OTTERPOOL PARK

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ENVIRONMENTAL STATEMENT

OP5 CHAPTER 10 **– GEOLOGY, HYDROLOGY AND LAND QUALITY**

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March 2022

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OTTERPOOL PARK

Environmental Statement Volume 2: Main ES
Chapter 10: Geology, Hydrogeology and Land Quality

MARCH 2022

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10.1 Introduction

10.1.1 This Chapter of the ES assesses the impact of construction and operation of the proposed Development with respect to Geology, Hydrogeology and Land quality.

10.1.2 This Chapter should be read in conjunction with Chapters 1-4 (the introductory chapters), Chapter 9: Cultural Heritage, Chapter 15: Surface Water Resources and Flood Risk and Chapter 17: Waste and Resource Management.

10.1.3 It has been prepared alongside and informed by a Ground Condition Report (GCR) provided in ES Appendix 10.1. A Mineral Resource Assessment report (ES Appendix 17.2) has also been prepared and has been included with the planning application. Relevant environmental information detailed within this Chapter is illustrated on Figures 10.1 to 10.6 (ES Appendix 10.2).

Relevant Aspects of the Proposed Development

10.1.4 A full description of the Development is given in Chapter 4: The Site and the Proposed Development. The aspect that is of particular relevance to this assessment is the potential for localised contamination to be present particularly due to the varied history of former military land uses across the site (considered within this Chapter).

10.1.5 There is a Geological Site of Special Scientific Interest (SSSI) which is located within the centre of the site and therefore requires measures to be put in place to safeguard the geological features. These measures are detailed in the Design and Mitigation section later in the chapter.

10.1.6 The proposed Development is within a Mineral Safeguarding Area which requires consideration to avoid unnecessary sterilisation of viable minerals for future use.

10.1.7 The management of the effects of the proposed Development on existing land drainage to demonstrate no detrimental impact to the groundwater regime across the site, has been incorporated into the assessment.

10.2 Assessment Methodology

Legislation, Policy and Guidance

Legislation

10.2.1 This impact assessment has been undertaken in accordance with current legislation relevant to the land quality and controlled waters specifically the hydrogeology regime, a summary of which is provided below.

10.2.2 The Environmental Protection Act 1990 (EPA) (Ref 10.2) defines, within England, the system for waste management and control of emissions into the environment. The Act was intended to strengthen pollution controls and support enforcement with heavier penalties. Before the Act there had been separate environmental regulation of air, water and land pollution and the Act brought in an integrated scheme that would seek the "best practicable environmental option".

10.2.3 Part 2A of the Environmental Protection Act 1990 (which was inserted into that Act by section 57 of the Environment Act 1995 (Ref 10.3) contains a regulatory regime for the identification and remediation of contaminated land. In addition to the requirements contained in the primary legislation, operation of the regime is subject to regulations and statutory guidance.

10.2.4 The main objective underlying the introduction of the Part 2A contaminated land regime was to provide an improved system for the identification and remediation of

land where contamination is causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land.

10.2.5 The identification of contaminated land, as defined in Part 2A of the Environmental Protection Act 1990, comprises a risk-based approach. For harm to the non-aquatic environment or pollution of controlled waters to occur, there must be a 'pollutant linkage'. This linkage is based on the following being present:

- A source of contamination (hazard);
- A pathway for the contaminant to move from source to receptor; and
- A receptor (target), which is affected by the contaminant. This includes humans, ecosystems, controlled waters, physical systems and built structures, which could be affected by the hazard.

10.2.6 The Contaminated Land (England) (Amendment) Regulations 2012 (Ref 10.4) came into force in April 2012. These regulations amended the 2006 version to take account of protected areas under Directive 2000/60/EC of the European Parliament and of the Council, establishing a framework for Community action in the field of water policy. They also take account of the updated definition of "controlled waters" in section 78A(9) of the Environmental Protection Act 1990.

10.2.7 The Water Environment (Water Framework Directive [WFD]) (England and Wales) Regulations 2003 (Ref 10.5) implements the WFD in England and Wales. This legislation provides a framework for the protection of surface (fresh) water, estuaries, coastal water and groundwater. The objectives of the WFD are to enhance the status, and prevent further deterioration, of aquatic ecosystems, promote the sustainable use of water, reduce pollution of water and ensure progressive reduction of groundwater pollution.

10.2.8 The Water Resources Act 1991 (Ref 10.6), as amended, sets out the regulatory regime under which water abstraction and impounding is licensed by the Environment Agency (EA). It is a criminal offence to knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters.

10.2.9 Part 5 of the Environment Act 2021 (Ref 10.7), brings together measures to strengthen and update the existing regulatory and long-term planning framework for water (including groundwater), helping to reduce environmental risks, including to water quality and land drainage. It also strengthens the regulation of water and sewerage undertakers by the newly established Office for Environmental Protection.

10.2.10 Geological sites of national importance are principally afforded protection under the Wildlife and Countryside Act 1981 (as amended) (Ref 10.8) or the National Parks and Access to the Countryside Act 1949 (Ref 10.9) by designation as SSSIs or National Nature Reserves (NNRs).

10.2.11 The Pollution Prevention and Control Act 1999 (Ref 10.10) provides for a unified system of environmental permitting. Within this the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (Ref 10.11) provide the permitting regime that encompasses water discharge activities, groundwater activities, waste management activities and some activities associated with mines and quarries, including waste mining operations. An environmental permit is required for specified activities. Certain activities may benefit from an exemption from the environmental permitting regime, provided that they fulfil the conditions set by the EA.

Policy

10.2.12 The assessment has considered the National Planning Policy Framework (NPPF) (Ref 10.12) which sets out Government policy in relation to development on contaminated land.

10.2.13 The assessment also considers those relevant policies of the Places and Policies Local Plan (2020) (Ref 10.14) and the Folkestone and Hythe District Council Core Strategy Review (2022) (Ref 10.15), in addition to the Kent County Council Minerals and Waste Local Plan (Ref 10.16). These have been summarised within Table 10-1 along with NPPF relevant policy paragraphs.

Table 10-1 Summary of Relevant Adopted Policies

Document	Policy	Summary of Requirements	Project Response
National Planning Policy Framework, as amended (2021)	Paragraph 119	Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land.	The assessment has considered the impact on receptors from land quality including controlled waters and detailed appropriate mitigation as detailed in Section 10.4 Design and Mitigation.
	Paragraph 120	Planning policies and decisions should: c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;	
	Paragraph 174	Planning policies and decisions should contribute to and enhance the natural and local environment by: e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate	The assessment has considered the impact on receptors from land quality including controlled waters and detailed appropriate mitigation as detailed in Section 10.4 Design and Mitigation.
	Paragraph 183	Planning policies and decisions should ensure that: a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.	

Document	Policy	Summary of Requirements	Project Response
	Paragraph 184	Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.	
	Paragraph 185	Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.	The assessment has considered the impact on receptors from land quality including controlled waters and detailed appropriate mitigation as detailed in Section 10.4 Design and Mitigation.
F&HDC Council Core Strategy Review 2022	Paragraph 5.69 Contaminated Land	Development on brownfield land shall include an appropriate strategy for addressing past contamination, where present, on a risk assessed basis. Interface with and potential conflict with the objective to the implementation of SuDS, should be addressed, as infiltration drainage is not always appropriate on brownfield sites.	The assessment has considered the impact on receptors from land quality including controlled waters and detailed appropriate mitigation as detailed in Section 10.4 Design and Mitigation. SuDS will not be implemented in areas where there is an unacceptable risk that contamination could be mobilised.
Places and Policies Local Plan (2020)	Policy NE7 (Contaminated Land)	When development is proposed on or near a site that has been used for the purpose of waste disposal, is known to be contaminated, or where there is reason to believe that contamination may exist, the applicant will be required to carry out a site assessment and submit a report of the findings in order to establish the nature and extent of the contamination. The assessment should be phased, starting with a Phase 1 Investigation (or Desk Study) the results of which will determine the requirement for a Phase 2 Investigation (intrusive investigation), which will in turn determine any requirement for a remediation strategy and Verification Report. Assessment should be carried out in accordance with Environment Agency CLR11 Guidance Model Procedures for the Management of Land Contamination. Development will be permitted subject to the identification, and commitment to the implementation of, practicable and efficient measures to treat, contain and/or control any contamination so as to: 1. Protect the occupiers of the development and neighbouring land users, including in the case of	Design and mitigation measures to assess contaminated land have been outlined in Section 10.4 Design and Mitigation.

Document	Policy	Summary of Requirements	Project Response
		housing the users of gardens, from unacceptable risk; 2. Ensure the structural integrity of any existing or proposed structure on or adjoining the site; 3. Prevent contamination of any watercourse, water body or aquifer; 4. Prevent the contamination of adjoining land or halt existing contamination; and 5. Ensure that any remedial measures do not damage adjacent historic artifacts. Any permission for development will require that the remedial measures agreed with the Council must be completed as the first step in the carrying out of the development. This policy replaces U10a Contaminated Land. The Core Strategy refers to the U10a policy.	
Kent County Council Mineral and Waste Local Plan (2013-30) as amended by the Early Partial Review (adopted 2020)	Policy DM7 (Safeguarding Mineral Resources)	Planning permission will only be granted for non-mineral development that is incompatible with minerals safeguarding, where it is demonstrated that either: 1. the mineral is not of economic value or does not exist; or 2. that extraction of the mineral would not be viable or practicable; or 3. the mineral can be extracted satisfactorily, having regard to Policy DM9, prior to the non-minerals development taking place without adversely affecting the viability or deliverability of the non-minerals development; or 4. the incompatible development is of a temporary nature that can be completed, and the site returned to a condition that does not prevent mineral extraction within the timescale that the mineral is likely to be needed; or 5. material considerations indicate that the need for the development overrides the presumption for mineral safeguarding such that sterilisation of the mineral can be permitted following the exploration of opportunities for prior extraction. 6. it constitutes development that is exempt from mineral safeguarding policy, namely householder applications, infill development of a minor nature in existing built-up areas, advertisement applications, reserved matters applications, minor extensions and changes of use of buildings, minor works, non-material amendments to current planning permissions; or it constitutes development on a site allocated in the adopted development plan; or 7. it constitutes development on a site allocated in the adopted development plan where consideration	A Mineral Resource Assessment (ES Appendix 17.2) has been prepared and submitted with the planning application

Document	Policy	Summary of Requirements	Project Response
		of the above factors (1-6) concluded that mineral resources will not be needlessly sterilised.	
Kent County Council Mineral and Waste Local Plan (2013-30) as amended by the Early Partial Review (adopted 2020)	Policy DM9 (Prior Extraction of Minerals in Advance of Surface Development)	Planning permission for, or incorporating, mineral extraction in advance of development will be granted where the sources would otherwise be permanently sterilised provided that: 1. the mineral extraction operations are only for a temporary period; and, 2. the proposal will not cause unacceptable adverse impacts to the environment or communities. Where planning permission is granted for the prior extraction of minerals, conditions will be imposed to ensure that the site can be adequately restored to a satisfactory after-use should the main development be delayed or not implemented.	A Mineral Resource Assessment (ES Appendix 17.2) has been prepared and submitted with the planning application
	DM10 (Water Environment)	Planning permission will be granted for minerals or waste development where it does not: 1. result in the deterioration of physical state, water quality or ecological status of any water resource and waterbody, including rivers, streams, lakes and ponds 2. have an unacceptable impact on groundwater Source Protection Zones 3. exacerbate flood risk in areas prone to flooding (as shown in Figure 15) and elsewhere, both now and in the future All minerals and waste proposals must include measures to ensure the achievement of both no deterioration and improved ecological status of all waterbodies within the site and/or hydrologically connected to the site. A hydrogeological assessment may be required to demonstrate the effects of the proposed development on the water environment and how these may be mitigated to an acceptable level.	A Mineral Resource Assessment (ES Appendix 17.2) has been prepared and submitted with the planning application

10.2.14 The following emerging supporting text from the recently published draft Kent Minerals and Waste Local Plan 2013-2030 (Ref 10.17) has also been considered in the assessment in Table 10-2.

