1. **Proposed new dwelling at Charters Lodge, Charters Lane, Long Sutton, PE12 9JX.**

2. **FLOOD RISK ASSESSMENT (FRA)**
3. Assessment of the risk to a development site from both present day and future flooding and to assess the impact that any development on the site has on flood risk to the site and its surroundings.
4. This FRA supports an application for planning consent for 1no detached single storey dwelling at Charters Lodge, Charters Lane, Long Sutton, PE12 9JX

5. **SITE LOCATION**
6. As shown on drawing numbered LS/2, grid reference TF 42111 23636, in flood zone 3 as Environment Agency (EA) flood map.
7. The application site is the rear garden of Charters Lodge, Charters Lane, Long Sutton, PE12 9JX.
8. The area of development is approximately 0.2 hectare.
9. The application site is shown in fluvial Flood Zone 1 of the South East Lincs Strategic Flood Risk Assessment (SELSFRA) Residual Depth Maps.
10. The application site is located in the defended South Holland Internal Drainage Board drainage district (SHIDB)

11. **FLOODING HISTORY**
12. There is no present evidence of the site or adjoining sites being affected by floods.

13. **PRESENT DAY FLOOD ALLEVIATION STATUS**
14. The application site lies within a defended floodplain, as defined in the EA 'Policy for the Protection of Floodplains'. The application site is considered to be passive unless a flood occurs that exceeds the currently designed defences. Therefore the likelihood of flooding due to overtopping or failure of a flood defence embankment is small. The SHIDB is protected by the following:-
15. a. River Welland tidal defences downstream of Spalding,
16. b. River Welland fluvial embankments; and
17. c. River Nene tidal defences downstream of Foul Anchor.
18. The application site and its surroundings, drain by gravity via SHIDB main drains to the tidal River Nene at Sutton Bridge. Existing ground levels at the application site are 2.90m above Ordnance Survey Datum (OSD) around the existing dwelling and 3.20m around the proposed dwelling ie an increase of 300mm.
19. The SHIDB standard of drainage is 1 in 50 years return period relates to the Department of Environment, Food, and Rural Affairs (DEFRA) / EA Flood and Coastal Defence R&D Programme

20. Freeboard, being the difference between the flood defence level and the design flood level, is 900mm is at the lowest land levels.
21. The operation and maintenance of the SHIDB pumping stations, structures and channels provide flood protection and it is assumed that the current maintenance regime of the SHIDB and EA maintains the defences in satisfactory condition. However when issues arise ie bank slips, blocked culverts/drains etc, these matters are the responsibility of the SHIDB for making good promptly.

22. SEQUENTIAL TEST

23. The sequential approach by South Holland District Council (SHDC) seeks applications that are compatible with the level of flood risk at an application site.
24. Drg. No LS/5 shows the proposed dwelling and the application site in context with the existing dwelling. Although the Sequential Test and Exception Test will be applied, the application site will be protected against both 1 in 200 year return period tidal event and 1 in 100 year return period fluvial event being located in fluvial Flood Zone 1 of the SELSFRA Residual Depth Map. The Sequential Test is met as the proposal is located in Flood Zone 1.
25. This application incorporates proposals that include flood mitigation measures to ensure they pass Part 2 of the Exception Test with a water exclusion strategy for the design flood and breach event.

26. POSSIBILITY OF RESIDUAL FLOODING

27. This is the type of flooding that occurs when the existing flood management measures are exceeded or fail (e.g. breaching of defences or sewer surcharging).
28. Possibility of flooding is assumed to be low due to the SHIDB management regime and its main drain design standards that incorporate a 900mm minimum freeboard to the lowest land level. This provides adequate storage for events greater than 1 in 50 years. Earlier rainfall events within the last 45 years were considered to be greater than 1 in 100 year events, causing little flooding to any residential properties at the time. The SHIDBs policy provides a standard of drainage satisfying the NPPFs (paras 159 et seq) requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and developments to the arterial system, and adopting a flexible approach that meets "sustainable urban drainage" standards ie a management regime and control structures used to attenuate run-off from development sites that also treats surface water runoff to remove pollutants that helps to mitigate the impact on downstream water bodies

29. Possibility of failure of South Holland Sluice on the South Holland Drain at Sutton Bridge onto the River Nene may occur due to mechanical breakdown or intermittent power supply. Should areas be at risk of flooding, the SHIDB would be responsible for taking emergency action to maintain drainage levels by utilising temporary pumps therefore the likelihood of such an occurrence is considered low.
30. The River Nene is tidal and its embankments provide a 1 in 200 year return period level of protection. The EA publication "The Wash Shoreline Management Plan 2 from Gibraltar Point to Old Hunstanton" details that the management regime to sustain flood defences for this area taking climate change into account.
31. The existing drainage system to Charters Lodge is to soakaways.
32. Recent hydraulic modelling work carried out on behalf of the EA has been included in the SELSFRA Flood Maps for residual Depth in 2115. The EA has confirmed that the site could be affected by floodwaters of between 0.50m-1.00m as a result of breaching and/or overtopping of the tidal defences to the Wash and River Nene in year 2115. The site is located some 6.5 kilometres from the nearest point of tidal defence (River Nene). To mitigate against such risks, flood resilient construction will be incorporated into the proposed new dwelling up to 1.00m above finished floor level (FFL).

