


# South Brooks Solar Farm

## Preliminary Environmental Information Volume 2: Appendix 16.1: Land and Groundwater Assessment Methodology and Criteria

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## Table of Contents

1	Land and Groundwater Assessment Methodology and Criteria	1
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### Tables

Table 1-1: Environmental value (sensitivity) and descriptions for geology and contamination	2
Table 1-2: Receptor importance for groundwater	3
Table 1-3: Magnitude of impact (change) criteria for geology and contamination	4
Table 1-4: Magnitude of impact criteria for groundwater	5
Table 1-5: Significance of effect criteria for geology, contamination and groundwater	7

# 1 Land and Groundwater Assessment Methodology and Criteria

## 1.1 Assessment Methodology and Criteria

1.1.1 A Preliminary Risk Assessment will be completed to support the DCO application. This will provide baseline data on the Site, alongside an assessment of risks relating to human receptors, controlled waters and other sensitive receptors. This work will be undertaken in line with the technical approach presented in the Environment Agency Land Contamination Risk Management guidance (2025) and in general accordance with British Standard 10175: 2011 + A2 2017.

1.1.2 The assessment criteria for land and groundwater for inclusion in the Environmental Statement for the Project in terms of land and groundwater receptors that have been scoped in are detailed below. It should be noted that these criteria were not presented in the EIA Scoping Report, as the Applicant intended to scope out all elements relating to land and groundwater. Elements relating to mineral resources have not been included in these tables, as this matter has been scoped out of the assessment. Although contamination has been scoped out of the assessment with respect to land, as there is some overlap between the assessment of land contamination and the assessment of groundwater contamination, these elements have been presented in the tables provided.

1.1.3 The methodology presented here adopts the approach used by the Design Manual for Roads and Bridges (DMRB) for assigning receptor sensitivity or importance, magnitude of impact (change) and significance of effect. These documents are:

- DMRB LA 109: Geology and Soils;
- DMRB LA 113: Road Drainage and the Water Environment; and
- DMRB LA 104: Environmental Assessment and Monitoring.

1.1.4 It is acknowledged that the main use of DMRB is for projects that relate to projects promoted by National Highways. However, in the absence of specific guidance relating to the assessment of impacts upon geology, contamination and groundwater with respect to solar projects, the use of DMRB is considered to result in a robust and appropriate assessment. The DMRB assessment criteria are presented in Table 1 and Table 2 and some further examples have been added in relation to groundwater importance in Table 2 to provide a clear discussion on the risks to groundwater from contamination, in addition to routine runoff, which was already included. Examples relating to licensed and unlicensed groundwater abstractions have also been added to Table 2, along with secondary aquifer types.

### Sensitivity of the receptor for geology and contamination

1.1.5 Sensitivity criteria for geology and contamination, derived from DMRB LA 109: Geology and Soils, are defined in Table 1-1.

1.1.6 It should be noted that when considering the potential for contamination to affect other receptors (human health or groundwater), the receptor sensitivity criteria for human health are taken from Table 1 and criteria for groundwater are provided in Table 1-2.

With respect to potential contamination issues, the receptor sensitivity is assigned based on the intended land-use, as this affects how the receptors will come into contact with the potential pollutant sources.

**Table 1-1: Environmental value (sensitivity) and descriptions for geology and contamination**

Receptor value (sensitivity)	Description
Very high	<p>Geology: very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, SSSIs and GCR where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: very high sensitivity land use such as residential or allotments;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
High	<p>Geology: Rare and of national importance, with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: high sensitivity land use such as public open space;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Medium	<p>Geology: of regional importance with limited potential for replacement (e.g. regionally important geological or geomorphological sites [RIGS]). Geology meeting regional designation citation criteria which is not designated as such.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: medium sensitivity land use such as commercial or industrial;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Low	<p>Geology: geological units of local importance or interest, with potential for replacement (e.g. non-designated geological exposures, former quarries, mining sites).</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: low sensitivity land use such as highways and rail;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Negligible	<p>Geology: no geological exposures or little or no local interest.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: undeveloped surplus land or no sensitive land use proposed;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>

### Importance of the receptor for groundwater

- 1.1.7 The importance criteria presented in Table 1-2 are derived from DMRB LA 113: Road Drainage and the Water Environment.
- 1.1.8 It should be noted that when considering the potential for contamination to affect other receptors (human health or groundwater), the receptor importance criteria for groundwater are taken from this table. Criteria for human health are provided in Table 1-3.

**Table 1-2: Receptor importance for groundwater**

Importance	Typical criteria	Typical examples
Very high	Nationally significant attribute of high importance	Principal aquifer providing a regionally important resource, and/or supporting a site protected under EC and UK legislation; Groundwater that locally supports a Groundwater dependent terrestrial ecosystem; Source Protection Zone 1; Public licensed groundwater abstraction for potable use.
High	Locally significant attribute of high importance	Principal aquifer providing locally important resource or supporting a river ecosystem; Groundwater that supports a Groundwater dependent terrestrial ecosystem; Source Protection Zone 2; Licensed or unlicensed private groundwater abstractions with domestic/potable use.
Medium	Of moderate quality and rarity	Secondary aquifer providing water for agriculture or industrial use with limited connection to surface water; Source Protection Zone 3; Public licensed groundwater abstraction for agricultural/industrial use; Licensed or unlicensed private groundwater abstraction with agricultural/industrial use.
Low	Lower quality	Unproductive strata

### Magnitude of change (impact) for geology and contamination

- 1.1.9 The magnitude of impact (change) is classified using the criteria presented in Table 1-4, which are derived from the DMRB LA 109.
- 1.1.10 It should be noted that when considering the potential for contamination to affect receptors (human health or groundwater), the magnitude of change criteria for human health are taken from this table. Criteria for groundwater are provided in Table 1-3.

