12. Flood Risk and Drainage

12.1. Introduction

12.1.1. This chapter considers the effects of the Proposed Development on water resources, flood risk and drainage during both the construction and operation phases.

12.1.2. This chapter presents the baseline conditions of the Site and identifies and reviews key sources of environmental impact arising from the construction and operation of the Proposed Development, as well as identifying the environmental receptors that are present within the context of the Site. Mitigation measures are also gauged and assessed in this chapter.

12.1.3. The potential for flood risk is examined in accordance with national guidance and the requirements of the Environment Agency (EA). A detailed Flood Risk Assessment (FRA) has been produced to accompany the planning application for the Proposed Development and included in **Appendix 12.1**. This FRA covers the technical aspects relating to hydrology, flood risk and drainage in more detail.

12.1.4. List of Appendices:

- Appendix 12.1 - Flood Risk Assessment and Surface Water Drainage Strategy

12.2. Assessment Approach

Methodology

12.2.1. Guidance for assessing the environmental impact of the Proposed Development on the receptors of the Site has been taken from *The Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999*.

12.2.2. To define the significance of effects of the Proposed Development on water resources and flood risk, a desktop study of the existing Site conditions was undertaken. Information was obtained from various data sources, including BGS geology mapping and BGS borehole logs, groundwater designation mapping via DEFRA's Magic Map software, flood risk mapping provided by the Environment Agency and included in the Nottinghamshire County Council Level 1 Strategic Flood Risk Assessment (SFRA), a topographical survey conducted by Tag Surveys in October 2021, and a Phase 1 Ground Investigation Desktop Study Report conducted by GeoDyne in December 2024 (**Appendix 13.1**).

Assessment of Significance

12.2.3. The key receptors of the Site were identified through analysis of the existing Site conditions. The key receptors are the aquatic features that are likely to be affected by the Proposed Development. The Applicants have not requested a formal Scoping Opinion in relation to Toton West in isolation, however, have instead followed the scope of that agreed in relation to the larger, separate 'Toton North' scheme, which lies adjacent to the Toton West Site. Due to the proximity of Toton North to the Proposed Development at Toton West, the received comments are considered appropriate to apply. Only receptors located within the Site boundary have been considered in this assessment, however, impacts arising from the Proposed Development on the wider area has been considered.

12.2.4. Each receptor was considered by its sensitivity to any change in environmental conditions, which has been classified in a scale ranging from negligible to high. **Table 12.1** goes into detail on the descriptors and definitions for each sensitivity level.

12.2.5. The magnitude of effect of the Proposed Development on each receptor has been considered by assessing the initial condition of each receptor and the manner of change experienced from the Proposed Development. **Table 12.2** goes into detail on the descriptors and definitions for each magnitude of change. The magnitude of change has been considered for the two main phases of the Proposed Development; construction, and operation.

12.2.6. The sensitivity and magnitude of effect values were compared in a decision matrix to assess the overall significance of each receptor **(Table 12.4).** Effects of moderate significance or above are considered to be significant in EIA terms, described in full in **Table 12.3**. This significance value assisted in deciding the appropriate levels of mitigation required for each receptor, is discussed further in Section 12.5.

Table 12.1 – Estimating the Sensitivity of Water Environment Attributes

Sensitivity	Description
High	Receptor with a high quality and rarity, little ability to absorb change without being fundamentally altered, and/or of regional or national scale importance and limited potential for substitution/replacement. Examples: Inner Source Protection zone (Zone 1). Site of Special Scientific Interest ('SSSI') or Special Area of Conservation ('SAC'). Excellent water quality. Large scale industrial agricultural abstractions (>1000m3/day) within 2km downstream, or abstractions for public drinking water supply. Watercourse widely used for recreation, directly related to watercourse quality (e.g. swimming, salmon fishery etc.) within 2km downstream. Conveyance of flow and material, such as a Main River >10m wide. Active floodplain area with importance in relations to flood defences. Water resources that support economic and social Development at a local scale. Areas located in Flood Zone 3b.

Sensitivity	Description
Medium	Receptor with a medium quality and rarity, a moderate capacity to absorb change without being significantly altered in character, and/or of local scale importance and limited potential for substitution/replacement. Examples: Outer Source Protection Zone (Zone 2). Nitrate Vulnerable Zone. Highly productive aquifer. Good water quality. Large scale industrial agricultural abstractions (500-1000m^3/day) within 2km downstream. Surface water abstractions for private water supply for more than 15 people. Watercourse used for recreation, directly related to watercourse quality (e.g. swimming, salmon fishery etc.). Conveyance of flow and material, such as a Main River >10m wide. Active floodplain area with importance in relations to flood defences. Areas located in Flood Zone 2 or 3. Watercourses < 10m wide.
Low	Receptor with a low quality and rarity, is tolerant of change without detrimental effect, and/or of low or local scale importance and reasonable potential for substitution/replacement. Examples: Total Catchment Source Protection Zone (Zone 3). Moderately productive aquifer. Fair water quality. Industrial/agricultural abstractions (50-499m^3/day) within 2km downstream. Groundwater abstractions 50-500m^3/day - Private water supplies present. Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality.

Sensitivity	Description
	Areas located in Flood Zone 1. Watercourses < 10m wide.
Negligible	Receptor with a negligible quality and rarity, able to accommodate change without material effect, and/or of limited importance and good potential for substitution/replacement. Examples: No Source Protection Zone. Low productivity aquifer/rocks with essentially no groundwater. Environmental equilibrium stable and resilient to changes that are greater than natural fluctuations, without detriment to its present character Polluted/poor water quality. Industrial/agricultural abstractions < 50m^3/day within 2km downstream. Fish sporadically present or restricted, no designated fisheries; not used for recreation. Watercourses < 5m wide. Areas located in Flood Zone 1. Receptor heavily engineered or artificially modified and may dry up during summer months.

Table 12.2 – Magnitude of Impact of Water Environment Attributes

Magnitude	Description
High	Total loss or major/substantial alteration to elements/features of the baseline conditions such that the post-development character/composition/attributes will be fundamentally changed. Examples: Results in major change to the aquatic environment (e.g. permanent deterioration in flow regime, water quality or habitat) that would result in permanent loss of sensitive habitat of deterioration in WFD status. Loss of employment source. Permanent loss of water resource of reduced water resource availability.

