

Stag Brewery Revised Scheme

Technical Note – Highways Options Analysis Chalkers Corner - Noise

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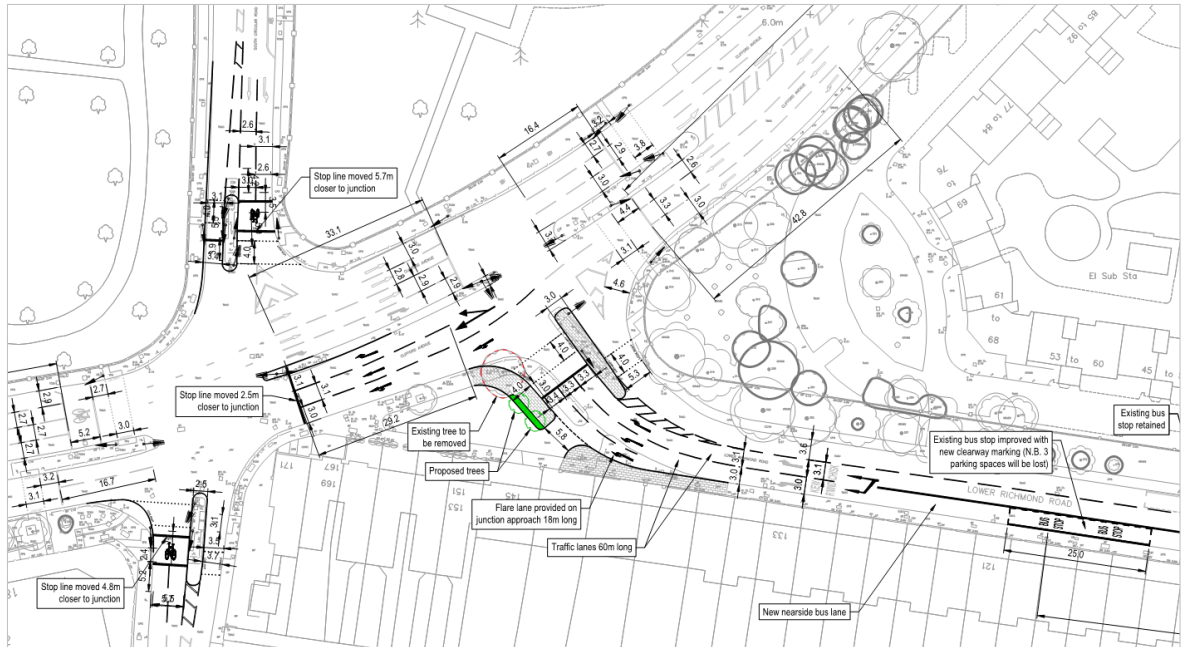
| Issue | Prepared by | Checked & Approved by |
|-------|--|---|
| 001 | Innes Urbanski Associate  | Mark Maclagan Technical Director  |

1. Introduction

- 1.1. There are currently 4 Options with regard to Chalkers Corner and Lower Richmond Road which are currently being reviewed. These are as follows:
 - **Option 1:** Do Nothing (No Change);
 - **Option 2:** Chalkers Corner 'Light' (new left-hand lane WB Lower Richmond Road);
 - **Option 3:** Lower Richard Road Bus Lane (Option 1 but with dedicated bus lane WB on Lower Richmond Road); and
 - **Option 4:** Chalkers Corner 'Light' & Bus Lane (Option 2 but with dedicated bus lane WB on Lower Richmond Road).
- 1.2. This Technical Note provides a preliminary noise assessment of the proposed Options to provide supporting information to the updated Noise and Vibration ES Chapter of the Stag Brewery Revised Scheme ES Addendum.
- 1.3. Reconfiguration of Chalkers Corner and/or introduction of a dedicated westbound (WB) bus lane on Lower Richmond Road, all of which are illustrative at this stage, are anticipated to be accommodated within the highway boundary. If it is agreed that all necessary highways works are within the adopted highway then Application C may be withdrawn.
- 1.4. Figure 1 presents the illustrative Light Scheme and WB Lower Richmond Road bus lane (Option 4). With regard to the Light Scheme, this would move the road edge at Chalkers Corner, and therefore road traffic noise source, closer to the receptors south of Lower Richmond Road proximate to the junction. The reduction in distance is approximately 4 metres but is dependent on location of the receptor to the reconfigured junction. With regard to the WB bus lane, WB vehicles on Lower Richmond Road would be restricted to the lane north of the bus lane. WB vehicles, except buses,

on Lower Richmond Road would therefore be at a slightly greater distance than current where WB vehicles use both WB lanes on Lower Richmond Road.

