

QS-11A

Landscaping Strategy for the whole scheme

1. Your landscaping strategy for the Scheme shall include the following information as a minimum:
 - 1.1. sketches and / or visualisations which show the integration of the landscaping design with the existing landscape;
 - 1.2. the methodology for 'rounding off' of the top and bottom of cuttings;
 - 1.3. typical slope gradients for regraded earthworks, including the 'feathering out' of earthworks into the adjacent land;
 - 1.4. indicative details of planting and fencing in landscaped areas;
 - 1.5. an explanation of how the landscaping design will impact or enhance biodiversity in the Scheme;
 - 1.6. the ground permeability of landscaped areas;
 - 1.7. the strategy for stripping, transport and storage of topsoil.
2. Your landscaping strategy shall include the following information for areas of the Scheme that are to be returned to calcareous grassland:
 - 2.1. the methodology for the creation of the final land form east of Parsonage Down;
 - 2.2. an explanation of how the footprint of the area used for placement of tunnel spoil will be minimised;
 - 2.3. the mitigation of the risks to the landscaping design associated with flood and surface water;
 - 2.4. the methodology and timetable to establish and monitor calcareous grassland trials;
 - 2.5. indicative details of the species selection and seed mixes for calcareous grassland areas;
 - 2.6. the strategy for the reuse or placement and cultivation of topsoil.
3. Your landscaping strategy shall include the following information for areas of the Scheme that are to be returned to agricultural use upon completion of the works:
 - 3.1. the strategy for the stripping, transport and storage of topsoil and subsoil;
 - 3.2. the strategy for the reuse or placement and cultivation of topsoil and subsoil;
 - 3.3. the strategy for the sowing and establishment of grassland and the subsequent establishment maintenance and management of the land until it is returned to agricultural use.



1. Landscaping Strategy for the whole scheme

Design Vision

Highways England's Vision for this project is clear, and we will deliver that vision through our understanding of the unique significance of the historic landscape and World Heritage Site and through our holistic approach to the whole landscape in achieving the Design Objectives.

The key elements of our landscaping strategy are set out in the project vision statement:

*“an exemplar highways landscape scheme, **successfully integrated into its context**, via a suite of **chalk downland habitats**, which will enhance the **sense of place** for visitors and tourists to the World Heritage Site, recreational users and local residents, as well as **increasing biodiversity** and wildlife opportunities.”*

The aim of the scheme is to provide a 'restored' landscape, to create an attractive setting to the road which reflects the valued landscape characteristics of the World Heritage Site and its management plan objectives.

Integration into the Existing Landscape

The Objectives

The overarching objectives are illustrated on the Environmental Masterplan and are set out in the Outline Landscape and Environmental Management Plan (OLEMP), and include for example:

- To promote the conservation, protection and improvement of the physical, natural and historic environment within the Scheme and its setting.
- To diversify ecological value through retention of existing features and in the creation of new diverse habitats.

- To preserve and enhance the character of the landscape and local distinctiveness through creation of new chalk grassland.
- To create new structural planting that links to existing habitats with locally appropriate species.
- To provide a variety of foraging, nesting and roosting opportunities for protected and notable species.
- To create floristically rich habitats to support a greater assemblage of species.
- To provide a framework for monitoring and reviewing the landscape implementation and establishment.

Our strategy for delivery will be set out in the LEMP and will adopt two broad approaches to achieving the objectives:

- Tying into existing landscape context.
- Minimising visibility of the road.

Tying into existing landscape context

The existing landscape context, in the broadest sense, must be understood. This includes landform, field patterns, planting structure and tree cover. This means that the scheme earthworks are reflective of contours and field boundaries, and new planting reinforces the existing structure and species mixes, increasing biodiversity, and also contributing to the sense of place for users.

Minimising visibility of the road

Our landscape design strategy is to set the road down into the landscape, to allow the surrounding landscape to 'pass through' the proposed highway corridor, connecting the landscape on both sides. This will result in a continuous landscape over the road with strong character, achieving a clear scheme objective in re-uniting the landscape around Stonehenge. Minimising the visual presence of the road does not mean applying extensive visual screening.



A landscape strategy for the whole scheme

The following plan demonstrates our understanding of the whole landscape through the application of the following design principles.

- Landscape connectivity
- Reduced visual presence
- Visual screening
- Driver experience
- Important views



Western section – reduced visibility in the landscape.

Central section – concealed within the tunnel.

Eastern section – more visible in the landscape and gateway to WHS.

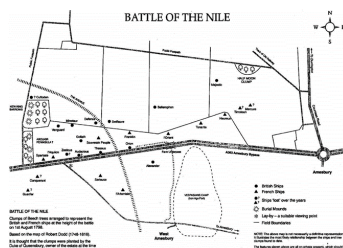


Western section

1. Views of Yarnbury Camp and the landscape to the west.
2. 1m high bunds screen the carriageway with scattered scrub and calcareous grassland to avoid 'green walls'.
3. Views of wider landscape revealed at crest.
4. Characteristics of Parsonage Down used to inform approach.
5. Screening to protect visual amenity of Winterbourne Stoke.
6. River Till crossing with blocks of woodland consistent with river landscape to integrate viaduct.
7. Green Bridge with slopes and bunds integrated into adjacent landform.
8. Visual screening around Longbarrow Junction with integrated earthworks.
9. Visually connect to the landscape for those leaving A303 via Longbarrow Junction.

