S1358/230117/WB/JG

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BAILEY JOHNSON HAYES CONSULTING ENGINEERS

Phase 2 – Catalyst, Bicester
Technical Note – LLFA / CDC Drainage Response

Introduction

This technical note has been produced as an addendum to Application No: 22/03677/DISC relating to discharge of Condition 40 (SW Drainage). This condition has been partially discharged for Phase 1 which is now complete. Phase 2 (Units 5-9) is the next and final phase of development for this application. Please find below Bailey Johnson Hayes responses to consultee comments received to date.

LLFA Comments Responses

1. Provide pipe numbering on the drainage plan which should read in line with the calculations produced.

   Drawings No. S1358-PH2-04B, 06B, 08B and 10B have been updated to provide MircoDrainage calculation pipe numbers and lengths as requested. Please note all pipe number can be found on drawing no. S1358-DD02 Rev C which is appended to the Catalyst Bicester SW Drainage calculations package revision 3.

2. Provide SuDS construction details drawings.

   New Drawings No. S1358-PH2-17A, 18, 19, 20, 21, 22 & S1358-PH1-23 are now submitted to provide full details of the Attenuation Basin 2, Petrol Interceptors 3-5, Permeable Paving, Hydro-brake outlet manhole, headwalls, culverts and ditches.

3. Provide consent to discharge to the existing watercourse.

   Application submitted to Tony Brummell at Cherwell District Council for approval of headwalls, culvert and re-graded outfall ditch to the Langford Brook.

4. Confirm the capacity of the ditch to take the proposed loads without posing flood risk to the neighbouring sites.

   Please find attached Ditch Capacity Calculations to confirm ditches are OK.

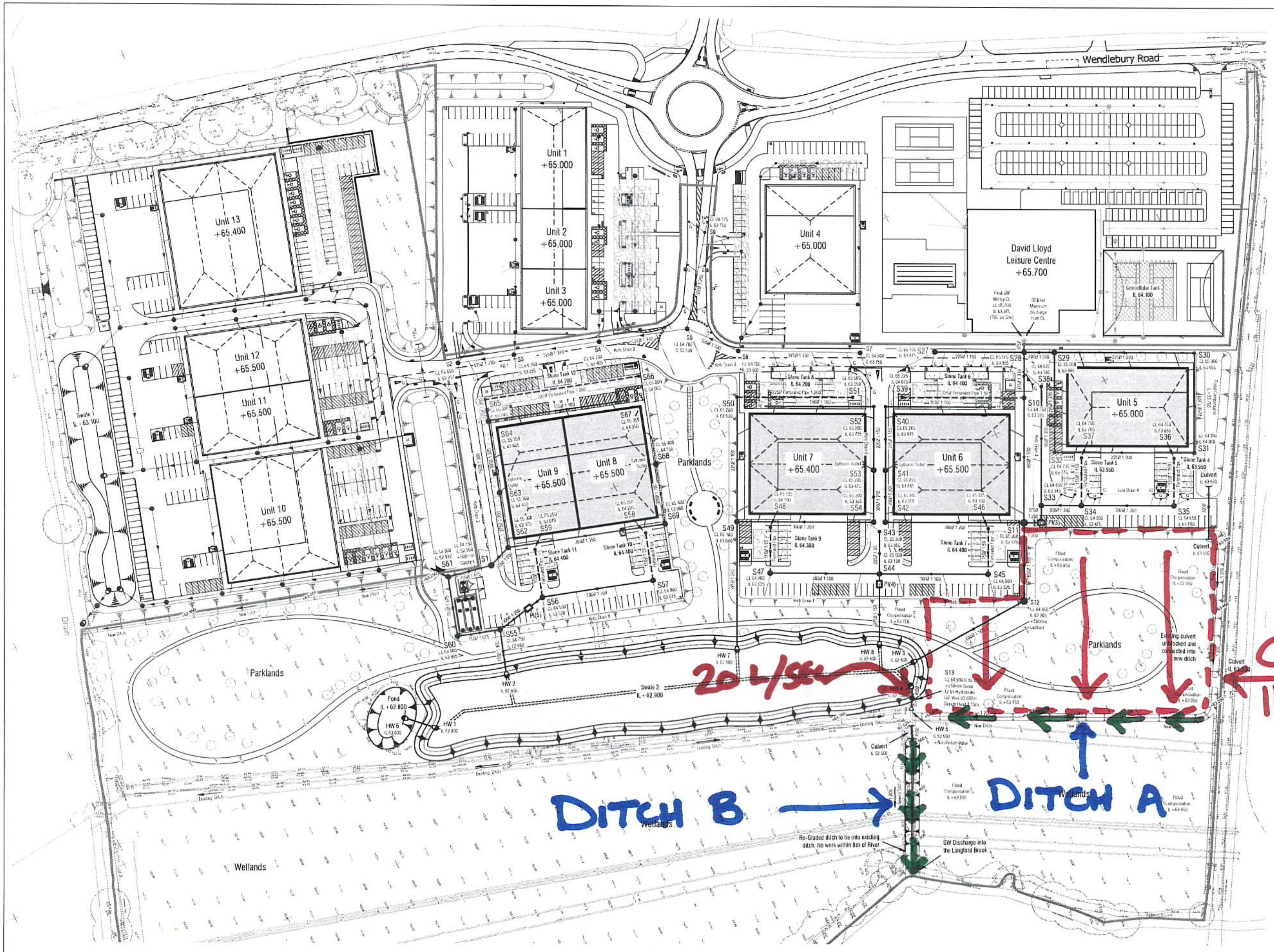
5. Provide flood exceedance plan with flood arrows demonstrating that all surface water will be kept away from structures and within the site boundary.

