EAST WICK AND SWEETWATER

FLOOD RISK AND HYDRAULIC IMPACT STATEMENT

BRIDGES H14 & H16 RESERVED MATTERS

OCTOBER 2016

EAST WICK & SWEETWATER

LONDON LEGACY DEVELOPMENT CORPORATION

BUROHAPPOLD ENGINEERING

Flood Risk and Hydraulic Impact Statement

Project	Eastwick and Sweetwater Development Specified Infrastructure Works: Bridges H14 & H16
Subject	Flood Risk and Hydraulic Impact Statement
Project no	034307
Date	October 2016

Revision	Description	Issued by	Date	Approved (signature)
01	Flood Risk Statement for Planning	NV	Oct-2016	DP

1 Introduction

The Legacy Communities Scheme (LCS) provides for the comprehensive, phased mixed used redevelopment of the Queen Elizabeth Olympic Park (QEOP). The LCS was granted outline planning permission in September 2012, which authorised the development of up to 759,900sqm of floorspace across a range of uses, as well as supporting infrastructure. Bridges H14 and H16 – new connections between Fish Island and the planned Sweetwater neighbourhood (also referred to as Planning Delivery Zone 4 (PDZ4)) were both granted outline planning permission as part of the LCS approval. Specifically, outline approval was granted for:

- H14: Replacement of the temporary H14 footbridge with a permanent highways bridge.
- H16: A new pedestrian and cycle bridge.

Condition LCSO.31 of the LCS outline planning permission states that reserved matters applications for bridges H14 and H16 shall be accompanied by *"a flood risk, hydraulic impact, navigation impact and ecology statement"*. This document addresses the flood risk and hydraulic impact elements of this requirement and relates to both bridges.

This Flood Risk and Hydraulic Impact Statement describes the impact of the proposed bridges (see Figure 1—1) on the flood risk of the local area and the wider Lower Lee Valley. The drawings that have been used in this assessment have been included in Appendix A of this report.

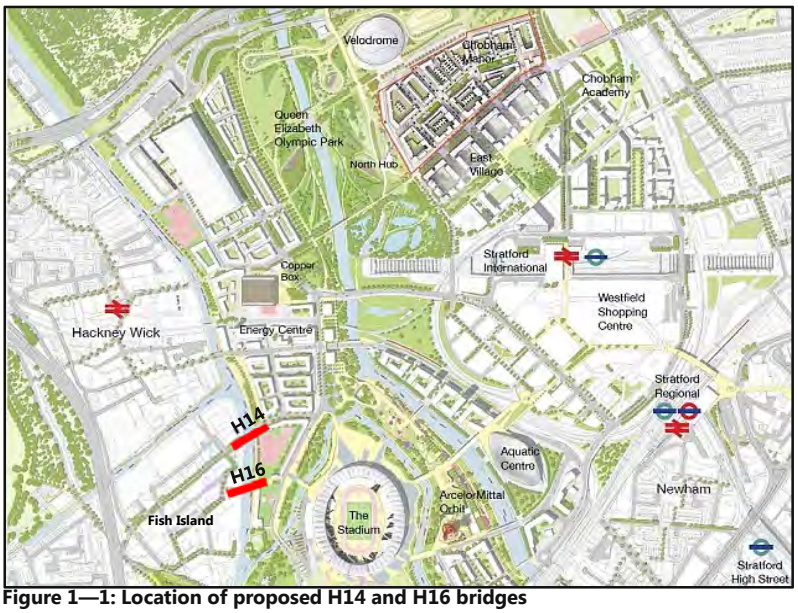


Figure 1—1: Location of proposed H14 and H16 bridges

2 Development Proposals

The proposals include the details of two new bridge crossings over the River Lee Navigation to better connect Fish Island with the QEOP. Figure 2—1 and Figure 2—2 illustrate schematic and section representation of the proposed bridges.

