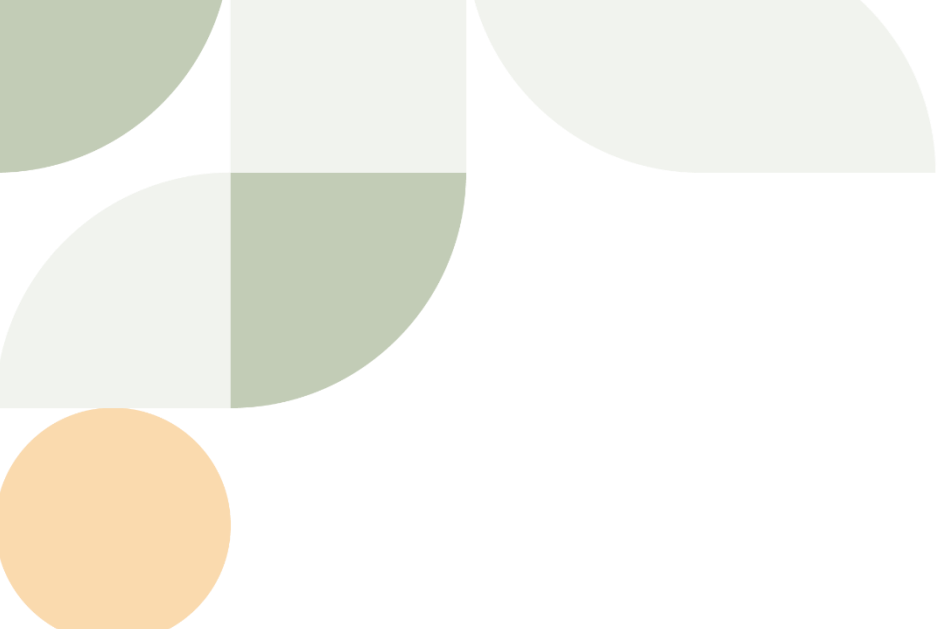




Lime Down

Solar Park

Outline Water Resources Strategy (Clean)

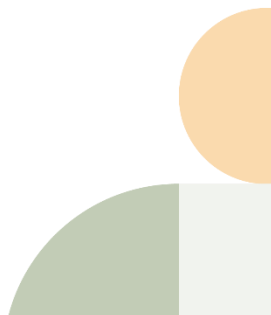
October 2026

Revision 2

Planning Inspectorate Reference: EN010168

Document Reference: APP/7.25

APFP Regulation 5(2)(q)



Schedule of Changes

Revision	Section Ref.	Description of Change	Reason for Revision
2	Throughout	Updates to account for water requirements associated with vegetation establishment.	Updated in response to Issues Specific Hearing 7, Action 28.
	Throughout	Minor alignments in calculations.	Applicant due diligence.

Executive Summary

1.1.1 Lime Down Solar Park Limited (the ‘Applicant’) is progressing with the development of a new solar and energy storage project in Wiltshire, known as the ‘Scheme’. This **Outline Water Resources Strategy [EN010168/APP/7.25]** (Revision 2) provides an early-stage evaluation of quantities of water required for the Scheme during construction and operation and where the Applicant is likely to resource these demands.

1.1.2 This Outline Water Resources Strategy covers the following:

- Identification of areas and quantities of Scheme water use, where necessary calling upon data from experience of other, similar projects and standard industry figures;
- Determination of potential sources of water for the Scheme and their potential yields (e.g. m³/year);
- Demonstrate that there are feasible and sufficient sources to supply the estimated water demands of the Scheme; and
- An explanation of how satisfactory vegetation cover is established and maintained, and of the targeted, seasonal nature of establishment watering for landscape planting.

1.1.3 Based on information provided for the Scheme, the following table summarises anticipated water demands during the construction and Operational and maintenance phases of the Scheme.

Category	Value	Unit
Total construction phase water	19,209	m ³
Average construction phase water	38.15	m ³ /day
Peak construction phase water	155.15	m ³ /day
Average operational water demand	2.14	m ³ /day
Peak operational water demand	25.65	m ³ /day

1.1.4 Note that there may be additional water demands from the decommissioning phase of the Scheme. However, these will be lower than the requirements for construction, and hence any water supply in place to satisfy construction will also satisfy decommissioning. Furthermore, the Scheme lifespan is 60 years, meaning that any estimates of decommissioning activities in approximately 2085 would be highly speculative.

1.1.5 The demands quantified above relate to construction and operational water use. Water use associated with vegetation is addressed separately in Section 3.11. Establishment watering of trees, shrubs, hedgerows, woodland and riparian planting under the **Outline Landscape and Ecological Management Plan**

(LEMP) [REP6-037] is targeted and seasonal, responds to planting condition and prevailing weather, and is drawn from the supplies identified in Section 4. Grassland is established and maintained through soil protection, seasonal sowing, progressive reinstatement and monitoring.

- 1.1.6 Various options have been considered for the supply of these water demands, each of which have relative advantages and disadvantages. The assessment concludes that the water demands for the Scheme can be met via the following options:

Mains Water Connection in Lime Down A

- 1.1.7 A mains water connection in Lime Down A, the possibility of which has been confirmed by Bristol Water at an advised connection flow rate of 7m³/hour. This is a key conclusion of this Outline Water Resources Strategy. All of the water required by the Scheme has been identified and quantified in Section 3, and supply is available for each of those requirements. This connection provides the principal mains source and commercial water tankering provides a further independent source at the volumes required, with consultation continuing with Wessex Water regarding a potential additional mains connection. The Scheme is therefore not dependent on a single point of supply. It is therefore recommended that:

- The Scheme approaches Bristol Water to begin the process of putting this connection in place as soon as possible and continues consultation with Wessex Water regarding the potential for an additional mains connection within their area of supply, if required.
- The Scheme considers what infrastructure and equipment is needed to transport this water to its different point source water demands and how mobile water demands can fill from the mains water connection point(s).
 - Note that even though this would require that the Scheme purchases its own tanker(s), this may be less expensive than using a tankering company due to their typically high unit cost of water compared to mains water.
- The Scheme confirms that the additional vehicle movements this implies are permitted by the relevant authorities. Given a tanker size of 30m³, this implies an approximately 450 tankering trips over the Scheme's two-year construction period for the relevant water uses (those for which an external contractor would not typically provide their own water, i.e. directional drilling and dust suppression).

Potential Additional Mains Water Supply

- 1.1.8 Wessex Water is also being consulted regarding the potential for water supply to the Scheme if required. Previous engagement took place regarding possible supply connections and Wessex Water has requested an updated developer

enquiry setting out the current Scheme demand requirements, so that an engineer within its Planning Liaison team can review potential supply. At the date of this revision, Wessex Water supply is therefore described as under consultation and as a potential additional supply. No Wessex Water capacity is assumed. An additional connection would provide further flexibility in distribution and would reduce water transport distances where appropriate.

Water Tankering

- 1.1.9 Water tankering also represents a viable option for the water supply to the Scheme, as indicated via discussions with tankering operator Greens H₂O. Water tankering provides the Scheme with a second, independent source of supply at the volumes required, giving resilience in addition to the mains connection. It demonstrates there exists a further means of supplying the quantified water demands of the Scheme, available as an alternative or in combination with mains supply.
- 1.1.10 It is therefore recommended that:
- The Scheme maintains contact with identified water tankering supplier(s) to confirm their availability as the construction phase approaches.
 - The Scheme confirms that infrastructure such roadways and connection points are incorporated and are of nature which permits transport and delivery of this tankered water.
 - The Scheme confirms that the additional vehicle movements this implies are permitted by the relevant authorities.

Rainwater Harvesting

- 1.1.11 Clean harvested rainwater may be used for suitable non-potable purposes where practicable, which may include landscape establishment watering and other appropriate non-potable Scheme uses. The **Outline Construction Environmental Management Plan (CEMP) [EN010168/APP/7.12]** (Revision 8) and the **Outline Operational Environmental Management Plan (OEMP) [EN010168/APP/7.13]** (Revision 8) each provide for opportunities for rainwater harvesting for appropriate non-potable uses to be considered at detailed stage. Harvesting is supplementary and opportunistic. It is not relied upon for drought resilience, because rainfall availability may be lowest when watering requirements are highest, and harvested water storage is not relied upon to provide the attenuation volumes required by the drainage strategies. The identified mains and tanker sources therefore remain the dependable basis of this Strategy.

Groundwater and Watercourse Abstraction

- 1.1.12 Borehole water and abstraction from local watercourses have been considered in Section 4 but are not relied upon to demonstrate water resource availability for the Scheme.

Vegetation Establishment

- 1.1.13 Rainfall volumes across the Solar PV Sites are unchanged by the Scheme. The Solar PV Panels intercept precipitation and redistribute it locally towards the panel edges, while the ground beneath and between the arrays remains vegetated and permeable and continues to drain to ground. Whether that local redistribution alters runoff therefore depends on the condition of the receiving ground, including vegetation cover, soil structure, compaction, erosion and hydrological connectivity, as set out in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy Covering Report [EN010168/APP/6.3]** (Revision 5).
- 1.1.14 The basis of the Scheme's hydrological mitigation for the Solar PV Sites is therefore satisfactory vegetation cover, appropriate soil structure, prevention and remediation of construction compaction, maintenance of infiltration, retention of diffuse sheet flow, avoidance of connected or channelised runoff pathways, and monitoring with corrective action where vegetation, soil condition or runoff behaviour is unsatisfactory. These matters are controlled through the **Outline Soil Resources Management Plan (SRMP) [EN010168/APP/7.15]** (Revision 6), the **Outline CEMP [EN010168/APP/7.12]** (Revision 8) and the Water Management Plan to be included within the detailed CEMP, the **Outline LEMP [EN010168/APP/7.18]** (Revision 5) and the **Outline OEMP [EN010168/APP/7.13]** (Revision 8).
- 1.1.15 Construction is anticipated to take place across an approximate two-year period and is phased and staggered across the Solar PV Sites and Cable Route Corridor, with the construction phase anticipated to be split into ten phases of development. Construction, reinstatement and establishment therefore progress progressively across multiple phases and work areas rather than across the whole Solar PV area at once. The phased programme limits both the extent and the concurrency of establishing ground at any one time, and provides repeated seasonal opportunities to secure satisfactory cover.
- 1.1.16 Against that programme, grassland being proposed as part of the Scheme will be established and maintained through:
- retention of existing suitable grassland or vegetation where practicable;
 - pre-establishment of grass cover where practicable;
 - use of suitable seasonal sowing windows;
 - limiting disturbance to active work areas;
 - protection of soil structure;

- remediation of compaction where identified;
- progressive reinstatement and seeding as individual work areas are completed;
- inspection of vegetation establishment; and
- local remedial cultivation and reseeding where cover fails or is damaged.

