



VIP COTSWOLDS CSEC SITING STUDY

DECEMBER 2021 - FINAL

VIP Cotswolds – Cable Sealing End Compound (CSEC) Siting Study

Introduction

- 1.1 This report presents the findings of a landscape and visual appraisal of potential cable sealing end compound (CSEC) siting zone options for the VIP Cotswolds project. Chartered Landscape Architects (Gillespies) undertook this study in winter 2021.
- 1.2 The VIP Cotswolds project involves the undergrounding of a section of overhead line within the Cotswolds AONB to the east of Cheltenham; as described in more detail in 'Background' text below. The construction of two CSECs, one at either end of the underground cable route, is required to facilitate the transition from the overhead line to the underground cable.
- 1.3 The description below, provided by National Grid, gives a brief overview of what would likely be required in terms of constructing and operating the CSECs:

'Each CSEC would comprise a fenced compound measuring approximately 80m by 40m containing cable terminations (cable sealing ends), electrical equipment and support structures enclosed by security fencing. The terminal pylon forming the end of the OHL (located either inside or close to the CSEC) acts as a support for the conductor system and 'down-leads', that feed each circuit onto the cable sealing ends. A connection is provided to the electrical equipment via landing structures (gantries) designed to take the tension force. The highest equipment within each of the CSECs will be the full line tension gantries which will be approximately 14.5m. A temporary construction compound of approximately 75m x 75m will also be required adjacent to each CSEC site. The compounds will comprise laydown areas, soil storage, parking, welfare facilities, waste facilities and security. Following the completion of construction, the temporary site installation facilities will be removed and the temporary working areas will be restored to their original condition. In addition to the compound itself, it will be necessary to construct a permanent access track from the existing highway network (where existing tracks cannot be utilised) to the CSEC for maintenance purposes. This access track would need to be a minimum of 5 metres wide.'

Background

- 1.4 Section ZF.2 was identified as a red category subsection in the VIP 2014 Technical Report¹. Figure 1 illustrates the location of ZF.2 in relation to the AONB and other National Grid infrastructure. This section of 400kV overhead line was judged to have overall combined landscape and visual impacts of high importance, with a total score of 24. This results from the combination of a high score for landscape impact and a high score attributed to both visual impacts on users of trails and cycle-ways and visual impacts on visitors to publicly accessible sites.
- 1.5 Due to the length of ZF.2 (approximately 17 km) National Grid acknowledged the cost of undergrounding the entire section would be considerable and commissioned a review of ZF.2 with a view to taking forward a project that is both technically and financially viable and one that provides the greatest benefits in terms of landscape and visual mitigation. Gillespies undertook a desk top review of ZF.2² in 2020 (2020 study).
- 1.6 The 2020 study proposed that ZF.2 be subdivided into three smaller subsections as illustrated in Figure 2 - ZF.2(A), ZF.2(B) and ZF.2(C). In terms of the identification of an

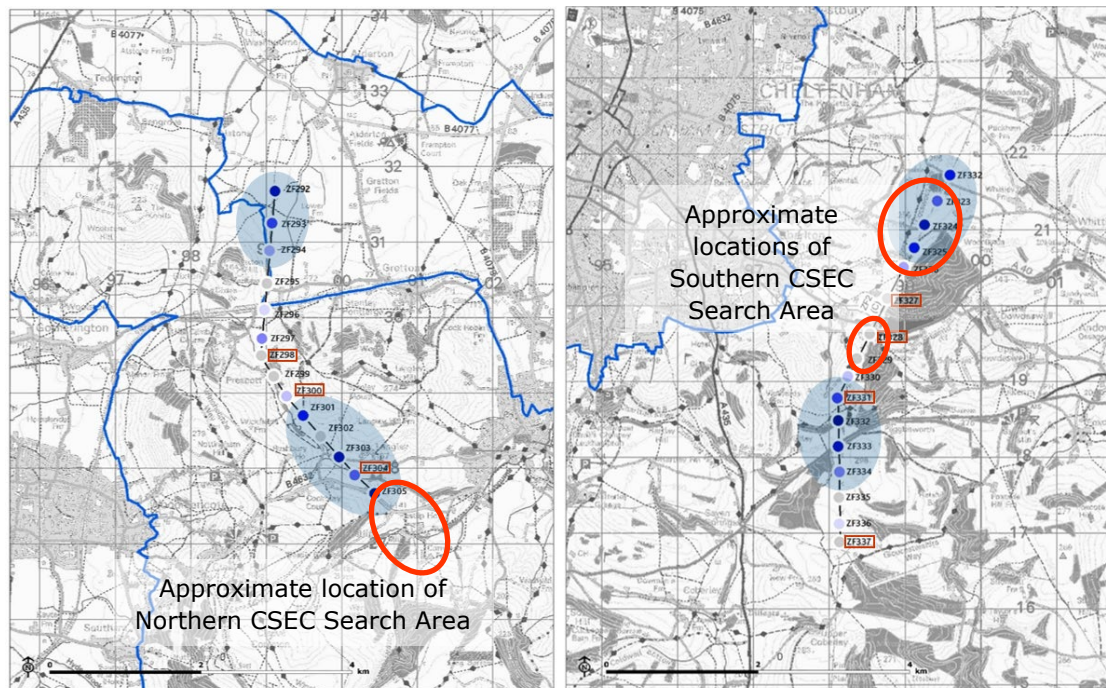
¹ Professor Carys Swanwick, Gillespies, Land Use Consultants (2014). Visual Impact Provision, Landscape and Visual Impact Assessment of Existing Electricity Transmission Infrastructure in Nationally Protected Landscapes in England and Wales, Technical Report

