

Comments on Storm and Foul Water Drainage

These comments are made following examination of the Rodgers Leask drawing number SK002, submitted (with other plans) in the request for approval of reserved matters (but not drainage).

Storm Water Drainage

An existing highway drain runs diagonally across the site, terminating in Gateway Avenue. It was installed in the 1980s to remove water from the A53 to the west of Baldwins Gate where a section of road is in a hollow, close to the speed restriction signs. A way leave for the drain would certainly have been obtained from the land owner. It is also likely that a condition would have been imposed stating that if the land in question were to be developed, then the County Council would have to pay for the drain to be diverted (NOT confirmed). A note on the drawing suggests *“diversion to be carried out by S.C.C.”*

The drawing referred to shows this existing storm drain within the development site as *“to be abandoned”*. This drain has a fall, from the levels given on the plan, of approximately 1 in 150. Recommendations for a 225mm/9” diameter drain are not “flatter” than 1 in 100 for self-cleansing etc.

The proposal is to lay a new 225mm diameter drain in the new road which will run along the northern boundary of the site before turning 90° right, 90° left and a further 90° right towards Gateway Avenue – a most circuitous route!! This route is very much longer than the original and consequently will have a much slacker fall. Much of the gradient over this 383m diverted length is in the region of 1 in 250, with a 91m section having a fall of 1 in 553 – to all practical purposes level; a recipe for disaster! On a relatively recent estate of just over 40 houses in Baldwins Gate, where similar gradients exist, pipes of 900mm/36” have been used to cope with silting and to give extra capacity.

Roads and footways, being impervious, are to be drained via pipes with diameters of 300mm/12”, 450mm/18” and 600mm/24” – presumably to cope with the incredibly flat gradients – into 3 swales on the northern side of the site. The total capacity shown of these swales is approximately 1,000 cu. m. Assuming the footways to be 2m wide each and the carriageway 5m then these swales would be full after approximately 85mm of rain if there was no “soaking away” of water – not an unreasonable assumption in current winter conditions.

A further note on the plan states that there will be 3 soakaway tanks with a total capacity of 3,300 cu. m. Details of these tanks, such as location, filtration rates etc. are not shown. However, with a stated 2m depth, the largest of these will be (if square) 30m x 30m!

Driveways and other hard standings are by way of “permeable paving”; whether this will be successful is open to conjecture during water logged conditions.

It is understood that roof water from dwellings will discharge into individual soakaways; it is well known that these have only a limited life before needing to be

renewed. Whether water will soak away into already saturated ground is, again, open to opinion.

A note on the plan states “*Porosity Test required prior to any works to determine exact infiltration rate*”. (Note: test, not tests!). When porosity tests were carried out by/for Richborough Estates as part of their outline planning application, it is noted that they were conducted on 28th June 2013. Whilst May of that year had average rainfall, both April and June had **half** of the average, i.e. the water table would be significantly lower than at other times, e.g. December 2015. Porosity tests, to have any worth, need to be undertaken during spells of prolonged wet weather to give meaningful results.

Foul Drainage

An existing foul water sewer is shown as following (approximately) the western boundary of the site and passing into Sandyfields. It is a rising main and is therefore pumped from somewhere outside of the site. The proposal is to divert this, from its entry into the site at the westernmost point, for a distance of approximately 30m, from where it will gravitate through the site drains to discharge into the existing foul system in Gateway Avenue.

Foul drainage of the site is to be by 150mm/6” diameter pipes with a general gradient of 1 in 150. Whilst the drainage *might* work, solids at these gradients will tend to settle. Nappy liners, sanitary towels, cotton buds etc. will exacerbate the situation and it is likely that blockages will occur. Where similar gradients exist on the development referred to above, blockages have occurred.

The integrity of the Gateway Avenue sewer has been the subject of much concern as to its condition; whether it will cope with the site drainage **and** the existing flow from the rising sewer is for STW/United Utilities to confirm beyond reasonable doubt.

General Comment

It should be noted that proposed floor slab levels throughout the site are generally up to 800mm/32” above existing ground levels. Using even a “slack” gradient of 1 in 90 to ensure better self-cleansing (1 in 60 would be much better), then foul sewers at the most westerly point of the site would need to be 1200mm/48” higher than proposed – and presumably the floor slabs raised by the same amount. If this were to occur then the floor slabs would be some 2.0m higher than the existing ground.

Richard Latham FIHIE (retired)
Highways engineer with Staffordshire County Council for over 25 years
11/01/16