   Please find submitted S1358-DD05 Rev A. Note this was also appended to the Catalyst Bicester SW Drainage calculations package revision 3.

CDC Drainage Comments Responses

1. I have not been able to inspect the outfall between the proposed attenuation basin and the receiving watercourse, the Langford Brook, due to the area being securely fenced at the time of visit. The outfall must be in sufficiently good condition to freely pass the outfall discharges and maintained thereafter. The discharge to the Langford Brook will require a consent from the environment Agency.

   Full details of outfall arrangements submitted to Cherwell District Council for approval of headwalls, culvert and re-graded outfall ditch to the Langford Brook.
   Note:- No works proposed within 8m of River so EA approval not required.



Phase 2 SW Drainage Layout 1:500

A0

DRAINAGE NOTES

1. This drawing is to be read in conjunction with all relevant Architects and Bailey Johnson Hayes drawings and specifications.
2. Do not scale. Work only to figured dimensions.
3. All dimensions and condition of existing drainage to have invert levels confirmed on site prior to commencement of work.
4. Proposed Site and Finishes Plan from Cornish Architects - Drawing Ref. 22011 - TP - 001 - E
   Topographical Survey by MK Surveys Limited
   Drawing Ref. 25646 (Rev 1) - Topographical Survey
5. All works to Adopted Sewers to be carried out in accordance with the requirements of Sewers for Adoption in the Sewerage Sector Guidance v2.2 (2022) and the Adopting authority requirements.
6. All private drainage is to be constructed in accordance with the Building Regulations as current at construction.
7. Drains to be 'Hepworth Supersleeve' or similar approved Laid in Class S Bedding to BS 862 1983. Table 4, or to BS 8301 1985. Appendix D. 450mm Diameter Drains and above are to be Hepworth Concrete Pipes Class H or similar approved drains within the site may be different main accordance with Sewerage Sector Guidance v2.2 (2022).
8. All trenches within trafficked areas to be backfilled with 75mm down graded stone fill, placed and compacted in 150mm layers. All pipes in Roadways / Parking, less than 900mm deep to pipe crown to be encased in concrete and flexible joints provided at 3000mm centres.
9. All drains to have Class S granular bed and surround, except where:
   a) Cover beneath roads or hardstanding is less than 900mm to Pipe Crown or,
   b) Cover beneath landscaping is less than 600mm in which case Class Z bed/surround is required.
10. All Manholes greater than 1m to soffit to be constructed in Precast Concrete Rings to BS 5911: Part 1. Rings to be bedded in sealant strips unless otherwise noted in Manhole Schedule.
11. Manholes in footpaths or landscaped areas to be backfilled with 40mm down graded stone fill, compacted in layers not exceeding 150mm thick. All manholes beneath roads and parking areas to be cased in minimum 150mm concrete surround.
12. All connections to rain water pipes to be provided with Rodding access.
13. All road gullies to be Hepworth Road Gullies, Ref 214 RGR4 with 150mm diameter outlets or similar approved. Gullies to be encased in minimum 150mm concrete.
14. Drains under buildings and within 300mm of the underside of floor slab to be encased in 150mm concrete. Casing to incorporate flexible fibre board joints at spacing's as recommended by the pipe manufacturer. Drains under buildings
15. Architect is to provide final rain water pipe positions for construction.
16. All Pipes to enter manhole with Soffits Level unless otherwise stated. See manhole details drawings for further clarity of connections.