Table 10-2 Summary of relevant emerging supporting text

Document	Reference	Description	Project Response
KCC-Minerals and Waste Local Plan 2013-30 Proposed Refresh (Regulation 18 Consultation) (December 2021) (Ref 10.17)	Policy DM7 (Safeguarding Mineral Resources)	A review of this policy concluded Policy DM7 was the subject of an early partial review of the Kent Minerals and Waste Local Plan 2013-30, the modifications clarified when an allocation in an adopted local plan could afford an exemption to land-won mineral safeguarding requirements of Policy CSM 5: Land-won Mineral Safeguarding. These changes were found sound by Independent Examination and the partially reviewed plan was adopted in 2020. The policy remains fully effective and does not require updating.	A Mineral Resource Assessment (ES Appendix 17.2) has been prepared and submitted with the planning application
	Policy DM9 (Prior Extraction of Minerals in Advance of Surface Development)	A review of this policy recommended that this policy *is consistent with national policy however the wording of criterion 1 is unclear and does not adequately express the intention of the policy. In light of this it is proposed that the text be updated to ensure its effectiveness*.	
	Policy DM10 (Water Environment)	A review of this policy recommended that *Updates are recommended to strengthen the requirement for risk assessments to consider impacts to groundwater from minerals and waste development.*	

Guidance

10.2.15 The following relevant guidance have been referred to and used in the assessment.

- Highways England, 2019. Design Manual for Roads and Bridges (DMRB), LA 109 Geology and Soils. (Ref 10.18), Environment Agency, 2019. Land Contamination Risk Management (LCRM). Bristol. Environment Agency. (Ref 10.19)
- Environment Agency Revised March 2017 Groundwater Protection: Principles and Practice (GP3) (Ref 10.20)
- Environment Agency, 2015. Contaminated Land Exposure Assessment (CLEA) tool. Bristol. Environment Agency. (Ref 10.21)
- Department for Environment, Food and Rural Affairs, 2012. Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance. London. The Stationery Office Limited. (Ref 10.22)
- Department for Environment, Food and Rural Affairs, 2013. Environmental Permitting Guidance, Core Guidance for the Environmental Permitting (England and Wales) Regulations 2010. London. The Stationery Office Limited. (Ref 10.23)
- British Standards, 2001. BS10175 Code of Practice for the Investigation of Potentially Contaminated Sites. London. British Standards Institution. (Ref 10.24)
- British Standards, 2015. BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. London. British Standards Institution. (Ref 10.25)

- CIRIA, 2006. CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. London. Construction Industry Research. (Ref 10.26)
- Planning Policy Guidance - Land affected by Contamination (July 2019) (Ref 10.27)
- Planning Policy Guidance - Land stability (July 2019) (Ref 10.28)
- Planning Policy Guidance - Water supply, waste water and water quality (July 2019) (Ref 10.29)

Consultation and Scoping

Consultation

10.2.16 Table 10-3 provides a summary of the consultation undertaken for this chapter prior to and following the submission of the 2019 application (Y19/0257/FH). The table summarises how the comments have been addressed in this chapter, where relevant.

Table 10-3 Summary of Consultation

Consultee/Contact/Date	Summary of Consultee Issue	Outcome
Natural England Sustainable development Sussex and Kent (9 May 2017 (site meeting), 17 May 2017 (letter)	Geological SSSI In summary, Natural England state '*Otterpool Quarry is located within the centre of the proposed Otterpool Park…. Its geological interest and open space mean it could form a key asset and even focal point of the garden town's Green Infrastructure (GI) strategy, with the benefit of improved access for the local community, an opportunity for education and recreation, and enhancement of the geological exposure itself to improve its use as a national scientific resource. The SSSI should be protected in its entirety, and integrated into the development of the garden town in a way which realises the best of these benefits*.'	Consultation has been undertaken with Natural England regarding the SSSI within the proposed Development. These elements have been considered and the SSSI is located within a proposed Country Park.
Shepway District Council (SDC) Environmental Protection Officer, Environmental Health (19 December 2016)	Potential for historic contamination The EIA should also include contaminated land implications from Westenhanger train station; Ashford Lane quarry (i.e. Otterpool Quarry Geological SSSI)/ lorry park) and former Lympne Airfield.	These elements have been considered and information included within the baseline section of this Chapter.
Environment Agency (EA) Kent and South London Customers and Engagement officer (7 December 2016)	Sensitivity of Controlled Waters The EA provided further environmental desk based information on abstractions and pollution incidents which supports that reviewed to date.	This information has been included in the baseline sections of this Chapter.
Consultations since 2019	***This mainly includes addressing the following LPA and key consultee comments to the previously submitted Outline Planning Application Otterpool Park (Y19/2057/FH)***	
Idom Meerbrook on behalf of FHDC regarding 2019	Review of ES chapter and appendices	Comments noted.

Consultee/Contact/Date	Summary of Consultee Issue	Outcome
application (May 2019) (Appendix I from LPA letter)	Idom considered that approach to the investigation undertaken was reasonable and that the density of exploratory holes was sufficient to support outline planning application. Residual effects on the land quality are considered to be slight adverse but not significant during the construction phase and contamination impacts have been scoped out during the operation phase of the development (as the necessary controls and remediation will have been implemented during construction). This conclusion is considered to be reasonable by Idom. Idom proposed that standard contaminated land planning conditions were applied to any consent for development to secure the appropriate detailed level of assessment.	
Natural England review of 2019 application (letter dated 28th June 2019)	In relation to Otterpool Quarry SSSI NE were pleased to see the SSSI would be protected and will form a key element of the wider green infrastructure strategy. NE would expect the landowners to continue protecting the site from scrub encroachment by a management regime. NE welcomes the benefits (scientific and educational) of enhancing the feature. Further information should be provided on management practices for the SSSI and it was suggested that a specific condition to agree a management scheme should be included in the permission.	Details regarding the enhancement is included in the mitigation section of this Chapter. The management of the SSSI are set out in the Green Infrastructure Strategy (ES Appendix 4.11).

Scoping

10.2.17 A previous EIA Scoping Opinion was undertaken for the 2019 application, where relevant, the comments from this process have been incorporated within Table 10-3. For this amended application, a request for a Scoping Opinion was submitted to F&HDC in June 2020. This outlined the work that had been undertaken to date and sets out the proposed approach to the EIA. A Scoping Opinion was issued by F&HDC in July 2020. Table 10-4 provides a summary of the scoping opinion comments relevant to this chapter, and how they have been addressed.

10.2.18 Additionally, a Scoping Addendum was submitted on 5 October 2021 to outline key changes to the application. These comprised additional land in the north-west corner of the site for provision of the waste water treatment works (WWTW), additional land for highway junction works at Newingreen Junction, minor amendments to clarify land ownership boundaries and a change in the assessment approach in relation to the future uses of Westenhanger Castle. A response was received from F&HDC on this Scoping Addendum as set out in Chapter 2: EIA Approach and Methodology. All

relevant changes since the submission of the scoping report have been assessed in this ES.

Table 10-4 Summary of EIA Scoping Opinion

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
2019 Scoping Opinion		
Idom Meerbrook	Key environmental receptors that should also be considered are • Adjacent land • Infrastructure along with existing and future buildings and structures.	Included in Sections 10.5 and 10.6 of this Chapter
Idom Meerbrook	Construction workers should be considered during the construction phase due to potential exposure of contaminants during works	Included in Sections 10.5 and 10.6 of this Chapter
2020 Scoping Opinion		
Temple (on behalf of F&HDC)	Cumulative contamination effects have been scoped out on the basis that cumulative schemes are expected to be built in accordance with legislative controls and built-in mitigation – this needs to be evidenced, otherwise this should be assessed in the ES. The potential for cumulative effects should be assessed, particularly with regard to elements of the Framework Masterplan that are not included within the proposed Development, due to their proximity.	Included in Section 10.5 of this Chapter
Temple (on behalf of F&HDC)	There is insufficient evidence of mitigation in the 2020 Scoping Report to scope out effects in presented in Section 10.5.4 [a list of operational effects to be scoped out including effects of historic ground and groundwater contamination following construction, potential for introduction of future contamination, and presence of natural contaminated (e.g. radon)] of the Scoping Report. If sufficient evidence can be provided in the ES, the assessment of these effects is not required.	Included in Sections 10.5 and 10.6 of this Chapter
Temple (on behalf of F&HDC)	Potential effects to the health of construction workers during the construction phase should also be considered.	Included in Sections 10.5 and 10.6 of this Chapter
Historic England	The works have the potential to cause detrimental changes to flood risk, water quality and resources. We highlight that there could be impacts on the archaeological resource and buildings from water changes, so this should be considered here and any subsequent assessment and design strategy. Monitoring of these effects may be required	Included in Hydrogeology section in Section 10.3 of this Chapter. Also assessed in Chapter 9 Cultural Heritage and Chapter 15 Surface Water Resources and Flood Risk.

10.2.19 Temple, on behalf of F&HDC, undertook a review of the Draft ES in December 2021. There were no topic specific comments relating to this chapter.

The Study Area

10.2.20 For the geological environment, the study area would be defined to include the area within the application site boundary, which includes the Geological SSSI.

10.2.21 With regards to land quality and hydrogeology, the study area has been defined to reflect the surrounding geological, hydrogeological and environmental (e.g. landfill sites) features to be inclusive of the distance over which significant effects can reasonably be possible.

10.2.22 With regards to land quality the study area is the application site boundary plus a surrounding area of 250m.

10.2.23 With regards to hydrogeological receptors, the study area is defined as extending up to 500m beyond the application site boundary.

Methodology for Establishing Baseline Conditions

10.2.24 Current baseline information has been gathered by:

- Identifying appropriate study areas;
- Taking into consideration issues raised through consultation with interested parties (including during EIA scoping);
- Undertaking a desk study (including requesting information from third parties) within the agreed study areas; and
- Undertaking intrusive ground investigation within agreed study areas.

10.2.25 The guidance documents detailed in paragraph 10.2.3 were considered to inform baseline information and the assessment that follows.

Forecasting the Future Baseline

10.2.26 The future baseline has been assessed by considering the current baseline and which elements have the potential to change in the future if the proposed Development does not take place.

Defining the Sensitivity of Resource

10.2.27 In relation to pre-existing (i.e. historic) contaminated land, a source-pathway-receptor approach in accordance with Environment Agency (EA) LCRM (Ref 10.19) and CIRIA C552 (Ref 10.30) has been adopted for assessing risks from contaminated soils / groundwater. Contaminant concentrations when available would be screened against appropriate screening values such as the Land Quality Management / Chartered Institute for Environmental Health (LQM/CIEH) Suitable 4 Use Levels (Ref 10.31).

10.2.28 The adopted assessment methodology comprises a number of stages and is drawn from the Design Manual for Roads and Bridges (DMRB) LA109 Geology and Soils (Ref 10.18).

10.2.29 The methodology for assessing the value of geology receptors is detailed within the DMRB, so the assessment of significance has been undertaken using this guidance with regards to the Otterpool Quarry Geological SSSI. The methodology pays due regard to recommendations from Natural England as detailed in Table 10-3 above.

10.2.30 In relation to hydrogeology, within this chapter an assessment of effects has been undertaken that considers derogation (water level and water quality) potential to water interests and environmental receptors. A high-level groundwater interests survey has been included in the baseline section of this chapter, to identify potential interests. A

water cycle study (ES Appendix 15.2) has been undertaken which assesses the risks from groundwater flooding. An assessment has then been undertaken to determine the significance of development-related impacts.

10.2.31 The value of the identified receptors / resources has been assessed against the criteria shown in Table 10-5 . It should be noted that the criteria for Buildings is based upon professional judgement, whilst the other criteria is taken from the DMRB LA109.

Table 10-5 Criteria for Determining Value (sensitivity) for Geology, Hydrogeology and Land Quality

Value (sensitivity)	Description of resource (receptor)
Very High	**Geology:** Very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, SSSI's and Geological Conservation Review (GCR) where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such. **Minerals:** An economic mineral resource or geology strata this is very rare and or internationally important. **Land Quality / Hydrogeology:** ***Human health:*** very high sensitivity land use such as residential or allotments. ***Surface water*:** watercourse having a WFD classification shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m3/s. Site protected/designated under European Commission (EC) or UK legislation (Special Area of Conservation, Special Protection Area, SSSI, Ramsar site, salmonid water)/Species protected by EC legislation LA108 (Highways England, 2020). ***Groundwater*:** Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation LA108 (Highways England, 2020) (Ref 10.32). Groundwater locally supports Groundwater Dependent Terrestrial Ecosystems (GWDTE). Groundwater located in source protection zone (SPZ) 1. **Buildings / Infrastructure**: Buildings of international historical importance, hospitals, fire stations and essential public buildings.
High	**Geology:** Rare and of national importance with little potential for replacement (e.g. geological SSSI, Area of Special Scientific Interest (ASSI), NNR). Geology meeting national designation citation criteria which is not designated as such. **Minerals** An economic mineral resource or geological strata which is rare or nationally important. **Land Quality / Hydrogeology:** ***Human health***: high sensitivity land use such as public open space. ***Surface water***: watercourse having a WFD classification shown in an RBMP and Q95 < 1.0m3/s. Species protected under EC or UK legislation LA108 (Highways England, 2020). ***Groundwater:*** Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE. Groundwater located in SPZ2.

