HIGHWAYS AGENCY

Introduction to Addendum

It has been noted that the Award Drain tributary of Bramprton Brook Features a flow split with one connection passing under the existing A1 then continuing in channel for approximately 750m before outfalling to Brampton Brook within Brampton Town. The other connection joins Brampton Brook immediately upstream of The A1.

The Award drain has a direct catchment of 1.07km^2 which is approximately 45% of the Brampton Catchment upstream from the A1. There is no current model information on the relative capacity of the two drainage connections or on the hydraulic performance of the flow split. In the current model build the runoff from the Award Drain Catchment is entered directly into Brampton Brook at user defined locations.

The Outline design for the Highway Scheme effectively routes all flows from the Award Drain into Brampton Brook upstream of the A1. So the response of modelled water levels to the introduction of the scheme is highly dependent on the assumptions made for the existing situation inflow schematisation. The previous assessment assumed a 50:50 flow split on the Award Drain, this addendum reports the model results for additional existing situation scenarios “Award Drain discharges all flows upstream of the A1” and “Award Drain discharges all flows downstream of the A1” in order to provide a complete picture of the possible flood risk implications of the scheme.

5. Hydraulic Model Outputs

5.1 Model Simulations

The model outputs were processed to extract maximum stage values at key locations for the 4%, 1% and 1% + CC AEP.

The 100yr baseline model was run for three different variations for the Award drain catchment flow split:

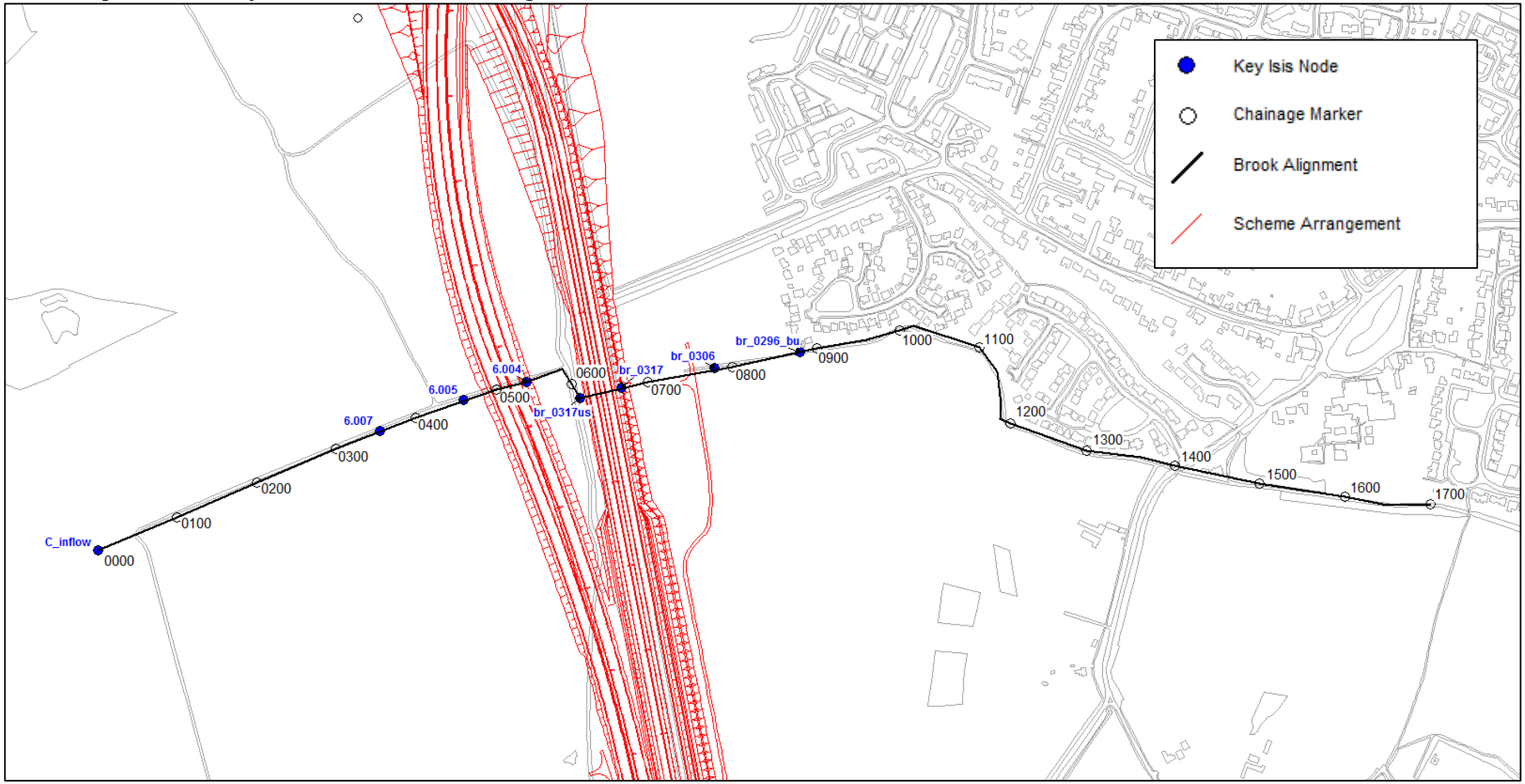
1. Existing Situation Award Drain discharges all flows upstream of the A1.
2. Existing Situation Award Drain discharges 50% of flows upstream of the A1 and 50% downstream.
3. Existing Situation Award Drain discharges all flows Downstream of the A1.

