

Volume 2

Environmental Statement

Proposed construction of landscape enhancement features using imported inert materials, together with the provision of public access and amenity; comprising revised landform and details to WSCC/029/18/SP

**in respect of land at Knepp Castle Estate,
West Grinstead, West Sussex**

Prepared for
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December 2019

Version FINAL

Contents

Page

1.	Introduction and Scope of the Environmental Statement	1
2.	Method and Approach	2
3.	Site and Surroundings	5
4.	Consented Development	6
5.	Proposed Development	16
6.	Alternatives	21
7.	Cultural Heritage - Archaeological	24
8.	Cultural Heritage - Architectural	26
9.	Landscape and Visual Impact	28
10.	Biodiversity	35
11.	Arboriculture	37
12.	Hydrology, Water Resources and Flood Risk	39
13.	Traffic and Transportation	43
14.	Noise and Vibration	48
15.	Soil and Ground Conditions	53
16.	Air, including Dust	55
17.	Population and Human Health	57
18.	Climate	59
19.	Cumulative Impacts	59
20.	Accidents and Disasters	60
21.	Conclusions	60

Appendices

Appendix 1	Heritage Impact Assessment - Archaeology - West Sussex Archeology
Appendix 2	Heritage Impact Assessment - Architectural - Charles Wagner Heritage & Planning
Appendix 3	Landscape Visual Impact Assessment - Krystyna Campbell
Appendix 4	Viewpionts - Ramsay & Co
Appendix 5	Ecological Impact Assessment - Environmental Business Solutions
Appendix 6	Arboricultural Impact Assessment - Ramsay & Co
Appendix 7	Flood Risk Assessment - Motion
Appendix 8	Transport Statement - Motion
Appendix 9	Noise Impact Assessment - Acoustic Associates Sussex Ltd
Appendix 10	Soils and Agricultural Land Classification - Dr S McRae
Appendix 11	Soils and Agricultural Land Classification - Matthews (Sussex) Ltd
Appendix 12	Dust Assessment - MJCA

1. INTRODUCTION AND SCOPE OF THE ENVIRONMENTAL STATEMENT

- 1.1. This Environmental Statement (ES) has been prepared on behalf of Sir Charles Burrell. It accompanies a planning application for proposed construction of landscape enhancement features, using imported inert materials, together with the provision of public access and amenity on land at Knepp Castle Estate, West Grinstead, West Sussex.
- 1.2. This proposal comprises an amendment to a scheme that was substantively granted planning permission in October 2012 (WSCC/028/11/SP) and commenced in February 2014. This was the subject of amendment in relation to the phasing of work and extensions to the timing for undertaking the works, including in November 2017 (WSCC/037/17/SP). More recently, in October 2018, planning permission was granted for an amendment to the proposed method of dredging the Mill Pond; revision to the location of deposition of the silt arisings from the dredging; consequential changes to the approved borrow pit to create a wetland habitat; importation of additional inert material in lieu of arisings from the borrow pit; and an extension of time for completion of works (WSCC/029/18/SP). This enables the completion of works to take place up until 30th April 2020.
- 1.3. The substantive planning permission for the development was deemed to be Environmental Impact Assessment (EIA) development and was thus accompanied by an ES. The most recent application (WSCC/029/18/SP) was also submitted with an ES.
- 1.4. Since this last consent, pre-application discussions have taken place with the LPA with respect to prospective revisions to the approved works. As part of this, and at the request of the Local Planning Authority (LPA), a request for a 'Scoping Opinion' was submitted in August 2019. This sought to obtain the views of the LPA on the content of an ES to accompany any planning application for revised works. The LPA issued their Scoping Opinion in a report dated 6th September 2019. This has been duly considered in the preparation of documentation to support the application.
- 1.5. This ES sets out the findings and conclusions of the EIA which has been undertaken for the proposed development. EIA is the structured process aimed at ensuring that the likely significant impacts of a proposal are assessed in a systematic way. EIAs should ensure that the importance of these impacts, and scope for reducing them, is clearly understood by both the public and the LPA before a decision is made on whether or not a project should proceed.
- 1.6. The current Environmental Impact Assessment Regulations came into force on 16th May 2017 (S.I. No: 2017-571) (hereinafter referred to as the EIA Regulations). Regulation 18(3) sets out that an Environmental Statement should include:
 - A description of the proposed development comprising information on the site, design, size and other relevant features of the development;
 - A description of the likely significant effects of the proposed development on the environment;

- A description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A non-technical summary of the information referred to in paragraphs (a) to (d); and
- Any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

1.7. This is expanded in Schedule 4(4) of the EIA Regulations 2017. This sets out that aspects of the environment which might be significantly affected by the development include:

- Population;
- Human Health;
- Biodiversity;
- Land;
- Soil;
- Water;
- Air;
- Climate;
- Material Assets;
- Cultural Heritage, including Architectural and Archaeological Aspects; and
- Landscape.

1.8. Schedule 4 notes that the description of the likely significant effects should cover the direct effects, and any indirect, secondary, cumulative, transboundary, short term, medium term and long term, permanent and temporary, positive and negative effects of the development.

2. METHOD AND APPROACH

2.1. Paragraph 4(15)(1) of the EIA Regulations 2017 sets out that a person who is minded to make an EIA application may ask the relevant Planning Authority to state in writing, their opinion as to the scope and level of detail of the information to be provided in the Environmental Statement (a 'Scoping Opinion').

2.2. As detailed above, in respect of this proposal, a Scoping Opinion was requested from the LPA in August 2019, and issued in September 2019.

- 2.3. This Opinion set out that, in the view of the LPA, the development would fall within Part 11(b) of Schedule 2 to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, because it comprises an installation for the disposal of waste, and with a site area in excess of 0.5 hectares, exceeds an applicable threshold.
- 2.4. The formal request for a Scoping Opinion ¹ set out details for the proposed format and content of the ES. The formal response of the LPA set out broad support for the proposed approach, and made recommendations for the inclusion of additional information and survey work to be included in the ES.
- 2.5. This ES has been prepared with close regard to, and reflecting, the applicant's proposals in the request for a Scoping Opinion, and the LPA's subsequent response.
- 2.6. A team of specialist Consultants has been commissioned to address the main environmental and technical issues arising from the proposed development. The consultancies and lead Consultants all have extensive experience in relation to their aspects of work on this project; the preparation of Environmental Impact Assessments; and assisted in the preparation of the most recent ES that accompanied the application on this site which was approved in October 2018 (WSCC/029/18/SP).
- 2.7. The following Consultants have supported and contributed to the production of this ES:
- **Charles Wagner** - BSc DipTP MA IHBC MRTPI FSA FRSA - Charles Wagner Heritage & Planning.
 - **George Anelay** - West Sussex Archaeology.
 - **Krystyna Campbell** - Landscape Architect - Heritage Management and Planning.
 - **William Gaudie** - MCIEEM - Environmental Business Solutions.
 - **Neil Jaques** - Motion Consultants.
 - **Fiona Thorp** - Motion Consultants.
 - **Scott Castle** - BSc (Hons) AMIOA - Acoustic Associates (Sussex).
 - **Andrew Ramsay** - MALA CMLI - Chartered Landscape Architect.
 - **Helen Davies-Pye** - BSc (Hons) MSC - Environmental Compliance Manager - Matthews.
 - **Dale Mayhew** - BA (Hons) BTP MRTPI - DOWSETTMAYHEW Planning Partnership.
- 2.8. The ES is the collation of the results of the EIA following the evaluation of the significance of the predicted effects. The ES aims to provide an objective report on the potential environmental effects and can be considered in a number of stages:

¹ Report dated July 2019

- A description of the baseline conditions against which the proposed development can be assessed;
- A description of the details of the development;
- The identification of the potential environmental effects;
- The design of measures able to mitigate the environmental effects;
- An analysis of the effectiveness of the mitigation measures.

2.9. The results of these stages is a detailed evaluation of the impacts of the development which should be sufficient to guide the decision maker in making the appropriate decision.

2.10. The ES is designed to be a self-contained document which considers all the relevant issues. It is divided into three volumes:

Volume 1 - The Non Technical Summary which is a simplified and shortened version of the ES;

Volume 2 - The main body of the ES (this document) which contains details of the site and existing environmental conditions, describes the proposed development, potential effects and the mitigation measures which would avoid unacceptable environmental impact;

Volume 3 - The appendices and figures comprising the full technical assessment of the different environmental aspects, and that comprise an integral part of the ES.

2.11. The ES has been prepared in accordance with the advice contained within the EIA Regulations 2017.

2.12. The ES consists of the following sections:

- Introduction and Scope of the Environmental Statement;
- Details of the Method and Approach of the Environmental Statement;
- Description of the Site and its Surroundings;
- A Summary of the Background to the Site and Evolution of the Works comprising the original scheme and other associated, and relevant planning applications that collectively comprise the 'Consented Development';
- A Summary of the scheme envisaged under this application comprising the 'Proposed Development';
- Consideration of Reasonable Alternatives;
- Baseline Environmental Studies that consider the environmental effects within the following chapters:

- Cultural Heritage - Archaeological;
- Cultural Heritage - Architectural;
- Landscape and Visual Impact;
- Biodiversity;
- Arboriculture;
- Hydrology, Water Resources and Flood Risk;
- Traffic and Transportation;
- Noise and Vibration;
- Soil and Ground Conditions;
- Air, including Dust; and
- Population and Human Health.

2.13. The ES then considers the cumulative impacts of the development.

2.14. Conclusions and summary are set out at the end of the report.

2.15. This Statement is supported by plans and appendices which are referred to in the ES text.

3. SITE AND SURROUNDINGS

- 3.1. Knepp Castle Estate is located approximately 1km south of Southwater, and in total extends to an area of approximately 1,400 hectares (3,500 acres). This comprises Knepp Castle, Knepp Mill Pond, parkland, woodland, areas of grassland, grazing land, farmhouses and cottages, rural offices and light industrial units, together with a polo club and polo fields. The Estate is predominantly located to the west of the north-south A24, with the significant majority located south of the east-west A272.
- 3.2. The application proposal relates to land that is within that part of the Estate known as Knepp Park. This covers an area of some 274 hectares (677 acres) and is located immediately west of the A24 and south of the A272.
- 3.3. Knepp Castle is located broadly centrally within Knepp Park. This is a Grade II* listed building constructed between 1800 and 1813 as a castellated gothic mansion (List Entry No: 1354214). The property is situated within a Grade II listed park and garden that extends to some 144 hectares of parkland and incorporates the Knepp Mill Pond.
- 3.4. The application site includes a section of the listed park and garden, comprising land to the east of the Mill Pond, around the area known as Hill House Lawn.
- 3.5. To the southeast of the listed park are the ruins of Knepp Castle. This is a Scheduled Ancient Monument (SAM) (List Entry No: 1010765) and comprises the mound and ruins of a motte castle which dates from shortly after the Norman conquest, together with its surrounding moat, outer bank

and approach causeway. The ruins of the castle are separately listed Grade II and comprises the ruins of an early Norman keep (Listing Reference: 1180576).

- 3.6. Immediately to the southeast of the listed park, and north of Knepp Castle ruins is a collection of buildings known as Floodgates Farm. This comprises existing and former agricultural buildings and residential properties. To the north of this, with access direct off the A24 is Charleston Farmhouse. This residential dwelling, is outside of the ownership of the Estate. To the north and northwest of this property is land that comprises part of the parkland and is used as polo fields (Hill House Lawn). To the north of this is a woodland, beyond which is a residential dwelling and existing and former agricultural buildings known as Hill House Farm. The dwelling is Grade II listed (List Entry No: 1026960). This group of buildings is accessed direct off the A24. To the north of this is land that generally rises from a low point defined by the tributary to the Knepp Mill Pond, rising in a westerly direction. To the north of this, and immediately adjacent to the junction of the A24 with the A272 is a petrol service station and McDonald's restaurant and drive thru; and immediately to the west of this are dwellings known as Buck Barn Bungalows.
- 3.7. The application site predominantly borders the western edge of the A24, which is typically defined by indigenous hedgerows together with a number of mature specimen trees.

4. CONSENTED DEVELOPMENT

- 4.1. The Knepp Estate has been within the ownership of the Burrell family since 1788. The existing house (Knepp Castle) was designed by John Nash and completed in 1812. Whilst no records relating to the layout of the grounds survive, it is likely that an area of parkland was laid out at the same time as the castle was built. This was probably to a design by Nash himself, influenced by the 'picturesque' principles advocated by his one-time partner, Humphrey Repton.
- 4.2. The pre-existing Mill Pond, would have been the most prominent feature of the Park, and Nash's design took advantage of the topography and the long views of the expanse of water so that this would have appeared to be part of a grand sweep of a river providing a setting to the castle. As noted in the Knepp Park Restoration Management Plan 2000 by Colson & Stone, an important part of the illusion was that the ends of the ponds at that time, were not visible from the castle, in order to trick the viewer into thinking the river continued on, as it curved away out of sight.
- 4.3. The extent of the Mill Pond has diminished over time, principally as a result of siltation arising from agricultural practices, in particular intensive agricultural production. By 1996, the Mill Pond was a little under 29 acres, with a maximum length of some 1,000m. This is some 30% of the size of the pond that was shown to exist in 1754. By the late 1990's much of the remaining open area of water was also only a few centimetres deep and as a consequence, in mid summer, algal bloom occurred across much of the open water, creating a dense cover and damaging the ecological value of the waterbody.
- 4.4. In 1999, it was decided to return the land around the castle to its former parkland appearance, reflecting the original intention of the setting of the castle. The landowners commissioned Colson & Stone to prepare a Restoration Management Plan for the restoration of the Park.

- 4.5. In 2001, in accordance with the Restoration Management Plan, 350 acres of land around the house was taken out of agricultural production and returned to grassland. This was followed by the introduction of fallow deer and other species of deer and livestock. This reflects the move away from intensive arable production to a pioneering approach to ecological land management, that is based on extensive livestock production on land that has been supported to 're-wild.'
- 4.6. Integral to the Restoration Management Plan was the intent to halt the siltation process of the Mill Pond and (via the removal of some of the silt) re-establish its role as the major feature within the setting of the castle and to safeguard its future as an important ecological resource and habitat.
- 4.7. In accordance with the Restoration Management Plan, a number of planning applications have been submitted over the last ten years, to facilitate delivery of the longterm vision for the Estate.
- 4.8. There are eleven planning applications that are of direct relevance to this proposal. These are:
- 4.9. **WSCC/072/10/SP** - Proposed restoration works to Knepp Mill Pond by dredging and the construction of landscape features using imported inert materials - Withdrawn prior to determination.
- 4.10. **WSCC/028/11/SP** - Restoration works to Knepp Mill Pond by dredging and the construction of landscape enhancement features using imported inert materials, together with the provision of public access and amenity - Approved 10th October 2012.
- 4.11. **WSCC/021/14/SP** - Variation of Conditions 4, 5, 7 and 41 of planning permission WSCC/028/11/SP to allow the export of clay and extension of time for restoration works to Knepp Mill Pond and the construction of landscape enhancement features - Refused planning permission in a Decision Notice dated 2nd July 2014.
- 4.12. **WSCC/073/15/SP** - Amendment of Conditions 2, 4, 5 and 7 of planning permission WSCC/028/11/SP to amend the phasing of the construction of the landscape enhancement features and the timescales associated with the progressive restoration works - Approved 23rd February 2016.
- 4.13. **WSCC/064/16/SP** - Amendment of Condition 4 of planning permission WSCC/073/15/SP to allow development to continue to 31st December 2017 - Approved 17th March 2017.
- 4.14. **WSCC/064/16/SP** - Condition 3 - Discharge of Condition application in relation to landscaping details - Approved 12th July 2017.
- 4.15. **WSCC/064/16/SP** - Condition 25 - Discharge of Condition application in relation to topographic survey reports - Submitted 16th May 2017.
- 4.16. **WSCC/037/17/SP** - Amendment of Condition 4 of planning permission WSCC/073/15/SP to allow development to continue to 31st December 2018 - Approved 17th November 2017.
- 4.17. **WSCC/029/18/SP** - Restoration works to Knepp Mill Pond by dredging and construction of landscape enhancement features using imported inert materials, together with the provision of public access and amenity (amendment to WSCC/037/17/SP) - Approved 4th October 2018.

- 4.18. **WSCC/029/18/SP** - Condition 18 - Discharge of Condition application in relation to an Archaeological Written Scheme of Investigations - Approved 6th February 2019.
- 4.19. **WSCC/029/18/SP** - Condition 25 - Discharge of Condition application in relation to wetland design scheme - Approved 9th April 2019.
- 4.20. The first two planning applications relate to the grant of planning permission for the substantive works. The third and fourth applications relate to amendments to the implementation details. The fifth and eighth applications relate to the extension of time for completing the works, initially up until 31st December 2017, and subsequently up until 31st December 2018. The sixth and seventh applications relate to discharge of conditions in respect of a soft landscaping scheme and topographic survey report. The ninth application relates to amendments to the method of dredging the Mill Pond; revisions to the location and deposition of the silt arisings from the dredging; consequential changes to the approved borrow pit and wetland habitat; importation of additional inert material in lieu of arisings from the borrow pit and an extension of time for completion of works until 30th April 2020. The tenth and eleventh applications relate to the discharge of conditions in relation to archaeology and the design of the wetland scheme.

Scheme Approval 2012

- 4.21. The restoration and enhancement works, were substantively approved in October 2012, under WSCC/028/11/SP. This comprised four elements:

Restoration of Knepp Mill Pond

- 4.22. As a result of the natural process of siltation exacerbated by intensive farming and ploughing in the vicinity of Knepp Mill Pond after World War II and runoff from the A24 and A272, the pond has reduced to less than a third of its original size and by the late 1990's was in places, only a few centimetres deep. The siltation led to the encroachment of marsh, reeds, alder and willow into open water. The reduction in size of the pond and the encroachment of vegetation has affected the setting of, and views from and to Knepp Castle and Knepp Park.
- 4.23. The application sought to re-establish the role of Knepp Mill Pond as a major feature in the historical setting of Knepp Castle Estate, and to safeguard its future as a site of nature conservation importance. The restoration was initially envisaged to be achieved by a suction dredging programme to partially restore the depth of Knepp Mill Pond and discourage further encroachment by vegetation in order to enhance the scenic and historic value of the Estate.
- 4.24. The lake was to be dredged to return it to a minimum water depth of 1.5m in the central section and to minimise the potential for further reductions in size due to the accumulation of silt. It was anticipated the dredging works would take 25 weeks and approximately 52,000 cubic metres of silt would be removed.