- 1.1.17 Together these measures deliver the vegetation cover on which the drainage strategy relies. Routine Scheme-wide irrigation of grassland is not proposed or relied upon. Targeted local watering may be used where inspection identifies that it is necessary to support establishment or remediation of poorly established or damaged areas, using the supply arrangements identified in Section 4.
- 1.1.18 Prolonged dry weather may delay germination or establishment of newly seeded grassland. That outcome is managed through the inspection and remediation framework secured by the management plans. Poor establishment will be identified through inspection, the cause will be considered including whether soil compaction, rutting, ponding or other poor ground condition is contributing, soil condition will be remediated where necessary, and failed or damaged areas will be reseeded at the next appropriate establishment opportunity. Temporary local runoff, erosion and sediment controls remain in place where required until satisfactory ground cover is established, so that at no stage does runoff management rely solely upon vegetation which has not yet satisfactorily established.
- 1.1.19 Trees, shrubs, hedgerows, woodland and riparian planting may require targeted establishment watering in accordance with the **Outline LEMP [REP6-037]**, which provides for newly planted trees, shrubs and hedgerows to be watered in their first summer and thereafter as required to ensure successful establishment, with bark mulch retained to conserve soil moisture. This is a recognised Scheme water use. It is applied to individual plants and planting areas over a limited establishment period, its extent varies with planting season, soil moisture and prevailing weather, and it is managed through the detailed LEMP using the supply arrangements described in Section 4.

Overall Conclusions

- 1.1.20 All of the water required by the Scheme has been identified and quantified, and supply is available for each of those requirements. The Bristol Water connection at Lime Down A provides the principal mains source and commercial water tankering provides a further independent source, so that the Scheme is not dependent on a single point of supply. Water will be distributed around the geographically dispersed Scheme by bowser, tanker or equivalent mobile distribution. Consultation with Wessex Water continues regarding a potential additional mains connection, which would provide further flexibility and shorter

water transport distances where appropriate, and harvested rainwater may supplement non-potable supply where practicable. Routine Scheme-wide irrigation of grassland is not proposed or relied upon. Targeted local watering may, however, be used where inspection identifies that it is necessary to support establishment or remediation of poorly established or damaged areas.

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1 Introduction

1.1 Overview

1.1.1 Lime Down Solar Park Limited (the 'Applicant') is progressing with the development of a new solar and energy storage project in Wiltshire, known as the 'Scheme'.

1.1.2 This **Outline Water Resources Strategy [EN010168/APP/7.25]** (Revision 2) provides an early-stage evaluation of quantities of water required for the Scheme during construction and operation and maintenance phases and where the Applicant is likely to resource these demands.

1.2 Consultation

1.2.1 As part of the Statutory Consultation feedback received by the Environment Agency it was recommended that water requirements were considered in more detail for the Scheme in the form of a Water Resource Strategy (including further detail on whether abstraction licenses are likely to be required). The relevant feedback is provided in **Table 1-1**:

Table 1-1 Environment Agency Statutory Consultation Feedback

Relevant Topic	Feedback Received
Water Resources	<i>"WR1 – Water Demands of the Scheme</i> <i>Document Reference(s): Lime Down Solar Park PEIR</i> <i>Chapter 3, Section 3.4.12 and 3.4.41-3.4.42</i> <i>Issue: Water requirements of the Scheme during construction are estimated to be 4,905m3 for welfare facilities and other uses. It is unclear what the scope of other uses includes.</i> <i>Impact: Whilst activities such as wheel and concrete washing can require relatively small quantities, dust suppression during the summer months and bentonite clay mixing and driving of HDD can require larger volumes of water. If water demands are underestimated ahead of the commencement of the construction phase, then licences may not be in place in time and potential limitations to water access may not have been planned for.</i> <i>Solution: Produce a water resources strategy which breaks down the water demands by activity and location to ensure all have been considered. An options appraisal of the sources of supply available can then provide the most practical solutions, if for example licences come with restrictions"</i>

Existing Abstraction License	<i>"WR2 - Existing Abstraction Licence</i> <i>Document Reference(s): Lime Down Solar Park PEIR Chapter 3, Section 3.4.42</i> <i>Issue: Sources of supply considered for water resources strategy to the site include the use of an existing abstraction licence. Some activities (such as dust suppression) are considered to be high loss water uses (very little of the water is returned to the environment). If the existing licence conditions do not accurately reflect these uses of water, a formal variation of the licence will be required.</i> <i>Impact: This may impose additional conditions if the abstraction is determined to be made more impactful as a result of these changes.</i> <i>Solution: As part of a water resources strategy, consider the existing licence conditions and implications for formally varying it to ensure that any restrictive conditions can be planned for, and security of supply ensured."</i>
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- 1.2.2 In its Deadline 2 submission **[REP2-048]** Wiltshire Council requested that rainwater harvesting for non-potable uses be explored where feasible. In response to the Examining Authority's first written question FHW1.16 the Applicant set out the water supply position for the construction, operation and maintenance and decommissioning phases, noted the possibility of rainwater harvesting for non-potable uses where feasible, and updated the **Outline CEMP [EN010168/APP/7.12]** (Revision 8) accordingly. Provision for consideration of rainwater harvesting for appropriate nonpotable construction and operational uses is now included within the Outline CEMP and the **Outline OEMP [EN010168/APP/7.13]** (Revision 8).
- 1.2.3 At Issue Specific Hearing 7 the Applicant was asked to provide further information on irrigation of the Scheme in response to Action 28 **[EV13-010]**, including the source of water, the anticipated frequency of watering, the potential for rainwater harvesting, and the relationship between watering and the management of habitats and hedgerows. This revision of the **Outline Water Resources Strategy [EN010168/APP/7.25]** (Revision 2) responds to that action. Section 3 sets out the position on grassland establishment and on establishment watering for landscape planting, and Section 4 sets out the water supply hierarchy, including the role of rainwater harvesting.
- 1.2.4 Engagement has taken place with both mains water undertakers whose supply areas the Scheme straddles. Bristol Water has confirmed the potential for a mains water connection close to field A1 of the Scheme near Sherston, at an advised connection flow of 7m³/hour. Wessex Water is being consulted regarding the potential for an additional mains water

supply to the Scheme if required, and has requested an updated developer enquiry setting out the current Scheme demand requirements so that an engineer within its Planning Liaison team can review potential supply. Wessex Water has not confirmed capacity and no Wessex Water capacity is assumed in this Strategy.

2 Scheme Information

2.1 The Scheme and Order Limits

- 2.1.1 The Scheme comprises a solar photovoltaic (PV) electricity generating station of over 50 megawatts (MW) and ‘associated development’ comprising up to 500MW export capacity Battery Energy Storage System (BESS), grid connection infrastructure and other infrastructure integral to the construction, operation and maintenance, and decommissioning phases. Further description of the scheme is provided in **ES Volume 1, Chapter 3: The Scheme [APP-055]**.
- 2.1.2 The PV electricity generating station and BESS would be contained within five land parcels referred to as Lime Down A, B, C, D and E (hereafter collectively referred to as the ‘Solar PV Sites’) (refer to **ES Volume 2, Figure 3-1: Indicative Site Layout Plan [REP3-035]**).
- 2.1.3 The Cable Route Corridor is the area within which the export connection cables (hereafter referred to as the ‘Grid Connection Cables’) would be located to connect the Solar PV Sites to the National Grid at the existing Melksham Substation (hereafter referred to as the ‘Existing National Grid Melksham Substation’) and the area within which cables connecting the Solar PV Sites would be located (hereafter referred to as ‘Interconnecting Cables’) (refer to **ES Volume 2, Figure 3-1: Indicative Site Layout Plan [REP3-035]**).
- 2.1.4 The Scheme also includes works at the Existing National Grid Melksham Substation and inclusion of Highway Improvement Areas (refer to **ES Volume 2, Figure 2-1: Elements of the Site [APP-077]**). All the above elements of the Scheme would be contained within the ‘Order Limits’ or ‘the Site’.
- 2.1.5 Key Scheme information relevant to this report is as follows:
- The Scheme is located on primarily agricultural land;
 - The expected lifespan is 60 years;
 - The construction period is anticipated to last two years (expected 2027-2029);
 - As per the Work Packages set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]** the construction phase is anticipated to be split out into 10 different phases of development; and
 - The Operational and Maintenance phase is expected to commence in 2029.

3 Scheme Water Demand

3.1.1 In order to appropriately evaluate water resources, it is important to first understand the anticipated water demand from the Scheme.

3.2 Areas of Water Demand

3.2.1 Water demands for the Scheme can be divided into those involved during its construction phase, and those involved during its operational and maintenance phase. Each potential demand identified in each of these phases are listed below.

- Construction phase:
 - Amenity water use for construction staff (e.g. for hand washing);
 - Vehicle washing water;
 - Equipment cleaning water;
 - Directional drilling water;
 - Dust suppression water; and
 - Landscape and ecological establishment watering, comprising targeted watering of newly planted trees, shrubs and hedgerows in accordance with the **Outline Landscape and Ecological Management Plan (LEMP) [REP6-037]**.
- Operational and maintenance phase:
 - Amenity water use for operation and maintenance staff;
 - Solar panel cleaning water; and
 - Landscape and ecological establishment watering, for the duration of the establishment period following planting, in accordance with the Outline LEMP.

