Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 15.5: Landscape and Visual Assessment Methodology

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1 Landscape and Visual Impact Assessment Methodology

1.1 Introduction

1.1.1 The following guidance was followed for the assessment of landscape and visual effects:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Swanwick, 2013);
- An Approach to Landscape Character Assessment (Tudor, 2014); and
- Landscape Institute Technical Guidance Note 06/19 – Visual Representation of development proposals (Landscape Institute, 2019).

1.1.2 The assessment of landscape and visual effects first assessed the significance of effects, taking into account primary and tertiary mitigation measures. Remaining effects, not mitigated by primary or tertiary measures, were further mitigated where possible and the assessment then assessed the significance of effects, taking into account the secondary measures.

1.2 Landscape assessment

1.2.1 For the purposes of this assessment, the definition of landscape follows the European Landscape Convention which covers natural, rural, urban and peri-urban areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes.

1.2.2 The landscape baseline was evaluated based on the constituent elements, features and other factors that contribute to existing landscape character within the study area including:

- the physical influences on the landscape resource - including topography, geology, soils, microclimate, water bodies and water courses;
- the influence of human activity – including land use, open space, transport routes, public rights of way (PRoW), land management, the character of settlement and buildings, the night-time environment, and the pattern and type of fields and enclosure;
- the aesthetic and perceptual aspects of the landscape – including scale, complexity, openness, tranquillity, and wildness; and
- habitats and heritage features – including nature reserves, sites of special scientific interest, conservation areas, listed buildings, registered parks and gardens and other elements contributing to historic landscape character.

Assessment criteria

1.2.3 For the LVIA, local landscape character areas (LCAs) (broadly homogeneous units of distinct features and elements) within the study area were identified. The areas were established using published landscape character assessments, desk study and site survey. Photographs illustrating the characteristic features of the LCA are provided in the appendices to Chapter 15: Landscape and Visual Amenity (Application document reference 5.4.15.2).

1.2.4 The value of each LCA was evaluated in accordance with the criteria set out in the table below in Table 1-1.

Table 1-1: Landscape value

Value	Criteria for assessing landscape value
High	Designated landscape such as National Park, AONB or undesignated landscape. High scenic quality with a distinctive combination of features, elements and characteristics, outstanding views and a strong sense of place. A scarce or fragile landscape with cultural, historic or ecological elements which make a major contribution to landscape character. No or very few landscape detractors. Has components which are difficult to replace (such as mature trees). A tranquil landscape in good condition, largely intact, with an unspoilt character.
Medium	Landscape locally designated (such as conservation area, regional park) or locally valued (for its recreational facilities and footpath networks for instance). Some scenic quality and a moderate sense of place. A landscape with some distinctive features, elements and characteristics. Some cultural, historic or ecological elements which contribute to landscape character. Some high use areas, but overall medium tranquillity. Few landscape detractors.
Low	Undesignated landscape, not valued for its scenic quality, with a disparate combination of features, elements and characteristics and a weak sense of place. Mainly common features and few or no cultural, historic or ecological elements that contribute to landscape character. Many landscape detractors. A landscape of low tranquillity.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

1.2.5 The susceptibility of each LCA to change was evaluated in accordance with the criteria set out in Table 1-2.

Table 1-2: Landscape susceptibility to change

Susceptibility	Criteria for assessing landscape susceptibility
High	The overall character and the valued landscape characteristics, elements and features have a low ability to tolerate the nature and scale of the change resulting from the proposed development without permanent serious adverse change to the baseline situation.
Medium	The overall character and the valued landscape characteristics, elements and features have a moderate ability to tolerate the nature and scale of the change resulting from the proposed development, with some adverse changes to the baseline situation.
Low	The overall character and the valued landscape characteristics, elements and features have a high ability to tolerate the nature and scale of the change resulting from the proposed development, with limited adverse changes to the baseline situation.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

1.2.6 The sensitivity of the landscape was evaluated by considering the existing value of the landscape and its susceptibility to tolerate or accommodate the type of change arising from development of the CSET Scheme.

