Consumer Data Research Centre

LIDA

UNIVERSITY OF LEEDS

OSM for sustainable transport planning

(OpenInfra project)

Greta Timaite, James Hulse, Robin Lovelace

SOTM 2022, Firenze

19-21 August

Fig. 2. Mapping out the benefits of walking and cycling

WHO (2022)

Health

Physical inactivity costs the NHS up to **£1bn per annum**, with further indirect costs calculated at **£8.2bn**

£8.2bn

Wellbeing

20 minutes of exercise per day cuts risk of **developing depression by 31%** and increases productivity of workers

Congestion

The new east-west and north-south cycle routes in London are moving **46% of the people** in only **30% of the road space**

Local businesses

Up to **40% increase** in shopping footfall by well-planned improvements in the walking environment

+40%

Environmental and air quality

Meeting the targets to double cycling and increase walking would lead to savings of **£567 million** annually from air quality alone and prevent **8,300 premature deaths** each year and provide opportunities to improve green spaces and biodiversity[5].

£567m

Climate change

Mode shift to active transport is one of the most cost-effective ways of reducing transport emissions

Economy

Cycling contributes **£5.4bn to the economy** per year and supports **64,000 jobs**

£5.4bn

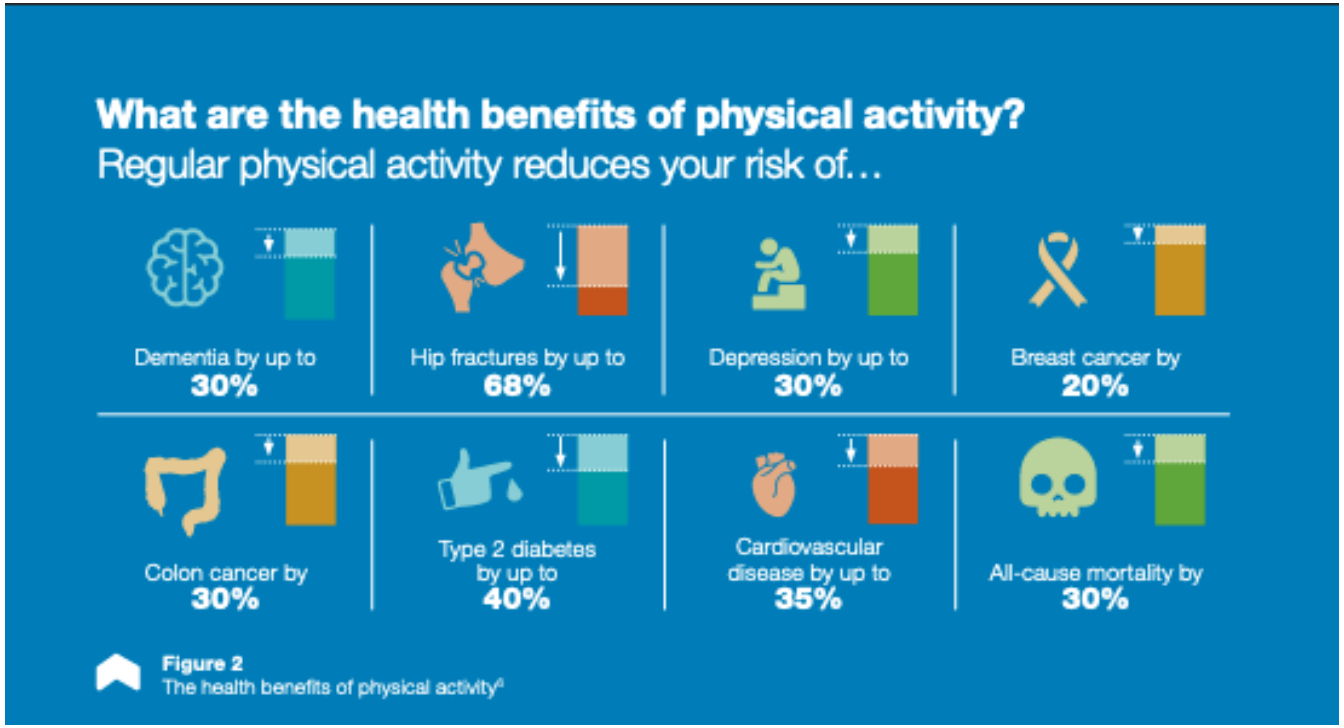

Figure 2
The health benefits of physical activity[6]

Gear change: a bold vision for cycling and walking (2020)

Department for Transport

Inclusive Mobility

A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure

Inclusive mobility: a guide to best practice on access to pedestrian and transport infrastructure (2021)

Cycle infrastructure should be accessible to everyone from 8 to 80 and beyond: it should be planned and designed for everyone. The opportunity to cycle in our towns and cities should be universal.

