



Water Lane, Angmering

Bridge Design – Design and Access Statement

On behalf of Barratt David Wilson Southern Counties

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Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN

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	Name	Position	Signature	Date
Prepared by:	Gabor Galyasz	Senior Engineer	GG	11.06.2020
Reviewed by:	Stephen Millns	Senior Associate	SM	11.06.2020
Approved by:	Dan Hayes	Director	DH	11.06.2020
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved

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1 Introduction

1.1 Overview

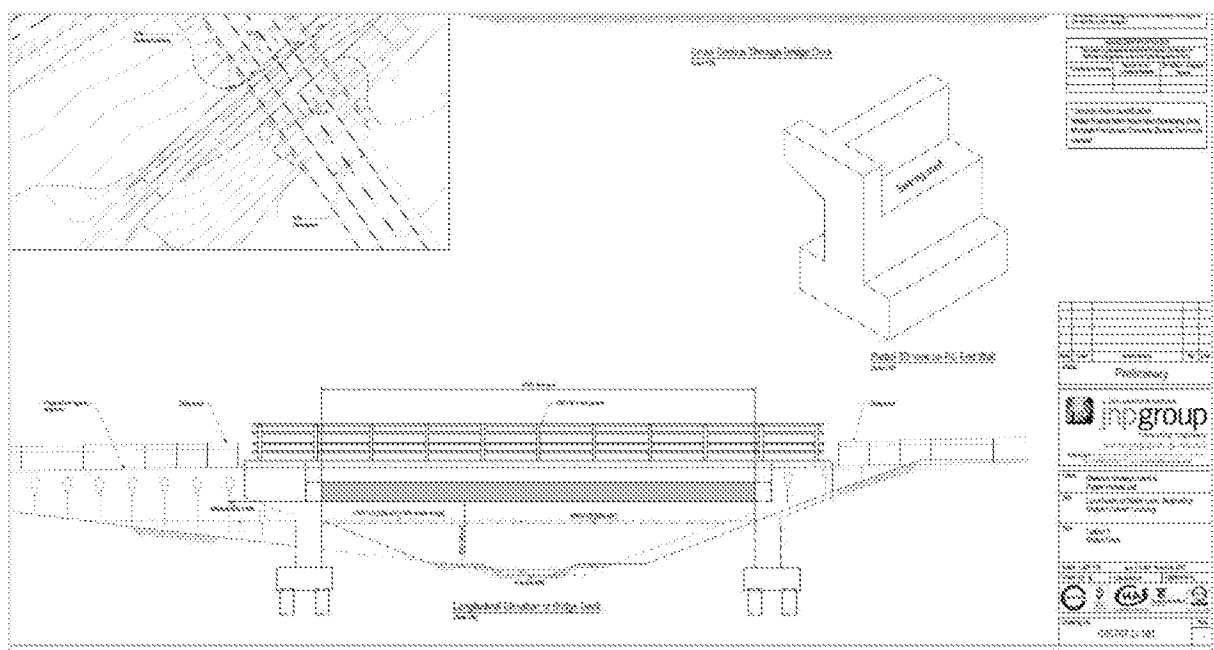
1.1.1 Stantec UK Ltd has been commissioned by Barratt David Wilson Southern Counties to prepare a Design and Access Statement (DAS) to support a Reserved Matters Applications (RMA) for the new bridge at Water Lane, Angmering.

1.1.2 The proposed bridge forms part of an Outline Planning Permission granted in 2018 (planning ref. A/99/17/OUT) for 175 no. residential dwellings, public open space, play area with associated infrastructure including roads, drainage and landscaping.

