

TECHNICAL NOTE

Job Name: Bristol Airport Appeal
Job No: 48889
Note No: TN32
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Subject: Airport Gyratory

Airport Gyratory Assessment

- 1.1. This note has been prepared in response to a request from NSC for additional information regarding the proposed airport gyratory improvements associated with the application for the expansion of Bristol Airport to 12mppa.
- 1.2. This note builds upon the statement made by NSC in the Committee Report for the development (dated 10th February 2020), which stated (p.135) that:

'To accommodate vehicle movements and improve flows within BA and onto the A38, a two lane, one-way system, gyratory road is proposed within the airport perimeter. This will provide additional capacity onto North Side Road and a connection between the A38 and the northern components of the airport, including the main terminal building, multi-storey car park and surface car parking areas.'
- 1.3. At that time, it was not felt necessary by NSC officers for BAL to quantify the additional capacity, since it was deemed to be clearly apparent by the provision of 2 lanes in and out of the airport when typically only one exists currently.
- 1.4. West of the northern access roundabout, the existing layout provides one lane of traffic in the inbound direction, and two lanes of traffic in the outbound direction, whilst only one lane of traffic is provided in each direction west of the North Side Road internal roundabout. The proposed layout instead provides two lanes of traffic west of the access roundabout (both inbound and outbound) and within the whole internal gyratory.
- 1.5. It is clearly apparent that capacity of the internal road layout will be significantly improved as a result of increasing the internal layout from one lane to two lanes.
- 1.6. This note sets out below an estimate of the minimum likely throughput capacity of the layout for the existing and proposed layouts.
- 1.7. There is no hard and fast rule regarding link capacities since these are dependent on various factors including, but not limited to, road width, number of junctions, active frontage, gradient, %HGV etc. There are no points within the airport where the internal road has to 'give way' to another traffic stream, so a typical single lane capacity could well be in excess of 1400vph, as for example currently experienced on the A38 north of the airport.
- 1.8. However, since drivers could be 'wayfinding' a more conservative approach to capacity has been taken, based on Appendix D of 'WebTAG Unit M3.1, Highway Assignment Modelling. This gives an estimate of link capacity taking the above factors into account for a variety of link types and is typically used to define speed/flow curves for highway delay assessments.
- 1.9. A road classification of class 7 'urban, non-central' has been selected as a conservative assumption (Table D.5). For this classification, flows of up to 1200 v/h/lane are expected with freeflow speeds of 28-48 kph.

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- 1.10. The frequency of major intersections averaged over the main road network (no/km) would typically be between 2 and 9 – the existing internal road is approximately 900m-long, with two intersections along its length plus a 5 minor junctions, whilst the proposed airport gyratory is approximately 1km-long (one-way), and with 5 minor junctions.

Note: capacity for urban roads given in the guidance relates to roads featuring a percentage of road network with frontage development of typically between 50% and 90%, whilst the existing and proposed internal airport roads will effectively have no frontage development. Therefore, it is expected that the capacity will actually be higher than suggested by the standard urban non-central category.

Notwithstanding the above, the maximum realistic flow (**Qc**) value for type 7 roads that has been applied in this assessment is **800veh/h/3.65m-lane**, even though in reality a much higher capacity is likely to be realised, more akin to the 1200v/h/lane maximum flows envisaged in Table D.5. This is because the **Qc** parameter in the speed/flow curve effectively reflects a point at which vehicle speeds have reduced, and will continue to do so as flows increase towards full saturation when flow breakdown occurs and traffic stops.

Existing Layout

- 1.11. The existing layout provides one lane of traffic per direction west of the North Side Road internal roundabout. Each lane has a width of approximately 3.65m (per direction) and **Qc** is therefore assumed to be **800veh/h** for the purposes of this assessment.

