

joc consultants ltd

Chartered Civil & Environmental
Engineering Consultants

1st March 2022

Your reference: 2021/94280

Our reference: 21/013/JO'C

Mr Nick Hirst
Kirklees Metropolitan Borough Council
Development Management
PO Box B93
HUDDERSFIELD
West Yorkshire
HD1 2JR

Dear Mr Hirst,

Land at Lady Ann Road, Soothill, Batley, WF17 0PY
Erection of 67 dwellings with associated works including new access off Lady Ann Road, regrading works and Landscaping

I refer to the statutory response to the above planning application sent to you in the Environment Agency letter dated 21st February 2022 under reference RA/2021/143906/02-L01.

The Environment Agency has requested further clarification of the methodology used to derive design flood levels. Rather than issue a further revision of the FRA report, Annex 1 of this letter provides a step by step explanation.

In addition, Annex 2 provides an overlay of the updated site layout plan on the flood map for planning. The site layout plan is drawing number 4026-102-U by Self Architects. This plan is the same as the plan submitted with the planning application under drawing number SELF-P-XX-DR-A-002 except that the plot numbers are included on plan 4026-102-U.

I note that the Environment Agency has confirmed that the proposals for floodplain compensation are acceptable, subject to it being satisfied with the derivation of flood levels through the site.

I trust that this further information is now sufficient to satisfy the Environment Agency.

Yours sincerely,

John O'Connor BSc.(Hons) C.Eng C.WEM MICE MCIWEM
Director

ANNEX 1: TECHNICAL EXPANATION OF THE DERIVATION OF DESIGN FLOOD LEVELS.

1. The Environment Agency model data for Batley Beck is provided in Appendix D of the FRA report revision 04. This data shows a falling water surface as the beck flows from north to south past the site. In a relatively flat landscape it would be appropriate to base the design flood level on the modelled flood level at the upstream boundary of the site but at the development site this would not be a realistic owing to the falling elevation, which is evident on the topographical survey plan in Appendix B of the FRA report. The Design Flood Level was therefore determined with reference to the nearest upstream model node and adjusted according to the water surface gradient.
2. The effects of climate change were considered for the 30% and 50% allowances. These were the recommended allowances which preceded the current guidance. As stated in paragraph 6.11.3 of the FRA report revision 04, the current guidance is for a CCA of 23% in the Aire and Calder Management Catchment. In order to avoid unnecessary re-calculation and alteration of all the floodplain compensation proposals, it was decided to continue with the 30% and 50% climate change allowances as this would over-estimate the flood levels and yield conservative results. The Environment Agency accepted this approach.
3. The Environment Agency model data provides estimates of the flow rates in Batley Beck with a 20% CCA. The 30% and 50% CCAs were calculated as follows:

1% AEP flow rate: Q100

1% AEP_20% CCA flow rate: Q100_{20%}

1% AEP_30% CCA flow rate: Q100_{30%}

1% AEP_50% CCA flow rate: Q100_{50%}

Therefore, by adjusting the 20% climate change effect pro-rata:

$$Q100_{30\%} = Q100 + (Q100_{20\%} - Q100) \times 30/20.$$

Likewise:

$$Q100_{50\%} = Q100 + (Q100_{20\%} - Q100) \times 50/20$$

4. This approach to estimating climate change effects from model data has been accepted by the Environment Agency on many occasions in the past and there is no reason why it should not be accepted now, especially when the climate change allowances applied exceed current guidance.

5. The water surface gradients differ between model nodes and also between flood events. Table L1 in the FRA report Appendix L shows the water surface gradients between nodes for the following events:

- 1% AEP;
- 1% AEP with 30% CCA
- 1% AEP with 50% CCA
- 0.1% AEP.

6. The distance downstream of each node is stated. Node 0846 is 239m downstream of node 1085; Node 0680 is 166m downstream of node 0846; and Node 0424 is 256m downstream of node 0680. The water surface gradient between nodes is calculated as follows:

Water surface gradient = (upstream node flood level – downstream node flood level) /distance between nodes
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7. Table L2 in Appendix L of the FRA report shows the location of the house plots in relation to the model nodes. Plots 36 to 42 are between nodes 1085 and 0846, so flood levels were determined with reference to the modelled level at the upstream node 1085. The distance downstream of the node in the third column is the distance from the model node to the upstream boundary of each plot listed in column 1. The 'Proposed FFL' in column 4 is the FFL as originally proposed by the architect; but this is what we needed to assess, so a comparison is made between this FFL and the flood level at each location for each event considered.

8. The flood level at each plot number is calculated as follows:

Event flood level = flood level at the upstream node – downstream distance x the water surface gradient for that event
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9. Thus, the flood levels for plots 36 to 42 are calculated with reference to node 1085; the flood levels for plots 43 to 50 are calculated with reference to node 0846; the flood levels for plots 51 to 63 are calculated with reference to node 0680.

10. The 1% AEP_30%CCA flood level in column 6 (the Design Flood Level) is compared with the Proposed FFL in column 4 in order to determine if there is sufficient freeboard. The freeboard is shown in column 7 and column 8 states whether or not this is acceptable. Where it is insufficient, the *required* minimum FFL is stated in column 10, based on a minimum freeboard of 600mm (shown in column 9).