Value (sensitivity)	Description of resource (receptor)
	Buildings / Infrastructure: Grade I and Grade II* Listed Buildings, significant transport links e.g. railways, airports and significant utilities.
Medium	**Geology:** Of regional importance with limited potential for replacement (e.g. Regionally Important Geological Site (RIGS)). Geology meeting regional designation citation criteria which is not designated as such. **Minerals:** A locally important economic mineral resource e.g. Peat **Land Quality / Hydrogeology:** ***Human health***: medium sensitivity land use such as commercial or industrial. ***Surface water***: watercourses not having a WFD classification shown in an RBMP and Q95 > 0.001m3/s. ***Groundwater***: aquifer providing water for agricultural or industrial use with limited connection to surface water. Groundwater located in SPZ3. **Buildings**: Grade II Listed Buildings, residential or industrial / commercial developments.
Low	**Geology:** Of local importance / interest with potential for replacement (e.g. non designated geological exposures, former quarry's / mining sites). **Minerals:** A Sub-economic mineral resource. **Land Quality / Hydrogeology:** ***Human health:*** low sensitivity land use such as highways and rail. ***Surface water***: watercourses not having a WFD classification shown in an RBMP and Q9 5 ≤ 0.001m3/s. ***Groundwater:*** Unproductive strata. **Buildings**: Locally Listed Buildings, local infrastructure, services.
Negligible	**Geology / Minerals:** Little local geological/geomorphological interest. **Land Quality / Hydrogeology:** ***Human health:*** Undeveloped surplus land/no sensitive land use proposed. **Buildings:** Buildings of no architectural or historical note, disused or dilapidated buildings.

Methodology for Assessing Impacts

Impact Characterisation

10.2.32 The magnitude of impact was determined using the criteria outlined in Table 10-6 It should be noted that the criteria for Buildings is based upon professional judgement, whilst the other criteria is taken from DMRB LA109.

Table 10-6 Criteria for determining the magnitude (scale) of impact on the Geology, Hydrogeology and Land Quality

Magnitude of impact	Definition
Major	**Geology:** Loss of geological feature / designation and/or quality and integrity, severe damage to key characteristics, features or elements. **Minerals:** Total sterilisation of the mineral resource **Land Quality / Hydrogeology:** ***Human health*:** significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. Category 4 Screening Levels (C4SLs) SP0101) (Ref 10.33) with potential for significant harm to human health. Contamination heavily restricts future use of land. ***Surface water:*** failure of both acute-soluble and chronic-sediment related pollutants in Highways England Water Risk Assessment Tool (HEWRAT) and compliance failure with Environmental Quality Standard (EQS) values Calculated risk of pollution from a spillage ≥2% annually (spillage assessment) Loss or extensive change to a fishery Loss of regionally important public water supply Loss or extensive change to a designated nature conservation site Reduction in water body with WFD classification ***Groundwater***: Loss of, or extensive change to, an aquifer Loss of regionally important water supply Potential high risk of pollution to groundwater from routine runoff – risk score >250 (Groundwater quality and runoff assessment) Calculated risk of pollution from spillages ≥2% annually (Spillage assessment) Loss of, or extensive change to, GWDTE or baseflow contribution to protected surface water bodies Reduction in water body WFD classification Loss of, or significant damage to, major structures through subsidence or similar effects **Buildings:** Catastrophic damage to buildings, structures or the environment.
Moderate	**Geology**: partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. **Minerals:** Permanent loss of part (50%) of the mineral resource **Land Quality / Hydrogeology:** ***Human health:*** contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. C4SLs SP1010). Significant contamination can be present. Control/remediation measures are required to reduce risks to human health/make land suitable for intended use.

Magnitude of impact	Definition
	Surface water: failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from spillages ≥1% annually and <2% annually. Partial loss in productivity of a fishery Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies Contribution to reduction in water body WFD classification ***Groundwater***: partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/industrial/agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff – risk score 150–250. Calculated risk of pollution from spillages ≥1% annually and <2 % annually. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification. Damage to major structures through subsidence or similar effects or loss of minor structures **Buildings**: Significant damage to buildings, structures or the environment
Minor	**Geology:** Minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. **Minerals:** Permanent loss of minor (15%) part of mineral resource **Land Quality / Hydrogeology:** ***Human health***: contaminant concentrations are below relevant screening criteria (e.g. C4SLs) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health. ***Surface water***: failure of either acute-soluble or chronic-sediment related pollutants in HEWRAT Calculated risk of pollution from spillages ≥0.5% annually and < 1% annually Minor effects on water supplies ***Groundwater:*** potential low risk of pollution to groundwater from routine runoff – risk score <150 Calculated risk of pollution from spillages ≥0.5% annually and <1% annually Minor effects on an aquifer, GWDTEs, abstractions and structures. **Buildings:** Minor damage to sensitive buildings, structures services or the environment.
Negligible	**Geology:** Very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected. **Minerals:** Temporary loss of negligible (>15%) part of mineral resources **Land Quality / Hydrogeology:** ***Human health:*** contaminant concentrations are substantially below levels outlined in relevant screening criteria (e.g. C4SLs) SP1010. No requirement for control measures to reduce risks to human health/make land suitable for intended use. ***Surface water:*** no risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants) Risk of pollution from spillages <0.5%

Magnitude of impact	Definition
	Groundwater: no measurable impact upon an aquifer and/or groundwater receptors and risk of pollution from spillages <0.5% **Buildings**: Easily repairable effects of damage to buildings or structures
No change	**Geology:** No temporary or permanent loss / disturbance of characteristics features or elements. **Land Quality / Hydrogeology:** ***Human health***: reported contaminant concentrations below background levels ***Surface water:*** no loss or alteration of characteristics, features or elements; no observable impact in either direction ***Groundwater:*** no loss or alteration of characteristics, features or elements; no observable impact in either direction **Buildings**: No damage to buildings or structures

Assessing Effect Significance

10.2.33 The determination of significance of the impact is a factor of the value/sensitivity of the feature/resource (receptor) and the magnitude of the impact (change) as described above. Table 10-7 shows how the significance of effect was derived.

Table 10-7 Determination of the Significance of Effects

Value (sensitivity)	Magnitude of Impact (Change)				
	No change	**Negligible**	**Minor**	**Moderate**	**Major**
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

10.2.34 Effects which are Very Large, Large, Large / Moderate or Moderate were considered to be significant for the purposes of EIA. Effects which were considered to be Slight or Neutral are considered to be non-significant and would not require further consideration.

Limitations and Assumptions

Limitations

10.2.35 The ground investigation undertaken to date across the proposed Development is preliminary in nature. This is partially due to restricted site access in some areas owing to land ownership issues. However, the scope of work undertaken is considered proportionate for the EIA stage. Plans showing exploratory holes indicating the extent of the intrusive ground investigation are included within the investigation factual reports (Ref 10.43 and 10.44) which are included in ES Appendix 10.1. Significant

contamination has not been identified to date, however there could be unforeseen ground conditions within the proposed Development which are currently unknown.

10.2.36 The investigation and completion of the GCR was prepared in 2019. The GCR uses data sets from this time. Ground conditions will not have significantly changed since this time and therefore the report is considered to be appropriate for the assessment of effects.

Assumptions

10.2.37 Further ground investigations will be undertaken as required through the evolution of the proposed Development for detailed design and to gather further ground quality data across the site. It is assumed that contamination may be present in areas across the site until proved otherwise. It is assumed that some investigation for design purposes may be required during the masterplanning (Tier 2) stage and further investigation to assess the contamination status would then be required in the reserved matters stage (Tier 3).

10.2.38 With regards to the mineral assessment, data on the thickness and quality of the minerals within the Hythe Formation and Folkestone Formation is not available for this location, so assumptions based on similar areas and geological literature have been made to assess the potential viability of the minerals.

10.2.39 The following aspects were scoped out of the operational phase assessment at EIA scoping stage:

- The effects of historic (pre-existing) ground and groundwater contamination on the identified receptors following construction. Any significant adverse effects that require mitigation will be reduced to acceptable levels by the time the Development is operational i.e. any contamination encountered would be remediated during construction phases.
- The potential for the introduction of future contamination as a result of new potentially significantly contaminative land uses on site is not considered likely given the mix of proposed uses and legislative operational controls that will be required for any future potentially contaminative activities e.g. tank bunding in accordance with EA guidance, on-site.
- In terms of natural contaminants, the site is located in a low probability area for radon gas emissions from the ground. Less than 1% of homes are estimated to be at or above the Action Level for Radon. Remedial measures in new dwellings are therefore not a statutory requirement.

10.2.40 It is assumed that:

- The proposed Development does not propose to undertake on-site abstraction of groundwater for water supply (potable or otherwise e.g. irrigation).
- The proposed Development design does not include deep basements or structures which would create a groundwater barrier.
- A sustainable approach to material management would be adopted and that material would be re-used on-site where possible and practicable.

10.3 Baseline

Existing Baseline

10.3.1 A GCR has been prepared for the site. This includes a desk-based study and interpretation of the ground investigations that have taken place at targeted locations across the application site. This is included as ES Appendix 10.1 and should be read in conjunction with this Chapter.

Topography and Geomorphology

10.3.2 The site is at an elevation of 107 m Above Ordnance Datum (AOD) at its highest point on the south of application site boundary, and slopes down to an elevation of 57 m AOD in the northwest, and 75m AOD in the northeast corner. The average gradient over the majority of the site is 1 in 68 (0.015) sloping down towards the north. The topography within the site is generally undulating and dominated by the East Stour River in the north, which drains the site to the north-west. Areas of elevated terrain are present in the south, at Westenhanger in the north and Somerfield Court Farm in the west.

10.3.3 The site is situated on the crest of the Greensand Ridge (Hythe Escarpment). This escarpment, located off-site to the south, bounds Romney Marsh to the south and formed the original coastline before c.1500 AD. The ridge is formed where the Hythe Formation overlies the less resistant Atherfield and Weald Clay Formations. These weaker materials are prone to softening and subsequent instability and landslip. The crest of the slope is adjacent to the application site boundary in the south-east and 340 m from the application site boundary in the south-west.

Published Geology

10.3.4 A review of British Geological Survey (BGS) data (Ref 10.34), as shown in Table 10-8 shows a generalisation of the geological succession of the site, including both drift and solid deposits and the location where it is anticipated to be found on the site. The superficial deposits are shown on Figure 10.1 and the solid geology is Figure 10.2 (ES Appendix 10.2).

Table 10-8 Summary of published superficial and bedrock geology of land underneath study area

Geological Formation	General Description	Location within the Application Site
Drift deposits (Superficial)		
Alluvium	Clay, Silt, Sand and Gravel Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.	Follows the course of the East Stour River and its tributaries in the north and east of the site.
Head Deposits	Clay and Silt. Poorly sorted and poorly stratified detrital material formed by subaerial slope processes (solifluction and/or hillwash and soil creep) in layers and fans.	Present mainly in the East Stour River valley between Barrow Hill Sellindge, and Newingreen. Smaller deposits are located north of Lympne Industrial Park and north of Harringe Brooks Wood.
Lower Greensand Group (Bedrock / Solid)		
Folkestone Formation	Sandstone	Occurs in north-east corner of site.

Geological Formation	General Description	Location within the Application Site
	Medium- and coarse-grained, well-sorted cross-bedded sands and weakly cemented sandstones; elsewhere includes calcareous sandstones	
Sandgate Formation	Sandstone, Siltstone and Mudstone Fine sands, silts and silty clays, commonly glauconitic and locally ferruginous or calcareous. Some soft sandstones. Reaches 50-100m thickness in West Sussex.	To the north and east of the site plus outliers at Lympne Industrial Park and north of Otterpool Quarry.
Hythe Formation	Interbedded Sandstone and Limestone Alternating sandy limestones ("Ragstone") and (subequal or subordinate) glauconitic sandy mudstones ("Hassock").	Underlying the above sequence and outcropping in the south and west of the site.
Atherfield Clay Formation	Mudstone and siltstone Massive yellowing brown to grey sandy mudstone, with an important phosphatic pebble bed with vertebrate bones, gritty sandstone or very shelly sandy mudstone with glauconite, at the base.	Outcrops in the valley north of Harringe Brooks Woods in the west of the site.
Wealden Group (Bedrock / Solid)		
Weald Clay Formation	Mudstone Dark grey thinly-bedded shales and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone, shelly and clay ironstones	Forms the base of the valley north of Harringe Brooks Woods in the west of the site.

