Figure 3: Existing Gully

3.6.7 The strata encountered throughout the Site has a degree of porosity, allowing some rainfall to infiltrate through to the layers below. However, the rates of infiltration are not considered high enough to allow for infiltration devices such as permeable paving or soakaways.

3.6.8 Rodger Leask undertook soakaway testing in 2017 (CD1.41), at six locations, outside of the historic landfill area. The infiltration rates were considered too low for development drainage design purposes, but were indicative of permeability within the strata.

3.7 Proposed Drainage Strategy

3.7.1 Ashfield District Council's (ADC) Strategic Flood Risk Assessment (SFRA) (CD13.6) states that SuDS, *"should be utilised for developments within the District"* and that developers should, *"demonstrate how the principles of Sustainable Drainage Systems have been applied to the development identifying what SuDS techniques have been used to reduce flood risk on and off site."*

3.7.2 Nottinghamshire County Council's (NCC) document 'Nottinghamshire County Council's Guidance Note on Validation Requirements for Planning Applications – March 2024' (CD13.5) states that, *"in all cases, a sustainable approach should be taken to the discharge of surface water following the sequential preference: (i) soakaway; (ii) watercourse; (iii) mains drainage."*

3.7.3 The FRA produced by Rodgers Leask covers the proposed surface water strategy for the Site including SuDS provision.

3.7.4 The FRA has reviewed the most suitable method of surface water discharge, in accordance with the hierarchy of drainage options outlined in NCC's guidance note. Soakaway testing undertaken by Rodgers Leask obtained infiltration rates that precluded the use of soakaways. The ECE Geotechnical and Geo-environmental Site Investigation report (May 2022) concludes that *"soakaway drainage is not considered to be viable".*

3.7.5 There is a ditch within the boundary of the Site, the ditch was shown by a drainage survey, to drain to the public surface water sewer located in Searby Road.

3.7.6 The FRA recommends a connection to the existing ditch be utilised where levels permit, however as the GPR survey was undertaken in 2017, a CCTV drainage survey is recommended prior to detailed design stage to confirm that the gullies and pipework draining to the public sewer from the ditch are in working order. A direct connection to the public surface water sewer has been shown in the drainage strategy for robustness, in case the gullies and pipework are not suitable.

3.7.7 An email from the LLFA confirming an acceptable discharge rate of 5 l/s/ha is contained at Appendix H of the FRA.

3.7.8 The FRA confirms, at section 3.3.2, that the final discharge rate used for drainage design calculations is 4.7 l/s/ha, which was calculated using the ICP SUDS method in MicroDrainage software.

3.7.9 The SFRA states that developers should *"calculate the Greenfield discharge rate for the site and required attenuation volume for the 1 in 100 year rainfall event but also taking into account the impact of climate change*". The FRA notes, at Section 3.5.8, that the drainage system is designed to cater for a 40% allowance for climate change, which is in accordance with the EA peak rainfall allowance for the Idle and Torne Management Catchment.

3.7.10 At 3.5.9 the FRA proposes open SuDS basins to attenuate flows, with other SuDS features such as swales, filter strips and filter trenches used where practicable. Utilising a combination of SuDS features will slow the flow of surface water within the site to better mimic greenfield conditions.

3.7.11 The attenuation volume has been calculated using MicroDrainage software, as noted in section 3.5.8 of the FRA. The illustrative masterplan shows the quantum of attenuation split between three basins located within the lowest lying parts of the Site. Flow controls would be utilised to restrict flows leaving the Site, to the calculated discharge rate.

3.7.12 The northern most attenuation basin, noted as Attenuation Pond 1 on the FRA drainage strategy plan (drawing reference 16530-RLL-17-XX-DR-C-201 Revision E), is illustrated to be located above the landfill area. Forming this basin would likely

require excavating into the landfill made ground, and the installation of a robust liner to its base. Examples of sites with SuDS features located above landfill made ground is discussed in section 4.4. This is a perfectly acceptable situation and well tried and tested means of addressing it exist.

3.7.13 However, as responses on the planning application raised local concern regarding the potential risk should there be leakage into the landfill materials, a simple alternative proposal is summarised in the following section.

3.7.14 A technical note, with reference 16530-RLL-24-XX-TN-S-0001, has been produced by Rodgers Leask, that sets out an alternative drainage strategy, with this basin removed, and the attenuation storage provided within an enlarged basin located within the western side of the Site. Calculations undertaken in Causeway Flow modelling software, are included within Appendix D, that demonstrate that this is achievable.

3.7.15 The technical note is contained at Appendix B and the proposed drainage strategy is shown on Rodgers Leask drawing no. 16530-RLL-24-XX-DR-C-205, contained at Appendix C. This drawing is separate to the FRA.

3.7.16 The principles of the proposed strategy are set out in Figure 4. Surface water from development areas will drain to an adoptable sewer network including SuDS. Flows will be restricted to controlled discharge rates, and storage for up to the 100 year, plus an allowance for 40% climate change, event provided within attenuation basins. Surface water will outfall to the surface water sewers in Searby Road.

3.7.17 Attenuation modelling results are summarised in Table 1 below.

Table 1

Attenuation Basin Ref.	Catchment Area (in ha)	Discharge Rate (in l/s)	Attenuation Volume (in m^3)
1	8.24	38.7	4872
2	4.41	19.5	3202
Total	12.65	58.2	8074

3.7.18 The total development catchment area measured from the revised illustrative masterplan (drawing reference EMS2254_120_01 Revision D) is 12.65ha, with flows generated by the development restricted to a total rate of 58.2 l/s. It has been ensured that the discharge rates stated at section 3.5.6 of the FRA have not been exceeded. Modelling using Causeway Flow software has demonstrated that the alternative attenuation layout shown on the alternate illustrative masterplan

can be accommodated, such that no attenuation storage features are shown located within the extents of the historic landfill area.