Central section

1. The Stonehenge setting with restored natural topography, minimal fencing with open skylines, celestial alignments and relationships with other sites and monuments in the landscape.
2. Passing through the green bridge, and entering and exiting the tunnel as events on the journey.
3. Accessible footpath network connecting the varied historical landscapes with Amesbury Village Centre passing Amesbury Abbey, Vespasian's Camp, The Nile Clumps and onto Stonehenge.
4. Protect the TPO trees of the Nile Clumps.
5. Avoid 'green walls' along carriageway.



Eastern section

1. Countess Junction acts as a gateway to Amesbury and the World Heritage Site.
2. Opportunity to allow views into land to the south to enhance sense of place along highway.
3. River Avon crossing with selected views into the river landscape.
4. Sense of place along the highway corridor important with this section acting as an arrival at Amesbury.
5. Rural views are revealed, including historic features.
6. Rural views open-out with upcoming bend in the road at Beacon Hill visible to the east.

Landscape Steering Group

We will establish a Landscape Steering Group (LSG) as set out in the OLEMP. Their role is to advise on alternative proposals, to work with HE to develop survey and monitoring methods of the landscape establishment and to liaise with HE to identify requirements to achieve the successful establishment of the landscaping.

It will be essential from the outset to agree and confirm the LSG role, its remit, governance structures and protocols, and the scope of their influence. We will also establish the relationships between the LSG and the Stakeholder Design Consultation Group seeking commonalities and efficiencies where we can.

The LSG is likely to include Natural England, National Trust, RSPB, Wiltshire Council, Landowners (via Agricultural Liaison Officer where appropriate), and English Heritage and Historic England. We need to understand their broader objectives and how this scheme can assist in the delivery of those. We recognise that they have a deep understanding of the site and its landscape context and we will work proactively with them in sharing that knowledge so that we can utilise it to the betterment of the scheme.





1.1 Integration with the existing landscape - earthworks

Our landscape strategy and design approach is centred around the concept of integration with the earthworks. We believe that fully combined earthworks and landscapes are key to achieving integration as they cannot be considered in isolation of each other. Our strategy is to ensure that earthworks provide a natural appearance and reflect the surrounding topography and to avoid 'engineered' smooth trapezoidal landforms.

Our Principles – achieving a balance

- Understanding DCO commitments and limits of deviation.
- Understand where there is the flexibility to be able to successfully address variations on site.
- Avoiding the creation of additional material requiring disposal.
- Understanding the material types and their usability in the various landscape types through soil management.
- Avoiding further impact on archaeology through excavation or compaction.
- Adopting a good quality design approach rather than focussing on a single issue such as footprint.

- Understanding the large-scale landscapes.
- Ensure multiple small-scale details and interfaces between earthworks, structures, planting and verges are considered holistically.
- Avoid sudden changes in landform.
- Be rounded at changes in grade and direction.
- Be blended into and not above the adjacent natural contours.
- That environmental bunds at structures and for screening are fully integrated into the earthworks and landscape.
- Use the natural landform which may be 'uneven'.
- Consider from the outset of the design approach the future maintenance and whole life costs.

The 'scale' of the uneven slope (e.g., micro-topographical) would be appropriate to the earthwork. The use of uneven contours may not be compatible in areas which are to be returned to agriculture. Landform profiles would be agreed with the landowner via the Agricultural Liaison Officer. We would seek to avoid micro-topographical and steepness limitations to the final Agricultural Land Classification grades for land returned to agriculture, in accordance with MAFF (1988) guidance.



