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Notes:

1. This drawing is to be read in conjunction with all relevant Architects and Engineers Drawings.
2. It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.

Drainage Strategy

The development site area totals 5789m<sup>2</sup>

Existing greenfield run off using IH 124 method based on 50Ha and interpolated down to 0.519Ha

SAAR (mm) 1133; Soil 0.5; Region No 3

Q1 50Ha = 417.1L/sec pro rata to 0.519Ha = 4.329L/sec  
Q30 50Ha = 918.5L/sec pro rata to 0.519Ha = 9.534L/sec  
Q100 50Ha = 1008.5L/sec pro rata to 0.519Ha = 10.4715L/sec

QBAR 50 Ha = 485L/sec pro rata to 0.519Ha = 5.03L/sec

NPPF requires that surface water arising from a developed site should as far as practicable be managed in a sustainable manner to mimic the surface water flows arising from the site prior to development.  
Opportunities to reduce the surface water run off and the associated flood risk should be identified.

Consideration has been given to the use of infiltration devices for dealing with the surface water drainage.

A search of recorded borehole logs in the surrounding area and local knowledge of the site show the underlying strata to consist of yellow/brown silty clays which will be unsuitable for any infiltration devices to work effectively.

The nearest water watercourse is the River Don which flows along the Northern Boundary of the site. The site slopes steeply towards the river.

The floor levels of the proposed new dwellings will be 3.9m above the floor levels of the recently developed Millstone residential development on the opposite side of the river, and 8.2m above the water level of the river (measured at the time of the survey).

The Environment Agency flood maps show the proposed development area to be in flood zone 1, the lower parts of the site to the North East adjacent to the bridge are shown to be in flood zones 2 and 3. This part of the site is to remain un-developed and there will be no alterations to the existing ground levels in this area. The 3 new dwelling will be accessed off Roughbirchworth Lane. In order to gain safe vehicular and pedestrian access to the properties the floor levels will be set above the existing ground levels, however this is well above the flood levels so there will be no loss in the available wash land on the site.

Any groundwater, overland flows or sewer flooding will be able to pass through the site and into the watercourse without affecting the proposed properties.

There is a foul public sewer in the adjacent highway. The proposal is to form a gravity domestic foul drainage connection onto this sewer.  
The off-site drains running below the adopted highway will be offered to Yorkshire Water for adoption under a Section 104 agreement.