10.3.5 Two geological faults are inferred to be situated within the site. One is located approximately 800m inside the sites western application site boundary, is approximately 1km in length and trends north to south with the downthrow to the east. The second fault is inferred to be on the east of the application site boundary, is approximately 700m long and is trending north to south, with the downthrow to the west between the Folkestone and Sandgate Formations.

Encountered Geology

10.3.6 A preliminary intrusive ground investigation has been undertaken across the site. The findings are detailed within the GCR presented in ES Appendix 10.1. The factual reports relating to the investigations are appended to the GCR. Exploratory holes plans are included within the factual reports (Ref 10.43 and 10.44).

10.3.7 The geology encountered during the investigation is generally consistent with the anticipated mapped geology. In addition to the published geology summarised in Table 10-8 topsoil was encountered in 63 (out of 70) exploratory holes to a maximum depth of 0.6m below ground level (bgl). The investigation was targeted toward areas identified as having contamination potential from previous site uses identified by desk-based data. Made Ground was encountered in 24 exploratory holes in areas associated with previous development or filling such as the lorry park / former quarry, the road off the A20 roundabout, Newingreen and areas surrounding the former airfield

and current Lympne Industrial Park entrance. The maximum depth of Made Ground encountered was 3.1m bgl which is with the area of the former quarry, however the typical thickness of Made Ground was less than one metre. Anthropogenic materials logged included concrete, charcoal, plastic, metal, slag, wood and brick.

10.3.8 The Table 10-9 and Table 10-10 below, which are taken from the GCR, summarise the strata encountered in the north and south of the site (with the divide being the A20). Bedrock at the site dips shallowly down to the north and, therefore, the surfaces of bedrock strata are generally at a lower elevation in the north of the site compared to the south.

*Table 10-9 Summary of Strata Encountered – North**

Strata Encountered	Thickness (m)	Depth to top of strata (m bgl)	Elevation of top of strata (m AOD)
Topsoil	0.2 – 0.5	0.0	57.9 – 84.3
Made Ground	0.1 – 0.6	0.0 – 0.35	58.0 – 82.2
Alluvium	1.1 – 3.5	0.2 – 0.5	57.6 – 70.1
Head Deposits	0.6 – 4.6	0.2 – 2.0	58.3 – 81.1
Folkestone Formation	Up to 1.2 (not proven)	1.2 – 1.3	75.6 – 80.5
Sandgate Formation	Up to 6.5 (not proven)	0.3 – 4.6	60.6 – 84.0
Hythe Formation	Up to 7.5 (not proven)	2.3 – 7.1	64.0 – 67.8
Atherfield Clay Formation	Up to 2.3 (not proven)	0.2 – 1.3	57.3 – 63.8
Weald Clay Formation	Up to 6.7 (not proven)	3.8	54.1

*North of Ashford Road: BH102, BH103, BH105, TP101, TP102, TP103, TP105, TP106, WS105, WS106, WS107, WS108, WS110, WS111, TP213, TP214, TP215, TP217, TP218, TP219, TP220, BH206, BH207, BH208, BH209

*Table 10-10 Summary of Strata Encountered – South***

Strata Encountered	Thickness (m)	Depth to top of strata (m bgl)	Elevation of top of strata (m AOD)
Topsoil	0.1 – 0.6	0.0	65.2 – 106.4
Made Ground	0.1 – 3.1	0.0 – 0.5	80.3 – 106.6
Alluvium	0.5	0.4	72.6
Head Deposits	0.25 – 4.7	0.1 – 1.2	65.0 – 106.3
Folkestone Formation	Not encountered		
Sandgate Formation	2.0	4.0	97.2
Hythe Formation	Up to 9.9 (not proven)	0.2 – 6.0	85.3 – 106.1
Atherfield Clay Formation	Up to 3.2 (not proven)	6.8	87.8
Weald Clay Formation	Not encountered		

**South of Ashford Road (not including trial pits in above-ground bunds): BH101, BH104, HD101, HD102, HD103, TP104, TP107, TP108, TP109, TP110, TP111, TP111A, TP112, TP113, WS101, WS102A, WS102B, WS103, WS104A, WS104B, WS104C, WS109, WS112, TP201, TP202, TP206, TP208, TP209, TP210, TP211, TP221, TP222, TP223, TP226, TP228, BH201, BH202, BH203, BH204, HD201, WS201, WS202, WS203

Geodiversity

10.3.9 Otterpool Quarry SSSI is located in the centre of site as shown on Figure 10.3 (ES Appendix 10.2). The site was designated a SSSI in 1984. The SSSI is also included within the Geological Conservation Review (Ref 10.35). This is a former ragstone quarry which was active prior to 1938 to between 1970 and 1980.

10.3.10 The key feature of the SSSI is the old quarry backwall face located in the south eastern corner of the designated area. The former quarry face shows a section through the Cretaceous Hythe Beds in East Kent and is of particular significance in showing the contact between this formation and the Sandgate Beds above. The Hythe Beds are especially fossiliferous at this locality. The photographs (Plates 1 and 2) below show the current condition of the SSSI. The last condition review by Natural England, in 2012, reported the site to be in a favourable condition.

Plate 1: Looking northwest along the exposure, with the spring emerging in the foreground (taken May 2017)

Plate 2: 'Rag and Hassock' Beds of the Hythe Formation (taken May 2017)

Mineral Safeguarding Area

10.3.11 The site is located in a designated safeguarding area for minerals. The safeguarding map for F&HDC from the Kent Country Council, Mineral and Waste Local Plan (Ref 10.16 and 10.17), indicates that the following minerals are present:

- Silica Sand / Construction Sand – Sandstone (Folkestone Formation) – northern part of the site.
- Sandstone (Sandgate Formation) – Central / northern part of the site.
- Limestone Hythe Formation (Kentish Ragstone) – southern part of the site.
- Sub-alluvial River Terrace Deposits.

10.3.12 A drawing showing the extent of the mineral safeguarding area is provided as Figure 10.4 (ES Appendix 10.2).

10.3.13 A Mineral Resource Assessment report (ES Appendix 17.2) has been prepared by SLR Consulting to identify areas of currently unsterilized mineral deposits beneath the site. Information sources relating to the extent of geological deposits, physical properties of the deposits, and the potential for extraction in respect of possible environmental impacts have been consulted to attempt to establish the amount of mineral that could be potentially sterilised by the proposed Development. This included the data obtained from the intrusive investigations undertaken for the proposed Development. Mineral sterilisation refers to when the mineral is no longer available for extraction due to development. The MRA report has been submitted as part of the Otterpool Park planning application (ES Appendix 17.2). The following information has been taken from the SLR report to provide baseline information on minerals.

10.3.14 The MRA report concludes that two of the deposits (Sandgate Formation and Sub-alluvial River Terrace Deposits) are of insufficient extent or quality to classify as viable mineral deposits.

10.3.15 The Hythe Formation and the Folkestone Formation occur within the site across sufficient areas to be considered as potentially viable mineral deposits. Data on the thickness and quality of the minerals is not available for this location, so assumptions based on similar areas and geological literature have been made to assess the potential viability of the minerals.

10.3.16 Based on the information consulted to prepare the MRA (data sources are included in Section 1.3.1 of MRA) and the assumptions made, the estimated tonnages of presently unsterilised minerals within the development site are c.837,000t of Folkestone Formation and c.17.2Mt of Hythe Formation.

10.3.17 With regards the Hythe Formation (Kentish Ragstone), the stock of planning permissions for crushed rock (ragstone) in Kent at the time of plan preparation (Ref 10.16) are sufficient to maintain a landbank of ten years supply throughout and beyond the end of the plan period and so no additional crushed rock (ragstone) sites will be identified in the Emerging Minerals Sites Plan.

10.3.18 Local historic market conditions have been such that the ragstone quarry in Otterpool became unviable and extraction ceased during the mid-2000's. No further interest in

the resumption of quarrying activities has been published, suggesting that the site is not viable under current conditions.

10.3.19 Higher quality deposits of Hythe Formation ragstone, with lower proportions of waste sand 'hassock', are more extensive around Maidstone where current and historic quarrying operations are located.

10.3.20 With regard to the Folkestone Formation (Silica Sand), the landbank of soft sand within Kent is such that one new site have been proposed in the Emerging Minerals Sites Plan, which would satisfy the landbank requirements for the Plan period and beyond.

10.3.21 The relatively small area of Folkestone Formation outcrop in the east of the site is such that a mineral resource of viable scale to warrant the exclusion of the proposed Development in that area is unlikely to be present. Large scale prior extraction of the minerals would likely be incompatible with the proposed Development, due to the resultant excavations created by extraction of bedrock materials. The lack of local and regional demand over and above that satisfied by existing operations is such that development of a new large extraction operation would not have a sufficient local market to be economically viable within the timescales appropriate to prior extraction (see ES Appendix 17.2 for further information).

10.3.22 In addition, the investment required to purchase or hire an aggregate processing plant, the associated infrastructure costs, and the environmental impacts in terms of noise, traffic movements etc., also serve to make minerals development for a small resource in an existing residential location both unviable and likely to cause an unacceptable adverse impact to the environment and local amenity.

10.3.23 Based on the conclusions of the MRA report, the minerals in the safeguarding areas are not considered to be receptors as extraction is not considered to be viable. Minerals safeguarding has therefore not been considered further within this assessment.

Hydrogeology

10.3.24 Table 10-11 below details the EA aquifer designations for the different geology strata within the site. This is illustrated on Figure 10.5 (ES Appendix 10.2).

Table 10-11 Aquifer designation of geological strata

Geological Strata	Aquifer Status[1]
Alluvium	Secondary A
Head Deposits	Unproductive Strata
Folkestone Formation	Principal
Sandgate Formation	Secondary A
Hythe Formation	Principal

[1] Principal - These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Secondary A - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Unproductive - These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

10.3.25 There are no groundwater Source Protection Zones (SPZ) within 1 km of the site boundary and no abstraction is recorded within the study area. The nearest groundwater abstraction is located approximately 2km to the east of the site.

10.3.26 Folkestone and Hythe District Council (F&HDC) confirmed that the records they hold of private drinking water supplies indicate that there are none within a 500m radius of the site.

10.3.27 Groundwater in the superficial deposits is anticipated to be associated with the Alluvium local to the streams and rivers in the northern portion of the site. Typically, groundwater is anticipated to be present at a relatively shallow depth across much of the site, evidenced by the springs shown on Ordnance Survey maps at Otterpool Quarry and Newingreen Farm, and confirmed during the ground investigation.

10.3.28 Groundwater flow in the Hythe Formation is usually through joints and fractures in the weathered limestone layers, with some limited matrix flow though the sand layer, depending on the proportion of silt and clay.

10.3.29 Groundwater percolating downwards is retarded by the lower permeability of the underlying Atherfield Clay and is expected to flow northwards consistent with the gentle dip of the clay strata, to emerge at springs feeding the East Stour River which is in the northern part of the site In wetter periods, near to the Hythe escarpment in the south, there is a southwards flow component emerging at or below the contact between the Hythe and Atherfield Clay formation sometimes to form springs in the area. A ground investigation was undertaken by Peter Brett Associates (PBA) to understand the hydrogeological regime across the site. Within the PBA report (Ref 10.36), the groundwater divide is estimated to be approximately 370m north of the Aldington Road.

10.3.30 The Kent Greensand Eastern groundwater body (GB40701G501400) is considered within the Water Framework Directive Screening report (ES Appendix 15.3). This groundwater body is currently considered to have poor levels of groundwater chemical and quantitative quality. No mitigation measures are provided in the South East River Basin Management Plan (Ref 10.37) to improve the status of this groundwater body.

10.3.31 Groundwater was encountered during the intrusive ground investigation and full strike details are included in the factual reports appended to the GCR, presented in ES Appendix 10.1. Three rounds of groundwater monitoring was undertaken after each phase of the investigation, in installed boreholes and the following piezometric levels were observed in the different strata;

- Head Deposits – groundwater recorded between 0.93m and 2.67m bgl.
- Sandgate Formation – groundwater recorded between 2.25m and 4.68m bgl.
- Hythe Formation – groundwater recorded between 1.48m and 11.39m bgl.