Long Barrow junction

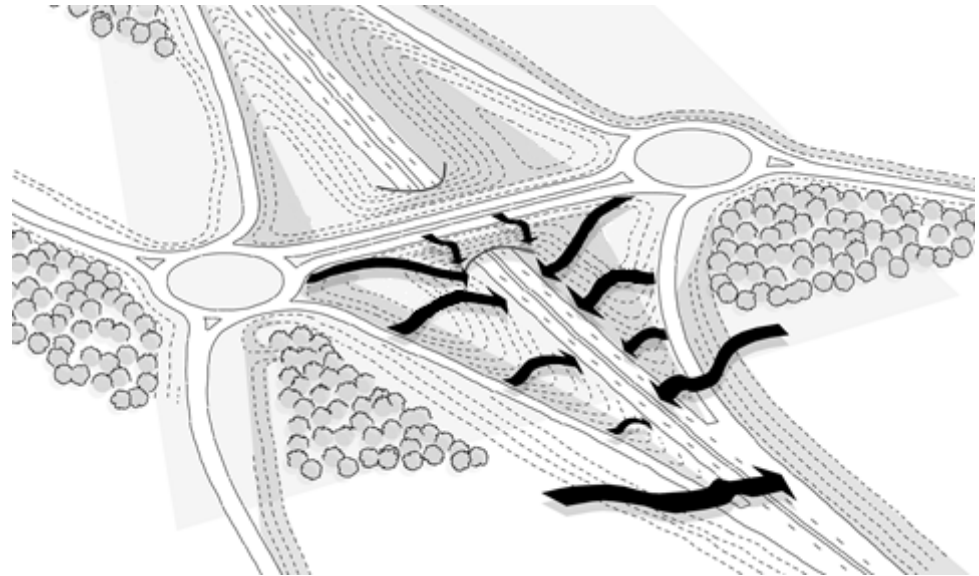


1.2 Methodology for 'rounding off' of the top and bottom of cuttings

The strategy toward landscape integration involves the consideration of the surrounding landscape and its relationship to the road. Rounded cuttings extend adjacent landscapes down to the road edge, creating continuity in landscape across the highway corridor.

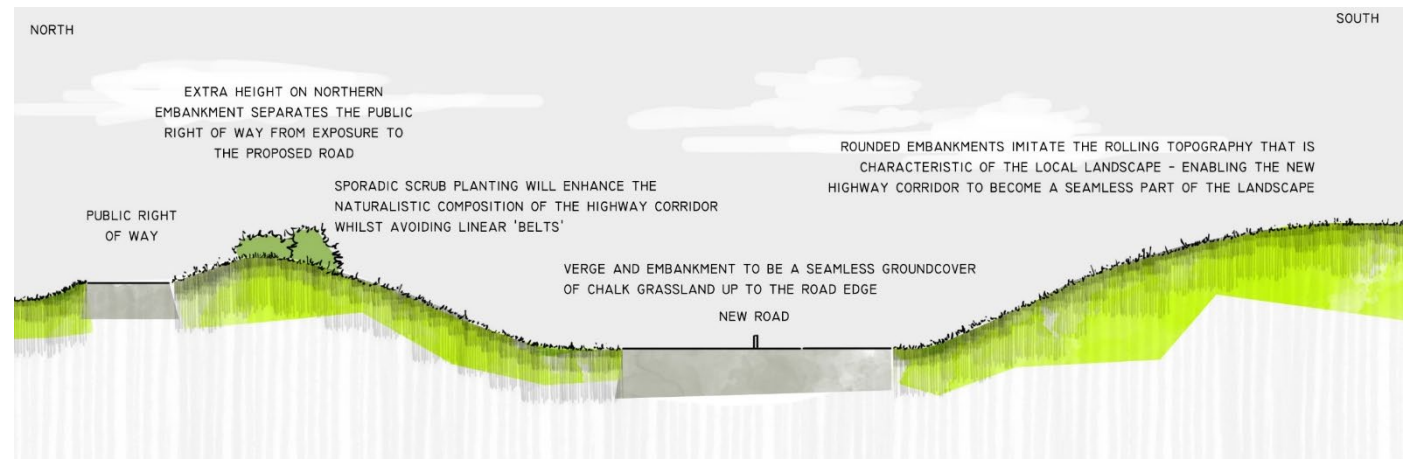
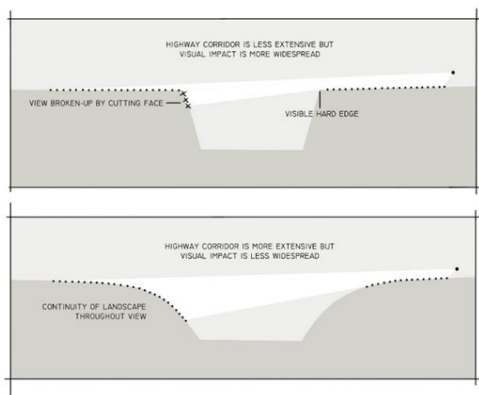
Our landscape architects are actively involved in the design of the earthworks, challenging the developing earthworks models and assisting with delivering earthworks balances that 'fit' into the landscape.

The 'rounding off' of earthworks needs to consider the broader landform and the smaller scale interfaces with other earthworks such as bunds. In addition, consideration needs to be given to other features such as fences and drainage. Cut off drains would be located at the top of rounded off slopes and consist of shallow 'channels' over the drainage material covered with chalk grassland so that they blend seamlessly into the earthworks and the surrounding landscape (see **QS-10**).



Long Barrow junction – integrated multiple earthworks kept below the existing ground levels

East of Green Bridge 1

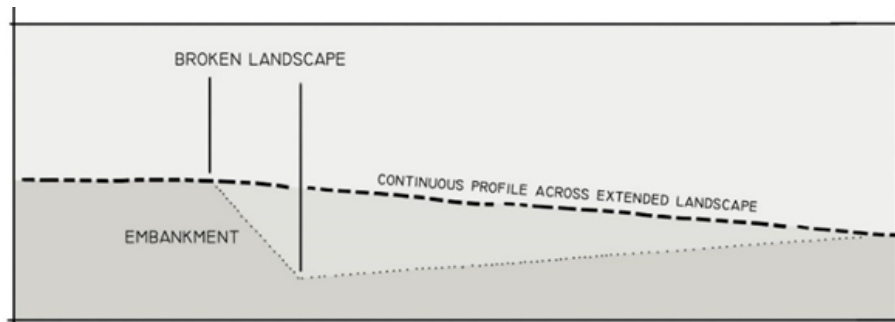




1.3 Typical slope gradients and ‘feathering out’

The objective is to feather out embankments so that they do not appear to rise-out of the landscape. To avoid the road appearing as an incongruous addition to the extended landscape, its embankments must appear to be a seamless part of it. As a broad response, this objective is achieved by utilising the slopes and shapes of the adjacent landform within the proposed earthworks so that a continuous profile is created over a large-scale.