Figure 1: Option 4 Illustrative Layout



2. Road Traffic Noise

Assessment Methodology

- 2.1. Two approaches have had to be adopted to allow assessment of changes in road traffic as a result of the Stag Brewery Revised Scheme but also of the four Options for Chalkers Corner.
- 2.2. Firstly, an assessment of noise level changes arising from forecast changes in road traffic volume, composition and speed associated with the Revised Scheme has been undertaken using the calculation methodology detailed within the Calculation of Road Traffic Noise¹ (CRTN) and magnitude criteria within the LA 111 DMRB².
- 2.3. As set out in the CRTN methodology, road traffic noise levels are typically measured and predicted in units of L_{A10} (18 hour) dB. The L_{A10} parameter is the A-weighted sound level in decibels exceeded for 10% of the measurement period, which in this case is the 18-hour period between 06:00 and 00:00 hours. This noise index has been shown to correlate well with people's subjective annoyance arising from road traffic noise. The basic noise level (BNL) is the L_{A10} (18 hour) dB at a distance 10 metres from the carriageway edge. It is the change in the BNL with the Revised Scheme that is used to determine the magnitude of the level of change in road traffic noise and its significance.
- 2.4. A change in noise level of 1dB is considered the smallest detectible change over the short-term assessment period (sudden change) whereas a change in noise level of 3dB is considered the smallest detectible change over a long-term period (gradual change).

¹ DoT. (1988): 'Calculation of Road Traffic Noise'. HMSO.

² Highways England. (November 2019): 'Design Manual of Roads and Bridges. LA 111 Noise and vibration'. Crown Copyright.

- 2.5. The BNL is calculated based on the 18-hour Annual Average Weekday Traffic (AAWT) volume, percentage of HGVs and speed in kph.
- 2.6. The magnitude of the change in BNL over the short-term is presented in Table 1 and have themselves been drawn from LA 111 DMRB.

Table 1: Magnitude of Change in BNL

| Magnitude | Short-Term |
|------------|------------|
| Major | ≥5.0 |
| Moderate | ≥3.0 |
| Minor | ≥1.0 |
| Negligible | <1.0 |

- 2.7. A short-term assessment for the opening year of 2027 has been undertaken for all road links potentially affected by the proposed Stag Brewery Revised Scheme.
- 2.8. Secondly, to allow assessment of changes in road traffic noise due to the proposed reconfiguration and/or introduction of a dedicated bus lane, in addition to the forecast changes in traffic volume, CadnaA noise modelling software has been used.
- 2.9. Due to the forecast number of bus movements within the dedicated WB bus lane on Lower Richmond Road within an 18-hour period (06:00-00:00) of 111 falling significantly below the low-flow criteria of 1000 vehicles, required for the application of 18-hour CRTN calculation methodology, a different approach to predicting road traffic noise has had to be adopted to allow comparison between all the proposed Options.
- 2.10. CadnaA has been used to predict road traffic noise in terms of the L_{Aeq} index rather than the L_{A10} noise parameter. CadnaA has converted the predicted L_{A10} noise parameter from the road input data to an L_{Aeq} value using Transport Research Laboratory³ methodology. The dedicated bus lane has however been modelled separately as a moving point source based on a maximum of 9 bus movements within a 1 hour period with a sound power level of 101.5dB(A)⁴.
- 2.11. Due to traffic congestion and traffic light controls, vehicles proximate to Chalkers Corner spend time stationary, idling and moving slowly. Vehicle speeds below 20 kph however fall below CRTN calculation methodology and therefore a vehicle speed of 20 kph has been adopted for all vehicles within the CadnaA noise model of Chalkers Corner for each Option. Due to the road traffic noise assessment being comparative, this approach is considered to be acceptable.