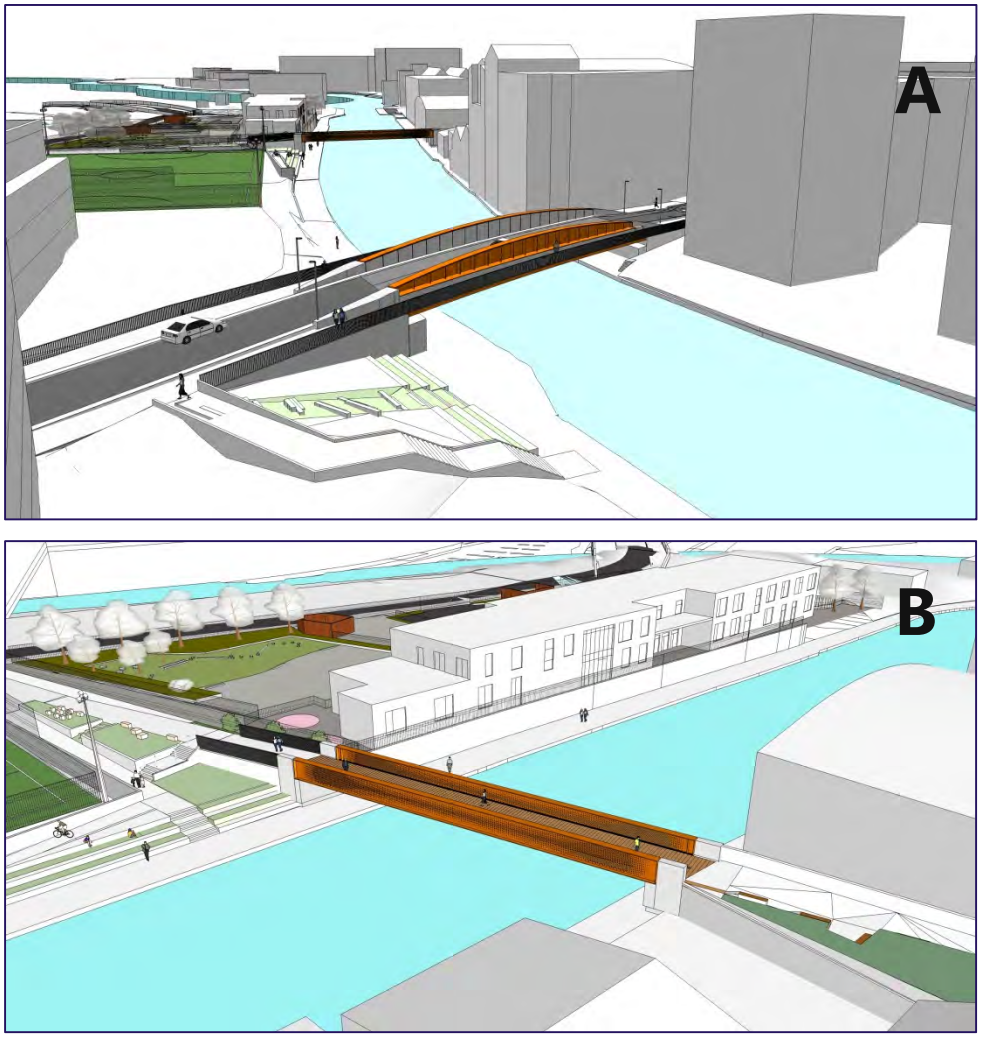


Figure 2—1: Schematic representation of proposed (A) H14 Bridge, and (B) H16 Bridge (drawings received from Sheppard Robson)

