance Schedule

Swales are linear, flat bottomed grassed or vegetated channels that convey water from one place to another which can also store water and allow it to soak into the ground. Maintenance of swales is relatively straightforward for landscape contractors. Adequate access is provided in the design of the swales for appropriate equipment and vehicles.

The major maintenance requirement for dry swales is mowing. Mowing should ideally retain grass lengths of 75-150mm across the main “treatment” surface, to assist in filtering pollutants and retaining sediments. However, longer vegetation lengths, where appropriate, are not considered to pose a significant risk. Grass clippings should be disposed appropriately away from the swale (SuDS Manual, 2015).

Table 1 – Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly, or as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding > 48 hours	Monthly, or as required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish silt removal prog.	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required, or if bare soil if exposed over 10% of swale area
Remedial Actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

7 Storage Basins – Maintenance Schedule

Basins, ponds and wetlands are depressions in the ground where water is stored and treated. Water levels rise after rain and then drops to the normal level as the excess soaks into the ground or is released slowly to a watercourse or drain. Some water maybe held back as a pond for final treatment, amenity or wildlife interest.

The major maintenance requirement for storage basins is mowing. Mowing should ideally retain grass lengths of 75-150mm across the main “treatment” surface. Regular mowing in and around basins is only required along maintenance routes, amenity areas (e.g. footpaths), across any embankment and across the main storage area. The remaining areas can be managed as “meadow” unless otherwise required.

Table 2 – Operation and maintenance requirements for Storage Basins

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes and/or meadow grass in basin	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly, (at start then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation, establish silt removal prog.	Half yearly
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove minor sediments from inlets, outlets and forebays	Annually
	Manage wetland plants in outlet pool - where provide	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years
	Remove major sediment from inlets, outlets forebay and main basin when required	Every 5 years
Remedial Actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Realignment of rip-rap	As required
	Repair/restore of inlets, outlets and overflows	As required

8 Pervious Pavements – Maintenance Schedule

Permeable surfaces such as permeable block paving, porous Asphalt, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Many of the specific maintenance activities can be undertaken as part of a general site cleaning contract.

Generally, pervious pavements require less frequent gritting in winter to prevent ice formation. There is also less risk of ice formation after snow melt, as the melt water drains directly into the underlying sub-base. A slight frost might occur on block paving.

Table 3 – Operation and maintenance requirements for Pervious Pavements

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequency's	Annually
	Monitor inspection chambers	Annually
	Brushing and vacuuming (Standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced based on manufacturers recommendations – pay particular attention to areas where water runs onto pervious surface from nearby impervious area as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised within 50mm of the level of paving	As required
	Remedial work to depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)

9 Management Guidance

9.1 The following details can be found in **Appendix A**:

- Details of the site that identifies runoff sub-catchments, SuDS components, critical water levels, control structures, flow routes (including exceedance routing) and outfalls.
- The extent of the adopted area along with easements and rights of way for access to carry out maintenance.

9.2 The following details can be found in **Appendix B**:

- The access that is required to each surface water management component for maintenance purposes and a plan for the safe and sustainable removal and disposal of waste periodically arising from the drainage system.
- The maintenance specification details the materials to be used and the standard of work required. The specification describes how the work should be carried out and contains clauses giving general instructions to the maintenance contractor.
- The maintenance checklist itemises the tasks to be undertaken and the frequency at which they should be performed so that an acceptable long-term performance standard is secured. This schedule can then be priced, checked on site and form the basis of an inspection log where appropriate. The checklist should act as a living document as it may change, where inspections advise changes to the scheme maintenance requirements.

9.3 The following details can be found in **Appendix C**:

- The landscaping plan, regime, planting schedule and maintenance & management plan. This is provided by the landscape architect and is to be read and implemented in conjunction with the recommendations in this report.

9.4 The following details can be found in **Appendix D**:

- Photographic records of the inspections to be used by the management company. This can pick up long-term changes that might not be apparent on a single visit, especially where inspections are carried out by different members of staff.

9.5 The appointed management company will be fully responsible for all maintenance works. The management company shall appoint a professional management surveying company to ensure all infrastructure and SuDS are properly maintained and managed.