Excavation and Restoration of a Borrow Pit

- 4.25. A borrow pit was to be excavated adjacent to, and east of, Knepp Mill Pond. The dredged material from the pond was to be deposited in the borrow pit. This would partially fill the pit, which would then be restored to a wetland habitat.

- 4.26. The borrow pit was to extend over an area of some 11,000sqm and comprise the excavation of some 56,000 cubic metres of material (i.e. average depth of over 5m). The arising material was to be used to form the Floodgates Farm landscape enhancement feature and partially form the Hill House Lawn landscape enhancement feature. The borrow pit was designed to accept the dredged material from Knepp Mill Pond and to allow water from the dredged material to flow back into the pond after settlement. The creation of the borrow pit was estimated to take approximately 6.5 weeks and the dredged material would be deposited in the borrow pit over a period of approximately 25 weeks. Following completion of the dredging, the borrow pit was to be filled almost to ground level (0.5m freeboard) with material dredged from the lake and allowed to regenerate to a low lying wetland habitat.

The Construction of Landscape Enhancement Features

- 4.27. The application approved the construction of landscape enhancement features along the eastern boundary of Knepp Park, adjacent to the A24 and the A24/A272 junction. These were to be constructed to provide a visual and acoustic screen to improve the scenic setting of Knepp Castle and Knepp Park to mitigate the effect of the duelled A24, and its junction with the A272 and the associated infrastructure around it (including service station).
- 4.28. The landscape enhancement features were to be constructed from material excavated from the borrow pit and imported inert material. This was to create, as far as practicable, a continuous landscape feature from land immediately southwest of the A24/A272 junction and continuing south adjacent, and close, to the A24, to a point immediately to the northeast of Floodgates Farm.
- 4.29. The landscape enhancement features could be broken down into three broad geographic areas; Buck Field landscape enhancement feature at the north end; Hill House Lawn landscape enhancement feature positioned centrally; and Floodgates Farm landscape enhancement feature at the south end. The construction of these landscape enhancement features required in part, the importation of inert material. This was approved to be delivered to the site via an upgraded access on to the A272 at a point to the west of Buck Barn Bungalows, together with haul roads constructed, as necessary, south of that point.
- 4.30. The Buck Field landscape enhancement feature is located along the eastern boundary of Knepp Park, from Buck Barn Bungalows to Hill House Farm. It was to be constructed to a maximum height of 28m AOD, which was up to a maximum of some 10m above the pre-existing ground levels. The landscape enhancement feature was to have a flat crest up to a maximum of 68m wide with battered slopes between 1 in 4 and 1 in 25. In total, the Buck Field landscape enhancement feature necessitated the importation of some 222,000 cubic metres of inert material.
- 4.31. The Hill House Lawn landscape enhancement feature is located along the eastern boundary of Knepp Park from Hill House Farm to Charleston House. This was to be constructed to a maximum height of 29m AOD, which is up to some 5m above pre-existing ground level. The main body of the feature was to be constructed with a crest which falls from north to south, consistent with pre-existing ground topography.
- 4.32. It was to have a flat crest up to 3m wide and the gradient of the western slope would be between approximately 1 in 2.5 and 1 in 20, and the gradient of the eastern slope would be approximately 1 in 3.5. The minimum width of the feature was to be 20m and the maximum width 115m.

- 4.33. The scheme included an access road gap in the southern part of the feature; and to the southeast of this, a small bund was to be constructed to maintain the continuous visual and acoustic screening benefits. This latter bund would be constructed to a maximum height of approximately 21.5m AOD, which is approximately 2m above pre-existing ground levels. Collectively, this feature incorporates a volume of some 91,000 cubic metres, which it was envisaged would be sourced by a mix of imported inert material and arisings from the borrow pit.
- 4.34. The Floodgates Farm landscape enhancement feature is located north of Floodgates Farm, and south of Charleston House. It was to have a maximum height of 21.6m AOD, some 3m above pre-existing ground levels. The gradient of the western slope would be some 1 in 3, and the gradient of the eastern slope some 1 in 4. This would necessitate some 13,000 cubic metres of material, which it was envisaged would be sourced from the borrow pit.
- 4.35. The landscape enhancement features were to be restored with a combination of grass, trees and shrubs to integrate with the wider Knepp Park.
- 4.36. Overall, the creation of the landscape enhancement features would necessitate the importation of approximately 270,000 cubic metres of inert material, in addition to the 56,000 cubic metres of material excavated from the borrow pit.

Public Access and Amenity

- 4.37. Integral to the provision of landscape enhancement features was the provision of a route for a Right of Way over the land. This was to run from the existing bridleway (No: 1875) which runs in a generally east-west direction, to the south of Floodgates Farm in a generally northerly direction toward the A272. This would be available to users of the existing bridleway, together with local residents, such as those at Buck Barn Bungalows, Hill House Farm and Floodgates Farm.
- 4.38. The Right of Way would provide accessible viewpoints of Knepp Park, including Knepp Castle, and the restored Knepp Mill Pond. At selective viewpoints, information boards were to be installed. In addition to this, a bird hide was proposed to be constructed, adjacent to the northwest corner of the existing dam at the south end of Knepp Mill Pond. This was to be available for public use to provide a facility to view birds and the pond, and in particular the heronry on the northern bank of the eastern arm of the pond.

Initial Scheme Implementation 2012-2018

- 4.39. Following the grant of planning permission in October 2012, works commenced in February 2014. Subsequently, two applications were submitted to amend the implementation details. The second of these, was approved in February 2016 (LPA Reference: WSCC/073/15/SP). This application sought to vary conditions in relation to approved plans (Condition 2); phasing (Condition 4 and Condition 5); and backstop date for completion of operations (Condition 7).
- 4.40. This planning permission approved an amended phasing for the implementation of the works. In accordance with the original planning permission, the phasing had commenced with the deposition of material in the northeastern area of Buck Field, in order to construct the Buck Field landscape enhancement feature. This had been followed by commencement of the northern part of the Hill House Lawn landscape enhancement feature to the southeast of Hill House Farm.

It was then proposed, to implement the remainder of the northern half of the Hill House Lawn landscape enhancement feature working in a generally north to south direction.

- 4.41. At that time, it was envisaged the borrow pit would be constructed in April and May 2016, and dredging operations carried out in the Summer and Autumn of 2016, over a predicted 25 week period. As part of this, the dredger would not move into the area of Knepp Mill Pond to the south of the borrow pit until after 30th June 2016, having regard to the avoidance of impacts on the heronry.
- 4.42. It was anticipated that the materials extracted from the borrow pit would be used to construct the Floodgates Farm landscape enhancement feature and residual parts of the Hill House Lawn landscape enhancement feature. Following completion of this, the scheme would complete the western part of the Buck Field landscape enhancement feature.
- 4.43. It was anticipated the works would be completed by July 2017. However, progress was slowed, principally as work on the southern part of the Hill House Lawn, and all of the Floodgate Farm Landscape Enhancement Features could only be undertaken after UKPN had completed their work in under-grounding the overhead power lines that previously cross the site. As a result a further Section 73 application was submitted in December 2016 to extend the time limit for works by 6 months to 31st December 2017. This was approved on 17th March 2017.
- 4.44. As of September 2017, UKPN had still not undertaken the necessary works to the power lines, notwithstanding their longstanding commitment to undertake the work at their earliest available opportunity.
- 4.45. On this basis, a further Section 73 application was submitted in September 2017, to enable works to complete the development to take place up until 31st December 2018. This was to enable the works, in particular the borrow pit construction and the dredging to take place outside of the prohibited time periods (1st January - 31st March in respect of the borrow pit; and 1st January - 30th June in respect of the southern extent of dredging). This was approved on 17th November 2017.
- 4.46. The submissions with that application made clear that the applicant was giving consideration to (i) an alternative methodology for dredging and spreading the silt from the Mill Pond; and (ii) an alternative design to the landscape enhancement features; but that this would be the subject of a separate application(s) in due course.

Amended Scheme Implementation (2018-2019)

- 4.47. As part of the ongoing implementation of the approved scheme, consideration was given to a number of amendments to the scheme, arising from a review of the methodology for the extraction of silt from the Mill Pond.
- 4.48. This culminated in the submission of application WSCC0/029/18/SP, that was approved in October 2018. This application comprised (i) amendment to the proposed methodology of dredging the Mill Pond; (ii) revisions to the location of deposition of the silt arisings from the dredging; (iii) consequential changes to the approved borrow pit and wetland habitat; importation of additional inert material in lieu of arisings from the borrow pit; and (iv) extension of time for completion of works.

Amendment to Dredging Methodology

- 4.49. Following approval of the original scheme, further consideration was given to the most appropriate methodology for the extraction. It was subsequently concluded that revised best practice advocated removal of the silt whilst the Mill Pond is drained down. This would enable the silt to be removed with a much higher solid to water ratio, and isolate the silt being removed from the remaining watercourse; thereby greatly diminishing the risk of elevated concentrations of suspended solids entering the downstream water system.
- 4.50. Draining of the Mill Pond occurs annually as part of the management of the waterbody, in association with the fish farming that occurs in the waterbody. On this basis, the draining of the Mill Pond is an integral part of the annual cycle of the waterbody.
- 4.51. Once the Mill Pond is drained, it would be allowed a period of time to dry out, via draining and evaporation.
- 4.52. Vehicular access points into the Mill Pond were proposed to be created on the eastern side of the lake with construction haul roads created at each point. The silt could then be removed via 35T 24m long reach 360 excavators.
- 4.53. The works comprised removal of circa 52,000 cubic metres of silt from the Mill Pond. This would deliver a minimum water depth of some 1.5m in the central area of the pond. The depth of the silt varies across the waterbody. It is deepest in the central section and increases in depth in a north to south direction. The deepest area of silt lies at the central southern section of the Mill Pond, close to the dam wall.
- 4.54. The dredging was to take place in sections through the length of the Mill Pond. Over time, and in particular once refilled, the remaining silt, would naturally slough, to create an even layer of remaining silt over the base layer of the Mill Pond. This would enable the maximum extent of the waterbody to benefit from silt removal/reduction.
- 4.55. The lake was drained down in January 2019, and the works commenced toward the northern end of the Mill Pond in circa May 2019. It commenced with the construction of an accessway into the Mill Pond toward the northwestern edge of Hill House Lawn. From this point dredging machinery was able to access the Mill Pond.
- 4.56. Works commenced by excavating a central section of the Mill Pond in a north to south direction. However, through this work, it became apparent that the bottom of the Mill Pond (and therefore the sludge) was much deeper than had been indicated from the bathymetric surveys undertaken of the lake.
- 4.57. On this basis, the proposed dry dredging methodology could not proceed as originally envisaged; as it was predicated on the ability of the machinery to dig down to the base layer of the lake and for this solid base to be used to stabilise the machinery used in the dredging works.

- 4.58. In light of the depth of the silt, a modestly revised methodology for dredging had to be employed. This comprised the partial refilling of the Mill Pond (via the closure of the sluice gates) and the use of floating machinery. Barges were then employed to transport the dredged material from the excavation point to the haul road extraction point.
- 4.59. This dredging methodology was employed with works taking place in a north to south direction until September 2019.

Amendment to Silt Deposition Area

- 4.60. The originally approved scheme envisaged the suction dredged silt/ water would be pumped into a borrow pit, formed on land north of Bow Wood and east of the Mill Pond. The revised dredging methodology envisaged removal of the dredged material from the Mill Pond in dump trucks, to be transported along a temporary haul route, to a revised deposition area.
- 4.61. This comprises two arable field parcels, located to the east of the Mill Pond, most recently used for grazing.
- 4.62. The fields were prepared for receipt of the dredged material via the cutting of the topsoil of the two-fields to a maximum depth of 250mm.
- 4.63. The silt was deposited and graded by a 20T 16m long reach excavator to a depth of 400-500mm. The depth and mass of the material was expected to reduce through drainage and evaporation by circa 40% over an initial 3 - 4 week period. The land was then to be cultivated and grass seeded.
- 4.64. Upon completion of the dredging and silt deposition, the temporary haul roads were to be removed.
- 4.65. Preparation of the silt deposition area was undertaken in spring 2019, shortly ahead of the commencement of the dredging of the Mill Pond. In accordance with the proposed methodology, material was transported to the deposition area from the Mill Pond by dumper trucks, along a temporary haul road. Deposition occurred within the fields working in a north to south direction.
- 4.66. As a result of the required modest amendment to the dredging methodology, the silt had a higher water content than originally envisaged. As a result of this, and a generally wet summer, the evaporation of the silt occurred at a slower rate than was originally predicted. As a result, the cultivation and seeding of the deposition area has yet to be completed, as at December 2019.

Amendment to Approved Borrow Pit / Wetland Habitat

- 4.67. In conjunction with the amended dredging methodology, and silt deposition, the scheme no longer required the creation of a borrow pit.
- 4.68. However, the LPA advised that the creation of the wetland habitat was considered to be a significant material benefit to the originally approved scheme. On this basis, in conjunction with wider scheme amendments, the proposals continued to include the creation of a wetland habitat.

This was to be in the same location and cover the same footprint as the originally approved borrow pit, i.e. some 11,000sqm.

4.69. In light of the absence of need to create a borrow pit, the wetland habitat design was revised, to accord with the Million Ponds Project principles and in discussion with the Knepp Estate's Ecologist. Best practice guidance recommends that to maximise the wildlife value of a new pond habitat, it is best to:

- Create pond complexes or multiple pond pools rather than a single waterbody;
- Within complexes, include both permanent and seasonal ponds;
- Ensure almost all pond slopes are shallow, less than 1:5 (12%) and preferably less than 1:20 (3%);
- Make broad, almost flat, undulating wetland areas around and between the ponds;
- Create underwater bars and shoals to benefit aquatic plants;
- Preferably ensure the surrounds are grazed in the long term; and
- Include some ponds of 20m in diameter to avoid complete overshadowing by trees.

4.70. On this basis, it was proposed to create a diverse habitat over the 11,000sqm area, with shallow and deeper areas, via the removal of some 7,000 cubic metres of material. This material would be used to contribute to the construction of the Floodgates Farm landscape enhancement feature.

4.71. The Million Ponds Project makes clear that following the creation of a pond it is best left 'clean' rather than planted. Within 2 to 3 years of creating the clean water pond, it can be as rich as a 50-year old pond, through natural colonisation. More importantly however, the new pond provides a distinctive habitat type which has its own value. For these reasons, it is recommended new ponds do not have silt added to them from other nearby waterbodies.

4.72. The detailed design of the wetland habitat was reserved by condition in conjunction with the grant of planning permission for the wider works, approved in October 2018. On this basis, a subsequent detailed design of the wetland habitat scheme was submitted via a Discharge of Condition application, and approved in April 2019.

4.73. Work on the creation of the wetland habitat was commenced in summer 2019.

Importation of Material in Lieu of Arisings from the Borrow Pit

4.74. In conjunction with the proposed changes to the dredging methodology, silt deposition and wetland habitat creation, and in particular in lieu of the creation of the approved borrow pit, the amended scheme required the importation of an additional 49,000 cubic metres of material. In order to complete the landscape enhancement features, as originally approved.

- 4.75. The additional importation solely relates to the balance of the source of the material from onsite won material, to material that is imported from offsite. The overall final approved landform and total requirement of 326,000 cubic metres of material remained unchanged.
- 4.76. The additional material was to be imported via the temporary access route located on the A272, a short way to the west of the junction of this road with the A24; and along the existing temporary haul road.

Extension of Time for Completion of Works

- 4.77. To facilitate the changes in methodology of the works, the application also sought approval for an extension of time for the completion of works until 30th April 2020.

Works Undertaken up to December 2019

- 4.78. The implementation of the initial planning permission commenced in February 2014.
- 4.79. The temporary access point on to the A272 was formed, and the temporary haul road constructed through the site, to the southern end of the Hill House Lawn landscape enhancement feature.
- 4.80. Site infrastructure was installed, in particular, wheel washing facilities, a short way south of the access point on to the A272.
- 4.81. The topsoil was stripped, and set aside from the footprint of the Buck Barn and Hill House Lawn landscape enhancement features.
- 4.82. Material importation commenced in 2014, as part of the works to construct both the Buck Barn and Hill House Lawn landscape enhancement features.
- 4.83. The work to construct the Buck Barn landscape enhancement feature is close to completion. It is estimated some further 5,000 cubic metres of material is required to be imported to the site to complete the works.
- 4.84. Similarly, work to construct the Hill House Lawn landscape enhancement feature is significantly advanced. It is estimated there is a requirement to import a further 10,000 cubic metres of material to complete the works. This material is predominantly required to complete the feature, following the under-grounding of the last remaining electric cables which crossed the route of the approved bund in a broadly east-west direction, centrally within the overall feature. As noted in previous submissions, the delays in UKPN under-grounding this cable, delayed the works in this area.
- 4.85. The works to construct the Floodgates Farm landscape enhancement feature have not yet commenced. This requires the importation of some 6,000 cubic metres of material offsite, together with the movement of 7,000 cubic metres of material onsite from the creation of the wetland habitat into this area.
- 4.86. The works to dredge the Mill Pond were commenced in May 2019, and were completed in September 2019. The material was deposited in the deposition area. Work in relation to its cultivation and re-seeding is ongoing.

- 4.87. Work on the creation of the wetland habitat commenced in summer 2019. This work remains ongoing.
- 4.88. The provision of the Public Right of Way and associated interpretation boards has not yet been brought into effect. This can only occur following the completion of works.
- 4.89. The bird-hide on the southwestern edge of the Mill Pond has been installed and been in use for a number of years.