LTN 1/20 Cycle infrastructure design (2020)

The implication from these patterns is that policy *does* need to more explicitly consider the needs and preferences of under-represented groups. We cannot assume that growing cycling levels (characteristic of many dense urban areas) will automatically increase the gender and age diversity of cyclists. It might be helpful to think in terms of a differential threshold effect: that all else being equal, we

Aldred et al. (2016)

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Aldred et al. (2016)

Engagement should continue throughout a project, contribute to the design, and might include user tests and trials.

Inclusive mobility (2021)

Before any specific proposal is put forward, the ground must be carefully prepared, with the public persuaded of the need for change and an attractive alternative to the status quo laid out that people can get interested in – this should relate proposals to things that affect people's lives directly, not just technical proposals and show why

LTN 1/20 Cycle infrastructure design (2020)

OpenStreetMap (OSM – openstreetmap.org) is an emerging data source with the potential to serve as a single source of infrastructure data with global coverage. OSM is a crowdsourced map of the world that provides free spatial data for the natural and built environment, including active transportation infrastructure. With data quality

Nelson et al. (2021)

The world's user-generated road map is more than 80% complete

Christopher Barrington-Leigh[1☯]*, Adam Millard-Ball[2☯]*

1 Institute for Health and Social Policy; and School of Environment, McGill University, Montreal, Québec, Canada, **2** Environmental Studies Department, University of California Santa Cruz, Santa Cruz, California, United States of America

☯ These authors contributed equally to this work.
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Using OpenStreetMap to inventory bicycle infrastructure: A comparison with open data from cities

Colin Ferster, Jaimy Fischer, Kevin Manaugh, Trisalyn Nelson & Meghan Winters

To cite this article: Colin Ferster, Jaimy Fischer, Kevin Manaugh, Trisalyn Nelson & Meghan Winters (2020) Using OpenStreetMap to inventory bicycle infrastructure: A comparison with open data from cities, International Journal of Sustainable Transportation, 14:1, 64-73, DOI: 10.1080/15568318.2018.1519746

Ferster et al. (2020)

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Aims to explore how OpenStreetMap (OSM) can be used to understand, prioritise, and design active travel infrastructure.

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Focus on accessible infrastructure.

The potential of OpenStreetMap for (accessible) active travel planning

Greta Timaite*[1], Robin Lovelace[1] and Victoria Houlden[2]

[1]Leeds Institute for Data Analytics, University of Leeds
[2]School of Geography, University of Leeds

January 17, 2022

Summary

Open-access data has the potential to encourage a more participatory and bottom-up approach to decision-making in transport research. This paper discusses the initial findings of OpenInfra project that aims to explore the potential of OpenStreetMap in (accessible) transport infrastructure planning, specifically in the context of active travel in the UK. Exploratory data analysis reveals that, while OSM provides extensive highways data, it lacks systematic information of key attributes relevant to planning for active travel (kerb height, sidewalk width), are still largely missing.

KEYWORDS: OSM, Active Travel, Planning, Accessibility

Timaite et al. (2022)

Transport Infrastructure Data Packs

James Hulse

2022-06-27

Source: `vignettes/data_packs.Rmd`

Setup

Library install

```
library(sf)
library(dplyr)
library(tmap)
#library(openinfra)
```

Data Packs

This vignette covers the transport infrastructure data packs.

The transport infrastructure data packs contain OSM infrastructure data for a given Local Authority District (LAD) as defined by the polygons of this map of UK LADs.

Whilst these LADs are currently being used to define the spatial area covered by each infrastructure data pack, any new set of updated boundaries (as a geojson file) can also be used to create the infrastructure data packs.