LEGEND

- INDICATES SURFACE WATER MANHOLES
- INDICATES SURFACE WATER PIPE RUNS
- INDICATES INDICATIVE DAVID LLOYD DRAINS
- INDICATES LINEAR DRAINAGE CHANNELS
- INDICATES ROAD GULLIES
- INDICATES SUBGRADE STONE TANK
- INDICATES ATTENUATION BASINS

ALL PIPES CONNECTED DIRECTY INTO GULLIES TO BE 150MM DIAMETER (COLOURED MAGENTA ON PLAN)

SCALE

10m 5m 0 10m 20m 30m

Scale 1:500 @A0

ADDITIONAL NOTES

NOTE: DAVID LLOYD SW DRAINAGE DESIGNED AND CONSTRUCTED BY OTHERS. RESTRICTED TO 60 L/S INTO CATALYST BICESTER SW SCHEME

NOTE: DRAINAGE IS A MIXTURE OF INVERT & SOFFIT MANHOLE DESIGN. SEE BJH MANHOLE DETAILS FOR SPECIFIC PIPE INLET/OUTLET LEVELS

NOTE: ALL RWP PIPE POSITIONS TO BE AGREED WITH THE ARCHITECT

TOWN PLANNING

Rev	Date	Revision Description
B	17.01.23	Minor Revs to LLFA comments
A	10.01.23	Issued for Tender

Revision Schedule

Project Title: Catalyst Bicester Wendlebury Road, Bicester

Client: ALBION LAND

Drawing Title: PHASE 2 SW Drainage Layout

BAILEY JOHNSON HAYES
Consulting Engineers

Scale	1:500 @A0	Drawing Number
Date	24.11.22	S1358-PH2-02 B
Drawn	JNG	

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Project	Project No.	Sheet No.
Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	S1358	1 of 2
	Drawing No. —	Rev. —
Section: Ditch Capacity Check	By: JG	Date: Jan 2023
	Checked: WB	Date: Jan 2023

Calculations

Ditch 'A' Capacity Check

Note: See Attached over Mark for Position of Ditch A.

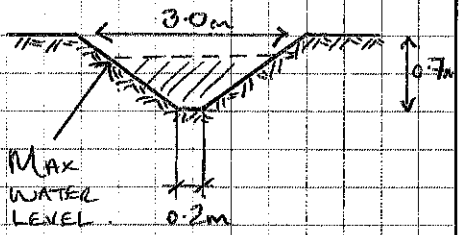
Ditch Design Parameters

Total Length of Ditch	=	120·0m
Invert Level at Top of Ditch	=	63·20m AOD.
Invert Level at Btm of Ditch	=	62·60m AOD.
Slope = 120 / (63.2 - 62.6)	=	1 in 200 or 0·005 m/m
Area Drained by Ditch	=	10,000 m² (Parklands Adjacent)
Upstream Area's Drained	=	10,000 m² (Garden Centre Overland Flow)

Channel Charaterlists

Average Top Width of Channel	=	3·0m
Average Btm Width of Channel	=	0·2m
Channel Depth (Average)	=	0·7m
Slope	=	0·005 m/m
Roughness Coefficent (n)	=	0·050*

* Fairly Regular Section with Some Pools of Earth.