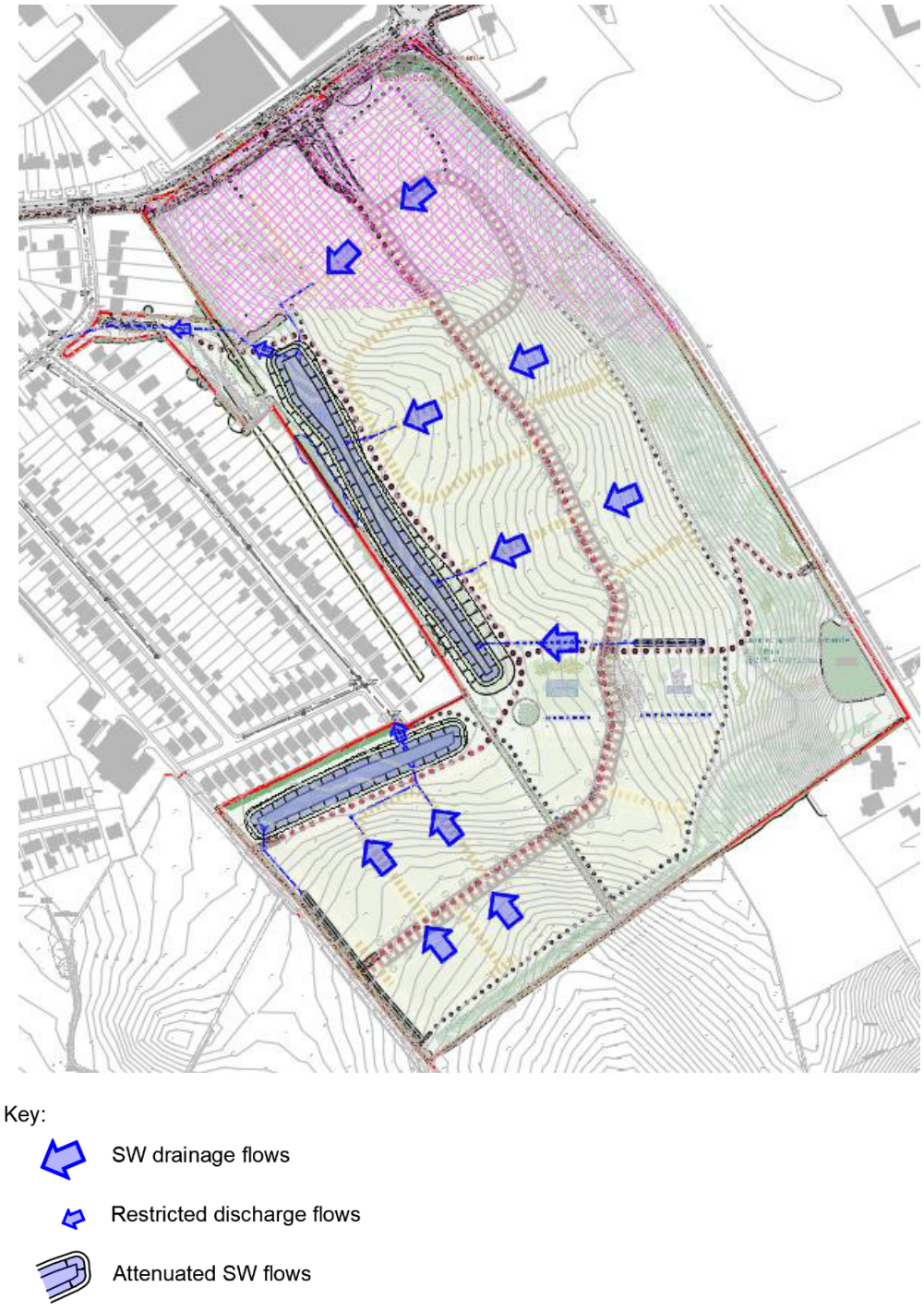

Figure 4: Surface Water Drainage Strategy Schematic

3.7.19 As noted within Section C3 of the Sewerage Sector Guidance Appendix C: Design and Construction Guidance (DCG), the design of SuDS should be carried out in accordance with CIRIA Report C753 'The SuDS Manual'.

3.7.20 The basins shown on the drainage strategy drawing no. 16530-RLL-24-XX-DR-C-205, have been designed in accordance with C753. Side slopes have a maximum gradient of 1:3 and a maintenance margin will be provided around the perimeter of the basin.

3.7.21 The importance of maintenance arrangements over the lifetime of the development is highlighted in paragraph 182 of NPPF. The maintenance regime will include regular inspection to ensure the drainage system is in an acceptable condition.

3.7.22 Draft planning conditions have been provided by ADC in the committee report, a number of which are relevant to the surface water drainage proposals.

3.7.23 Draft conditions require that no part of the development commences until a detailed surface water drainage scheme based on the principles set out in the FRA and Drainage Strategy have been approved.

3.7.24 The condition covers how surface water flows will be managed during construction and how surface water drainage systems will be maintained and managed for the lifetime of the development. The wording of the condition will ensure that maintenance is carefully considered in detail, and implemented through the lifetime of the development. The condition can also require the basins to be outside the area of the former landfill shown on drawing no. 16530-RLL-24-XX-DR-C-205.

3.7.25 Draft conditions also require that development shall not commence until details are approved demonstrating how the onsite sewers will be adopted pursuant to a Section 104 agreement (Water Industry Act). The wording of this condition will require that the sewer networks serving the site are adopted by a Sewerage Undertaker, which will ensure maintenance is upheld. As the overall drainage network includes and is dependent on SuDS features, the adopting water authority will require certainty that the features are sized correctly through modelling and are maintained in accordance with standards, regardless of their ownership arrangements. The Rodgers Leask technical note demonstrates that the SuDS features shown on the illustrative masterplan are sized to cater for the 100 year, plus an allowance for climate change, event. Calculations will be refined at detailed design stage, for the purposes of a Section 104 technical submission to the adopting Sewerage Undertaker.

3.7.26 It is considered that the below ground (piped) surface water infrastructure would most likely be offered for adoption by the developer via Section 104 (S104) of the Water Industry Act (1991). Severn Trent Water is the incumbent Sewerage

Undertaker in the area, but the infrastructure could be adopted by an alternative Sewerage Undertaker, referred to as New Appointments and Variations or NAVs. Ofwat describes NAVs as, "*limited companies which provide a water and/or sewerage service to customers in an area which was previously provided by the incumbent monopoly provider*." Once adopted, the infrastructure would be maintained by the Sewerage Undertaker in perpetuity.

3.7.27 The basins would be maintained by either a private management company appointed by the Developer, or by the Local Authority. This approach is commonplace, and is acceptable to the incumbent water authority (Severn Trent Water) and also NAVs. This is in accordance with PPG paragraph 060.

3.7.28 Should a private management company be appointed, funding for maintenance over the lifetime of the development would usually be secured via a management charge to new residents. In the event that the Local Authority are appointed to maintain the basin, funding for maintenance over the lifetime of the development would usually be secured either via a commuted sum or again via a management charge to residents.

3.7.29 The reason stated within the committee report for the need for the submission of a detailed surface water management plan through planning, is to ensure that the development is in accordance with Policy ST1 of the Ashfield Local Plan Review. With the measures outlined above it will be.