5. PROPOSED DEVELOPMENT

- 5.1. The application now submitted seeks to deliver a number of changes to the approved scheme. These would provide significant material benefits over and above the approved scheme. This relates to substantial enhancements in the final appearance of the landscape enhancement features, enabling an extension of the parkland area of the Estate to the benefit of heritage assets, improvements in highway safety, including via the closure of a direct access on to the A24, and enhancements in the public access and amenity benefits of the scheme principally via the provision of a public car park, and amended route of the Public Right of Way through the site.
- 5.2. The amendments to the scheme can be summarised as:
- Revised form to the Buck Barn landscape enhancement feature via the delivery of a ‘Kim Wilkie’ designed amphitheatre landform;
 - Revised form to the Floodgates Farm landscape enhancement feature to provide enhanced landscape design over and above approved engineering bund;
 - Permanent retention of existing temporary access on to A272 to provide vehicular access to buildings at Hill House Farm, enabling the associated closure of the existing direct access on to the A24, and enabling a new access to the rear of Buck barn Bunglалows which will ease difficulties that the residents of the 4 dwellings are experiencing due the congestion at MacDonalds/ the service station;
 - Provision of access route from commercial yard adjacent to A24, alongside part of the Hill House Lawn landscape enhancement feature, to connect to an existing internal Estate track to provide alternative access on to the A24 via Castle Lane;
 - Provision of public car park at south end of the Floodgates Farm landscape enhancement feature for use by, inter alia, the public in association with existing and proposed Public Right of Way;
 - Re-routing of new Public Right of Way to provide enhanced understanding and appreciation of existing onsite heritage assets;
 - Revisions to approved landscaping to provide more extensive landscape parkland associated with the biodiversity gains of the wider ‘rewilding’ project at Knepp Estate; and
 - Extension of time of implementation of works, for an additional three years.

5.3. Each of these are now described in further detail below.

Revised Form to the Buck Barn Landscape Enhancement Feature

- 5.4. The Buck Barn landscape enhancement feature is located along the eastern boundary of the Knepp Estate, extending from Buck Barn Bungalows in the north, to Hill House Farm in the south. The land originally raised to a high point of some 26m adjacent to Hill House Farm, falling gently to the north before rising again to 26m, before falling in a generally north and west direction. In broad terms, this original landform comprised a small promontory that extended westward before falling to the course of the river feeding Knepp Mill Pond.
- 5.5. The currently approved scheme comprises the provision of a landscape enhancement feature that would be constructed to a maximum height of some 28m, initially running north from Hill House Farm, before then extending north-westward, to the south of Buck Barn Bungalows.
- 5.6. It would be a maximum of some 10m above pre-existing ground levels. It would have a flat-crest of up to 68m in width with battered slopes between 1 in 4 and 1 in 25. In totality, the landscape enhancement feature necessitated the importation of some 222,000 cubic metres of inert material.
- 5.7. The landscape enhancement feature is substantively complete with a further circa 5,000 cubic metres of material remaining to be imported. Restoration via landscaping has already commenced, in particular tree planting has taken place along the eastern side of the landscape enhancement feature, bordering the A24.
- 5.8. The scheme now proposed, envisages a revision to this landform. Reflecting the English tradition of reshaping landscapes to create high quality parkland, the award winning Kim Wilkie has designed a revised 'amphitheatre' landform. This would create a new vista and 'bookend' to the intentionally created northeasterly views from Knepp Castle.
- 5.9. The scheme would entail an increase in the footprint of the landform, and a revised final appearance. The 'engineering' style bund immediately north of Hill House Farm would be revised to soften its appearance and create a more parkland form. From this, land would fall in a generally northwesterly direction, before rising to an amphitheatre located to the southwest of the existing landscape enhancement feature. This would comprise the creation of a level, circular area of ground (set at some 22m AOD) that would contain a water feature close to its southwestern edge. From this, land would fall away to the south and west, and would rise to the east and north. The land would be formed to create a circular 'amphitheatre', rising to a ridgeline set at some 31m, on its northeastern edge. Land would fall from this high point along the back of the amphitheatre, in a southwest and southeast direction.
- 5.10. This landform would provide a high quality landscape feature that would deliver improved enclosure of the parkland area of the Estate and represent an extension of the Grade II listed Knepp Park which is currently contained immediately to the south and west of the landscape enhancement feature.
- 5.11. The works to this area would require the importation of some 225,000 cubic metres of material beyond that currently consented. The topography of the land would vary, but at a maximum gradient of 1 in 3.

Revised Form to Floodgates Farm Landscape Enhancement Feature

- 5.12. The Floodgates Farm landscape enhancement feature is located along the eastern boundary of the Knepp Estate, extending south from Charleston House, to the northern edge of the buildings at Floodgates Farm. The land currently falls from a high point of some 18m AOD in the north, to circa 14m in the south.
- 5.13. The currently approved scheme comprises the provision of a landscape enhancement feature that is designed as an 'L-shaped' engineering bund. It would have a maximum height of 21.6m AOD, some 3m above pre-existing levels. The gradient of the western slope will be some one in three, and the gradient of the eastern slope would be some one in four. In totality, this landscape enhancement feature would necessitate the importation of some 13,000m³ of material. The approved scheme envisages that some 7,000m³ of this would be sourced from the wetland habitat, currently under construction, with the residual sourced from imported material.
- 5.14. The construction of the landscape enhancement feature has yet to commence.
- 5.15. The scheme now proposed, envisages a revision to this landform. Reflecting the wider design iterations of the Kim Wilkie scheme, it is proposed to amend the approved landform to create a more natural parkland appearance. This would comprise an expansion in the footprint of the works in a westward direction to include the majority of the field parcel in which the landscape enhancement feature is located. The feature would not increase in maximum height, but its sloping sides, particularly to the west, and south would slope more gradually to merge back into existing ground levels.
- 5.16. The landform would provide a high quality landscape feature that would be reflective of the wider works at Hill House Farm, Buck Barn.
- 5.17. The works to the area would require the importation of a total of some 20,000m³. This would comprise 7,000m³ from the approved wetland habitat, with the residual 13,000m³ comprising imported materials. This is some 7,000m³ more than the currently consented scheme.

Permanent Retention of Existing Access on to A272, and Closure of Existing Access on to A24

- 5.18. The material imported off site to contribute towards the construction of the landscape enhancement features would access the site via the A272, at a point located a short way to the west of the junction of this road with the A24. This formerly comprised an agricultural field access, that was upgraded in conjunction with the grant of planning permission for the original scheme in 2012. Since that date, the access has served the development of the site, and is subject to a condition requiring its removal upon completion of the development.
- 5.19. Separate to this, the existing cluster of buildings at Hill House Farm, which include domestic, commercial and agricultural buildings are served by a vehicular access directly on to the northbound carriageway of the A24. This has long been considered suboptimal. During previous proposals to deliver improvements to the A24, the Highways Agency envisaged the permanent closure of this access and the delivery of an access route on Estate land to reach the public

highway via a new access junction on to the road network. This series of upgrades is no longer being pursued.

- 5.20. The application proposals seek to amend the existing access arrangements. It proposes the permanent retention of the temporary construction access on to the A272 and for an access route to be constructed from this point in a broadly south-east then southerly direction, parallel and adjacent to the A24 to reach the Hill House Farm building group. In conjunction with this, the existing direct access on to the A24 would be permanently closed.
- 5.21. This amendment would deliver significant, and material improvements in the highway safety operation of the road network.
- 5.22. In addition, the closure of the access onto the A24 enables a more comprehensive delivery of acoustic improvements to this part of the Estate. It would comprise a modest northward extension of the Hill House Farm landscape enhancement feature, which, together with the provision of an acoustic fence (running through existing trees, to be retained) would provide improved acoustic enhancements within this area.
- 5.23. The permanent retention of the temporary construction access provides the potential for this to be used to access the rear of the properties known as 1-4 Buck Barn Bungalows. These are presently accessed via a spur cul-de-sac that uses the same access point onto the A272 as that used by the service station and MacDonalds. This regularly experiences queuing from vehicles seeking to exit onto the A272. This, in turn, can create difficulties for residents and visitors to access the Buck Barn Bungalows access.
- 5.24. The alternative of an access to the rear of Buck Barn Bungalows, will present a positive remediation of this congestion issue, to the benefit of occupiers of these dwellings, and also the wider users of the existing access point into the service station and MacDonalds.

Provision of Access Route from Commercial Yard Southward via Castle Lane to A24

- 5.25. Approximately midway between the north/south extent of the Hill House Lawn landscape enhancement feature, and on its eastern side, is an existing industrial unit that falls within the ownership of the Knepp Castle Estate. At present, this unit is solely served by a vehicular access directly onto the northbound carriageway of the A24.
- 5.26. The application proposals envisage the provision of an alternative vehicular access route. This would extend immediately west from the existing industrial units before turning south to run along the western side of the Hill House landscape enhancement feature, before turning southwest a short way to the north of Charleston House. It would then connect into the existing internal Estate access track that runs south to Floodgates Farm, to connect to Castle Lane. This then provides access on to the A24 both northbound, and southbound.
- 5.27. It is considered that this access route would provide enhanced highway safety over the existing access arrangements serving the industrial unit.
- 5.28. The access would be predominantly use the route of the grassed access way that was approved to be provided in conjunction with the extant scheme. This was to be reserved as a long-term

potential route to deliver highway improvements. It would therefore necessitate only relatively modest alterations to the approved Hill House Lawn landscape enhancement feature.

Proposed Public Car Park

- 5.29. The scheme envisages the provision of a new 12 vehicle car park area at the southern end of the Floodgates Farm landscape enhancement feature, and a short way to the north of the existing buildings at Floodgates Farm. This car park would be accessed via Castle Lane and along the existing Estate access track that runs north to serve the buildings at Floodgates Farm.
- 5.30. The car park would be available for use by, inter alia, visiting members of the public, to facilitate improved access and enhanced use of both the existing public right of way that runs from the A24 westward along Castle Lane; and the new public right of way that will run north from Floodgates Farm over the landscape enhancement features to connect to the A272 at Buck Barn.
- 5.31. Given the character and traffic volume of the dualled A24, it is considered at present that there is more limited opportunity for members of the public to benefit from the existing and proposed public right of way. Users would need to either cross the A24 from the east, or travel along the existing Public Right of Way from the west.
- 5.32. The proposed public car park will provide greater opportunity for visitors to reach the site and benefit from the public access opportunities.

Re-Routing of New Public Right of Way

- 5.33. The extant consent envisages the provision of a Public Right of Way running north from Castle Lane along the existing internal Estate access track along the Hill House Lawn landscape enhancement feature, and along the Buck Barn landscape enhancement feature to reach Buck Barn at a point adjacent to the existing, temporary construction access road.
- 5.34. Along this route would be information and interpretive boards to provide information to users of the Right of Way.
- 5.35. In conjunction with the revised scheme, this route is proposed to be modified. There would be no change to the section running parallel to Floodgates Farm landscape enhancement feature; the change would be relatively modest over the Hill House Lawn landscape enhancement feature; whilst the routing would be more significantly modified over the Buck Barn landscape enhancement feature. This would be to enable the route to follow a section of the crest of the amphitheatre, before turning north to connect to the A272 at the point as currently approved. The revised alignment would provide a 360 degree panoramic view from the crest of the amphitheatre, including a vista looking southwest to Knepp Castle, across the northern edge of Knepp Mill Pond.
- 5.36. The revised alignment to the approved Right of Way would afford improved views and a greater appreciation of the heritage asset of Knepp Castle and its setting.

Revisions to Landscaping

- 5.37. The current planning permission includes proposals for planting the landscape enhancement features. The details of this were approved on 12 July 2017. The overarching objective is to create a

parkland habitat that complements and buffers the existing parkland in line with the Estate's wider nature conservancy principles and the historic landscape. The scheme comprised new planting, together with measures to encourage areas of natural regeneration around the periphery of parts of the existing woodland, reflecting the wider 're-wilding' project which has underpinned the benefits in biodiversity terms of this approach to nature conservancy.

- 5.38. The overall planting intent was to create pastureland with sporadic planting reflecting three planting regimes: scrub mix, and two woodland mixes, both comprising larger trees with smaller shrubs around the periphery.
- 5.39. The approved planting scheme is partially implemented, in particular at the northern end of the Hill House Lawn landscape enhancement feature, and along the eastern edge of the Buck Barn landscape enhancement feature.
- 5.40. As part of the amended works proposed under this application, the landscaping scheme would be amended. In particular, it would be extended to provide a greater level of planting within the Buck Barn landscape enhancement feature. It is proposed to provide additional planting along the outward facing slopes of the amphitheatre. This would provide improved habitat, and improved habitat connectivity between the existing landscaping works, and woodland. The additional landscaping areas would comprise new woodland and native tree planting, incorporating and reflecting the principles used in the delivery of the landscaping works to date.

Extension of Time for Implementation of Works

- 5.41. The works at Knepp Castle were originally approved in 2012, and commenced in early 2014. Subsequent applications have approved extensions of time for the implementation of the works, reflecting protracted timelines in securing diversion of infrastructure (in particular UKPN's undergrounding of power lines), and more recently, amendments to facilitate the revised methodology of the dredging of the Mill Pond.
- 5.42. The planning permission most recently granted in October 2018 requires completion of the works on, or before, 30th April 2020.
- 5.43. This application envisages amendments to the work which require additional time to complete. Having regard to the works proposed, and undertaken to date, it is considered that the amended scheme would take an additional three years to complete, beyond that currently approved. On this basis, this application seeks approval of the works to be undertaken up to, and including, 30th April 2023.

6. ALTERNATIVES

- 6.1. National Planning Practice Guidance makes clear that the EIA Regulations do not require an applicant to consider alternatives (NPPG - Paragraph: 041 Reference ID 4-041-20170728). However, where alternatives have been considered, paragraph 2 of Schedule 4 of the Regulations require the applicant to include in the ES a description of the reasonable alternatives studied (for example, in terms of development design, technology, location, size and scale) and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

6.2. The application relates to a scheme that was granted planning permission in 2012, and was followed by a number of amendments, most recently in October 2018. The consideration of alternatives is therefore focussed on options that relate to iterations of the scheme, compared to that most recently approved. These ‘alternatives’ have been considered under the following subheadings:

- Do Nothing;
- Alternative Locations; and
- Alternative Designs.

Do Nothing

6.3. Having regard to the extant consent, the ‘Do Nothing’ scenario would comprise the continued implementation of the scheme approved in October 2018 (WSCC/029/18/SP). This would comprise the importation of the residual quantum of material remaining from the consented scheme (circa 21,000 cubic metres), together with the completion of the wetland habitat and transfer of the arising material (circa 7,000 cubic metres) to contribute to the creation of the Floodgates Farm landscape enhancement feature.

6.4. The ‘Do Nothing’ scenario would fail to deliver the material benefits of the scheme now proposed, in particular the enhancement to heritage assets and their setting, highway safety, and public amenity benefits.

Alternative Locations

6.5. The proposed development is an integral part of a wider long term plan to deliver restoration and future management of Knepp Park. The extant consent includes works in relation to the restoration of the Mill Pond which suffered continued siltation resulting in degradation and a reduction in its scale and heritage interest with respect to the setting of Knepp Castle; the provision of landscape enhancement features to deliver visual and acoustic benefits to the setting of the Park and its associated heritage assets; and delivery of public amenity benefits.

6.6. The proposed works represent an evolutionary amendment to the consented scheme, to deliver additional material benefits in relation to heritage and landscape setting, highway safety and public amenity.

6.7. The improvements to heritage assets comprise the extension of Knepp Park that lies to the south and west of the site, which is designated Grade II. Given this, and the delivery of the improved vista to and from the Grade II* listed Knepp Castle, it is not considered there is an alternative location that could deliver equivalent benefits in heritage asset terms.

6.8. The proposed highway improvements serve the Hill House Farm buildings and existing light industrial unit adjoining the A24. Delivery of the proposed alternative means of access along the periphery of the landscape enhancement works is the most direct and least impactful means of facilitating highway improvements to serve these buildings.

- 6.9. The proposed new public car park is sited in close proximity to both the proposed new Public Right of Way, and the existing Public Right of Way that runs west from the A24 along the southern edge of Knepp Mill Pond. It is considered that any alternative location would be likely to be more visually prominent and/or less attractive to potential users having regard to its juxtaposition in relation to the Public Right of Way network.
- 6.10. The proposed revisions to the Public Right of Way are a consequence of the proposed amended design. In particular, it seeks to facilitate public access along the new crest-line of the Buck Barn landscape enhancement feature. This would maximise the views, including across Knepp Mill Pond to Knepp Castle.
- 6.11. It is not considered that there are better alternative locations for the proposed scheme that would deliver equivalent or enhanced benefits, compared to the application proposal.

Alternative Designs

- 6.12. The proposed works at Knepp Park are part of an iterative design process. Initially, the landscaped bund was proposed to be constructed only in the area of the Hill House Lawn landscape enhancement feature. However, to achieve optimum noise and landscape benefits, this feature was extended to the north to join the Buck Barn landscape enhancement feature and to the south to Floodgates Farm.
- 6.13. The landscape enhancement feature, as approved, has been designed to provide continuous visual and acoustic screening for the majority of the northeastern corner and eastern boundary of Knepp Park. The scheme now proposed, envisages an amended design, in order to deliver additional material benefits in relation to heritage assets, highway safety, and public amenity. It is considered the alternative design proposed under this application is a material enhancement over the consented scheme.
- 6.14. Alternative options could include a revised design to the landform, including a reduced or greater level of material importation, and the omission of one or more elements of the scheme. The latter would result in a consequential reduction in the material benefits.
- 6.15. The proposed design of the landscape enhancement features comprises a bespoke design by an award winning Landscape Architect that seeks to deliver significant enhancements to heritage assets and their setting. It is considered that the delivery of a scheme of reduced scale would not achieve these aims. The extent of the scheme both in footprint and height reflects the works that are necessary to deliver a high quality vista to the northeast views from Knepp Castle. This was an integral part of the original design of Knepp Castle, but has diminished via the siltation of Knepp Mill Pond. The scheme provides a modern high quality feature that re-introduces this, and acts as a juxtaposition to the vista looking southeast from Knepp Castle towards the Scheduled Ancient Monument of the Knepp Castle ruins.
- 6.16. Overall, the design in footprint, quantum, form and height delivers the identified enhancements and future-proofing of the setting of the Estate in the longer term.
- 6.17. It is considered alternative designs would fail to deliver the same, equivalent material benefits.