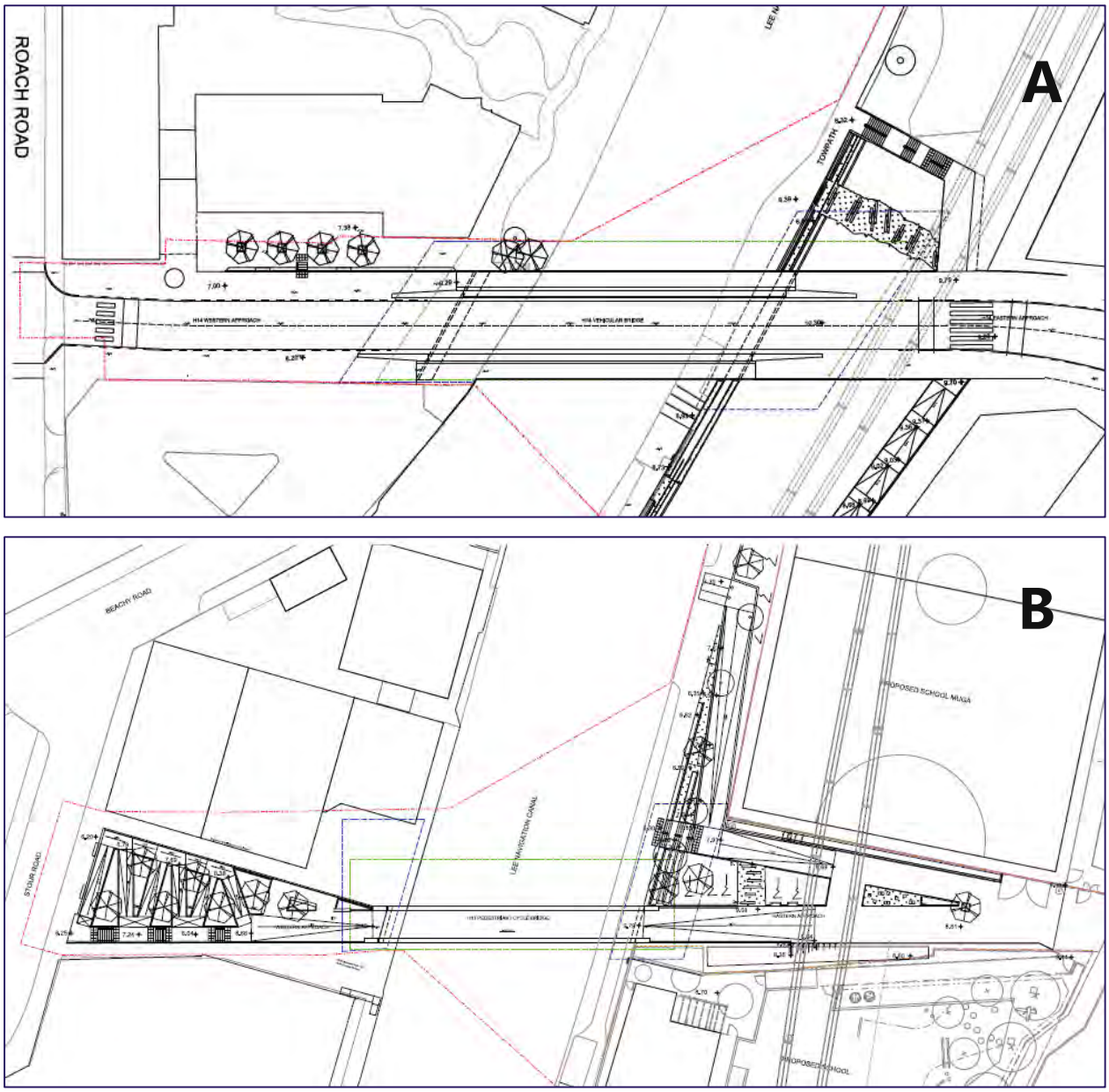


Figure 2—2: Plan view of proposed (A) H14 Bridge, and (B) H16 Bridge (see Appendix A for more details)

2.1 H14 Bridge

The proposed H14 bridge will be situated in the same location as the current H14 bridge, accessible on the western bank via Roach Road. Due to the replacement of the footbridge with a vehicular bridge, the existing H14 bridge and its approaches are proposed to be demolished to make way for the new bridge.