3.2.2 Further discussion and quantification of these areas of demand is undertaken in this section of this report. It is notable that since the Scheme is at relatively early stages in the consenting process, no detailed design for the elements included has been finalised. As such, a variety of estimation techniques have been used and the figures given are necessarily indicative.

3.2.3 The intention of this document is to demonstrate general feasibility of water supply to the Scheme, rather than provide specific details and detailed design regarding how this supply will be implemented. Water demands during decommissioning of the Scheme are anticipated to be less than the demands during construction.

- 3.2.4 Two different types of vegetation related water use are distinguished in this report. Establishment watering of trees, shrubs, hedgerows, woodland and riparian planting is a targeted Scheme demand, addressed in Section 3.11. Grassland is established and maintained by soil and vegetation management, and is also addressed in Section 3.11.
- 3.2.5 Note that this report does not assess the change in water demand from transitioning from agricultural land to solar infrastructure but rather the specific needs of the Scheme to meet its construction and operational requirements.

3.3 Previous Estimates and Assumptions

- 3.3.1 Previous estimates have been developed for some areas of water use. These are:
- An estimated 6,564 m³ total of water during construction to support welfare facilities onsite and other uses, or approximately 1,005 m³ during peak months; and
 - The Solar PV Panels would be cleaned using water only. Up to 2,945m³ would be required for panel cleaning per cycle.
- 3.3.2 The results produced in this document are compared to the above figures in Section 3.12.

3.4 Amenity Water Use for Construction Staff

- 3.4.1 Amenity water use consists of:
- Toilet and urinal flushing;
 - Hand basin water use; and
 - Kitchenette water use.
- 3.4.2 British Standard (BS) 8551:2015: Provision and management of temporary water supplies and distribution networks (not including provisions for statutory emergencies) - states that for an open industrial site (e.g. construction, quarry, without canteen), the water use is 60 litres/employee/day, or 0.06 m³/employee/day. This figure is used in the assessment to provide a conservative estimate of water use. The actual usage figure could be lowered by considering options such as non-flushing chemical toilets, etc.
- 3.4.3 The following staff numbers are estimated for the Scheme:
- A total of 268 full time equivalent employees over the course of a year of construction; and

- A peak construction workforce of 622 employees.

3.4.4 Given these figures, the amenity water use for construction staff is estimated in **Table 3-1**:

Table 3-1 Construction Water Demand

Category	Value	Unit
Construction staff water use	0.06	m ³ /employee/day
Peak construction staff employee numbers	622	employees
Peak amenity water use for construction staff	37.3	m³/day
Average construction staff employee numbers	268	employees
Average amenity water use for construction staff	16.1	m³/day
Annual workdays	252	days
Annual water use	4,052	m ³ /year
Construction phase duration	2	Years
Total amenity water use for construction staff	8,104	m³

3.5 Construction Phase Vehicle Washing Water

3.5.1 Deliveries of materials to the Scheme during the construction phase will be made principally by heavy good vehicles (HGVs). This will vary between 16.5m long articulated vehicles and rigid vehicles 8 to 10m in length. Other vehicles will be used to transport staff, etc. to the Scheme. Wheel wash facilities will be provided ahead of vehicles exiting the construction areas to minimise mud or debris spill on the local highway network. The number of vehicle movements have been estimated as per the tables appended to this document. Using these figures, **Table 3-2** estimates construction phase vehicle washing water.

Table 3-2 Vehicle Washing Water Demand

Category	Value	Unit
Total vehicle movements	28,086	
Total precipitation days (Ref 1)	160	per year
Proportion of precipitation days	43.84%	
Vehicle movements on precipitation days	11,435	
Vehicle wheel wash water use (Ref 2)	0.15	m ³ /vehicle
Construction phase duration	2	Years

Total vehicle washing water use in construction phase	3,430	m³
Annual workdays	252	
Average vehicle washing water use in construction phase	6.8	m³/day
Peak daily vehicle movements	148	
Vehicle wheel wash water use	0.15	m ³ /vehicle
Peak vehicle washing water use in construction phase	22.2	m³/day

3.6 Construction Phase Equipment Cleaning Water

3.6.1 Equipment cleaning involves washing down various pieces of fixed and portable pieces of equipment during the construction phase. It will be highly variable and hence all that can be provided at this stage is an indicative estimate based on potential cleaning flows and times. It is assumed that a cleaning station will be situated in each work area listed in Section 2, with some additional work areas assigned to e.g. HDD locations and to compensate for the long length of the cable route. This led to a conservative estimate of work areas of 10 being used. **Table 3-3** details the calculations.

Table 3-3 Equipment Cleaning Water Demand

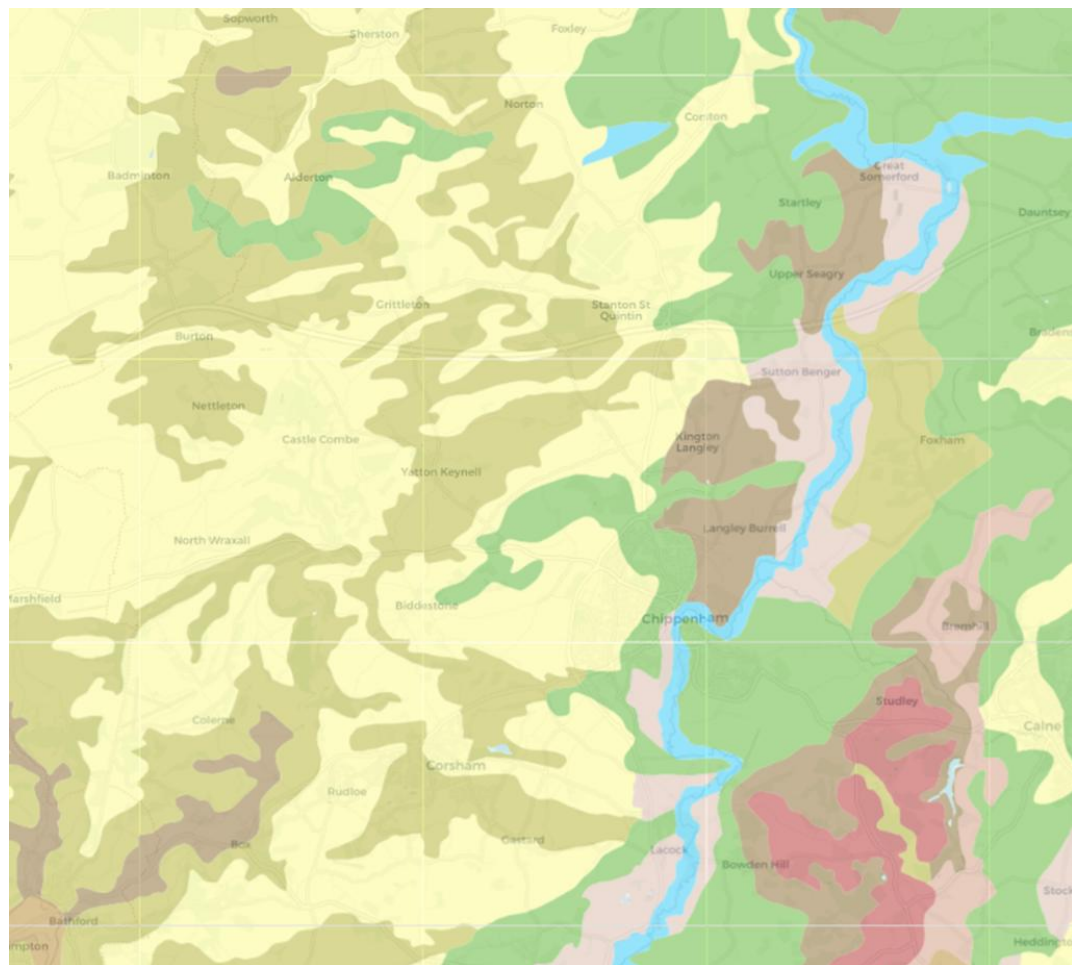
Category	Value	Unit
Number of work areas	10	
Hose flow rate	1.5	m ³ /hour
Average daily hose water use	0.25	hours
Average construction phase equipment cleaning water	3.75	m³/day
Annual workdays	252	
Construction phase duration	2	years
Total construction phase equipment washing water use	1,890	m³
Peaking factor during peak construction	3	
Peak construction phase equipment cleaning water	11.25	m³/day

3.7 Construction Phase Directional Drilling Water

3.7.1 Some of the Grid Connection Cables will be installed using horizontal directional drilling (HDD). This avoids open cut trenching and hence can be used to installed cables, etc. under roadways, watercourses, etc; or to protect areas of significant environmental or heritage significance.

- 3.7.2 HDD uses water for tasks such as cooling drilling tools and removing debris and mud from the drilled channel. Estimating the volume of water used by HDD is based on the volume (m^3) of earth removed during the drill. A typical figure of around $2.5m^3$ of water per m^3 of earth removed (Ref 3) provides a reasonable indicative estimate. However, for solids with a significant level of clay, a higher ratio of 5:1 water:earth is required. The soilscape of the Scheme has been considered and is shown in **Figure 1** (Ref 4).

Figure 1: Soilscape Around Development Area



LEGEND

	Lime-rich loamy and clayey soils with impeded drainage
	Shallow lime-rich soils over chalk or limestone
	Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils

- 3.7.3 Given the mix of lime rich loamy and clayey soils and shallow lime rich soils around the Scheme, a ratio of 3:1 water:earth is used to estimate HDD water usage.
- 3.7.4 Based on Scheme information, **Table 3-4** estimates HDD demands over the course of the construction based on the Avoidance Areas shown in **ES Volume 2, Figures 3-2-1 to 3-2-10: Key Construction Phase Features [REP3-036]**. To estimate the peak water usage for the purposes of this report, it is assumed that only one directional drill will occur at a time and maximum of one drill will occur each day.