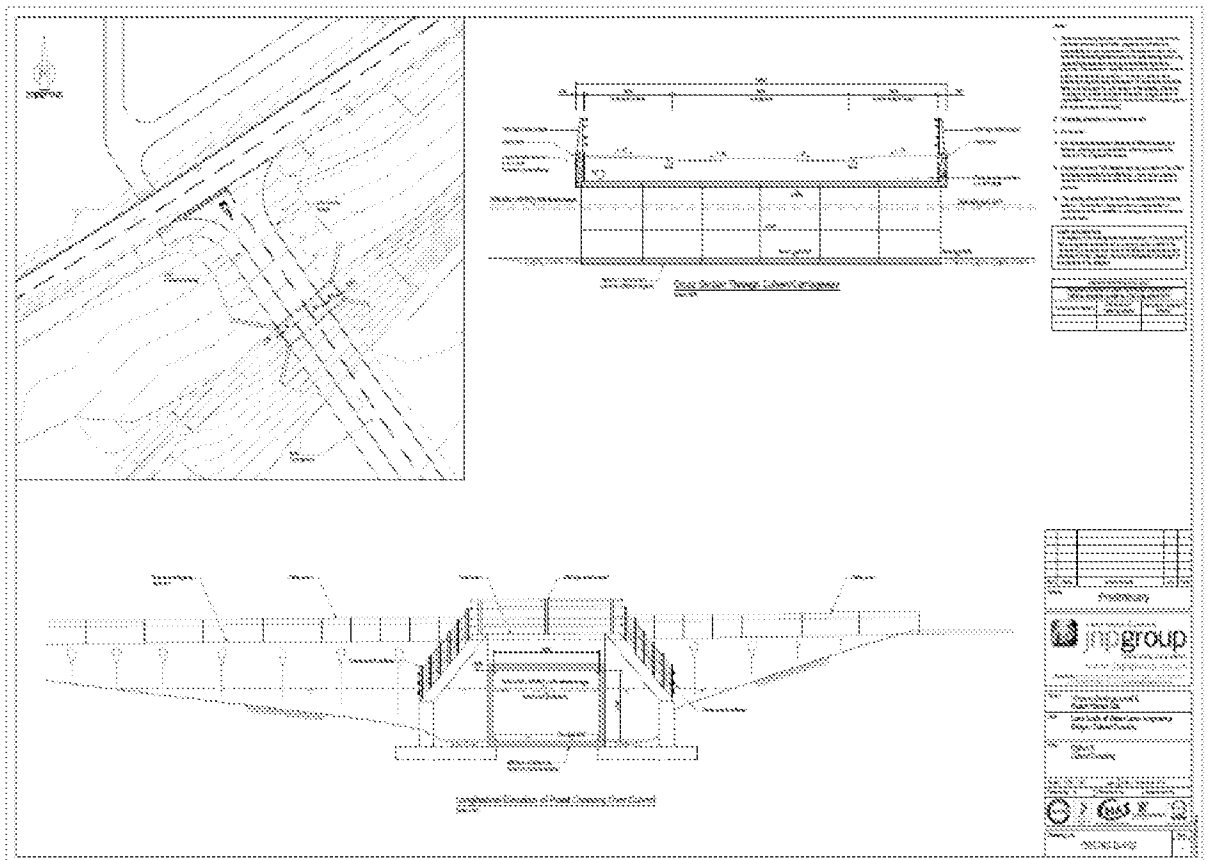
1.2 Background

1.2.1 As part of the Outline Planning Permission, three bridge design options were presented. These were:

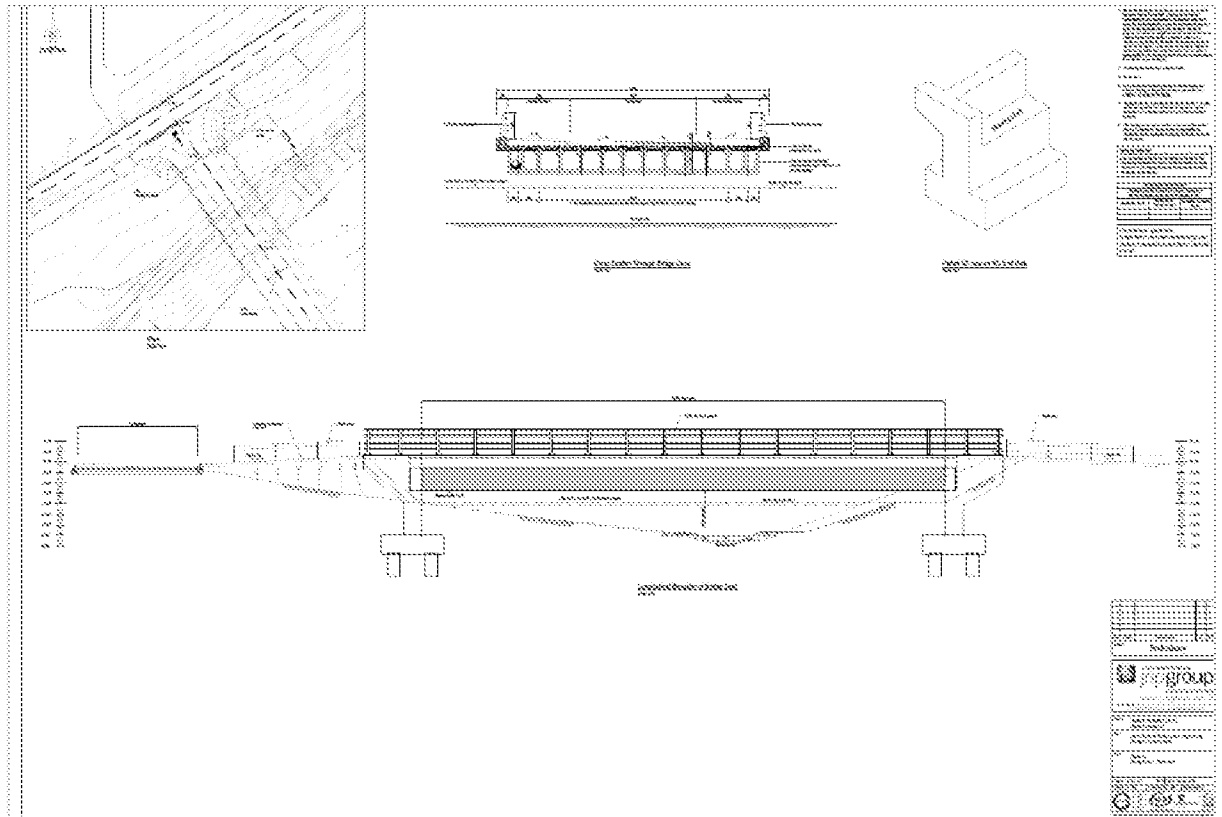
- Option 1: A bridge deck construction with a 14m clear deck (Drawing no. C85767-D-101)



■ Option 2: Culvert crossing (Drawing no. C85767-D-102)



- Option 3: A bridge deck construction with a 25m clear span (Drawing no. C85767-D-103)



2 Bridge Context

2.1 Site Description

- 2.1.1 The site is located approximately 800m east of the centre of Angmering and south of Water Lane. It is bounded by the A280 to the east, Weavers Hill to the west and High Street to the south.
- 2.1.2 The proposed bridge will link Water Lane to the development site, which is located on the southern side of Black Ditch.

2.2 Site Conditions and Constraints

Flood Risk

- 2.2.1 In 2018, Edenvale Young Associates Ltd (EYV) constructed a 1D-2D Estry-Tuflow model of a 2.6km length of the Black Ditch, adjacent to Water Lane in Angmering.
- 2.2.2 Stantec has re-run the EYV model in response to the Environment Agency's (EA) requirement to consider the 1 in 100yr+45% and 1 in 100yr+105% climate change allowance events in when assessing the soffit level of the proposed new bridge.
- 2.2.3 The final soffit level is still to be confirmed but will be set at a minimum of 600mm above the 100yr+45% climate change allowance event level (11.04m aOD). This minimum soffit level will satisfy the EA's requirements for freeboard.

Headroom for inspection / maintenance

- 2.2.4 The structure will be subject to regular inspections during its lifetime, therefore it is required to consider such activities when establishing the headroom.