It is our view that it is undesirable to apply a uniform approach along the road-side that could ‘grey-out’ localised variability in landform when considered along the long-profile of the road. This would work against efforts to integrate the scheme into the landscape, by emphasising the road’s linear and smooth pattern. Our earthworks design will respond to localised contours and apply a variance in embankment slopes, with an allowance for uneven contours. We will also look to integrate multiple earthworks such as those at cuttings and bridges.



Earthworks at Structures

Our landscape strategy will adopt principles which seek to ensure that new infrastructure is sympathetic to the landscape. Structures such as the River Till Viaduct and at Long Barrow Junction have associated large scale landscape earthworks with the approach embankments at the viaduct and at the slip roads to the junction. Our strategy will ensure these are integrated into the landscape.

We will also examine the detail interfaces with bridges and portals considering each of the elements meeting as a single integrated design solution. For example, the green bridges include multiple earthworks; the cutting, the bridge embankment, the bunding on the bridge and alongside the carriageway in places.

Our design strategy is to ensure these multiple earthworks are designed as one, and in the context of the wider landscape.





1.4 Indicative details of planting and fencing in landscaped areas

Planting

The existing landscape is characterised by its open and rolling character, with tree cover being minimal on the thin soils. Verge planting can determine the degree of immersion into the wider landscape and it can provide variance, character and interest along the road-side environment, particularly in cuttings, where the wider landscape is no longer visible.

Planting Types and Species Selection

The OLEMP sets out the range of planting types and the species associated with each type. Our strategy will focus on ensuring the right ground and soil conditions for each planting type, in particular for the calcareous grassland.

Woodland

Woodland tends to occur in one of two forms: punctuating the field pattern with scattered, regular-shaped blocks of deciduous plantation, and along the River Till and River Avon, ribbons of woodland, surrounded by more scattered trees and scrub, follow and help define the sinuous valleys of the watercourses.

Topsoil depth will be 300mm, potentially up to 400mm, and feathered down over 3m at the edge to match grassland area soils. Our strategy is to ensure soils are well managed and protected from degradation, with their value as an important resource fully recognised. The key is ensuring that the subsoil/substrate beneath topsoil has a sufficient permeability and porosity to allow roots to penetrate and uptake water; this may be possible to achieve over chalk provided it has suitable properties.

Planting will be undertaken with bare root plants in the correct season. The average planting spacing of 2m will be varied to create diversity on the woodland with more open areas for herbaceous

layers, scrubby edges, and to reflect tie-ins to adjacent woodland. Planting would be protected by suitable fencing to protect it from browsing rabbits and deer.

Table 8.1 within the OLEMP provides an indicative species mix. Specific planting requirements for each area would be set out within the LEMP and site-specific variations to the mix would be informed by site surveys of existing woodland and reference to the arboricultural impact assessment report. The woodland at Countess roundabout would not be the same as woodland at Long Barrow junction for example.

Scrub planting

Dense scrub in the Salisbury Plain area includes hawthorn, purging buckthorn, dogwood and wayfaring tree. This has informed the proposed species selection for dense scrub planting with species selected to minimise the potential damage to archaeological remains through root intrusion.

The average planting spacing of 1m will be varied to create diversity within the scrub planting. For example, dense shrub planting is proposed as a bat commuting feature and at mammal tunnels, whereas a more open and scattered form of scrub planting would be appropriate around the waterbodies. The indicative species planting mix would be adapted to suit site specific requirements informed by site conditions and biodiversity enhancement opportunities.

Waterbodies

Waterbodies are the drainage treatment areas used to control scheme drainage, treat and attenuate run-off, and to provide biodiversity opportunities with additional wetland and grassland habitats. The main infiltration basin will be above free draining chalk and managed as dry grassland, with the shallow basin at the inlet end as a lined pond to allow the development of pond margins. The landscape proposals are presented on the drawings within **QS-10**.



Our planting and management strategy is to avoid tall, vigorous species that would form dense swamp vegetation, and reproduce vegetation with a resemblance to the semi-improved pastures of the local winterbournes such as the River Till, with associated marginal and aquatic plants (e.g., watercress, brooklime, water forget-me-not, water mint, fool's watercress and pond water-crowfoot).

We will actively seek local sources for marginal plants to be translocated and will look to the LSG to provide support with their local contacts. If material cannot be sourced locally that is economically viable, the stock would be planted in the second year.

Waterbody aftercare – We note low intensity cattle grazing is the preferred method of management. Our LEMP will set out the practical aspects of achieving this method of management, notably around finding a suitable herd, movement restrictions, access requirements and preventing the animals escaping from the areas. Should grazing not prove practical, then mowing would be undertaken.