2.2 H16 Bridge

The proposed H16 bridge will be situated south of bridge H14 but north of the Old Ford Lock. This bridge will be a pedestrian bridge accessible on the western bank via Stour Road.

3 Hydraulic Assessment

This assessment has been based on the latest hydraulic model for the Lower Lee Valley, the Queen Elizabeth Olympic Park Legacy model (QEOPL 2015). This model has been developed by BuroHappold on behalf of the LLDC and approved by the Environment Agency (EA) in August 2015. This model is a 1D-2D ISIS TUFLOW hydraulic model that utilises a grid resolution of 5m by 5m.

Due to recent changes in the EA's recommended climate change allowances, the QEOPL 2015 model has been simulated for the Design Flood Event (DFE) of 1 in 100 year event plus a 35% allowance for future climate change, prior to and post the proposed developments. The site of the proposed H14 and H16 bridges has been assessed against the fluvial flood levels in the River Lee Navigation. As the proposed bridges are clear span, the fluvial impact of these bridges was assessed by raising ground levels at the locations of the bridge abutments, which may displace flood flows during a flood event. The reduction in tow path width on the east bank of H16 was represented using a flow constriction cell (2d_fcsh layer) in the 2D domain.

4 Fluvial Flood Risk

The flood risk resulting from the proposed bridges has been assessed and compared to the QEOPL 2015 baseline model for the DFE of 1 in 100 year, including a 35% allowance for climate change.

Figure 4—1 illustrates the flood extent for both the baseline (existing) and proposed scenarios in the area surrounding Bridges H14 and H16 during the DFE.

Table 4-1 details the flood levels in the existing and proposed scenarios for the DFE at five locations within the River Lee Navigation. These five locations are also illustrated as yellow points in Figure 4—1.

Figure 4—1 illustrates that there will be very limited out of bank flooding in the area surrounding bridges H14 and H16 during the DFE. The public towpath located on the east bank of the River Lee Navigation will become inundated during the DFE, however, flooding is not shown to extend beyond the towpath.

Figure 4—1 and Table 4-1 illustrate that the proposed scenario has a negligible impact on the flood levels or flood extent.

The hydraulic modelling results indicate that the area surrounding the bridges and the wider Lower Lee Valley will not be at an increased risk of flooding as a result of the proposed works during the DFE.