Road Traffic Noise Assessment Results

Methodology 1 – CRTN Stag Brewery Revised Scheme

- 2.12. Table 2 presents the results based on predicted change in the $L_{A10,18}$ hour for the Stag Brewery Revised Scheme based on the forecast traffic data provided by Stantec for the opening year 2027. The traffic speed data is the same as that provided by Stantec. A summary of the data used in the assessment of the Revised Scheme with no change to road layout or lanes with and without Development are presented within Appendix A to this Technical Note.

³ Abbott PG, Nelson PM (2002): 'Converting The UK Traffic Noise Index $L_{A10,18h}$ to EU'. (PR/SE/451/02) TRL.

⁴ Laib F, Braun A, Rid W. (2019): 'Transportation Research Procedia 37 (2019) 377-384. Modelling noise reductions using electric buses in urban traffic. A case study from Stuttgart, Germany'. Elsevier.

Table 2: Stag Brewery Revised Scheme CRTN Basic Noise Level (BNL) Results

| Road Link | Predicted dB $L_{A10,18h}$, No Development 2027 | Predicted dB $L_{A10,18h}$, With Development 2027 | Change |
|--|---|---|--------------|
| A316 Clifford Ave | 75.1 | 75.1 | 0.0 |
| A316 Lower Richmond Road | 73.2 | 73.3 | 0.1 |
| South Circular (north of A316) | 69.4 | 69.5 | 0.1 |
| South Circular (south of A316) | 70.3 | 70.3 | 0.0 |
| A3003 Lower Richmond Road (Watney's Sports Ground) | 70.8 | 71.1 | 0.2 |
| A3003 Lower Richmond Road (Mortlake Green) | 70.9 | 71.1 | 0.2 |
| Williams Lane ^[1] | Below CRTN Low Flow Criteria | 56.8 | See note [1] |
| Mortlake High Street | 71.3 | 71.4 | 0.1 |
| The Terrace (west of Barnes Bridge Station) | 71.0 | 71.1 | 0.1 |
| White Hart Lane (south of Mortlake High Street) | 64.8 | 64.9 | 0.1 |
| Sheen Lane (north of Level Crossing) | 64.8 | 65.1 | 0.3 |
| Sheen Lane (south of Level Crossing) | 64.4 | 64.7 | 0.3 |
| Sheen Lane (south of South Circular) | 63.3 | 63.5 | 0.2 |
| South Circular Road (west of Sheen Lane) | 71.1 | 71.1 | 0.0 |

Note: ^[1] AAWT for the No Development scenario of 747 is below CRTN low flow criteria of 1000 per 18-hr. On this basis it is not possible to assign reliance to a predicted road traffic noise level and therefore this has not been presented. The overall flow of vehicles on Williams Lane has nearly doubled (91% increase) and therefore the expectation is that noise from this road link would approximately increase by 3dB. Due to the contribution at this location from Lower Richmond Road however at this location the overall increase in road traffic noise is expected to be greater than 1dB but less than 3dB and therefore of minor significance.

- 2.13. For all road links, with the exception of Williams Lane, the predicted change in road traffic noise for the 'Revised Scheme' is negligible. At Williams Lane, a minor increase in road traffic noise is predicted with the Revised Scheme.

Methodology 2 – CadnaA Noise Model Chalkers Corner All Options

- 2.14. Table 3 presents the predicted road traffic noise levels as an L_{Aeq} value at key residential receptors for all Chalkers Corner Options.