Typical Section

Channel Flow Capacity

The Maximum Velocity and Maximum Discharge are Calculated Below using Mannings Formula Assuming the Channel is 75% Full.

$$V = \frac{R^{\frac{2}{3}} \times S^{\frac{1}{2}}}{n} = \frac{0.246^{\frac{2}{3}} \times 0.005^{\frac{1}{2}}}{0.05} = 0.555 \text{ m/s}$$

$$Q = A \times V = 0.6 \times 0.555 \times 0.75 = \underline{250 \text{ l/s}}$$

Expected Peak 1-Hour Flows

Area to be Served	=	20,000 m² (A)
Assumed FEH Rainfall Intensity	=	82·6 mm/hr (i)
Duration = 1 Hour.		
Coefficient of Runoff (Average)	=	0·5 (conservative) (C)

$$Q = CiA = \frac{0.5 \times 0.0826 \times 20,000}{60 \times 60} = 0.23 \text{ m}^3/\text{s} \text{ or } 230 \text{ l/s}$$

< 250 ✓ OK.

∴ Ditch is Currently OK

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Project	Project No.	Sheet No.
Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	S1358	2 of 2
	Drawing No. --	Rev. -
Section: Ditch Capacity Check	By: JG	Date: Jan 2023
	Checked: WB	Date: Jan 2023

Calculations

Ditch 'B' Capacity Check

Note: See Attached Over Mark for Position of Ditch B.

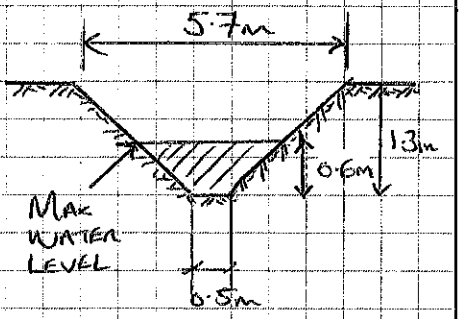
Ditch Parameters

Total Length of Ditch	= 46.5m
Invert Level at Top of Ditch	= 62.50m AOD.
Invert Level at Btm of Ditch	= 62.268m AOD.
Slope = (46.5 / (62.5-62.268))	= 1 in 200 or 0.005 m/m
Area Drained by Ditch	= 265 m² (Area of Ditch)
Upstream Flows Drained	= 20 l/s (Swale 2) } < 250-300 l/s.
	= 230 l/s (Ditch A) }

Channel Characteristics

Average Top Width of Channel	= 5.7m
Average Btm Width of Channel	= 0.5m
Channel Depth Overall	= 1.3m
Slope (S)	= 0.005 m/m
Roughness Coefficient (n)	= 0.05 *

* Fairly Regular Section with Small Pools of Water.



Channel Flow Capacity

The Maximum Velocity and Maximum Discharge are Calculated Below Using Mannings Formula Assuming Max Depth of 0.6m

$$V = \frac{R^{\frac{2}{3}} \times S^{\frac{1}{2}}}{n} = \frac{0.320^{\frac{2}{3}} \times 0.005}{0.05} = 0.66 \text{ m/s}$$

$$Q = A \times V = 1.0 \times 0.66 = \underline{660 \text{ l/s}}$$

Expected Peak 1-Hour Flows

Area Served Directly by Ditch	= 265 m²
FEH 1-Hour Rainfall Depth	= 82.6 mm/hr
Duration	= 1 Hour
Coefficient of Runoff	= 0.3
Additional Flows	= Say 300 l/s.

$$Q = CiA = \frac{0.3 \times 0.0826 \times 265}{3600} + 300 \text{ l/s} = 18 + 300 = \underline{318 \text{ l/s Max}}$$

∴ Ditch is currently OK ✓