1 Low Traffic Neighbourhood: GIS Methodology

The analysis was predominantly conducted with ArcGIS Pro. The output for each prioritisation factors is attached in Appendix A, and the analysis processes are outlined as follows.

Traffic

Average Speeds

The dataset consists of every road in the study area, with their average speeds contained in the attribute table. The average speed of each cell was calculated across all roads that intersect.

Percentage of through traffic (Weekday AM, Midday and PM Peak periods) and Estimated no. of total traffic across three weekday peak periods

The through traffic percentage and the estimated number of total traffic was provided in the dataset supplied by The Floow by peak periods. The percentage was multiplied by the total traffic number to obtain the number of through traffic.

The dataset supplied by The Floow was collected using telematics technology. The Floow developed a method named the Blend Analysis, which was conducted by identifying the origin and destination, in terms of LSOAs, for each journey in the sample. The Floow repeated this process for a set of key time periods, which correspond to the weekday (or weekend) AM (or PM) peaks, midday, and night-time activity.

For each period, a blend designation was assigned to each journey to indicate whether the travel is exclusively internal to the cell ('In-In'), exclusively external to the cell ('Out-Out') or involves an origin ('In-Out') or destination ('Out-In') inside of the cell only. The occurrences of segments within journeys were then tallied in terms of the blend designation and were stored as a percentage of all journeys.

Killed or Seriously Injured (KSIs) Casualties - Vulnerable Road Users (Pedestrians and Cyclists)

The road safety datasets obtained from Department for Transport contains the location and details of all Personal Injury Collisions (PICs) in the UK between 2014 and 2018. The PICs are categorised into the categories above for analysis.

An inner buffer of 20m has been taken from the boundary of each cell, to exclude PICs that occur outside of the cells, such as those happened along main roads.

The number of within each cell buffer was counted, then divided by total area of the cell (sqm) to obtain a value by area.

Mode Shift

Availability of Public Transport

The total number of bus stops and train stations within each cell were counted. A power of five times was applied to the number of train stations. Both numbers were summarised then divided by total area of the cell (sqm) to obtain a value by area.

Length of Cycle Network Within Reach

An outer buffer of 20m has been taken from the boundary of each cell, to consider of routes passing nearby and within reach of the cell. The length of cycle network intersecting each cell buffer was summarised, then divided by total area of the cell (sqm) to obtain a value by area.

Pedestrian Movement

The Space Syntax dataset quantify the spatial accessibility of roads based on the number of route choices available and directness of walking routes. It describes the distribution of movement, identifies where pedestrian movement is likely to be higher.

The "Choice 2km" score in the dataset has been used. It measures how often a street segment appears on a hypothetical, simplest route between all other street segments in the network. The simplest route is defined as the route that undergoes the least total change in direction from start point to end point when linking all segments within a defined distance, which is 2km in this instance. 2km has been chosen, out of the option of 10km and 100km, as this setting identifies where pedestrian movement is likely to be higher.

The average "Choice 2km" score of each cell was calculated across all roads that intersect.

Propensity to Cycle (PTC) (Government target scenario)

The PTC dataset obtained is in the format of road lines, containing the number of cyclists forecasted to be using the road under the Government target scenario. Roads intersecting each cell were extracted with their cyclist numbers summarised. The total forecasted number of cyclists each cell was then divided by total area of the cell (sqm) to obtain a value by area.

Population

Workspace population and Residential population

The data obtained from NOMIS is in Output Area (OA) boundary. The population values in OA boundary were apportioned to the neighbourhood cell boundary by area weighting. This value was then divided by the total area of the cell (sqm) to obtain a value by area.

No. of commuters start or end their journey to work within cell

The data obtained from NOMIS is in a matrix table showing the number of commuters that travel to work between each Output Areas (OA) within or close to Tunbridge Wells. The number of commuters starting and ending their journeys within each cell were summarised, then divided by total area of the cell (sqm) to obtain a value by area.

Health

Index of Multiple Deprivation (IMD) Decile – Health Deprivation and Disability Domain

The data obtained from NOMIS is in Lower Layer Super Output Area (LSOA) boundary. The values in LSOA boundary were first intersected with the neighbourhood cell boundary, then averaged to obtain the value for each cell.

Male life expectancy, Female life expectancy, Percentage of children obese at Reception Year, Percentage of children obese at Year 6 and Asthma Prevalence

These datasets are presented in Middle Layer Super Output Area (MSOA) boundary. The values in MSOA boundary were first intersected with the neighbourhood cell boundary, then averaged to obtain the value for each cell.

Size of Open Space

The datasets contain the location of all open greenspaces in the UK. The area of which within each cell was then summarised, then divided by the total area of the cell (sqm) to obtain a value by area.

No. of Play Areas

The number of children play areas within each cell was counted, then divided by total area of the cell (sqm) to obtain a value by area.

Air Quality

PM10, PM2.5 and NO2 concentrations

These datasets present pollutant concentration data in a 1x1km point grid. Inverse distance weighting was used to interpolate the concentration level in a 100x100m grid. An average concentration value was then calculated for each neighbourhood cell.

Trip Attractors

No. of Schools (weighted by the number of pupils)

The dataset obtained from the TWBC contains the location and pupil numbers of all schools in Tunbridge Wells. Each school is given a percentile value (0.25, 0.5, 0.75 and 1), based on the percentile range its pupil numbers fall into, in comparison to all other schools in the LTN study area. The percentile value of schools within each cell was summarised, then divided by the total area of the cell (sqm) to obtain a weighted number of schools by area.

No. of Amenities

The location of healthcare facilities, cultural infrastructure, sports facilities in Tunbridge Wells are added into a single amenities layer. The number of amenities within each cell was counted, then divided by total area of the cell (sqm) to obtain a value by area.