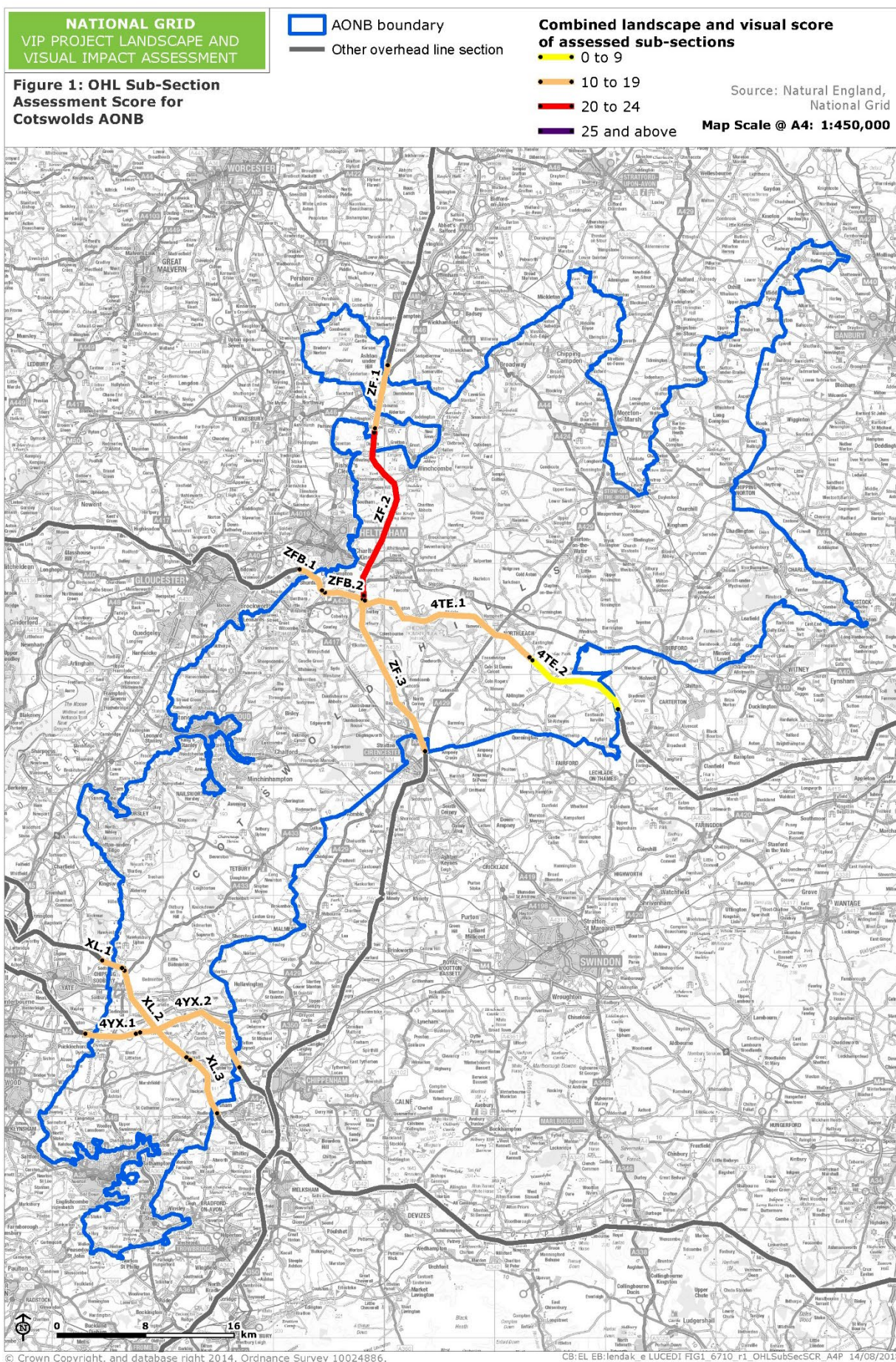
² Gillespies (2020). VIP Cotswolds AONB ZF.2 – High Level Appraisal