Hedgerows

Existing hedgerows would be protected and retained, and they would be managed so that their structure is improved during the construction period and if required, this would include areas of gapping-up.

The OLEMP sets out the indicative species mix for new hedgerows with blackthorn, hazel, hawthorn and holly (planted as 40-60cm and 60-80cm transplants) along with feathered hedgerow trees of beech, wild cherry and oak (planted at 150-175cm and 200-250cm high).

The strategy is to achieve rapid effective screening which would be achieved through a suitable density of planting at 7 plants per linear meter in well prepared soils, using mulch and weeding to limit weed growth, and to maintain bare ground under the hedge for first two years after planting.

The detailed hedgerow planting mixes would be developed for the LEMP with the inclusion of tree species. Whilst the inclusion of feathered trees is for rapid effective screening, we will consider their inclusion in the context of the wider landscape. Where the landscape is open with limited hedgerow trees, the hedgerow planting will be designed to reflect that landscape context. Fruit and nut bearing species would provide a food source for birds and small mammals.

Amenity tree and shrub planting

The amenity planting at Countess Roundabout is to provide high scenic quality, soften the view of the flyover, provide year-round interest, and include the use of semi-mature and specimen trees. Species selected may include non-native species so that the landscape can provide that interest at this important junction and gateway into the World Heritage Site. Amenity shrubs would be planted at 2 to 5/m² depending on species.

The landscape proposals for Countess Roundabout are presented in **QS-9** and include:

- Locally appropriate woodland to provide screening.
- Ornamental specimen trees to create amenity interest.
- Planting on the slip road embankments to provide screening.
- Native specimen trees to add identity to the junction.
- Scattered trees to allow views through to the River Avon to create a connection to the place.
- Management of woodland edges where trees are lost.

Maintenance and management

Our consideration of the detailed landscape management proposals will start at the detailed design. Our strategy recognises the importance of landscape maintenance in the successful delivery of the landscape proposals. A good planting specification and good planting workmanship are only the initial stages of the process.

The Handover Environmental Management Plan (HEMP) will set out the typical annual maintenance operations in accordance with the DMRB Volume 1 Series 3000 specification.



The type and frequency of those operations needs to be flexible to adapt to changing circumstances on the ground, recognise that the landscape takes time to develop, and bearing in mind the overall long-term outcomes.

Woodland and scrub aftercare - The OLEMP sets out the requirements for immediate aftercare including watering, mulch and tree staking and protection. Our strategy is to review these requirements and bring forward sustainable solutions; for example using vegetation removed on site to create bark mulch, seeding between plants to minimise weeding and soil erosion, and minimising the use of plastics within tree and plant guards with a focus on biodegradable materials.

Calcareous grassland aftercare – management operations need to limit natural succession and maintain the target diversity of composition of the grassland. Our strategy will identify areas that may be practicable for low intensity management by grazing; ones that are fenced, with a water supply and are readily accessible. Verges and other areas would be mown, removing arisings where possible and with selective scrub cutting if required. Key to achieving this will be detailed co-ordination between landscape and earthworks design so that slope angles are such that they can be mown effectively by machine and avoid impractical strimming operations.

Our strategy is to monitor the developing landscape, in particular the calcareous grassland, report on its progress and use this information in consultation with Highways England and the Landscape Steering Group to adjust the annual maintenance operations to suit.

Fencing: Why Fencing is an Important Issue

Fencing has the potential to work against the landscape integration achievements of carefully designed earthworks and structures. Landscape integration is about allowing the landscape characteristics to pass through the proposed scheme, connecting the landscapes of either side.

Poorly considered fencing visually reinforces the footprint of a scheme, making landscape severance more likely. Interfaces between other fence types such as road restraint systems and parapets also need detailed consideration.

Fencing Strategy for the A303:

The scheme has a clear requirement for the least visually intrusive fencing design, including no fencing where appropriate. Post and wire fencing is recommended as a low visibility option, especially for proposed byways.

Boundary fencing in the WHS will be visually recessive and have a low reflectivity finish. All fencing above the top of the cuttings shall be post and wire with stock-proof netting and be consistent with other fencing within the WHS. Fencing above structures will be similarly transparent with a bespoke fence (see **QS-1**).

Our strategy is to give detailed consideration to the relationship between earthworks and fence lines. Positioning the fences carefully can also ensure that they are not visible in the wider landscape. For example the top restraint railing above the western tunnel approach retaining walls will be no higher than the ground level at the top of the cutting so it will not be seen in the wider landscape.

The relationship between fence types and landscape will also be considered in detail. Associations with hedges can reduce the visibility of fencing, whereas fences in open calcareous grassland are more visible.

We are also mindful of the relevant policies and actions set out within the Stonehenge, Avebury and Associated Sites World Heritage Site Management Plan 2015 and will look to support those through the selection of fencing and barriers. We will also liaise with the LSG and SDCG with respect to fencing and gating.

We will also look to select the least visually intrusive fence types during construction as indicated in the heritage management plan.