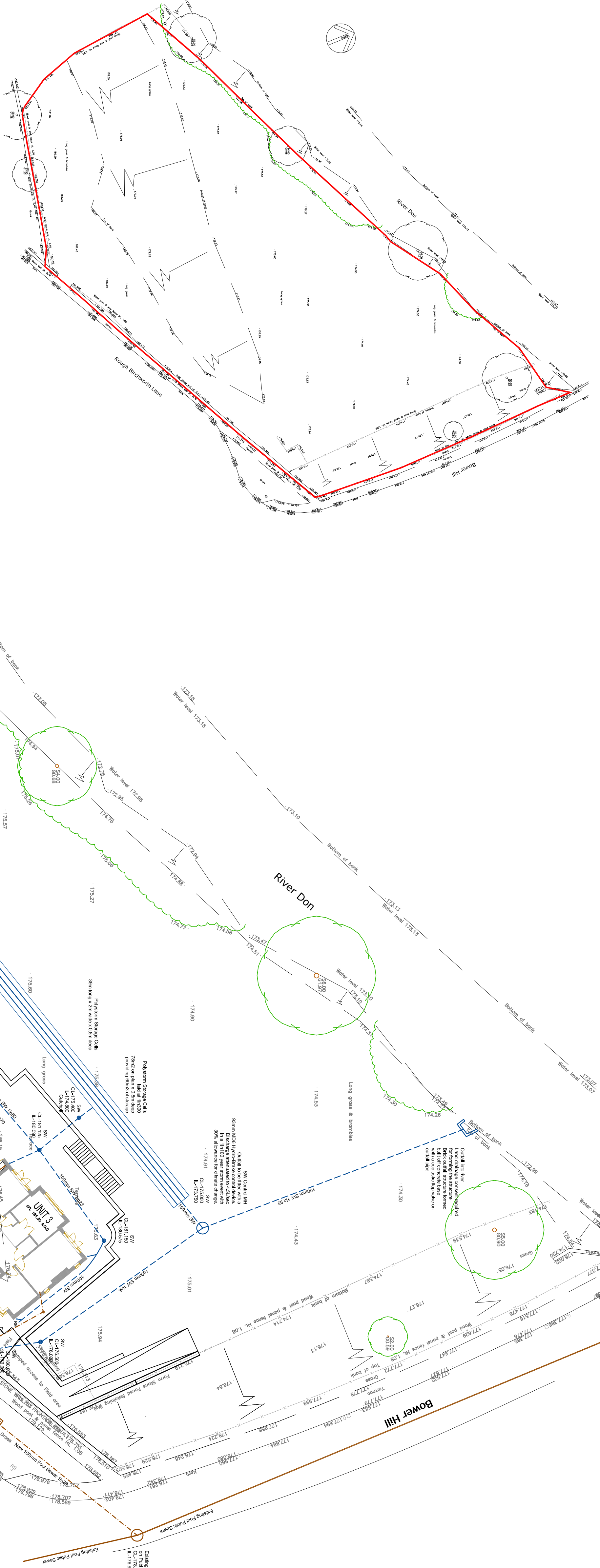
The proposed strategy for draining the surface water from the site is to form a new piped outfall into the adjacent watercourse with the flows attenuated to an acceptable level.

The QBAR for the site is 5.03L/sec

The site drainage will be designed to ensure that the peak discharge rate does not exceed 5.03L/sec in a 100 year storm event with a 30% allowance for climate change.

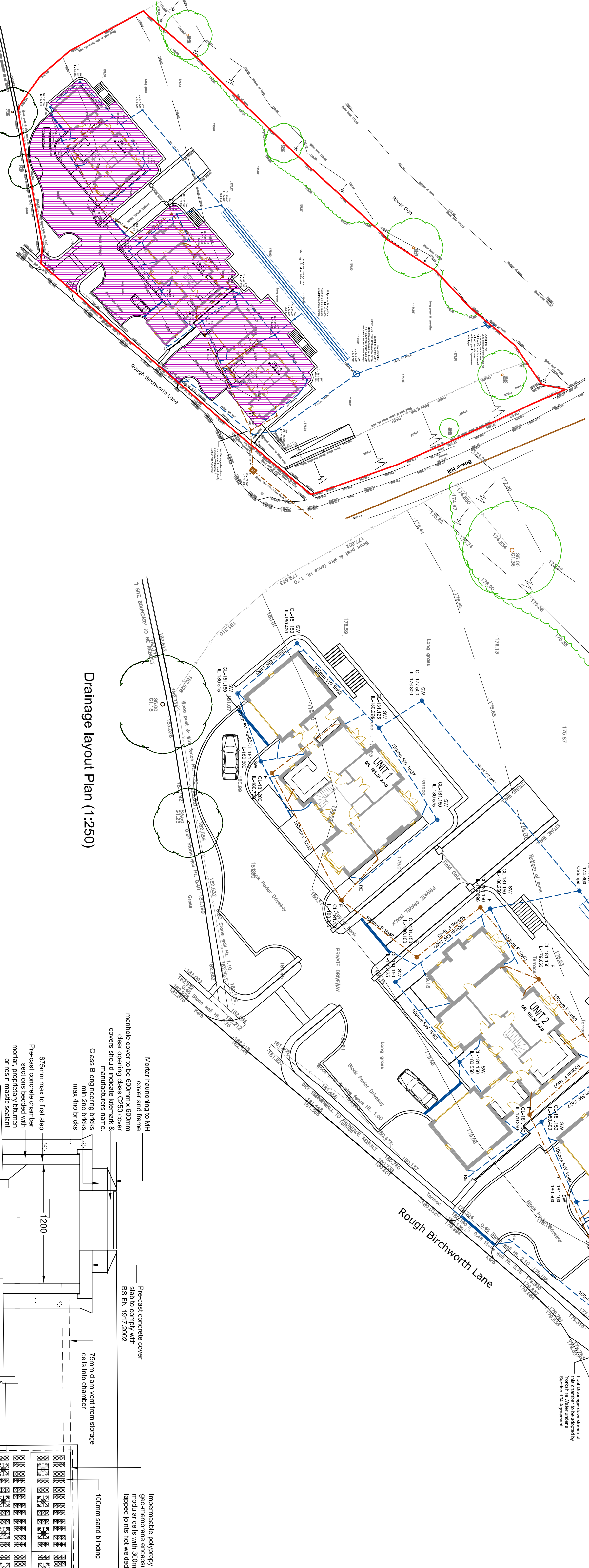
The proposed surfaced and drained catchment area is 1560m<sup>2</sup>