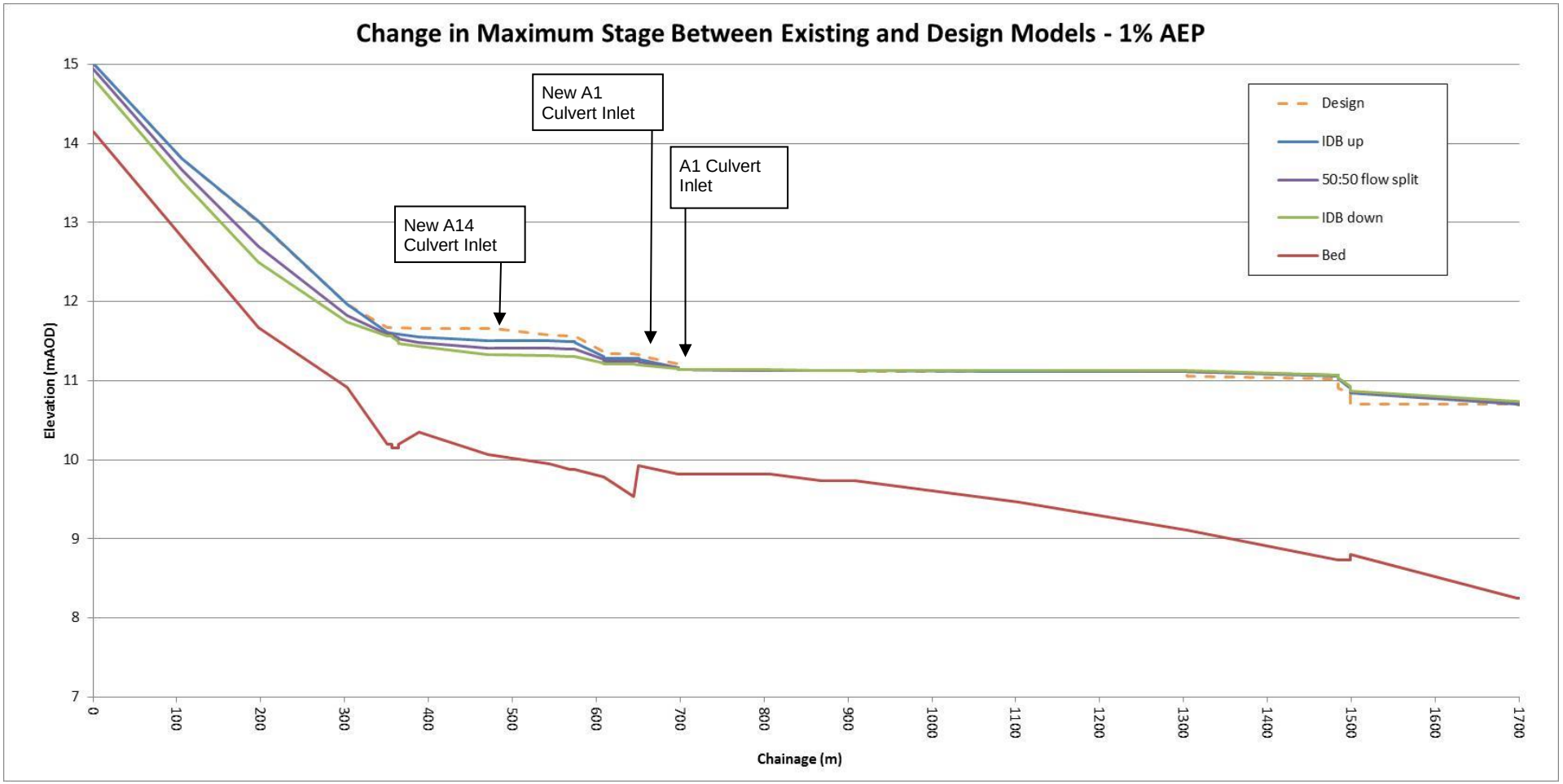
This sensitivity testing was undertaken to show the full range of possible existing situation water levels without the significant model updating work that would be required to quantitatively asses the hydraulic performance of the Award Drain and its structures.