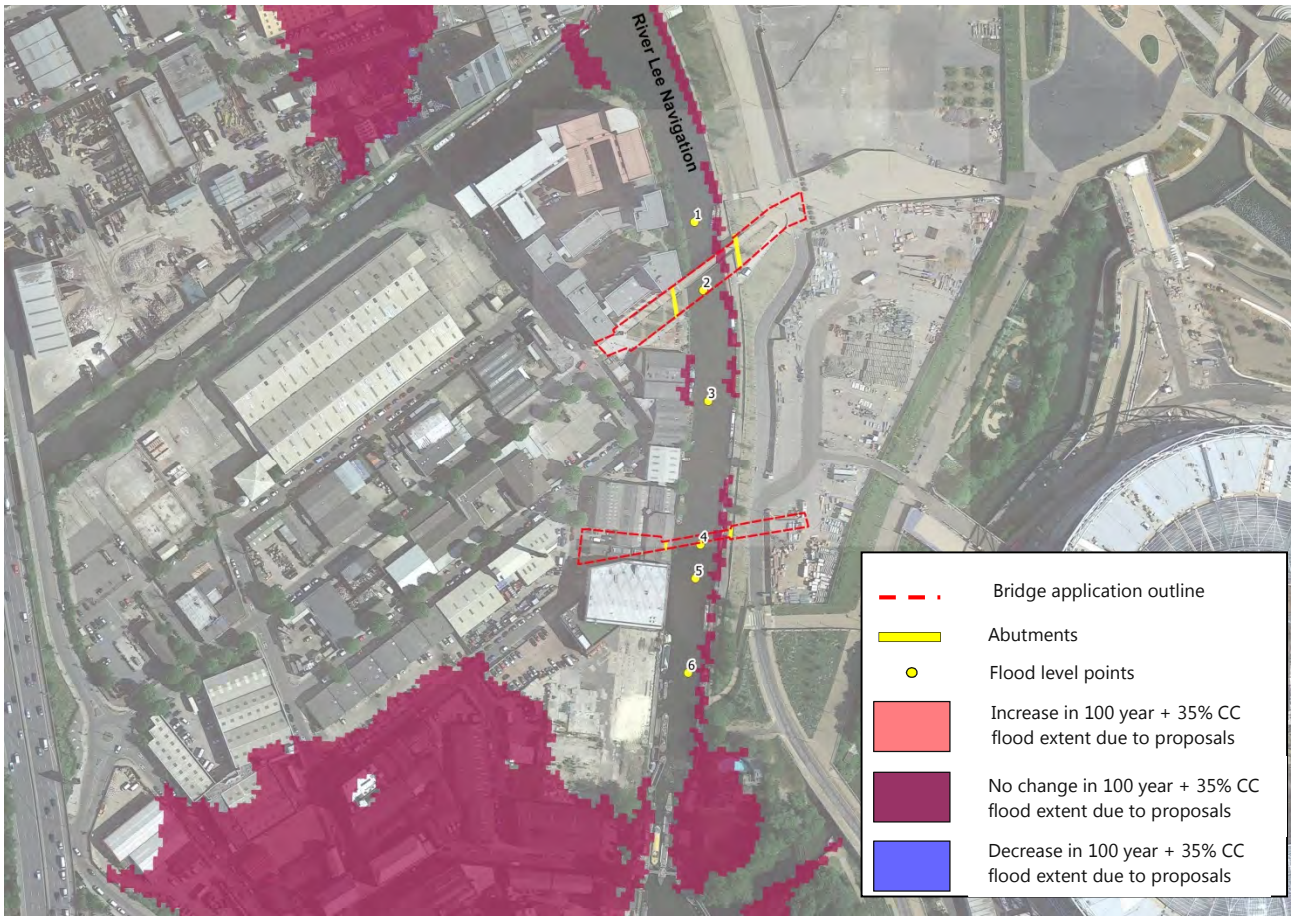


Figure 4—1: DFE extent map showing outline of bridges in red and locations of maximum flood levels shown in Table 4-1

Table 4-1: Flood level estimated from the QEOPL 2015 hydraulic model. Location of points are shown in Figure 4—1

Location	Flood level for the DFE (m AOD)	
	Baseline	Post-development
(1) L-R6A-0375	6.288	6.288
(2) L-R6A-0350ii	6.285	6.285
(3) L-R6A-0275	6.284	6.284
(4) L-R6A-0200i	6.280	6.280
(5) L-R6A-0175	6.279	6.280
(6) L-R6A-0125	6.278	6.278

5 Other Sources of Flood Risk

5.1 Tidal Flooding

The Lower Lee Valley is protected from an extreme tidal event by the suite of tidal flood defences along the River Thames, including the Thames Barrier. The Thames tidal defence network protects the site from flooding during extreme tidal events with an annual exceedance probability of less than 0.1% (i.e. less than 1 in 1000 chance of happening in any year).

The location of the H14 and H16 bridges is also considered to be at a low risk of tidal inundation due to protection from tidal flooding provided by locks and other hydraulic structures that separate the watercourses surrounding the site (River Lee Navigation & Old River Lee) from the River Lea and River Thames.

It is therefore concluded that the risk of tidal flooding at the site is considered to be low.

5.2 Surface Water Flooding

Surface water flooding occurs when rainfall from large storm events cannot infiltrate into the ground and runs off, causing ponding in areas of low topography. It can also occur when combined, foul or surface water sewers cannot accept the increased runoff and surcharges. Sewer flooding is associated with blockage or failure of the sewer network.