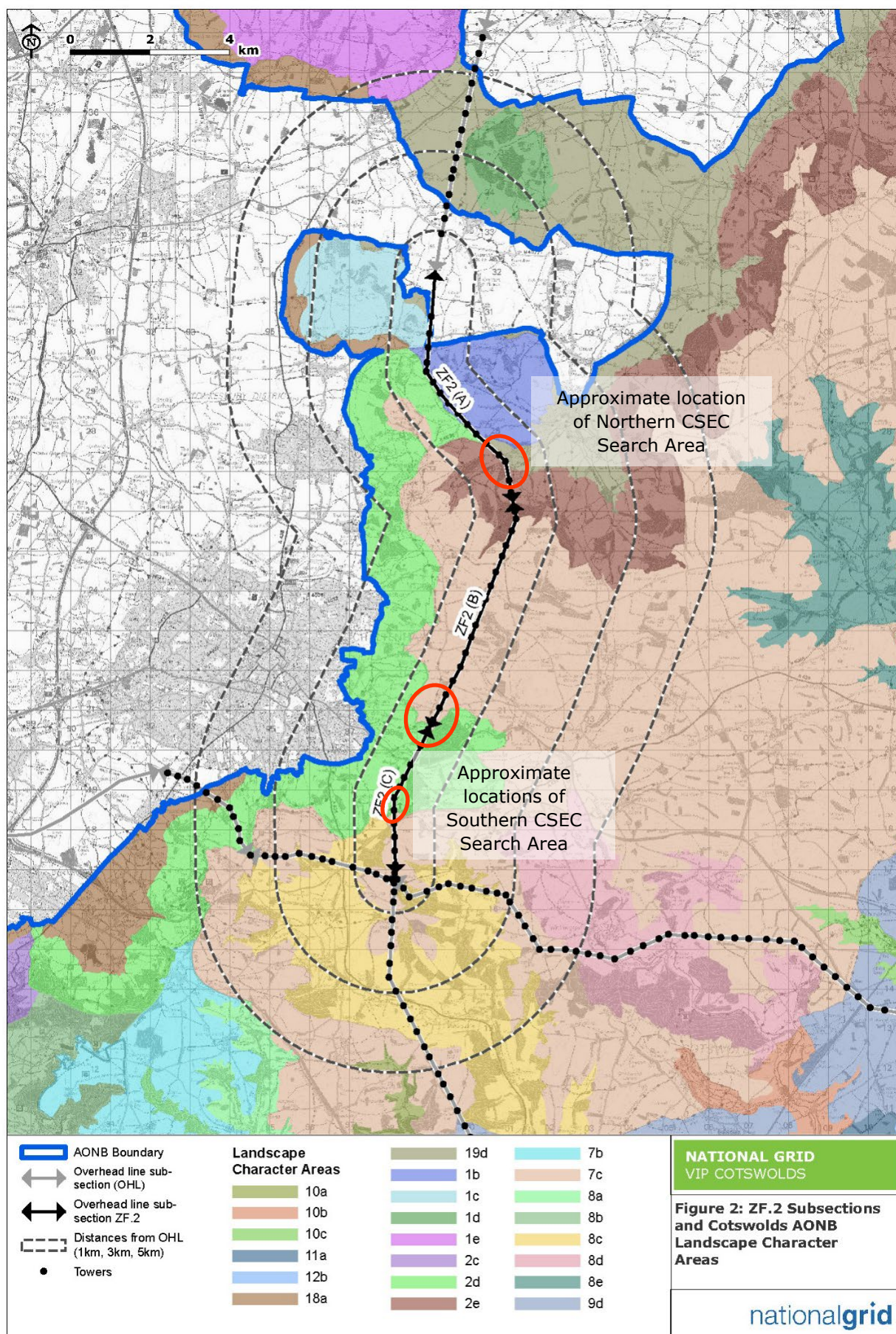
undergrounding project, the conclusion and recommendation was that National Grid should consider undergrounding the central subsection ZF.2(B). The removal of this part of ZF.2 would result in the most significant visual benefits to the widest range of key visual receptors.

- 1.7 An additional study was undertaken in spring 2021 to review which towers within subsections ZF.2(A) and ZF.2(B) have the highest visual impact. The study also considered potential options (other than undergrounding) for reducing the visual impact of these sections of overhead line. Plate 1 illustrates the findings of the study in terms of the towers judged to be most visually prominent (as represented in transparent blue shading). The red circles roughly indicate the location of the CSEC Search Areas (considered in this study) in relation to the spring 2021 study.

Plate 1: Analysis of the visual impact of towers (spring 2021 study)







Purpose and approach to this study

- 1.8 The purpose of this CSEC siting study is to provide a concise and illustrated report presenting a comparative landscape and visual analysis of a number of CSEC siting zone options. The report will be used by National Grid to inform an overall options appraisal of the potential CSEC site options, which will consider other factors in addition to landscape and visual considerations.
- 1.9 The scope and approach to this study is set out in brief below:
- Establish CSEC Siting Zones within the Northern and Southern CSEC Search Areas, based on factors such as location, topography and landcover;
 - Prepare plans to illustrate CSEC Siting Zones in relation to designations and other constraints/ considerations;
 - Production of individual indicative Zones of Theoretical Visibility (ZTV) for each of the CSEC Siting Zones (based on maximum potential height of CSEC equipment). *Note: The ZTV plans are contained within Appendix A;*
 - Analysis of the extent of the indicative ZTV and key visual receptors that fall within the indicative ZTV for each Siting Zone, in order to identify those sites that may have the greatest visual impact;
 - Site visit in November 2021 (cross referenced to previous site visit undertake in June 2021) to take viewpoint photography and verify the desktop ZTV analysis and consider baseline visibility and potential visual impact of CSEC siting options. *Note: The viewpoint photographs are contained within Appendix B;*
 - Analysis of individual CSEC Siting Zones (systematic review and reporting of each of the CSEC siting zones based on findings of desk and site work - consideration of siting zone baseline and key issues/receptors (designations/character/views), main potential impacts, likely mitigation requirements and residual impacts or implications, summary and conclusions) *Note: The Siting Zone Options Appraisals are contained within Appendix C;* and
 - Comparative appraisal of CSEC Siting Zones within the Northern and Southern CSEC Search Areas - production of narrative summary identifying preferred options in terms of landscape and visual considerations (based on evidence detailed in the above landscape and visual analysis of individual CSEC siting zones).