Reference

Contents

Reference
All functions

All functions

`example_data`	OSM infrastructure data used in creation of transport infrastructure data packs.
`oi_active_cycle()`	Function to recategorise OSM infrastructure based on cycleability
`oi_active_walk()`	Function to recategorise OSM infrastrcutre based on pedestrian walkability.
`oi_clean_maxspeed_uk()`	Re-classifies the maxspeed column of an OSM data frame to be compliant with current UK speed limits. The clean re-coded speeds are stoed in `oi_maxspeed`.
`oi_inclusive_mobility()`	Function to recategorize OSM data based on the Inclusive Mobility (IM)
`oi_is_lit()`	Function to recategorise OSM infrastrcutre based on lighting presence.
`oi_recode_road_class()`	Re-classifies OSM Roads
`oi_road_names()`	Function to recategorise OSM data, combining both the `name` & `ref` field for an OSM feature, or whichever is available.

Openinfa Functions

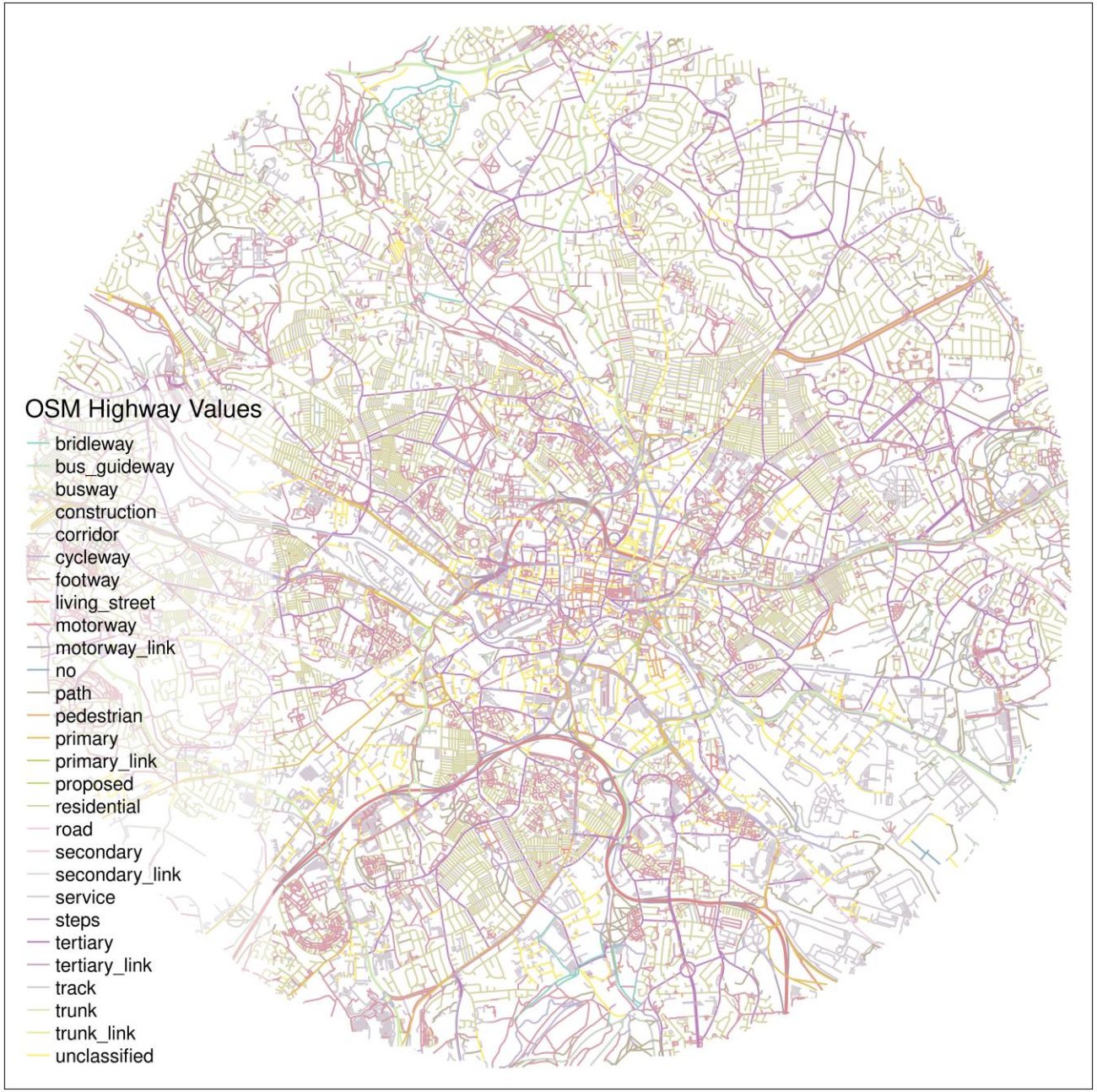


Figure 1. Default OSM highway values, within a 5km radius network of Leeds (UK) centred at the city centre