1. Existing Model - Award Drain up	Maximum Stage values for the Existing Model are provided in the table below at key locations:			
Location	**Model node**	**Peak Water level (mAOD)**		
		4%	**1%**	**1% + CC**
115m u/s of A14	6007A		11.584	
u/s of proposed A14	A14_CVTu		11.504	
d/s of proposed A14 (at proposed extension outlet location)	6.004		11.503	
u/s of A1	br_0317us		11.277	
d/s of A1	br_0317		11.142	
60m d/s of A1	br_0306		11.132	
2. Existing Model - 50:50 Flow Split	Maximum Stage values for the Existing Model are provided in the table below at key locations:			
Location	**Model node**	**Peak Water level (mAOD)**		
		4%	**1%**	**1% + CC**
115m u/s of A14	6007A	11.469	11.530	11.572
u/s of proposed A14	A14_CVTu	11.284	11.413	11.489
d/s of proposed A14 (at proposed extension outlet location)	6.004	11.26	11.412	11.489
u/s of A1	br_0317us	11.14	11.242	11.289
d/s of A1	br_0317	11.068	11.141	11.172
60m d/s of A1	br_0306	11.057	11.135	11.167
3. Existing Model - Award Drain down	Maximum Stage values for the Existing Model are provided in the table below at key locations:			
Location	**Model node**	**Peak Water level (mAOD)**		
		4%	**1%**	**1% + CC**
115m u/s of A14	6007A		11.473	
u/s of proposed A14	A14_CVTu		11.324	
d/s of proposed A14 (at proposed extension outlet location)	6.004		11.316	
u/s of A1	br_0317us		11.204	
d/s of A1	br_0317		11.141	
60m d/s of A1	br_0306		11.136	

Scheme Model	Maximum Stage values for the Scheme Model are provided in the table below at key locations			
Location	**Model node**	**Peak Water level (mAOD)**		
		4%	**1%**	**1% + CC**
115m u/s of A14	6007A	11.529	11.669	11.771
u/s of proposed A14	A14_CVTu	11.458	11.658	11.769
d/s of proposed A14 (at proposed extension outlet location)	6.004	11.402	11.577	11.674
u/s of A1	br_0317us	11.22	11.331	11.389
d/s of A1	br_0317	11.083	11.145	11.172
60m d/s of A1	br_0306	11.067	11.136	11.165
Effect of proposed Structures	Model results were interrogated immediately u/s of the proposed A14 structure (model node = A14_CVTu). At this location the increase in maximum stage between each of the baseline scenarios and the design model was calculated for the 1% AEP event. The greatest increase in stage occurs when it is assumed that the existing Award Drain arrangement discharges entirely downstream of the A1. In this scenario the maximum increase in stage was approximately 334mm. Conversely, the lowest increase in maximum stage, approximately 155mm, was seen when it is assumed that the existing Award Drain arrangement discharges entirely upstream of the A1. With the Existing situation Award Drain discharge split evenly upstream and downstream of the A1, the maximum increase in stage was 245mm.It is reiterated that differences between the increases in maximum stage quoted above are as a result of the changes in the baseline scenarios rather than the design scenario. The following figures present a comparison of the maximum stage for the three Existing scenarios and the Scheme Model for the 1% AEP event. The graph shows that beyond 170m upstream of the proposed culvert, the maximum stage in the design scenario is the same as in the upstream discharge scenario. Downstream of the existing A1 the baseline scenarios all show a similar maximum stage. Whilst the implementation of the scheme causes a minor, localised reduction in maximum stage. There is no significant flood risk benefit conferred to the residential areas downstream.			

Brampton Brook Key Model nodes and Chainages




Change in Maximum Stage Between Existing and Design Models - 1% AEP
New A1 Culvert Inlet
A1 Culvert Inlet
New A14 Culvert Inlet
Design
IDB up
50:50 flow split
IDB down
Bed
Elevation (mAOD)
Chainage (m)
15
14
13
12
11
10
9
8
7
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700