Magnitude	Description
	Pollution of potable source of abstraction. Significant change in baseline flood risk (spatial extent, temporal duration, flow, water level).
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed. Examples: Marginal change to the aquatic environment (e.g. in relation to flow regime, water quality or habitat) that would result in a temporary (but reversible) change and would not result in a permanent change in baseline WDD statues. Reduction in water resource availability and/or quality. Moderate change in baseline flood risk (spatial extent, temporal duration, flow, water level).
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable, but the underlying character/composition/attributes of the baseline condition will be similar to the pre-development. Examples: Marginal change to the aquatic environment (e.g. in relation to flow regime, water quality or habitat) that would result in a short-term change that would not pose a risk to baseline WFD status. Minor reduction in water resource availability and/or quality, which would not affect water users. Nominal change in flood risk (spatial extent, temporal duration, flow, water level).
Negligible	Very little change from the baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a “no change” situation. No measurable change to the aquatic environment (e.g. in relation to flow regime, water quality or habitat). No measurable change to the resource availability of quality. No measurable change in flood risk (spatial extent, temporal duration, flow, water level).

Table 12.3 Significance of Effects Categories

Significance	Description
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effects on a particular resource of receptor.
Minor	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in the enhancing of subsequent design of the project.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 12.4 Significance of Effects Matrix

Sensitivity of Receptor	Magnitude of impact			
	High	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Legislative and Policy Framework

12.2.7. There are several sources of guidance and policies that impact the Site drainage conditions. These include the National Planning Policy Framework, National Planning Practice Guidance, Land Drainage Act 1991, Water Framework Directive, Flood and Water Managements Act, and the Broxtowe Borough Council Local Plan. The key policies and guidance are outlined below.

National Planning Policy Framework (2024)

Chapter 14 of the NPPF "*Meeting the challenge of climate change, flooding and coastal change*" highlights the requirements on planning applications in relation to taking a proactive approach to mitigating and adapting to climate change, moving development away from flood risk areas where possible and considering marine and coastal management where applicable.

The Local Plan

12.2.8. The Broxtowe Borough Council (BBC) Local Plan Part 2 (adopted October 2019) sets out the strategy for dealing with flood risk in Policy 1;

"Development will not be permitted in areas at risk from any form of flooding unless:

- *There are no suitable and reasonably available alternative locations for the proposed development in a lower-risk area outside the Green Belt; and*
- *In the case of fluvial flooding, the proposal is protected by the Nottingham Trent Left Bank Flood Alleviation Scheme or other flood defences of equivalent standard of protection; and*
- *Provision is made for access to watercourses (8 metres for 'main river') and flood risk management assets; and*
- *Measures are included to:*
  - *a) mitigate any residual fluvial flood risk;*
  - *b) provide flood compensation where it is appropriate; and*
  - *c) ensure, including by the use of Sustainable Drainage Systems (SuDS), that:*
    - *i. developments on greenfield sites maintain greenfield (pre-development) surface water run off rates.*
    - *ii. developments on brownfield sites reduce surface run off by a minimum of 30% compared with pre-development rates."*

<u>The Flood and Water Management Act (2010)</u>

12.2.9. The Flood and Water Management Act provides better, more comprehensive management of flood risk for people, homes and businesses. Two of the key features contained in the Act are as follows;

- *To give the Environment Agency an overview of all flood and coastal erosion risk management and Unitary and County Councils the lead in managing the risk of all local floods*
- *To encourage the uptake of sustainable drainage systems by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SuDS for new developments and redevelopments.*

Scoping Criteria/Consultation

12.2.10. As discussed in Chapter 2, the Applicants have not requested a formal Scoping Opinion in relation to Toton West in isolation, however, have instead followed the scope of that agreed in relation to the larger, separate 'Toton North' scheme, which lies adjacent to the Toton West Site. Due to the proximity of Toton North to the Proposed Development at Toton West, the received comments are considered appropriate to apply. The Toton North Scoping Opinion and summary of consultee responses is included at **Appendix 2.1**.

12.2.11. With regards to drainage and flood risk matters, the BBC, Environment Agency (EA) and Stapleford Town Council (STC) provided feedback on the proposed contents of the Toton North ES. The BBC confirmed that the ES for Toton North should address all receptors as laid out in the respective scoping report, with particular regard given to reducing the risk of flooding downstream, given that the lower part of the catchment is already developed. The EA confirmed that the proposed drainage strategy as set out in the scoping report for Toton North would be acceptable if sediment pollution mitigation during the construction phase was addressed. Severn Trent Water provided no comments on the Toton North EIA Scoping Report.

12.2.12. Taking into consideration the Scoping Opinion for the scheme known as Toton North, the same environmental issues have been considered, as follows;

- Proposed Development and Flood Risk
- Proposed Development and Surface Water Quality
- Proposed Development and Public Foul Sewer Network
- Proposed Development and Pluvial Flow Routes

12.2.13. During the construction and operation phase of the Proposed Development, the area of impermeable hardstanding would increase. Construction plants would also compact the ground. Left unmanaged, these would increase surface water runoff rates and associated surface water flood risk. The increased surface water runoff rates would also increase flows reaching local Ordinary Watercourses, potentially increasing flood risk downstream.

12.2.14. Similarly, an increase in generated silt from the construction and operation of the Site could cause a build-up in the local surface water drains, decreasing their available capacity for attenuating surface water and causing an increase in flood risk.

12.2.15. Contaminant levels arising from the Proposed Development would likely increase during construction and operation. An increase in contaminants would subsequently pollute surface water runoff, and other watercourses around the Site. Contaminants could include silt, vehicle oils and other chemicals. Mitigation measures are required to reduce the risk of contaminants appearing in surface water runoff.

12.2.16. The impact of construction and operation on groundwater quality has been scoped out of this report. From the desktop study, the Site is not located within a Source Protection Zone nor a Drinking Water Safeguard Zone (Groundwater). The impact of the Proposed Development on groundwater quality during the operational phase would be limited as surface runoff from the Proposed Development would collect pollutants, which would be treated with pollution mitigation measures, forming part of the proposed Surface Water Drainage Strategy (**Appendix 12.1**) to be submitted alongside the planning application.