Table 3-4 HDD Water Demand

Category	Value	Unit
Total construction phase directional drilling water	1,145	m ³
Average construction phase directional drilling water	2.3	m ³ /day
Volume of water used	38	m ³
Peak construction phase directional drilling water	38	m ³ /day

- 3.7.5 In order to produce a conservative estimate of water demands for the Scheme, the above is included in the overall water demand calculations. However, in practice it may be that that HDD contractors will come equipped with their own mobile bowzers of water to undertake the work.

3.8 Construction Phase Dust Suppression Water

- 3.8.1 Water can be used to suppress dust and control Scheme air quality during the construction phase. The key area of water use for dust suppression is the use of hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and regularly cleaned. **Table 3-5** estimates the total, average and peak water use associated with this demand, noting that dust suppression requirements are highly weather dependent and hence any such estimates are indicative.

Table 3-5 Dust Suppression Water Demand

Category	Value	Unit
Total area of hard surfaced road (track)	116,000	m ²
Estimated peak requirement for dust suppression	10%	/day
Estimated peak area of hard surfaced road requiring suppression	11,600	m ² /day

Dust suppression water requirements	0.004	m ³ /m ²
Peak construction phase dust suppression water requirements	46.4	m³/day
Estimated applications of dust suppression over entire hard surfaced area	5	/year
Estimated dust suppression water requirements	2,320	m³/year
Total construction phase dust suppression water requirements	4,640	m³
Average construction phase dust suppression water requirements	9.2	m³/day

3.8.2 In order to produce a conservative estimate of water demands for the Scheme, the above is included in the overall water demand calculations for it. However, in practice it may be that dust suppression contractors will come equipped with their own mobile bowsers of water to undertake the work.

3.9 Amenity Water Use for Operational and Maintenance Staff

3.9.1 As with the construction phase, operational and maintenance amenity water use consists of:

- Toilet and urinal flushing;
- Hand basin water use; and
- Kitchenette water use.

3.9.2 Welfare facilities will be required at the substations. It is not proposed to have a permanent discharge to sewer. Any wastewater will be removed via tanker to local licenced wastewater treatment works. During operation and maintenance, self-contained portable welfare units which store foul/wastewater for collection/emptying by specialist licenced contractors would be deployed on an ad hoc basis (e.g. if required by maintenance crews). The same water per capita figure used in the construction estimates of 60 litres/employee/day, or 0.06 m³/employee/day has been applied here. This figure is used in the assessment in order to provide a conservative estimate of water use.

3.9.3 The following staff numbers are estimated for the scheme:

- A total of 15 full time equivalent employees based offsite.

3.9.4 Given these figures, the amenity water use for operational and maintenance staff is estimated in the **Table 3-6**:

Table 3-6 Operational and maintenance phase Amenity Water Demand

Category	Value	Unit
Operational and maintenance staff amenity water use	0.06	m ³ /employee/day
Average operational and maintenance staff employee numbers (based on 20% site attendance per day)	3	employees
Average operational and maintenance staff amenity water use	0.18	m³/day
Peak operational and maintenance staff numbers	15	employees
Peak operational and maintenance staff amenity water use	0.90	m³/day

3.10 Operational and Maintenance Phase Solar PV Panel Cleaning Water

- 3.10.1 In order to maintain the effectiveness and energy generation efficiency of the Solar PV Panels, it is necessary to periodically clean them. De-ionised water would be used as a preference. The frequency of cleaning is annual. **Table 3-7** summarises the expected water demands for the cleaning process. According to the latest information provided, the cleaning will occur over a one-month period.

Table 3-7 Cleaning Water Demand

Category	Value	Unit
Total surface area of solar panels	1,832,368	
Cleaning water requirements for solar panels (Ref 6)	0.27	Litres/m ² /cycle
Total operational and maintenance phase panel cleaning water	495	m ³ /cycle
Annual workdays (annual cleaning cycle)	252	
Average Operational and maintenance phase panel cleaning water	1.96	m³/day
Panel cleaning workdays per year	20	
Peak Operational and maintenance phase panel cleaning water	24.75	m³/day

- 3.10.2 In order to produce a conservative estimate of water demands for the Scheme, the above is included in the overall water demand calculations for it. However, in practice it may be that panel cleaning contractors will come equipped with their own mobile bowsers of water to undertake the work.

3.11 Landscape and Ecological Establishment Water

- 3.11.1 This section addresses water use associated with the establishment of vegetation. It deals first with grassland proposed as part of the Scheme, which is established and maintained through soil and vegetation management, and then with landscape planting comprising trees, shrubs, hedgerows, woodland and riparian planting, for which targeted establishment watering may be required in accordance with the **Outline Landscape and Ecological Management Plan (LEMP) [REP6-037]**.

Grassland Establishment

- 3.11.2 Rainfall volumes across the Solar PV Sites are unchanged by the Scheme. The Solar PV Panels intercept precipitation and redistribute it locally towards the panel edges, while the ground beneath and between the arrays remains vegetated and permeable and continues to drain to ground. Whether that local redistribution alters runoff therefore depends on the condition of the receiving ground, including vegetation cover, soil structure, compaction, erosion and hydrological connectivity.
- 3.11.3 **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy Covering Report [REP4-021]** is the principal source for this hydrological position. It confirms that Solar PV panelled areas are not treated as impermeable drainage catchments, that the panels are elevated above ground level, drain to the existing ground and are not sealed into a drainage network, and that infiltration and diffuse drainage to ground will continue to represent the primary drainage mechanism across much of the Scheme area where vegetated ground cover is retained beneath the arrays. It further identifies that runoff should sheet flow onto and across vegetated areas, that groundcover vegetation should be maintained in good condition in those areas receiving runoff, and that where construction has resulted in soil compaction the areas between panel rows would be tilled or scarified to an appropriate depth and then re-seeded with an appropriate vegetation cover.
- 3.11.4 The basis of the Scheme's hydrological mitigation within the Solar PV Sites is therefore:
- satisfactory vegetation cover;
 - appropriate soil structure;
 - prevention and remediation of construction compaction;
 - maintenance of infiltration;
 - retention of diffuse sheet flow;
 - avoidance of connected or channelised runoff pathways; and

- monitoring and corrective action where vegetation, soil condition or runoff behaviour is unsatisfactory.

3.11.5 Each of these is principally a matter of soil and vegetation management, delivered and monitored through the management plans identified in Section 3.13. Routine Scheme-wide irrigation of grassland is not proposed or relied upon as a grassland mitigation measure. Where inspection identifies poor establishment or localised vegetation failure, targeted watering may be used where necessary to support establishment or remediation. As this is a localised contingency measure rather than a routine Scheme demand, a fixed water requirement is not assigned to it in this Strategy.

3.11.6 Grassland proposed as part of the Scheme will be established and maintained through the following hierarchy of measures, which are secured through the **Outline CEMP [REP6-029]**, the **Outline Soil Resources Management Plan (SRMP) [REP6-035]** and the **Outline LEMP [REP6-037]**, and which are applied progressively across the phased construction programme described below:

- retention of existing suitable grassland or vegetation where practicable;
- pre-establishment of grass cover where practicable, particularly where construction is programmed during the summer months;
- use of suitable seasonal sowing windows, noting that the Outline LEMP identifies autumn sowing as preferable, with seed sown as soon as practicable following construction of the array;
- progressive construction across the Scheme;
- limiting disturbance to active work areas;
- protection of soil structure and avoidance of unnecessary compaction;
- remediation of compaction where identified;
- progressive reinstatement and seeding as individual work areas are completed;
- inspection of vegetation establishment;
- local remedial cultivation and reseedling where cover fails or is damaged; and
- temporary runoff, erosion and sediment controls where vegetation has not yet satisfactorily established.

- 3.11.7 No percentage of vegetation cover is adopted as a hydraulic threshold. The condition and hydrological performance of the ground will be assessed having regard to vegetation establishment, soil condition, evidence of erosion or rilling, and whether runoff remains diffuse. Any numerical establishment trigger contained within the Outline LEMP is a management trigger for remedial action rather than a threshold at which an adverse hydrological effect is assumed to occur.
- 3.11.8 The same approach applies to the ecological grassland habitats created under the **Outline LEMP [REP6-037]**, including seeded species-rich grassland, wildflower areas and other grassland habitat types within and around the arrays. These similarly rely on appropriate seasonal establishment, monitoring and remedial reseeded rather than on routine irrigation, unless the Outline LEMP specifically provides otherwise for a particular habitat.
- 3.11.9 Pre-established vegetation may suffer some localised damage from construction traffic and installation works. This is anticipated. Affected areas will be inspected following works and will be subject to localised remediation and reseeded where required. Pre-establishment therefore reduces, rather than removes, the need for post-works reinstatement.
- 3.11.10 Targeted watering of localised remedial areas may be undertaken where inspection identifies that it is necessary to support satisfactory establishment or recovery of vegetation. Where used, watering will be limited to the affected area and period necessary to support establishment, will be drawn from the water supplies identified in Section 4, and will form part of the remedial toolkit rather than a Scheme-wide irrigation measure.

Landscape Planting Establishment

- 3.11.11 Trees, shrubs, hedgerows, woodland and riparian planting may require targeted establishment watering in accordance with the **Outline LEMP [REP6-037]**. The Outline LEMP provides that newly planted hedgerows shall be regularly watered in their first summer, and that all trees and shrubs will be regularly watered in the first summer and thereafter as required to ensure successful establishment. It also provides for bark mulch to be maintained around each tree or shrub in order to suppress weeds and retain soil moisture. Establishment watering of landscape planting is therefore recognised as a genuine Scheme water use.
- 3.11.12 The quantity of water required for landscape establishment watering is determined by conditions at the time of planting and during the establishment period, including:
- planting stock;

- species;
- planting season;
- soil conditions;
- soil moisture;
- antecedent rainfall;
- temperature;
- evapotranspiration;
- exposure;
- establishment success;
- mulching;
- planting phasing; and
- the amount of planting requiring watering concurrently.

3.11.13 Landscape establishment watering is therefore intermittent, targeted, seasonal and weather dependent. Actual watering requirements will be determined through implementation of the detailed LEMP, having regard to planting condition and prevailing weather and soil conditions.