Table 3: CadnaA Predicted Noise Levels (dB L_{Aeq,T}) 2027

| Receptor | Option 1 With Dev | Option 1 No Dev | Option 2 | Option 3 | Option 4 | Range |
|--|-------------------|-----------------|----------|----------|----------|-------|
| 135-137 Lower Richmond Road | 70.4 | 70.2 | 70.5 | 70.0 | 70.3 | 0.5 |
| 139 Lower Richmond Road | 69.7 | 69.5 | 70.0 | 69.6 | 70.0 | 0.5 |
| 141 Lower Richmond Road | 69.1 | 68.9 | 69.6 | 69.0 | 69.6 | 0.7 |
| 143 Lower Richmond Road | 68.3 | 68.1 | 68.8 | 68.2 | 68.8 | 0.7 |
| 145 Lower Richmond Road | 68.1 | 68.0 | 68.5 | 68.1 | 68.5 | 0.5 |
| 151-153 Lower Richmond Road | 68.2 | 68.1 | 68.4 | 68.2 | 68.4 | 0.3 |
| 155-157 Lower Richmond Road | 68.7 | 68.6 | 68.8 | 68.7 | 68.8 | 0.2 |
| 155-157 Lower Richmond Road | 69.3 | 69.2 | 69.4 | 69.3 | 69.4 | 0.2 |
| 159-161 Lower Richmond Road | 69.8 | 69.7 | 69.9 | 70.2 | 70.3 | 0.1 |
| 163-165 Lower Richmond Road | 70.3 | 70.2 | 70.3 | 71.4 | 71.5 | 0.1 |
| 167-169 Lower Richmond Road | 71.4 | 71.4 | 71.5 | 72.5 | 72.5 | 0.1 |
| 171 Lower Richmond Road | 72.5 | 72.4 | 72.5 | 72.4 | 72.4 | 0.1 |
| Chertsey Ct Facing Chalkers Corner | 64.3 | 64.1 | 64.3 | 64.3 | 64.4 | 0.3 |
| Chertsey Ct Lower Richmond Road | 66.6 | 66.4 | 66.6 | 66.7 | 66.7 | 0.3 |
| Chertsey Ct Clifford Avenue | 67.7 | 67.6 | 67.7 | 67.7 | 67.7 | 0.1 |
| Lower Richmond Road Adjacent to Bus Lane | 70.4 | 70.5 | 70.5 | 69.8 | 70.0 | 0.7 |

- 2.15. The maximum range in predicted noise levels, from the lowest to the highest is less than 1dB for all receptors, and therefore it can be concluded that in noise terms the difference between all the Chalkers Corner Options is negligible.
- 2.16. Figure 2 present the predicted noise contour plot for Option 2, Chalkers Corner Light configuration. Figure 3 presents a noise difference contour plot Option 2 minus Option 1 No Development. Figure 3 illustrates negligible change in noise level with Option 2, Chalkers Corner Light configuration, when compared to No Development for the same future year of 2027.

Figure 2: Chalkers Corner Option 2 (Light) Noise Contour Plot (dB LAeq,T)