Receptors

12.2.17. The receptors identified to be present on/around the site forming part of this assessment are as follows;

- On-site field ditch
- Culverted Watercourse

- Public Foul Sewer Network
- Pluvial Flow Routes

Temporal Scope

12.2.18. All receptors have been considered for both phases of the Proposed Development. All impacts arising from the construction phase would be temporary, short, and direct. Impacts arising from the operational phase would be long-term and permanent.

12.2.19. Accordingly, this chapter considers the following potential effects:

- Construction Phase – Effect of Construction on Flood Risk;
- Construction Phase – Effect of Construction on Water Quality;
- Construction Phase – Effect of Proposed Development on Pluvial Flow Routes;
- Construction Phase – Effect of Proposed Development on Foul Sewer Network;
- Operational Phase – Effect of Proposed Development on Flood Risk;
- Operational Phase – Effect of Proposed Development on Water Quality;
- Operational Phase – Effect of Proposed Development on Pluvial Flow Routes and;
- Operational Phase – Effect of Proposed Development on Foul Sewer Network;

Limitations to the Assessment

12.2.20. The assessment has been performed via a desktop study of the existing Site conditions and an estimation of the details of construction and operation for the site. Materials assessed via desktop study include BGS Geology mapping and nearby borehole logs, groundwater designation mapping provided by DEFRA Magic Maps, flood risk mapping provided by the EA and BBC and a topographical survey conducted by Tag Surveys in October 2021.

12.3. Baseline Conditions

Site Description and Context

12.3.1. The Site is located entirely within Flood Zone 1.

12.3.2. The Site is situated predominantly above a Secondary A Aquifer, which is described by the EA as a bedrock forming permeable layers that can support local water supplies and may form an important source of base flow to rivers. The EA also defines the aquifers beneath the Site to be of “high productivity”.

12.3.3. From a desktop review of the ground conditions, the soils beneath the site are comprised of “loamy and clayey soils with impeded drainage”. BGS Borehole logs from nearby locations within the same soil band confirm the existence of clays.

12.3.4. The Site is not situated within a Source Protection Zone, which are designated for the purposes of safeguarding drinking water quality.

12.3.5. The EA has identified localised areas across the Site to be at risk of pluvial flooding. The largest areas are situated towards the south-east of the site.

12.3.6. There is a field ditch present across the Site, situated in the western half and falling east to west. This field ditch follows the natural topography of the Site and conveys surface water flows westwards to a Severn Trent Water (STW) sewer, which culverts beneath Toton Sidings to the west.

Baseline Survey Information

Existing Watercourses

12.3.7. There are no Main Rivers located on Site. The River Erewash (Main River) flows approximately 600m west of the Site, located at a significantly lower elevation, circa 36m AOD (4.58m lower than the lowest level of the Site). The Erewash canal is located west of the main river.

Surface Water Drainage

12.3.8. There is a field ditch located within the Site boundary, which gravitates west towards the western site boundary. According to correspondence with the Local Lead Flood Authority (LLFA) in October 2024, these ditches have 3m maintenance easements from the top of the bank. The landowner of the Site is responsible for the maintenance of these watercourses.

12.3.9. Asset plans obtained from Severn Trent Water (STW) indicate that the field drain culverts adjacent Toton Sidings and runs west. The culvert is comprised of a circular pipe approximately 400mm diameter.

12.3.10. Based on a desktop review of all available data sources, there are no other recorded features present.

Foul Water Drainage

12.3.11. The Site is greenfield, so there are no existing foul water sewers present within the Site boundary.

12.3.12. Foul flows produced by the Proposed Development of 420 units have been estimated to be around 19.4l/s. The predevelopment report obtained from, STW have confirmed that the most suitable connection point is located to the southwest of the Site at MH0201, located in Hampton Close 110m to the south of the Site, or at MH0101 located 212m to the south of the Site. There is also a connection point available at MH6502 to the east along the Site boundary, however this would require a pumped solution.

Site Topography

12.3.13. The topography of the Site falls generally towards Toton Sidings, located to the west of the site. The highest point of the Site is located along the eastern boundary at 64.12mAOD and falls to 40.58mAOD western boundary adjacent to Toton Sidings.

12.3.14. A Site wide topographical survey was undertaken by Tag Surveys in October 2021.

Ground Conditions

12.3.15. The geological map of the area shows that the Site is underlain predominantly by Tarporley Formation Mudstone and Siltstone, with thin bands of Tarporley Formation Sandstone running across the Site.

12.3.16. Soilscapes mapping [1]indicates that the Site is also underlain by loamy and clayey soils with impeded drainage. These are indicative of poor infiltration potential.

Flood Risk

12.3.17. The Site is shown on the Environment Agency's flood maps as being in Flood Zone 1 – an area designated at low probability of flooding by fluvial sources. This is land assessed as having a less than 1 in 1000 annual probability of river flooding (<0.1%, based on December 2024 mapping).

Pluvial Flooding

12.3.18. A review of the Environment Agency's Pluvial Flood mapping indicates that there are localised areas within the Site that are at medium to high risk of flooding from surface water. These localised areas are entirely confined within the extents of the existing field ditch and are not predicted to exceed 0.6m in depth.

12.3.19. The majority of the Site is otherwise not predicted to be at risk of surface water flooding.

Former Pollution Incidents

12.3.20. From the EA pollution incident dataset, there are no known pollution incidents on Site.

Groundwater

12.3.21. The Environment Agency classifies the bedrock of the Site to form a Secondary A aquifer, which is defined as bedrock comprising of "permeable layers that can support local water supplies and may form an important source of base flow to rivers".

12.3.22. Analysis of BGS Borehole logs in the area show that no groundwater was encountered within 3m of the ground surface. The existing ground conditions are unlikely to be suitable for the inclusion of infiltration techniques. It should be noted that these boreholes were located approximately 80m to the north of the Site boundary at elevations of around 38mAOD and were advanced in 2002.

Factors Influencing Baseline

12.3.23. Baseline conditions are unlikely to change significantly, although the effect of climate change would likely increase the flood risk on the Site, due to increased rainfall intensities.

12.4. Assessment of Likely Significant Effects

12.4.1. The assessment of likely significant effects looks at each scoped in water receptor for construction and operational phases of the Proposed Development, and assesses the sensitivity of each receptor, magnitude of change prior to the implementation of mitigation measures, and the overall significance of potential effects arising from the Proposed Development.