10.3.32 A proposed woodland burial area is likely to be located within the west side of the application site. A hydrogeological study (Ref 10.38) was undertaken to establish the most suitable location for this feature with regards to groundwater levels, sensitivity using aquifer vulnerability and as assessed in accordance with EA guidance (Ref 10.39).

10.3.33 The study concluded that the site should be ranked as Moderate vulnerability with the following exceptions:

- A large area in the north of the site should be excluded from consideration, where the groundwater level is expected to be less than 1 m below ground level and is therefore given a high vulnerability. It is noted that there is some uncertainty on groundwater level in this area due to limitations in the spatial extent of available data.

- Some areas of the site are expected to be classified a Low vulnerability, owing to their high relative elevation and depth to water, and due to a lower density of drainage features in these higher elevation areas. The largest of these Low vulnerability areas is centred between Lympne and Lympne Industrial Park close to Aldington Road and the southernmost point of the site. It is noted that this location would be due north and immediately upgradient of the Lympne Escarpment Site of Special Scientific Interest (a biological SSSI located to the south of the study area) and would therefore likely be unsuitable for the burial area.

10.3.34 A Water Cycle Study has been undertaken and is included as ES Appendix 15.2. Within the Water Cycle Study, a summary of the Level 2 Strategic Flood Risk Assessment for Folkestone & Hythe District Council is included. The Level 2 report concluded that the district is generally located within a low-risk area in terms of groundwater flooding and has not specifically identified any risk within the area impacted by the proposed Development. Further information can be reviewed within the report in ES Appendix 15.2.

Hydrology

10.3.35 Surface water is addressed in detail in this ES Chapter 15: Surface Water Resources and Flood Risk. However, surface water is considered to be a receptor with regards to land quality and therefore brief baseline details are provided below.

10.3.36 The major surface water features found within the site include tributaries of the East Stour River running westerly from Newingreen past the racecourse and Barrow Hill, Sellindge and out of the northwest corner of the site. Another tributary drains Harringe Brooks Wood to the west of the site toward the same direction, following the line of the inferred fault.

10.3.37 There are several ponds in the northern half of the site with the largest located at the racecourse.

10.3.38 A licenced surface water abstraction point is recorded west of the pond in the centre of Folkestone Racecourse. This licence has been renewed by Otterpool Park LLP. There are 3 discharge consents to surface water within the site as shown on Figure 10.3 (ES Appendix 10.2).

Historical Review / Aerial Photography

10.3.39 A table detailing the historical development of the site from review of the available Ordnance Survey (OS) maps is included within the GCR (ES Appendix 10.1). The salient points are detailed below and illustrated on Figure 10.3 (ES Appendix 10.2).

10.3.40 The first edition (1876-1877) of available OS maps shows the study area to mainly comprise fields, woods with scattered farm buildings. The South Eastern Railway is shown in its current alignment adjacent to the northern portion of the site boundary. Westenhanger Station is located off-site to the northeast.

10.3.41 Generally, the site did not change significantly over the next 60 years, with the majority remaining undeveloped. Some features include; small pits are shown in north west (1871-1883) which are later infilled or grassed over, a quarry at Upper Otterpool (1898-1899) and Folkestone Racecourse in north east (1907). The main Otterpool quarry (now a SSSI) is indicated in 1938 which is shown as enlarged in size in the 1970s.

10.3.42 In 1938 three large hanger buildings are shown in southern area of the site which is in the location of the current adjacent Lympne industrial estate. Around this time Lympne Airport is indicated on the maps. No paved runways are shown. The layout of the airport changes over time and is later known as Ashford Airport and paved runways were introduced. This remains on maps until around 1990. Historic England have provided several aerial photographs of Lympne Airport which are included in Section 4.2 of the GCR for information.

10.3.43 On the 1970-1974 edition a refuse tip is indicated 200m east of Upper Otterpool. This is possibly associated with the nearby quarry but may also have been used for disposal of other wastes.

10.3.44 In 1989 / 1990, a pumping station (sewage) is shown to the east of the race track at Folkestone Race Course. This is still shown on current base mapping.

Environmental Information

10.3.45 Additional environmental information for the study area has been obtained from Landmark Information Group Ltd. A detailed summary is given in Table 4 of the GCR. Information provided from consultations with consultees detailed in Table 10-3 have also been included.

10.3.46 Pertinent information is provided below:

- Landfills – there is one landfill site within the Site. This is located to the north of the Lympne Industrial Park. The first waste (inert) input was recorded in 1992 but it is unknown when waste was last deposited. The licence has been cancelled (date unknown). There is another landfill site called Quarry Field, which is in the location of the former Shipway Cross Quarry, to the east of Lympne Village, 270m south-west of the site. The last waste was deposited in 1962 and included inert and household waste.
- Pollution Incidents – three pollution incidents (two minor, one significant) are indicated within the site, however all dated to the late 1990s and therefore severe impact is unlikely to still be present.
- Fuel Stations / Trade Directory Entries – there are three fuel stations within the study area; Lympne Industrial Park, Crosskeys Service Station and a facility at Area Auto. These are all located outside of the site boundary. There are 87 trade entries across the study area. Approximately half of these relate to activities at the industrial park and many of these are no longer active. This area is outside of the site boundary and therefore the active entries are unlikely to cause a concern with regards to ground conditions on the site.

Unexploded Ordnance (UXO)

10.3.47 An Unexploded Ordnance (UXO) desk study was undertaken by Zetica (Ref 10.40) to establish the risk of explosives originating from World War II (WWII) to remain at the site. The report is included as an appendix to the GCR (ES Appendix 10.1).

10.3.48 Based on the information collected, Zetica zoned the site (low to very high) as shown in Figure 10.6. There is a high potential for UXO around the former RAF Lympne as it was used during WWII):

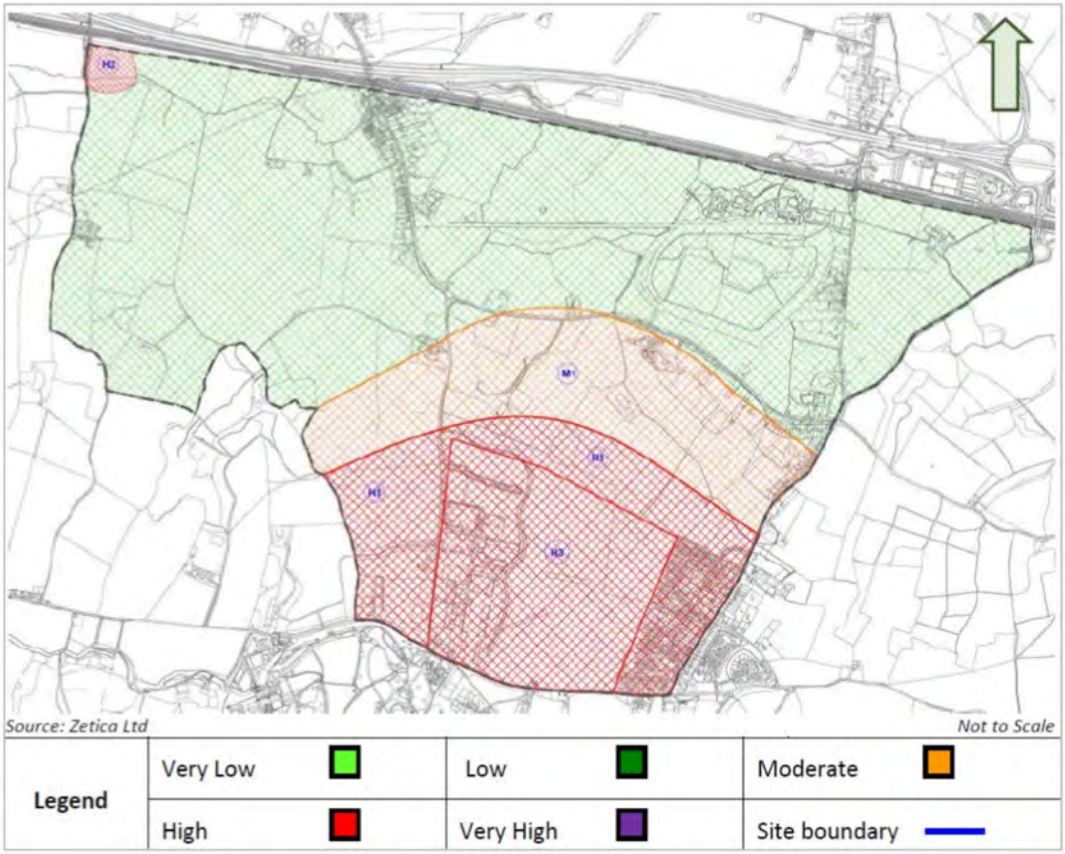

Figure 10.6 UXO Hazard Level Plan

10.3.49 Records have been found that at least 500 High Explosive bombs fell on the southern part of the site during several heavy air raids.

10.3.50 Records indicate that RAF Lympne was underlain with pipe mines which could be detonated to destroy the airfield if it was going to be invaded. Clearance of the pipe mines was undertaken, but further mines have been discovered and therefore there is uncertainty as to whether all the mines have been removed. A letter from 33 Engineer Regiment (Explosive Ordnance Disposal) which is included in the Zetica report concludes that there is "a high possibility of uncleared pipe mines" and that a full clearance should take place prior to development work.

10.3.51 An abandoned bomb is indicated in the north western corner of the site which is given a high risk rating.

10.3.52 The majority of the site has been given a low hazard level, where no significant bombing has been identified.

10.3.53 Prior to the intrusive ground investigation works on the former RAF Lympne, Zetica undertook a non-intrusive geophysical survey using a multi-frequency electromagnetic sensor of the areas around the proposed exploratory hole locations. The findings are detailed in a report entitled UXO Risk Mitigation for Ground Investigation (Ref 10.41)

which is included as Appendix E in the GCR (ES Appendix 10.1). Approximately 250 isolated metallic anomalies were identified during the survey which cannot be discounted as potential unexploded bombs and 38 linear features were identified which may relate to the presence of pipe mines. Other features such as utility services, demolition arisings and areas of possible buried waste were detected.

10.3.54 Further UXO investigations were undertaken prior to archaeological trial trenching undertaken by Wessex Archaeology in 2020. This included a non-intrusive geophysical survey to the east of the industrial estate, which detected 5 linear features which may have related to historic pipe mines and 158 isolated metallic anomalies. An intrusive investigation was undertaken which found that the linear features and 52 of the isolated metallic anomalies were not UXO related, however two targets comprised shrapnel from a bomb that had exploded in WWII. Reports relating to this work are included in ES Appendices 9.20 and 9.21 for information.

Ground Investigation – Contamination Data

10.3.55 A contamination assessment was undertaken by SLR (Ref 10.42) in 2008 for a planning application (PAG/AW/SH/08/124) at Otterpool Quarry. This report detailed that the site was used for the manufacture of cement and asphalt and vehicle maintenance, and which was demolished in 2005. An investigation undertaken in 2005 reported hydrocarbon contamination in the former weighbridge and plant area, impacting on shallow groundwater.

10.3.56 This report concluded that there was a low risk to human health and controlled waters in the context of the proposed industrial development and no specific remediation was recommended except for the removal of above and below ground tanks and contaminated soil. It is unknown if this has been carried out.

10.3.57 To address the potentially significant risks and areas of uncertainty across the site, a preliminary ground investigation was undertaken by Arcadis in 2017 and 2018. This work was undertaken over 2 phases and targeted areas of potential contamination as well as to provide general ground conditions data across the site. The factual information including exploratory hole logs and chemical data is provided in two factual reports (Ref 10.43 and Ref 10.44). These are appended to the GCR (presented in ES Appendix 10.1) (Appendix A and B) and the interpretation of the findings are presented in the GCR.

10.3.58 Soil and groundwater samples were analysed for a suite of contaminants such as metals, non-metals, asbestos (soils only) and hydrocarbons.

10.3.59 The soil results were compared to generic assessment criteria (GAC) for a residential land use (sensitive) to establish the contamination status of the soils analysed. Contaminant concentrations above the residential GAC were recorded in relatively few samples compared to the number (77) analysed. The following details summarise where exceedances were recorded:

- Asbestos fibres were encountered in 4 samples associated with the garage at the airport café which were either from Made Ground or Topsoil.
- Polycyclic Aromatic Hydrocarbon (PAH) compounds were present in concentrations above the GACs in 9 out of 76 samples mainly from the Made Ground or Topsoil. These were associated with the lorry park and three other locations. Full details are provided in ES Appendix 10.1.
- Lead was elevated in one topsoil sample at the Folkestone Racecourse with a concentration of 340mg/kg against a screening value of 200mg/kg.