CSEC Search Areas and Siting Zones

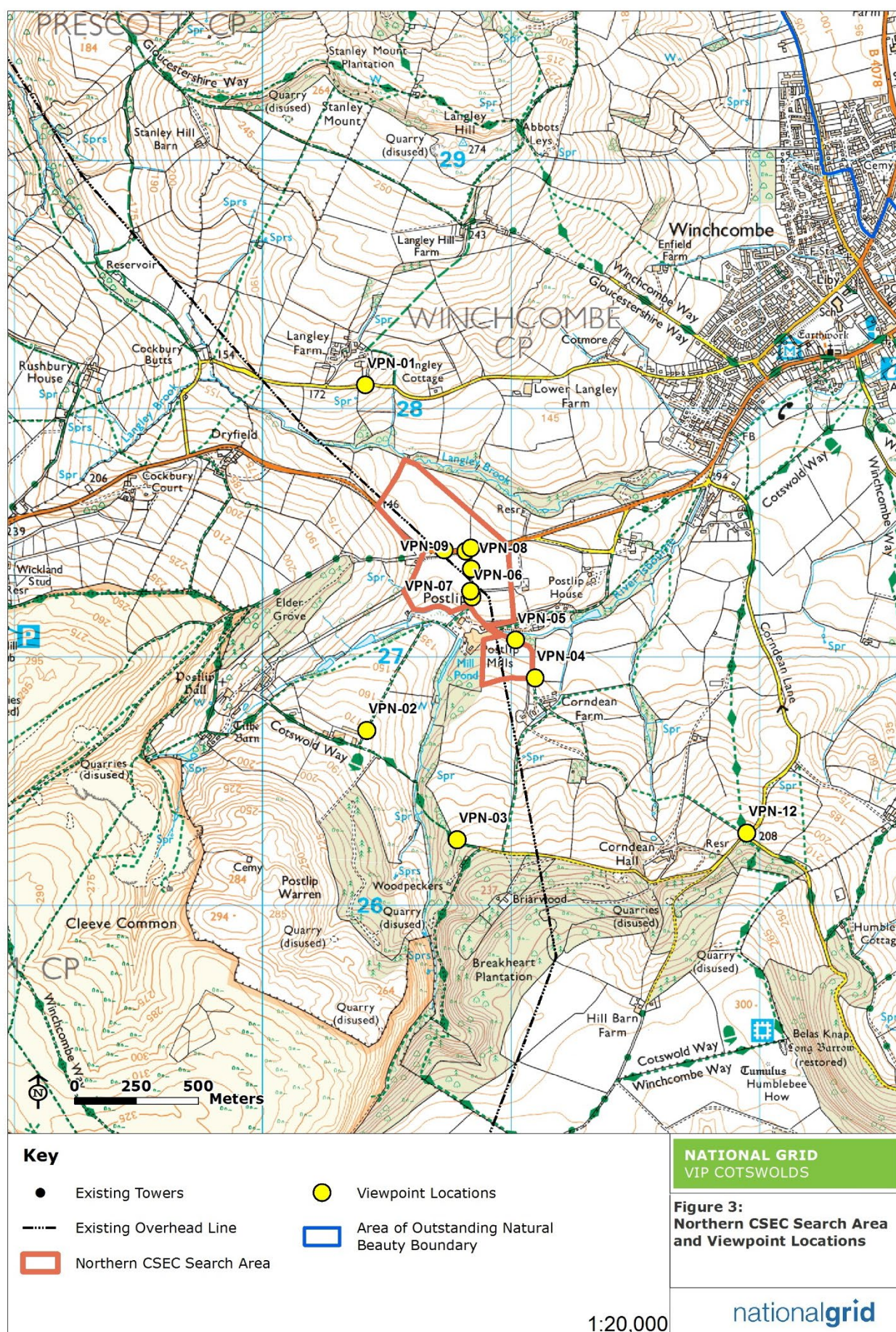
- 1.11 National Grid identified two CSEC Search Areas to be considered in this study - one to the north and one to the south of the proposed undergrounding section. These are considered to represent areas within which it would be feasible to site a CSEC and associated infrastructure and are neutral to any existing environmental designations. The Search Areas are shown on Figures 3 and 4 and described below:
- The Northern Search Area covers an area of approximately 23 hectares and comprises land to the north and south of the B4632 near Postlip Mills. Existing towers ZF305, ZF306 and ZF307 also fall within the Search Area.
 - The southern Search Area comprises land to the north and south of Ham Road (minor road) near Upper Colgate Farm, Middle Colgate Farm, Wood Farm and Hill Farm. It also covers two smaller disjointed areas to the south of the A40. It covers an area of approximately 41 hectares and is located 1.7km to the west of Charlton Kings. Existing towers ZF323, ZF324, ZF325, ZF326 and ZF328 also fall within this Search Area.
- 1.12 Ten CSEC Siting Zones have been identified within the Northern and Southern CSEC Search Areas as listed below and shown on Figure 5:
- Northern CSEC Search Area, Siting Zones: N1, N2, N3 and N4; and
 - Southern CSEC Search Area, Siting Zones: S1, S2, S3, S4, S5 and S6.