[1] https://www.landis.org.uk/soilscapes/

Construction Phase

Effect of Construction on Flood Risk

12.4.2. The field ditch across the Site is of a Low sensitivity, as it only offers drainage for the surrounding agricultural fields and as such is of extremely localised importance. There are no base flows from the east.

12.4.3. The culverted watercourse that is present adjacent to the site drains the areas surrounding the Site. This is considered to be of a High sensitivity, as it mitigates the flood risk for several existing developed areas across Stapleford and thus can be considered to be of importance to the borough of Broxtowe.

12.4.4. The construction phase would increase the number of vehicles on the Site which may lead to soil compaction and an increase in runoff due to a reduced infiltration potential. This may lead to increased flood risk on-site **prior to mitigation**.

12.4.5. Additionally, the activity of construction could mobilise silt and sediment, causing it to reduce the overall capacity of attenuation features such as ditches and watercourse.

12.4.6. Since the field ditch drains into the culverted watercourse, both receptors would experience similar effects because of construction.

12.4.7. For the field ditch, this would result in a **Moderate** adverse effect, which is considered significant. For the culverted watercourse, this would result in a **Major** adverse effect, which is also considered significant. Note these effects are anticipated prior to the adoption of suitable mitigation measures.

Effect of Construction on Water Quality

12.4.8. The existing site topography would likely be regraded in order to provide construction platforms and suitable road grades. In the absence of mitigation, the construction phase would likely cause a medium adverse magnitude of effect by providing the potential for silt to enter the existing field ditch which may affect the water quality negatively. Since the field ditch also convey flows to the culverted watercourse, sediment pollution could also enter the sewer.

12.4.9. The construction phase would also increase the number of vehicles within, and close to, the Site. When considering concrete production particularly, there is a risk of particulate pollution entering the ditch from vehicle wash down, prior to mitigation.

12.4.10. There would also be an increased possibility of hydrocarbon pollutants as a result of machinery and vehicle use during construction. This may result in pollution of the nearby ditch, for example due to spillages, and subsequently alter the water quality and existing habitats, prior to mitigation.

12.4.11. Construction activities may also introduce additional substances to the Site such as solvents, cleaning agents, paints, and other polluting substances. The storage or use of such materials may lead to pollution of the nearby watercourses and disruption of existing ecological habitats, prior to mitigation.

12.4.12. Overall, the construction process would likely exhibit a high magnitude of impact on the Site. For the field ditch, this would result in a **Moderate** adverse effect, which is considered to be

significant. For the culverted watercourse, this would result in a **Major** adverse effect, which is also considered **significant**. Note these effects are prior to mitigation.

Effect of Construction on Pluvial Flow Routes

12.4.13. The surface water drainage patterns of the Site, attributed with localised depressions in topography and an increased risk of pluvial flooding, are of a low sensitivity. From a review of the EA's surface water flooding risk maps, these areas follow the existing field drain and are considered to be of a "High" risk of pluvial flooding.

12.4.14. As previously discussed, the construction phase would also increase the number of vehicles within, and close to, the Site. This may lead to soil compaction and an increase in runoff due to a reduced infiltration potential. Compacting the ground may increase the risk of surface water flooding in areas where there currently is not. Additionally, stripping of topsoil for earthworks will also increase the rate of run off, as it would also mobilise and transport silt, potentially contributing to flooding.

12.4.15. Additionally, as cut and fill takes place to construct the Proposed Development, the pluvial flow routes may change due to the regraded topography. In some cases, the change of topography could cause runoff to be conveyed beyond the Site boundary and flood adjacent land. For these reasons, the significance of construction would be **Moderate** adverse, due to a high impact on a low sensitivity receptor. This is considered to be **significant**. Note these effects are prior to mitigation.

Effect of Construction on Foul Water Sewers

12.4.16. The foul water sewers surrounding the Site are of a high sensitivity, as they convey foul flows from various developments nearby. Exceeding the existing sewer capacity with additional foul flows could cause flooding of connected properties.

12.4.17. During the construction phase, there could be a temporary increase in flows within the local foul water sewer network due to the presence of construction workers and welfare facilities. Therefore, the effect of the Proposed Development on the public sewer network would be **Major** adverse, due to a medium magnitude of impact on a high sensitivity receptor. This is considered to be **significant**. Note these effects are prior to mitigation.

Operational Phase

Effect of the Proposed Development on Flood Risk

12.4.18. In the absence of mitigation, the existing field ditch would likely experience a high adverse magnitude of effect when considering the potential for increased flood risk from the Proposed Development. The Site comprises entirely agricultural greenfield land with greenfield runoff rates. Under the Proposed Development, the impervious area of the Site would increase, which would increase the rate and volume of runoff entering the drains during rainfall events. The field ditch is currently not sized to attenuate the increased level of runoff, and as such flooding without the implementation of appropriate mitigation measures is considered likely.

12.4.19. The effect of the Proposed Development with respect to flood risk on the field ditch would be **Moderate** adverse, due to a high magnitude of impact on a low sensitivity receptor. This is considered to be **significant**.

12.4.20. Similarly, in the absence of mitigation, the culverted watercourse would experience a high adverse magnitude of effect when considering the potential for increased flood risk from the Proposed Development. The Proposed Development would discharge a much higher rate of surface water into this system, which would likely exceed the capacity of the existing network and create flooding within the Site as well as exceeding the capacity of the downstream system and creating blockages which could subsequently impact the system upstream.

12.4.21. It is therefore considered that prior to mitigation, the effect of flood risk on the culverted watercourse would be **Major** adverse, due to a high magnitude of impact on a high sensitivity receptor. This is considered to be **significant**.

Effect of the Proposed Development on Water Quality

12.4.22. In the absence of mitigation, the field ditch would also experience a medium adverse magnitude of effect when considering contamination and water quality. The Site in operation could produce more contaminants than the existing conditions, however since the field ditch currently attenuates runoff from the surrounding agricultural fields, it is possible that it already contains agricultural pollutants such as pesticides, and as such the magnitude of impact would be lessened when considering the baseline conditions.

12.4.23. It is therefore considered that prior to mitigation, the impact of the Proposed Development with respect to Water Quality in the field ditch would be **Moderate** adverse, due to a medium magnitude of impact on a low sensitivity receptor. This is considered to be **significant**.