3.7.30 The surface water drainage strategy for the Site addresses water quantity such that the development would not lead to an increase of flood risk elsewhere, over the lifetime of the development and considering climate change. This is demonstrated by the Rodgers Leask FRA and Technical Note documents.

3.8 Conclusions

3.8.1 The proposed drainage strategy follows NPPF, NCC and ADC guidance. In accordance with paragraph 164 and 182 of the NPPF, the drainage strategy incorporates sustainable drainage systems (SuDS), which will include drainage basins and swales as well as filter strips and filter drains where appropriate.

3.8.2 Discharge rates from the site will note exceed the maximum rates agreed with the LLFA (Greenfield QBAR), and flows up to the 100 year event, plus an allowance for climate change, attenuated within the proposed sustainable drainage system.

3.8.3 The drainage system will be designed in accordance with industry standard guidance including DCG and CIRIA 753.

3.8.4 It is my opinion that the Site has been assessed to not increase flood risk to adjacent land following development, subject to the outlined drainage strategy being implemented.

4 Works Within The Historic Landfill Area

4.1 Introduction

4.1.1 As discussed in Section 3.7 of this statement, and as shown on the updated illustrative masterplan, there is no requirement for attenuation basins to be located within the extents of the historic landfill area. However part of the development will be located within the landfill area, including residential housing, POS, as well as road and utilities infrastructure.

4.1.2 It is not uncommon for former landfill sites to be developed. A list of example former landfill sites ranging from those under construction to those that are occupied, is as follows:

- Heathside Walton Secondary School in Walton-on-Thames
- Residential development at Bourne Street, Coseley, Dudley.
- Residential development in Glen Parva, Leicestershire.

4.2 Infiltration

4.2.1 The made ground within the historic landfill area is considered to be relatively porous, comprising of sands and gravels as well as waste building materials, though not porous enough to allow soakaway drainage of a development. There is currently no surface hardstanding, or any impermeable cap, or membrane preventing rainwater from infiltrating from the surface through the made ground and into the substrata below.

4.2.2 The historic landfill area is shown to cover an area of 4.74ha on EA mapping. The extents are shown as pink hatching on Pegasus drawing no. EMS2254_120 Revision D, and in Figure 5.

4.2.3 The proposed illustrative masterplan will develop approximately 2.49ha of the area shown as historic landfill on EA mapping. The masterplan is at outline stage, however based on previous experience, the impermeable areas within the development such as roofs, drives and roads, will make up approximately 65% of the developable area. On this basis the landfill area will be covered with approximately 1.61ha of impermeable surfacing, post development. This is a reduction in permeable area over the landfill area of around 33%.

4.2.4 Runoff from impermeable areas will be positively drained via the sewer and SuDS network. This will significantly reduce the amount of rainfall that is currently able

Figure 5: Extents of Landfill from EA Mapping

to infiltrate through the made ground. This is considered a betterment to the existing scenario.

4.3 Infrastructure

4.3.1 The new site access will be formed off Newark Road. Newark Road is lower than the Site in this location, and will require a proportion of the Site close to the access to be lowered relative to existing ground level by up to 1.2m, before the access road slopes up to meet existing ground level approximately 45m into the Site.

4.3.2 Surface water drainage will need to be constructed up to 1.5m deep below the proposed road level. As a result, installing highway pavements, drainage and utilities will require excavating into the landfill made ground material. The Land Contamination Proof should be referred to for a detailed summary of the ground conditions across the Site.

4.3.3 Surface water drainage and water mains could present a pathway for contaminants and so a fully sealed piped system will be installed to prevent this. Materials will be chosen to suit the ground conditions, to prevent any possible degradation. The design and specification of surface water and drainage and potable water networks will be technically vetted by the adopting water authority.

4.3.4 Developers, contractors and water companies will install potable water pipework in accordance with current regulations and guidance. UK Water Industry Research's (UKWIR) Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (2011) provides guidance to ensure that the correct materials are selected for water pipes and components used below ground, within

brownfield sites. The UKWIR guidance was supported by supplementary guidance and protocols published by Water UK and the Home Builders Federation (2014). The documentation sets a requirement that a risk assessment is undertaken for water supplies to developments within land potentially affected by contamination. Water UK is a trade association for the water industry. Severn Trent Water (STW) are the incumbent water authority in Sutton in Ashfield. STW's Contaminated Land Assessment Guidance follows the guidance set out by Water UK and the Home Builders Federation.

4.3.5 Drainage and service pipes located within the made ground will have flexible connections such as rocker pipes and be laid to falls to accommodate any settlement. This will ensure that pipes flow as intended and will reduce the risk of leakage. Clean material will be used for pipe bedding and surround, and will be in accordance with the Sewerage Undertaker's construction specification and Nottinghamshire County Council's highway construction specification.

4.3.6 Any unsuitable material encountered when excavating, will be removed and replaced with suitable, clean fill material.

4.3.7 Excavations within the made ground will be carried out under controlled conditions, in accordance with the Construction Management Plan (CMP).

4.3.8 During the construction phase groundworkers have the potential to come into contact with contaminated material through activities like drainage installation and excavation of footings. Standard construction practices such as maintenance of hygiene, adequate welfare and dust suppression techniques will address the contaminative effects for construction workers and neighbouring members of the public during the construction phase of the project.

4.3.9 The alternative drainage strategy shown at Appendix C, shows attenuation basins located outside of the extents of the historic landfill area. If any water were to leak from the basins this would not pass through any of the made ground of the landfill area.

4.3.10 The recommended planning conditions within the committee report includes a pre-commencement condition requiring the approval of a Construction Environmental Management Plan (CEMP). The CEMP will ensure that necessary methods for working in and around the landfill area are planned out and adhered to.

4.3.11 Another recommended pre-commencement condition requires the approval of details setting out how surface water flows will be managed during construction and that no increase in flood risk off site is ensured.

4.3.12 The CEMP will ensure that dust and noise are managed, and that surface water runoff and silt is controlled and prevented from leaving the Site.

4.4 Existing Development on Historic Landfill Sites

Heathside Walton Secondary School, Walton-on-Thames

4.4.1 A full planning application (Ref: 2019/2157) for a new 900 pupil secondary school was submitted to Elmbridge Borough Council in August 2019. The site is located northeast of Waterside Drive. Following widespread excavation of gravel in the 1960s, the entire site was landfilled with Inert waste between 1975 and 1986. Ground investigations have confirmed the depth of landfill to be generally up to 8m and the Made Ground was reported to comprise sandy and clayey fill with brick, concrete, wood, glass, ceramic, plastic and ash. Elevated concentrations of heavy metals and PAHs were recorded, as well as the presence of asbestos. The site is within close proximity to existing residential housing.