3.11.14 Water for this purpose would be drawn from the supply sources identified in Section 4, including harvested rainwater for appropriate non-potable use where practicable.

3.11.15 The frequency and quantity of establishment watering cannot reasonably be prescribed as a fixed Scheme-wide demand, because both depend on planting condition, soil moisture, rainfall, temperature and the phased planting programme. There is therefore no fixed calendar frequency. Newly planted trees, shrubs and hedgerows will be watered regularly during their first summer in accordance with the **Outline LEMP [REP6-037]**, and thereafter where required, with the actual frequency determined by plant condition, soil moisture, rainfall and prevailing weather. The detailed LEMP will identify the planting programme and the arrangements for any required establishment watering in advance of the relevant planting phase, taking account of the available mains and tankered supply and prevailing conditions.

Construction Phasing and Dry Weather

3.11.16 Construction is anticipated to take place across an approximate two-year period. The **Outline CEMP [REP6-029]** confirms that works during the construction phase are phased and staggered across the Solar PV Sites

and Cable Route Corridor, and as set out in Section 2.1 the construction phase is anticipated to be split into ten different phases of development.

- 3.11.17 The consequences for vegetation establishment and for water resources are that:
- construction and reinstatement progress across discrete work areas rather than across the whole Solar PV area at once;
 - vegetation establishment therefore occurs progressively, work area by work area, across the programme;
 - grassland can be retained or established ahead of later phases;
 - reinstatement can occur progressively as individual work areas are completed;
 - different phases will pass through construction, reinstatement and establishment at different times;
 - the extent of bare or newly establishing ground at any one time is therefore limited; and
 - a number of seasonal opportunities are available for initial establishment or for remedial reseeded.
- 3.11.18 The programme therefore provides repeated opportunities to secure satisfactory cover as each work area is completed, rather than a single establishment window across the Scheme.
- 3.11.19 Prolonged dry weather may delay germination or establishment of newly seeded grassland. Establishment will be monitored and, where poor or failed establishment is identified, remedial action will be taken having regard to the cause and prevailing conditions:
- the cause will be considered, including whether inadequate soil moisture, soil compaction, rutting, ponding or other poor ground condition is contributing;
 - soil condition will be remediated where necessary in accordance with the **Outline SRMP [REP6-035]**;
 - failed or damaged areas will be reseeded promptly once soil moisture and weather conditions are suitable for germination and establishment, without waiting for a subsequent planting season where suitable conditions occur earlier;
 - where inadequate soil moisture is preventing satisfactory establishment, targeted local watering will be undertaken where

necessary to support germination, establishment or recovery, using the water supply arrangements identified in Section 4; and

- temporary local runoff, erosion and sediment controls will remain in place where required until satisfactory ground cover has been established.

- 3.11.20 The **Outline SRMP [REP6-035]** provides for compaction of in-situ soil resources to be monitored during construction by inspecting the soil following installation of piles but prior to fixing the panels, with remedial action taken while the ground remains accessible to the machinery required to relieve compaction. The **Outline LEMP [REP6-037]** provides for inspection following seeding of grassland and for reseeding where ground cover is unsatisfactory, and records that reseeding in August is likely to be particularly appropriate where the months of May, June and July have been very dry.
- 3.11.21 At no stage does runoff management rely solely upon vegetation which has not yet satisfactorily established. The **Outline CEMP [REP6-029]**, and the Water Management Plan to be included within the detailed CEMP, provide the construction and transitional controls. The **Outline LEMP [REP6-037]** establishes and manages vegetation. The **Outline OEMP [REP6-031]** then provides ongoing operational inspection and corrective action.

3.12 Summary

- 3.12.1 **Table 3-8** summarises water demands during the construction phase of the Scheme:

Table 3-8 Summarised Construction Water Demand

Total Construction Water Use	Value	Unit
Total amenity water use for construction staff	8,104	m ³
Total vehicle washing water use in construction phase	3,430	m ³
Total construction phase equipment washing water use	1,890	m ³
Total construction phase directional drilling water	1,145	m ³
Total construction phase dust suppression water	4,640	m ³
Total construction phase water	19,209	m³
Average Construction Water Use	Value	Unit
Average amenity water use for construction staff	16.1	m ³ /day
Average vehicle washing water use in construction phase	6.8	m ³ /day
Average construction phase equipment cleaning water	3.75	m ³ /day
Average construction phase directional drilling water	2.30	m ³ /day

Average construction phase dust suppression water	9.2	m ³ /day
Average construction phase water	38.15	m³/day
Peak Construction Water Use	Value	Unit
Peak amenity water use for construction staff	37.3	m ³ /day
Peak vehicle washing water use in construction phase	22.2	m ³ /day
Peak construction phase equipment cleaning water	11.25	m ³ /day
Peak construction phase directional drilling water	38.0	m ³ /day
Peak construction phase dust suppression water	46.4	m ³ /day
Peak construction phase water	155.15	m³/day

- 3.12.2 The estimate above of 8,104m³ for total amenity water use for construction staff accords approximately with the estimate of 6,564m³ provided in Section 3.3. The estimate above of 37.3m³/day for peak amenity use for construction staff implies a peak monthly use of around 820m³ and thus also accords approximately with the estimate of 1,005m³ provided in Section 3.3. This document retains the 8,104m³ total and 820m³ peak estimates.
- 3.12.3 It is notable that, as shown in the table above, the peak construction phase water use is calculated as the sum of the peak use of each element of usage. Thus, the estimate is conservative in that it is unlikely that each element of usage would peak simultaneously.
- 3.12.4 **Table 3-9** summarises water demands during the Operational and maintenance phase of the Scheme. Note that the total operational water use is not included (as it was for construction) because the Scheme lifespan of 60 years means that any estimates of longer-term water use over the operational period would be highly speculative, but could be expected to reduce rather than increase, due to potential technological developments in this long timeframe resulting in improved water efficiency:

Table 3-9 Summarised Operational and Maintenance Water Demand

Average Operational Water Use	Value	Unit
Average operational and maintenance staff amenity water use	0.18	m ³ /day
Average operational and maintenance phase panel cleaning water	1.96	m ³ /day
Average operational water demand	2.14	m³/day

Peak Operational Water Use	Value	Unit
Peak operational and maintenance staff amenity water use	0.9	m ³ /day
Peak operational and maintenance phase panel cleaning water	24.75	m ³ /day
Peak operational and maintenance water demand	25.65	m³/day

- 3.12.5 The water required to fill external firefighting water storage tanks has been excluded from this report as the water demand is not on a per day/year basis during operation and maintenance.
- 3.12.6 The estimate in Section 3.10 of 495m³ for total panel cleaning water is significantly lower than the estimate of 2,945m³ given in Section 3.3. The key variable used to estimate this is the cleaning water requirements for solar panels. A figure of 0.27litres/m²/year is used in this report, which is sourced from a published journal (Ref 6), and hence this estimate is retained for the Scheme, rather than the higher estimate undertaken previously.
- 3.12.7 **Table 3-10** summarises how each identified Scheme water use is treated in this Strategy, and where each is addressed in this report.

Table 3-10 Treatment of Scheme Water Demands

Water Use	Status	Where Addressed	Supply Basis
Amenity water use for construction staff	Required	Section 3.4	Mains water or tanker
Construction phase vehicle washing water	Required	Section 3.5	Mains water or tanker
Construction phase equipment cleaning water	Required	Section 3.6	Mains water or tanker
Construction phase directional drilling water	Required, intermittent	Section 3.7	Mains water, tanker or contractor supply
Construction phase dust suppression water	Required, weather dependent	Section 3.8	Mains water or tanker
Establishment watering of trees, shrubs, hedgerows, woodland and riparian planting	Targeted and seasonal	Section 3.11	Mains water or tanker, with harvested rainwater where practicable
Routine irrigation of the proposed grassland	Not proposed / not relied upon	Section 3.11	Not applicable

Water Use	Status	Where Addressed	Supply Basis
Amenity water use for operational and maintenance staff	Required	Section 3.9	Available water supply
Solar PV Panel cleaning water	Required, periodic	Section 3.10	Appropriate water supply or contractor supply

3.12.8 Section 4 outlines means of satisfying these demands.

3.13 Interface with the Wider Management Framework

3.13.1 This Outline Water Resources Strategy sits within a wider framework of management plans. **Table 3-11** summarises the role of each document in relation to water, soils and vegetation, in order to demonstrate the relationship between the documents. It does not duplicate their full requirements, which are set out in the relevant plans. The **Mitigation Route Map [REP5-102]** records how each mitigation commitment, including those relating to soils, vegetation, drainage and monitoring, is secured and through which control document.

Table 3-11 Interface between this Strategy and the Wider Management Framework

Document	Role in Relation to Water, Soils and Vegetation
This Outline Water Resources Strategy [EN010168/APP/7.25] (Revision 2)	Identifies Scheme water requirements, supply options and distribution of water around the Scheme.
Outline LEMP [REP6-037]	Controls vegetation and landscape establishment, inspections, management, and remedial planting or reseeded.
Outline SRMP [REP6-035]	Controls soil handling, trafficking, wet working, compaction prevention, inspection and remediation.
Outline CEMP [REP6-029], including the Water Management Plan to be included within the detailed CEMP	Controls temporary construction drainage, runoff, erosion, sediment and water quality risks while ground is disturbed or vegetation is establishing.
Outline OEMP [REP6-031]	Provides operational inspection, including vegetation condition, bare ground, erosion, scour, rutting, sediment movement and concentrated or channelised runoff, with corrective action.
Mitigation Route Map [REP5-102]	Records how each mitigation commitment relating to soils, vegetation, drainage and

Document	Role in Relation to Water, Soils and Vegetation
	monitoring is secured and through which control document.