12.4.24. In the absence of mitigation, the culverted watercourse would experience a High adverse magnitude of effect when considering contamination and water quality. Since the field ditch discharges to the culverted watercourse, the same environmental impacts can be assumed to apply across both receptors. It is also likely that the culverted watercourse ultimately discharges to more significant watercourses downstream, and therefore pollution could reach these.

12.4.25. It is therefore considered that prior to mitigation, the high sensitivity culverted watercourse would experience a high magnitude of impact regarding flood risk and pollution, which equates to a **Major** effect, which is considered to be **significant**.

Effect of the Proposed Development on Pluvial Flow Routes

12.4.26. In the absence of mitigation, the pluvial flow routes would experience a high adverse magnitude of impact from the Proposed Development. The existing localised depressions would be regraded following earthworks and paved with impervious materials, which would likely cause a greater amount of pluvial flooding compared to the current greenfield conditions. Additionally, the Site would likely be regraded topographically to facilitate the Proposed Development. This could create new flow paths for pluvial flooding, which could result in directing the runoff into areas of existing development including those neighbouring developments.

12.4.27. It is therefore considered that prior to mitigation, the effect of the Proposed Development on the pluvial flow routes would be **Moderate** adverse, due to a high magnitude of impact on a low sensitivity receptor. This is considered to be **significant**.

Effect of the Proposed Development on Foul Water Sewers

12.4.28. In the absence of mitigation, the foul water sewers would experience a High adverse magnitude of impact from the Proposed Development. The increased foul flows entering the system would

exceed the capacity of the existing services, which could cause sewer flooding in the surrounding area.

12.4.29. Severn Trent Water have also confirmed there is currently no capacity for additional foul flows but are looking to upgrade the foul sewer system.

12.4.30. It is therefore considered that prior to mitigation, the effect of the Proposed Development on the foul water sewers would be **Major** adverse, due to a high magnitude of impact on a high sensitivity receptor. This is considered to be **significant**.

Summary of Effects

12.4.31. The potential impacts of both phases on the water receptors have been identified below. Flooding mitigation, pollution mitigation and other mitigation methods proposed to offset the impact of the Proposed Development's construction and operational phases have not been considered in the assessment below.

Table 12.4 – Assessment of Likely Significant Effects from Site Construction Prior to Mitigation

Receptor	Sensitivity	Construction Phase Impact Magnitude	Significance
Flood Risk – Field ditch	Low – ditch serves to attenuate runoff from agricultural fields.	High – Increase in number of vehicles on site may lead to soil compaction and mobilisation of silt and increase of runoff.	**Moderate adverse (significant)**
Flood Risk – Culverted watercourse	High – The culverted watercourse connects to main surface water drainage system, which prevents pluvial flooding across the Broxtowe Borough.	High – Increase in number of vehicles on site may lead to soil compaction and mobilisation of silt and increase of runoff.	**Major adverse (significant)**
Water Quality – Field ditch	Low - ditch serves to convey runoff from agricultural fields.	Low – Increase in the number of vehicles on site, increasing the possibility of hydrocarbons and particulates entering the field ditch.	Minor adverse **(not significant)**
Water Quality – Culverted watercourse	High – The culverted watercourse is likely to outfall to a main river.	High – Increase in the number of vehicles on site, increasing the possibility of hydrocarbons and particulates entering the culverted watercourse.	**Major adverse (significant)**

Pluvial Flow Routes	Low – There are few areas at risk of surface water flooding, with a maximum flooding depth of 300mm.	High - Increase in number of vehicles on site may lead to soil compaction and changing over existing pluvial flow routes	**Moderate adverse (significant)**
Foul Water Sewers	High – The foul sewer network serves the larger Broxtowe area. Severn Trent Water have confirmed that the sewer currently has limited capacity.	High – Temporary increase in foul flows due to the presence of construction workers and welfare facilities.	**Major adverse (significant)**

Table 12.5 – Assessment of Likely Significant Effects from Site Operation Prior to Mitigation

Receptor	Sensitivity	Operational Phase Impact Magnitude	Significance
Flood Risk – Field ditch	Low – ditch serves to attenuate runoff from agricultural fields.	High – The increase in impervious surfaces would cause more runoff to enter the ordinary watercourses, which would exceed the available attenuation capacity.	**Moderate adverse (significant)**
Flood Risk – Culverted watercourse	High – The culverted watercourse connects to main surface water drainage system, which prevents pluvial flooding across the Broxtowe Borough.	High – the Proposed Development would likely result in a much higher discharge rate of water into the culverted watercourse, which would exceed the existing capacity and could cause flooding.	**Major adverse (significant)**
Water Quality – Field ditch	Low - ditch serves to convey runoff from agricultural fields.	Low - Surface water runoff from impervious surfaces such as roads and roofs would contain pollutants, however such particulates are likely only marginally more harmful than the existing agricultural runoff pollutants such as insecticides and herbicides.	Minor adverse **(not significant)**
Water Quality – Culverted watercourse	High – The culverted watercourse is likely to outfall to a main river.	High – the allocated discharge point is connected to a culverted watercourse. Pollutants entering this	**Major adverse (significant)**

Receptor	Sensitivity	Operational Phase Impact Magnitude	Significance
		system would impact more than just the culverted watercourse and could end up contaminating the nearby rivers.	
Pluvial Flow Routes	Low – There are few areas at risk of surface water flooding, with a maximum flooding depth of 300mm.	High – the Proposed Development would provide significant impervious areas around the areas where surface water flooding currently occurs, and the Site topography would be regraded to facilitate the Proposed Development. This would likely change the drainage patterns of surface water flooding.	**Moderate adverse (significant)**
Foul Water Sewers	High – The foul sewer network serves the larger Broxtowe area. Severn Trent Water have confirmed that the sewer currently has limited capacity.	High – the Proposed Development would generate sufficient flows to exceed the capacity of the existing foul sewer by providing an additional 420 dwellings. Without upgrading the sewer system, it would likely overflow.	**Major adverse (significant)**

12.5. Mitigation, Enhancement and Residual Effects

Mitigation by Design

12.5.1. An FRA has been undertaken for the Site (see **Appendix 12.1**), and measures have been included in the drainage design which would ensure flood risk and water quality is managed effectively during the operational stage.