Design principles

- 2.2.5 The proposed bridge meets the overarching key requirements through the following:

Functionality

- Vehicular bridge
- Not to increase flood risk

Structure

- Simply structure
- Constructability

Material

- Low maintenance requirement
- Dissuasive to street art

Maintainability

- Low maintenance requirement,
- Access for inspections / maintenance

2.3 Design development

- 2.3.1 The bridge outline design was developed in close multi-disciplinary collaboration with civil and hydro engineers to address the design requirements giving due consideration of the three options presented as part of the outline planning process.
- 2.3.2 Flood risk analyses has revealed that the floodplain storage would be significantly reduced using Option 1 (14m long clear span) and Option 2 (Culvert), therefore these options were both discounted.
- 2.3.3 Hydrology modelling has subsequently identified that a 21m clear span bridge span will be required with a soffit level that will provide the requisite maintenance requirements and suit the local topography.
- 2.3.4 The road passing over the bridges will comprise of a two-lane single carriageway with a footway on the west side and a footway/cycleway on the east side. Considering the width requirements, we established the minimum width for the bridge in consultation with the highway designer.
- 2.3.5 To set out the vertical position of the bridge we have engaged with the Environmental Agency to confirm minimum freeboard requirements and flood levels, consulted with the highway designers, considered the future inspections and maintenance of abutments and bridge deck.
- 2.3.6 We have undertaken bridge optioneering considering different materials, structural form, maintenance requirements, construction, and shape to meet the key principles.

3 Proposed bridge design

- 3.1.1 The proposed bridge structure will carry a section of road providing access to the development site over the Black Ditch.
- 3.1.2 The bridge superstructure will comprise of precast prestressed reinforced concrete beams with an in-situ reinforced deck cast over the top. The clear span of the bridge will be 21m (minimum), as shown in **Figure 1** and the width of the bridge will be 12.1m (minimum), as shown in **Figure 2**.
- 3.1.3 The deck will be supported on in-situ concrete abutments at both ends. The bridge foundation is currently assumed to be piled and will be confirmed during detailed design stage.
- 3.1.4 The bridge abutments will be extended by wing walls either side of the bridge to retain the adjoining road embankment.
- 3.1.5 The design working life of the bridge structure (deck, supports, foundations and wing walls) is 120 years with provision of suitable maintenance.
- 3.1.6 Future provision for utilities will be accommodated in the footway/cycleway over the bridge and between the beams
- 3.1.7 The structure will be equipped with bridge parapets at the deck edge to protect vehicles, pedestrians and cyclists.