This can be achieved by attenuating the flows using a 93mm MD6 Hydro-brake and providing 60m<sup>3</sup> of storage.  
See micro-drainage calculations



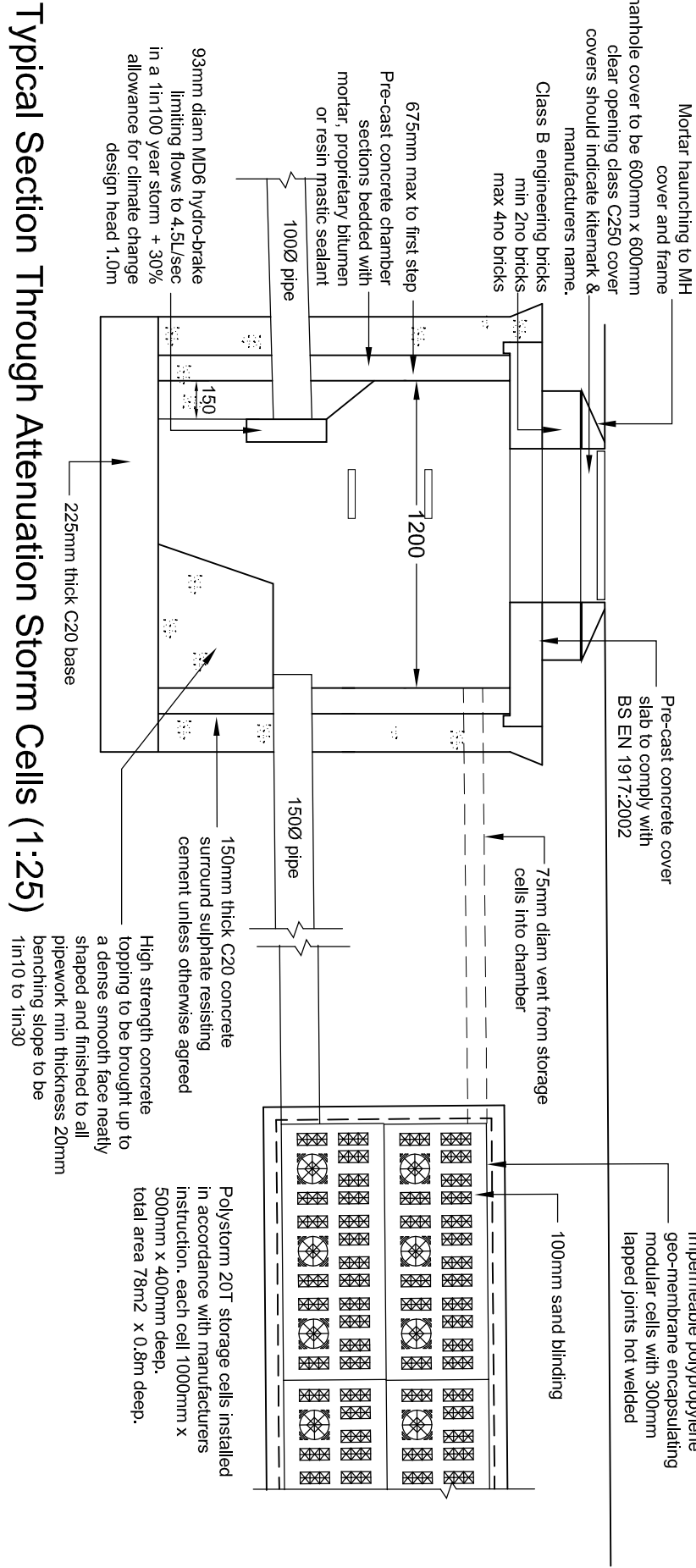
Existing Topographical Survey (1:500)