7. CULTURAL HERITAGE - ARCHAEOLOGICAL

- 7.1. An Archaeological Heritage Statement has been prepared by West Sussex Archaeology and is attached at Appendix 01.
- 7.2. This Statement builds on extensive heritage appraisals that have underpinned the wider proposals for the development of this part of Knepp Park Estate.
- 7.3. A comprehensive cultural heritage assessment covering the entire Estate was prepared by Andrew Joseph in April 2011. This sets out that the Estate has its origins in a Norman Motte and Bailey Castle, which became the hunting lodge for a medieval deer park. In the later medieval and post-medieval period it gradually changed in use to become primarily agricultural land, with the deer park being disemparked in the 16th century; and the original Norman castle abandoned, and then largely demolished by the 18th century. It was not until the early 19th century that the current Knepp Castle was built, set within a landscaped park which shared similar boundaries to its medieval predecessor.
- 7.4. The Mill Pond is of uncertain origin, but was certainly at least in part, in existence by the 16th century, when it was used to power an ironworks. Following the abandonment of these works, the pond became increasingly silted up, and is now of considerably reduced size in comparison to when it was first created.
- 7.5. The only record of archaeological activity within the Park and its immediate vicinity prior to the medieval period, and predating any of the results obtained from the current archaeological works, was the recovery of Roman pottery found in a drainage ditch at Pike Barn, on the east side of the A24.
- 7.6. Other archaeological/heritage assessments predating the preparation of this application have been undertaken by Archaeology South-East (2003), Nexus Heritage (2009), and West Sussex Archaeology (2013 and 2014). These have not added anything significant to the Joseph's Assessment. No further County Council Historic Environment record entries of relevance within a 1km radius of the site have been added since the latest archaeological/heritage assessments onsite.
- 7.7. As part of the proposals for works in this part of the Estate, archaeological field work has been undertaken. This included works undertaken by Stratascan (2004) covering fields to the east of Floodgates Farm, and by Northamptonshire Archaeology (2008) covering Buck Barn field, Hill House Lawn, and an area between the lake and Floodgates Farm. An archaeological watching brief was also undertaken by ADAS (2018) during the digging of a cable trench to the north of Floodgates Farm. This failed to reveal any significant archaeological remains.
- 7.8. The results of the geophysical survey recorded a number of 'magnetic anomalies' within the Buck Barn field, the majority of which were then subsequently investigated (via trial trenching) as part of the required work in conjunction with the implementation of the 2012 planning permission. It indicated that most of the anomalies comprised post-medieval or modern drainage. However, toward the southwest edge of the Buck Barn Field, the investigation revealed the potential for a

small enclosure, of potential heritage significance. Two trial trenches (numbers 68 and 69) identified the potential for a possible enclosure of an Iron Age and/or Romano-British date.

- 7.9. In conjunction with ongoing discussions with the LPA as part of the current application, it was requested that additional survey investigation be undertaken ahead of the preparation and submission of the scheme.
- 7.10. In line with this request, eight additional trial trenches have been excavated within the approximate area of the potential archaeological find. These trench excavations took place in September 2019. The evidence from this work indicates that a rectangular enclosure of a late Iron Age to early Roman date once existed within the southwestern part of the Buck Barn field. The excavations reveal a clear diminution in the dimensions of the enclosure ditch as it extends south, suggesting this is probably a result of cultivation erosion down the slope towards the stream that runs along the south side of the Buck Barn field.
- 7.11. The function of the ditch and enclosure is not clear. The comparative scarcity of domestic artefacts or internal features would argue against a settlement, certainly one of any density, as does its elongated shape, as it descends the slope to the south. It is suggested therefore it might have been a stock enclosure, with perhaps some seasonal or occasional occupation by stockmen. The presence of streams to the south and west would have made this an attractive location, particularly as it lies itself on a slight ridge above the lower ground.
- 7.12. No other evidence for activity within this period has been revealed, either as a result of the evaluation trenching or the geophysical surveys, except for a single Romano-British pit lying just outside the northwest corner of the enclosure.
- 7.13. It is concluded that there is a high potential for further archaeological remains associated with this enclosure in Buck Barn field, but low potential for remains associated with this period elsewhere within the scheme's boundary.
- 7.14. Having regard to the findings, it is proposed the implementation of the development within the Buck Barn Field would take place in conjunction with an increase in the coverage of evaluation trenching, to include all of the proposed extent of topsoil stripping, and for all those parts of this area that have not been covered by geophysical survey; the density of trenching would be increased from 2.5 to 5%.
- 7.15. A geophysical survey has been undertaken within the Floodgate Farm area, with negative results. However, no evaluation trenching has been undertaken to date. In light of changes to the footprint of the proposed works, it is proposed to add a further two trenches to the previously agreed four trenches within this field to cover the further work.
- 7.16. The further trial trenching within the Buck Barn and Floodgates Farm areas would allow the opportunity to assess areas for as yet unknown archaeological remains and to determine the exact extent of the known late Iron Age/Romano-British enclosure, where its limits have not yet been established.
- 7.17. The results from this evaluation would inform a decision over whether any further archaeological mitigation is required, including the potential for exclusion of areas from topsoil stripping to allow

for the preservation in-situ of archaeological remains. It is proposed this further archaeological investigation would be carried out in accordance with a methodology agreed with the LPA.

- 7.18. Having regard to the archaeological work undertaken to date, the results of this, the extent of the increased footprint of the works, and the proposed revised methodology mitigation, it is considered that the works will not result in significant adverse effects on any archaeological heritage asset.
- 7.19. Direct effects can be mitigated through the methodology approach, and no adverse indirect effects are likely to occur. It is not considered there will be secondary, cumulative or transboundary effects either in the short, medium or long term.

8. CULTURAL HERITAGE - ARCHITECTURAL

- 8.1. A Cultural Heritage Assessment of the impacts of the proposed scheme on above ground heritage assets has been prepared and is presented at Appendix 02. This is in addition, and complementary, to the Archeological Assessment detailed in the preceding chapter of this ES.
- 8.2. The Architectural Cultural Heritage Appraisal draws on the work of the previous Knepp Castle West Sussex Cultural Heritage Assessment produced in April 2011 by Andrew Josephs.
- 8.3. The Knepp Castle Park was added to the Register of Historic Parks and Gardens in December 1988 (Grade II). It included the main park west of the water, Knepp Mill Pond and Hill House Lawn and the area around the Bow. Hill House Farm and the fields to its west and Floodgates Farm were excluded as were the fields south of the main drive from the A24 that crosses the dam, including the old castle site, which is a major eyecatcher. Knepp Castle is the only listed building within the Park (Grade II*). Hillhouse Farmhouse to the south of the main earthworks and west of long bunds on the eastern boundary of the site, is also listed (Grade II).
- 8.4. As the Historic England Register entry notes, Hill House Lawn was a typical John Nash landscape feature:

“To the east of Knepp Mill Pond is Hill House Lawn, a rectangular expanse of open parkland laid out on gently rising land which meets the A24 at its boundary, screened by a tree belt. The term ‘lawn’ in this Nash like setting refers to a forest lawn as advocated by William Gilpin in his Remarks on Forest Scenery (1791)”.

- 8.5. The Colson Stone Historic Landscape Survey and Restoration Masterplan (2000) envisaged taking the Hill House Farm fields and Buck Barn fields into the park and suggested constructing earthworks along the northeastern and eastern boundaries to help reduce the impact of the trunk roads on the park.

Baseline

- 8.6. Site observations, a manual desk-based review of OS maps and relevant heritage receptors have determined the study area, further informed by regard to building locations and heights, topography and roadscape features, and an understanding of the scale of the proposed development. Two prior assessments of Knepp Castle’s cultural heritage both above and below ground have supported in understanding the scope of the study. It incorporates all above ground heritage assets within 1km

from the centre of the site including Schedule Monuments, Listed Buildings, Conservation Areas, World Heritage Sites, Registered Parks and Gardens and Undesignated Heritage Assets, such as locally Listed Buildings. The assessment focuses on these assets where there is potential for an impact.

- 8.7. The determination of the planning application for the original substantive works confirmed that these were regarded these as having a positive impact on the environment, and provided a landscape buffer to the Knepp Estate with its historic park and Grade II* Listed Knepp Castle from the A24.
- 8.8. The proposed application would deliver further material improvements over the consented scheme. It would amend the Buck Barn landscape enhancement feature into an amphitheatre with an open bowl on the southeast, facing towards the lake, providing a view point into, and to become an extension of, Knepp Park. The design of landform would be in keeping with the Reptonian form of the wider park.
- 8.9. The further landscaping along the eastern boundary of the site would reform long, engineered bunds with steep profile, into more interesting landscape forms. It would provide a series of features along the new footpath that links the A272 with the footpath to the south of Floodgates Farm.
- 8.10. The proposed works would have a direct effect on the Registered Park and Garden via the completion of the works to Hill House Lawns. The changes to the approved scheme would not be significant. The final landscape form would provide a positive addition to the Registered Park and Garden and to the setting of the Grade II* Listed Knepp Castle, as an axial point. The Park would be extended by the new amphitheatre landscape feature, to the northeast of the lake. The tranquility of the area would be improved and the visual and noise effects of the A24 and A272 would be diminished. The three key views from the Grade II Listed house to the northeast, east and southeast would be protected and enhanced.
- 8.11. The construction works would have potential indirect impacts on the Registered Park and Garden and Grade II* Listed Knepp Castle. This would not be significant, given it is temporary in nature and broadly reflective of the construction works taking place under the consented scheme.
- 8.12. The final landscape forms would have a positive indirect effect on the registered Park and Garden and setting of the Grade II* listed Knepp Castle. Views from Knepp Castle House to the northeast would benefit from a focal point and the east views across the lawn over the rising bank, screening the A24, would improve the sense of enclosure.
- 8.13. Overall, the scheme is considered to have positive direct and permanent effects on the registered Park. The amphitheatre feature would represent an addition to this, that is both sympathetic and not out of place. It would enclose the northeastwards vista from Knepp Castle House. The landscape enhancement features in their totality would represent an enhancement to the designated heritage of the landscape of the registered Park and the setting of the Grade II* listed building.
- 8.14. Notwithstanding the potential effects during the construction period, in the longer term, the landscape features will bring significant indirect benefits to the heritage assets by reducing the

visual and noise intrusion of the A24 on the registered Park and listed buildings within and around it. The landscape enhancement features as amended would enable views of Knepp Mill Pond, the lake and Knepp Castle from a reorientated Right of Way created along the east side of the Park.

- 8.15. The proposals would be of greater benefit in cultural heritage terms, compared to the approved scheme. It would be an integral part of a wider design exercise to create new landscape outside the existing registered Park and reduce the impact on the A24 and its associated infrastructure. No harm will be caused to the significance of any designated heritage assets and the significance of the registered Park will be enhanced.

9. LANDSCAPE AND VISUAL IMPACT

- 9.1. A Landscape and Visual Impact Assessment (LVIA) of the proposed scheme has been prepared and is presented at Appendix 03.
- 9.2. The Guidelines for Landscape and Visual Impact Assessment (GLVIA) sets out an accepted and well established assessment methodology² for such a study.
- 9.3. An LVIA comprises two separate parts:
- the Landscape Impact Assessment, which considers the effects of the proposal which may give rise to changes in character of the landscape, and how this is experienced; and
 - the Visual Impact Assessment, which considers the potential changes arising to views of a development proposal, the resultant effects on visual amenity and people's responses to the change.
- 9.4. The GLVIA notes that in undertaking an assessment: *'Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional ... the assessment should be tailored to the particular circumstances in each case.'* (GLVIA 1.17,p.9).
- 9.5. The 2012 EIA for Restoration Works and Landscape Works at Knepp Castle included an LVIA prepared by David Jarvis Associates Ltd. (May 2011).
- 9.6. In undertaking an LVIA of the proposed scheme, a field survey examined the current baseline (2019) and undertook a landscape and visual assessment of the amendment proposals, one of which relates to the construction of a new landform - an 'amphitheatre', at 'Buck Barn.' Emphasis was placed on tailoring the assessment to best relate to these proposals so that the assessment was *appropriate and proportional (GLVIA 1.17,p.9)*. Re-examining the 2011 assessment and findings, facilitated an aid to defining the scope of a relevant assessment.

Redesign of Buck Barn Landform

- 9.7. Arrangements of trees and clumps, water, ornamental buildings and eye-catchers, are all characteristic of designed parks in the English tradition, as is 'reshaping of the land' earthwork modelling to achieve either formal, or informal effects and features. At Knepp, the objective is to

² The Landscape Institute and the Institute of Environmental Management and Assessment. (2013) Guidelines for Landscape and Visual Impact Assessment. Third edition, Routledge.

continue the long landscape tradition, and create the impression of a ‘natural landscape’ experienced from parkland walks and rides, and carefully composed views of the house, garden and trees.

Baseline Conditions

9.8. Having regard to the proposed works, the baseline conditions are summarised in the table below.

Existing Situation and Baseline	
Designations <i>(for greater detail see Cultural Heritage: Architectural Statement , Wagner 2019)</i>	Registered Historic Park – Knepp Castle Park Grade II Archaeological Sites Listed Buildings – Knepp Castle (Grade II*)
Surrounding Land Uses and Residential Properties	To NE lies Service Station at A24/A272 crossroad To the N - A272 trunk road, Pondtail Farm, agricultural land and woodlands. To E – A24 trunk road, to its east is West Grinstead Park, agricultural land woodland and Park Farm. To S and SW – Knepp Castle SAM, the River Adur, agricultural land and woodland. To W – agricultural land, woodland Shipley village To NW is agricultural land and woodland.
Regional Landscape Character	Low Weald (RCA 121) and High Weald Regional Character Area
County Landscape Character	Central Low Weald (LW6)
District Landscape Character	Upper Adur Valley (LW9) Southwater and Shipley Wooded Farmlands (Area G4) Upper Adur Valleys (Area P2)

9.9. **Landscape Character** - Knepp Park is located within the Low Weald Regional Character Area (RCA121) as defined by the Countryside Agency; as presented in West Sussex County Council’s study ³ it lies within the Central Low Weald landscape character area (LW6) and the Upper Adur Valley landscape character area (LW9).

9.10. Knepp Park is a mainly pastoral landscape with a well-wooded character. It is a large parkland estate, adjacent to major roads with some suburban development in its vicinity. Many small farms and cottages are concentrated along lanes in the local, surrounding area to the park and there are crossroads at Buck Barn (A272xA24) and Shipley Paygate.

³ West Sussex County Council (2005), A Strategy for the West Sussex Landscape

- 9.11. The local landscape character corresponds to these existing landscape descriptions. The A24, A272, Buck Barn crossroads and services form a considerable intrusion locally, to Knepp Park's intrinsic landscape character.
- 9.12. Fieldwork examining the works being implemented against the LVIA undertaken for the previous consented application demonstrates that, as predicted, these works have had a moderate-significant effect on the landscape character. Seeing/visiting the completed lengths of landform constructed to date, verify the substantial landscape benefit in reducing the effects of the A24 dual carriageway on Knepp Castle Park. This has secured specifically, a reduction in noise, an increase in the spatial relationship between the parkland and its perimeter boundary (especially from views looking east from Knepp Castle) and a corresponding perception of the park as 'separate' from the busy carriageways out-with the park.
- 9.13. **Landscape Sensitivity** - To assess how a proposal is likely to affect a landscape, a judgement is made on the extent to which it can accommodate change of a particular type and scale, arising from the proposal.
- 9.14. **Landscape Value** - Landscapes are valued by different stakeholders, for a variety of reasons, which means that judgements in assessing to what extent a landscape is sensitive to change in respect of its value are difficult. Nevertheless, recognised landscape designations are one measure of how a landscape is valued as are cultural designations (registered parklands, listed buildings and scheduled ancient monuments); also relevant are its amenity value (for example, public rights of way network), ecological value, and its 'tranquillity.'
- 9.15. Knepp Park is of landscape value due to its:
- Intrinsic value - medium-high value;
 - Amenity value (public rights of way crossing the park) - medium-high value;
 - Ecological value - high value;
 - Tranquillity - medium-high value; and as a
 - Cultural landscape, a park registered due to its special historic interest and a setting for listed building and scheduled ancient monuments - high value.
- 9.16. The major landscape receptors for the current proposal are Knepp Castle and Knepp Park with Buck Field, Hill House Lawn, and the two fields used for grazing that lie to the west of Hill House Farm. There will be effects on Floodgate Farm - where a landform and car park are to be constructed and at Hill House Farm, where the final phase of landform is to be amended and a footpath constructed.
- 9.17. The Zone of Visual Significance (ZVS) relevant to the phase of construction works that included the dredging of Knepp Mill Pond (shown on the VP Plan) was adopted at scoping stage for the current proposal. Although it assisted in ascertaining potential viewpoints for the current assessment, it extends further south-westwards than is relevant.

9.18. Desk study and fieldwork confirm that the ZVS is restricted to a limited area and extends:

- Across Knepp Park and Knepp Mill Pond.
- Buck Barn Field to the north boundary with the A272.
- To a very limited area to the north of the A272 and east of the A24. It excludes the western park (that is the area from North Lodge to the Pleasure Grounds and then eastwards to Pondtail Row).

Assessment of Effects

9.19. The design of the proposed park landform will have a beneficial impact in the long term:

Receptor/subject	Buck Barn + Floodgate Farm park landform
the inherent value of Knepp Park	beneficial effects of moderate significance
the amenity value of the area	beneficial effects of substantial-moderate significance
the local amenity	significant effects due to the creation of a Right of Way
the tranquillity of the area;	long-term beneficial effects of substantial-moderate significance
on Scheduled Ancient Monuments in the vicinity of the site	no significant effects
on Knepp Castle, its setting in Knepp Park and Hill House Farmhouse	long-term beneficial effects of substantial-moderate significance
on the landscape value of Knepp Park	beneficial effects of substantial-moderate significance

Effects on Landscape Character

9.20. **Temporary Effects:** In constructing the Buck Barn and Floodgate Farm landforms there will be a temporary adverse effect on the landscape character of slight significance due to lorry, plant and work activity on site, the removal and storage of topsoil and subsoil, and landform construction.

9.21. This will also cause temporary adverse effects on the inherent landscape value of Knepp Park, judged to be of moderate significance. Effects on the tranquillity of the area will be short-term adverse impacts of moderate significance caused by the noise and movement of machinery when undertaking the works.