Indicative Zones of Theoretical Visibility

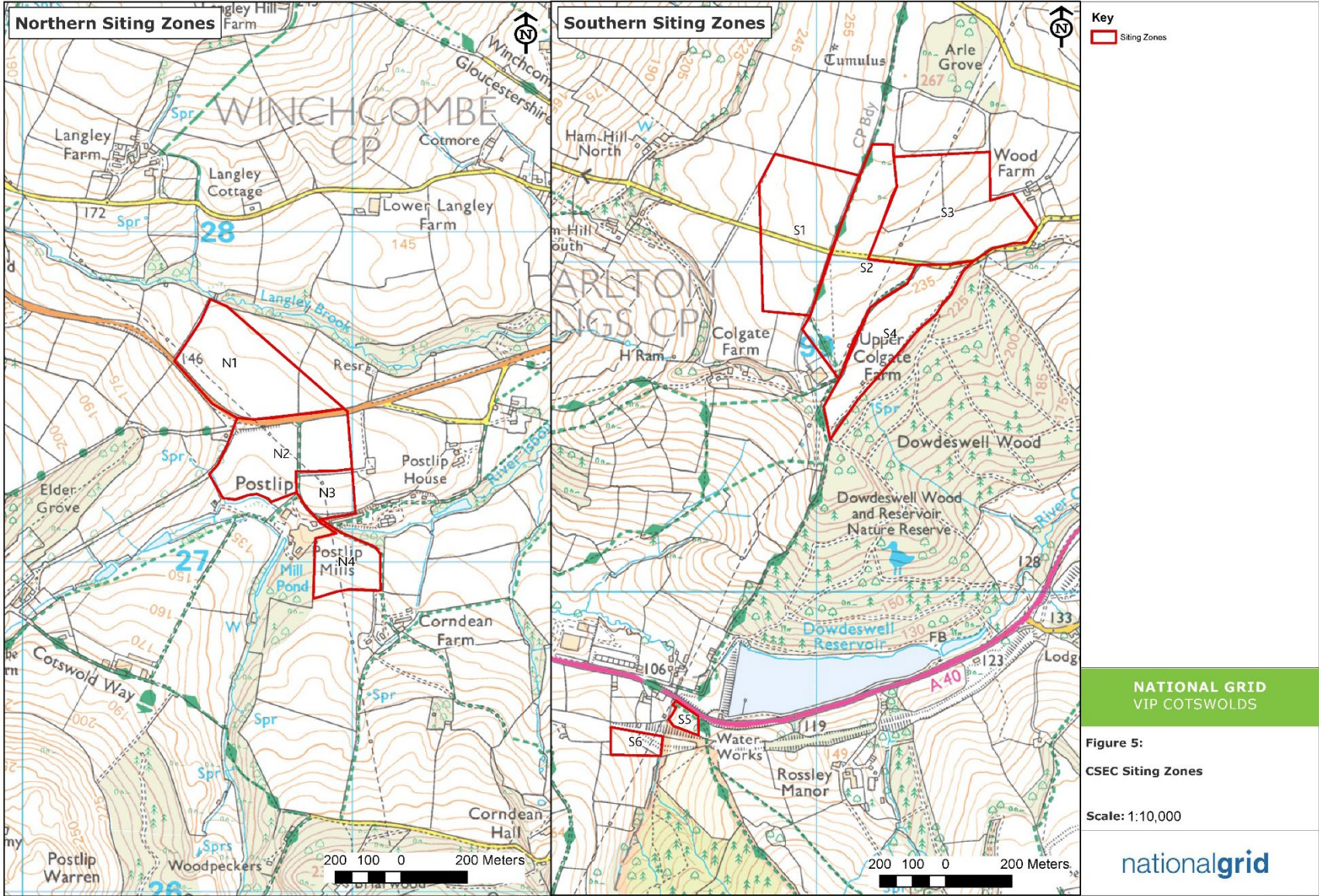
- 1.13 Indicative ZTVs for the individual CSEC Siting Zones are presented in Appendix A. The ZTVs have been generated using ArcGIS and illustrate the worst case scenario in terms of potential visibility of the gantries which would be required in the CSEC. The gantries would be the tallest structures within the CSEC at an approximate height of 14.5m. For the purpose of this study, the location of the gantries is based on the centre of each of the Siting Zones.
- 1.14 The ZTVs are based on 'bare earth' scenarios and do not consider the screening/ filtering effects of any intervening trees, woodland blocks, built form or very localised changes in landform.
- 1.15 The ZTVs have been used to inform the visual appraisal of each of the CSEC Siting Zones. Where potential visual receptors fall outside the ZTV, they have been discounted from the appraisal.