This may not always be possible where more robust fence types are required for security, tree protection (for example at Nile Clumps TPO), or to ensure protection of archaeological features. The selection of the appropriate fence type will be through consultation with the members of the HMAG (for works within or affecting the WHS) and Wiltshire Council and English Heritage and Historic England (for works outside of the WHS).

The Accommodation Works identify the various agreements with landowners – including fence types. Any variation to the fence types would be agreed via the Agricultural Liaison Officer and within the limits of preferred types. Other fence types e.g., post and wire may be considered acceptable where they are associated with hedgerows and other planting.

1.5 Enhancing biodiversity in the Scheme

The local landscape is highly sensitive, with a strong character that is not only generated by human activity – natural processes and ecological communities are also crucial drivers toward the landscape's sense of place.

This is reflected in the Special Protection Area designation of the Salisbury Plain, the Parsonage Down National Nature Reserve and the River Avon Special Area of Conservation. The complex interworking of human and natural processes is further evident at the Sites of Special Scientific Interest at Yarnbury Castle, Parsonage Down, River Till and River Avon.

The Vision for Ecological Delivery

We will apply the principles of government biodiversity strategy, planning policy and regional and local strategies, allied to the HE's own biodiversity plan to deliver a scheme that:

- minimises its construction impacts through sensitive design,
- maximises its biodiversity potential and strives to achieve biodiversity net gain,
- considers design at the landscape, ecosystem and location specific scales,

- provides a significant and positive contribution to the resilience of the local ecological networks, and
- adds to our natural and cultural heritage.

Delivery

- Ensure a fully integrated design and delivery approach by working collaboratively within the wider project e.g., engineering, heritage, ecology, drainage, noise, highways, recreation and agriculture to develop and deliver integrated design solutions.
- View habitat creation as opportunities to contribute to the local green infrastructure and green corridors;
- Investigate new opportunities to re-connect locally fragmented habitats and green corridors, including small-scale habitat creation or enhancements to provide further reaching benefits;
- Look to maximise opportunities for community benefit e.g., embedding public access proposals to benefit from habitat creation and enhancement (e.g., visually, interpretation opportunities or access and recreation);
- Deliver opportunities for phasing of works to incorporate early planting / habitat creation to lessen the impacts and effects of construction; and
- Engaging with local stakeholders for 'buy-in' to proposals, delivery and subsequent management.

1.6 Ground permeability in landscaped areas

Our strategy recognises that to achieve sufficient permeability for landscaped areas, a holistic approach is required taking into account topography, geology and likely overland/sub-surface water flows. Further work will be undertaken to fully understand these site- and location-specific elements, such that it is not possible to state with certainty at this stage what hydraulic conductivities need to be achieved through the soil profile for each area. For example, the depth requirement for free drainage may be reduced where steep slopes are present.



We have set out a strategy based on relevant guidance and experience with regards to wetness classes and the influence of slowly permeable layers, as well as our understanding of what will be achievable with the tunnel arisings.

Good permeability for areas of calcareous grassland is essential for its successful establishment and development. Similarly, overly compacted ground must be avoided for the successful establishment of woodland.

Consideration of ground permeability is particularly important for the calcareous grassland east of Parsonage Down since it will be formed over tunnel chalk arisings; our developing strategy is as follows:

- Target wetness class I (well-drained) for the overall soil profiles, defined as where the soil profile is not wet within 70 cm depth for more than 30 days in most years.
- The placed chalk fill will need to at least be 'permeable', i.e., vertical saturated hydraulic conductivity of >0.1 m/d, to a minimum depth of $\sim 0.5\text{--}0.8$ mbgl.
- To achieve this, we will use decompaction methods best suited to the materials, which will be trialled as necessary in the field.
- We will draw upon experience and research from other projects which have worked/are working with similar materials.
- If the target permeability cannot be achieved, we will consider interventions such as drainage trenches and blanket drainage layers, implemented in advance of any landscaping, which could potentially involve the sustainable reuse of temporary works aggregates.
- As-dug chalk from elsewhere within the scheme could also be used within the shallow soil profiles, as this is likely to be less de-structured than the tunnel arisings.
- Calcareous grassland has the best chance of success on steep ($> 16^\circ$), south-facing slopes, which will also improve drainage. As such, we will aim for these conditions where possible.

In other landscape areas (beyond the area of tunnel arisings placement), we will similarly aim for free-draining soil profiles for the calcareous grassland, but it is likely that the as-dug chalk will be a less challenging material with which to achieve this.

- Drainage interventions and decompaction measures will be considered as required.
- In planting areas, deeper soil profiles would be preferred to provide adequate rooting depth, such that the depth to potentially low-permeability substrates should be such that traditional decompaction measures would be sufficient to achieve target permeabilities. Archaeological restrictions would be considered in selecting the most appropriate method.
- Soil handling and decompaction for all materials would only be undertaken when materials are dry and friable to avoid compaction and smearing, which compromise final permeability.
- A holistic approach will be taken with regards to permeability, taking into account the topography and the likely overland/sub-surface flows based on the materials and slope angles, such that there may be options to improve the overall soil-water regime for landscaping through multiple means.

1.7 Our strategy for stripping, transport and storage of topsoil.

Our strategy recognises that both a Soils Handling Strategy and Soil Resource Plan are required as part of the Soils Management Strategy, as per the Outline Environmental Management Plan.