4 Scheme Water Supply

4.1 Introduction

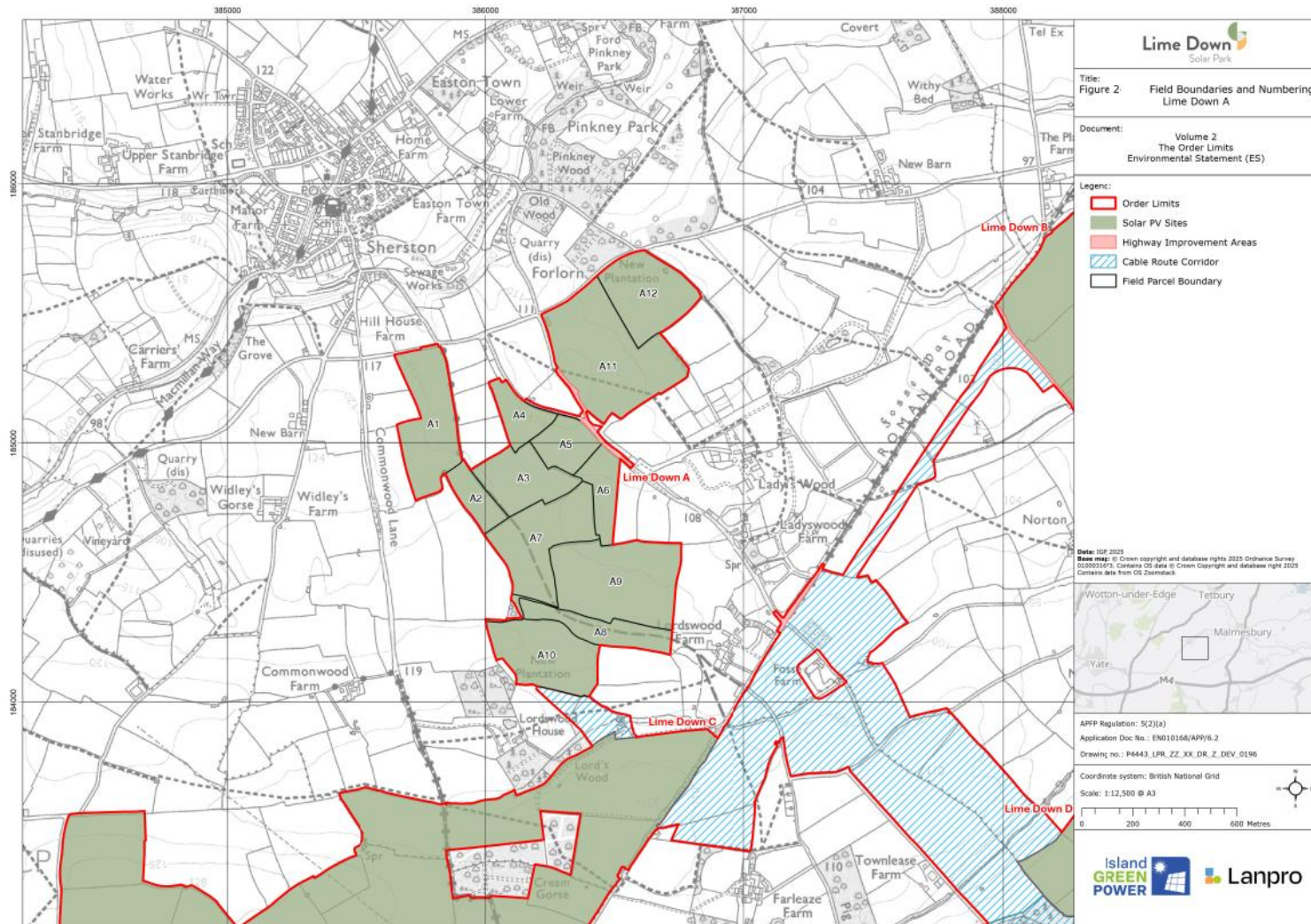
- 4.1.1 During the construction phase, the water demands of the Scheme are both relatively high, but also dispersed – the large extent and various areas involved (as listed in Section 3) mean that a ‘traditional’ approach to industrial water supply (that is, a point water source with a piped distribution system) is not suitable.
- 4.1.2 The key consequence of this is that point sources such as a mains water connection or a single borehole or watercourse abstraction which provides water for only one point at the Scheme will be insufficient to service it in its entirety. Given the large extent of the Scheme, a distribution network of underground pipework is not feasible. Thus, regardless of the water source used, some kind of vehicular transport system for the water (e.g. tankering) will be required to transport water to the various demands across the Scheme.
- 4.1.3 Distribution around the Scheme would therefore be by bowser, tanker or equivalent mobile distribution, drawing either from a point supply such as a mains connection or from delivered tankered water. This applies to establishment watering for landscape planting in the same way as it applies to the quantified construction and operational demands.

4.2 Mains Water

- 4.2.1 The Scheme straddles two mains water supplier areas, Bristol Water and Wessex Water. Engagement has taken place with both undertakers. Bristol Water has confirmed the potential for a connection in the Lime Down A area, as set out below. Wessex Water is being consulted regarding the potential for an additional mains water supply to the Scheme if required. Previous engagement took place regarding possible supply connections, and Wessex Water has requested an updated developer enquiry setting out the current Scheme demand requirements so that an engineer within its Planning Liaison team can review potential supply. Wessex Water has not confirmed capacity, and no Wessex Water capacity is assumed in this Strategy. The purpose of continuing engagement is to investigate an additional or alternative mains supply which may provide further flexibility and reduce water transport distances where appropriate. Supply for the Scheme's identified water requirements is available from the sources set out below, and continuing engagement with Wessex Water is directed at additional flexibility rather than at establishing supply.
- 4.2.2 However, Bristol Water confirmed that they are able to provide a water connection from an existing 4-inch cast iron water main in a location close

to field A1 of the Scheme near Sherston. Bristol Water also advised that a flow of 7m³/hour was possible from this connection. That figure is the advised connection flow rate. It is not a confirmation of continuous 24-hour availability, and no guaranteed daily volume has been confirmed. This Strategy therefore refers to 7m³/hour as the advised connection rate and does not derive a daily volume from it. Parcel A1 is shown below, with a likely connection point being on the northern side of the parcel.

Figure 2: Scheme Layout Showing Parcel A1



- 4.2.3 This confirmation means that a viable mains water supply is available to the Scheme. Water from a point supply of this kind would be distributed around the geographically dispersed Scheme by bowser, tanker or equivalent mobile distribution, as described in Section 4.1.**
- 4.2.4 Note however, as outlined in Section 4.1, this represents a point water supply source. The Scheme will therefore have to incorporate some means of transporting this water to the various point demands (such as amenity blocks) around the Scheme and also put in place filling infrastructure so any mobile water demands (which do not bring their own filled tankers) can fill at this point. Given a tanker size of 30m³, this implies an approximately 450 tankering trips over the Scheme's two-year construction period for the relevant water uses (those for which an external contractor would not typically provide their own water, i.e. directional drilling and dust suppression). These estimates have been captured within **ES Volume 3, Appendix 13-1: Transport Assessment [REP6-014]**.

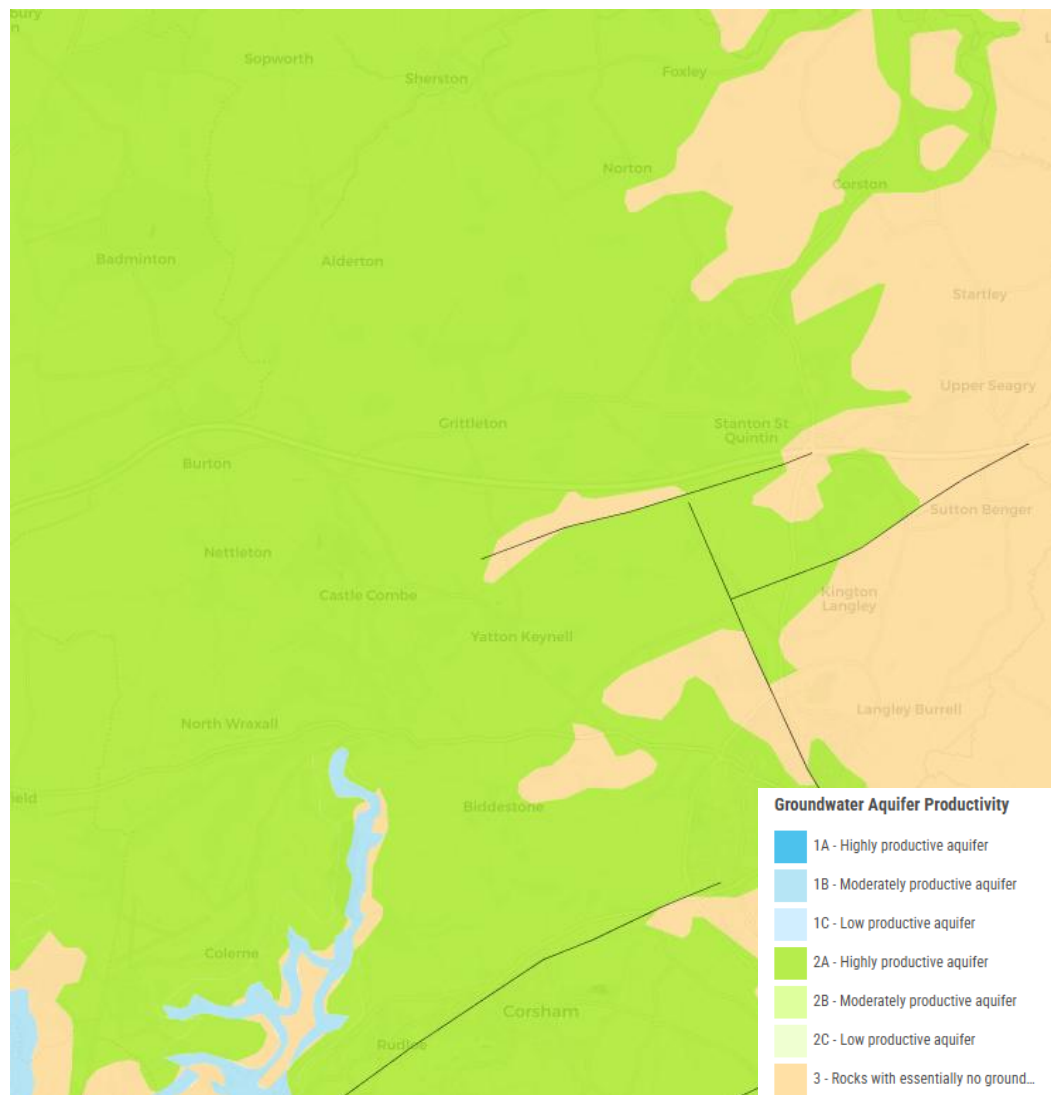
4.3 Water Tankering

- 4.3.1 Contact was made with a number of water tankering companies during the production of this report in order to check the availability of potential suppliers for the Scheme.
- 4.3.2 Details regarding the proposed level of supply were provided to these suppliers. A positive response was received from one supplier (Greens H₂O) who indicated that they were capable of meeting the peak construction phase demand for the Scheme as advised to them, which equates to six of their articulated water tankers.
- 4.3.3 This confirmation means that there is a further independently viable water supply for the Scheme.**
- 4.3.4 Furthermore, the supplier confirmed that they also offer deionised water in tankers, which would obviate the need for onsite treatment; something which the other solutions investigated in this assessment would have to provide for.