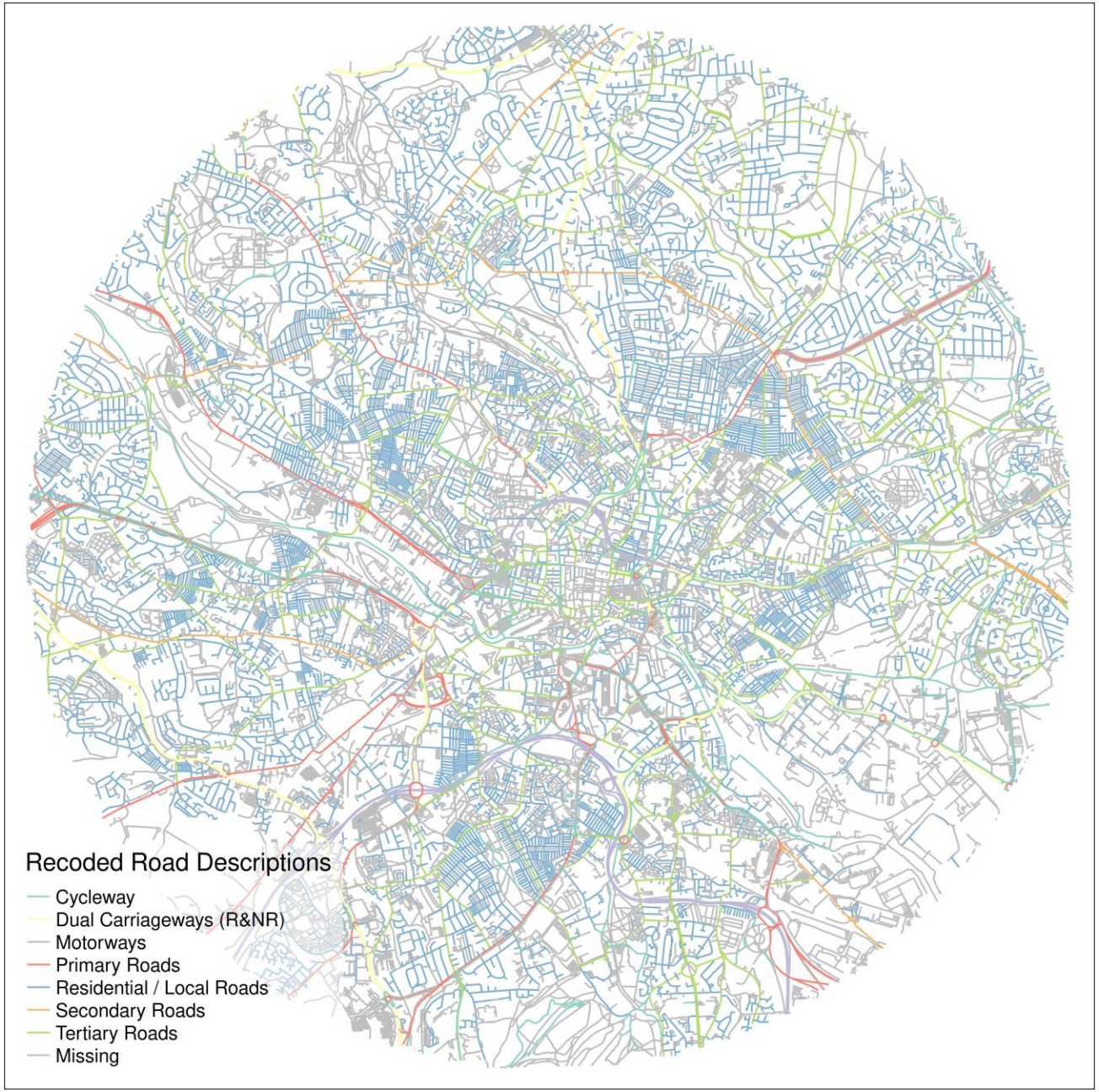


Figure 2. Recoded OSM highway values, an oi_recode_road_class output, within a 5km radius network of Leeds (UK) centred at the city centre

