

Technical Note

01 September 2020

To Jackson Civil Engineering
CC
Subject CS/099505 Drainage Strategy
Document Reference A29-CAP-HDG-00-AN-D-0052 S3-P05

The technical note supports the drainage strategy drainage layout drawing A29-CAP-HDG-00-SK-D-0047 and covers the following information:

- Outline details of the various infiltration and attenuation ponds
- Ground water levels
- Control discharge rates to watercourses
- Overland flows

Property and infrastructure

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1. Infiltration and attenuation ponds

| Pond Ref No. | No.1 | No. 2 | No. 3 | No. 4 |
|---|---|-------------------------------------|---|--|
| Type | Infiltration (cellular storage) | Infiltration | Attenuation (Off-line) | Attenuation (Off-Line) |
| Chainage | Ch 0 | Ch 470 | Ch 780 | Ch 1420 |
| Chainage distance | Roundabout tie-in areas and Ch 0 – Ch 160 | Ch 160 – Ch 470 | Ch 470 – Ch800 and Ch 800 – Ch 1000 | Ch 1015 – Ch 1290 |
| Catchment Area (ha) | 0.535 | 0.717 | 1.135 | 0.590 |
| Invert level of the Storage volume (m AOD) | 1A - 13.000 1B - 13.000 | 12.700 | 10.900 | 8.500 |
| Base Level (m AOD) | 1A - 13.000 1B - 13.000 | 12.700 | 10.730 | 8.325 |
| Infiltration rate (m/hr) | 0.144 | 0.064 | N/A | N/A |
| Discharge Rate (l/s) | N/A | N/A | 1.8l/s (See section 2.0) | 5l/s (See section 2.0) |
| Volume of storage (m3) | 345 | 495 | 1151 | 408 |
| Plan area (m2) | 345 | 683 | 1588 (top of water) | 807 (top of water) |
| Ground water level (m AOD) (See section 2.0) | 12.700 BH 2 (Recorded GWL) | 12.531 BH 104A (Recorded GWL) | 11.454 DS102 (Winter Monitored GWL) | 9.449 DS103 (Winter Monitored GWL) |
| Existing ground level (m AOD) | 15.500 | 13.760 | 11.620 | 10.050 |
| Proposed Road CL level | 14.880 | 14.650 | 12.540 | 10.470 |

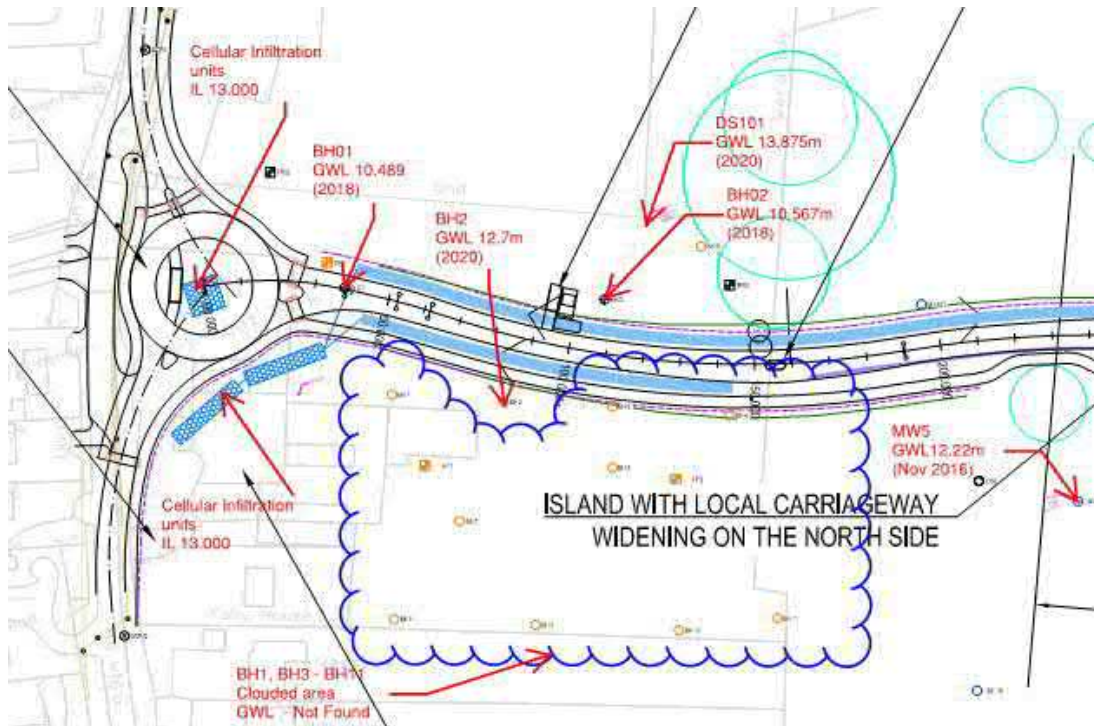
Note: As agreed with WSCC/ Arun DC the 1m clearance between peak GWL and IL of infiltration units is not required.