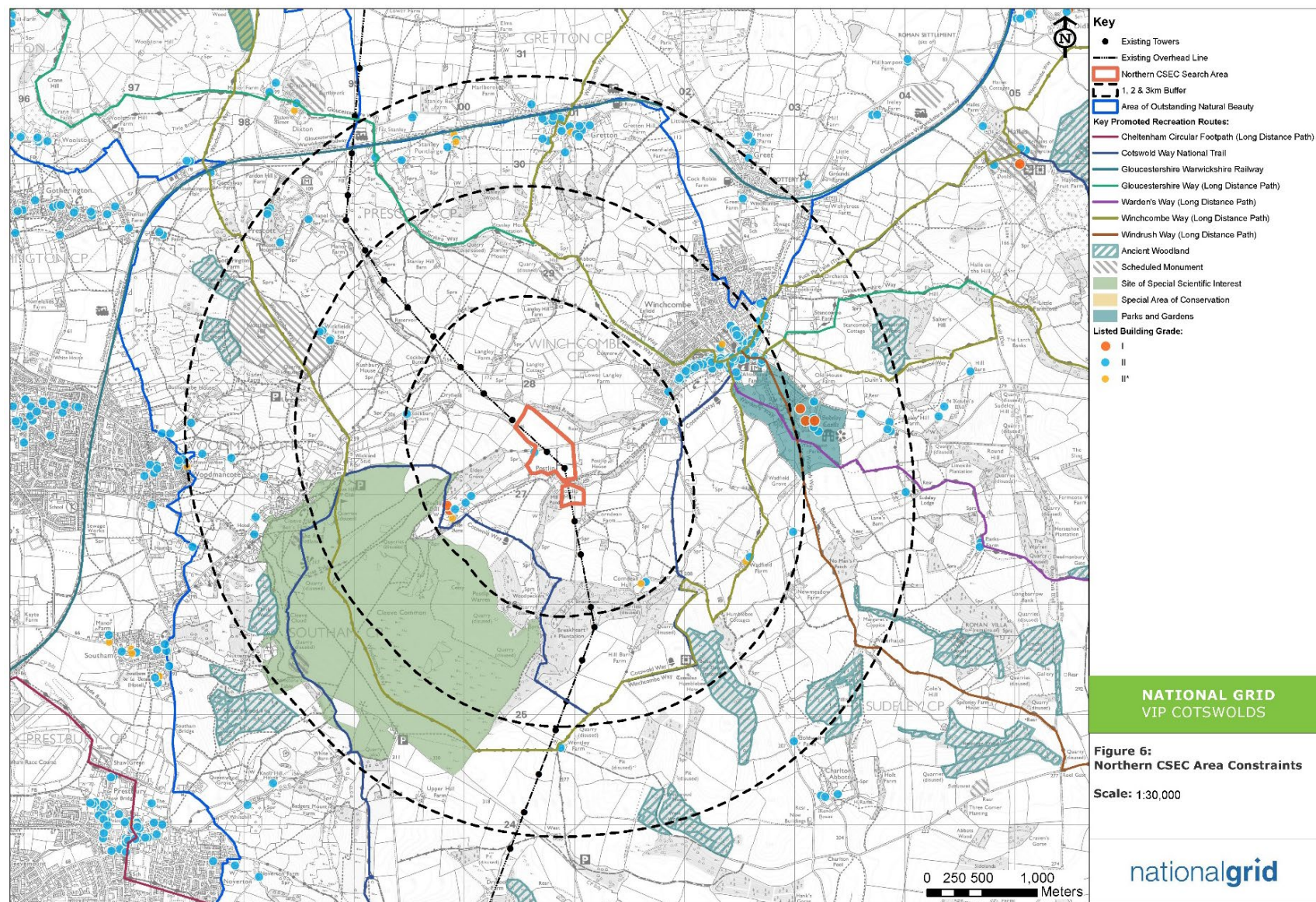
Key Visual Receptors and Constraints

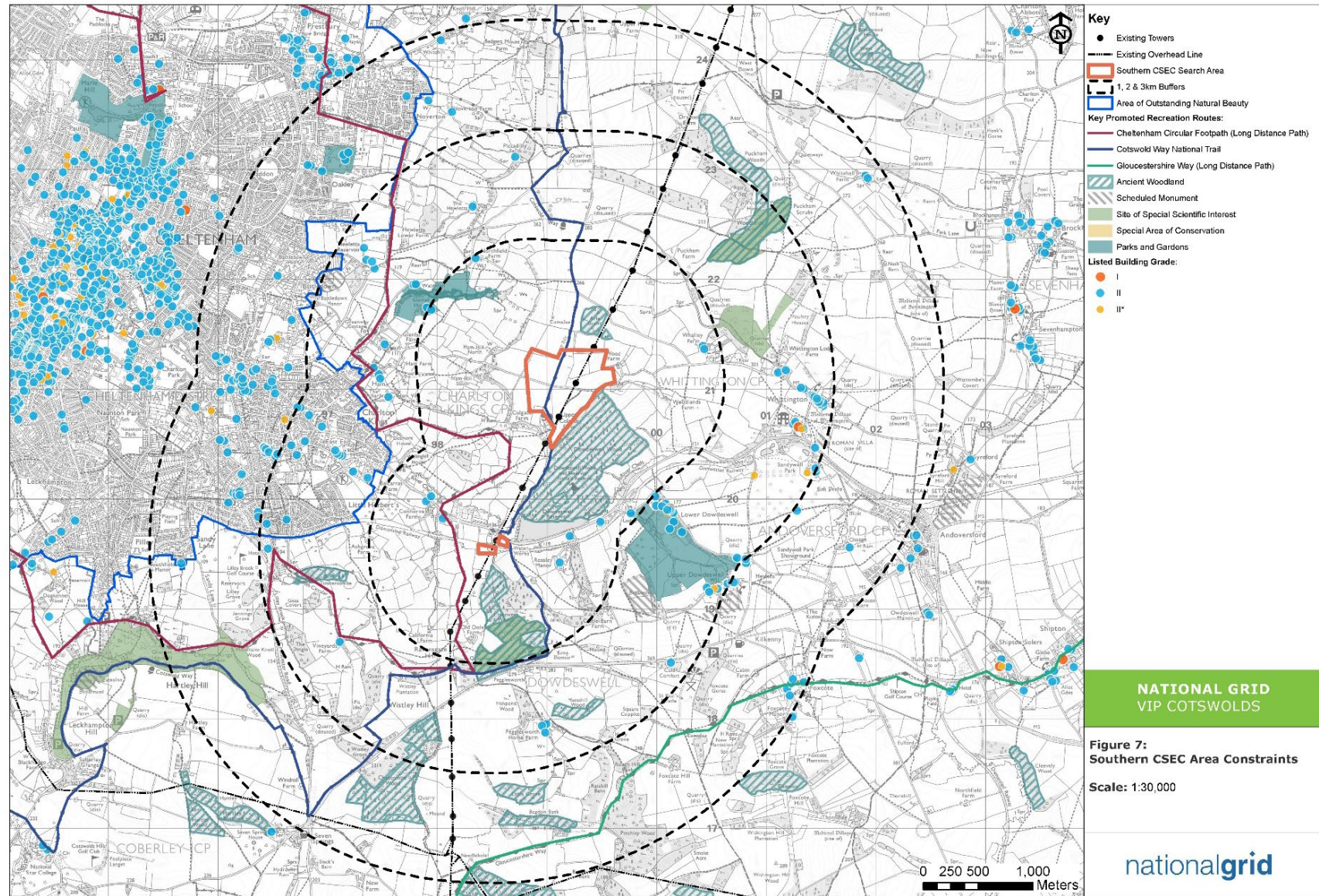
- 1.16 The identification of key receptors who may have views of each of the CSEC Siting Zones is based on a desk study of OS 1:25,000 maps and ZTV analysis. Where possible this analysis was verified on site. Viewpoint photography is presented in Appendix B and the viewpoint locations are illustrated in Figures 3 and 4 in relation to the CSEC Search Areas.
- 1.17 The focus of this study is on key receptors such as people engaged in recreation, visiting key attractions and walking or cycling on National and regionally promoted trails where the landscape and views make an important contribution to their enjoyment. Promoted recreation routes and key constraints and designations are shown on Figures 6 and 7 in relation to the Northern and Southern CSEC Search Areas.