4.4.2 The school development comprises sports pitches, parking, access roads and drainage and SuDS. A drainage layout taken from Jacobs' Proposed Drainage

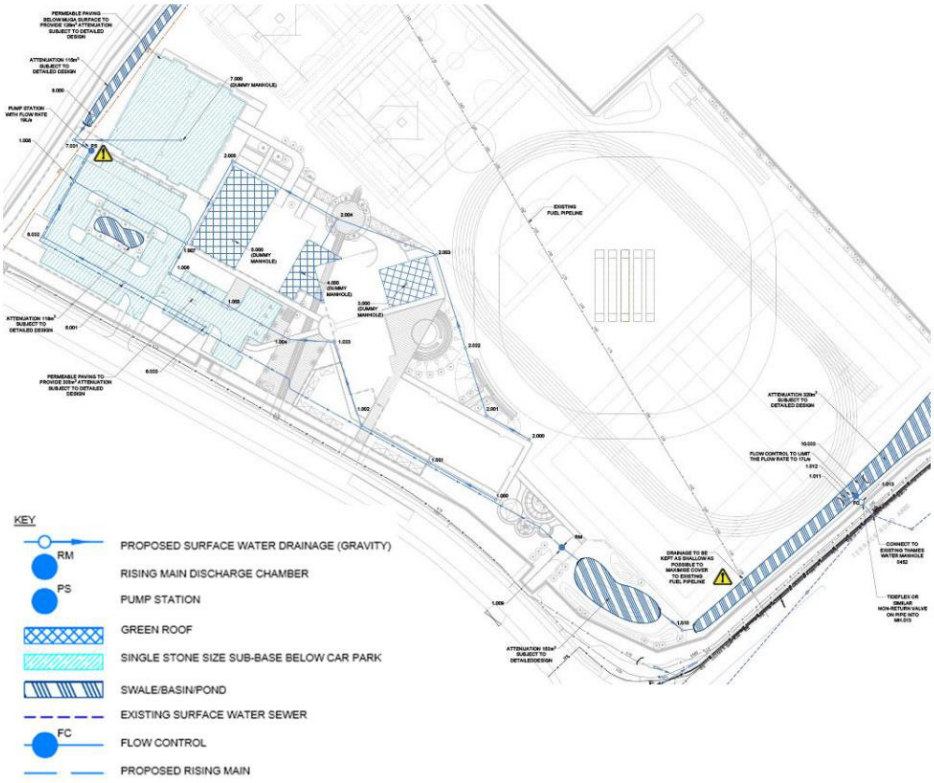

Figure 6: Drainage Strategy

Strategy (FS0588-JAC-00-XX-RP-C-0001-2) dated 21 May 2019 is shown in Figure 6. The drainage system is shown to comprise of various SuDS features including swales and ponds as well below ground attenuation tanks.

4.4.3 The LLFA confirmed that the proposed drainage scheme was acceptable subject to condition.

4.4.4 Planning permission was granted with conditions in July 2020. The school opened in September 2022, and publicly available aerial mapping shows open SuDS features partially constructed in the locations proposed on the drainage strategy. The approach in the appeal scheme original illustrative masterplan is not at all unusual by reference to this example.

Residential Development, Coseley, Dudley

4.4.5 The outline planning application (Ref: P17/0184) for up to 100 dwellings on Land off Bourne Street and Cedar Avenue was submitted in 2016. The entirety of the site is registered as a historic landfill by the Environment Agency which was listed to accept inert, commercial, industrial and special waste between 1979 and 1986. The landfill utilises a former opencast colliery site with the thickness of Made Ground identified on site to a maximum depth of 25.00 m, comprising ashy sand with clinker and coal ash; and a clayey cobbly sand of gravel with brick, concrete, shale, wood, clinker, masonry and other construction waste. The site is encircled by existing residential properties.

4.4.6 An FRA report was submitted under the outline application, produced by Integra Consulting and dated May 2017. The FRA did not include a drainage strategy layout. The LLFA responded requesting further information, but acknowledged that the site could be drained, subject to allocation for attenuation storage being provided within open space and that the use of soakaways would not be acceptable. The outline planning application was approved in March 2019.

4.4.7 The development appears to be under construction on publicly available aerial mapping. The approach to development is not at all unusual by reference to this example.

Residential Development, Glenn Parva, Leicestershire

4.4.8 The outline planning application (Ref: 15/0176/OUT) for 165 dwellings on Land to the South West of Cork Lane was submitted in 2015. Almost the entirety of the site is registered as a historic landfill by the Environment Agency which was listed to accept inert, household, commercial and industrial waste between 1974 and 1994. Ground investigations identified a maximum thickness of Made Ground to be 15.00 m comprising a clayey sand or gravel with ash, brick, concrete rubble and wood fragments. The site is bounded by existing residential properties to the north and to the south.

4.4.9 An FRA report was submitted under the outline application, produced by JPP Consulting and dated February 2014, with an updated version dated March 2015. The FRA contains an 'Indicative Drainage Strategy' drawing, with reference no. R6711-FRA02 revision B, that shows a proposed piped drainage network located entirely within the extents of the landfill area. The piped network drains to an open detention basin located partially within the extents of the landfill area.

4.4.10 A drainage layout that appears within JPP Consulting's FRA (R-FRA-R6711PP-01) dated February 2014. The drainage strategy shows a piped network leading to an open attenuation basin, that overlaps the EA Historic Landfill extents. At this time the EA were the consultee for flood risk and drainage, and responded confirming that it considered that planning permission could be granted subject to conditions.

4.4.11 An application for the discharge of reserved matters was submitted (Ref: 19/0813/RM) in 2019. 'Drainage Layout' drawing produced by Diamond Wood & Shaw Limited, dated March 2019, was submitted under this application. The drainage strategy reflects the JPP strategy submitted under the outline application. Foul and surface water piped networks and an open SuDS pond is shown draining the proposed development, which is located within almost entirely landfill extents area, refer to Figure 7.