2. Ground Water Level

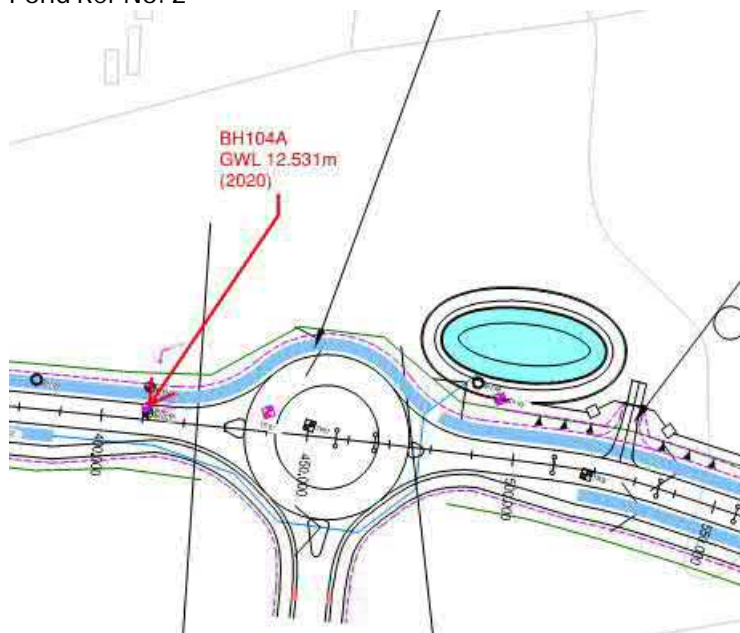
This section provides images for the location of the GWL data locations.

Pond Ref No. 1

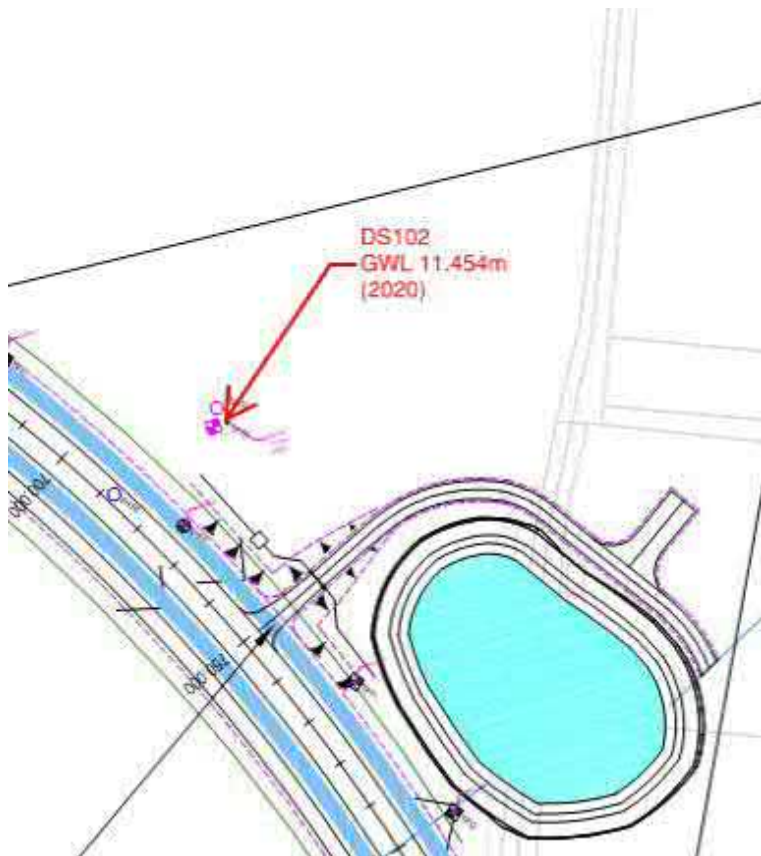
Due to uncertainty of the GWL in the area of the infiltration units, additional soakaway testing will be undertaken in winter 2021, prior to finalising the design.