12.5.2. Surface water would be attenuated using SuDS features, which would be suitably designed to accommodate the volume of surface water runoff generated from the critical duration 1% annual probability storm event, including the appropriate allowance for climate change (35%). Since infiltration is not feasible, the attenuated water would discharge to the existing outfall at a rate agreed with by Severn Trent Water, or the LLFA.

12.5.3. Newly constructed impervious areas would be suitably graded to convey surface water towards proposed attenuation features. This would be achieved using roadside gullies and drainage pipework, with such drainage features situated strategically to ensure all pluvial flooding is directed towards public open space away from dwellings.

12.5.4. Proposed SuDS features would contain pollution mitigation measures to ensure surface water runoff is thoroughly cleansed before discharging to the culverted watercourse. Run-off from car parks and roads would discharge through an appropriate hydrocarbon interceptor to remove vehicle oils that would contaminate the surrounding surface water systems.

12.5.5. The Proposed Development would be designed with a foul sewer system that has sufficient capacity to support it. The details of the system are covered in the FRA and DS (**Appendix 12.1**).

Additional Mitigation.

12.5.6. A Construction Environmental Management Plan (CEMP) would be prepared to document the environmental management procedures during construction, and can be secured through an appropriately worded condition. The CEMP would ensure that any impact from construction would be minimised to a level that is not significant, as any spillages or similar that would affect the local receptors would be contained to a local level and have a minimal impact on widespread conditions.

12.5.7. The following construction mitigation measures would likely be included within the CEMP:

- Construction would be phased to upgrade/install drainage features prior to construction of hard standings and impervious areas;
- Cover stockpiles of topsoil with sheeting or suitable vegetation and store as far as reasonably possible from watercourses;
- Fuel stores to be bunded and situated as far as reasonably possible from watercourses;
- Temporary siltation traps and temporary settlement lagoons to be installed to greenfield plots as necessary;
- Catch pits and trapped gullies to be installed;
- Regular inspection of surface water drains and debris clearance; and
- Temporary shut-off valves would be installed at sensitive locations on-site as attenuation features are constructed.

12.5.8. As part of the planned maintenance regime, all storage structures and flow controls would be regularly inspected with cyclic maintenance works undertaken to remove vegetation/weed growth and silt, following guidance laid out in the CIRIA SuDS Manual. This would ensure there is no loss of capacity resulting from sedimentation during construction and operation.

Table 12.6: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Installation of sufficiently sized attenuation features	X		
2	Limiting discharge rates to public sewers and watercourses	X		
3	Clearing of existing field ditch	X		
4	Pollution mitigation features utilised in drainage strategy	X		
5	Strategically placed drainage gullies to prevent pluvial flooding	X		
6	Implementation of a foul sewer system that has sufficient capacity to support the Proposed Development	X		
7	CEMP			X
8	Construction Surface Water Management Plan			X

Enhancements.

12.5.9. The attenuation basin would be graded to provide aquatic planting shelves and planted with suitable vegetation to provide biodiverse aquatic habitats and assist in delivering BNG on the Site.

Residual Effects

12.5.10. It is assumed that an appropriate CEMP would set out measures such as those listed above to mitigate the risks of the construction phase on the receptors on and in the vicinity of the Site, and an appropriate contractor(s) would conduct the works. The CEMP would ensure that any impact from the construction phase would be minimised to a negligible level, as any spillages or similar that would affect the local receptors would be contained to a local level and have a minimal impact on widespread conditions. This results in a **negligible** overall effect.

12.5.11. The flood risk of the field ditch is considered to have an effect of moderate adverse significance. The proposed mitigation measures seek to reduce the flood risk by conveying surface water flows through installed pipework separate to the ditch, to the attenuation pond, and provide regular silt removal. These measures would decrease the flood risk to 1% or less per annum, with a safety factor of 40% applied to account for climate change. Overall, this would provide a **minor beneficial** effect to the field ditch.

12.5.12. The potential pollution of the field ditch during the operational phase is considered to have an effect of minor adverse significance, as the field ditch does not provide a significant contribution to the environmental conditions of the Site. The proposed mitigation measures would provide pollution mitigation infrastructure to cleanse water entering the field ditch, which the Site

currently does not have. Therefore, the impact of the Proposed Development on the pollution of the field ditch would be **minor beneficial**.

12.5.13. The flood risk of the existing culverted watercourse during Operation is considered to have an effect of major adverse significance, as they serve a wider area than just the Site. The Proposed Development would seek to discharge surface water runoff into the culverted outfall at a rate equivalent to the greenfield runoff rate, agreed with the LLFA. With these mitigation measures, the Site would have a **negligible** impact on sewer flood risk, as the Proposed Development would discharge at an adjusted Qbar greenfield rate,

12.5.14. The potential pollution of the existing culverted watercourse during the operational phase is considered to have an effect of major adverse significance, as it is likely that the watercourse which could discharge to local rivers. The proposed mitigation measures would ensure that any pollutants generated by the Site would be sufficiently removed by SuDS features and other installations, such as petrol interceptors. Overall, the Site would have a **negligible** impact on sewer pollution.

12.5.15. The localised topographical depressions of the Site are considered to have an effect of moderate adverse significance, as the Site is currently entirely greenfield, and therefore the Site composition would change with the inclusion of impervious surfaces. This would change the existing surface water flow paths. The proposed mitigation measures would ensure that localised depressions formed from the Proposed Development would have suitable drainage features present, to prevent pluvial flooding and water pooling in these areas. The Site would also be regraded to ensure surface water flows gravitate naturally to designed attenuation basins, keeping runoff from escaping the Site and flooding neighbouring areas. Overall, the Site would have a **minor beneficial** impact on existing surface water routes.

12.5.16. The flood risk of the existing foul water sewers during the operational phase is considered to have an effect of major adverse significance, as they serve a wider area than just the Site. Severn Trent water have confirmed that they would look to upgrade the existing foul water sewers to accommodate the Proposed Development. The Site would also be constructed with a sufficient foul water sewer system in order to provide the required capacity from flows generated by the Proposed Development. Overall, the Site would have a **negligible** impact on the flood risk of the existing foul water sewers.

12.5.17. Overall, the receptors accessed on and in the vicinity of the Site would have residual effects ranging from **beneficial** to **negligible** as a result of the Proposed Development. No significant residual effects are anticipated.