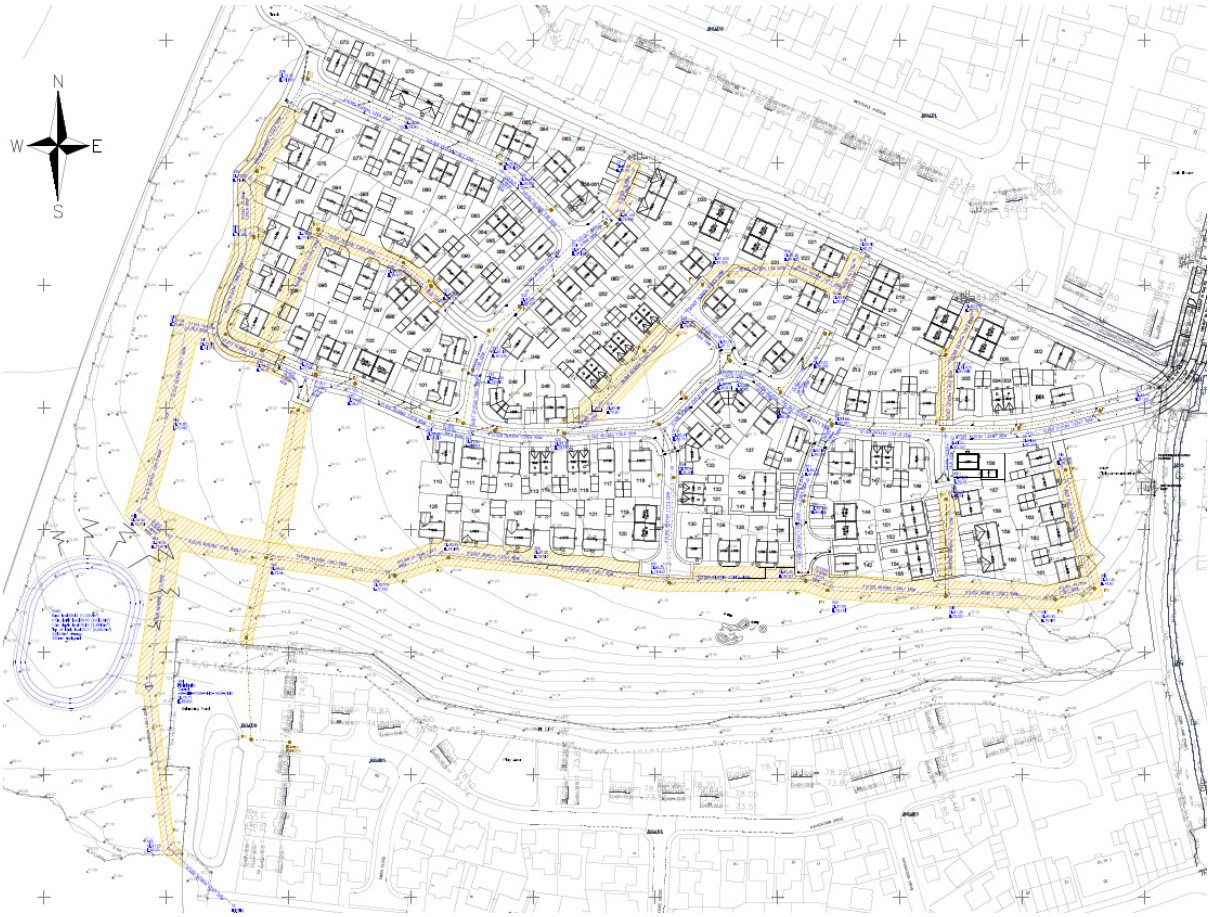

Figure 7: Drainage Layout

4.4.12 At this time Leicestershire County Council had become the relevant consultee on flood risk and drainage, as LLFA. The LLFA confirmed that it had no concerns with the application proposals.

4.4.13 Planning permission was granted by Appeal Decision in January 2023, however it is not clear whether construction activities have commenced at the site. The approach in the appeal scheme original illustrative masterplan is not at all unusual by reference to this example.

5 Third Party Representations

5.1.1 Flood risk and drainage is not a reason for refusal within the Ashfield District Council Statement of Case (SoC). However I have addressed the main concerns raised by local residents through the Public Consultation, and those registered as an interested party. The summarised comments below also take on board those listed under Drainage and Flood Risk within the Committee report.

The proposed SuDS features are not in accordance with local guidance and will not be maintained

5.1.2 The SFRA makes reference to the CIRIA SuDS Manual. All SuDS features will be designed in accordance with the most up to date version of the CIRIA SuDS Manual which is C753 (2015).

5.1.3 In accordance with the C753, surface water attenuation storage should be provided for up to the 1 in 100 year rainfall event within the site, whilst also taking into account the impact of climate change. The LLFA have raised no objections to the proposed drainage strategy. The drainage strategy caters for all storm events up to the 1 in 100 year rainfall event plus an allowance of 40% for climate change. Calculations are to be found within Appendix D, confirming that the quantum of attenuation shown is appropriate.

5.1.4 A draft condition within the Committee report requires that development shall not commence until details are approved demonstrating how the onsite sewers will be adopted pursuant to a Section 104 agreement (Water Industry Act).

5.1.5 As noted within Section C3 of the SSG Appendix C: Design and Construction Guidance (DCG), the design of SuDS should be carried out in accordance with CIRIA Report C753 'The SuDS Manual'.

5.1.6 The basins shown on the drainage strategy drawing have been designed in accordance with C753. Side slopes have a maximum gradient of 1:3 and a maintenance margin will be provided around the perimeter of the basin. A minimum 300mm freeboard will be provided from the top of the bank. Refer to section 3.7 of this statement, for a summary of the drainage strategy approach.

Houses within the locality are currently impacted by flooding, and the development will make the situation worse.

5.1.7 The Site currently drains via a combination of overland flow with some limited infiltration. The Site falls from east to west through the western portion of the site and north to south through the southwestern portion of the Site. As a result overland flow is directed towards Searby Road and the properties that are served by Searby Road or Sotheby Road.

5.1.8 The proposed drainage system will intercept flows generated by the Site, and convey flows to a positive outfall. Flows will be slowed and attenuated using SuDS features.

5.1.9 At section 3.3.3 of the FRA, the existing runoff rate from the site during the 100 year storm is calculated as 247.1 l/s. At section 3.5.7 of the FRA, the proposed discharge rate from the development during the 100 year storm event, plus a 40% increase in flows to allow for climate change, is only 63.4 l/s. The total discharge rate within the alternative drainage strategy (Appendix C) is only 58.2 l/s for the same storm event. As a result, the flow rate leaving the site during higher category storms such as the 100 year event, will be significantly reduced from that at present, and will be conveyed via a controlled below ground system, rather than by uncontrolled overland runoff. The proposed drainage system will provide a significant betterment to the existing situation.