11. Column 11 shows the amount by which the proposed FFL needs to be raised in order to achieve the minimum freeboard. This is:

Column 10 – Column 4

12. Table L2 then compares the residual risk of a 1%_50%CCA flood level with the *required* minimum FFL in order to determine the freeboard for that event and the procedure is repeated for the 0.1% flood level.
13. Although two dimensional modelling has not been used in the FRA, the methodology used is legitimate and conservative and is based on flood levels provided by the Environment Agency's Batley Beck model. It is logical to base finished floor levels on the falling water surface in Batley Beck as it flows past the site. It should be understood that the FFLs in column 10 of Table L2 are the required *minimum levels*. Provided the actual FFLs are at or above these levels there will be sufficient freeboard.
14. It should also be understood that the flooding depicted on the flood map represents overland flow, rather than contained standing water, so it is inevitable that there will be minor differences in the flood level between neighbouring houses.

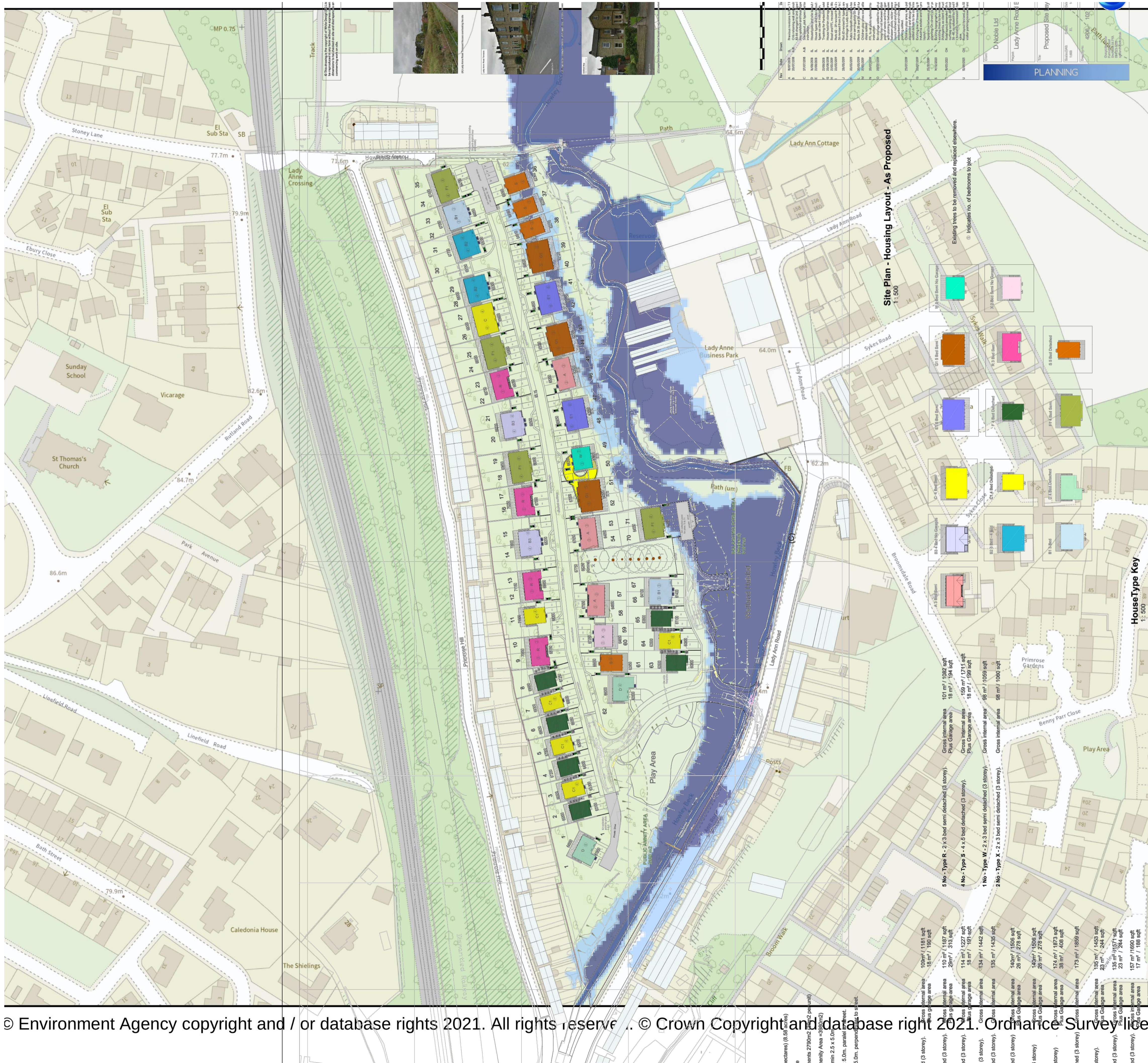
ANNEX 2: OVERLAY OF THE FLOOD MAP ON THE SITE LAYOUT PLAN 4026-102-U

The current Flood Map for Planning has been overlaid on the current site layout plan (revision U) and Table 6.2 in the FRA report has been checked. The table is updated as follows:

Table 6.2: Identification of plots in flood zones 2 and 3 UPDATE				
	Flood Zone 2	Total in Flood Zone 2	Flood Zone 3	Total in Flood Zone 3
Plot numbers	(49)*	2	36 to 43	8
			(44 to 48)*	5
			50*	1
			70 to 71	2
Totals:		2		16

* gardens only

The flood map overlay is shown overleaf.



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
424978/424576

Scale
1:2500

Created
28 Feb 2022 14:40

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area



End of Report