1.2.7 The sensitivity of each LCA was evaluated in accordance with the criteria set out in Table 1-3.

Table 1-3: Landscape sensitivity

Sensitivity	Criteria for assessing landscape sensitivity
High	Landscape of high importance, rarity and value with distinctive features/elements with limited ability to accommodate change without incurring substantial loss/gain (i.e. designated areas, registered parks and gardens, country parks and strong sense of place). Landscape with elevated tranquillity, components not easily replaced or substituted and limited scope for effective mitigation in character with the existing landscape. A high susceptibility to change due to the type of development proposed.
Medium	Landscape of medium value and local or regional recognition of importance, able to accommodate some change (i.e. with features worthy of conservation and with some sense of place). A landscape with moderate tranquillity, components that are easily replaced or substituted and scope for effective mitigation in character with the existing landscape. A medium susceptibility to change due to the type of development proposed.
Low	Undesignated landscape of low value, able to accommodate change (i.e. non-designated or designated areas of local recognition or areas with little sense of place). A landscape with limited tranquillity, components that are easily replaced or substituted and scope for effective mitigation in character with the existing landscape. A low susceptibility to change due to the type of development proposed.

Source: Criteria based on guidance in the GLVIA3 (LI and IEMA, 2013)

1.2.8 The magnitude of impact on landscape character in construction and operation was determined by considering:

- the nature of an impact - whether the introduction of the proposed WWTP will be of benefit or detriment to the existing landscape character;

- the scale of the change – the extent of the loss of landscape elements, the degree to which aesthetic features or perceptual aspects of the landscape are altered (by the removal of hedgerows or introduction of new structures for example) and whether a key characteristic of the landscape is altered;
- the geographical extent of the area affected; and
- the duration of the change and its reversibility.

1.2.9 The magnitude of impact on landscape character was evaluated in accordance with the criteria set out in Table 1-4.

Table 1-4: Impact magnitude - landscape character

Magnitude of change		Typical descriptions
No change	No change	No noticeable alteration or improvement, temporary or permanent, of landscape character of existing features and elements.
Negligible	Adverse	Very minor loss, damage or short-term alteration to existing landscape character of one or more features and elements. A short-term change to an LCA or its setting.
	Beneficial	Very minor or short-term improvement to existing landscape character by the restoration of one or more existing landscape features and elements. A short-term change to an LCA or its setting.
Minor	Adverse:	Slight loss or short/medium-term damage to existing landscape character of one (maybe more) key features and elements. Addition of uncharacteristic new features and elements. Changes that will alter a small proportion of the landscape character area (LCA) and its immediate setting. A short/medium-term change to an LCA or its setting.
	Beneficial	Slight or short/medium-term improvement of landscape character by the restoration of one (or more) key existing features and elements. Addition of new and characteristic features. Changes that will alter a small proportion of the LCA and its immediate setting. A short/medium-term change to an LCA or its setting.
Moderate	Adverse	Partial or noticeable damage to existing landscape character or distinctive features or elements. Addition of new uncharacteristic, noticeable features or elements (i.e. infrastructure), but which do not necessarily conflict with key characteristics of the existing landscape. A medium/long-term or permanent change to an LCA or its setting.
	Beneficial	Partial or noticeable improvement of landscape character by restoration of existing features or elements.

Magnitude of change		Typical descriptions
		Addition of new and characteristic features or elements or removal of noticeable detracting features or elements. A medium/long-term or permanent change to an LCA or its setting.
Major	Adverse	Total loss or large-scale damage to existing landscape character or distinctive features or elements. Addition of new uncharacteristic, conspicuous features or elements (i.e. infrastructure). Changes that alter a substantial proportion of the LCA. Introduction of long-term or permanent changes to an LCA or its setting.
	Beneficial	Large scale improvement of landscape character to features and elements. Addition of new distinctive features or elements, or removal of conspicuous infrastructure elements. Changes that alter a substantial proportion of the LCA. Introduction of long-term or permanent changes to an LCA or its setting.