Figure 1: Western Bridge Elevation

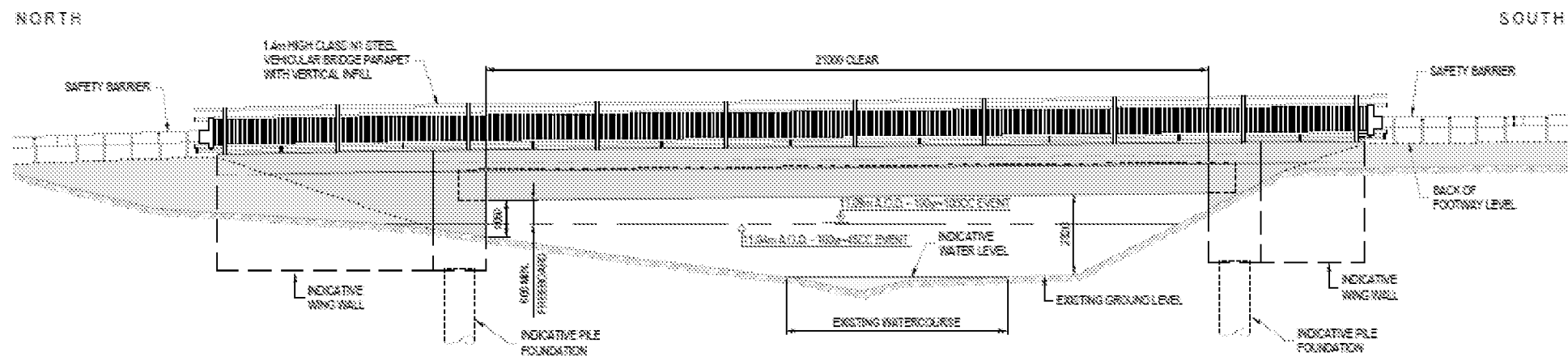
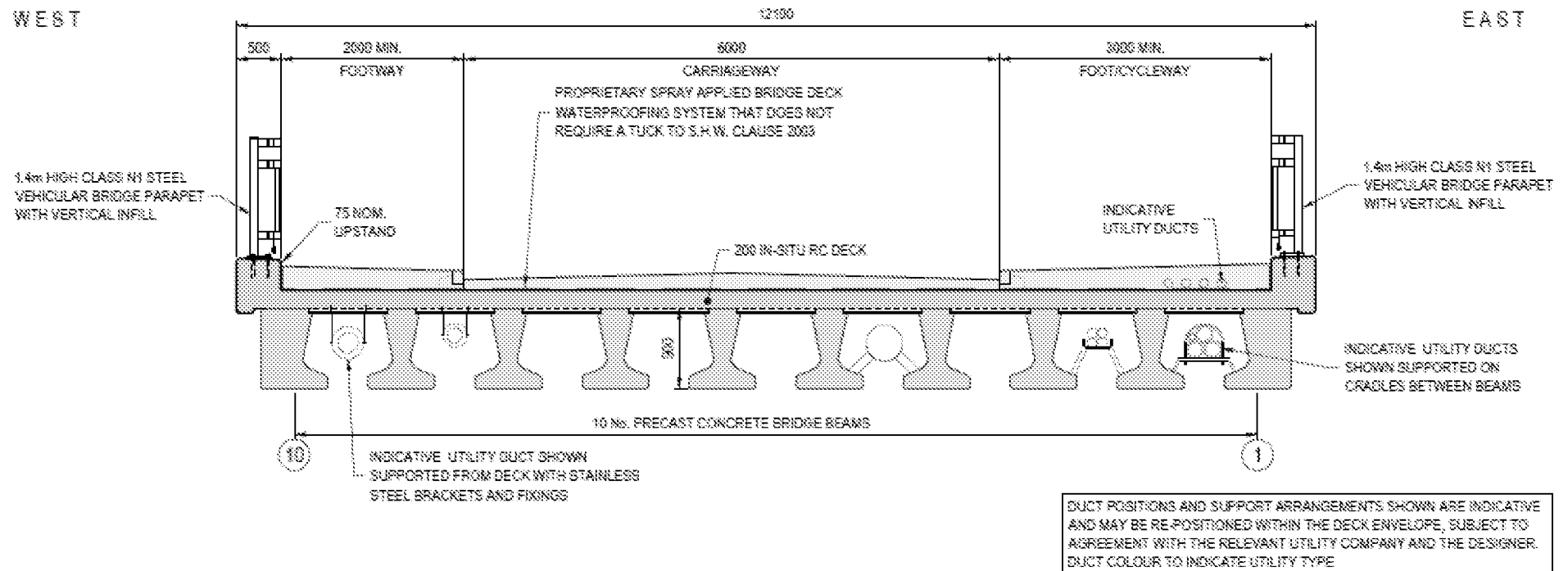