10.3.60 The groundwater samples were screened against appropriate Water Quality Standards (WQS) such as Drinking Water Standards (DWS) and Environmental Quality Standards (EQS). In general, the groundwater analysis indicated that

contaminant levels were low in all the samples. No hydrocarbons were detected. Several heavy metals (cadmium, mercury, nickel, zinc) were recorded above WQS protective of surface water features however these were considered to be minor (as same order of magnitude as WQS) and not significant. The location with the most and highest WQS exceedances was an exploratory hole from the Folkestone Racecourse installed within the Head Deposits, This may reflect localised heavy metal contamination around the waste and fuel storage areas, however exceedances were considered to be minor. Other exceedances were associated with the former airport and west to the Racecourse.

10.3.61 Gas monitoring was carried out in the installed exploratory holes across the site. These included holes near to potential gas sources such the landfill at Lympne Industrial Park and backfill at the former Otterpool Quarry.

10.3.62 Low concentrations of methane (<LOD to 0.1% v/v) and carbon dioxide (<LOD to 4.7 % v/v) were recorded. Flow rates ranged between -0.9l/h and 0.6l/h. A gas risk assessment was undertaken in the GCR based on the results. This concluded that there is a low risk gas regime within the site based on guidance CIRIA C665 (Ref 10.26). This is typical of natural soils of a low organic content or typical of Made Ground which was encountered across the site.

Buildings / Infrastructure

10.3.63 There are existing buildings on site including residential properties, farms, Folkestone Racecourse. Major infrastructure include the HS1 rail line adjacent to the north of the application site boundary and the A20 which crosses the site.

10.3.64 Table 10-12 provides a summary of the values assigned to receptors. These have been assigned using the criteria presented in Table 10-5 .

Table 10-12 Summary of the Value of Geology, Hydrogeology and Land Quality Receptors

Receptor Type	Receptors	Value (Sensitivity)
Geology	Otterpool Quarry - Geological SSSI of National Importance	High
	Superficial deposits / Bedrock (little / no local interest)	Negligible
Human Health	Construction Workers[2]	Very High
	Existing residents in nearby properties	Very High
	User of Public Open Space	High
Hydrogeology	Principal Aquifer (Folkestone Formation, Hythe Formation)	High
	Secondary A (Alluvium, Sandgate Formation)	Medium
	Unproductive Strata (Head Deposits)	Low
Surface Water	East Stour	Medium
	Ponds, Ordinary watercourse	Medium
Buildings / Structures	Existing and proposed	High to Low

[2] Construction Workers are not considered to be receptors in DMRB LA109 but have been included in this assessment (as per a request within the 2020 Scoping Opinion). They have been given a Very High value / sensitivity, as they could be exposed to contaminated soils during the works.

Future Baseline

10.3.65 The future baseline is the situation that would prevail should a proposed Development not proceed. The future baseline is further defined by the assessment scenario that the topic adheres to. The future baseline for Geology, Hydrogeology and Land Quality has identified the following.

- The predicted effects of climate change over the duration of construction are expected to increase the frequency of intense rainstorms which would raise groundwater levels. In addition, there is predicted to be more periods of drought, which would have the reverse effect on groundwater levels (refer to Chapter 8: Climate Change for further information).
- Contamination is generally due to historic land uses as operations / protocols of current works / industry are more tightly controlled. It should be noted that the proposed Development is within a mainly rural setting and no significant contamination has been identified to date. Therefore, the existing baseline conditions are considered likely to represent the future baseline conditions for the site, in the absence of the proposed Development.
- It is noted that there is a consented permitted waste facility on the site and this is considered within the cumulative section below.
- It is not possible to predict future changes to regulatory policy and frameworks, so the future baseline assumes no significant changes with respect to these. It is not envisaged that future minor changes or refinements would materially affect this assessment.

10.4 Design and Mitigation

10.4.1 The following section sets out:

- The embedded design measures, including good practice approaches, relied on in this assessment; and
- The potential significant effects remaining after the application of embedded design measures and good practice approaches, and any additional mitigation required to address these potential significant effects.

10.4.2 The potential significant effects prior to additional mitigation are identified in the Assessment Summary table.

10.4.3 Environmental considerations have influenced the proposed Development throughout the design development process, from early options assessment through to refinement of the Project design. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project design teams, stakeholders and public consultation

10.4.4 Impacts would be reduced by measures embedded into the design of the development, as well as by additional mitigation, and together these measures would act to avoid, reduce and mitigate effects. The measures have been summarised by whether they are embedded design measures, which are secured through the documents for approval, or additional mitigation secured, for example, by planning condition or legal agreement. Embedded measures are described as measures that form part of the design, developed through the iterative design process and good practice standard approaches and actions commonly used on development projects to avoid or reduce environmental impacts, typically applicable across the whole Development. Additional mitigation is described as any additional Development-specific measures needed to avoid, reduce or offset potential impacts that could

otherwise result in effects considered significant in the context of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Embedded Design Measures

Construction

10.4.5 To safeguard the quality of the receptors, an Outline Code of Construction Practice (CoCP) has been developed to form part of the application (ES Appendix 4.17). This document details best practice construction techniques and methodologies and describes the management of environmental impacts during construction. It is expected that a planning condition would be established requiring the outline CoCP be further developed into a detailed CoCP.

10.4.6 The following best practice measures are included in the CoCP:

- A watching brief protocol would be adopted, with site workers remaining vigilant such that visual or olfactory signs of contamination are noted and that contaminated soil is kept separate from other materials. Suspected contaminated material would be analysed to determine if it is suitable for re-use on the site or requires disposal off-site to an appropriate soil recycling or disposal facility. It is assumed that a sustainable approach to material management will be adopted and that material will be re-used on-site.
- Prior to any construction compound area being prepared, a baseline survey would be undertaken to determine the current land quality across the compound area. This would highlight localised contamination if present. If appropriate such areas would be remediated prior to, or as part of, the soil stripping / enabling works or other measures such as the use of an appropriate cover system / barrier to reduce the risk of exposure to site workers.
- Within the construction site compounds, specific areas would be designated for the storage of chemicals, waste oils and fuel and refuelling activities. These areas would be bunded and placed on hardstanding to prevent downward migration of contaminants. Any transfer of fuel or other potentially contaminated liquids would only take place within a designated fuel transfer area. Drip trays would be provided to reduce the risk of spillages. These areas would be designed with appropriate drainage to ensure any spillages can be isolated. Waste water generated from the construction compound would be disposed of via appropriate means, e.g. pumped out and removed from site by tanker.
- An Emergency Response / Spill Response Plan would be produced by the Main Works Contractor. Appropriate equipment (e.g. spill kits, absorption mats) would be made easily accessible on-site and personnel would be trained in using them. Clear protocols and communication channels would be provided to ensure that any spillages are dealt with immediately and adequately. This would prevent large areas of soil / geology potentially becoming contaminated and in turn protect surface water quality.
- During the construction phase, localised contamination may occur within the compound areas through spillages / leakages of fuel and therefore a repeat survey would be undertaken once the construction has finished and the compound dismantled, to demonstrate the area has been returned to its previous state. If contamination has occurred during the lifetime of the compounds, remediation would be undertaken to return the land to its previous land quality state.
- The Contractor would prepare detailed method statements and appropriate controls to protect receptors. The plan would include best practice pollution prevention guidelines for activities such as excavation and dewatering, storage of

fuels, chemicals and oils, vehicle washing, pollution control and emergency contingency.

- To reduce the risk to surface water, excavated materials would be appropriately stored to ensure that water runoff from stockpiles would not enter the water environment via drains and nearby watercourses. If necessary, stockpiles would be covered. Pollution prevention best practice protocols would be adopted to ensure contamination do not enter surface water.
- A Site Waste Management Plan (SWMP) (outline version available in ES Appendix 17.3) and a Materials Management Plan (MMP) would be developed by the Contractor at Tier 3 based on the Outline CoCP (ES Appendix 4.17) submitted at Tier 1. The MMP would be prepared following the protocols within the CL:AIRE Definition of Waste: Development Industry Code of Practice (Ref 10.45) to ensure that excavated materials are re-used appropriately, sustainably and remain outside the waste hierarchy.
- During the construction phase, construction / site workers would be exposed to soil via accidental ingestion, inhalation or dermal contact. If contamination is present, to mitigate risks all persons engaged in site construction works would be made aware of the findings of the intrusive investigations and the hazards associated with handling potentially contaminated materials via the detailed CoCP and Health and Safety Plan. All works would be conducted in accordance with the Health and Safety Executive publication entitled Protection of Workers and the General Public during the Development of Contaminated Land (HSE, 1991) (Ref 10.46) and follow Construction (Design and Management) Regulations (2015) (Ref 10.47).
- Suitable Personal Protective Equipment (PPE) including Respiratory Protective Equipment (RPE) would be available to all site workers as detailed in the Health and Safety Plan. Appropriate site hygiene protocols would be adopted during the construction phase.
- Where any hazardous chemicals would be used in the construction works, risk assessments would be made under The Control of Substances Hazardous to Health Regulations (as amended).

10.4.7 Excavated soils would be appropriately stored to ensure that fugitive dust emissions would be minimised. This would be achieved through the application of best practice preventative measures such as the fencing, seeding, or covering of any stockpiles. Additionally damping down with water would be used during periods of dry weather to minimise the possibility of dust emissions. Other best practice measures such as damping down site areas, vehicle wheel washing and covering lorries containing soils would be utilised to reduce the impacts from dust. Further information is presented in Chapter 6: Air Quality of this ES.

10.4.8 Prior to excavation works in the medium and high UXO risk areas and especially in the area where pipe mines were installed, further assessment would be undertaken to establish the accurate UXO risk in this area. This may involve both non-intrusive (desk based and geophysical surveys) and intrusive surveys (excavations to determine if objects are UXO). The process to establish the UXO risk and remove any devices encountered would be undertaken in a systematic approach as detailed in a UXO Mitigation Strategy. This strategy would be agreed with the local planning authority and relevant organisations prior to implementation.

10.4.9 The groundwater is known to be shallow (<1m bgl) in the northern part of the site. During construction of infrastructure and foundations in these areas, groundwater control may be required. Whilst groundwater contamination has not been encountered to date, if during further works, contamination is found, produced groundwater would be disposed of appropriately and with the necessary agreements in place. During

such activities, consideration would be given to soil concentrations in the locality to ensure that contaminants do not become mobilised and enter the water environment.

Operational

10.4.10 The proposed Development design does not include deep basements or structures which would create a groundwater barrier.

10.4.11 The proposed Development does not propose to undertake on-site abstraction of groundwater for water supply (potable or otherwise e.g. irrigation).

10.4.12 The proposed Development would utilise SuDs to manage surface water in terms of both water quality and quantity. Further information is provided in Chapter 15: Surface Water Resources and Flood Risk. SuDs would be designed to appropriate standards to safeguard the quality of the underlying groundwater regime. The key SuDs strategy principles are set out in Flood Risk Assessment and Surface Water Drainage Strategy in ES Appendix 15.1. Strategic SuDs infrastructure would be included in green infrastructure spaces that would be present throughout the proposed Development. These green spaces are illustrated on the Open Spaces and Vegetation Parameter Plan (ES Appendix 4.2), with further detail provided on the illustrative SuDS layout plan provided in ES Appendix 15.1 (Figure 27). Space to accommodate these SuDS features is integrated into the sites design and the key principles regarding the phasing of SuDS construction, detailed in the FRA (ES Appendix 15.1), is expected to be secured via a planning condition that specifies how SuDS will be built out in line with these principles.

Additional Mitigation

10.4.13 An iterative appraisal of the proposed Development taking into account the embedded design measures and good practice was undertaken to identify any potentially significant effects that would require additional mitigation. Effects on geology, hydrogeology and land quality that could be significant and therefore required further consideration for additional mitigation were as follows:

Construction Effects:

- Should contamination be identified, effects of exposure of potentially contaminated soils through direct contact and airborne dust to human health receptors. Earthworks during construction could cause mobilisation of existing contamination which could migrate into the water environment causing impact on groundwater and surface water. Structures within the developments may need to be piled or have deep foundations. These could create pathways for contamination to migrate downwards and have an impact on the groundwater environment.
- Infrastructure and buildings are present on the site and construction activities could impact these features during construction.