10 Spillage – Emergency Action

- 10.1 Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.
- 10.2 In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.)

Contact the Environment Agency immediately.

11 Queries Regarding Design Features

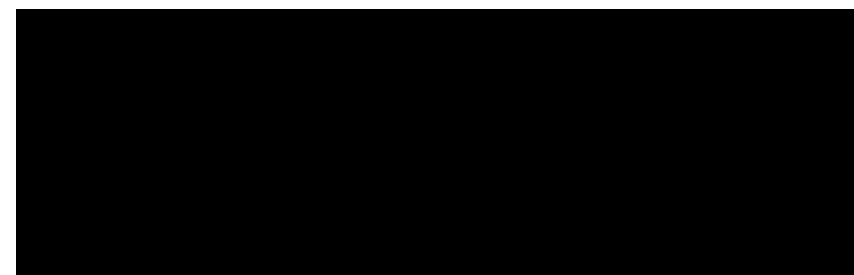
In the event of a concern or failure of a SuDS design feature contact:

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S1358/September 2020

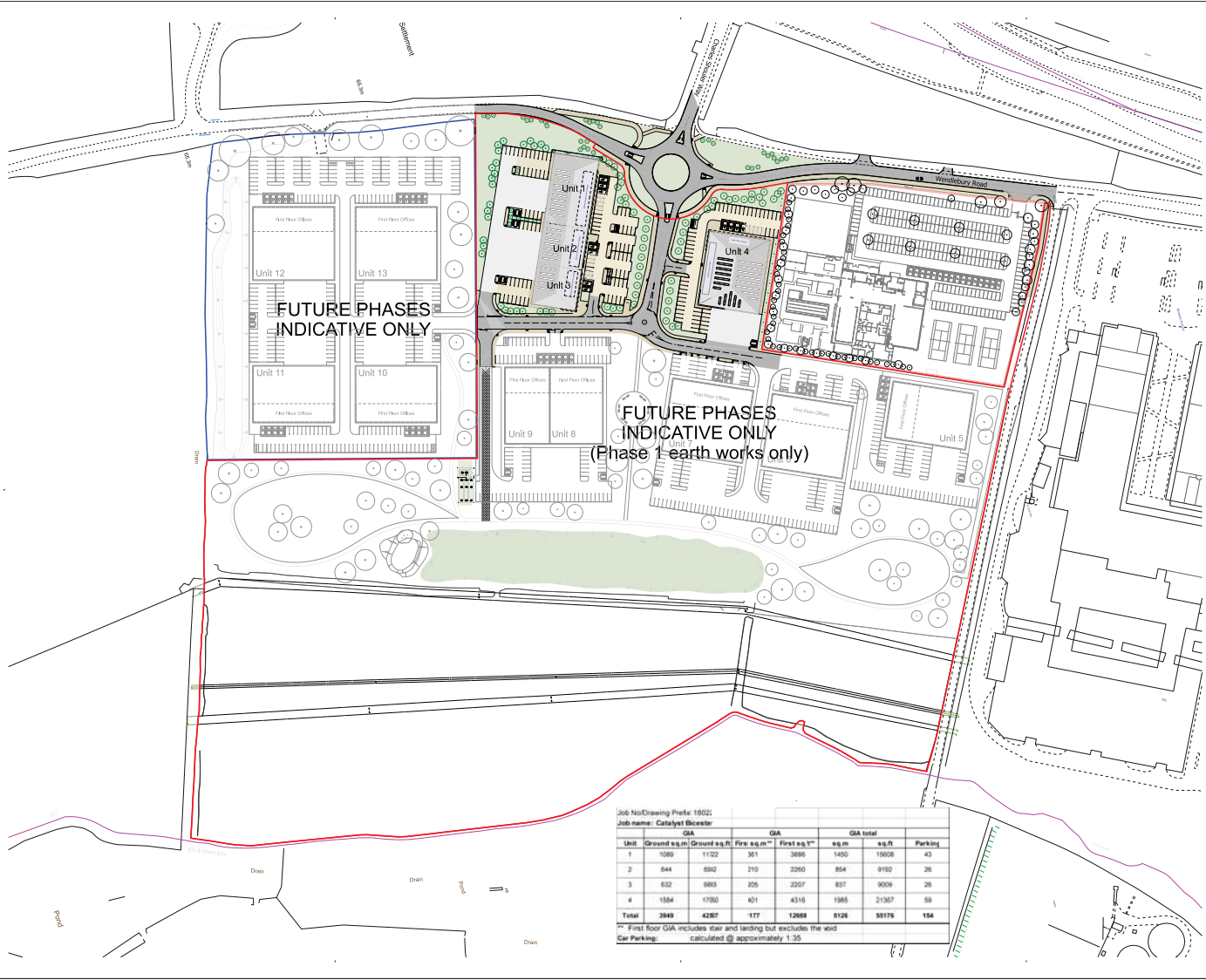
APPENDIX A

Drainage Layout Plans, Easement Plans and SuDS Details

By BJH & Cornish Architects

APPENDIX A.1

PHASE 1 PLANS



NOTES

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Legend:

- Concrete block paving to parking spaces
- Concrete block paving to parking (4.5m x 4.5m)
- Brushed concrete roadways
- Concrete block paving to footpaths
- Tarmac
- Soft landscape as Reform Information
- Trees as Reform Information
- W/ array
- Groundguard or di filter (gravel filter)
- EV charging point
- Dropped kerb with tactile paving
- RMA Phase 1 Boundary
- Other Land - Farm Site Boundary
- Health & Request Club Site

Scale:

1:1000

Job No: Drawing Prefix: 18022
Job name: Catalyst Bicester

Unit	GIA		GIA		GIA total		Parking
	Ground sq.m	Ground sq.ft	First sq.m	First sq.ft	sq.m	sq.ft	
1	1069	11522	361	3886	1430	15408	43
2	644	6932	210	2260	854	9192	26
3	632	6803	205	2207	837	9009	26
4	1564	17050	401	4316	1965	21367	59
Total	3949	42307	1177	12669	5126	55176	154

First floor GIA includes stair and landing but excludes the void
 Car Parking: calculated @ approximately 1:35