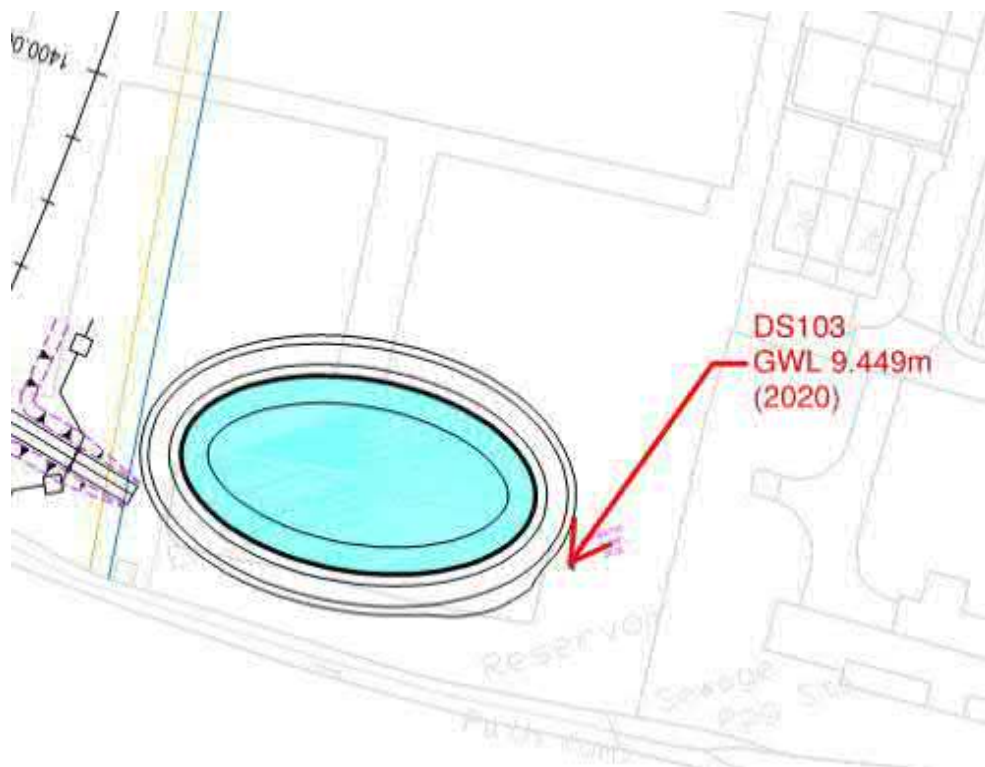
Pond Ref No. 2



Pond Ref No.3



Pond Ref No. 4



3. Control discharge rates to watercourses

3.1. Barnham Lane Ditch

The catchment area of infiltration pond no. 3 is 1.135ha.

Based on a greenfield runoff rate for 1 in 2 year as 2.1 l/s/ha the allowable discharge rate is 1.8l/s.