Operational Effects:

- SuDs are proposed within the development. The introduction of SuDS in an area of contaminated soils could cause a reduction in groundwater quality as leaching and migration of contamination could occur. Also if SUDs are proposed in areas of existing high groundwater this could increase groundwater levels in areas across the site if not suitably designed.
- Potential impacts to hydrogeology receptors due to creation of a woodland burial site.
- Damage to new buildings and infrastructure due to instability during the lifetime.
- A geological SSSI is present on the site and it is proposed to include this within a Country Park. This would provide a positive impact on this geological feature.

Construction

10.4.14 A preliminary intrusive ground investigation has taken place across the site to establish the general ground conditions. This has targeted potential contaminated land areas. The data has been assessed using the source-pathway-receptor principles and a Conceptual Site Model for the proposed Development has been created. Further intrusive investigations will be undertaken across the site for detailed design which will increase the understanding of ground conditions and potentially identify areas of contamination across the site. It is anticipated that standard contaminated land planning conditions would be part of the planning permission and therefore further intrusive work would need to satisfy these requirements. Archaeological supervision should be undertaken during these further investigations to confirm the presence of archaeological remains across the site.

10.4.15 To date contamination concentrations in areas targeted for investigation have been found to be low. However, if unacceptable risks are identified in further intrusive investigations due to the concentrations of contaminants found, remedial action would be proposed to reduce the risk to receptors. This could include removal of contaminated materials or remediation by appropriate *in-situ* or *ex-situ* techniques. The action required would be detailed in a remediation strategy which would be developed after further investigations and regulatory approved via the anticipated standard contaminated land planning conditions.

10.4.16 To reduce the spread of contaminants, contaminated soils (identified by intrusive investigation works and subsequent assessment) within areas to be excavated would be removed prior to the main works as detailed in a remediation strategy. Materials would be treated so they can be reused within the site or if this is not possible materials would be disposed of at an appropriate waste facility. Re-use criteria (protective of human health and groundwater) would be defined within the remediation strategy which would be regulatory approved via a planning condition prior to implementation.

10.4.17 Use of minerals / materials derived through incidental extraction during the development will be considered, subject to confirmation of their properties to reduce the demand for importation of construction aggregates from off-site sources. Further ground investigation would be required to assess the potential for incidental use and would be considered during the detailed design stages of the proposed Development.

10.4.18 The use of the mineral Kentish Ragstone as a visible element of the proposed Development (such as building facing or landscaped areas) would be considered as a suitable use of site-won materials in promoting the geodiversity and heritage of the region. A woodland burial area is proposed within the Illustrative Masterplan (ES Appendix 4.5) but the location has not been fixed. The indicative location has a moderate vulnerability rating which would be considered suitable for the intended use. The siting of the burial area would be in a location within the site which would protect the underlying groundwater and therefore is given a moderate or low vulnerability. In addition, appropriate EA guidance (Ref 10.39) includes that burials should not take place within 30m of a watercourse or within 10m of any proposed SuDS drainage infrastructure that would be utilised. A ground investigation would be completed within the proposed indicative burial area to confirm that groundwater levels, ground conditions and soil quality are appropriate for the detailed design of the burial area. The location of the burial ground is to be submitted to the LPA for approval as part of a Tier 2 level masterplan. It must be in a location within the site which would protect the underlying groundwater.

10.4.19 Existing buildings and infrastructure are present within the site. Some of the buildings have medium importance due to their regional significance. The Parameter Plans (ES Appendix 4.2) show that natural buffer zones via open space have been proposed around these features and therefore no construction impact is anticipated. However,

if this changes and it is considered necessary, an assessment of ground conditions near to existing buildings / infrastructure would be undertaken to demonstrate that construction techniques such as piling and excavations would not have detrimental effect to the foundations of these features especially from vibrations. If a potential risk is considered present, appropriate mitigation would be implemented.

10.4.20 Based on current gas monitoring data, there is a low-risk gas regime across the site. This would be confirmed by additional investigation / monitoring for detailed design. Appropriate gas protection measures (if required) would be designed into buildings to mitigate the risk from any ground gases present. This would be included in the remediation strategy which would be regulatory approved via a planning condition prior to implementation.

10.4.21 Foundations for buildings would be appropriately designed to accommodate the ground conditions across the site and reduce the risk of instability. The inferred faults would be investigated and considered during detailed design.

10.4.22 Structures such as bridges are proposed within the site. Geotechnical techniques such as piling for the foundations of the structures may be used to construct these features. Such techniques can introduce pathways for contaminants into pore water to migrate into underlying groundwater. Appropriate techniques would be reviewed via a piling strategy and an appropriate design would be included to safeguard the underlying groundwater regime to ensure that groundwater quality would not be compromised. It is expected that a planning condition relating to piling / foundation works risk assessment would be established and require to be discharged at the reserved matters stage.

Operation

10.4.23 Should deeper infrastructure be required, e.g. deep main sewers, their design will include clay stanks (or similar) to prevent them acting as a preferential groundwater drainage pathway. This element would be included within a foundation works risk assessment, which is anticipated to be conditioned.

10.4.24 The design of the proposed Development notes that the geological SSSI (Otterpool Quarry) is located within a proposed Country Park. The former quarry face will be maintained and enhanced (benched back (steps created in quarry face) to expose additional areas of the Hythe Formation geology and signage for educational purposes. This will increase accessibility to the feature which will need to be managed to avoid damage. Natural England (NE) has in principle agreed to the setting of the SSSI (in a letter dated 7th Nov 2018) and also in consultation regarding the 2019 application as detailed above. The detailed design of the area including access and maintenance is discussed within the Landscape chapter (Chapter 12: Landscape Visual) site and would be agreed with NE prior to implementation of the works. This mitigation will be secured via a planning condition attached to the permission which states that detailed design of the enhancement, including access and maintenance should be submitted to the LPA for approval as part of the Tier 3 RMA for that part of the site.

10.5 Assessment of Residual and Cumulative Effects

10.5.1 The following section sets out the residual effects following the implementation of the embedded measures and additional mitigation set out above.

Residual Effects from Construction

Human Health receptors

10.5.2 Construction workers will be present during the construction of the proposed Development. They can be exposed to soils (potentially contaminated) during earthworks including excavation, topsoil stripping, stockpiling, transportation and backfilling. Exposure to potential contaminated soils could be through accidental ingestion, inhalation of dust and dermal exposure. Nearby residents and users of public open spaces could also be exposed to potentially contaminated dust blown from earthwork activities. Construction workers and residents are considered to be of very high value and users of public open space are allocated a high value. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact on these receptors is considered to be negligible, resulting in a **Slight Adverse** significance of effect (for all receptors) which is **Not Significant**.

Geology, Hydrogeology and Hydrology receptors

10.5.3 During construction activities, there is the potential for accidental spillages of oils, chemicals, cement and fuels from the movement of construction traffic and the storage of chemicals. This could impact the underlying geology and with the potential for contamination to migrate into the water environment. Geology (excluding the Geological SSSI) across the site is considered to have low value. With the implementation of the design and mitigation measures detailed in Section 10.4 such as best practice detailed in the Outline CoCP (ES Appendix 4.17), remediation strategy and piling strategy, the magnitude of impact is considered to be negligible, resulting in an overall **Neutral** significance of effect, which is **Not Significant**. Groundwater underlying the site in considered to be high value when considering the Principal aquifer designation, medium value with regards the Secondary A aquifer and low value for the unproductive strata. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact is considered to be negligible, resulting in an overall **Slight Adverse** (for the Principal aquifer and Secondary A aquifer) or **Neutral** (for the unproductive strata) significance of effect, which is **Not Significant**. The effect from existing contamination on surface water is considered to be of medium value and assuming the appropriate environmental design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. The significance of effect is assessed as **Neutral**, which is **Not Significant**.

10.5.4 During the construction of new bridges across the East Stour and other watercourses, there is the potential for the creation of pathways into the underlying aquifers using techniques such as piling. Excavations and general earthworks activities could mobilise contaminants present which in turn could migrate into the water environment. Groundwater underlying the site is considered to be high value when considering the Principal aquifer designation, medium value with regards the Secondary A aquifer and low value in areas of unproductive strata. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact is considered to be negligible with an overall **Slight Adverse** (for the Principal aquifer and Secondary A aquifer) or **Neutral** (for the unproductive strata) significance of effect, which are **Not Significant**. The effect from existing contamination on surface water is considered to be of medium value and assuming the appropriate environmental design measures and mitigation /are adopted, the magnitude of impact is considered

to be negligible. The significance of effects is assessed as **Neutral,** which is **Not Significant**.

10.5.5 Archaeological remains are present in a waterlogged area to the south of the Ashford Road (A20), which includes the Roman Villa (ID 167 – further details included in Chapter 9: Cultural Heritage). This area will be kept as open space as part of the proposed Country Park. The groundwater table in this area is likely to remain as current levels or possibly may increase due to additional recharge occurring upstream and infiltration which will still occur due to the soft landscaping that will remain in place. The condition of the archaeological remains are therefore unlikely to change. An assessment of the **Significant** effects on the archaeological remains from groundwater is included in Chapter 9: Cultural Heritage.

Buildings

10.5.6 There are existing buildings on site which are given a low to high value. Infrastructure such as roads and utilities are present and the HS1 rail line is present adjacent to the north of the application site boundary; these are given a high value due to their national significance. Damage could occur to these features during construction. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact on these receptors is considered to be minor, resulting in an overall **Slight Adverse** to **Neutral** significance of effect, which is **Not Significant.**

UXO

10.5.7 During construction there is a risk of disturbance of UXO and pipe mines which may be present on the site. The main risk is to Construction Workers, nearby residents and users of public open space. These receptors are considered to be of very high or high value. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact on these receptors is considered to be negligible, resulting in a **Slight Adverse** significance of effect, which is **Not Significant**.

Residual Effects from Operation

10.5.8 The impact from potential contamination during the operational phase, with respect to the effects of historic (pre-existing) ground and groundwater contamination on identified receptors (following construction) has been scoped out as existing contamination would be remediated prior to construction, through measures such as the remediation strategy. In addition, the effects of operational activities associated with those of a Garden settlement are considered not to be of significance with respect to ground contamination, and have therefore been scoped out, given the proposed mix of uses and low likelihood of significant contamination being generated from them. Furthermore, in terms of natural contaminants, the site is located in a low probability area for radon gas emissions from the ground. Less than 1% of homes are estimated to be at or above the Action Level for Radon. Therefore, natural contaminants are not considered to be of significance in terms of effects from ground contamination and have been scoped out.

10.5.9 SuDS are proposed within the Development to manage surface water drainage. This will infiltrate and join the underlying groundwater across the site, which could reduce water quality or change the groundwater regime within the locality. Groundwater underlying the site is considered to be high value when considering the Principal aquifer designation, medium value with regards the Secondary A aquifer and low value in areas of unproductive strata. With the implementation of the design and mitigation measures detailed in Section 10.4 and Chapter 15: Surface Water Resources and Flood Risk, the magnitude of impact is considered to be negligible, resulting in an overall **Slight Adverse** (for the Principal Aquifer and Secondary A aquifer) or **Neutral** (for the unproductive strata) significance of effect, which are **Not Significant**. Surface

water is considered to be of medium value and assuming the appropriate environmental design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. The significance of effects is assessed as **Neutral,** which is **Not Significant**.

10.5.10 A woodland burial ground is proposed within the Development, which could impact the underlying groundwater. Groundwater underlying the site is considered to be high value when considering the Principal aquifer designation, medium value with regards the Secondary A aquifer and low value in areas of unproductive strata With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact is considered to be negligible with an overall **Slight Adverse** (for the Principal aquifer and Secondary A aquifer) or **Neutral** (for the unproductive strata) significance of effect, which are **Not Significant**, depending on the location within the site.

10.5.11 New buildings / infrastructure are proposed which would be considered to have medium to low value. With the implementation of the design and mitigation measures detailed in Section 10.4, the magnitude of impact is considered to be negligible which would result in an overall **Neutral** significance of effect, which is **Not Significant**.

10.5.12 It is noted that no assessment criteria is presented in the DMRB to assess beneficial effects. The former Otterpool quarry which is a designated SSSI is considered to have a high sensitivity due to the geological features present. With the proposed mitigation to enhance this feature within a woodland country park as detailed in Section 10.4, the nature of impact is considered to be **beneficial**.

10.5.13 As part of the proposed Development, contamination encountered, that presents unacceptable risk, would be remediated. This would result in a **beneficial** effect as the risk of mobilisation of contaminants into the wider environment would be reduced.