A site-wide surface water drainage strategy was developed for the QEOP to ensure that the drainage system for the park has capacity for new developments, including new surface water drainage systems and outfalls.

The surface water runoff from both bridges H14 and H16 is proposed to be discharged to the River Lee Navigation, which complies with the site-wide surface water drainage strategy. As surface water runoff will be confined to the River Lee Navigation, surface water flooding is not expected to increase elsewhere as a result of the development.

A drainage system is proposed to collect the surface runoff from bridge H14 before discharging into the River Lee Navigation. As bridge H14 will have vehicular traffic water quality mitigation will be included in this system to intercept pollutants (e.g. hydrocarbons) before discharging to the River Lee Navigation. This proposed pollution control measure also complies with the site-wide surface water drainage strategy.

5.3 Groundwater Flooding

Groundwater flooding occurs when water in the underlying strata rises to the surface or intersects sloping topography. Given the relative unobtrusive nature of the works below ground and the proximity of the works to the canal, the risk of groundwater flooding is low and is not expected to be made worse by the proposed works.

The site is located near a groundwater source protection zone (Zone 2). Given the vulnerability of the area surrounding the site, the construction of the bridges should be appropriately managed and monitored in accordance with the approved LCS Code of Construction Practice.

5.4 Flooding from Artificial Sources

Flooding from artificial sources is flooding from water sources that are retained above natural ground level, this includes flooding from reservoirs, canals and lakes. The EA's website reservoir flood map indicates that the site is at risk of flooding from King George V reservoir (see Figure 5—1).

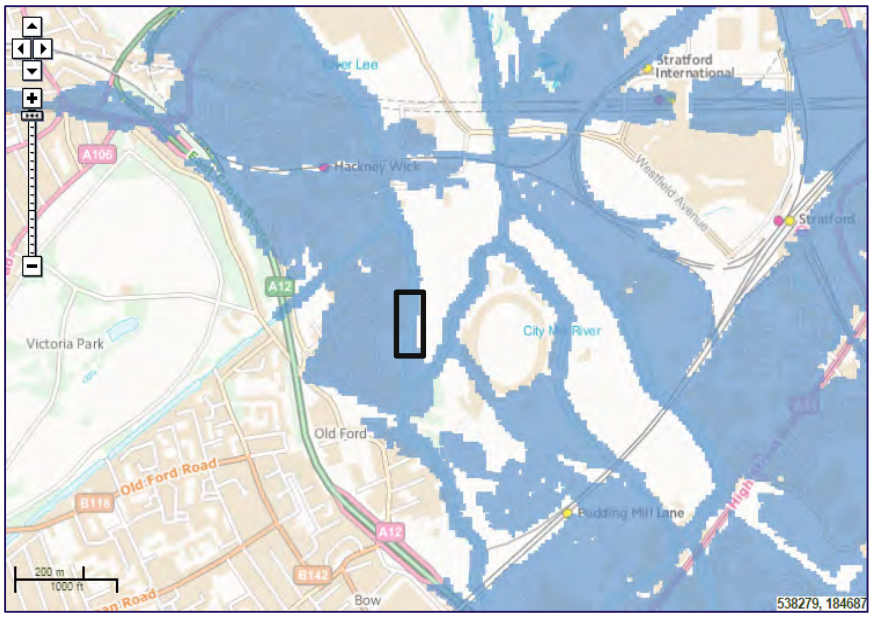


Figure 5—1: Risk of Flooding from Reservoirs at the site. Source: Environment Agency, Risk of Flooding from Reservoirs (accessed 12th July 2016)

The risk form reservoir flooding is mitigated by regular inspections and essential safety work undertaken for all large reservoirs required to meet the Reservoirs Act 1975.

Flood risk from the Lee Navigation, which is a man-made canal, has been assessed as part of the Fluvial Flood Risk assessment (Section 4 of this note), which concluded that the risk of fluvial flooding at the site from the River Lee Navigation is considered to be low.