PHASE 1 PROPOSED SITE & FINISHES PLAN

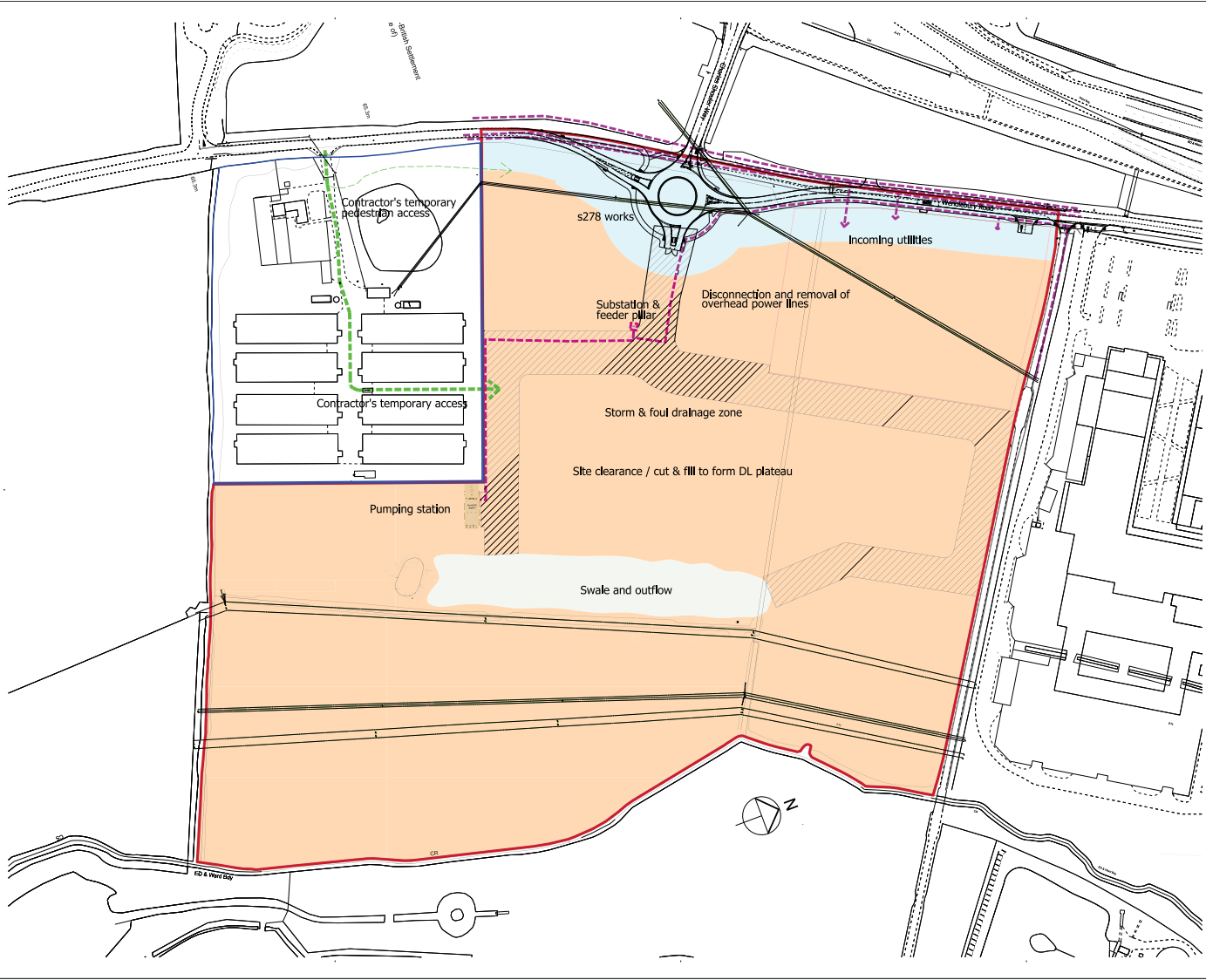
TOWN PLANNING

Scale: 1:1000 @ A1 29/07/2020 C S

ALBION LAND

18022 - TP - 001

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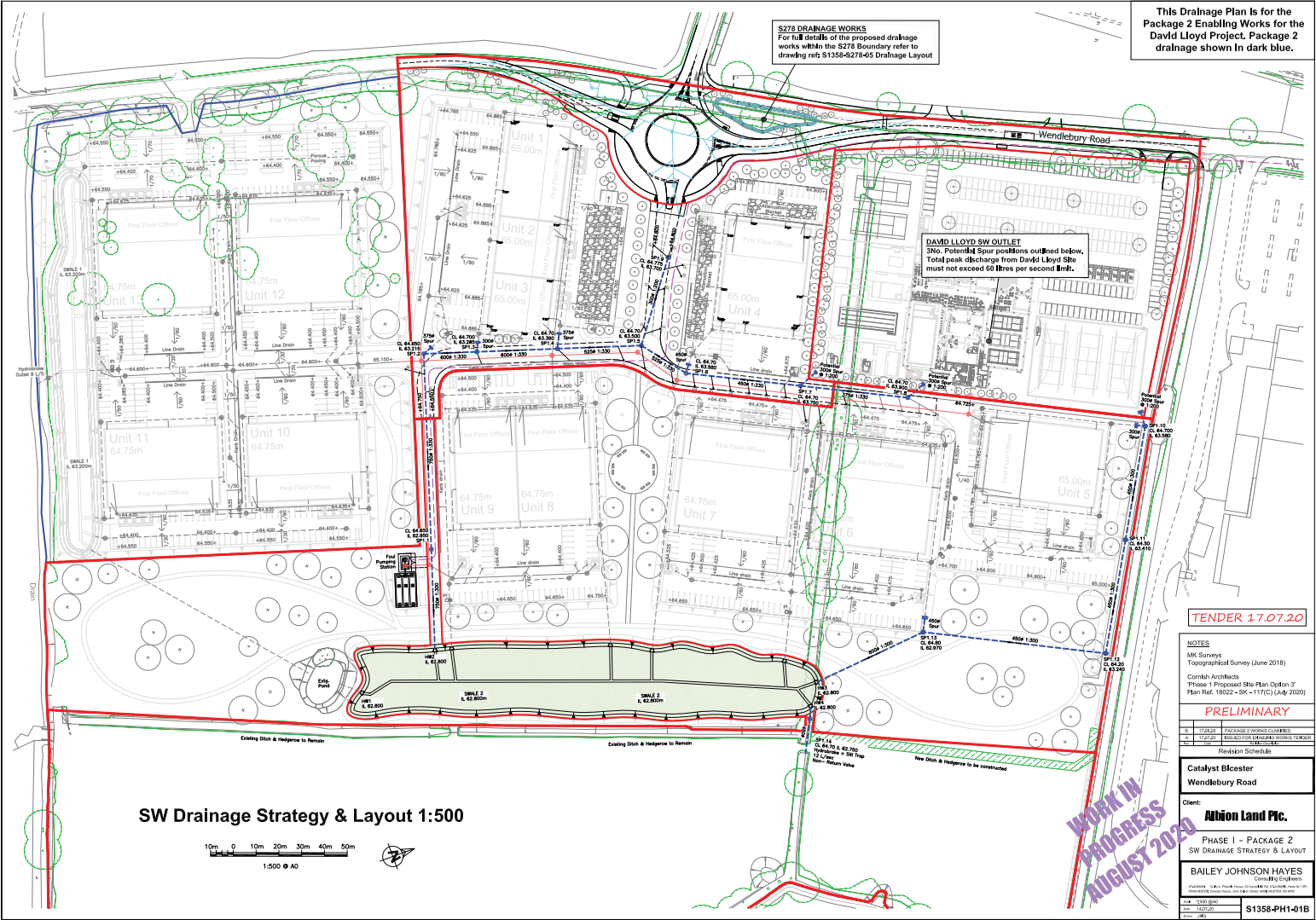
- NOTES**
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 Subject to design development.
 Where applicable this drawing is to be read in conjunction with other consultants drawings and shall be used for that purpose.
- Site Boundary
 - Adjoining Land Owned by Applicant
 - (Pink) Lloyd Health & Request (L&R) Site
 - Site clearance / cut & fill to form DL plateau
 - s278 works
 - ▨ Storm and foul drainage zone
 - ▨ Swale and outflow
 - Incoming utilities
 - Contractor's temporary access
 - Contractor's temporary pedestrian access

D	Drainage Zone amended	CS	17/09/2020
C	Contractor's access amended	CS	08/09/2020
B	Drainage amended	CS	16/07/2020
A	Access and shading added	CS	16/07/2020
Rev	Drawings	CS	08/09/2020

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 Project No: **CATALYST BICESTER**

Drawing No: **PHASE 1 DAVID LLOYD ENABLING WORKS**