1.3 Visual assessment

1.3.1 The baseline study identified visual receptors and important, designated or protected views that will potentially be affected by the development. These may include residential, recreational, hotel, educational, transport, active sports and employment receptors. Representative viewpoints, each illustrated with a photograph, were selected to represent the experience of groups of receptors in areas where the change to the view, as a result of the Proposed Development, is likely to be similar (for example in urban areas or areas where there are numerous public rights of way). Photographs illustrating the existing view from the representative viewpoints in winter and summer are provided in the appendices to Chapter 15: Landscape and Visual Amenity (Application document reference 5.4.15.2). Specific viewpoints were also chosen to illustrate effects on key views from landscapes of high visual amenity or to illustrate a particular effect or issue. Visual receptors vary in their sensitivity to changes in the view and this was determined by considering the value receptors attach to specific views and their susceptibility to a change to views and visual amenity. The selection of representative viewpoints took into account:

- the accessibility of the viewpoint;
- the number of receptors likely to be affected;
- the viewing direction and distance from the site of the Proposed Development;
- the nature of the viewing experience; and

- cumulative views, in conjunction with other projects.

1.3.2 The selection of representative viewpoints proposed was based on the extent of the ZTV, the findings of site surveys in winter and summer, a review of planning policy documents and discussion with the Greater Cambridge Planning Service, the National Trust, Cambridge Past Present and Future and English Heritage in meetings on 7th December 2021 and 13th December 2021.

1.4 Assessment criteria

1.4.1 The value attached to a view was evaluated in accordance with the criteria set out in Table 1-5.

Table 1-5: View value

View value	Criteria for assessing view value
High	A view in which attractive features are dominant or include attractive focal points and/or skyline features. Visual detractors may be present but are not strongly apparent in the composition of the view. A view in a high-quality landscape such as an Area of Outstanding Natural Beauty, designated or identified as of value in a guidebook or tourist literature. A view where the composition is a fundamental aspect of the design or function of a heritage asset and is integral to its setting.
Medium	An unremarkable view where neither attractive or discordant elements are dominant or form a clearly apparent part of its composition. A view that is not designated or documented.
Low	A view where discordant or unattractive features are dominant or prevalent and/or where such features are focal points and/or skyline features. Views may contain some attractive features, but these are not strongly apparent in the composition of the view. A view that is not designated or undocumented.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

1.4.2 The susceptibility to change depends on the occupation or activity of the receptor and the extent to which their attention is focused on the view and visual amenity. The susceptibility of receptors to change was evaluated in accordance with the criteria set out in Table 1-6.

Table 1-6: Visual receptor susceptibility to change

Susceptibility	Criteria for assessing visual receptor susceptibility
High	Occupiers of residential properties, users of PRoW and visitors to places whose attention is focussed on the landscape.
Medium	People working outdoors in or travelling through rural areas whose attention is partially on the landscape. People walking or cycling through urban areas whose views are partially focussed on their surroundings. Users of publicly accessible outdoor open space including cemeteries.
Low	People at work, at school and engaging in formal sport. People walking or cycling through urban areas whose attention is focussed on their destination rather than enjoying the scenery they are passing through. People travelling at high speed on main roads or railways.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

1.4.3 The sensitivity of visual receptors was evaluated by considering the value attached to specific views and the susceptibility of individual visual receptors to changes to views and visual amenity. The value attached to a view could derive from the relative dominance of attractive or detracting features in the view, its cultural or historic associations or its location in a high-quality landscape. The susceptibility to change depends on the occupation or activity of the receptor and the extent to which their attention is focused on the view and visual amenity.

1.4.4 The sensitivity of each visual receptor was evaluated in accordance with the criteria set out in Table 1-7.

Table 1-7: Visual receptor sensitivity

Sensitivity	Criteria for assessing visual receptor sensitivity
High	Occupiers of residential properties, PRoW users and visitors to places whose attention is focussed on the landscape. Views with few detracting features. High value views which may be designated or undocumented.
Medium	People working outdoors in or travelling through rural areas, people walking or cycling through urban areas and visiting outdoor publicly accessible open space. Views in which neither attractive nor discordant elements are dominant. Medium value views which may be undesignated and undocumented.
Low	People at work, at school, engaging in formal sport, commuting in urban areas and travelling at high speed on main roads or railways. Typically, view may include predominantly discordant or unattractive features. Low value views which are undesignated and undocumented.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

1.4.5 The magnitude of impact on views in construction and operation was determined by considering the scale, nature and duration of the change, the distance of the change from the visual receptor, the receptor's direction of view, the extent of screening and filtering of the view and whether the receptor was static or moving.

- Close – up to 250m from the site of the Proposed Development;
- Mid-distance – between 250m and 500m from the site of the Proposed Development; and
- Distant – more than 500m from the site of the Proposed Development.

