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Introduction

WSP have prepared a concept drainage plan and drainage statement to support the planning submission for a 14 dwelling residential development.

The objective of this concept plan is to outline a simplified alignment drainage network of proposed locations of the manholes, outfall locations and any attenuation requirements.

The drainage statement details the design methodology and assumptions that have been considered when determining the most effective drainage solution. The effectiveness of the drainage layout plan is based on the most cost efficient drainage network which achieves the requirements of Northumbrian Water Limited (NWL).

Existing Site

The existing site is situated to the north east of Elwick Village, located to the west of Hartlepool and immediately east of A19.

The site comprises farmhouse and gardens, redundant farm buildings and paddocked areas. The total site area is approximately 0.770 Ha of which is 0.332 Ha can be considered impervious (will contribute to surface water run off).

Proposed Development

The site is to be re-developed to provide 14 new 'grouped farm buildings' residential dwellings.

NWL Requirements

The allowable foul water discharge is into the existing combined public sewer at 6401.

No surface water discharge will be allowed to connect into the existing public sewer system unless it is proven that the alternative options which are listed within Part H of the Building Regulations 2010 Edition are not viable.

Listed in decreasing priority, these alternative options are listed below:

1. An adequate soakaway or some other adequate infiltration system
2. A watercourse
3. A sewer

Should a sewer connection be the only option, then a restricted surface water flow of 23 l/s can discharge into the 375 mm diameter surface water sewer at manhole 5305.

Environment Agency/Lead Local Flood Authority

If option 3 is deemed the most appropriate option of those provided from NWL, discussion will be required with the Environment Agency to discuss the sewage treatment capacity in greater detail.

The Environment Agency surface water flood map indicates a 'Low Risk' of flood throughout the entire development site. A 'Low Risk' area is categorised as having a chance of flooding between 1 in 1,000 and 1 in 100 in any given year (refer Figure 1).



Figure 1: Environment Agency Flood Risk Map

Storage Requirements

Using the Microdrainage software, simple storage calculations were performed to determine the on-site storage requirement for 2, 30 and 100 year rainfall events.

- 2 Year event (12m^3 to 33m^3)
- 30 Year event (44m^3 to 85m^3)
- 100 Year event (69m^3 to 126m^3)

Due to the proposed development servicing residential dwellings, the upper value of the 100 year event 126m^3 will be used as the required surface water storage. This will result in a zero chance of the residential dwellings being at risk of flooding.

Alternate Drainage Strategy Considered

Due to the clayey profile of soil within Elwick and the surrounding areas, it is unlikely that a soakaway or similar infiltration systems would be feasible for controlling surface flows.

Proposed Foul Drainage Strategy

It is proposed that the new foul drainage system for the re-developed site collect all discharges from the 14 dwellings and drain by gravity to the south west to allow connection with the existing foul manhole 6401 (refer Figure 2).

The proposed foul drainage strategy is shown in more detail on drawing 70012327/C0002.

Proposed Surface Water Drainage / Sewerage

The proposed surface water drainage system for the re-development is proposed to drain flows from the new 14 dwellings and associated paved areas. This system will drain to the south east of the site prior to discharging at existing manhole 5305 via a proposed 173 metres of 225 mm drain. This proposed drain will be located parallel to the existing foul sewer drain within Elwick Road (refer Figure 2).

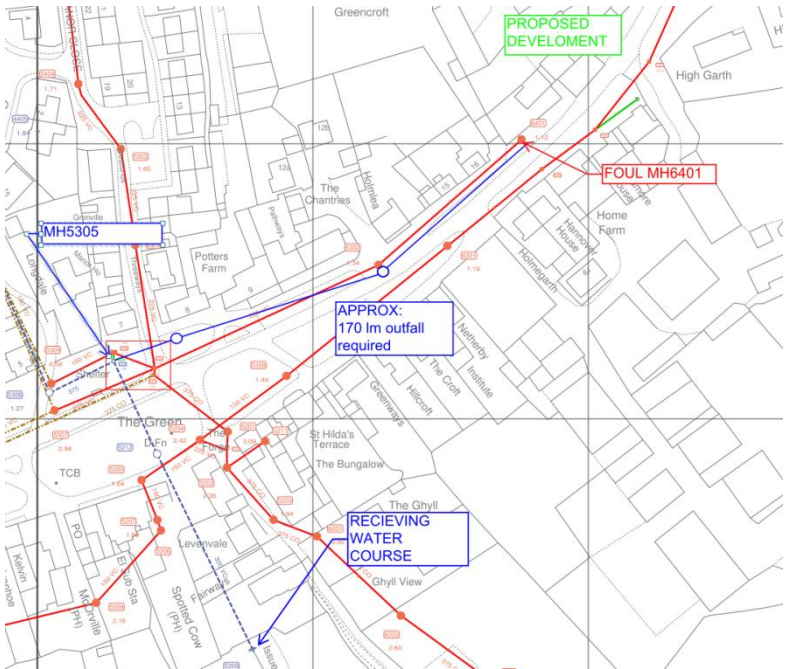


Figure 2: Required Outfall Works

The proposed alignment will have an impact on the existing infrastructure along Elwick Road and will likely require the removal and reinstatement of footways, nature strip and road pavements (refer figures 3-6). Detailed survey of existing underground services will also be required to avoid any potential clashes.



Figure 3 Potential Infrastructure Clashes with Elwick Road



Figure 4 Potential Infrastructure Clashes with Elwick Road



Figure 5 Potential Infrastructure Clashes with Elwick Road

Flows will be limited by means of a hydro-brake flow control device and the provision of a cellular storage tank.

The proposed foul drainage strategy is shown in more detail on drawing 70012327/C0002.

Surface Water Attenuation

The proposed strategy for surface water attenuation is to store up to the 100 year storm return period below ground. The 100 year storm event in this context will include a 20% allowance for climate change.

The strategy outlined above will be developed further during the detailed design stage and will ensure the proposed design will conform to the final discharge restrictions of Northumbrian Water.

Constraints/Limitations

The significant fall of the existing site will require considerations to the pipe velocities and the constructability of pipe network in the detailed design stage.

The location of all manholes is indicative only, exact locations will be determined upon availability of additional survey and an amended layout plan from the architect.

The cover levels of manholes and the invert of pipe levels are indicative only; they have been detailed on drawing 70012327/C0002 to determine the feasibility of the design.

Pipe sizes are indicative only; the exact pipe sizes will be hydraulically modelled and sized accordingly in the detailed design phase. Similarly, minor pipes that do not influence the hydraulics of the design have not been shown on this report

Drawing 70012327/C002 is not to be used for costing purposes; the purpose of the drawing is to show that a successful drainage design can be incorporated into the North Farm residential development.

Conclusions

It is considered that there are suitable outfall routes for both foul and surface water and that appropriate and adequate drainage systems can be designed to serve the proposed development site.

However, WSP would recommend further discussions with the local council and Northumbrian Water to negotiate the possibility of connecting the surface water directly into the sewer network. This would help to avoid the additional costs and disturbance associated with constructing the additional surface water outfall.

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