6 Summary and Conclusions

An assessment has been carried out to identify the impact in terms of flood risk of the proposed H14 and H16 bridges in Planning Delivery Zone 4 of the Queen Elizabeth Olympic Park.

The assessment of fluvial flood risk was based on the latest hydraulic model for the Lower Lee Valley, the Queen Elizabeth Olympic Park Legacy model (QEOPL 2015). The QEOPL 2015 model has been simulated for the Design Flood Event (DFE), 1 in 100 year event plus a 35% allowance for future climate change, based on recent changes to EA climate change allowance guidance. The hydraulic modelling indicates that the site is at a low risk of fluvial flooding and that the proposals will not have an impact in terms of flooding elsewhere.

Surface water flooding is not expected to increase as a result of the proposed works with runoff being discharged to the River Lee Navigation in line with the site-wide surface water drainage strategy.

The site is located near a groundwater source protection zone (Zone 2). Given the vulnerability of the area surrounding the site, the construction of the bridges should be appropriately managed In accordance with the approved LCS Code of Construction Practice.

Flooding from all other sources are considered to be low.

It is concluded that the proposed H14 and H16 bridges will have no impact in terms of flood risk in the local area or the wider Lower Lee Valley.

Appendix A – Bridge Proposals

A1

LEGACY DEVELOPMENT IN ACCORDANCE
WITH FUTURE PDZ4 ZONAL MASTERPLAN

LEGACY DEVELOPMENT IN ACCORDANCE
WITH FUTURE PDZ4 ZONAL MASTERPLAN

H14 WESTERN APPROACH

H14 VEHICULAR BRIDGE

H14 EASTERN APPROACH

e a c h y R o a d

N

DO NOT SCALE FROM THIS DRAWING
The contractor shall check and verify all dimensions on site and report discrepancies in writing to Sheppard Robson before proceeding work.

FOR ELECTRONIC DATA ISSUE
Electronic data / drawings are issued as 'read only' and should not be interrogated for measurement. All dimensions and levels should be read only from those values stated in text on the drawing.

AREA MEASUREMENT
The areas are approximate and can only be verified by a detailed dimensional survey of the completed building. Any decisions whatsoever to be made on the basis of these predictions, should include due allowance for the increases and decreases inherent in the design development and building processes. Figures relate to the likely areas of the building at the current state of the design.
Gross External Area (GEA) / Gross Internal Area (GIA) / Nett Internal Area (NIA) are calculated in metric units generally in accordance with the RICS Property Measurement 1st Edition. All areas are subject to amongs other things but not limited to Town Planning and Conservation Area Consent, Building Regulation approvals and detailed Rights to Light analysis.

NOTES

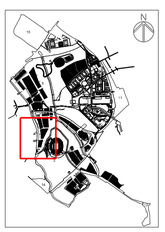
RMA BOUNDARY

BRIDGE DECK STRUCTURE LIMIT OF DEVIATION (LCS)

ABUTMENT LIMIT OF DEVIATION (LCS)

REV.	DATE	AMENDMENT
-	-	-

KEYPLAN



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SHEPPARD ROBSON DRAWING NUMBER
5192-06-200