1.4.6 The magnitude of impact on views was evaluated in accordance with the criteria set out in Table 1-8.

Table 1-8: Impact magnitude – visual amenity

Magnitude of change		Typical descriptions
No change	No change	No part of the proposed scheme would be discernible.
Negligible	Adverse	Only a small part of the proposed scheme would be discernible or being at such a distance it would form a barely noticeable feature or element of the view. Adverse changes almost entirely obscured by intervening vegetation and/or built form. A short-term change to the view.
	Beneficial	Only a small part of the proposed scheme would be discernible or being at such a distance it would form a barely noticeable feature or element of the view. Beneficial changes almost entirely obscured by intervening vegetation and/or built form. A short-term change to the view.
Minor	Adverse:	The proposed scheme or part of it would be perceptible but seen as one of a series of components in the wider panoramic view, affecting a small proportion of the view and not altering the balance of features in the view. Adverse changes within the background of the view or viewed obliquely and largely filtered/screened by intervening vegetation or built form. A short or medium-term change to the view.
	Beneficial	The proposed scheme or part of it would be perceptible but seen as one of a series of components in the wider panoramic view, affecting a small proportion of the view and not altering the balance of features in the view. Beneficial changes within the background of the view or viewed obliquely and largely filtered/screened by intervening vegetation or built form. A short or medium-term change to the view.
Moderate	Adverse	The proposed scheme or part of it would form a noticeable feature or element of the view, readily apparent to the receptor. Noticeable adverse change partially filtered by intervening vegetation and/or built form or viewed obliquely. A **medium/long-term or permanent** change to the view.
	Beneficial	The proposed scheme or part of it would form a noticeable feature or element of the view, readily apparent to the receptor. Noticeable beneficial change partially filtered by intervening vegetation and/or built form or viewed obliquely. A medium/long-term or permanent change to the view.
Major	Adverse	The Proposed Development or part of it would become the dominant feature or focal point of the view. Addition of new features visible across the majority of the view. Total loss or substantial adverse alteration to key characteristics of the view. A long-term or permanent change to the view.

Magnitude of change		Typical descriptions
	Beneficial	The proposed scheme or part of it would become the dominant feature or focal point of the view. Addition of new features visible across the majority of the view. Substantial beneficial change to key characteristics of the view. A long-term or permanent change to the view.

Source: Criteria based on guidance in GLVIA3 (LI and IEMA, 2013)

Significance of effects

1.4.7 Professional judgement was used to determine the overall significance of effect on landscape and visual receptors by weighing the sensitivity of the receptors against the magnitude of change. For the purpose of this assessment, any effects with a significance level of slight or neutral are considered to be not significant.

1.4.8 The evaluation of the significance of effect was guided by the matrix in Table 1-9.

Table 1-9: Significance matrix

		Sensitivity		
Magnitude of change		**Low**	**Medium**	**High**
	No change	Neutral Not significant	Neutral Not significant	Neutral Not significant
	Negligible	Neutral Not significant	Neutral/slight Not significant	Slight Not significant
	Minor	Neutral/slight Not significant	Slight Not significant	Slight Not significant **Moderate** **Significant**
	Moderate	Slight Not significant	**Moderate** **Significant**	**Moderate/large** **Significant**
	Major	Slight Not significant **Moderate** **Significant**	**Moderate/large** **Significant**	**Large** **Significant**

2 Assessment of Lighting Impacts

2.1.1 The night-time baseline assessment was informed by the Environmental Lighting Impact Assessment (Application document reference 5.4.15.3) and considered the visibility, brightness and prominence of existing light sources in views and commented on existing light spill, glare and skyglow. The effects of lighting on the night-time landscape character and views from residential properties, campsites, recreational attractions which are open at night, hotels and healthcare institutions were assessed in construction and operation. This was a qualitative assessment and did not include a quantitative lighting assessment of existing light levels or lighting impacts which is provided in the Environmental Lighting Impact Assessment.