5.1.10 A shallow, wide, valley runs from the southern boundary of the Site and towards the existing ditch that runs along the western edge of the Site. The proposal is to intercept any overland flow that may run through this depression, using shallow ditches along the southern edge of the site and convey flows to the ditch within the Site, using pipes to suit the proposed layout.

5.1.11 Local residents have raised the occurrences of flooding to properties along Searby Road. Section 3.6.5 of this statement discusses the presence of a watercourse to the west of the Site, that flows towards the properties fronting Searby Road.

5.1.12 The Site is not affected by this watercourse, and the proposed development will not have an adverse impact on any flooding associated with the watercourse. The Site boundary is elevated almost 4m above the watercourse. The Site is within a different catchment area, except for a thin sliver of land along its western boundary. Surface water runoff generated by this sliver of land will intercepted

and removed from the catchment under the development proposals, which will provide a betterment to the current scenario. Refer to Figures 8 and 9.

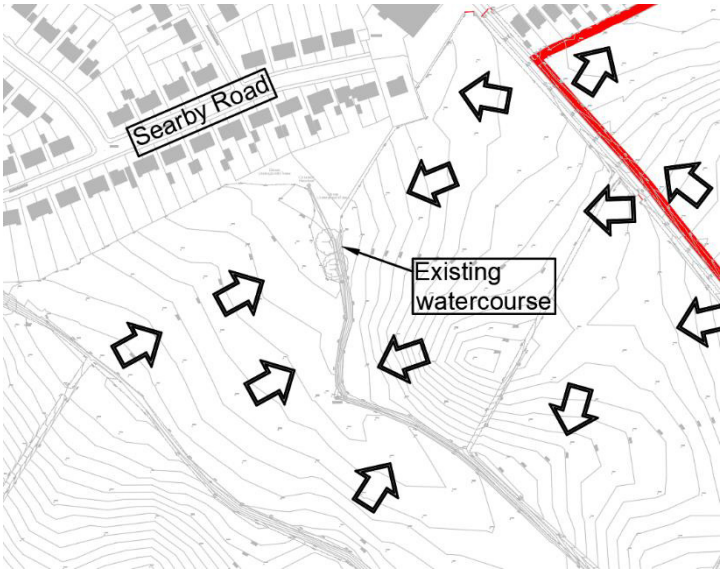

Figure 8: Watercourse to West of the Site

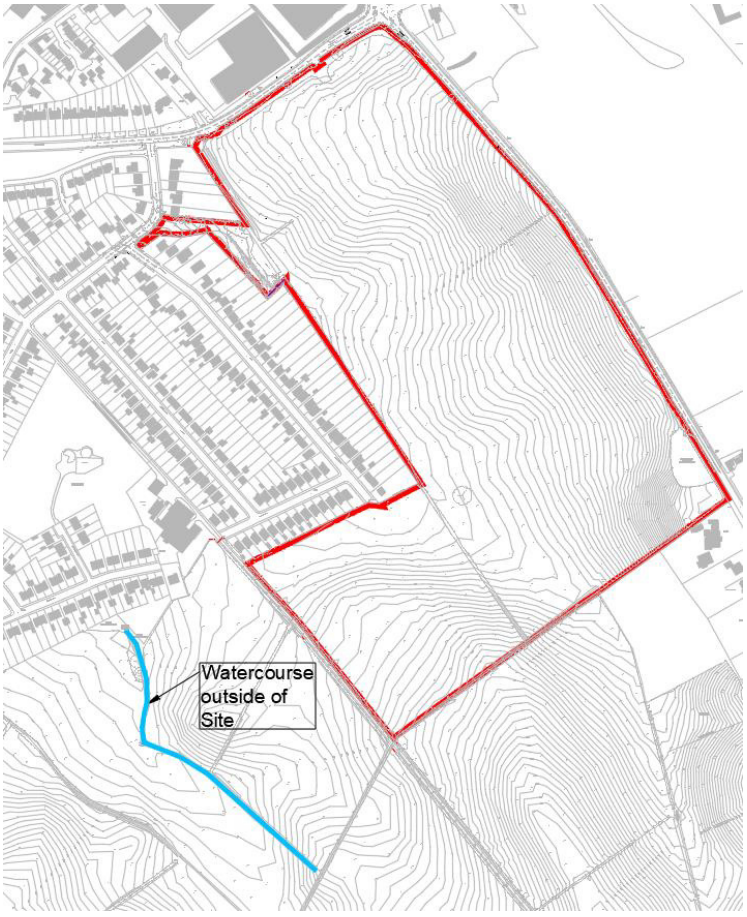

Figure 9: Watercourse to West of the Site

5.1.13 To conclude, the development will not create an adverse impact on surface water runoff within the locality. During higher category storm events there will be a material betterment to the rate of surface water discharge from the site.

There is a risk that the proposed attenuation basins could lead to the migration of contaminants in the historic landfill area.

5.1.14 As discussed within section 3.7 of this statement, it has been shown that attenuation basins can be located outside of the extents of the historic landfill area. Even if they had to be located within it, which they don't, there are well tried and tested means of making that safe and suitable, as shown by the other examples I have set out above.

5.1.15 In addition the development of the Site will introduce a significant coverage of impermeable surfacing that doesn't exist now. Impermeable surfacing will be positively drained by a robust, piped drainage system that will convey flows to the attenuation basins. Any swales located within the extents of the landfill area will have an impermeable liner. No infiltration drainage systems are proposed within the extents of the landfill area.

5.1.16 The committee report includes a planning condition recommended by NCC that requires the approval of any surface water drainage systems infiltrating to the ground.

5.1.17 It is considered highly unlikely that residents will install private infiltration drainage devices over the lifetime of the development. A clean cover system, will applied across the site, which will deter residents from digging to the required depth to install soakaways. The site layout will not be conducive to or need the use of soakaways, which require minimum offsets from foundations. The site will be positively drained and fully served by an adopted sewer network that is sized to cater for urban creep, and so any additional impermeable surfacing added by residents is already catered for in the drainage system. If a resident replaced the impermeable surfacing of their driveway with a porous solution, rainfall would slowly infiltrate and diffuse in a uniform manner.

There are springs within the Site.

5.1.18 The FRA refers to an intrusive site investigation, undertaken in April 2017 by Rodgers Leask. Groundwater monitoring points remained dry across the site except for at one location groundwater was recorded at 1.85m below ground level (bgl). Similar results were obtained during monitoring in 2018, with no groundwater recorded higher than 1.85m bgl.

5.1.19 The FRA includes an email from the LLFA that notes that there are features within the site that appear to suggest ground water issues, such as springs, due to the

presence of channel features across the fields. I have observed channel features on some of the steepest slopes, but did not observe springing water.