FOR INFORMATION
 Scale: 1:1000
 Date: 29/06/2020
 Drawing No: **18022 - SK - 123** Rev: **D**

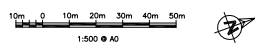


S278 DRAINAGE WORKS
 For full details of the proposed drainage works within the S278 Boundary refer to drawing ref: S1358-S278-05 Drainage Layout

This Drainage Plan is for the Package 2 Enabling Works for the David Lloyd Project. Package 2 drainage shown in dark blue.

DAVID LLOYD SW OUTLET
 5No. Potential Spout positions outlined below. Total peak discharge from David Lloyd Site must not exceed 60 litres per second inflow.

SW Drainage Strategy & Layout 1:500



TENDER 17.07.20

NOTES

- MJK Surveys Topographical Survey (June 2018)
- Corrish Architects Phase 1 Proposed Site Plan Option 3 Plan Ref: 19022-SK-117102 (JAH) 2020

PRELIMINARY

17.07.20	PACKAGE 2 WORKS SUPPLEMENT
17.07.20	PROPOSED FOR CONSULTATION TENDERS
17.07.20	REVISION SCHEDULE

Catalyst Bicester Wendlebury Road

Client: Altion Land Plc.

PHASE 1 - PACKAGE 2 SW DRAINAGE STRATEGY & LAYOUT

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WORK IN PROGRESS
AUGUST 2020