Comparative Appraisal

- 1.18 The options appraisal presented in Appendix C broadly follows National Grid's 'Options Appraisal - Toolkit for Project Teams' guidance (2012) for outline siting options (Stage 2). The appraisal has been informed by findings of desk and site work and considers the landscape and visual baseline; key issues/receptors (designations/character/views); main potential impacts; likely mitigation requirements and residual impacts or implications; and summary and conclusions. The Horlock Rules 'NGC Substations and the Environment: Guidelines on Siting and Design' has also been taken into consideration.
- 1.19 Based on the desktop study and findings of the site visit, the CSEC Siting Zones have been reviewed and ranked below to highlight those considered the most favourable in landscape and visual terms.
- 1.20 All ten of the Siting Zones fall within the Cotswold AONB which is a consideration of Horlock Rule 2. However, the aim of the VIP Cotswold project is to reduce the impact of the 400kV overhead line on this designated landscape and as such, it is anticipated that the undergrounding project will overall have major landscape and visual benefits.
- 1.21 Table 1 below presents a high-level summary of the key considerations for the Northern CSEC Siting Zones (in order of preference).

Table 1: Northern CSEC Siting Zones

Rank	CSEC Siting Zone	Key Landscape and Visual Considerations (and notes in relation to compliance with the Horlock Rules)
1	N4	<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3). The landscape in the vicinity of this Siting Zone is already influenced by Postlip Mills, Sewage works and the overhead line. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of overhead line to the south.</p> <p>This Siting Zone takes advantage of some screening provided by landform and existing woodland and hedgerows (Horlock Rule 4). During construction and at year 1 there would inevitably be notable effects on users of the local right of way which runs immediately north and east of the site and which is also used for residential access to Corndean Cottages (Corndean Farm); however, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5).</p>
2	N1	<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3). The B4632 and the overhead line to some degree already influence the landscape of this Siting Zone; however, there is not a tower within the site itself. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a longer section of overhead line to the south.</p> <p>With the exception of the lower lying northern part of the Siting Zone there is relatively less opportunity for screening provided by landform and existing woodland and hedgerows (Horlock Rule 4). During construction and at year 1 there</p>

		would inevitably be effects on the community travelling along the B4632 and also on people living in the community, particularly in elevated views from the north. However, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5).
3	N3	<p>The site avoids areas of local amenity value (Horlock Rule 3). The landscape in the vicinity of this Siting Zone is already influenced by Postlip Mills, Sewage works and the overhead line (most notably a large angle tower within the site). Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of overhead line to the south.</p> <p>This Siting Zone takes some advantage of screening provided by landform, combined with existing tree cover to the south (Horlock Rule 4). However, there is one residential property (Dry Ground Farm) directly east of the site with close up, open views (Horlock Rule 5). During construction and at year 1 there would inevitably be notable effects on users of the local right of way which runs immediately west of the site and also on local community at Dry Ground Farm. There may be opportunity to mitigate visual impacts in the longer term; however, this may be challenging in terms of the proximity of residential receptors.</p>
	N2	<p>A Grade II listed building is located directly north west of this site and the western boundary of the site comprises the entrance drive to several listed buildings and a Scheduled Monument (Horlock Rule 3). The landscape to the south of this Siting Zone is to some degree influenced by Postlip Mills and the overhead line (there is an existing tower within the western field of the Siting Zone and an existing angle tower just south of the eastern field). The northern extent of the site is also influenced by the B4632. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed to some degree by the removal of overhead line to the south.</p> <p>In terms of the Siting Zones considered in the Northern CSEC Search Area, N2 is the most elevated. With the exception of the lower lying southern parts of the site (closest to Postlip Mill) there is limited opportunity to take advantage of screening provided by landform and existing tree cover (Horlock Rule 4). There is also one residential property (Postlip Lodge) directly west of the site and another to the south east (Dry Ground Farm) with close up, open views (Horlock Rule 5). During construction and at year 1 there would inevitably be notable effects on users of the local right of way which runs north/south through the centre of the site and also on local community (at Postlip Lodge and/ or Dry Ground). There may be opportunity to mitigate visual</p>

		impacts in the longer term; however, this may be challenging in terms of the proximity of residential receptors.
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- 1.22 Table 2 below presents a high-level summary of the key considerations for each of the Southern CSEC Siting Zones (in order of preference).