9.22. **Long-Term Effects:** The Buck Barn park landform is a ‘formal’ sculpted design, lying outside the designated ‘Registered’ Park boundary. This area, the “ North Park” is to become part of the formal parkland (through planting and management), and part of the Deer Park. Past study shows that Buck Barn Field was not parkland, but was farmed as part of Hill House Farm, in 1847 it was arable; some agricultural field boundaries, and some raised pond banks (industrial iron-working period) survive. Latterly (2000), it was enclosed pasture⁴.

⁴ Colson Stone Management Plan, 2000, p.86

- 9.23. The completed Buck Barn landform will have beneficial effects on the landscape character of substantial significance it will:
- Expand Knepp Deer Park by creating an area of new parkland;
 - Form a screen that reduces the negative effects of the A24 dual carriageway on both the Registered Park and the setting of Knepp Castle;
 - Provide an elevated viewpoint on a major design axis across the historic parkland and
 - Be a significant landscape feature in its own right, continuing the 'English landscape' tradition of landform modelling; and
 - Aid in protecting the park from any future road improvements at Buck Barn Crossroads, so that it is 'experientially' separate in character from the surrounding complex road environments.
- 9.24. **Temporary Effects:** In modifying the consented Hill House landform there will be a temporary adverse effect on the landscape character of moderate significance due to lorry, plant and work activity on site, the removal and storage of topsoil, subsoil, and regrading works. Material is to be brought in to construct the park-perimeter earthwork. Effects will be short-term adverse impacts of moderate significance.
- 9.25. **Long-Term Effects:** The major aim of the amendment is to improve the finished landform and landscaping scheme so that the bund - an engineering form - appears more natural. By shifting it further eastwards, and planting the slopes, the amended scheme will help to break up direct views to/from Hill House and the footpath; and secure a wider physical separation between the house, the landform/proposed footpath and A24. Effects will be long-term beneficial impacts of moderate significance.

Effects on Landscape Value

- 9.26. The overall sensitivity of the application site to change affecting its inherent landscape value is judged as medium-high. Examining the proposed amendments against the current baseline shows that the range of temporary effects will be adverse effects of moderate-slight significance.
- 9.27. Completion of the park landform and landscaping will secure long-term beneficial effects on the park's landscape value of substantial/moderate significance due to the screening of the A272 and A24, Buck Barn crossroads and service station.

Effects on Landscape Receptors

- 9.28. The major effects will be on Knepp Park and Knepp Castle; on Buck Field and the two fields west of Hill House Farm (used for sludge deposition). There will also be effects on Floodgate Farm – where a landform and car park are to be constructed and at Hill House Farm, where the final phase of landform is to be amended and a footpath constructed. Both these lengths of landform make up the eastern parkland boundary.

9.29. Major benefits accrue from the visual and acoustic screening, introduction of public access and amenity, the re-establishment and enhancement of the visual design axis and introduction of a new landscape character which draws on a significant English tradition of sculpting the land. Buck Barn will become a new landscape - a dramatic area of parkland to be visited and enjoyed. Incorporating these areas into Knepp Park achieves the major proposals envisaged by the Estate in 1999⁵.

Effects on Public Amenity

9.30. Effects on the local amenity value, as perceived by users of the existing PRow, footpaths and bridleways is of moderate significance, once works are complete.

9.31. The new public footpath leading from the A272 at the north on to the Buck Barn park landform, will enable elevated views down from the Buck Barn Landform, across the 'amphitheatre' and parkland. The walk along the crest will lead downslope, then on to a raised walk along the eastern park perimeter (the Hill House Farm landform), and end at the car park at the southern end of Floodgate Farm. This will be of long-term benefit, of substantial/ moderate significance.

Visual Impacts

9.32. Thirteen viewpoints were assessed as they proved to be sensitive receptors to the current proposal. The viewpoint assessment is presented in Appendix A of the LVIA, accompanying photographs taken from these viewpoints by Andrew Ramsay BA (Hons) MALA CMLI, attached at Appendix 04. The assessment sets out the likely effects of the proposals on these 13 receptor viewpoints.

9.33. Residents at Buck Barn Bungalows will experience adverse impacts of substantial significance during the construction of the Buck Barn landform, albeit temporary. Following completion, and establishment of planting the substantial effects experienced will be of a neutral nature - they will effectively look out on to a different character of landscape - sloping pasture and trees.

9.34. Charleston House and Hill House Farm will experience temporary adverse impacts of substantial significance during construction of the landform, and alterations to the constructed lengths (where amendments are proposed). On completion, Charleston House visual receptors will be subject to neutral effects of moderate significance. Also, Hill House visual receptors will be subject to neutral effects of moderate significance, but a beneficial effect of moderate significance to the east, with amendments to the landform, its position, footpath route and planting.

9.35. Floodgate Farm and Cottages will experience temporary adverse impacts of substantial significance during construction of the landform and car park. These all relate to the environment to the east and north-east of the properties. Upon completion there will be beneficial effects of substantial significance to receptors at Floodgate Farmhouse and at Floodgate Farmhouse Cottages beneficial effects of moderate significance, due to both screening by the landform and dedicated access arrangements.

9.36. The Viewpoint assessment, considered the proposed 'new' design axis, from Knepp Castle to the Buck Barn landform, which re-establishes a long vista north-eastwards from the Castle. Part of Nash's scheme was to create the illusion from the castle of a great river flowing through the park.

⁵ Colson Stone's New Deer Park, Masterplan of 2000, see Figure 11a, pp.39-40

Although in reality this is currently a ‘theoretical’ viewpoint, the Buck Barn landform construction makes this long vista and visual ‘trick’ possible.

Cumulative Effects

- 9.37. When assessed in 2011-2012 the consented landform construction was regarded as of positive environmental benefit because it provided a landscape buffer to the Knepp Estate with its historic park and Grade II* listed Castle. The amendments to the consented scheme can be considered as a physical modification of an existing consented development - the landscape effects will not be intensified.
- 9.38. The current amendment proposal can be considered as a ‘temporal’ cumulative effect – intensifying the time-scale of the development by extending it to 2023. The temporal extent is relatively modest when considered alongside the works secured and implemented to date:
- Knepp Mill Pond - consented 2012, completion April 2020
 - Wetland Habitat - approved 2019, works are underway
 - Landscape enhancement features consented 2012, with this application for modifications seeking to complete the works by 2023.
- 9.39. This should be set against the original concept for the scheme deriving from the Colson Stone Management Plan in 1999. The Estate have been ambitious in undertaking this complex project.
- 9.40. Temporal cumulative impacts exist but are relatively minor and restricted. They are so because of the relatively discrete visual characteristics of Knepp Park. They need to be considered alongside the considerable visual and environmental factors of the major roads - the A272 and A24. Impacts on visual receptors are allied to phasing of the works; they are not widespread across the study area. Temporal cumulative effects can be considered short/medium-term adverse impacts of moderate significance.

Conclusion

- 9.41. Work undertaken to date onsite, with improvements to the trunk road effects on tranquillity and ‘sense’ of separation from the park proves both the feasibility and desirability of completing the Knepp Park project.
- 9.42. This application modifies the consented landforms to secure a design feature in Buck Barn, as a new parkland feature, and a more naturalistic, flowing landscape along the park perimeter. A major beneficial impact is reinstating the parkland’s principal historic vista (part of the landscape design). This was first proposed in Colson Stone’s Management Plan⁶. The 2000 study identified the design opportunity to reinstate the long vista from Knepp Castle leading out north-eastwards over the northern length of Knepp Mill Pond. This vista plays on the illusion of the pond forming a large river flowing through the Park.

⁶ Colson Stone 2000, Figure 19, pp.35

9.43. The creation of the new right of way and improvements to local amenity and existing access are feasible once the engineering and restoration works are completed. The firm intention is to enable wider public enjoyment and appreciation of the considerable landscape benefits - the historic parkland and setting of the Castle, alongside greater tranquillity, a greater perception of 'space' within/across the park and the long term retention of an area of countryside. Strengthening the park perimeters by landform and planting will to some extent guard the landscape park from the depredation of the adjacent major transport routes, ensuring a measure of 'robustness' to the historic and newly fashioned landscapes.

10. BIODIVERSITY

10.1. A full and detailed Ecological Impact Assessment (EclA) has been prepared and is presented at Appendix 05.

10.2. The EclA notes that ecological survey and assessment work has been conducted at Knepp Castle Estate on an ongoing basis since 2009. The results of the surveys undertaken in 2009 form the Ecological Baseline Survey for the site. This is supported by further desk study and data search work, and ongoing survey work, undertaken by the current Ecology Consultants between 2017-2019.

10.3. There are no sites which are statutorily designated for ecological reasons within 2km of the site. There are two non-statutory designations of county level importance within this area, both categorised as Local Wildlife Sites. This comprises the Knepp Mill Pond, the River Adur and Lancing Brook LWS; and the Horsham Common, Alder Copse, Coate's Furzefield and Constables Furze LWS.

10.4. There are a number of habitats within the site that have been the subject of ecological appraisal. This comprises the application site, together with its immediate surroundings, including Knepp Mill Pond, having regard to the extent of previous iterations of the application. These habitats include:

- Semi-improved Grassland - Throughout the site, with the largest area found in the field south of Knepp Mill Pond and on the southern edge of the polo fields;
- Improved and Amenity Grassland - Comprising the polo pitch located to the east of Knepp Mill Pond;
- Woodland - Bordering Knepp Mill Pond, particularly around the southeast and east edge, with the southeastern edge classified as Ancient and Semi-Natural Woodland;
- Standing Water and Marginal Vegetation - Comprising Knepp Mill Pond and its immediate surrounds, including areas of reed and fen vegetation, together with four smaller ponds (each under 100sqm) located to the east of Knepp Mill Pond and of varying water quality and habitat suitability;
- Hedgerows - Throughout the site and of varying level of intactness and species richness, with only poor quality hedgerows present on the application site; and

- Spoil Piles and Earth Banks - Comprising the current iteration of the implemented approved works.

10.5. In addition to habitats, the baseline site surveys together with ongoing, recent surveys have considered the potential presence of a range of fauna on site. This includes:

- Bats - The 2009-2010 Surveys identified five species of bat present, comprising Common Pipistrelle; Soprano Pipistrelle; Noctule; Serotine; and Brown Long-Eared Bat. Data searches revealed a further eight species present within a 2km radius. It is considered that the woodland and airspace above the Mill Pond provide valuable habitat, with areas of grassland and field of more limited potential and value. It is considered that in light of assessments undertaken there will be no undue impact on bat species.
- Badgers - Habitat appraisal within the site indicates there is structural suitability for badger within the woodland areas. No evidence of badger presence however, has been noted in surveys undertaken.
- Birds - The 2017 data search presented records of a range of bird species within a 2km radius of the site. Results of the summer bird surveys in 2009 have provided further information of bird occurrences, including a small heronry on the lake edge within Hogg Wood. Further observations of birds during site appraisals 2017-2019 have been recorded with a comprehensive bird list species included as an appendix to the EclA.
- Great Crested Newt (GCN) and Other Amphibians - The 2017 data search gave no record of GCN occurrence within the immediate area, but these were recorded within 2km's of the site. Surveys conducted in 2009 showed no evidence of GCN presence. In more recent surveys since 2017, a total of three ponds with potential for GCN were identified and appraised. One was dry and overgrown, and two were surveyed following Natural England recommendations. The Knepp Mill Pond was discounted from further GCN survey due to its size, water foul presence and stock of coarse fish. The ponds surveys revealed a 'poor' score following an appraisal following the Habitat Suitability Index Assessment.
- Water Vole - Data records indicate the presence of water vole around the southern and western banks of Knepp Mill Pond and surveys were undertaken during July 2017. No signs of water vole were noted and repeated surveys in 2018-2019 have failed to reveal water vole presence.
- Otter - The data search has revealed no records of otter and survey work in 2017 have failed to reveal signs of otter.
- Reptiles - Surveys in 2009 and data search records of 2017 have revealed the presence of grass snake and slow worm within the area. The area was the subject of surveys throughout 2017 where a peak count of 3 adult slow worms and two adult grass snakes were noted. These were evaluated as low populations and do not qualify for the Key Reptile Site Register. The area surveyed was subject to a set of Reasonable Avoidance Measures outlined in the translocation projection in 2019. No reptiles were noted and the area was deemed 'sterile' for reptiles.

- Other Wildlife - The site is suitable for brown hare, but no evidence was recorded during surveys. There is negligible potential value for hedgehog. There were field signs indicative of red fox and rabbit, but no fox dens were discovered during survey work. With respect to invertebrates, the area is split into three habitat types comprising amphibious lakeside habitat; grassland; and woodland. A relatively high number of species (393) were recorded within the three habitats. The disturbance of these habitats, in particular with respect to woodland is limited, and the grassland area supports very low invertebrate diversity. Overall, it is considered the works would increase invertebrate biodiversity.
- 10.6. The EclA considers an assessment of the potential effects on valued ecological receptors. It considers there will be no significant effects to the two identified local wildlife sites within 2km of the site.
- 10.7. It also considers there would be no significant effects to deciduous woodland including having regard to the proposed additional planting and mitigation and compensation measures proposed. It is not considered there would be any significant effects on fauna, including having regard to mitigation and compensation measures.
- 10.8. The report concludes there would be no permanent negative significant effects. Conversely, the proposed works would help increase the overall biodiversity of the site and surrounding areas. The opportunities for biodiversity gain include additional woodland, creation of a pond within the amphitheatre area, increase in the parkland area which contributes to the wider Estate 're-wilding' and the positive spin off benefits, which comprise wetland and habitat diversity strengthening.
- 10.9. The works are to take place in accordance with a series of recommendations, which include Reasonable Avoidance Measures with respects to badger, water vole, breeding birds, tree protection and avoidance of invasive species.
- 10.10. Overall, it is considered that the proposed works provide an opportunity to significantly improve the biodiversity of the area including through tree planting, additional ponds, and wetlands, hedgerow creation and areas left to natural succession. The scheme will create habitat corridors and wildlife havens, providing ecological niche, and an overall high net biological gain over the present habitats and the wider area. Disturbances will be temporary and suitably compensated and mitigated through the development phase.

11. ARBORICULTURE

- 11.1. An Arboricultural Impact Assessment (AIA) of the proposed scheme has been prepared and is presented at Appendix 06.
- 11.2. This has been prepared in accordance with the guidelines laid out within BS5837-2012: Trees in Relation to Design, Demolition and Construction - Recommendations. Where appropriate, the impact on existing trees has been considered with regard to the following:
- The direct and indirect effects of the proposed scheme on the surveyed trees in relation to the scheme layout;
 - General activities including the importation of spoil and general groundwork activities.

Tree Survey

- 11.3. A tree survey as part of the AIA was carried out on 21st November 2019. A total of 33 no. tree specimens, tree/shrub lines and tree groups were surveyed. Details of this are contained within the accompanying Tree Schedule.
- 11.4. A total of 29 tree specimens were assessed as being category 'A' trees along with 4 woodland edges/tree groups:

Table 01: Tree / Woodland Edge / Hedgerow Categorisation Summary			
Cat.	Tree/Shrub Specimens	Woodland Edges / Tree Groups	Formal / Informal Hedgerows / Shrub Groups
A	29	4	
B	4	3	3
C			1
U	1		

Trees to be Removed

- 11.5. To the northwest of Hill House Farm, 4 mature Oak trees (T13/T14/T15/T16) and field edge shrubs (SG11/SG12) are proposed to be removed to accommodate the proposed changes in topography. Further south to the east of Hill House Farm, a single Oak tree is dead and is scheduled to be removed with a standing monolith retained. A number of Ash trees were in the process of being removed in this area at the time of the survey as a result of Ash dieback.
- 11.6. To the north of Floodgates Farm, a single mature Oak tree (T32) is proposed to be removed to facilitate the proposed landform to the west of the A24. In addition the row of conifers (TG33) to the western edge of the A24 are proposed to be removed as they are considered to detract from the Knepp Castle Estate and not appropriate to the rural landscape setting.

Tree Protection

- 11.7. The trees designated for retention are to be retained and protected with tree protection fencing in accordance with 'BS5837: 2012 Trees in Relation to Design, Demolition and Construction – Recommendations.' Details of the proposed tree protection fencing locations are contained on Tree Protection Drawings (RCo201/07-11). The setting out of the tree protection fencing is to be supervised by a suitably qualified/experienced arboriculture professional.
- 11.8. Access would be provided by an existing temporary haul route which extends south from the A272 and runs adjacent to the A24 highway corridor.
- 11.9. All proposed underground service routes should be located out-with of the existing tree root protection areas.
- 11.10. All hazardous materials should be strictly controlled in order to ensure that the risk of accidental spillage and thus risk of damage to existing tree root systems is minimised.

- 11.11. A suitably qualified/experienced arboriculture professional is to be appointed to oversee the setting out of all tree protection measures prior to any construction activities and to supervise any activities which may be damaging to the existing trees. Regular inspections should be conducted in order to ensure the requisite tree protection measures remain in place.

Landscape Planting

- 11.12. In conjunction with the proposed scheme would be the delivery of extensive tree and shrub planting. This would supplement, and be in addition to the landscape planting that has previously been approved, and is part implemented in relation to the consented works.
- 11.13. The additional planting would in particular focus on the outward face of the proposed amphitheatre landform at Buck Barn. There would also be strategic tree specimen planting on the inward facing slopes of the landscape enhancement features. The latter would in particular seek to reflect the parkland landscape character that exists elsewhere on the Estate, and is a feature of the parkland and re-wilding exercise that has been undertaken over recent years.
- 11.14. Additional native tree and shrub planting would also be undertaken to the new landscape enhancement features alongside the A24. This would enhance the landscape character of the highway corridor.
- 11.15. Overall, the proposed scheme will deliver a net gain in the arboricultural value and character of the site.

12. HYDROLOGY, WATER RESOURCES AND FLOOD RISK

- 12.1. An assessment of the geology, hydrogeology and hydrology of the site as well as a Flood Risk Assessment (FRA) has been prepared and is presented at Appendix 07.
- 12.2. The FRA and the Water Resource and Flood Risk chapter of this ES have been prepared based on desktop research, site visits conducted in March 2017 as well as intrusive site investigations carried out in June 2007, contained within previous ES chapters. It builds on the work undertaken in support of the ES prepared for this site in 2018.