5.1.20 A Phase 2 ground investigation was undertaken by ECE in 2022. No groundwater monitoring was undertaken however groundwater was only encountered at 2.1m bgl within a borehole.

5.1.21 Springing water was not encountered during the intrusive site investigations undertaken by Rodgers Leask or ECE, or during any site walkovers undertaken by Rodgers Leask.

5.2 Conclusion

5.2.1 Based upon the above, I believe that the implementation of the measures noted would appropriately mitigate drainage and flood risk from all sources.

5.2.2 Draft planning conditions have been provided by NCC (LLFA) within the committee report. Draft conditions require the development to be carried out in accordance with, "the principles set forward by the approved Flood Risk Assessment (FRA) and Drainage Strategy".

5.2.3 I consider that the relevant flood mechanisms which could put the site at risk of flooding have been considered, and where issues have been identified, appropriate mitigation measures have been proposed which can be readily achieved within the proposed development.

5.2.4 It is my opinion that the proposed development would not be at risk of flooding, nor would it increase the flood risk to the local area for the lifetime of the development and accords with both national and local planning policy.

6 Summary and Conclusions

6.1.1 Flood risk and drainage is not a reason for refusal within the Ashfield District Council Statement of Case (SoC).

6.1.2 No objections to the development proposals were raised by the LLFA or the EA, subject to conditions being imposed on any resultant permission.

6.1.3 In producing this statement I have reviewed the FRA document alongside national and local policy and relevant technical guidance.

6.1.4 The drainage strategy is in accordance with the NPPF and the SFRA, as well as being in accordance with the requirements of the LLFA and relevant technical guidance.

6.1.5 The development will reduce surface runoff rates during higher category storm events which will help to reduce flood risk off site.

6.1.6 I have reviewed consultee responses and have demonstrated that an alternative attenuation layout can be accommodated within the illustrative masterplan, such that no attenuation SuDS features are required to be located within the EA historic landfill extents, should this be a concern.

6.1.7 I have reviewed other sites, including a school and residential developments, that are being built on historic landfill sites around the country. The developments include infrastructure comprising roads, piped drainage networks and open SuDS features, located within the extents of historic landfill. This is reasonably normal and can be accommodated with standard measures of design, and construction mitigation.

Land at Newark Road, Sutton-in-Ashfield

Appeal Reference: APP/W3005/W/24/3350529

Drainage

Statement of Evidence Appendices

Produced on behalf of Hallam Land

December 2024

P16-530

16530-RLL-24-XX-RP-C-002

Appendix A – Site Topography Plan

A1

GENERAL NOTES

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site works prior to such approval being provided it is entirely at their own risk.
5. All dimensions are in metres unless otherwise stated.
6. The Rodgers Leask Designer's Risk Assessment(s) for this project must be reviewed PRIOR to the commencement of any works on site.

N

KEY

Site boundary

Direction of fall in topography

Gully and chamber linking culvert.
Gully drains overflow from ditch

Shallow ditch

Watercourse outside of site boundary

Health and safety symbols refer to reference numbers indicated on Designers Risk Assessment number: 16530-RLL-24-XX-HS-C-0001

Health & Safety Information Key

- Used to provide design specific safety information that may not be obvious to a competent contractor but may be useful
- Used to restrict/prevent a possible action, e.g. stop construction traffic from entering an area
- Used to warn of significant design hazards, adding recommendations
- Used to encourage a positive action, e.g. use of robust protection for inspection chambers

Rev	Date	Amendments	By	Chk
P02	17.12.24	Notes revised.	ML	KAH
P01	10.12.24	Preliminary issue.	ML	KAH

RLRE Consulting Engineers

Client

HALLAM LAND

Project

LAND SOUTH OF NEWARK RD
SUTTON IN ASHFIELD

Drawing Title

SITE TOPOGRAPHY PLAN

Status

FOR INFORMATION

Scale	Drawn	Checked	Date
1:1000 @ A1	ML	KAH	10.12.24

Drawing Number	Revision
16530-RLL-24-XX-DR-C-203	P02

BIM Drawing Reference

-

Scale Bar

1:1250 10 20 30 40 50 60 70 80 90

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Appendix B – Drainage Strategy Technical Note

Technical Note

Project:	P16-530 Land at Newark Road, Sutton-in-Ashfield		
Subject:	Technical Note – Drainage Strategy		
Prepared by:	Matthew Leask – Associate	**Date:**	16 Dec 2024
Authorised by:	Kriston Harvey - Director	**Status:**	S2 - Information
Document Ref:	16530-RLL-24-XX-TN-S-0001	**Revision:**	P02

1 Introduction

1.1 Terms of Reference

This technical note has been commissioned by Hallam Land and relates to planning application reference V/2022/0629, for a residential development of up to 300 dwellings with associated infrastructure and landscaping.

2 Current Drainage Strategy

2.1 Rodgers Leask Drainage Strategy

Rodgers Leask have undertaken a Flood Risk Assessment & Drainage Strategy (FRA) for the development site ("the Site") with reference 16530-RLL-22-XX-RP-C-001. The latest revision is P03, dated 24th June 2022.

2.2 Attenuation Strategy

The Rodgers Leask drainage strategy outlined within the FRA, proposes to restrict surface water flows generated by the proposed development, to the equivalent greenfield runoff rate (QBAR). This has been calculated using ICP SUDS method within MicroDrainage software. Attenuation storage is shown on illustrative masterplan drawing no. EMS2254_102 Revision E (dated June 2022) within three open SuDS basins.

The northernmost basin is located within the extents of a historic landfill area in that illustrative masterplan. Forming this basin would likely require excavating into the landfill made ground, and the installation of a robust liner to its base. As local concern regarding the potential risk should there be leakage into the landfill materials has been raised,

notwithstanding that this is not accepted as an issue, an alternative proposal is summarised in the following section which would simply avoid the issue.

3 Alternative Attenuation Layout

3.1 Revised Drainage Strategy

It is proposed to remove the northernmost basin (formerly referred to as "Attenuation Pond 1") from the illustrative masterplan and drain the area within the Site extending from Newark Road down to the southern boundary, into the basin formerly referred to as "Attenuation Pond 2". Refer to Rodgers Leask drawing no. 16530-RLL-24-XX-DR-C-205 revision P02. The revised illustrative masterplan has the drawing no. reference EMS2254_120 Revision D (dated December 2024).

This basin, formerly referred to as "Attenuation Pond 2" has now been enlarged to suit the revised catchment area, and the basins have been renamed. The discharge rates have been recalculated based on the latest illustrative masterplan, it has been ensured that the rates do not exceed the 4.7 l/s/ha rate specified at section 3.5.6 in the FRA.