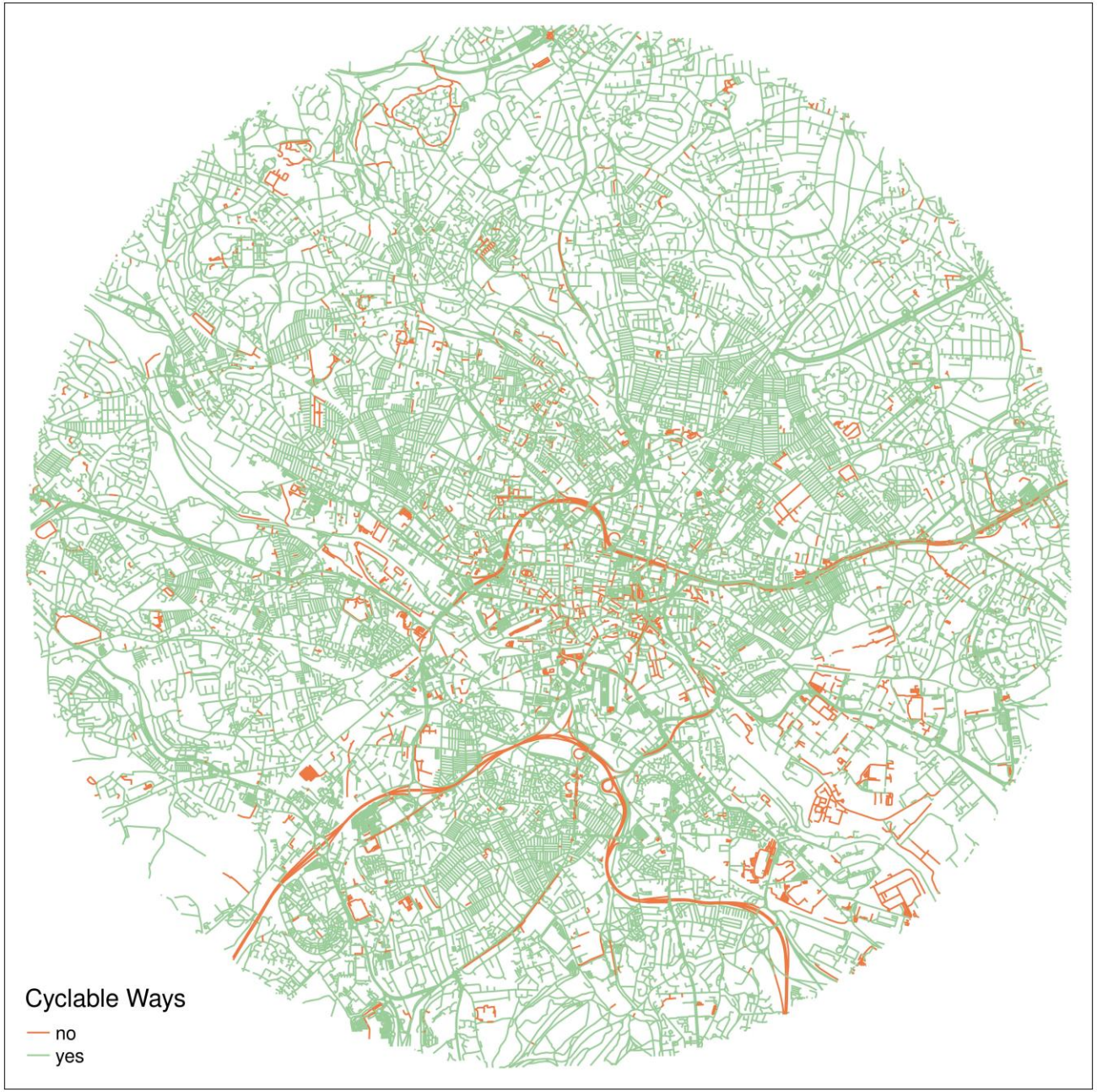


Figure 3. Usable OSM infrastructure for cyclists, an oi_active_cycle output, within a 5km radius network of Leeds (UK) centred at the city centre