Background Information and Baseline Conditions

- 12.3. The majority of the background information has been taken from published maps from the British Geological Survey site utilising publicly available borehole records associated within the A24 junction improvement scheme. Additionally, information has been drawn from logs associated with three trial pits excavated within and around the site in June 2007.
- 12.4. The published maps show the western section of the proposed enhancement features are underlain by a thin sandstone which forms a subcategory of the Weald clay formation. To the north of Knepp Mill Pond and along the valley of the watercourse upstream from the pond, the underlying geology is shown as Quaternary Alluvium. These underlying strata's confirm the whole site to be located within an area underlain by the strata designated as cretaceous Weald clay.

- 12.5. From the mapping it can be seen that the alluvium is composed predominantly of silts and clays, with an unknown thickness on site. The composition of the Weald clay is predominantly grey silty mudstone incorporating thin bands/layers of red clay, sand, limestone and sandstone. Additionally, the sandstone subcategory of the Weald clay formation is identifiable by the thin beds of sandstones along with associated red clays and intervening bioturbated grey silt mudstones (as a result of boring/burrowing organisms mixing soils).
- 12.6. The thickness of the Weald clay ranges from approximately 172m to approximately 275m in the vicinity of the site. The Weald clay found at and in the vicinity of the site comprises generally firm to stiff grey brown sandy clay interbedded with thin bands of mudstone, siltstone or occasional thin bands of clayey, well fissured black shale.

Groundwater Movement

- 12.7. The following assumptions have been made based upon previous works within comparable strata's, as well as from data collected on site during intrusive testing. It is likely that the clay, mudstones and siltstones of the Weald clay have a low permeability.
- 12.8. It is likely that the Alluvium has a low permeability restricting infiltration and vertical groundwater movement where present.
- 12.9. The sand, sandstone and limestone of the Weald clay may be water bearing. It is likely that the sand, sandstone and limestone of the Weald clay have a moderate to high permeability.
- 12.10. No groundwater was struck in the boreholes drilled in the vicinity of the site and no groundwater was struck in the trial pits excavated in the vicinity of the site in April 2003 with the exception of a trial pit located to the north east of the site adjacent to the A24 where a slight seepage was recorded at 4.00mbgl.
- 12.11. No groundwater was struck in the trial pits excavated at and in the vicinity of the site in June 2007 with the exception of trial pit TP2 located in the south of the site to the east of Knepp Mill Pond where a slow seepage was recorded at 3.2mbgl.
- 12.12. Information from the Environment Agency (EA) shows:
- The Alluvium on site is designated a Category A Secondary aquifer;
 - The clay, mudstones and siltstones of the Weald clay are designated unproductive strata and the sands, sandstones and limestones of the Weald clay are designated Category A secondary aquifers;
 - The site is not located in the Source Protection Zone of a public water supply facility; and
 - There are no licensed or deregulated groundwater abstractions within 2km of the site.
- 12.13. It is understood that the Local Authority does not hold records of private water abstractions within the proximity of the site.

- 12.14. The site is located in the catchment of the River Adur which is between 4m and 5m wide in the vicinity of the site and flows generally north west to south east approximately 220m south of the site at the closest point.
- 12.15. A tributary of the River Adur, previously dammed to form Knepp Mill Pond flows generally north to south and is approximately 3.5m to 3.8m wide. Drainage ditches convey water from the dam at the southern end of Knepp Mill Pond to the River Adur. The flow from Knepp Mill Pond into the drainage ditches is controlled by two sluice gates located at the western and the eastern ends of the dam. Additionally, there is an inactive old pump house located at the western end of the dam, previously utilised to convey water to the Knepp Castle estate in the early 1900's.
- 12.16. A spur of Knepp Mill Pond extends through woodlands to the south and south east of the site. A watercourse drains south east from the spur of Knepp Mill Pond and join Blakes Gill approximately 210m south east of the site. Flows from the spur of Knepp Mill Pond are controlled approximately 140m south of the site by a sluice gate located near Floodgates Farm. Blakes Gill eventually joins the River Adur, joining at the east of the Bay Bridge, approximately 730m south east of the site. Blakes Gill flows generally north to south. Additionally, there is a drainage ditch that runs generally east to west along part of the southern boundary of the proposed Buck Field landscape enhancement feature to then join the main watercourse that forms Knepp Mill Pond.
- 12.17. There are no major surface water bodies within the application site. However, there is a small pond located adjacent to the southern boundary of the proposed Buck Field landscape enhancement feature, as well as a small pond located adjacent to the west of the proposed Hill House Lawn landscape enhancement feature.

Water Quality and Abstractions

- 12.18. The following data has been utilised from prior measurements and investigations between 2000 and 2007, based on both EA data as well as site investigations.
- 12.19. The surface water samples collected from Knepp Mill Pond in 2007 show that the water from Knepp Mill Pond is characterised by neutral pH, moderately low concentrations of dissolved oxygen and moderate electrical conductivity together with negligible or very low concentrations of nitrate, low concentrations of ammoniacal nitrogen and moderate concentrations of total organic carbon.
- 12.20. Water sample collections from the tributary to the north of Knepp Mill Pond show low concentrations of dissolved oxygen within the waterbody.
- 12.21. Within a 2km vicinity of the site, there exists one licensed surface water abstraction and one licensed surface water impoundment. The abstractions are owned by Knepp Castle Polo club and is used for spray irrigation. The licensed surface water impoundment is for Hammond Pond which is itself a tributary of the River Adur located approximately 880m south west of the site.

Flood Risk Classifications

- 12.22. The majority of the development site is located wholly within Flood Zone 1 (as designated by the EA) having a less than 1 in 1000 year annual probability of river flooding.

Assessments of Effects

Buck Field Landscape Enhancement Feature

- 12.23. All landscape features including the proposed Buck Barn and Floodgate Farm landscaping enhancement features will be constructed from inert imported materials with the addition of materials sourced on site through the creation of the wetland habitat.
- 12.24. The waste acceptance procedure and the waste acceptance criteria will be agreed with the Environment Agency and specified as part of the Environmental Authorisation for the development. Therefore, all material imported to the site will be subject to appropriate checks to ensure that they conform with specified waste acceptance criteria and that only suitable inert material is used in the development. As all materials used will be imported inert materials as well as arising won from site, it is therefore considered that there will be no adverse impact on the quality of the surface or ground water in the vicinity of the site.
- 12.25. During the construction phase of the landscape enhancement features, there will inevitably be a transference and increase of suspended solids draining from the unvegetated surfaces. It is proposed that the landscape enhancement features be progressively restored and seeded thus minimising the migration of these suspended solids.
- 12.26. It is proposed to control surface water flows away from this section of site along with its associated soil storage areas via temporary drainage ditches or shallow berms as the development progresses. Temporary settlement ponds will be placed in key locations, agreed during the construction phase, in order to reduce the concentration of suspended solids prior to discharge into any watercourse.
- 12.27. Once the surface landscaping works have been completed and covered in vegetation, the wetland habitat will be retained in order to create a new wetland habitat, with any temporary settlement ponds and drainage ditches being infilled, or in the case of the settlement ponds these may be retained as permeant features. It is proposed that permanent drainage ditches are constructed in order to manage and control the flows and collection of surface water from the newly landscaped areas.

Additional Considerations

- 12.28. There is a potential risk to the quality of surface water and groundwater at the site from the use and storage of fuel and or chemicals at the site. The storage of fuel and oil at the site together with the refuelling of the excavation machinery will be undertaken generally in accordance with Environment Agency guidance 23.

Flood Risk Assessment

- 12.29. It is foreseeable that the construction of the landscape enhancement features will result in an increase in the rate of surface water run-off from these areas. It is proposed that drainage ditches be excavated round the proposed Buck Field landscape enhancement feature in order to manage and convey surface water run-off away from the A24 and the properties adjacent to the site. The water in the ditches will drain to Knepp Mill Pond or be led into the vicinity of the sluice gates depending on the drained level of the pond at the time of construction.

- 12.30. The FRA has concluded, based on the flow direction and volume and rate of surface water from the landscaped bunds, that it is unlikely that any increase in the rate of surface water run-off from the landscaped bunds will affect adversely the pattern or the magnitude of flooding at Knepp Park and will have no significant effect on the pattern or magnitude of flooding of areas external to Knepp Park.

Conclusion

- 12.31. As the construction of temporary haul roads will be located directly on the ground following the stripping of the topsoil, it is considered that these works will not increase the flood risk to the area around or in Knepp Park.
- 12.32. In conclusion, based on the FRA carried out in accordance with the PPG and NPPF it can be seen that the proposed development will not impede or significantly alter flood flows at the site, or increase the risk of flooding to the site and surrounding areas.
- 12.33. Surface water drainage proposals have been included within the development masterplan in order to mitigate against any risks associated with the flow of surface water to offsite receptors. Additionally, the excavation and the creation of the wetland habitat will increase the flood storage capacity within the vicinity of the site.

13. TRAFFIC AND TRANSPORTATION

- 13.1. A full and detailed assessment of the traffic and transportation impacts of the proposed scheme has been prepared and is presented at Appendix 08.
- 13.2. The Scoping Opinion for the EIA, submitted to West Sussex Council (WSCC) in July 2019, indicated that the chapter on traffic and transportation would be based on the Transport Statement, on the basis that this approach was previously accepted in association with earlier planning approvals. The Scoping Opinion received from WSCC in September 2019, confirmed this approach was acceptable, subject to addressing items raised separately in pre-application advice provided by WSCC Highways.
- 13.3. The proposals subject of the current application relate to the importation of a further 250,000 cubic metres of material to form altered landscape features to those previously approved over further three year period, beyond the current time limited end date for implementation of the works i.e. up to 2023. The number of heavy goods vehicle (HGV) movements associated with the quantum of material imported on an annual basis would be in line with that previously permitted. The proposals also include retention of the construction access to the A272 following completion of the landscape works to serve Hill House Farm and closure of the Farm's existing access to the A24. An internal access road is proposed within the Estate to redistribute existing traffic via the A272 access and Castle Lane. A small public car park is also proposed to serve the existing and proposed public rights of way via Castle Lane.
- 13.4. It was agreed as part of pre-application liaison with Transport Officers at WSCC in December 2018 that:

- There would be no requirement for additional surveys or junction modelling on the basis that the anticipated the number of daily HGV movements is likely to be in line with that assessed in the original and more recently approved schemes;
- Continuing use of the A272 access is acceptable; and
- Closure of the access serving Hill House Farm off the A24 would be acceptable in principle and further information should be provided in respect of any proposed alterations to the gap in the central reservation.

13.5. The Transport Statement provides information on anticipated movements by HGVs having regard to recorded vehicle loads associated with the approved operations. It also considers issues relating to the amended access arrangements following completion of the landscape works and impact of the proposed car park and future footpath. In summary the Transport Statement demonstrates that:

- The proposals accord with national and local policies relevant to transport;
- There are no significant road safety issues associated with the local highway network, or linked to current site operations, that are detrimental to the existing standard of road safety;
- The proposed revised footpath through the site will connect the A272 access road with the route leading south to Castle Lane and facilitate the use of non-vehicle transportation around the area;
- The proposed access alterations to Hill House Farm are considered to represent an enhancement to the existing situation, where existing traffic would be redistributed from a sub-standard access on to a dual carriageway (A24) to an access that has been designed to accord with relevant standards;
- The existing sub-standard access serving Hill House Farm/buildings would be permanently closed;
- Creation of an internal access road within the site will provide the opportunity for an existing light industrial unit to use Castle Lane, which benefits from good visibility, as an alternative to the direct access to the A24,
- Use of Castle Lane to serve the proposed public car park would result in few, if any, additional vehicle movements associated with the existing and proposed public rights of way network on the basis that the proposed car park seeks to formalise existing parking associated with this network; and,
- The number of movements by HGVs associated with the importation of additional material will remain in line with that previously assessed and conditioned as part of the previous planning applications and it is therefore considered the proposals will not be detrimental to the free-flow of traffic or safety on the adjoining highway network.

Traffic Generation, Impact and Mitigation

Approved Operations

- 13.6. The Environmental Statement submitted in support of the original application (approved in October 2012) estimated that the approved proposals would result in an average of 58 HGV movements per day (or 29 deliveries) linked with 77,000 cubic metres of material being imported per annum, which was secured by planning condition. The works were to take place over a 3.5 year period. It was assumed that large (circa 10m long) tippers would be used to import material, with each vehicle having a capacity of 10 cubic metres. This would give rise to a total of 7,700 HGV deliveries, or 15,400 HGV movements per annum. Information provided within the Transport Statement identifies a total of 14,300 HGV movements in the calendar year 2016.
- 13.7. Planning permission was granted in 2018 to import an additional 49,000 cubic metres of material to complete the approved landscape enhancement (application WSCC/029/18/SP). It was intended that importation of this additional material, as well as 18,000 cubic metres of approved outstanding material, would be completed by the end of April 2020. HGV movements were estimated to average 34 a day, and hence to remain in line with the level previously approved. As such, the same condition on HGV movements was imposed as on the original permission.
- 13.8. It is understood that the majority of this approved additional material has already been imported and that circa 21,000 cubic metres remains outstanding at present. It is further understood that importation of this approved material is anticipated to be completed by the end of April 2020, in line with a condition of the planning consent.

Future Operations

- 13.9. It is intended that the future operations (HGV movements and hours of operation) subject of this application will continue within the parameters of the original planning permission. In addition, the same size of vehicle(s) and hence average loads will continue for future operations. The assumption relating to average vehicle load has been verified in liaison with the Applicant.
- 13.10. Based on a total of 250,000 cubic metres of material being imported to the site over a three year period, this will result in a total of circa 8,350 HGVs per annum. Based on current HGV loads and site operational hours, this equates to 64 daily HGV movements (or 32 deliveries). The table below provides a summary of the approved and future daily HGV movements.

Scenario	Daily
Approved	58 movements
Approved + 10% Annual Permitted Excess	64 movements
Recently Approved (October 2018)	34 movements
Future	64 movements

Table 1 - Summary of Daily HGV Movements

- 13.11. It is evident from the table above that the quantum of material to be brought on to the site is able to be imported over the extended time period, within the conditions of the approved development. On the basis that the average number of daily HGV movements is in line with the level assessed and approved as part of the original and more recently approved applications, it is considered there is no requirement for more detailed junction assessment. This was also confirmed by the County Council's pre application response in December 2018. On this basis it is also considered there is no requirement for mitigation measures.
- 13.12. As outlined previously, circa 21,000 cubic metres of approved material remains to be imported and works associated with the permitted scheme are due to be completed by the end of April 2020. It is therefore reasonable to assume that all approved material will have been imported prior to this date and before any further material importation associated with the current application commences.

Redistribution of Traffic Arising from Access Alteration

Hill House Farm

- 13.13. Following completion of the landscaping works it is proposed that the temporary construction access to the A272 would be retained to serve Hill House Farm. The existing access on to the A24 that serves this part of the site would be permanently closed - no alterations are proposed to the associated gap in the central reservation in this location on the A24. In this regard, the gap also serves Green Lane enabling vehicles to turn north from Green Lane, on to the A24. No changes are proposed to the permitted land uses or quantum of development at Hill House Farm. As such all existing traffic associated with this group of built form (domestic, commercial, agricultural, equestrian etc) would be redistributed to the A272 access from the A24. An internal access road would be provided between this access and Hill House Farm.
- 13.14. The A272 access has been constructed in accordance with technical drawings approved as part of a Section 278 Agreement related to the original planning permission. The access provides 2.4m by 160m visibility splays in each direction, the appropriate sight-lines for roads subject to a 50mph speed limit.
- 13.15. It is considered closure of the existing access to the A24 would be positive in relation to road safety, as this will reduce the potential for conflict with other vehicles travelling on the A24 and using the gap in the central reservation.
- 13.16. Pre-application advice from the Highway Authority confirms continuing use of the A272 access to import additional material and to then be permanently retained to serve Hill House Farm is acceptable. The advice further indicates that closure of the access would be acceptable in principle.

Castle Lane

- 13.17. Castle Lane serves a number of existing land uses. As part of the current application, a small car park (12 spaces) is also proposed in association with the existing and future public rights of way. However, it is not envisaged provision of this parking area would result in an increase in vehicle

movements using Castle Lane, rather the car park will formalise parking for existing vehicles visiting the public rights of way network.

- 13.18. It is also proposed that Castle Lane will serve an existing light industrial unit, as an alternative to the existing direct access off the A24. No changes are proposed to the use or quantum of development at this unit. As such, vehicle movements associated with this unit will either continue to access the site direct from the A24 or use the alternative route via Castle Lane.
- 13.19. Castle Lane benefits from good visibility on to the A24, with sight-lines of 2.4m by 215m achievable on to the A24, the appropriate sight-lines for roads subject to a 60 mph speed limit. It is considered creation of the internal access road to provide the opportunity for the existing light industrial unit to use Castle Lane as an alternative to the direct access to the A24, is positive in terms of road safety.

Access Alteration Summary

- 13.20. In relation to the alterations to access arrangements to Hill House Farm and serving the existing light industrial unit and proposed public car park, it is understood existing movements associated arising from these areas will simply be redistributed to alternative access points. As such, it is considered this aspect of the proposals will not result in additional vehicle movements on the local highway network.

Public Rights of Way and Facilitating Sustainable Transport

- 13.21. The proposals also include amendments to the route of an approved future Public Right of Way through the site to reflect the revised landscape forms subject of the current application. The route is proposed to lead south from the A272 access, around the revised landscape feature and continue south, connecting with the proposed access road to Castle Lane.
- 13.22. There are two locations where the future footpath intersects the proposed access road: in the vicinity of Hill House Farm and north of Charleston House. The internal access roads will be lightly-trafficked and designed to encourage low vehicle speeds. It is anticipated that the needs of footpath users can be prioritised where the footpath crosses or runs parallel with the proposed access road through appropriate design and/or signage.
- 13.23. The proposed revised Right of Way through the site will provide a pedestrian connection between the A272 access with the route leading south to Castle Lane, connecting with an existing Public Right of Way along Castle Lane (Bridleway 1875) and the wider public rights of way network. In this regard, provision of the future route will facilitate the use of non-vehicle transportation around the area.