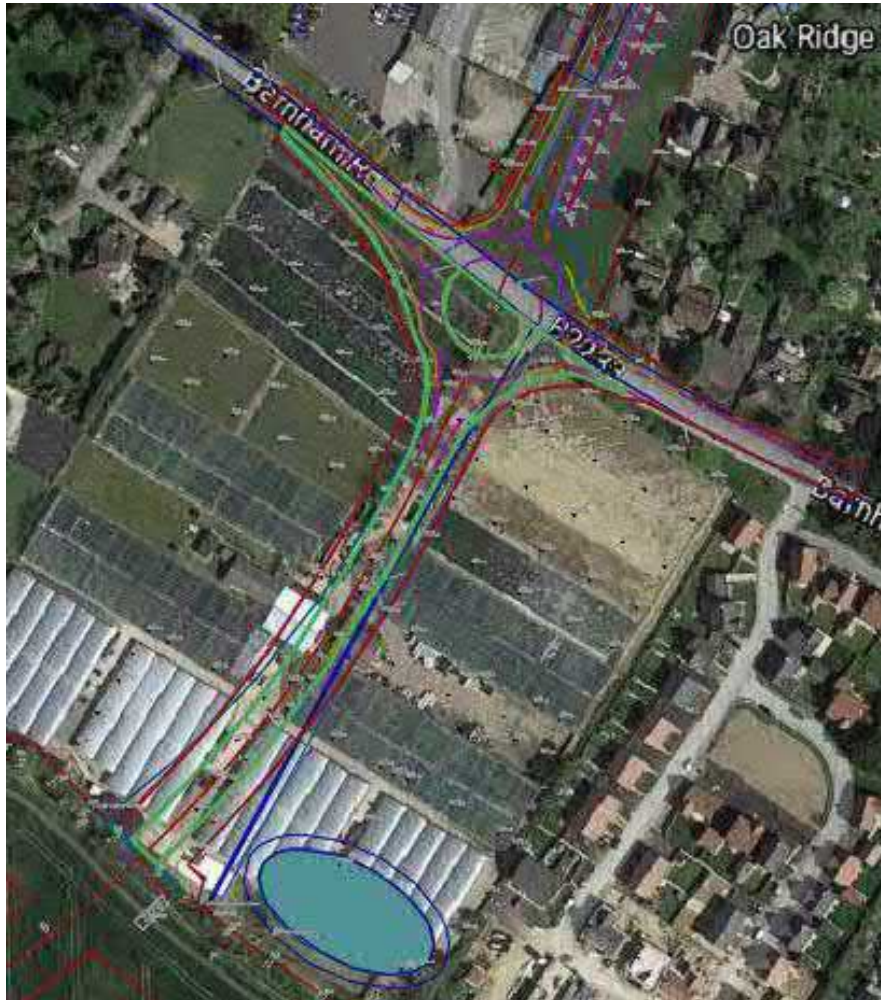
The WSP Flood Risk Statement Report (FRS) identified the catchment (referred to as Area 1) currently discharging to the Barnham Lane Ditch. The proposed alignment of the A29 will isolate 7.8ha of the existing catchment from the ditch, this equates to a reduction in greenfield runoff of 16.4 l/s. Therefore, the proposed discharge rate of 1.8l/s from pond no. 3 is a betterment to the net discharge into the Barnham Lane Ditch.

The existing FRS had concluded that no culvert was required to enable catchment Area 1 to continue to discharge into the Barnham Lane Ditch, as the surface runoff would go to the south watercourse.

Once the development is constructed this seems reasonable, but it is unclear how surface water flows will behave in the short term.

3.2. School watercourse

The section of the new roundabout and southern road section extending to the school watercourse is approx. 4235m², as per green outline in the image below. The area is split between impermeable and permeable areas as it passes through the existing nursery site.



Calculated discharge rate based on current conditions:

Existing Permeable area = 2750m²

Based on greenfield runoff rate for 1 in 2 year as 2.1l/s/ha the effective flow rate is 0.58l/s

Impermeable area = 1485m²

Based on Wallingford procedure the 1 in 2 year flow rate is 4.5l/s

The total existing flow for a 1 in 2 year event from the green area is therefore 5.08l/s

With reference to WSCC Highway Drain Criteria and Document W5-074-A-TR-1 'Preliminary rainfall runoff management for developments' item 17. The practicable minimum limit on the discharge rate is set a 5l/s.

Therefore, providing the 5l/s from pond no. 4 does not offer betterment but is no worse than the existing discharge to School Watercourse.

4. Overland Flow

4.1. Fontwell Avenue Roundabout

An existing overland flow route has been identified along Fontwell Avenue running from north to south through the location of the proposed roundabout. The existing drainage system and levels through this area are to be investigated and measures put in place, during the detailed design, to prevent any increase in flood water levels in this area.

4.2. Barnham Road Roundabout

An existing overland flow route has been identified along Barnham Road running west to east through the location of the proposed roundabout. This area currently drains to the School Watercourse located to the south of Barnham Rd. The existing drainage system is to be investigated and the detailed design will be developed to maintain or improve the capacity of the system to discharge flows to the School Watercourse and so avoid any increase to flood levels in this area.