12.6. Cumulative and In-Combination Effects

12.6.1. As set out in Chapter 2, Assessment Scope and Methodology, there are three sites adjacent to the Proposed Development that have been scoped to be considered in this EIA. Land at Toton North and Land at Toton East are similar developments being pursued by the Applicant in conjunction with others, proposing residential development situated 450m to the north-east and adjacent the eastern boundary on the other side of the B6003, respectively. Southfields Farm is a proposed Battery Energy Storage System , the main site parcel being located to the north of the Site beyond Toton North; the grid connection runs along Stapleford Lane to the east of the Site.

Inter-Project Effects

12.6.2. Land at Toton North and Land at Toton East are being pursued by the Applicant in conjunction with the Proposed Development. Toton North is proposed to deliver 880 dwellings, and Toton East is proposed to deliver 155 dwellings. These developments are also proposed to discharge surface water into existing ditches and surface water sewers.

12.6.3. Similar mitigation measures would be proposed for these other sites, meaning they would have a negligible impact on the existing surface water systems. For this reason, the cumulative effects of these sites do not require consideration.

12.6.4. Southfields Farm has been granted conditional planning permission as of the 21st of August 2024. The drainage strategy, located on the Broxtowe Borough Council Planning Portal under application reference 24/00066/FUL, indicates that this scheme would be drained using infiltration-based SuDS, and would not discharge any surface water runoff into the surrounding drainage system. This scheme would therefore not provide a cumulative impact on the surrounding water receptors with the Proposed Development.

Intra-Project Effects

12.6.5. Surface water discharge into watercourses can have a adverse impact on the local ecology if the water has not been treated properly. Pollutants generated from the Proposed Development construction and operation would be collected by surface water runoff and likely discharged into local watercourses. Ecological fauna and flora inhabiting these watercourses would subsequently be harmed by the level of pollution present. To mitigate this, pollution removal measures shall be implemented into the drainage design for the Site, utilising petrol interceptors and geotextiles to trap vehicle oil and sediments before they enter the watercourses. This would ensure there would be no significant effects.

12.7. Summary

Introduction

12.7. This chapter considers the effects of the Proposed Development on water resources, flood risk and drainage during both the construction and operation phases.

12.7.1. This chapter assesses the baseline conditions of the Site as a basis for the quality and quantity of existing aquatic features, and then considers the impact of the Proposed Development on these features and proposes sufficient mitigation measures to reduce the overall impact.

12.7.2. The potential for flood risk is also examined in accordance with national guidance and the requirements of the EA. More technical aspects of the drainage strategy for the Proposed Development are covered in the FRA included as **Appendix 12.1** to this ES.

Baseline Conditions

12.7.3. The Site is currently agricultural greenfield, with a field ditch present across the Site. This field ditch follows the natural topography of the Site and conveys surface water flows westwards to a Severn Trent Water sewer, which culverts beneath the Toton Sidings to the west.

12.7.4. The topography of the Site falls generally towards Toton Sidings, which is located to the west of the site. The highest point of the Site is located along the eastern boundary at 64.12mAOD and falls to 40.58mAOD.

12.7.5. From BGS Borehole logs, there is shown to be no groundwater within 3m of the ground surface level. The bedrock of the Site is also stated to contain "high productivity aquifers."

12.7.6. The Site is not within a Source Protection Zone, which are designated for the purposes of safeguarding drinking water quality.

12.7.7. There are no recorded instances of sewer, fluvial, pluvial or groundwater flooding on Site. There are also no records of pollution incidents present on the Site.

12.7.8. There are no public foul sewers located within the Site boundary.

Likely Significant Effects

12.7.9. During construction, without mitigation, onsite flood risk could be increased. There would be an increase in vehicles present which could lead to soil compaction and thus an increase in runoff due to a decrease in infiltration potential of the ground. This would be anticipated to result in a **major** (for the culverted watercourse) or **moderate** (for the field ditch) adverse effect **prior to mitigation**, which is **significant**.

12.7.10. During construction, onsite water quality could be negatively impacted. The increase of vehicular use and abundance of pollutant materials used in construction may result in an increase of pollution reaching the on-site field ditch and culverted watercourses, subsequently altering the water quality. **Prior to mitigation**, this would be anticipated to result in a **major** adverse effect on the culverted watercourse, and a **moderate** adverse effect on the field drain. Both adverse effects are of a level that is considered **significant**.

12.7.11. During construction, pluvial flow routes could be negatively impacted, therefore creating a higher level of pluvial flooding risk. The increased number of vehicles on site could compact the ground and cause a decrease in infiltration potential, thus increasing the level of pluvial flooding. Additionally, regrading of the Site could cause the existing flow routes to change, which could result in adjacent land flooding. This would be anticipated to result in a **moderate** adverse effect **prior to mitigation**, which is **significant**.

12.7.12. During construction, existing foul water sewers could be negatively impacted due to the temporary local increase in foul flows within the existing system. Exceeding the capacity of the existing sewer systems with additional foul flows could cause sewer flooding in connected properties. The presence of construction workers and welfare facilities would generate additional foul flows on top of what is already present. This would be anticipated to result in a **moderate** adverse effect **prior to mitigation**, which is **significant**.

12.7.13. During operation, the onsite field ditch could be subjected to an increased flood risk as a result of the Proposed Development. Developing the Site would increase the impervious areas, which prior to mitigation would likely overwhelm the existing ditch as they would not have sufficient capacity to attenuate the additional runoff. Additionally, **prior to mitigation**, silt and sediment build-up could occur at a higher rate than current, which if left unmoderated would reduce the capacity of the ditch and increase the risk of flooding across the Site. This would be anticipated to result in a **moderate** adverse effect **prior to mitigation**, which is **significant**.

12.7.14. During operation, the onsite field ditch could also be subjected to an increase of pollutants present. The increase of impervious surfaces and the usage of road vehicles would increase the number of pollutants present on-site, which would be discharged into the field ditch with the surface water runoff. **Prior to mitigation**, this would be anticipated to result in a **minor** adverse effect, which is **not significant.**

12.7.15. During operation, the culverted watercourse adjacent the Site could be subjected to an increased flood risk. The additional runoff generated from the Site would be discharged into this sewer which may not have sufficient capacity to convey the higher amounts of runoff. This would be anticipated to result in a **major** adverse effect **prior to mitigation**, which is **significant**.