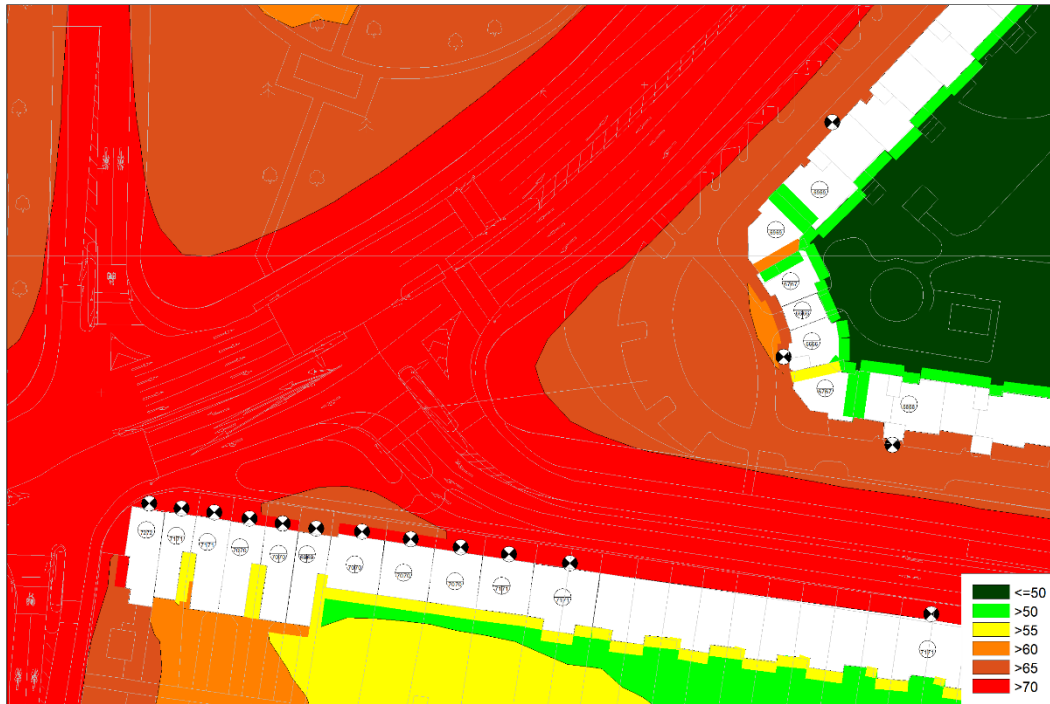
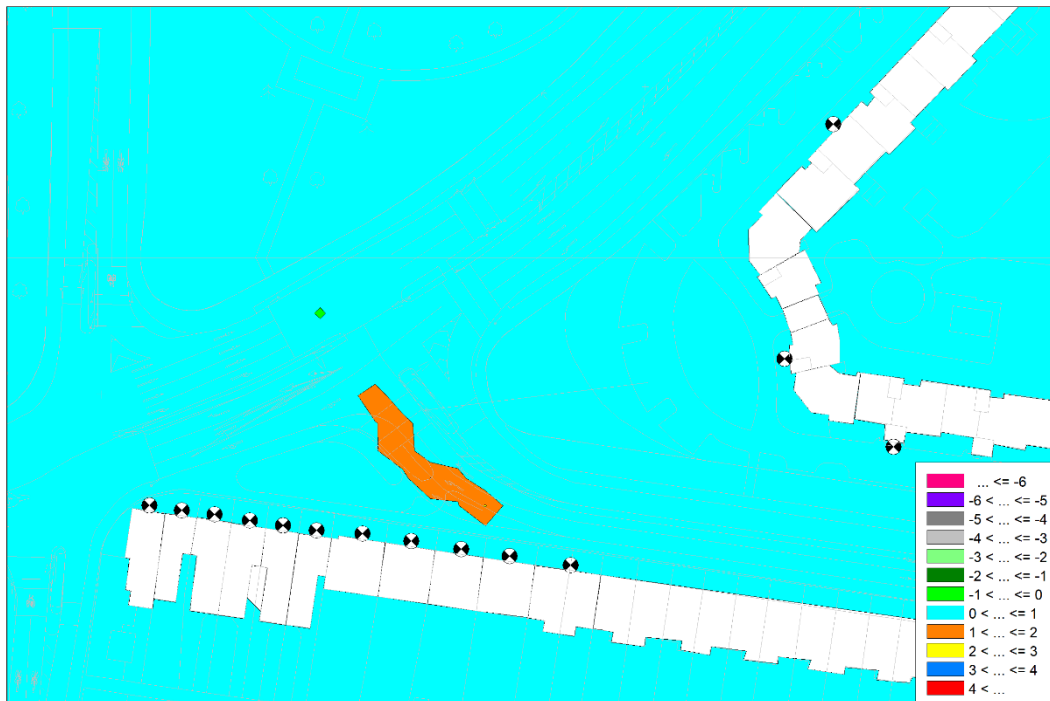


Figure 3: Option 2 *minus* Option 1 No Development Noise Level Difference



3. Summary

Option 1 – Do Nothing

- 3.1. There is negligible difference in road traffic noise levels with or without the Stag Brewery Revised Scheme.

Option 2 – Chalkers Corner ‘Light’ Scheme

- 3.2. The highest increase in road traffic noise with the Light Scheme are experienced at those properties south of Lower Richmond Road nearest to proposed new left-hand lane. The predicted increase in noise level however is less than 1dB. The reason for this is due to the significant contribution from all the other road links and not just the WB lanes of Lower Richmond Road.
- 3.3. The overall predicted increase however is negligible.