Total development site area = 5789m<sup>2</sup>



Drainage layout Plan (1:250)

1. EXCAVATE THE TRENCH TO THE REQUIRED DEPTH ENSURING THAT THE FLOOR AREA IS SLIGHTLY GREATER THAN THAT OF THE STORAGE CELL UNITS.
2. LAY 100mm BED COURSE SAND, LEVEL AND COMPACT.
3. LAY THE GEOMEMBRANE OVER THE BASE AND IF THE SIDE OF THE TRENCH.
4. LAY THE STORAGE CELL UNITS PARALLEL WITH EACH OTHER OR IN ROWS, ENSURING THEY ARE FULLY LAPPED OVER THE CURBS AND THE SHEET CONNECTORS.
5. HOT WELD WITH GEOMEMBRANE AROUND THE UNITS FORMING A DOUBLE SEAL IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
6. DRAINAGE CONNECTIONS TO BE MADE USING PROPRIETARY ADAPTORS.
7. LAY 100mm OF COURSE SAND BETWEEN THE TRENCH WALLS AND THE STORAGE CELLS.
8. LAY 100mm BED OF COURSE SAND OVER THE GEOTEXTILE AND COMPACT BACKFILL WITH STONE FREE AS SUG WATER.



Typical Section Through Attenuation Storm Cells (1:25)

| Approval                                                                                                                                                                                  |                                                                 |           |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------|----------|
| Status                                                                                                                                                                                    | Revision                                                        | Date      | Drawn    |
| A                                                                                                                                                                                         | Foul drainage amended with offsite connection onto public sewer | 2.3.14    |          |
| No.                                                                                                                                                                                       |                                                                 |           |          |
| Client                                                                                                                                                                                    |                                                                 |           |          |
| Yorkshire Land Ltd                                                                                                                                                                        |                                                                 |           |          |
| Project                                                                                                                                                                                   |                                                                 |           |          |
| Development on Land North of Roughbirchworth Lane, Oxspring                                                                                                                               |                                                                 |           |          |
| Drawing title                                                                                                                                                                             |                                                                 |           |          |
| Drainage Proposals                                                                                                                                                                        |                                                                 |           |          |
| Client                                                                                                                                                                                    |                                                                 |           |          |
| SHARPE-TOPPING<br>STRUCTURAL ENGINEERS<br>Winder House   Cornwell Road   Harrogate   HG1 2PW<br>t: 01423 522 293 f: 05601 146 377<br>e: info@sharpe-topping.com w: www.sharpe-topping.com |                                                                 |           |          |
| Drawn                                                                                                                                                                                     |                                                                 |           |          |
| PS                                                                                                                                                                                        | CHKD                                                            | Date      | Scale    |
| 14088                                                                                                                                                                                     |                                                                 | June 2014 | Var      |
| Contract No.                                                                                                                                                                              |                                                                 | Dwg No.   | Revision |
|                                                                                                                                                                                           |                                                                 | C-50      | A        |