**Table 1-3: Magnitude of impact (change) criteria for geology and contamination**

<b>Magnitude of impact (change)</b>	<b>Typical description</b>
Major	<p>Geology: loss of geological feature/designation and/or quality and integrity, severe damage to key characteristics, features or elements.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. category 4 screening levels, as detailed within SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, 2014) with potential for significant harm to human health. Contamination heavily restricts future use of land;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Moderate	<p>Geology: partial loss of geological feature/designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. category 4 screening levels). Significant contamination can be present. Control/remediation measures are required to reduce risks to human health/make land suitable for intended use;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Minor	<p>Geology: minor measurable change in geological feature/ designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: contaminant concentrations are below relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>
Negligible	<p>Geology: very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature/ designation. Overall integrity of resource not affected.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: contaminant concentrations substantially below levels outlined in relevant screening criteria (e.g. category 4 screening levels). No requirement for control measures to reduce risks to human health/make land suitable for intended use;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>

Magnitude of impact (change)	Typical description
No change	<p>Geology: no temporary or permanent loss/disturbance of characteristics features or elements.</p> <p>Contamination:</p> <ol style="list-style-type: none"> <li>1) Human health: reported contaminant concentrations below background levels;</li> <li>2) Surface water: this receptor is included in DMRB LA 113 and is assessed within the hydrology chapter; and</li> <li>3) Groundwater: use sensitivity criteria from Table 3.70 in DMRB LA 113.</li> </ol>

### Magnitude of impact for groundwater

- 1.1.11 The magnitude of impact for changes to groundwater receptors have been classified using the criteria presented in Table 1-4 below, which are adapted from DMRB LA 113: Road Drainage and the Water Environment.
- 1.1.12 It should be noted that when considering the potential for contamination to affect receptors (human health or groundwater), the magnitude of impact criteria for effects on groundwater are taken from this table. Criteria for magnitude of impact effecting human health are provided in Table 1-3.

**Table 1-4: Magnitude of impact criteria for groundwater**

Magnitude of impact	Criteria	Typical example
Major adverse	Results in loss of attribute and/or quality and integrity of the attribute	<p>Loss of, or extensive change to, an aquifer.</p> <p>Loss of regionally important water supply.</p> <p>Potential high risk of pollution to groundwater from contamination introduced as a result of the Project, as a result of mobilisation of existing contamination, or as a result of routine runoff.</p> <p>Loss of, or extensive change to groundwater dependent terrestrial ecosystem or baseflow contribution to protected surface water bodies.</p> <p>Reduction in water body Water Framework Directive classification. Loss or significant damage to major structures through subsidence or similar effects.</p>
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Partial loss or change to an aquifer.</p> <p>Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies.</p> <p>Potential medium risk of pollution to groundwater from contamination introduced as a result of the Project, as a result of mobilisation of existing contamination, or as a result of routine runoff.</p> <p>Partial loss of the integrity of groundwater dependent terrestrial ecosystem.</p> <p>Contribution to reduction in water body Water Framework Directive classification.</p> <p>Damage to major structures through subsidence or similar effects or loss of minor structures.</p>

Magnitude of impact	Criteria	Typical example
Minor adverse	Results in some measurable change in attributes, quality or vulnerability	Potential low risk of pollution to groundwater from contamination introduced as a result of the Project, as a result of mobilisation of existing contamination, or as a result of routine runoff. Minor effects on an aquifer, groundwater dependent terrestrial ecosystems, abstractions and structures.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	No measurable impact upon an aquifer and/or groundwater receptors.
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.
Moderate beneficial	Results in moderate improvement of attribute quality	Contribution to improvement in water body Water Framework Directive classification. Improvement in water body catchment abstraction management Strategy (or equivalent) classification. Support to significant improvements in damaged groundwater dependent terrestrial ecosystem.
Major beneficial	Results in major improvement of attribute quality	Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body Water Framework Directive classification.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction

### Significance of effect for geology, contamination and groundwater

- 1.1.13 The significance of effect for geology, contamination and groundwater is based on the sensitivity or importance of the receptor and the magnitude of impact (change), as outlined in Table 1-5 and derived from the DMRB LA 104. The significance of effect can be adverse or beneficial.
- 1.1.14 The significance of an effect is reported as either 'significant' or 'not significant'. Any effects determined as 'moderate' or above are considered to be significant. Any effects determined as 'slight' or below are considered not significant.
- 1.1.15 Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate), or an effect significance range can be applied. Where a range for the effect of significance means that the effect could be either significant or not significant, professional judgement has been applied to define the significance (for example with the range 'slight to moderate', where slight would be not significant, but moderate would be significant). Where both categories within the range fall within either 'significant' or 'not significant', the range has not been adjusted to a single descriptor (for example if the range is 'neutral or slight', as both effects are

- 1.1.16 considered to be not significant; or if the range is 'large or very large', as both effects are considered to be significant).
- 1.1.17 Descriptive terms are applied to the significance criteria to provide further clarification of the extent of the effect. The effect can be characterised as positive (beneficial) or negative (adverse); direct or indirect; short-term, medium term or long-term; and permanent or temporary.

**Table 1-5: Significance of effect criteria for geology, contamination and groundwater**

Value/Sensitivity/ Importance	Magnitude of impact (change)				
	No change	Negligible	Minor	Moderate	Major
Very high	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Note: the value/sensitivity/importance criteria for groundwater do not include a category of negligible



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