33. **FLOODING TRENDS AND PROBABILITIES**

34. It assumed that the probability of the application site flooding from local drainage systems is very low.
35. The probability of the site flooding with water from a SHIDB main drain is less than 1% as the existing flood defence systems give storage within the existing drainage channels in the vicinity of the application site.
36. The probability of fluvial flooding at the application site is less than 1% due to the existing state of the flood defences and the location and elevation of the application site.
37. If floodwater levels from the SHIDB main drains rose to affect the application site, then this is unlikely to be sudden and that there would be sufficient time for precautionary actions to be taken that would control the extent and impact of any flooding.
38. It is assumed that local drainage channel levels will rise as a result of climate change therefore the inclusion of flood resilient construction up to 1.00m above FFL will be essential to accommodate the designed life of this proposal (i.e. 50 years).

39. **IMPACT FROM FLOODING**

40. The FFL of the proposed dwelling will be approximately 300mm higher than that of the existing dwelling which together with the flood resilient construction and the proposed surface water drainage system to soakaways will protect against impacts from extreme short duration and localised storm events.
41. It is assumed that due to the location of the site within the SHIDB catchment area that there is likely to be at least 2 to 3 days warning time of an extreme incident.
42. No displacement of water from the application site would arise that would affect any adjoining properties.
43. Surface water from the application site will drain to new soakaways and will not discharge directly into the SHIDB system.
44. The applicant will ensure via a Health and Safety File that future occupiers of the dwelling are warned of the risk of flooding, the standard of the surrounding existing defences and this FRA. The EA provides a Floodline Direct Warning Service (FDWS) which includes Flood Warnings Codes using direct warning methods where the risks and impacts of flooding are urgent and high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding generally by media broadcasts via local radio and television. Additionally, direct and indirect flood warnings by the EA operate a 24 hour a day via FDWS providing advice and information on flooding, telephone: 0345 988 1188 textphone: 0345 602 6340. The future occupants will be advised to register with the FDWS to receive future flood warnings.
45. Egress from the application site after receipt of a flood warning is via Charters Lane, then Gedney Road, B1359 to the A17 to Holbeach where land is in Flood Zone 1.
46. Therefore no significant impacts of flooding are envisaged.

47. RESIDUAL RISKS FROM EXTREME EVENTS

48. The residual risk is that which remains after all risk avoidance and mitigation measures have been implemented, or where such measures fail.
49. Residual risk from an extreme event is very low at the application site due to its location within the SHIDB and being approx 6.50 kilometres from the tidal defences of the River Nene.
50. This application site is not located within a Functional Flood Plain of any ‘main river’ or ‘main drain’. The EA Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.
51. SHDC and Boston Borough Council in conjunction with the EA and the SHIDB have prepared the SELSFRA for the whole District by independent Consulting Engineers. The SELSFRA has produced similar Flood Risk Maps to the EA maps

and analysed flood return periods of all tidal and fluvial defences up to 2115 taking into account climate change effects. Breach scenarios of embankments failing and/or being overtopped established the Flood Risk Zones.

52. The SELSFRA demonstrates the SHIDB system protects against a 1 in 100 year return period event up to 2115 inclusive of the effects of climate change.
53. The application site falls outside the SHIDB Flood Risk Zone although there is a risk that it could be affected by flooding resulting from a breach of the River Nene tidal defences in 2115.

54. CONCLUSION

55. The application site is not in a Functional Floodplain.
56. It is located in the Passive Floodplain protected by defences for a 1 in 100 year return period, (1.0%) .
57. The application site is within Flood Zone 1 of the SELSFRA.
58. As the application site is located within the SHIDB having a minimum standard of drainage of 1 in 50 years, it therefore accords with DEFRA guidelines. Freeboard of 900mm to lowest land level is available for events greater than 1 in 50 years with further storage provided within the numerous drainage channels.

59. RECOMMENDATIONS

60. Surface water from the proposed dwelling will be discharged to BRE 365 designed soakaways.
61. The proposed FFL will exceed by 300mm that of the existing dwelling, Charters Lodge.
62. Flood resilient construction will be incorporated in the building fabric and design up to 1.00m above GFFL which will protect from the risk of flooding from tidal defences being breached in 2115 and beyond.

63. REFERENCES

64. Strategic Flood Risk Assessment Map – Depth of Flooding 2115
65. SHIDB Plan
66. DEFRA/EA Flood and Coastal Defence R&D Programme