4.4 Borehole Water

- 4.4.1 Borehole water is obtained from pumping under licence from underground aquifers. **Figure 3** shows groundwater productivity levels around the Scheme.

Figure 3: Groundwater Productivity Levels (Ref 7)



- 4.4.2 Thus, there are significant areas of highly productive aquifers around the Scheme, as shown in the figure above which illustrates the majority of the area surrounding the order limits contains “Highly productive aquifer”. Therefore, depending on factors such as aquifer depth, the number of existing boreholes, and their total abstraction volumes, a borehole water source may be possible for the Scheme.
- 4.4.3 To investigate this further, a borehole prognosis report from the British Geological Society could be pursued. This report gives a preliminary borehole prognosis plus information on the availability, quantity and quality of water that is likely to be abstracted at the chosen location. With this information, the potential for a borehole water source and its potential yield will become clearer. Based on obtaining this information, further steps such as test drilling and practical yield testing could be planned.

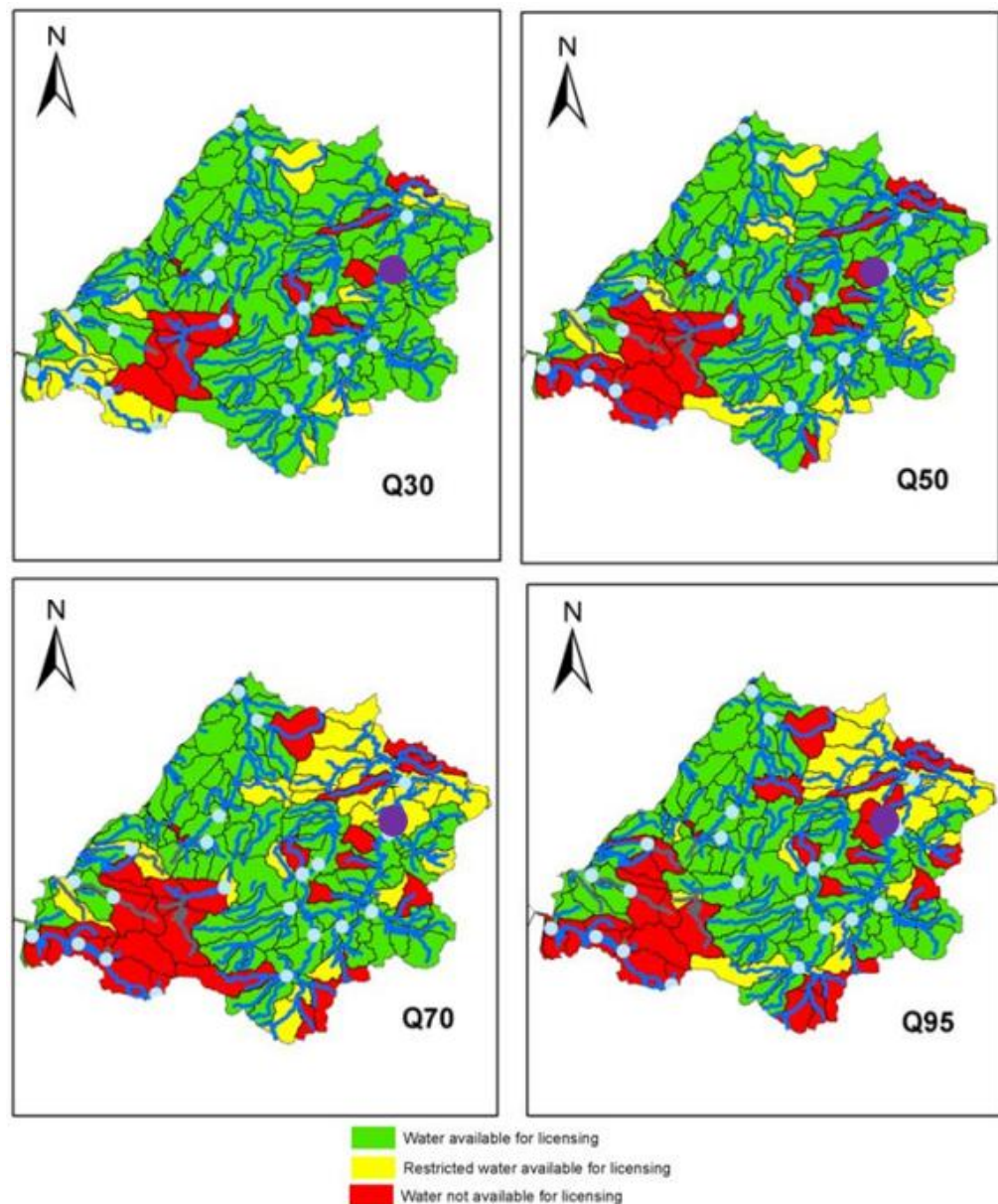
4.4.4 Abstraction of more than 20m³ per day from a source of supply generally requires an abstraction licence from the Environment Agency. Abstraction of 20m³ per day or less is exempt, provided that it forms part of a single operation and that the combined total from all abstraction points on the same source does not exceed that figure (Ref 8). That exemption threshold is substantially below the daily water requirements identified in Section 3. An abstraction licence, together with the necessary consent for the construction of a borehole, would therefore be required in order for groundwater to provide a meaningful contribution to the water requirements of the Scheme.

4.4.5 However, given the possibility of a mains water connection and water tankering for the Scheme, progressing a borehole is not a priority for the Scheme. Borehole abstraction is not relied upon to demonstrate water resource availability for the Scheme.

4.5 Surface Water (Watercourses)

4.5.1 Surface water from watercourse can be obtained by pumping out of rivers, streams, etc. Abstraction can occur under licenses issued by the Environment Agency. **Figure 4** shows the general level of licencing availability in the region around the Scheme (approximate scheme location shown in purple).

Figure 4: Abstraction Licencing Availability



- 4.5.2 Flow statistics are expressed as the percentage of time that flow is exceeded. Resource availability is calculated at four different flows, Q95 (lowest), Q70, Q50 and Q30 (highest). This map shows that there may be some potential for water abstraction at the areas around the Scheme, especially for higher flow conditions. To investigate this further, a specific location should be identified where abstraction could occur (such as at the from the River Avon near Sherston), and discussions opened with the Environment Agency to determine the specific licencing conditions.
- 4.5.3 As set out in Section 4.4, abstraction of more than 20m³ per day generally requires an abstraction licence from the Environment Agency, and since 1 January 2018 most previously exempt abstraction activities have required

a licence where they exceed that threshold. Abstraction within the 20m³ per day exemption would not provide a meaningful contribution to the daily water requirements identified in Section 3, and an abstraction licence would therefore be required for any watercourse abstraction of a scale useful to the Scheme.

- 4.5.4 However, given the possibility of a mains water connection and water tankering for the Scheme, progressing a surface water abstraction is not a priority for the Scheme. Abstraction from local watercourses is not relied upon to demonstrate water resource availability for the Scheme.

4.6 Surface Water (Runoff)

- 4.6.1 Given the large extent of the Scheme, it is likely to generate significant amounts of surface water from rainfall. Drainage assessments have been produced for the Scheme, (**ES Volume 3, Appendix 11-1 Flood Risk Assessment and Drainage Strategy Covering Report [REP4-021]**) including preliminary modelling of sustainable drainage systems (SuDS) systems. However, to maintain the natural environment around the Scheme, no infrastructure, e.g. large SuDS basins, from which surface water could easily be harvested are included in the Scheme.
- 4.6.2 Clean harvested rainwater may nonetheless be used for suitable non-potable purposes where practicable. This may include landscape establishment watering and other appropriate non-potable Scheme uses. The **Outline CEMP [REP6-029]** provides that the detailed CEMP will consider opportunities for rainwater harvesting for appropriate non-potable construction uses, including vehicle washdown, where practicable, subject to not compromising SuDS performance, firewater containment, pollution control or the sealed and isolatable drainage principles for the BESS and substation infrastructure. The **Outline OEMP [REP6-031]** makes equivalent provision for appropriate non-potable operational uses, including occasional panel cleaning, where feasible.
- 4.6.3 Rainwater harvesting is supplementary and opportunistic. It cannot be relied upon for drought resilience, because rainfall availability may be lowest at the times when watering requirements are highest. No large-scale rainwater harvesting system is proposed, and none is implied by this Strategy.
- 4.6.4 Harvested water storage is not relied upon to provide the attenuation volumes required by the drainage strategies for the Scheme. The contributing areas, discharge rates, attenuation volumes and SuDS features required are set out in **ES Volume 3, Appendices 11-1 to 11-9: Flood Risk Assessment and Outline Drainage Strategies [REP4-021, REP5-047, REP5-049, REP6-010, REP5-053 to REP5-060, and REP3-063]**, and do not depend upon rainwater harvesting.