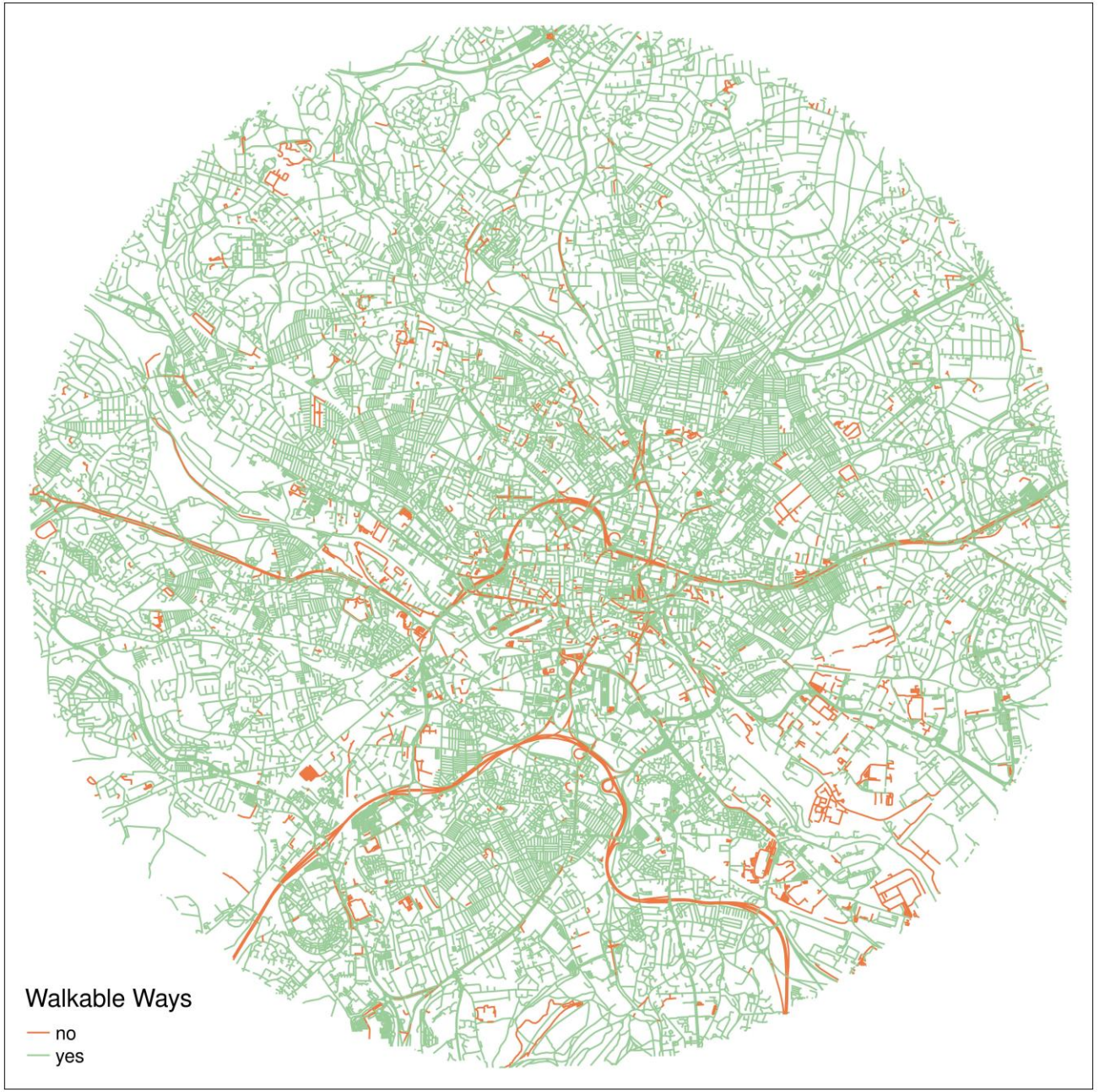


Figure 4. Usable OSM infrastructure for pedestrians, an oi_active_walk output, within a 5km radius network of Leeds (UK) centred at the city centre