Attenuation storage has been sized using Causeway Flow drainage modelling software. The results are summarised in Table 1 below.

Attenuation Basin Ref.	Catchment Area (in ha)	Discharge Rate (in l/s)	Attenuation Volume (in m^3)
1	8.24	38.7	4872
2	4.41	19.5	3202
Total	12.65	58.2	8074

Table 1

3.2 Conclusion

The total development catchment area measured from the illustrative masterplan in the FRA was 13.49ha, with flows generated by the development restricted to a total rate of 63.4 l/s. The total development catchment area measured from the revised illustrative masterplan is 12.65ha, with flows generated by the development restricted to a total rate of 58.2 l/s. It has been ensured that the discharge rates stated at section 3.5.6 of the FRA have not been exceeded.

Modelling using Causeway Flow software has demonstrated that the alternative attenuation layout shown on the updated illustrative masterplan can be accommodated, such that no attenuation storage features are shown located within the extents of the historic landfill area.

Appendix C – Drainage Strategy Drawing

A0

NEWARK ROAD

NEWARK ROAD

COMMOR ROAD

SEARBY ROAD

Searby Road

Sotherby Avenue

Searby Avenue

John Whetton Park
Play area and recreation field

FW drainage to connect to existing CW sewer between manhole refs. 3301 and 3303.

SW drainage to connect to existing SW manhole ref. 3304

FW connection

Gully and chamber linking culvert. Gully drains overflow from ditch

Control chamber restricting flows up to and including the 100yr + 40% allowance for climate change.
Max. discharge rate = 38.7 l/s

Existing ditch approximately 600-1000mm deep

Gully and chamber linking culvert. Gully drains overflow from ditch

Proposed land drainage swales. Check dams, and planting to inhibit flow

Ditch observed on site, depth varies between 0.3-0.6m along length

Attenuation Basin 1
Draining proposed development area.
Volume = 4872m³ min.
IL = 148.7m
TWL = 150.1m
Freeboard = 300mm
Side slopes = 1:3 max.

Ditch observed on site, depth varies between 0.3-0.6m along length

FW drainage to connect to existing FW manhole ref. 5102

SW drainage to connect to existing SW manhole ref. 5001

Control chamber restricting flows up to and including the 100yr + 40% allowance for climate change.
Max. discharge rate = 19.5 l/s

Attenuation Basin 2
Draining development area.
Volume = 3202m³ min.
IL = 150.8m
TWL = 152.2m
Freeboard = 300mm
Side slopes = 1:3 max.

Traced line and approximate level of 450mm dia water main through site. 6m easement shown either side of pipe C/L

Cut off drainage to intercept any overland flow

Approximate line of buried pipe, assumed to be a land drain

181.1m

GENERAL NOTES

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site works prior to such approval being provided it is entirely at their own risk.
5. Preliminary proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions, contaminants, drainage, design and planning / density negotiations.
6. Sewers are shown indicatively and only the final section of network prior to the connecton into the basins is shown for illustrative purposes only. The drainage network is subject to design stages beyond that suitable for an outline drainage strategy.
7. All dimensions are in metres unless otherwise stated.

Key

- Site boundary
- Existing public surface water sewer
- Existing public combined sewer
- Existing public foul water sewer
- Existing public foul water rising main
- Proposed surface water sewer
- Proposed foul sewer
- Proposed development drainage swale
- Proposed land drainage swale
- Proposed land drainage pipe
- Approximate ditch location
- Buried pipe or culvert
- Indicative sewer easement
- Extents of historic landfill area (EA mapping)

Rev	Date	Amendments	By	Chk
P02	12.12.24	Updated to included latest illustrative masterplan.	ML	KAH
P01	10.12.24	Issued for information.	ML	KAH

RLRE Consulting Engineers

Client
HALLAM LAND

Project
LAND SOUTH OF NEWARK RD SUTTON IN ASHFIELD

Drawing Title
DRAINAGE STRATEGY ALTERNATIVE ATTENUATION OPTION

Status
PRELIMINARY

Scale	Drawn	Checked	Date
1:1000 @ A0	ML	KAH	10.12.24

Drawing Number
16530-RLL-24-XX-DR-C-205

Revision
P02

BIM Drawing Reference
-

Scale Bar
1:1000 10 20 30 40 50 60 70

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Appendix D – Drainage Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.394	Preferred Cover Depth (m)	1.200
CV	0.840	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	6.460	5.00	150.500	1800	451460.146	358368.107	1.700
2			150.400	1800	451469.408	358364.133	1.700
3			151.290	1800	451473.518	358362.554	2.731
1A		5.00	150.700	1800	451443.181	358375.735	1.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	5.000	0.600	148.800	148.700	0.100	50.0	1700	5.10	75.0
1.001	2	3	23.998	0.600	148.700	148.559	0.141	170.2	300	5.44	75.0
1.000A	1A	1	18.601	0.600	148.900	148.800	0.100	186.0	1700	5.09	75.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	6.553	14874.0	2059.2	0.000	0.000	6.460	0.0	421	4.704
1.001	1.202	85.0	2059.2	1.400	2.431	6.460	0.0	300	1.217
1.000A	3.391	7697.2	0.0	0.100	0.000	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	5.000	50.0	1700	Circular	150.500	148.800	0.000	150.400	148.700	0.000
1.001	23.998	170.2	300	Circular	150.400	148.700	1.400	151.290	148.559	2.431
1.000A	18.601	186.0	1700	Circular	150.700	148.900	0.100	150.500	148.800	0.000

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1800	Manhole	Headwall	2	1800	Manhole	Adoptable
1.001	2	1800	Manhole	Adoptable	3	1800	Manhole	Adoptable
1.000A	1A	1800	Manhole	Adoptable	1	1800	Manhole	Headwall

Simulation Settings

Rainfall Methodology	FSR	Winter CV	0.840
FSR Region	England and Wales	Analysis Speed	Normal
M5-60 (mm)	20.000	Skip Steady State	x
Ratio-R	0.394	Drain Down Time (mins)	240
Summer CV	0.750	Additional Storage (m³/ha)	20.0

Simulation Settings

Check Discharge Rate(s) x | Check Discharge Volume x

Storm Durations

60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	148.700	Product Number	CTL-SHE-0259-3870-1400-3870
Design Depth (m)	1.400	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	38.7	Min Node Diameter (mm)	1800

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	148.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2256.0	0.0	1.700	5229.0	0.0