12.7.16. Similarly, during operation, this culverted watercourse would be negatively impacted by the higher rates of pollutants present in the water discharged into them from the Site. The culverted watercourse outfalls to another culverted watercourse, which potentially discharges into the River Erewash. This would be anticipated to result in a **major** adverse effect **prior to mitigation**, which is **significant**.

12.7.17. During operation, pluvial flow routes could be affected as the existing Site conditions would likely change as a result of the Proposed Development. If existing areas at risk of pluvial flooding are surfaced with impervious materials, it is possible that flooding could occur elsewhere outside of the Site boundary. The natural Site topography is also likely to be regraded with the Proposed Development, which would further change the natural drainage patterns of the Site. This would be anticipated to result in a **moderate** adverse effect **prior to mitigation**, which is **significant**.

12.7.18. During operation, existing foul water sewers could be negatively impacted due to the increased flows within the existing system. Exceeding sewer capacity with additional foul flows could cause sewer flooding in connected properties. This would be anticipated to result in a **major** adverse effect **prior to mitigation**, which is **significant**.

Mitigation and Enhancement

12.7.19. A suitable CEMP/Construction Surface Water Management Plan would be prepared to document the environmental management procedures during construction and can be secured through an appropriately worded condition. The CEMP/CSWMP would ensure that any impact from construction would be minimized to a **low or negligible level (not significant)**, as any spillages or similar that would affect the local receptors would be contained to a local level and have a minimal impact on widespread conditions.

12.7.20. Pollution mitigation can be achieved by including specific features in the drainage strategy that can remove pollutants and sediment from runoff, which in turn would protect the water quality of the field ditch and culverted watercourse, resulting in either **negligible or minor beneficial effects (not significant**).

12.7.21. SuDS are proposed to be sized to be able to hold runoff sufficiently during large rainfall events, resulting in **negligible effects (not significant**). These features would discharge attenuated water at a rate that is agreeable with the LLFA, or the EA.

12.7.22. The topography of the Proposed Development would be regraded to convey flows naturally towards the drainage attenuation basin, and features such as gullies would be positioned to ensure surface water runoff is retained within the Site and does not pool in any location, resulting in **minor beneficial effects (not significant**).

12.7.23. STW have confirmed that would look to upgrade the existing public foul water sewers to accommodate the Proposed Development. The Proposed Development would also be constructed with a sufficient foul water sewer system in order to provide the required capacity from flows generated by the Proposed Development, resulting in **negligible effects (not significant**).

Conclusion

12.7.24. Following the implementation of suitable mitigation measures, the Proposed Development would **not result in any significant effects** on water receptors and is anticipated to provide either **negligible** or **minor beneficial effects (not significant)**.

12.7.25. Aspects of the Proposed Development would provide betterment in comparison to the existing Site conditions.

12.7.26. **Table 12.7** provides a summary of effects, mitigation and residual effects.

Table 12.7: Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Field ditch	Increased runoff overwhelms existing field ditch, creating more flood risk on-site.	Temporary, Direct	Low	High	Local	**Moderate (significant)**	Implement a CEMP to mitigate the issues.	**Negligible (not significant)**
Field ditch	Increased level of pollutants due to construction vehicles and materials.	Temporary, Direct	Low	High	Local	**Moderate (significant)**	Implement a CEMP to mitigate the issues	**Negligible (not significant)**
Culverted watercourse	Increased runoff overwhelms existing culverted watercourse system, creating more flood risk on-site and downstream.	Temporary, Direct	High	High	Borough	**Major (significant)**	Implement a CEMP to mitigate the issues.	**Negligible (not significant)**
Culverted watercourse	Increased level of pollutants due to construction	Temporary, Direct	High	High	Borough	**Major (significant)**	Implement a CEMP to mitigate the issues.	**Negligible (not significant)**

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
	vehicles and materials.							
Pluvial Flow Routes	Change of flow routes due to impervious construction, ground compaction and level regrading.	Temporary, Direct	Low	High	Borough	**Moderate adverse** **(significant)**	Implement a CEMP to mitigate the issues.	**Negligible** **(not significant)**
Foul Water Sewers	Increase in foul flows from construction workers.	Temporary, Direct	High	Medium	Borough	**Major adverse** **(significant)**	Implement a CEMP to mitigate the issues.	**Negligible** **(not significant)**
Operation								
Field ditch	Increased runoff overwhelms existing field ditch, causing flooding on-site. Runoff sources generate more silt, which builds up in ditch and	Permanent, Direct	Low	High	Local	**Moderate adverse** **(significant)**	Cleaning out sediment in ditches to provide more attenuation. Providing aquatic shelves in ditches to allow for planting and biodiversity.	**Minor beneficial** **(not significant)**

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
	causes more flooding.						Frequent maintenance as per CIRIA SuDS Manual.	
Field ditch	Pollutants generated from the Site are picked up by runoff and contaminate existing field ditch.	Permanent, Direct	Low	Low	Local	**Minor adverse (not significant)**	Sufficient pollution mitigation measures are implemented into the drainage strategy, utilising oil interceptors and geotextile material.	**Minor beneficial (not significant)**
Culverted watercourse	Increased runoff overwhelms existing culverted watercourse, causing flooding off-Site as sewer system is inundated.	Permanent, Direct	High	High	Borough	**Major adverse (significant)**	Limiting discharge of surface water from the Site to a greenfield rate, or a rate agreed with by the LLFA/EA.	**Negligible (not significant)**
Culverted watercourse	Pollutants generated from the Site are picked up by runoff and contaminate culverted watercourse system, which could discharge	Permanent, Direct	High	High	Borough	**Major adverse (significant)**	Sufficient pollution mitigation measures are implemented into the drainage strategy, utilising oil interceptors and geotextile material.	**Negligible (not significant)**

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
	to nearby watercourses.							
Pluvial Flow Routes	Pluvial flow routes are changed due to increase in impervious area, causing runoff to egress out of the Site boundary.	Permanent, Direct	Low	High	Local	**Moderate adverse (significant)**	Grading of the Site to ensure all runoff is kept within the Site boundary. Provision of drainage gullies in occurring low spots to prevent rainwater pooling.	**Minor beneficial (not significant)**
Foul Water Sewers	Increase in foul flows from additional constructed properties	Permanent Direct	High	High	Borough	**Major adverse (significant)**	Implementation of a foul sewer network within the Site with sufficient capacity to support the Proposed Development	**Negligible (not significant)**