

## Data Extraction Summary

A total of 8 data extraction points are identified on figure above. Time series data has been extracted from the hydraulic model for each scenario and for each data extraction point. These have been summarised in the following tables, which included **maximum** water surface elevation, depth, velocity, time of inundation and **maximum** flood hazard. The time of inundation relates to the time when the area floods subsequent to the onset of coastal defence overtopping or subsequent to the defence breach failure.

Table A: Data Extraction Point 1

| Scenario                   | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|----------------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT <sup>1</sup>   | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT                | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT             | 6.47                      | 1.07            | 0.36           | 13.58                  | Significant |
| 0.5% AEP OT&B <sup>2</sup> | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT&B              | 6.50                      | 1.11            | 0.36           | 14                     | Significant |
| 0.5% AEP+CC OT&B           | 7.79                      | 2.40            | 0.36           | 12.75                  | Extreme     |

Table B: Data Extraction Point 2

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.50                      | 1.16            | 0.51           | 13.08                  | Significant |
| 0.5% AEP OT&B    | 6.34                      | 1.00            | 0.36           | 13.42                  | Significant |
| 0.1% AEP OT&B    | 6.52                      | 1.18            | 0.37           | 13.08                  | Significant |
| 0.5% AEP+CC OT&B | 7.79                      | 2.46            | 0.35           | 1.5                    | Extreme     |

Table C: Data Extraction Point 3

| Scenario                      | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|-------------------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT                   | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT                   | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT                | 6.46                      | 0.67            | 0.30           | 13.58                  | Significant |
| 0.5% AEP OT&B                 | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT&B                 | 6.50                      | 0.71            | 0.34           | 14                     | Significant |
| 0.5% AEP+CC <sup>3</sup> OT&B | 7.80                      | 2.01            | 0.56           | 12.75                  | Extreme     |

<sup>1</sup> OT - Overtopping

<sup>2</sup> OT&B – Overtopping and breach

<sup>3</sup> CC – Climate change

Table D: Data Extraction Point 4

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.50                      | 1.10            | 0.54           | 13                     | Significant |
| 0.5% AEP OT&B    | 6.34                      | 0.94            | 0.38           | 13.33                  | Significant |
| 0.1% AEP OT&B    | 6.52                      | 1.13            | 0.40           | 13                     | Significant |
| 0.5% AEP+CC OT&B | 7.79                      | 2.40            | 0.37           | 1.42                   | Extreme     |

Table E: Data Extraction Point 5

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.59                      | 1.19            | 0.55           | 12.16                  | Extreme     |
| 0.5% AEP OT&B    | 6.39                      | 0.99            | 0.59           | 0.16                   | Significant |
| 0.1% AEP OT&B    | 6.52                      | 1.12            | 0.63           | 0.16                   | Extreme     |
| 0.5% AEP+CC OT&B | 7.76                      | 2.36            | 1.02           | 0.08                   | Extreme     |

Table F: Data Extraction Point 6

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.61                      | 1.60            | 0.79           | 12.08                  | Extreme     |
| 0.5% AEP OT&B    | 6.39                      | 1.37            | 0.40           | 0.5                    | Significant |
| 0.1% AEP OT&B    | 6.52                      | 1.51            | 0.46           | 0.66                   | Significant |
| 0.5% AEP+CC OT&B | 7.77                      | 2.76            | 0.64           | 0.33                   | Extreme     |

Table G: Data Extraction Point 7

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.45                      | 0.89            | 0.17           | 13.58                  | Significant |
| 0.5% AEP OT&B    | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT&B    | 6.36                      | 0.80            | 0.14           | 13.92                  | Significant |
| 0.5% AEP+CC OT&B | 7.78                      | 2.39            | 0.38           | 12.66                  | Extreme     |

Table H: Data Extraction Point 8

| Scenario         | Surface Elevation (m AOD) | Water Depth (m) | Velocity (m/s) | Time to Inundation (h) | Hazard      |
|------------------|---------------------------|-----------------|----------------|------------------------|-------------|
| 0.5% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.1% AEP OT      | -                         | -               | -              | -                      | -           |
| 0.5% AEP+CC OT   | 6.51                      | 1.12            | 0.23           | 13                     | Significant |
| 0.5% AEP OT&B    | 6.35                      | 0.96            | 0.29           | 13.58                  | Significant |
| 0.1% AEP OT&B    | 6.52                      | 1.13            | 0.30           | 13.25                  | Significant |
| 0.5% AEP+CC OT&B | 7.78                      | 2.39            | 0.23           | 1.5                    | Extreme     |

The discussion below provides a brief commentary with respect to the results of the data extraction tables.

There is no data presented for 0.5% AEP OT (overtopping) and 0.1% AEP OT scenarios because floodwater was either not sufficient to overtop the defences (0.5% AEP OT) or the flood extent was not significant and did not affect the data extraction point locations (0.1% AEP OT). Therefore, there is only one overtopping scenario which affects the data extraction points (0.5% AEP+CC OT), which is with the inclusion of climate change.

The surface elevation observed at each of the data extraction points is relatively consistent between individual scenarios. This suggests that the peak water level is reached at each data extraction point and an approximate equilibrium observed across the study area.

The flood depth from one data extraction point to another varies significantly, which is dependant upon the ground level at the extraction point. It should be noted that there is some topographical variation in the proximity of each data extraction point and the least elevated area was chosen for the data extraction point location. This approach was adopted to illustrate the approximate maximum flood depths.

Maximum velocities tend to be higher for data extraction point 5 and 6, which can be attributed to their position which is closest to the breach location and the coastal defences.

Time to inundation varies significantly between data extraction points and each scenario. The location of the data extraction point has a significant impact upon time of inundation, with distance increasing the time of inundation. The effects of Seaward Way and the A39 also tend to increase the time of inundation for those extraction points located beyond these features.

The first tidal curve results in only a small amount of overtopping during the 0.5% AEP+CC OT scenario, which does not affect any of the data extraction points. However, the second (and largest) tidal curve, when the storm surge is at its peak causes sufficient water to overtop the coastal defences and spread over the coastal zone affecting the data extraction points. Consequently, time of inundation for the 0.5% AEP+CC OT scenario is associated with a relatively long period, which starts when the first overtopping incident is observed (in the first tidal cycles) to the second, when the data extraction point experiences flooding.

Time of inundation associated with the breach scenarios is very short (less than 0.5 hours) for the data extraction points close to the coastal defences and breach location (i.e. points 5 and 6). The West Somerset Railway and Seaward Way influence the onset of inundation and consequently the time of inundation is extended to extraction points beyond these features, by approximately 45 minutes. However, there is some variation between data extraction points and individual scenarios.

Maximum flood hazard identified in the tables above for the various data extraction points is either significant or extreme, which can be attributed to the low-lying ground levels at each data extraction point. Low or moderate flood hazard only tends to be located towards the edges of the flood extent.