- These documents shall be prepared in accordance with Annex A.3 of the OEMP.
- The documents will help avoid/mitigate impacts on soil, such as sealing and degradation, facilitating its sustainable reuse within the scheme.
- The Soil Management Strategy will draw upon the results of the Agricultural Land Classification Soil Resources report.



- A gap analysis shall also be undertaken to determine the need for further survey to inform agricultural restoration and landscaping, particularly the calcareous grassland, and we would be responsible for ensuring adequate data are available to inform the Soil Resource Plan.
- As per the OEMP, this information would also be used to produce Preconstruction Soils Statements for areas of agricultural land temporarily occupied during construction.

Topsoil balance strategy

We recognise that topsoil is a valuable finite resource and will strive for a soils mass balance, linked to the Materials Management Plan. Our final restoration soil profiles will be designed to take full account of the DAMS requirements, temporary works proposals to reduce soil stripping and storage where possible, whilst ensuring that the final soil profiles are suitable for the final landscaping. Our strategy:

- Recognises that topsoil is a valuable material which we need to conserve.
- Identifies the volumes created and the volumes needed for the various landscaping and planting types to ensure a balance.
- Understands the different types of materials and how they can be reused.
- Understands the ground constraints and limits, particularly for soil chemistry, archaeology and water.
- The Soil Resource Plan would be developed setting out details of stripping, storage and restoration – linking up between soils, landscape and ecology to support the restoration design.
- Identifies areas for storage of soil types which avoids mixing of materials and minimises their transport.

- Restoration proposals need to be set before the topsoil / subsoil strip to reduce cost of stripping soil which could potentially be surplus at the end of the scheme.
- A robust soil resource survey is critical to understanding what soils are present and their nature, and so how to manage them.
- Establishes a number of scenarios which successfully address variations in excavated material types and volumes and how they can be placed within the scheme limits.

Topsoils left in-situ

We would protect topsoil left in-situ in compounds area and haul roads where they would otherwise be severely damaged.

- We will ameliorate soils that are left in-situ principally through decompaction measures (e.g., cultivation), as well as removal of debris left from the compound where required.
- Appropriate decompaction methods will be selected based on the depth and degree of compaction, cognisant of archaeological constraints.
- Protection measures will be considered such as the use of geogrid and geotextiles to protect soils during construction.
- The restoration of land will be monitored, including inspections as required, and remedial measures such as drainage interventions will be agreed with the landowner.

It is recognised that subsoiling will not be permitted where archaeological constraints exist. As such, cultivation will be focussed to the topsoil (upper 300mm) and will likely include the use of a rigid tine harrow (shakerator), followed by landscape raking with a small to medium sized excavator to prepare the seedbed as required.



2. Calcareous grassland

The aim is to create a mosaic of calcareous grassland that varies from sparsely vegetated bare ground, through to closed, species-rich swards. At Parsonage Down, early successional scrub will be added to the grassland habitat. The target is to achieve early successional grassland as a basis for future development. The grassland targets are defined in the LEMP (Table 2-1, Vol2 Pt2) and will take active management and monitoring over several seasons to achieve targets (section 2.8).

New calcareous grassland will be created to serve a variety of 'roles' within the design and, as such, will be created with varying methods, as per section 2.6. The varying topsoil and ground conditions at each area will influence the grassland seed mix succession.

2.1 The final landform at Parsonage Down

Our strategy is to utilise the naturally occurring crests and dry valleys to target placement of fill where the landscape can best accommodate tunnel excavation material. In addition, we will ensure that the requirements of the archaeological mitigation strategy are met and will not place material in those areas where it is to be excluded.

In this way the footprint of the landform may be reduced through carefully considered design. The design will work with the existing topography so that natural drainage patterns are maintained.

Our approach will be determined by the following design issues:

- Available area within the red line, noting that some areas are not available within this e.g., the crest of the hills
- Compliance with the DAMS in relation to the retention of soils or where the fill depth is >1m, topsoil will be removed prior to deposition of fill materials.
- Review LoD levels in the ES to see what change is acceptable.

- Final volumes and the capacity of the site.
- Flexibility – accepting changes, construction site close down.
- Placing excavated material over existing topsoil.
- Substrate - where creation of landform is to be established the substrate is a key consideration in terms of permeability, pH level, porosity, phosphorous, organic matter etc.
- Work with topography to ensure natural drainage patterns are maintained and protected.

2.2 Minimising footprint east of Parsonage Down

Our aim is to achieve a well-designed balance between minimising the new landform's footprint and successfully integrating the landform into the existing landscape.

Minimising footprint is important, but our approach to the earthworks design is one such that the landform should become a seamless part of the existing landscape, rather than a noticeable addition.

2.3 Flood and surface water risks

We are working closely with the drainage team to understand the flood and surface water risks and how the landscape would assist in the management of risk.

Areas of landscaping would be seeded as soon as possible after earthworks have been completed in the spring. This will ensure successful grass establishment to minimise soil run off.