Figure 2: Bridge Cross Section

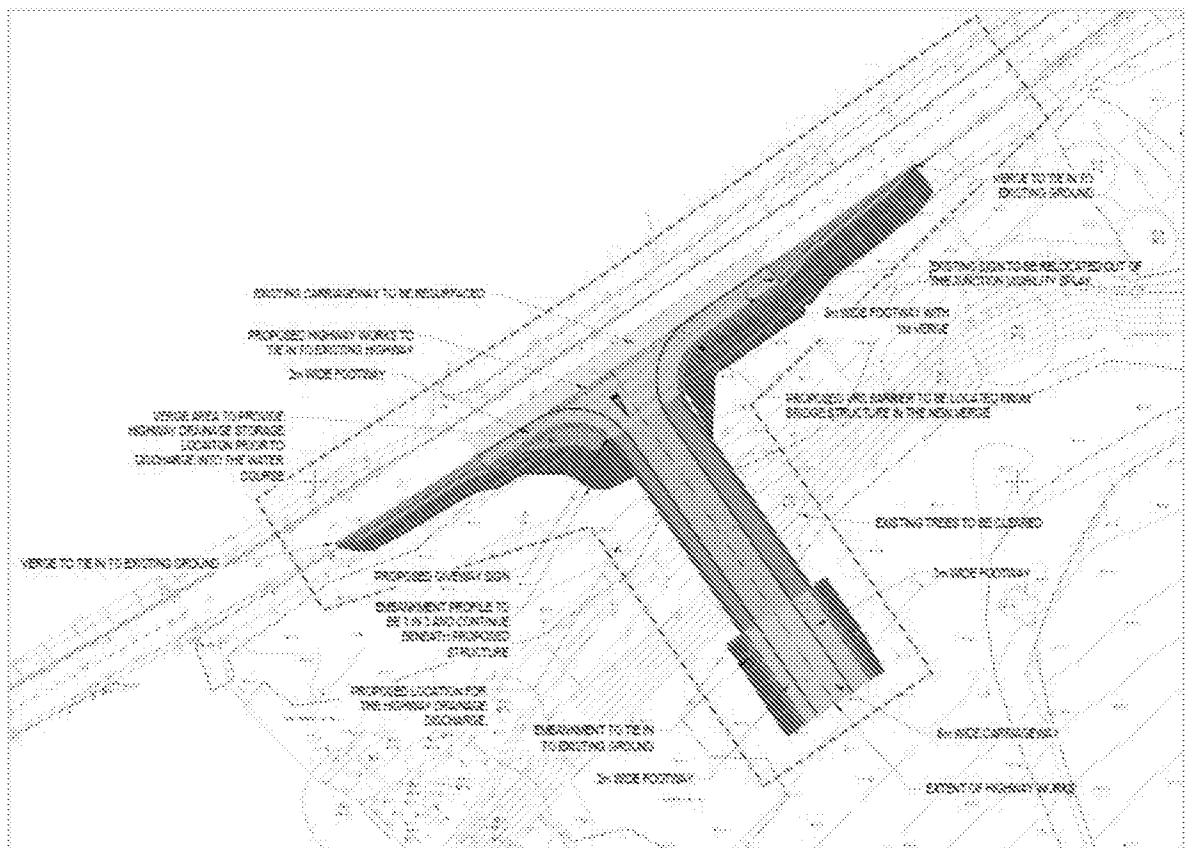


4 Site Access

4.1 Outline Details

- 4.1.1 The proposed access serving the development is in the form of a simple priority T-junction to Water Lane as shown in Stantec Drawing 46353_2002_001. This is reproduced in **Figure 3** and illustrates the alignment of the proposed bridge perpendicular to Water Lane.

Figure 3: General Access Arrangement



- 4.1.2 The proposed carriageway width is 6m with 10m radii leading onto Water Lane. Allowance for a 3m and 2m wide footpaths over the new bridge structure has been provided to allow for future provision.
- 4.1.3 The access road raises up from Water Lane to the proposed bridge structure over the existing water course with a 1 in 100 longitudinal profile over the structure. The proposed new highway embankments will have slopes of 1 in 3 leading down to the existing water course with verge widths of 1m to accommodate the required vehicle restraint barriers leading to the structure.
- 4.1.4 The existing highway drainage and proposed drainage from the new access road will be collected and north west verge prior to discharge to the existing water course. Agreed position for discharge has been outlined within the outlined planning documentation.
- 4.1.5 Revised Street lighting will be undertaken to amend the existing lighting layout of Water Lane to accommodate the new priority junction.

- 4.1.6 From reviewing the submitted and approved Transport Assessment (ref. TW/MC/ITB9105-007D R) and the guidance on visibility required for the proposed priority T-junction, then Manual for Streets (MfS) is applicable in this location. Based on the existing highway geometry and current speed limits in place on Water Lane, the proposed visibility requirements have been applied for the site access of:

- 2.4m X 90m to the left and right

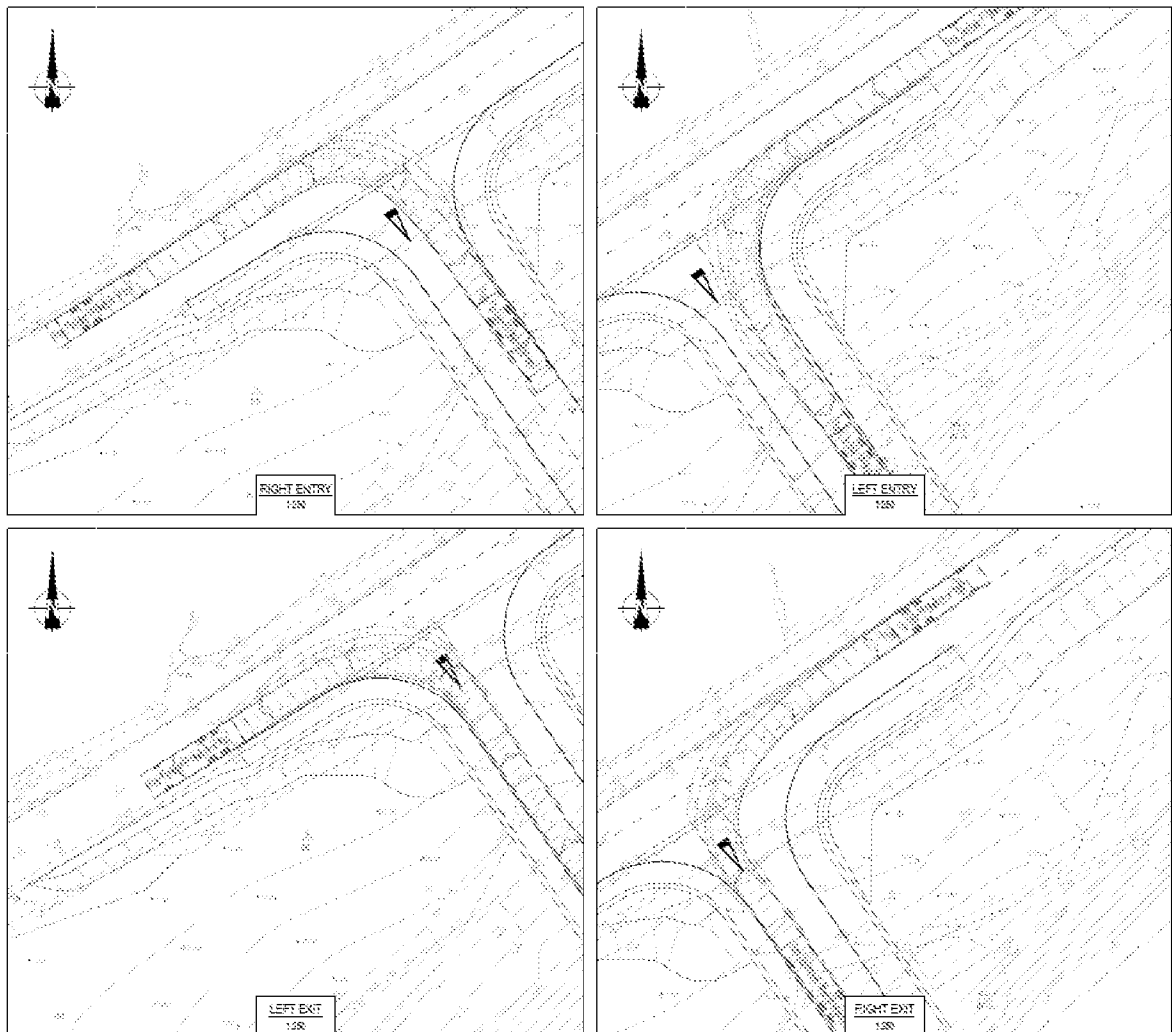
Figure 4 illustrates that this Sight Stopping Distance (SSD) can be achieved.

Figure 4: Visibility Splay



- 4.1.7 Autotrack vehicle swept path analysis has been undertaken to demonstrate that the site access can accommodate the typical largest vehicle, which is a refuse vehicle. The vehicle swept path analysis is shown in **Figure 5**, which demonstrates that satisfactory access can be achieved for a refuse vehicle based upon the proposed site access geometry.

Figure 5: Vehicle Swept Path Analysis



- 4.1.8 Outline details of the proposed bridge deck are contained in **Figure 6**. The details indicate the future provision for the footpaths over the 21m span structure and the proposed carriageway widths.

Figure 6: Bridge Dimensions