Table 2: Southern CSEC Siting Zones

Rank	CSEC Siting Zone	Key Landscape and Visual Considerations
1	S6	<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3). The A40 to some degree, the overhead line and the former railway embankment already influence the landscape in the vicinity of this Siting Zone; however, there is not a tower within the site itself. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a longer section of overhead line to the north.</p> <p>This Siting Zone takes advantage of screening provided by landform and existing woodland, trees and hedgerows (Horlock Rule 4). During construction and at year 1 there would inevitably be effects on people living in the community (one property approximately 60m to the north and another approximately 130m to the west); however, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5).</p>
		<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3). The overhead line influences the landscape in the vicinity of this Siting Zone; one tower is within the site itself. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a section of overhead line to the north.</p> <p>This Siting Zone takes advantage of some screening provided existing, trees and hedgerows (Horlock Rule 4). During construction and at year 1 there would inevitably be effects on local community at Wood Farm and to a lesser degree on people walking along the Cotswold Way National Trail; however, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5).</p>
2	S3	<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3). The overhead line influences the landscape in the vicinity of this Siting Zone; one tower is within the site itself. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a section of overhead line to the north.</p> <p>This Siting Zone takes advantage of some screening provided existing, trees and hedgerows (Horlock Rule 4). During construction and at year 1 there would inevitably be effects on local community at Wood Farm and to a lesser degree on people walking along the Cotswold Way National Trail; however, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5).</p>
	S4	<p>This Siting Zone avoids areas of local amenity value (Horlock Rule 3); although Dowdeswell Wood (Ancient Replanted Woodland) lies immediately south east. The overhead line influences the landscape in the vicinity of this Siting Zone; however, there is not a tower within the site itself. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a section of overhead line to the north.</p>

		<p>This Siting Zone takes advantage of some screening provided by existing woodland, trees and hedgerows (Horlock Rule 4). During construction and at year 1 there would inevitably be effects on users of the local right of way, which runs immediately west of the site and which is used for access to Upper Colgate Farm. There would also be filtered views from a small section of the Cotswold Way National Trail; however, there is opportunity to mitigate visual impacts in the longer term (Horlock Rule 5), particularly in relation to extending woodland planting which could tie in with Dowdeswell Wood.</p>
3	S1	<p>This Siting Zone avoids areas of local amenity value although there is a Scheduled Monument approximately 350m to the north (Horlock Rule 3). The landscape of this Siting Zone is the least influenced by the overhead line which lies approximately 150m east at its closest point. A new CSEC would spread the influence of detractors in this locality although this may be outweighed to some degree by the removal of overhead line to the north.</p> <p>In terms of the Siting Zones considered in the Southern CSEC Search Area, S1 is one of the most elevated and there is less opportunity to take advantage of screening provided by landform and existing tree cover than the other sites considered (Horlock Rule 4). In terms of close up views, there is one residential property (Ham Hill Farm) directly west of the site; however, views are filtered by intervening garden boundary vegetation. The access road to Middle Colgate Farm forms part of the eastern boundary of the site (Horlock Rule 5). The Cotswold Way National Trail runs along the entire length of the eastern site boundary from which there are frequent open views. During construction and at year 1 there would inevitably be notable effects on users of the Cotswold Way National Trail. There may be opportunity to mitigate visual impacts in the longer term; however, this may be challenging in terms ensuring that mitigation measures in the form of planting and/or mounding do not conflict with the elevated and more open nature of this part of the High Wold Plateau.</p>
	S2	<p>This Siting Zone avoids areas of local amenity value although there is a Scheduled Monument approximately 340m to the north west (Horlock Rule 3). The landscape of this Siting Zone is influenced by the overhead line in the south but less so in the north. One tower is located in the far south of the site. A new CSEC would spread the influence of detractors in this locality if sited in the north of the site although this may be outweighed to some degree by the removal of overhead line to the north.</p> <p>In terms of the Siting Zones considered in the Southern CSEC Search Area, S2 is one of the most elevated. As such, there is slightly less opportunity to take advantage of screening</p>

		<p>provided by landform and existing tree cover than the other sites considered (Horlock Rule 4). In terms of close up views, Middle and Upper Colgate Farm are directly south of the site, although existing vegetation may filter views from the properties themselves (Horlock Rule 5). The access road to Middle Colgate Farm forms part of the western boundary of the site and has filtered views of the site. The access to Upper Colgate Farm, also a local right of way, forms part of the eastern boundary and has open views of the site. The Cotswold Way National Trail runs along the entire length of the western site boundary from which there are frequent open views. During construction and at year 1 there would inevitably be notable effects on users of the Cotswold Way National Trail. There may be opportunity to mitigate visual impacts in the longer term; however, this may be challenging in terms ensuring that mitigation measures in the form of planting and/or mounding do not conflict with the elevated and more open nature of this part of the High Wold Plateau.</p>
	S5	<p>The site avoids areas of local amenity value (Horlock Rule 3). The landscape in the vicinity of this Siting Zone is already influenced by the A40, the overhead line and the former railway embankment. Although a new CSEC would intensify the influence of detractors in this locality this may be outweighed by the removal of a longer section of overhead line to the north.</p> <p>This Siting Zone takes some advantage of screening provided by landform, combined with existing tree cover to the south (Horlock Rule 4). However, there is one residential property (adjacent to Dowdeswell Reservoir) directly northeast of the site with close up views (Horlock Rule 5). There is also a bar and restaurant with an outdoor seating area immediately to the west, the entrance to Lineover Woods (Woodland Trust - Open Access woodland) to the east and the Cotswold Way National Trail runs through the site. During construction and at year 1 there would inevitably be notable effects on residential and recreational receptors. There may be limitations in terms of what mitigation could be considered due to the small size of the site and therefore mitigation may pose a challenge.</p>

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