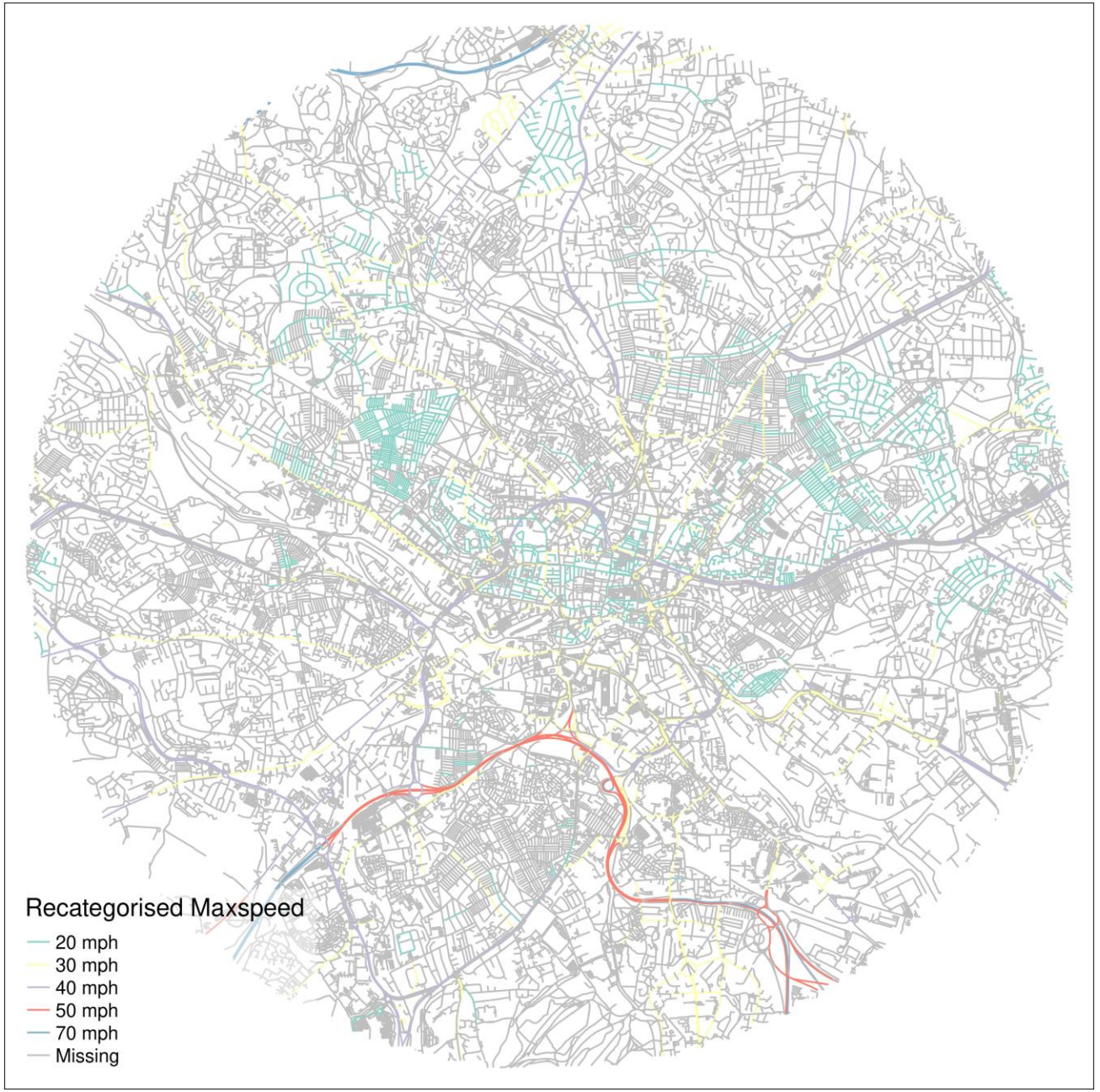


Figure 5. Cleaned OSM maxspeed values, an oi_clean_maxspeed_uk output, within a 5km radius network of Leeds (UK) centred at the city centre