Conclusions

- 13.24. On the basis of the assessment completed within the Transport Statement, it is considered that there is no reason why the proposals should be resisted on traffic or transportation grounds.

14. NOISE AND VIBRATION

- 14.1. An assessment of the noise and vibration impacts of the proposed scheme has been presented at Appendix 09.

Baseline Assessment, Assessment Metrics and Identification of Noise Sensitive Receptors

- 14.2. A Noise Impact Assessment was most recently undertaken on 5th December 2017 in relation to the scheme granted planning permission in October 2018. This replicated an assessment previously undertaken in 2007 at a number of identified noise sensitive properties. There are no apparent reasons why the site soundscape should have changed since December 2017, warranting any additional readings.
- 14.3. The metrics to determine noise impact were noise change in terms of LAeq and additionally the application of MPS2 minerals working guidance, as the latter is specific to such projects involving earth profiling and landscaping operations.
- 14.4. The noise data and noise sensitive properties both within and outside of the Knepp Castle Estate are detailed in the Noise Impact Assessment. Noise Sensitive Receptors have focused upon Buck Barn Cottages Floodgates Farm and Charleston House. The Scoping response from West Sussex County Council dated 6th September 2019, requested that the following details be included within the EIA;
- A cumulative impact assessment on Buck Barn Bungalows to consider both the construction traffic as well as proposed traffic using the new permanent vehicle route.
 - A cumulative assessment of Floodgates Farm for both construction site traffic as well as proposed traffic using the new permanent vehicle route.
 - The impact of the new car park to be considered.
 - Reflected noise as a result of the amphitheatre style landform on the Buck Barn Bungalows.

Who Will Be Impacted and When

- 14.5. Noise Modelling Software (IMMI) has been used to input the proposed plant and their associated sound power levels, as well as the existing contribution to the site from the A24 road traffic noise. The noise modelling software predicted the LAeq from static operations taking into account noise attenuation over distance.
- 14.6. To reinforce the noise modelling output, a calculation was also used to predict the impact of HGVs importing additional materials to site. The drive past calculations utilise the sound profile of the vehicle, site speed limits, and the calculated number of passes in a worst-case hour, and the distance to the nearest receptor.
- 14.7. The table below shows the impacted noise sensitive properties with the greatest impact shown at the top in shaded light red cells. The remaining unshaded cells are the works carried out in line with the requirements of West Sussex County Council which do not have any impact on the site. This

provides an assessment of both short term construction effects (static mobile plant as well as a haul route assessment) and operational effects post completion of the project.

Receptor Location	Phase of Work	Predicted Sound Level (L _{Aeq,T})	Predictions vs Measured Sound Levels	MPS2+10 Criterion	MPS2 Absolute Criterion
Charleston House	Stationary Plant-North of Floodgates Bund	72	10.9	10 dB above	17 dB above
3-4 Buck Barn	Stationary Plant-Amphitheatre	58.7	7.7	0.7 dB above	2.7dB above
3-4 Buck Barn	HGV Deliveries to Site	56.3	5.3	1.7 dB below	1.3 dB above
1-4 Buck Barn Cottages	Operational Effects of Landform and Reflection	No Change			
1-2 Floodgates	Permanent Access Road	37.4	-17.6	Not Applicable	Not Applicable
4 Buck Barn	Permanent Access Road	26	-25	Not Applicable	Not Applicable
Charleston House	Permanent Access Road	29.6	-28.4	Not Applicable	Not Applicable
1-2 Floodgates	Assessment of New Car Park	23	-32	Not Applicable	Not Applicable
SunnyHill	Permanent Access Road	33.9	-40.1	Not Applicable	Not Applicable

Table: Impact Assessment of Activities

14.8. The impacts are considered by receptor location below.

Charleston House

14.9. Without any construction site activities happening, Charleston House due to the close proximity to the A24 will already experience high levels of road traffic noise from the adjacent carriageways.

14.10. Whilst identified as a residential receptor likely to be impacted by only the creation of the bund, the works are temporary in nature, are unlikely to be continuous and will diminish with distance from the mobile plant.

14.11. The operational noise impact of vehicles using the permanent access route has also been considered for Charleston House with the resulting impact well below previously measured ambient sound levels.

1-4 Buck Barn Cottages

14.12. 1-4 Buck Barn Cottages are in close proximity to the haul route used, as well as line of sight for any earth moving/reprofiling activities being carried out at the northern slope of the amphitheatre. Both impacts are short term construction activities and will cease on completion of the project in 2023.

14.13. The operational noise impact of vehicles using the permanent access route has also been considered for 1-4 Buck Barn Cottages with the resulting impact well below previously measured ambient sound levels.

Effects

14.14. Context remains critical when quantifying the results of such an assessment. The proposed works to be carried out on the Estate are short term construction noise which are not all located in one place and will impact different noise sensitive receptors at different times. The works will improve the estate and benefit the residents within the estate. The effects remain limited to the daytime only and will be constrained by natural light as, when it is dark, the landscaping works will cease on safety grounds.

- 14.15. The operational noise sources have been assessed in terms of impact and include the use of the new car park, the use of the two new permanent access roads and any reflection effects of road traffic noise generated by the land mass of the amphitheatre.
- 14.16. In terms of overall effects and the EIA approach, the figure below shows both the overall impact and the short term construction impact, the latter of which may be mitigated against.

MAGNITUDE (Nature of Impact)		DESCRIPTION OF EFFECT (on a specific sensitive receptor)	SIGNIFICANCE (as required within EIA)	
Substantial	BENEFICIAL	Receptor perception = Marked change Causes a material change in behaviour and/or attitude, e.g. individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a non-significant effect)	Overall Impact
Moderate		Receptor perception = Noticeable improvement Improved noise climate resulting in small changes in behaviour and/or attitude, e.g. turning down volume of television, making more use of opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	(Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a significant effect)	
		Receptor perception = Just noticeable improvement	Less Likely to be Significant	
Slight		Noise impact can be heard, but does not result in any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Not Significant	
Negligible		N/A = No discernible effect on the receptor	Not Significant	
Slight	ADVERSE	Receptor perception = Non-intrusive Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television, speaking more loudly, closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Less Likely to be Significant (Greater justification needed and receptor sensitivities – to justify a significant effect)	Short Term Construction Impact
		Receptor perception = Intrusive	(Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a non-significant effect)	
Moderate		Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly, closing windows. Potential for non-awakening sleep disturbance ⁴¹ . Affects the character of the area such that there is a perceived change in the quality of life.	More Likely to be Significant	
Substantial		Receptor perception = Disruptive Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature-awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	Significant	
Severe		Receptor perception = Physically Harmful Significant changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Significant	

- 14.17. In summary, there are no significant effects as a result of the continued works. However, to satisfy Schedule 4 of the 2017 EIA regulations, the effects may be broken down further.

Direct Effects

- 14.18. The direct effect of the works is the creation of a more enclosed parkland landscape with greater tranquillity and less road traffic noise for the residents within the Estate. Occupiers of the Hill House Farm group of buildings and BG Machinery also benefit directly from the creation of two new permanent access routes for vehicles which removes a reliance on their current junctions directly on to the A24. The revised highway access arrangements represent a significant improvement on highway safety grounds.

Indirect Effects

- 14.19. As a result of the construction works there will be limited impacts to two of the identified noise sensitive properties. The construction site noise impacts are related to daytime only and are unlikely to be a continuous noise source.

Secondary Effects

- 14.20. There are no secondary effects as a result of the scheme and proposed further works.

Cumulative and Transboundary Effects

- 14.21. There are no cumulative or transboundary effects.
- 14.22. The operational (post construction) effects of the new car parking area, the two new permanent access routes and a review of the potential reflection of road traffic noise by the amphitheatre land mass have all been considered and do not cause any impact to the site receptors.
- 14.23. No other potentially cumulative schemes were noted.

Short Term / Medium Term / Long Term Effects

- 14.24. As discussed in paragraph 4 above, the construction works effects are considered to be short term, whereas the benefits realised by the overall scheme are much longer term and benefit those residents within the estate by reducing their exposure to the road traffic noise of the A24. Whilst the construction effects are considered to be short term, the importing of soil via HGV's is likely to remain an ongoing and protracted event which can be mitigated against.

Likely Mitigation Measures to Minimise Impact

- 14.25. The noise impact assessment process identifies those receptors likely to be impacted as a result of specific activities and when. Accordingly, focused mitigation measures and resources may be implemented to reduce the impact on the residential receptors.
- 14.26. The following mitigation measures are relevant to the site and were presented in the ES dated May 2018:
- Setting of constraints for 'noisy' construction hours.
 - Limits on timings for delivery vehicles.
 - Use of 'just in time' delivery methods, whereby the contractor's delivery vehicles are timed to arrive at the site in a controlled manner ensuring a smooth flow and no queuing or bottlenecks of vehicles at site entrances or junctions.
 - Selection of inherently quiet plant during the tendering and contracts process.
 - No idling of plant and plant to be shut down when not in use.

- Plant to be well maintained and inspected as well as being regularly serviced to ensure that all relevant fixtures and fittings remain in good working order.
- Plant to contain any mufflers or silencers as appropriate to ensure that the noise limit and noise marking requirements prescribed by the Noise Emission in the Environment by Equipment For Use Outdoors Regulation 2001 implementing the EU directives 2001/14/EC.
- Planning condition 15 of WSCC/073/15/SP already requires that vehicles attending and operating on the site only use a white noise or broadband reversing alarm signal as opposed to a single tone alarm.
- Where plant exhibits noisy characteristics or directional noise, consideration may be given to temporary acoustic fences or barriers in close proximity to the source.
- Any plant to be located in such a position, or orientation that any directional noise is away from residential receptors.
- Plant and any welfare facilities to be located well away from residents' properties.
- Construction plant will not be permanently located in one position.
- Toolbox talks will be delivered to site staff on the importance of noise and being courteous contractors.
- Residents to be kept apprised of project timescales and be provided with local contact details should they wish to make contact with the contractors.
- Vehicle speeds limits will be applied to all site haul roads.
- The use of bunds, hoarding or barriers.

14.27. More focused interventions or mitigation measures might include the following:

- It is strongly recommended that the previous bund located to the South of 1-4 Buck Barn Bungalows is reinstated to provide a degree of protection to the residents. The bund should seek to match in height the existing bund which runs north to south at the western end of Buck Barn Bungalows. The bund would provide a conservative 5dB loss in predicted sound levels, reducing the noise impact of the importation of soils to only marginally above the existing measured ambient noise levels (51 dB LAeq, 3 hour) from the A24/A272.
- Regular examination of the haul route being used to ensure good surface conditions. The filling of potholes and uneven surfaces when identified will assist in reducing the clatter and rattle from passing vehicles.
- Regular examination and servicing of all mobile plant on site including an examination of any mufflers, silencers or measures intended to minimise noise emissions

- Information being provided to residents, farms and businesses in respect of phasing of works, what is likely to occur and when and importantly, for how long. This serves to manage expectations and will be of particular relevance to the Floodgate complex.
- No idling of mobile plant to be permitted. When plant is not in use, it should be switched off.
- Where imported soils are used for the Floodgates bund, it may be preferable to have the HGV's arrive via the southern A24 access to the estate rather than the A272 northern access as this is more direct.
- When commencing work at the Floodgates Bund, consideration should be given to commencing works at the northern end closest to Charleston House to ensure that the mobile plant moves away from the receptor rather than increasingly towards the property.

Conclusion

- 14.28. The methodologies and tools associated with the EIA process are typically applied to consider longer term change and more specifically, the change in soundscape. Whilst the EIA process has been applied, contextually, the works under consideration are an extension of works which have already taken place on the Knepp Castle Estate since February 2014.
- 14.29. The overall works to site are the continued reprofiling of bunds to the eastern boundary, as well as the creation of an amphitheatre landscape feature generating a more enclosed parkland vista.
- 14.30. To ensure a robust approach, December 2017 noise data has been applied to computer noise modelling software to determine the likely impact to noise sensitive receptors.
- 14.31. In carrying out the remainder of the works to complete the site by 2023, there are likely to be time limited and temporary impacts to two different residential receptors. The use of good site management, as well as focused mitigation measures will ensure that, where practicable, the noise impact on residential receptors is kept to a minimum.
- 14.32. Based on the assessment carried out, there are no significant impacts which cannot be mitigated against.

15. SOIL AND GROUND CONDITIONS

- 15.1. As part of the preparatory work in relation to the original scheme at the site, investigations of soil and ground conditions were undertaken in May 2007. This assessed the agricultural land classification and soil resources of the site. The assessment was based on the criteria and guidelines for the Agricultural Land Classification system.⁷
- 15.2. At that time, the areas of land investigation were limited to the proposed Buck Barn landscape enhancement feature and the Hill House Lawn landscape enhancement feature. A subsequent assessment of soil resources in the area extended to the site of the then proposed borrow pit, the

⁷ Ministry of Agriculture, Fisheries and Food (1988) Revised Guidelines and Criteria for Grading Agricultural Land. The Ministry of Agriculture, Fisheries and Food was replaced by the Department for Environment, Food and Rural Affairs (DEFRA) in 2001

Floodgates Farm landscape enhancement feature, and an extension of the area to the Buck Barn landscape enhancement feature. These were based on soil maps and information from the 2007 site survey. A copy of this is attached at Appendix 10.

- 15.3. More recently, in light of the works that were the subject of the 2018 application⁸ further intrusive site investigations were undertaken. These focussed on the two field parcels to the west of Hill House Farm, that were proposed as deposition areas for the silt to be dredged from Knepp Mill Pond. A copy of this report is attached at Appendix 11.

Baseline

- 15.4. The original investigations identified two types of soil at the site. Due to the combination of poor drainage and heavy topsoil textures, both soil types were classified as sub-grade 3B of the Agricultural Land Classification. This is the lowest grading which can be applied to soils developed directly over the Weald clay with little or no superficial drift.
- 15.5. The more recent investigations of the two additional field parcels were also classified sub-grade 3B.

Assessment of Effects

- 15.6. In keeping with the implementation of the landscape enhancement features to date, the further areas of work would be the subject of topsoil stripping, which will then be stored prior to the commencement of development. The only deviation from this approach, would be in relation to the modest areas of potential archaeological records, were this considered necessary in respect of preserving below-ground heritage assets. The topsoil would be stored in bunds of not more than 3m in height.
- 15.7. No subsoil would be stripped on the basis that there is either no recognisable subsoil, or, if such a layer were to be detected, it is of negligible thickness and limited distribution.
- 15.8. The topsoil stripped from the area would be stored and then used as a surface layer in completing the creation of the landscape enhancement features, ahead of landscape planting.
- 15.9. Given the extent of proposed works in particular relative to the change in footprint to that which has been consented, together with the intent to retain all existing soils onsite, it is considered that the works would have no significant environmental effects either in the short, or long term. There will be no direct or indirect effects.
- 15.10. Although the works do represent a modest increase in the footprint of the scheme as consented, it is not considered this will generate any cumulative or transboundary significant effects.
- 15.11. The proposed implementation of the works follows a phased completion approach. Therefore, whilst the overall duration of timing of the works will be extended, the extent of groundworks being undertaken, and its impact on soil and ground conditions at any one time, would not be increased.

⁸ Application Reference: WSCC/029/18/SP

15.12. Matters in respect of the impact of the work on air quality, including dust, are dealt with in subsequent chapters of this ES. Overall, it is considered that the scheme will not give rise to undue impacts on soil and ground conditions.

16. AIR, INCLUDING DUST

- 16.1. To result in an impact, dust must be generated and carried in sufficient quantities from the source to a sensitive receptor. This is dependent on site activities with dust generating potential, together with meteorological conditions including wind speed, direction and rainfall. There are approximately 50 residential properties that fall within 1km of the application site boundary. Wind from any direction with sufficient speed to cause the wind blow of dust may transport dust to these sensitive receptors.
- 16.2. The wind speed at which dust may become airborne varies with a range of factors including particle size and ground conditions. Although dust particles can become airborne at wind speeds as low as 2.9m/s for loose sandy soils, higher wind speeds are necessary to result in significant dust blow. Wind speeds over 5.5m/s may cause wind blow of dust. Generally it is accepted that wind blow of dust does not occur on days with rainfall on average greater than 0.2mm.
- 16.3. Wind speed and direction together with rainfall and the proximity of sensitive receptors were considered in a dust impact assessment submitted with the original application and EIA and a copy of this assessment is presented at Appendix 12. This concluded that the number of days on which there is a risk of dust blow is low. Notwithstanding this, good practice in respect of dust management has been adopted throughout the works to date.
- 16.4. It is considered that the findings of this assessment continue to apply with equal validity; and the number of days on which there is a risk of dust blow remains low.
- 16.5. Nonetheless as part of the proposed works, dust may be generated during soil stripping, storage and placement, the transportation and deposition of inert material, the movement of plant and vehicles during operations, and the surface drying of stockpiles.
- 16.6. The effectiveness of dust control is dependent on good site management. Appropriate management during site operations minimises the risk of dust emissions. The activities which may give rise to dust together with the appropriate dust control measures that will be implemented are set out in the table below:

Activity that may give rise to dust	Comment	Risk	Controls	Effectiveness of the Controls	Likely Impact
Soil stripping, storage and placement	Generally intensive short term operations	Low	Soils generally will be handled between April and September inclusive when dry and friable. Operations will cease until weather conditions improve if significant dust blow occurs.	Low	Low
Placement of inert material	Imported by HGVs and graded by bulldozer	Moderate	Material will be dampened using a water bowser and sprayed when necessary.	Moderate	Low
Storage of soils		Moderate	Maximum height 3m. Mounds will be sprayed when necessary and seeded if appropriate.	Moderate	Low

Assessment of the impact of dust generated during the development

Monitoring Measures, Methods, Schedules and Techniques

- 16.7. During all site operations continuous visual monitoring for emissions of dust would be undertaken by site personnel. Site personnel would be suitably trained in identifying potential sources of dust and the actions necessary in the event of an unacceptable dust emission. It is considered that the visual monitoring by suitably trained site staff is the most effective method of detecting as quickly as possible emissions of dust facilitating the selection as quickly as possible of an appropriate additional or alternative method of dust control based on observations at the time of the emission.
- 16.8. The use and effectiveness of dust controls and any dust emissions would be assessed during inspections undertaken at the site each working day by the site management.