Cumulative Effects

Cumulative Effects with other Developments

10.5.14 The cumulative effects of the proposed Development have been assessed with reference to those schemes listed in ES Appendix 2.5 of the ES. The assessment considers those schemes that have been consented within the borough of Ashford and F&HDC and that have the potential to have a cumulative impact on geology, hydrogeology and land quality. The developments which could impact the receptors due to their relative distance include residential dwellings, offices and employment uses such as

- Land adjacent to the Surgery, Main Road, Sellindge – 200 dwellings;
- Land at Grove House – residential properties and public open space;
- Land at rear of Rhodes House – neighbourhood extension of 162 homes;
- Land adjacent to Enterprise Way – Employment Development (B1, B2 and B8);
- Land adjacent to The Link Park, Lympe Industrial Estate - Employment Development (B1, B2 and B8); and
- Holiday Extra, Ashford Road – two storey office and extension of car park.

10.5.15 These developments are generally low risk activities with regards to land quality. Prior to construction, the potential developments detailed above would have been investigated, assessed and remediated (as necessary). During the construction phase of each development, the cumulative impact from potential contamination would be covered by the mitigation measures outlined for the construction phase and contamination would be assessed as necessary prior to construction. During the operational phase, the cumulative impact would be covered by the mitigation measure or remediation prior to operational phase..

10.5.16 All consented developments would follow best practice with regards to land quality and are likely to need to satisfy planning conditions with regulatory approval prior to construction. Significant discharges to groundwater which may change the hydrogeological regime would need to considered for any of the new developments, and would need to seek regulatory approval.

Cumulative Effects with the Framework Masterplan

10.5.17 The elements of the Framework Masterplan that are not included within the proposed Development could have a cumulative impact on geology, hydrogeology and land quality due to their proximity. As with other developments, regulatory approval would be sought prior to the development of the additional elements. Planning conditions relating to land quality and groundwater discharges would need to be satisfied prior to development taking place.

Cumulative Effects with the Permitted Waste Facility

10.5.18 An application has been granted for a materials recycling facility (SH/08/124) on this site. This permission has planning conditions which relate to undertaking site investigations to establish contaminant concentration prior to construction (condition 14), preparation of a verification report after remediation has taken place (condition 15), long-term monitoring and maintenance (condition 16), dealing with contamination not previously identified (condition 17). These elements have received regulatory consent (through application reference SH/08/124/RVAR (KCC/AS/0314/2013) and will safeguard receptors. Once operational the facility would need to comply to a

permit and therefore the operation risk in relation to contaminated land is considered to be low.

10.5.19 With this in mind, it is considered that the cumulative effect on geology, hydrogeology and land quality receptors would be **Neutral**.

10.6 Monitoring

10.6.1 No specific monitoring requirements have been identified for geology, hydrogeology and land quality. However, monitoring requirements may be identified through the further ground investigation and remediation strategy (if required) which will need to be implemented.

10.7 Assessment Summary

10.7.1 This assessment has concluded that the development of the site could be undertaken without detrimental significant effects on geology, hydrogeology and land quality receptors. This would be achieved by implementation of best construction practice and appropriate design. With regards to the Geological SSSI present on site, the proposed Development would provide a beneficial effect as the feature would be enhanced and be made more accessible.

10.7.2 Table 10-13 provides an assessment summary with respect to Geology, Hydrogeology and Land Quality, including the potential significant effect with embedded design measures in place, and additional measures required to reach the residual significance of effect.

Table 10-13 Assessment Summary

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Additional Mitigation Delivery Mechanism	Residual Effect Significance
Human Health	As set out in the Outline CoCP (ES Appendix 4.17): Use of best practice on site to avoid creation of dust. Use of appropriate PPE on site. .	Exposure to potentially contaminated soils via accidental ingestion, inhalation and dermal contact, = Significant	C	Undertake further ground investigation to determine areas of contaminated soils prior to earthworks. If required implementation of a remediation strategy.	Planning condition	**Slight Adverse/ Not significant**
Human Health	UXO Mitigation Strategy implemented prior to construction.	Exposure to UXO	C	No additional mitigation required.	N/A	**Slight Adverse/ Not significant**
Geology	As set out in the Outline CoCP (ES Appendix 4.17): Baseline survey prior to development of construction compounds and remediation if required during topsoil stripping. Best practice e.g. implementation of pollution prevention measures. Repeat survey at end of construction and removal of any	Pollution with fuels, oils, construction products etc = Not Significant	C	No additional mitigation required.	N/A	**Neutral / Not Significant**

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Additional Mitigation Delivery Mechanism	Residual Effect Significance
	contamination created.					
Geological SSSI	Preserved within open space as secured through the Parameter Plans (ES Appendix 4.2).	Enhancement of feature within the Woodland Country Park	O	The former quarry face will be maintained and enhanced (benched back (steps created in quarry face) to expose additional areas of the Hythe Formation geology and signage for educational purposes. This will increase accessibility to the feature which will need to be managed to avoid damage.	Planning condition	**Beneficial**
Hydrogeology Principal aquifer)	As set out in the Outline CoCP (ES Appendix 4.17): Use of pollution prevention measures on site. Removal of contaminated materials via remediation strategy to reduce mobilisation.	Pollution with fuel, oils, cement or concrete. Mobilisation of contaminants. Creation of pathways during construction = Significant	C	Undertake further ground investigation to determine areas of contaminated soils prior to earthworks. Completion of a Foundation Works Risk Assessment to set out appropriate construction techniques (e.g. piling) to reduce risk of creating pathways.	Planning condition	**Slight Adverse / Not Significant**
Hydrogeology Secondary aquifer						**Slight Adverse / Not Significant**
Hydrogeology - Unproductive aquifer						**Neutral / Not Significant**
Hydrogeology Principal aquifer	Appropriate design and location of features within development as secured through the Surface Water	Use of SuDS within Development – reduction in water quality / increase groundwater level = Not Significant	O	Appropriate location for the woodland burial site.	Planning condition	**Slight Adverse / Not Significant**
Hydrogeology Secondary aquifer						**Slight Adverse / Not Significant**

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Additional Mitigation Delivery Mechanism	Residual Effect Significance
Hydrogeology - Unproductive aquifer	Drainage Strategy (ES Appendix 15.1)	Creation of woodland burial site = Significant				**Neutral / Not Significant**
Surface Water	As set out in the Outline CoCP (ES Appendix 4.17): Use of pollution prevention measures on site. Removal of contaminated materials via remediation strategy to reduce mobilisation. Best practice in stockpiling of materials away from water courses	Pollution with fuel, oils, cement or concrete. Mobilisation of contaminants. = Not Significant	C	No additional mitigation measures required.	Planning condition	**Neutral / Not Significant**
Surface Water	Appropriate design and location of features within development as secured through the Surface Water Drainage Strategy (ES Appendix 15.1)	Use of SuDS within Development – reduction in water quality = Not Significant	O	No additional mitigation required	Planning condition	**Neutral / Not Significant**
Existing Buildings / infrastructure	N/A	Damage due to construction around features = Significant	C	Assessment of ground conditions around existing buildings.	Planning condition	**Slight Adverse to Neutral / Not Significant**

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Additional Mitigation Delivery Mechanism	Residual Effect Significance
New Buildings / infrastructure	N/A	Damage from instability during lifetime = Significant	O	Further site investigation for detail design and appropriate design of new building.	Planning condition	**Neutral / Not Significant**
Notes: Phase column, Construction = C, operation = O						

10.8 References

Reference	Title
Ref 10.1	Reference not used
Ref 10.2	HMSO (1990) Environmental Protection Act 1990
Ref 10.3	HMSO (1995) Environment Act 1995
Ref 10.4	The Contaminated Land (England) (Amendment) Regulations 2012
Ref 10.5	HMSO (2003) Water Environment (Water Framework Directive [WFD]) (England and Wales) Regulations 2003
Ref 10.6	HMSO (1991) Water Resources Act 1991
Ref 10.7	HMSO (2021) Environment Act
Ref 10.8	HMSO (1981) Wildlife and Countryside Act 1981
Ref 10.9	HMSO (1949) National Parks and Access to the Countryside Act 1949
Ref 10.10	The Pollution Prevention and Control Act 1999
Ref 10.11	Environmental Permitting (England and Wales) Regulations 2016 (as amended)
Ref 10.12	Department for Communities and Local Government (2021) National Planning Policy Framework (NPPF)
Ref 10.13	Reference no longer used
Ref 10.14	Folkestone and Hythe District (2020) Council Places and Policies Local Plan
Ref 10.15	Folkestone and Hythe District Council (2022) Core Strategy Review
Ref 10.16	Kent County Council (2016) Kent Minerals and Waste Local Plan (2013-30) as amended by the Early Partial Review (adopted 2020)
Ref 10.17	KCC- Minerals and Waste Local Plan 2013-30 Proposed Refresh (Regulation 18 Consultation) (December 2021).
Ref 10.18	Highways England (2019) Design Manual for Roads and Bridges (DMRB), LA 109 Geology and Soils.
Ref 10.19	Environment Agency (2019) Land Contamination : Risk Management (LCRM)
Ref 10.20	Environment Agency Revised (March 2017) Groundwater Protection: Principles and Practice (GP3)
Ref 10.21	Environment Agency, (2015). Contaminated Land Exposure Assessment (CLEA) tool.
Ref 10.22	Defra, (2012). Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance. London. The Stationery Office Limited.
Ref 10.23	Defra, (2013). Environmental Permitting Guidance, Core Guidance for the Environmental Permitting (England and Wales) Regulations 2010. London. The Stationery Office Limited.

Reference	Title
Ref 10.24	British Standards, (2001). BS10175 Code of Practice for the Investigation of Potentially Contaminated Sites. London. British Standards Institution.
Ref 10.25	British Standards, (2015). BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. London.
Ref 10.26	CIRIA, (2006). CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. London. Construction Industry Research.
Ref 10.27	Planning Policy Guidance - Land affected by Contamination (July 2019)
Ref 10.28	Planning Policy Guidance - Land stability (July 2019)
Ref 10.29	Planning Policy Guidance - Water supply, waste water and water quality (July 2019)
Ref 10.30	CIRIA (2001) Contaminated land risk assessment. A guide to good practice (C552)
Ref 10.31	LQM / CIEH (2015) The LQM / CIEH S4ULs for Human Health Risk Assessment
Ref 10.32	Highways England (2020) Design Manual for Roads and Bridges LA108 Biodiversity
Ref 10.33	DEFRA. (2014). Development of Category 4 Screening Levels, Main Report, SP0101. London: Department for Environment Food and Rural Affairs (DEFRA).
Ref 10.34	BGS (1974) Geological Map of Folkestone and Dover (Solid and Drift) 1:50,000
Ref 10.35	Joint Nature Conservation Committee (JNCC) The Geological Conservation Review http://jncc.defra.gov.uk/
Ref 10.36	Peter Brett Associates (PBA) (2008) Link Park, Lympne, Kent, report on Hydrogeological Assessment (16003/051D Doc Ref 6962 JC ab)
Ref 10.37	DEFRA / Environment Agency (2009). South East River Basin District Management Plan: 2016.
Ref 10.38	Arcadis Consulting (UK) Limited (2018) Determining the best location for a Woodland Burial Cemetery Site at the Otterpool Park development: Spatial assessment of groundwater vulnerability to controlled waters (10011914-35564-ARC-XX-XX-MR-YY-0002-P1.0-FINAL)
Ref 10.39	Environment Agency (2002) Pollution Potential of Cemeteries Draft Guidance R&D Technical Report P223, Almondsbury, UK:
Ref 10.40	Zetica (2017) UXO desk Study and Risk Assessment, Otterpool Park, Lympne, Kent (P6258-17-R1)
Ref 10.41	Zetica (2018) UXO Risk Mitigation for Ground Investigation, Otterpool Park (P6248-17-R2-A)
Ref 10.42	SLR (2008) Otterpool Quarry, Nr Hythe, Kent, Contamination Assessment (Ref 409.1376.00002)
Ref 10.43	Arcadis Consulting (UK) Limited (2017) Otterpool Park Ground Investigation Report (0001-UA008926-43-AFS-GLR-G0001)
Ref 10.44	Arcadis Consulting (UK) Limited (2018) Otterpool Phase 2, Ground Investigation Factual Report (10011914-AFS-GLR-G0001)

Reference	Title
Ref 10.45	CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice, Version 2
Ref 10.46	Health and Safety Executive (1991) Protection of Workers and the General Public during the Development of Contaminated Land
Ref 10.47	Construction (Design and Management) Regulations (2015)

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