Proposed Layout

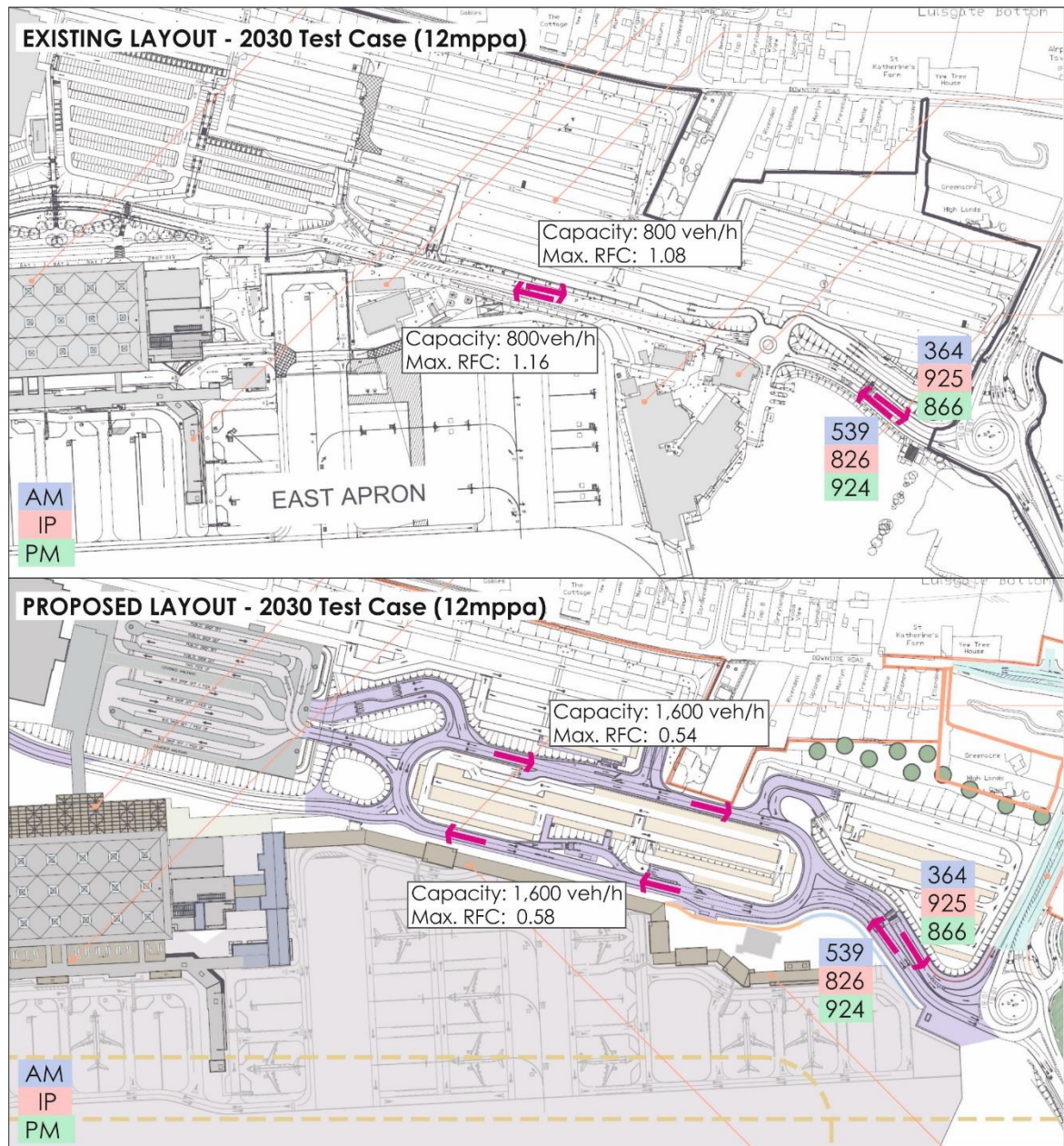
- 1.12. The proposed gyratory will provide two lanes of traffic per direction (total width per direction of c.7.3m). The lowest likely capacity of the of the gyratory (per direction) is therefore assumed to be **1,600 veh/h** for the purposes of this assessment.

Capacity Assessment

- 1.13. The forecast traffic flows using the airport internal roads has been extracted from the TA Addendum for the worst-case peak hour flows for the 2030 Test Case (12mppa).
- 1.14. Based on the **Qc** value of 800 veh/h, a maximum Ratio of Flow to Capacity (RFC(**Qc**)) of the existing and proposed internal layout of the airport has been calculated at the point where the highest levels of traffic are expected. Traffic flows are expected to disperse to the west of the first on site junction, as cars enter car parks along the road i.e. car hire, short stay, MSCP. The results of this assessment are illustrated in **Figure 1.1** below, showing worst case RFC(**Qc**) values of 1.16 for the existing layout and 0.58 for the proposed gyratory.
- 1.15. The assessment uses the **Qc** values quoted in Table D.5 to provide an indication of RFC, but as can be seen, in all cases, the predicted flows are well below the 1200 veh/h/lane maximum typical flow value quoted in Table D.5
- 1.16. This assessment has demonstrated that the proposed gyratory will provide additional capacity compared with the existing layout and that it is likely to operate substantially within its maximum capacity, even based on conservative assumptions.

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Figure 1.1 – Existing/ Proposed Layout Flow Comparison



Note: traffic flows used in the Transport Assessment Addendum (TAA) have been adjusted to reflect likely split of traffic using the northern and southern roundabouts, which is based on:

- All drop-off, taxi and PT services use the northern access
- the distribution of car parking in 2030 is based on the proposed development. This results in a 30.7%/ 69.3% split at the northern (Long Stay, Premier, Meet & Greet car parks – 6,843 spaces) and southern roundabouts (Silver Zone and Silver Zone Extension – 15,457 spaces)..
- the relocation of staff to the new administration building and main Silver Zone staff car park - all additional staff traffic is assumed to use the southern roundabout.