3 Zone of Theoretical Visibility

3.1.1 The zone of theoretical visibility (ZTV) of the proposed WWTP was mapped in accordance with guidance on ZTV mapping in paragraphs 6.6–6.11 of GLVIA3 using 2m resolution digital surface model data. The ZTV was modelled on the most prominent of the tall structures on the proposed WWTP. The boiler stack, at 24m high, will be the tallest structure on the site but it will be a narrow element in most views. Therefore, though it will be visible over a wide area, it will be less prominent in the view than the more substantial digesters at 20m high. ZTVs generally overestimate the visibility of a development because they do not fully register the screening effect of all existing vegetation. For example, a series of narrow tree belts between a receptor and a development can be as effective a screen as a substantial woodland block but they will not be registered in the digital surface model data. Nor do ZTV take into account how the impact of a development on the view diminishes with distance.

4 Photomontage Methodology

4.1.1 To support the assessment, a number of verifiable photomontages were prepared. These compare the existing view with views of the proposed scheme in winter of year 1 of operation and year 15, when planting mitigation will have matured. Woodland and tree planting was assumed to have reached 7.5m high after 15 years and hedgerows to have reached 2.5m high after 15 years. The locations selected for the photomontages were agreed in consultation with the Greater Cambridge Planning Service, the National Trust, Cambridge Past Present and Future and English Heritage in meetings on 7th December 2021 and 13th December 2021.

4.1.2 The verifiable photomontages were prepared following the Landscape Institute's *Technical Guidance Note 06/19: Visual Representation of Development Proposals.* This document aims to help landscape professionals produce visualisations appropriate to the circumstances in which they will be used. The guidance points out that: *Two dimensional visualisations, however detailed and sophisticated, can never fully substitute what people see in reality. They should, therefore, be considered an approximation of the three-dimensional visual experience that an observer might receive in the field* (Paragraph 1.2.13).

4.1.3 The Landscape Institute guidance recommends that for verifiable photomontages, the baseline photography should be taken using a fixed 50mm focal length (FL) lens. However, the guidance does acknowledge that in circumstances, where a development might not be fully captured by a 50mm FL lens, a 35mm FL lens is acceptable (Appendix 1, Paragraph 1.1.7). The agreed locations for the verifiable photomontages include a near view (Low Fen Drove Way) and more distant views (Footpath Horningsea 130/6 and Horningsea Road) and it was decided to use a 35mm FL lens to capture as much of the Proposed Development, including mitigation planting at year 15, as possible.

4.1.4 The camera used for the baseline photography was a Sony A7rIV with Sigma 35mm lens. A panoramic mount was used, custom engineered to rotate the camera in a flat plane within 0.015 degrees to the horizon. The camera was mounted on a tripod 1.65m above the ground and high quality architectural photographic practice was used to capture the view in two-point perspective. For panoramic images the camera was placed on a rotating mount and a sequence of images sharing the same point of perspective and orientation with respect to the horizon were captured using a fixed 35mm lens. Images were captured in RAW format and a photograph taken of the camera in its location. Reasonable effort was made to capture images in the best weather and at the best times of day with regards to the angle of the sun.

4.1.5 A Leica total station was used to record a set of 15-25 3d coordinates within the view. These coordinates were aligned to OS using a Leica Viva GNSS system. Where a view was in a rural location with no fixed survey points, temporary survey targets were placed and the survey undertaken at the same time as the photography.

4.1.6 The RAW image was processed into a tiff image which was remapped to remove all lens distortion to ensure a perfect fit with the 3d data. For panoramic images, the individual frames were stitched together in specialist software to create a seamless image to the specified field of view in an equirectangular projection. The image was then placed into a larger background and positioned so that the calculated position of the image's optical axis was aligned with the centre of the background to compensate for any lens shift.

4.1.7 The OS coordinate and orientation of the camera was calculated using the 3d OS survey coordinates and their corresponding 2d coordinates on the image. The values obtained by this process along with the OS coordinates were moved to a local point of origin to reduce their numerical size and entered into the 3ds Max Physical camera controls and the survey points rendered out over the background image to verify the alignment.

4.1.8 The photographer provided the following information:

- a high-resolution layered tiff file with marked survey points and corresponding rendered objects as separate layers;
- information describing the physical parameters of the camera and the time and date of the image capture;
- 3ds Max Physical Camera aligned to survey;
- a spreadsheet and DXF of survey points and camera coordinates in original OS and local coordinates; and
- a photographic record was taken of the camera in its position.

Get in touch

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Calling our Freephone information line on **0808 196 1661**

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