- 4.6.5 The mains and tanker sources identified in Sections 4.2 and 4.3 therefore remain the dependable basis of the water resource strategy for the Scheme.

4.7 Conclusions

- 4.7.1 Various water supply options have been considered in the previous sections, each of which has advantages and disadvantages. These are summarised in **Table 4-1**.
- 4.7.2 The supply hierarchy for the Scheme is as follows. The Bristol Water connection in the Lime Down A area, the potential for which has been confirmed, is the principal confirmed mains supply considered by this Strategy. Wessex Water supply is a potential additional mains supply which remains under consultation. Commercial tankering is a viable supplementary and contingency supply which is independently capable of meeting the quantified demands. Rainwater harvesting is a supplementary non-potable source where practicable. Borehole water and abstraction from local watercourses are not relied upon to demonstrate water resource availability for the Scheme.

Table 4-1 Water Source Relative Advantages and Disadvantages

Supply Option	Advantages	Disadvantages
Mains Water	• Reliable supply. • High water quality, little further treatment required. • Relatively low capital costs. • Bristol Water has confirmed the potential for a connection. Wessex Water is being consulted regarding a potential additional supply.	• Relatively high unit costs (per m³). • Would require planning for distribution of water, e.g. tanker hire. • Would require a deionisation system for panel cleaning.
Water Tankering	• Reliable supply. • High water quality, little further treatment required. • No capital costs. • Includes a distribution system by its very nature, so would not require planning for e.g. (empty) tanker hire. • Would not require a deionisation system for panel cleaning.	• High unit costs (per m³). • Increased vehicle movements to and from the Scheme.
Borehole Water	• Moderately reliable supply, depending on nature of aquifer. • Relatively good water quality, some treatment required.	• Uncertain capital costs due to requirement to acquire existing licenses. • Uncertain unit costs (per m³) due to requirement to acquire existing licenses. • Would require planning for distribution of water, e.g. tanker hire. • Would require a deionisation system for panel cleaning.
Surface Water (Watercourses)	• Moderately reliable supply, depending on nature of watercourse.	• Relatively low water quality, significant further treatment required. • Uncertain capital costs due to requirement to acquire existing licenses. • Uncertain unit costs (per m³) due to requirement to acquire existing licenses. • Would require planning for distribution of water, e.g. tanker hire. • Would require a deionisation system for panel cleaning.

Surface Water (Runoff)	• Moderately good water quality, some treatment required. • Moderate unit costs (per m³).	• Low reliability of supply, due to variations in rainfall. • SuDS ponds do not form part of Scheme drainage plan. • Would require planning for distribution of water, e.g. tanker hire. • Would require a deionisation system for panel cleaning.
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5 Conclusions

- 5.1.1 Based on the data currently available for the Scheme, **Table 5-1** summarises anticipated water demands during the construction and Operational and maintenance phases of the Scheme.

Table 5-1 Summarised Scheme Water Demands

Category	Value	Unit
Total construction phase water	19,209	m ³
Average construction phase water	38.15	m ³ /day
Peak construction phase water	155.15	m ³ /day
Average operational and maintenance water demand	2.14	m ³ /day
Peak operational and maintenance water demand	25.65	m ³ /day

- 5.1.2 The demands summarised above relate to construction and operational water use. Water use associated with vegetation is addressed in Section 3.11. Establishment watering for landscape planting is a recognised Scheme water use determined through the detailed LEMP, and grassland is established and maintained through soil and vegetation management.
- 5.1.3 Various options have been considered for the supply of these water demands, each of which have relative advantages and disadvantages. The assessment concludes that the water demands for the Scheme can be met via the following options:

Mains Water Connection in Lime Down A

- 5.1.4 A mains water connection in Lime Down A, the possibility of which has been confirmed by Bristol Water at an advised connection flow rate of 7m³/hour. This is a key conclusion of this Outline Water Resources Strategy. All of the water required by the Scheme has been identified and quantified in Section 3, and supply is available for each of those requirements. This connection provides the principal mains source and commercial water tankering provides a further independent source at the volumes required, with consultation continuing with Wessex Water regarding a potential additional mains connection. The Scheme is therefore not dependent on a single point of supply. It is therefore recommended that:
- The Scheme approaches Bristol Water to begin the process of putting this connection in place as soon as possible and continues consultation with Wessex Water regarding the potential for an additional mains connection within their area of supply, if required; and

- The Scheme considers what infrastructure and equipment is needed to transport this water to its different point source water demands and how mobile water demands can fill from the mains water connection point(s).
 - Note that even though this would require that the Scheme purchases its own tanker(s), this may be less expensive than using a tankering company due to their typically high unit cost of water compared to mains water.
- The Scheme confirms that the additional vehicle movements this implies are permitted by the relevant authorities.

Potential Additional Mains Water Supply

- 5.1.5 Wessex Water is also being consulted regarding the potential for water supply to the Scheme if required. Wessex Water has requested an updated developer enquiry setting out the current Scheme demand requirements so that an engineer within its Planning Liaison team can review potential supply. Wessex Water has not confirmed capacity. Wessex Water supply is therefore a potential additional mains supply which remains under consultation, and would provide further flexibility in distribution and shorter water transport distances where appropriate. The purpose of continuing engagement is to investigate an additional or alternative mains supply which may provide further flexibility and reduce water transport distances where appropriate.

Water Tankering

- 5.1.6 Water tankering also represents a viable option for the water supply to the Scheme, as indicated via discussions with tankering operator Greens H₂O. Water tankering provides the Scheme with a second, independent source of supply at the volumes required, giving resilience in addition to the mains connection. It demonstrates there exists a further means of supplying the quantified water demands of the Scheme, available as an alternative or in combination with mains supply.
- 5.1.7 It is therefore recommended that:
- The Scheme maintains contact with identified water tankering supplier(s) to confirm their availability as the construction phase approaches.
 - The Scheme confirms that infrastructure such as roadways and connection points are incorporated and are of nature which permits transport and delivery of this tankered water.
 - The Scheme confirms that the additional vehicle movements this implies are permitted by the relevant authorities.

Distribution of Water Around the Scheme

- 5.1.8 Regardless of the source used, water will be distributed around the geographically dispersed Scheme by bowser, tanker or equivalent mobile distribution.

Rainwater Harvesting

- 5.1.9 Clean harvested rainwater may be used for suitable non-potable purposes where practicable, which may include landscape establishment watering and other appropriate non-potable Scheme uses. The **Outline CEMP [REP6-029]** and the **Outline OEMP [REP6-031]** each provide for opportunities for rainwater harvesting for appropriate non-potable uses to be considered at detailed stage. Harvesting is supplementary and opportunistic. It is not relied upon for drought resilience, and harvested water storage is not relied upon to provide the attenuation volumes required by the drainage strategies.

Groundwater and Watercourse Abstraction

- 5.1.10 Borehole water and abstraction from local watercourses are not relied upon to demonstrate water resource availability for the Scheme, and their progression is not a priority.

Vegetation Establishment

- 5.1.11 Rainfall volumes across the Solar PV Sites are unchanged by the Scheme. The Solar PV Panels redistribute rainfall locally towards their edges, while the ground beneath and between the arrays remains vegetated and permeable, so whether that redistribution alters runoff depends on the condition of the receiving ground.
- 5.1.12 Construction is anticipated to take place across an approximate two-year period and is phased and staggered, with the construction phase anticipated to be split into ten phases of development. Construction, reinstatement and establishment therefore progress across discrete work areas progressively across multiple phases and work areas rather than across the whole Solar PV area at once. The phased programme limits both the extent and the concurrency of establishing ground at any one time, and provides repeated seasonal opportunities to secure satisfactory cover.
- 5.1.13 Against that programme, satisfactory vegetation cover is secured through retention of existing suitable grassland or vegetation where practicable, pre-establishment of grass cover where practicable, use of suitable seasonal sowing windows, progressive reinstatement, protection of soil structure, remediation of compaction where identified, inspection of vegetation establishment, and local remedial cultivation and reseedling where cover fails or is damaged. Secured through the **Outline CEMP**

[REP6-029], Outline SRMP [REP6-035], Outline LEMP [REP6-037] and Outline OEMP [REP6-031], these measures deliver the vegetation cover on which the drainage strategy relies. Routine Scheme-wide irrigation of grassland is not proposed or relied upon. Targeted local watering may be used where inspection identifies that it is necessary to support establishment or remediation of poorly established or damaged areas, using the supply arrangements identified in Section 4.

- 5.1.14 Prolonged dry weather may delay germination or establishment of newly seeded grassland. The response is managed through inspection and remediation. Poor establishment will be identified through inspection, the cause will be considered including whether soil compaction, rutting, ponding or other poor ground condition is contributing, soil condition will be remediated where necessary, and failed or damaged areas will be reseeded at the next appropriate establishment opportunity. Temporary local runoff, erosion and sediment controls remain in place where required until satisfactory ground cover is established, so that at no stage does runoff management rely solely upon vegetation which has not yet satisfactorily established.
- 5.1.15 Establishment watering of trees, shrubs, hedgerows, woodland and riparian planting under the **Outline LEMP [REP6-037]** is targeted and seasonal. Its extent is governed by planting condition, soil moisture, prevailing weather and the phasing of planting, and it will be managed through implementation of the detailed LEMP using the supply arrangements described in Section 4.

Overall Conclusions

- 5.1.16 All of the water required by the Scheme has been identified and quantified in Section 3, and supply is available for each of those requirements. The Bristol Water connection at Lime Down A provides the principal mains source and commercial water tankering provides a further independent source, so that the Scheme is not dependent on a single point of supply. Consultation with Wessex Water continues regarding a potential additional mains connection, which would provide further flexibility and shorter water transport distances where appropriate. Harvested rainwater may supplement non-potable supply where practicable. Routine irrigation of the grass sward is not proposed and is not relied upon, satisfactory vegetation cover being delivered through the phased construction programme and the management plans identified in Section 3.13. Progression of options for borehole water, surface water abstraction and large-scale surface water runoff harvesting is not a priority for the Scheme, and none of those sources is relied upon.

6 References

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