We recognise that tunnel fill material is generally not permeable without treatment so this could affect site drainage strategy. Tunnel excavation materials will be treated and placed to allow for drainage through the material, and the landform shaped to direct surface water to drainage treatment areas.



2.4 Calcareous grassland trials methodology and time line

Requirements for calcareous grassland trials are set out in the Design and Technical scope.

Processed tunnel arisings are required for the trials, and these may not be available for some time, or at a time which suits grass seeding and establishment. Other chalk materials may need to be adapted to replicate the tunnel arising material characteristics. Detailed proposals will be developed for the LEMP and the trials will need to be actively managed and monitored so that the methods used can be adapted if required and demonstrate that the target grasslands can be achieved.

Grassland trials at Parsonage Down will inform the final species selection and mixes for the whole of Parsonage Down.

2.5 Species selection and seed mixes for calcareous grassland

It is important to note that successful establishment of grassland depends as much on soils and short-term management as it does on selected seed mixes.

A single bespoke species mix of grasses and wildflowers (OLEMP Chapter 6) is to be used throughout. The mixes in the OLEMP would be developed to consider and potentially include legumes for Parsonage Down for example. There are also special requirements, for example turf fragments used on the Stone Curlew site, and at Parsonage Down, juniper scrub planting within the grass.

Large quantities of seed will be required and we will:

- Identify the quantities of mix required.
- Engage early with the supply chain to identify suppliers and secure/place orders for growing (not wild-harvesting).
- Allow for some flexibility between specification and what seed is successfully grown.

- Link to programme for when land is available, seed supply at the correct season for successful sowing.
- Supply could be over 2+ seasons or supply chain to identify more land to grow plants for seed.
- Allow for over-seeding with selected species to achieve desired seed mix
- Wildflower plug planting for difficult species to germinate and targeted areas.

2.6 The strategy for the reuse or placement and cultivation of topsoil.

We recognise that that different approaches to calcareous grassland creation are required dependent on the soils and substrates at each location, particularly the physical and chemical properties of the soil, and the differences between 'dug chalk' in areas of cut, and the chalk tunnel-boring arisings.

- For verges, embankments, bridges, tunnel portals and redundant paved surfaces, chalk would be mixed with topsoil at a ratio of 3-part chalk to 1-part topsoil placed over chalk and other materials as set out in the OLEMP.
- East of Parsonage Down, the chalk tunnel arisings will be placed over the existing topsoil, but topsoil would be stripped where the fill depth is >1m.

However, soil testing and trials (where practicable) would be used to identify the most appropriate blends for the seeding mediums and the approach varied accordingly. Variability will also be introduced to the soils and substrates to encourage diversity in the swards. Variations to the OLEMP approach will be considered as appropriate to maximise sustainability and biodiversity, for instance using topsoil without chalk additions where suitable for the purpose. Methods for placement and cultivation of soils will be set out in the Soil Resource Plan and series 3000 specification.



3. Land returned to agriculture

Our strategy for returning land to agriculture is centred around developing a thorough understanding of the landowner agreements and ensuring that those agreements are honoured. Our Agricultural Liaison officer will work with the land agents through the construction period and through the subsequent establishment maintenance period of the land until it is returned to the landowner for agricultural use. We will:

- Understand how long we have the land for so we can understand the programme implications;
- Seek to arrange hand-back timed to suit the agricultural activities.
- Make land available for sowing at the correct season wherever possible for successful germination.

We would look to support the Agricultural policies and actions set out within the WHS Management Plan 2015 for example by selecting fencing which is not visually intrusive and to maintain and establish semi-natural, species rich grassland.

3.1 Our strategy for the stripping, transport and storage of topsoil and subsoil

As part of our soil resource planning, we will undertake soil surveys so that we have a clear understanding of the existing soils. This will ensure that everyone has a common understanding of the existing condition and assist with ensuring that agricultural quality soils are restored to their existing condition.

Our strategy for topsoil stripping will be informed by the detailed archaeological mitigation strategy. Some areas, for example under the compound areas, require the preservation of archaeological remains which will require a different approach to those areas of earthworks which will be stripped.

Our strategy is to strip and store topsoil locally in areas where it is close to the land which is to be returned to agriculture. This will minimise the impacts on soils as a result of transportation and storage, and prevent these soils be mixed with others. We will not store soils within the World Heritage site. Returning the soils to the same area they came from will give confidence to the landowners that they are not getting soils from elsewhere placed onto their land. This approach will also assist in maintaining the soil chemistry appropriate to its agricultural use.

3.2 Our strategy for the reuse or placement and cultivation of topsoil and subsoil

Subsoils and topsoils will be taken from local storage and be placed in accordance with good practice as set out in the specification. The most appropriate cultivation techniques will be used to deliver the required agricultural land use.

During this period, we will re-test the soils, compare the results against the baseline test results and develop a fertiliser regime (if required) to be used during cultivation such that the soil chemistry meets the requirements of the agreements with the landowner.

3.3 Our strategy for sowing and establishment of grassland for land returned to agriculture

- The grassland species selected will be derived from the landowners' agreements and the Environmental Statement.
- We will monitor success of seeding through regular inspections.
- We will undertake maintenance operations are required including over-seeding failed areas or with species that have failed to germinate.