

Andrew Simcox

Piper Well House and Barn
Park Head Lane / Piper Well Lane,
Huddersfield HD8 8BA

Foul Drainage Technical Note



Control Sheet

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Site Information

1. Introduction

1.1 General

- 1.1.1 Sanderson Associates Consulting Engineers have been appointed by Andrew Simcox to provide advice technical advice on foul drainage associated with the proposed redevelopment of Piper Well House and Barn, Park Head Lane / Piper Well Lane, Huddersfield HD8 8BA. The existing and proposed site plans are included at **Appendix A**
- 1.1.2 This technical note has been prepared to respond to a concern raised by the environmental health team with regards to the proposed us of a bio disc treatment package treatment works.
- 1.1.3 This technical note will look to address the concern form an engineering standpoint.

2. Existing

- 2.1 The site is located to the northeast of the junction of Piper Well Lane and Park Head Lane. On the site there is currently an existing stone-built farmhouse with associated stable and Barn.
- 2.2 The existing farmhouse and stable run parallel with Piper Well Lane with the barn running at 90 degrees.
- 2.3 The farmhouse currently consists of a hall with a living room and kitchen either side of the hall on the ground floor with 2 bedrooms and a bathroom on the first floor. There is a single Soil Vent pipe (SVP) on the eastern wall adjacent to the bathroom which serves the property.
- 2.4 There is an existing lateral connection connecting the SVP to the Yorkshire Water combined sewer located in Piper Well Lane, though the lateral is in a poor state of repair with a broken length of pipe and demolished demarcation chamber. The Invert Level of this connection at the upstream end adjacent to boundary wall is 309.30mAOD with the sewer manhole having an invert level 308.70mAOD.
- 2.5 The existing Finished Floor Level of the barn is approximately 309.29mAOD

3. Proposed

- 3.1 It is proposed to redevelop the existing buildings to provide a 3-bedroom property with multiple toilets and bathrooms, with some of the ground floor.
- 3.2 The redeveloped building will have multiple finished floor levels with the store and associated toilet in the most western building have a finished floor level of 308.48 and the remaining buildings having a finished floor level of 309.29.
- 3.3 As this is an existing building it would not be practical to raise the floor levels to be able to provide suitable headroom in each room.
- 3.4 There will be a number of internal pop-ups required to service the proposed development each will need to have a rest bend and provide suitable fall to a mini access chamber located outside the building to allow future maintenance. These chambers will need to be approximately 0.6m deep to allow for the ground floor build-up, the rest bend and the associated gradient from the pop-up to the chamber.
- 3.5 Based on the Finished floor levels of the proposed building the chambers to serve the ground floor appliances would have the following invert level
 - Main building FFL 309.29 = Invert Level 308.69
 - Store FFL308.48 = Invert Level 307.88
- 3.6 As mentioned in section 2 the surveyed level in the Yorkshire Water sewer is 308.70mAOD which is higher than the above-mentioned levels which will make it impossible to connect the ground floor drainage to the Yorkshire Water sewer.
- 3.7 It is noted that the first-floor foul drainage could be connected to directly to the Yorkshire Water sewer though this would be impractical for a number of reasons considering the proposed method of draining the foul drainage from the site.

4. Potential Drainage Solutions

- 4.1 Considering the site constraints there are multiple options for dealing with the foul drainage, below we have considered these and provided a commentary on the positives and negatives of each
- 4.2 The first option to consider would be reusing the existing lateral drain connecting to the Yorkshire Water sewer. The developer has carried out a CCTV survey of the existing connection and has identified that there is a joint with a 50% displacement of a joint along the run. As mentioned above while undertaking this survey the owner has also identified the levels of the drainage which indicates that the existing Yorkshire Water sewer has an invert level of 308.70mAOD with a 1 in 17 fall between the property and the sewer.
- 4.3 It is noted that under the change in water regulations of 2012 this lateral would become adopted from the point it exits the site boundary and the displaced would therefore need to be repaired by YW, we would also point out that YW would not regrade the pipe to provide a more suitable invert level within the property, this would therefore need to be paid for by the developer. We also note that based on the downstream invert level and utilising a minimum gradient of 1 in 80 the best level that could be achieved within the property boundary would be 308.825mAOD. This would then require the FFL raising by circa 300-500mm to provide a gravity outfall which would reduce the available internal headroom in the building which is not feasible.
- 4.4 The regrading of the pipe would also incur significant additional cost given that this work is located under an adopted highway and the works can only be carried out by a limited number of contractors who are permitted to work on YW and Kirklees Highways assets. The regrading of the pipe will have to pass under the existing dry stone boundary wall of the property which could cause a section of the wall to need rebuilding if the stability of the wall is compromised.
- 4.5 Given the impracticality of altering the internal FFL's and the associated cost of relaying the lateral connection this option does not appear to be suitable.
- 4.6 The next option would be to split the first floor & ground floor drainage to allow the first floor to go via gravity and the ground floor to be dealt with through an alternative method. This would still require the regrading of the lateral connection incurring that cost while also providing the additional cost of some form of foul water management. This second form would be either a treatment plant or a pumping station. A pumping station would have its own maintenance issues and liability and if it was proposed to provide a treatment plant this would need to be served by the entire property to function properly.

- 4.7 Considering using a package pump station as an option would provide flexibility in the position of the unit to suit the required gradients on the pipe work to provide suitable drainage for the property and the flexibility to position the unit in the most suitable position. Though when considering using a pump station it will still require the regarding of the lateral connection as there will need to be a breaking chamber upstream of the demarcation chamber to allow flows to enter the adopted system as gravity flows. Pumping stations have significant individual costs to install them and have a risk of flooding should the pump fail, this can be managed by providing a twin pump unit which has a duty and standby set up though this would increase the cost of the unit significantly. There would also need to be an annual maintenance carried out to the pump station to reduce the risk of failure though the failure may not be associated with an issue with the pumps, the failure could be caused by a failure of the non-return valve failing causing shunting which could burn the pump out. This could happen multiple times if the valve is not replaced at the same time as the pump as a visual inspection is unlikely to identify an issue with the valve.
- 4.8 The final option as was selected in the original application is to provide package treatment plant to serve the residential redevelopment. This option provides the flexibility to provide suitable gradients from the proposed mini access chambers to carry the foul drainage to the location of the owners choosing to allow the drainage system to comply with the requirements of Part H of the building regulations. This option has the benefit of not needing to relay the existing lateral connection to the sewer and that associated cost. The treatment plants can be cheaper to install than the package pumpstation and though they require an annual or by-annual maintenance that would include the emptying of the unit of sludge. This maintenance would include a service of the unit which would identify any issues. It is noted that the system if not properly sized could become excessively full leading to a spillage of effluent though the unit will be fitted with a high-level alarm to inform the property own of the level with this level set when there is a set number of days of normal use left available within the unit.

5. Conclusion

- 5.1 Given the constrained nature of the site and the need to redevelop the existing buildings along with the associated costs with the various options for the drainage we feel that the most cost-effective solution will be to provide a package treatment works.
- 5.2 Though the best solution would be to have a system drained by gravity it is noted that the existing adopted sewer is located to the upgradient side of the site with site levels falling away from the sewer with the existing sewer relatively shallow in this area.



Appendix A

Site Information



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