Option 3 – Lower Richmond Road Bus Lane

- 3.4. Introduction of a dedicated bus lane WB on Lower Richmond Road is predicted to result in a slightly lower overall noise level at the properties south of Lower Richmond Road adjacent to the bus lane. The reason for this is the relatively low flow of buses, 111 within an 18 hour period with a maximum of 9 buses within a 1 hour period, compared to WB vehicles on Lower Richmond Road whose movement is restricted to the running lane north, and therefore slightly more distant to properties south of Lower Richmond Road.
- 3.5. The overall predicted change in noise level is negligible.

Option 4 – Chalkers Corner ‘Light’ Scheme & Bus Lane

- 3.6. The results of Option 4 reflect those in Option 2 for residents near to Chalkers Corner and Option 3 for residents adjacent to the bus lane. The overall predicted change in noise level is negligible.
- 3.7. In summary, all the predicted changes in road traffic noise levels when compared with Option 1 No Development or between Options, is less than 1dB and is therefore considered negligible. On this basis none of the proposed Options provide a clear noise benefit over the other Options.

Appendix A: CRTN Road Traffic Noise Calculations

| Road | 2027 No Development | | | 2027 With Development | | | BNL 18 hour | | | |
|--|---------------------|-------------|-------|-----------------------|-------------|-------|---------------|--------------------------|-----------------------|--------|
| | % HGV | Speed (kph) | Flow | % HGV | Speed (kph) | Flow | % Flow Change | 2027 Without Development | 2027 With Development | Change |
| 1 A316 Clifford Ave | 10.0 | 64 | 36800 | 10.0 | 64 | 37282 | 1.3 | 75.1 | 75.1 | 0.0 |
| 2 A316 Lower Richmond Road | 6.0 | 48 | 40326 | 6.0 | 48 | 40897 | 1.4 | 73.2 | 73.3 | 0.1 |
| 3 South Circular (north of A316) | 6.4 | 48 | 16313 | 6.4 | 48 | 16545 | 1.4 | 69.4 | 69.5 | 0.1 |
| 4 South Circular (south of A316) | 4.1 | 48 | 23229 | 4.1 | 48 | 23322 | 0.4 | 70.3 | 70.3 | 0.0 |
| 5 A3003 Lower Richmond Road (Watney's Sports | 8.9 | 45 | 20277 | 8.8 | 45 | 21655 | 6.8 | 70.8 | 71.1 | 0.2 |
| 6 A3003 Lower Richmond Road (Mortlake Green) | 10.0 | 42 | 20473 | 9.7 | 42 | 21890 | 6.9 | 70.9 | 71.1 | 0.2 |
| 7 Williams Lane | 7.1 | 41 | 747 | 6.5 | 41 | 1432 | 91.7 | - | 56.8 | - |
| 8 Mortlake High Street | 10.8 | 42 | 21558 | 10.6 | 42 | 22535 | 4.5 | 71.3 | 71.4 | 0.1 |
| 9 The Terrace (west of Barnes Bridge Station) | 8.9 | 46 | 20697 | 8.8 | 46 | 21538 | 4.1 | 71.0 | 71.1 | 0.1 |
| 10 White Hart Lane (south of Mortlake High Street) | 8.0 | 40 | 5815 | 7.9 | 40 | 5950 | 2.3 | 64.8 | 64.9 | 0.1 |
| 11 Sheen Lane (north of Level Crossing) | 3.4 | 48 | 6987 | 3.6 | 48 | 7427 | 6.3 | 64.8 | 65.1 | 0.3 |
| 12 Sheen Lane (south of Level Crossing) | 2.6 | 48 | 6722 | 2.8 | 48 | 7162 | 6.5 | 64.4 | 64.7 | 0.3 |
| 13 Sheen Lane (south of South Circular) | 4.3 | 33 | 5742 | 4.4 | 33 | 6009 | 4.7 | 63.3 | 63.5 | 0.2 |
| 14 South Circular Road (west of Sheen Lane) | 8.6 | 43 | 22852 | 8.6 | 43 | 22852 | 0.0 | 71.1 | 71.1 | 0.0 |

Below CRTN 18-hour low flow criteria of 1000, therefore road traffic noise cannot be reliably calculated.