Compliance Action Plan

- 16.9. In the event of visible unacceptable emissions of dust from the site, or a complaint is received the following dust compliance action plan would be implemented and the Environment Agency notified:
- When visual monitoring identifies an emission of dust with the potential to result in off site nuisance of annoyance, the operation in the affected area would be suspended temporarily. The working area would be sprayed with water to minimise emissions of dust before operations recommence.
 - If based on a visual assessment of dust emissions it is considered that nuisance or annoyance is likely, the occurrence would be investigated and the results of the investigation recorded. Consideration would be given to the wind speed and direction, the

site operations and controls in place at the time and site observations. The relevant operational procedures would be reviewed as necessary and amendments or improvements would be implemented.

- In the event of a complaint associated with dust emitted from the site an investigation would be undertaken immediately to determine the source. Appropriate action will be taken which would include the cessation of the activity resulting in dust if necessary. The action taken would be communicated to the complainant. The nature of the complaint, the findings of the investigation and the action taken will be recorded.

Data Management and Reporting

- 16.10. Daily dust monitoring would be carried out by the Site Manager. A record would be made on the daily inspection sheet kept at the site of any fugitive emissions of dust and any actions taken. In the event that the dust compliance action plan is implemented and a dust compliance action plan record form is completed the form would be kept at the site.
- 16.11. The monitoring plan for dust emissions to air would be reviewed annually. The review would include the consideration of the dust monitoring results, complaints, records and progress with any improvements identified as necessary. A record of the reviews would be kept at the site.

Conclusion

- 16.12. With the above measures in place is concluded that it is unlikely that there would be significant dust emissions from the site. Dust emissions can be controlled to a standard that ensures that the development does not cause a significant impact in respect of nuisance relating to dust.

17. POPULATION AND HUMAN HEALTH

- 17.1. At the heart of the NPPF is a presumption in favour of sustainable development, comprising the three overarching and interdependent objectives of economic, social and environmental. The economic objective seeks to ensure new development contributes to building a strong responsive and competitive economy; the social objective seeks to ensure new development supports strong, vibrant and healthy communities; and the environmental objective seeks to protect and enhance the environment.
- 17.2. In considering these roles in the assessment of the population and health impacts of the proposals, the economic impacts, such as employment are likely to be generated as a consequence of the construction of the development; and the social impacts, are likely to arise from increased public access to the Park.

Economic Impacts

- 17.3. The proposed development entails works with a construction phase that is expected to continue for up to an additional 36 months. The onsite processes involve contractors to manage the site, along with heavy machinery/equipment operators. Technical support has been and continues to be required in the form of Ecologists, Arboriculturists, Archeologists and Administrative Staff. Overall

the approved works have created and will continue to support employment roles for the duration of the proposed works.

- 17.4. Once completed, the long term aftercare of the Park will continue to generate the need for further employment to provide basic management and maintenance of the parkland landscape.
- 17.5. The income generated by employees who live locally will be recycled into the local economy generating a new round of expenditure and further associated demand. Whilst the scale of employment generation in this particular case is not significant it is nevertheless a positive contributor.
- 17.6. Any new jobs created directly or indirectly by the construction phase will be temporary and short term. Therefore at the end of the construction phase the jobs created will cease. This represents the natural cycle of the development process. Given the scale of job creation it is unlikely that the loss of so few construction/technical jobs in the temporary construction phase will be significant and a such no mitigation is considered necessary and there are unlikely to be any residual effects.

Social Impacts

- 17.7. The social impacts of the proposed development are likely to be positive. As outlined above, on completion the works will provide greater tranquility for the Estate, and a reduction in noise levels for those living there.
- 17.8. At present there are a number of Public Rights of Way at and in the vicinity of the Park, but none of these actually cross the application site. The proposed works will introduce additional public access to the site in the form of a Public Right of Way constructed from Bridleway 1875 to the south of Floodgate Farm along the crest of the landscape features to Buck Barn Bungalows.
- 17.9. Under the application, the proposed route of the new Public Right of Way would be amended. Its alignment would reflect the design of the amended landscape enhancement features and seek to maximise the public amenity benefit arising from this; in particular in relation to providing new views looking southwest toward and of, the Grade II* listed Knepp Castle. This represents a material benefit in comparison to the approved scheme.
- 17.10. Information boards and seating areas are to be established on the landscape enhancement works accessible for the public for recreation use. Encouragement to access both the existing and proposed Right of Way will be facilitated and maximised by the provision of a new public car park.
- 17.11. A publicly accessible bird hide has already been constructed as part of the ongoing works adjacent the north western corner of the dam wall at the south of the Knepp Mill Pond. This allows views of the birds on the Mill Pond, and in particular the heronry on the northern bank of eastern arm of the pond.
- 17.12. The overall works will benefit footpath users both in terms of visual and general amenity.
- 17.13. Direct impacts on nearby residents in respect to noise and dust have already been discussed in previous chapters.

18. CLIMATE

- 18.1. Schedule 4 to the EIA Regulations states that an ES must provide a description of the likely significant effects of the development on the environment resulting from the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.
- 18.2. In terms of greenhouse gas emissions that main contributor will be indirectly from vehicles required during the construction phase only and as set out in Section 13 above, the daily HGV movements estimated to be associated with the importation of the additional material, will be no greater than that which was assessed and approved in the original landscape works application. Their impact on the climate as a result of green house gas emissions would be a short term temporary effect only and on completion of the works will be balanced by the longer terms benefits that will be brought about as a result of the additional landscaping and extensive tree planting as set out in Section 11 above.
- 18.3. As set out at Section 12 the proposals have been designed to take into account flood risk, will not increase flood risk elsewhere and will actually improve flood water storage capacity at the site.

19. CUMULATIVE IMPACTS

- 19.1. Assessment of the cumulative impacts of the development within the wider area have been considered, having regard to any proposals for other sites which have permission or are under construction for comparable development.
- 19.2. Schedule 4 to the EIA Regulations states that an ES must include a description of the likely significant effects of the development, including reference to possible cumulative effects. This refers to the potential cumulative impact with other developments which have not yet been built and are either in planning or consented and therefore do not already form part of the environmental baseline.
- 19.3. The application site is located away from major built-up areas. Within the wider district of Horsham sites for substantial development have been allocated within the Horsham District Planning Framework (HDPF). The main focus for such development is around the key settlement of Horsham with smaller allocations proposed around other settlements in accordance with the settlement hierarchy as set out in the adopted Framework. Policy SD10 of the HDPF allocates land to the west of Southwater for around 600 homes and planning permission has been granted for 540 dwellings and 54 retirement living apartment along with associated vehicular, cycle and pedestrian access, drainage and landscape works (applications DC/14/0590 and DC/16/1919 refer). Works have commenced and are expected to continue until 2023.
- 19.4. Whilst this is a substantial development with works expected to continue over a long period of time it is some 4km away from the application site and is not comparable in type. In combination effects are therefore unlikely to be experienced.
- 19.5. The HDPF is due to be the subject of review. Initial work has been undertaken, and it is anticipated that consultation on a new Local Plan will next take place in spring 2020. It is anticipated this will

include details of prospective housing need within the district and development to meet this, over the forthcoming Plan period.

- 19.6. Ahead of this, it is noted that a number of developers are promoting land in the district for the potential delivery of significant new housing. This includes land promoted for residential development immediately to the north of the A272 and east of the A24 (i.e. northeast of the application site). Scheme proponents have published material which indicates they seek to deliver circa 3,500 new homes together with associated infrastructure. This would include a new flyover junction on the A24 and a Park and Ride scheme.
- 19.7. This proposal is currently at a speculative, preliminary stage. There is no indication, or certainty, that the development would be considered appropriate, or supported through the review of the HDPF.
- 19.8. For these reasons, and having regard to the EIA Regulations with respect to cumulative impacts, this development is not assessed in conjunction with the application proposal.

20. ACCIDENTS AND DISASTERS

- 20.1. Schedule 4 to the EIA Regulations requires a description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.
- 20.2. On the basis that this project involves the importation of only inert materials, the main major accidents and/or disasters that this project would be vulnerable to would be major flood event and transport accidents both of which have already been considered and discussed in preceding chapters.

21. CONCLUSIONS

- 21.1. The proposals for the restoration of Knepp Mill Pond via dredging and associated landscape enhancement works, to improve the noise and visual amenity of Knepp Castle Estate, together with the provision of public access and amenity was substantively granted planning permission in 2012. The scheme was deemed EIA development, and was thus accompanied by an ES. Works commenced in 2014, and were the subject of a number of subsequent applications to amend details of the scheme. This occurred most recently in 2018, when planning permission was granted for amendments, principally arising from a change in the best practice methodology of dredging the Mill Pond. That application proposal was also deemed EIA development was accompanied by an ES.
- 21.2. The current proposal envisages further design iterations, focussed on the final appearance of the landscape enhancement features, most notably to introduce an 'amphitheatre' at Buck Barn, together with amendments to permanent vehicular access points to deliver highway safety improvements, and additional public amenity benefits, including the provision of a public car park in association with the new (and existing) Public Right of Way.
- 21.3. The application proposals now submitted, do not include the works for the dredging of the Mill Pond or creation of the wetland habitat, as these elements have, or are, being implemented under the extant consent.

- 21.4. The works now proposed would result in an extension in the timescales for the implementation of the scheme by a further 3 years, up to 2023, and the requirement to import a further circa 250,000m³ of material beyond that currently consented.
- 21.5. The application proposals were the subject of a formal request for a Scoping Opinion and this was issued by WSCC in September 2019. This ES has been prepared in accordance with this Opinion. It builds on the work undertaken in the preparation of previous ES's with technical studies and reports updated, to enable a robust assessment of the potential impacts of the development proposals.

Alternatives

- 21.6. In accordance with Government guidance, consideration has been given to alternatives to the scheme. Having regard to the background to the proposal, these comprise the 'Do Nothing' scenario (ie continued implementation of consented scheme), alternative locations and alternative designs of the scheme.
- 21.7. Taking into account the objectives of the project, including to provide significant improvements to the character and setting of the site's heritage assets, including Knepp Castle, and the registered Park and Garden, it is considered that the alternatives would not deliver the equivalent level of material benefits, including with regard to heritage assets, highway safety, and public amenity.

Cultural Heritage - Archaeological

- 21.8. Knepp Castle Estate has its origins in the 11th Century Norman Motte and Bailey Castle, that became the hunting lodge for a medieval deer park. The Mill Pond is of uncertain origin, but was at least in part, in existence in the 16th Century.
- 21.9. The site has been the subject of a number of archaeological field work, including the geophysical surveys, and more recently trial trenching as part of the implementation of the consented works. This has revealed the potential for the presence of an enclosure of an Iron Age and/ or Roman-British date, located within the footprint of the proposed works of the 'amphitheatre'.
- 21.10. Further trial trenching undertaken in September 2019 have determined the location of a ditch and enclosure, with the comparative scarcity of domestic artefacts or internal features indicating a potential stock enclosure.
- 21.11. It is concluded that there is high potential for further archaeological remains associated with this feature in Buck Barn, but low potential elsewhere on the application site. With recommended mitigation and/ or avoidance measures it is not considered the scheme will result in adverse effects on archaeological interests.

Cultural Heritage - Architectural

- 21.12. Knepp Castle was designed by John Nash and completed in 1812. Whilst no records relating to the layout of the grounds survive, it is likely that an area of parkland was laid out at the same time as the castle was built, probably designed by Nash, but influenced by the 'picturesque' principles of Humphry Repton.

- 21.13. Knepp Castle is Grade II* Listed Building, and part of Knepp Park is a Grade II Listed Park and Garden. In close proximity to the application proposals is Hillhouse Farmhouse, a Grade II Listed building.
- 21.14. The scheme proposals are considered to have a positive and permanent direct effect on the registered Park; as the amphitheatre in particular would represent a material enhancement in the character and setting of the site's heritage assets. The scheme would extend the Park to include Buck Barn and its surroundings, provide a focal point and views from, and to, Knepp Castle, in a manner sympathetic to the original design intent of the building, and provide improved enclosure, noise and visual amenity of the site. Impacts during the construction period would be adverse but temporary in nature and limited in effect.
- 21.15. The proposals would be of greater benefit in cultural heritage terms than the consented, scheme.

Landscape Visual Impact Assessment

- 21.16. The proposed design of the 'amphitheatre' would be in accordance with the over-arching objectives for long term restoration of Knepp Castle Estate, and would be reflective of the English landscape tradition of re-shaping the land.
- 21.17. The LVIA has reviewed the Zone of Visual Significance and identified 13 Viewpoints that are sensitive receptors to the proposed scheme. These predominantly result in beneficial effects following the completion of the development. Whilst some receptors will experience adverse impacts during the construction phase, this is limited in time, and typically limited in effect.
- 21.18. When assessed against the extant consented scheme, the proposals are considered to represent a positive environmental benefit, including the delivery of a major beneficial impact of reinstating the parklands principal historic vista from Knepp Castle.
- 21.19. The scheme will deliver greater tranquility, and landscape character, and wider public enjoyment and appreciation of the landscape benefits will be delivered through enhanced public access.

Biodiversity

- 21.20. There are a number of habitats and fauna within the application site and the surrounding Estate.
- 21.21. The scheme has been designed to minimise impact on habitats, and utilises Reasonable Avoidance Measures where possible, and mitigation if required. The works are focussed in areas that have an overall limited value in ecological terms.
- 21.22. It is considered that the works provide an opportunity to significantly improve the biodiversity of the area, through the proposed tree planting, additional pond, wetland, hedgerow creation and areas left to natural succession. The scheme will create habitat corridors and provide improved habitat connectivity. This will contribute to the wider estate aims and success of the 're-wilding' project.
- 21.23. Any disturbances will be temporary and will be adequately compensated for and protected with stringent mitigation measures.

Arboriculture

- 21.24. The scheme has been designed to avoid impact on existing arboricultural interest where possible. Within proximity of the application site, a total of 33 tree specimens, tree/ shrub lines and tree groups were surveyed. The majority were assessed as Category 'A'.
- 21.25. The scheme requires the removal of 5 mature Oaks, a row of conifers and a number of field edge shrubs. These are to be compensated by extensive additional planting, which would take place in accordance with the approved landscaping strategy that is part implemented in respect of the wider works. In particular there would be significant additional planting along the outer side of the 'amphitheatre'.
- 21.26. All existing trees and landscaping to be retained would be protected in accordance with best practice methodology.

Hydrology Water Resources and Flood Risk

- 21.27. It is concluded that the proposed development including the construction of landscape enhancement features with inert materials can be undertaken without significant adverse effects on the surface water system or on groundwater flow and quality. The proposed development will include the construction of surface water management drainage to mitigate the risks associated with surface water and silt runoff during the development.
- 21.28. A Flood Risk Assessment has been carried out in accordance with the guidance set out in PPG and the NPPF. This concludes that the proposed development will not impede significantly flood flows at the site or increase the risk of flooding in the area round Knepp Park. The excavation of the proposed wetland habitat will increase the flood storage capacity at the site.

Transport Network and Traffic Movements

- 21.29. The proposed scheme would include additional importation of material to complete the amended landscape features. The number of HGV's associated with this over the extended 3 year implementation period would be the same on annual basis as the previously permitted level of HGV movements to and from the site. This would be some 64 HGV movements per day (32 deliveries). It is considered this would have no undue impact on highway safety or capacity.
- 21.30. The proposed permanent retention of the temporary access to the site via the A272, and its use by vehicles serving Hillhouse Farm, together with the associated closure of the direct access onto the A24, would have a positive effect on road safety.
- 21.31. Similarly, the provision of an alternative vehicular access via Castle Lane for the commercial unit that is currently restricted to access direct off the A24 only, would also have a positive effect on road safety.
- 21.32. The provision of a public car park for users of the existing and proposed Public Right of Way is not considered to result in any material adverse effect on highway safety, but would encourage use of non-car modes of travel.

Noise

- 21.33. The previous noise impact assessment of the scheme has been reviewed in light of the amended scheme. This identifies a number of noise sensitive properties, and assesses the impact of the proposed works.
- 21.34. This reveals some impact arising from the construction phase of the works. Recommendations are detailed for mitigatory measures to be employed during the construction phase, such as hours of operation etc, to void undue impact on local residential amenity.
- 21.35. The report also considers the effect of the proposed revised access arrangements, in particular on the residential amenity of occupiers of Charleston Farmhouse and 1-4 Buck Barn Bungalows. For these properties, it is concluded the changes will result in noise that is below the recorded ambient noise levels. This reflects the position of these properties in close proximity to the A24 or A272, and the associated traffic noise.
- 21.36. Subject to mitigatory measures, it is concluded the scheme will not have an adverse effect arising from noise impacts.
- 21.37. The landscaping works will however, provide acoustic screening with a reduction in noise levels up to 5dB(A) depending on the location of the observer in Knepp Park.

Soil and Ground Conditions

- 21.38. The topsoil will be stripped from the areas of development and stored on site. The stored topsoil will be used in the restoration of the landscape enhancement features.
- 21.39. It is considered that the subject to the implementation of appropriate methods of soil handling and replacement there will be no long term significant impact on the soil resources at the site and the use of the soils in the restoration and landscaping works is commensurate with the overall objectives of the project.

Air, including Dust

- 21.40. It is concluded that dust emissions can be controlled to a standard that ensures that the development does not cause a significant impact in respect of nuisance relating to dust.

Population and Human Health

- 21.41. The proposals have and will continue to generate employment for the duration of the works, with aftercare of the Park on completion of the works continuing to generate employment in the local area in the long term. Income generated by employees will be recycled into the local economy generating a new round of expenditure and demand. Additional positive impact on the local population come in the form of greater tranquility for the Estate and a reduction in noise for those living there, but with the additional benefit of increased public access for the wider population.

Cumulative Impacts

- 21.42. There are no known consented developments in the local area, that should be considered as part of an appraisal of cumulative impacts. Whilst it is noted that land to the north-east is being 'promoted'

for significant residential development, this is speculative at this stage, with no indication of likely support from the LPA.