SCALE@A1	DATE	ORIGINATOR	CHECKED	AUTHORISED
1:250	**21.10.2016**	**CD**	**CS**	**CS**

PROJECT
EAST WICK & SWEETWATER

TITLE
H14 BRIDGE
PROPOSED PLAN

STATUS	CLASSIFICATION
PLANNING	**PUBLIC**

DRAWING NO. **SIW-SHRO-81-XX-DG-A-06200** REV. **1**

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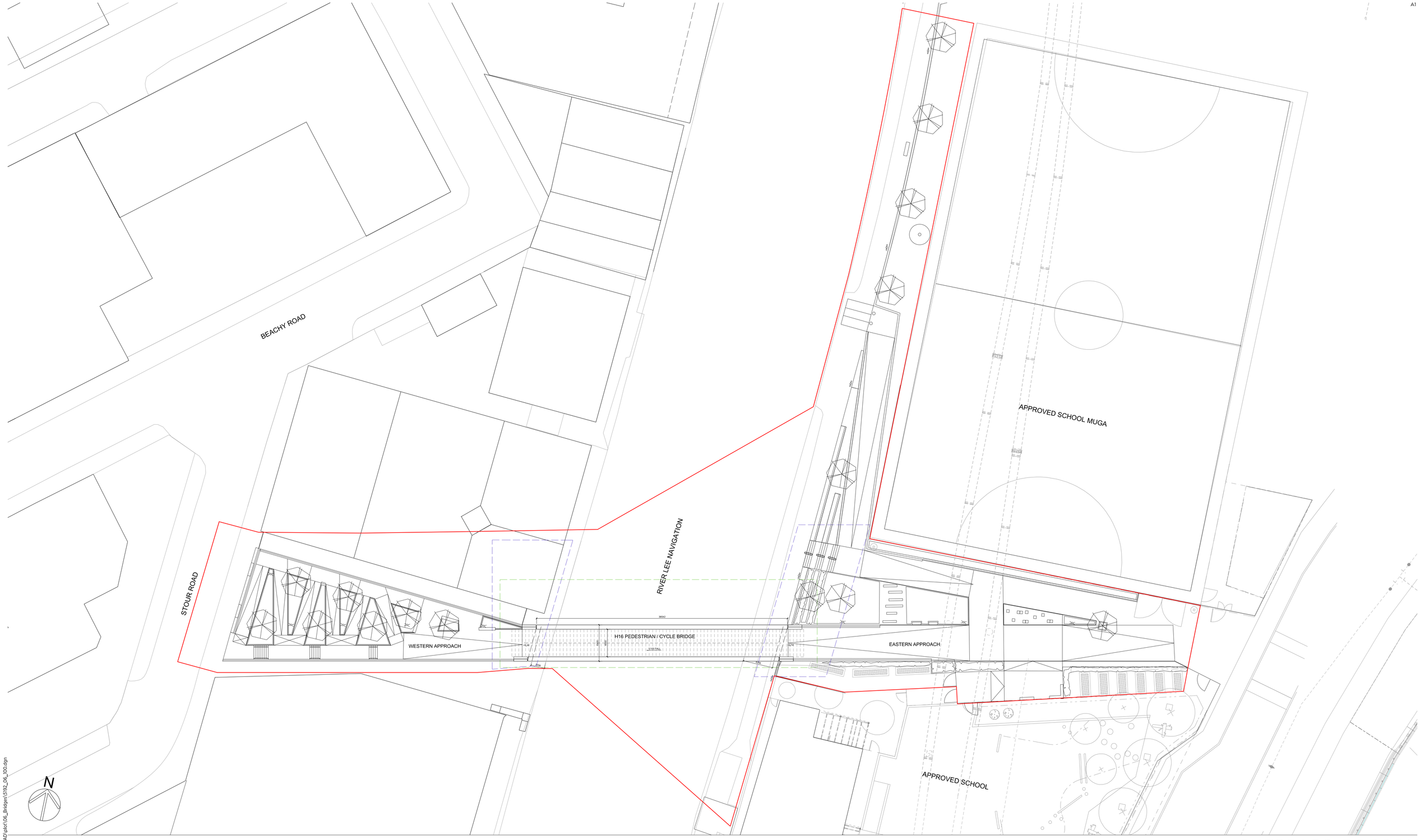
Plotted 26/10/2016



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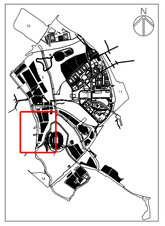

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PROJECT
EAST WICK & SWEETWATER

TITLE
H16 BRIDGE
PROPOSED PLAN

STATUS	CLASSIFICATION
PLANNING	**PUBLIC**

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