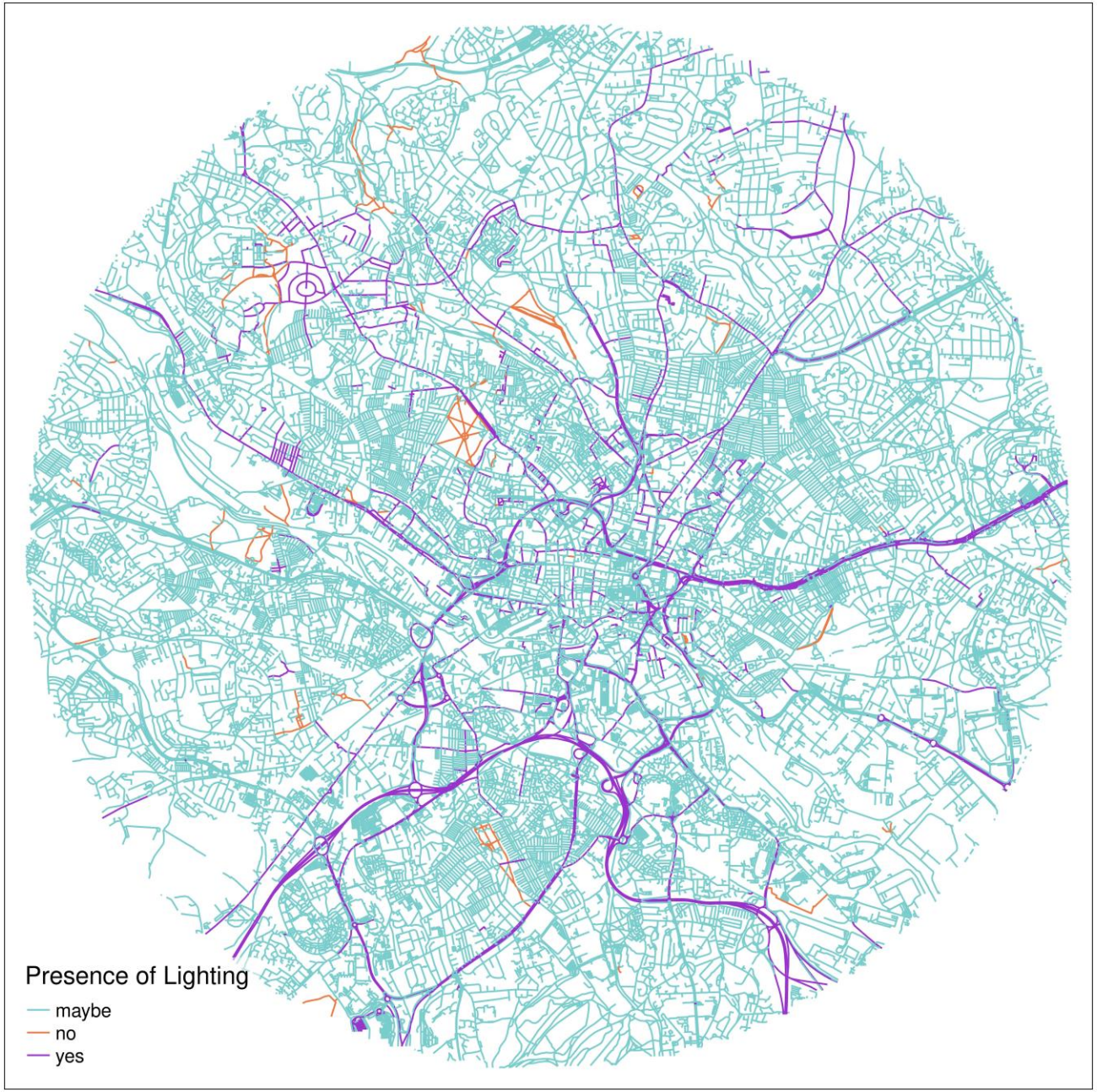


Figure 6. Default OSM highway values, an oi_is_lit output, within a 5km radius network of Leeds (UK) centred at the city centre

Function and documentation for Inclusive Mobility guide (2021)

Source: `vignettes/im_get.Rmd`

The purpose of the `inclusive_mobility_get` function is to recategorize OSM data based on the recent Inclusive Mobility (IM) guide UK. The goal behind this is to encourage the use of crowd-sourced open data in the inclusive infrastructure planning. Indeed, the function has been written to encourage discussions around the applicability of open data and act as a starting point.

It has to be noted that this function is a simplification of all the requirements outlined in the guide. There are a couple of reasons for this. First, while there is a large number of tags in OSM to create detailed maps, but the values imputed are not always IM guide-friendly. For example, in the guide 6 different types of tactile paving are outlined, yet those types are not key values in the OSM as it focused on the presence/absence of tactile paving. This, then, leads not only to the fact that not all OSM data can be sensibly recategorized based on the IM guide but also that it is highly unlikely that a single function could capture the detailed specifications outlined in the IM guide.

Inclusive Mobility function

When a ‘footway’ is mentioned in this document, it refers to the (usually raised) ‘pavement’ adjacent to a road. A ‘footway’ is defined in section 329 of the Highways Act 1980 as the part of the highway on which pedestrians have a right of way, alongside the part of the highway that is meant for the passage of vehicles. A ‘footpath’ refers to any other right of way for pedestrians, that does not run adjacent to a road, usually a Public Right of Way. Footways and footpaths should generally be treated the same in terms of design and the needs of users.

Inclusive mobility (2021)

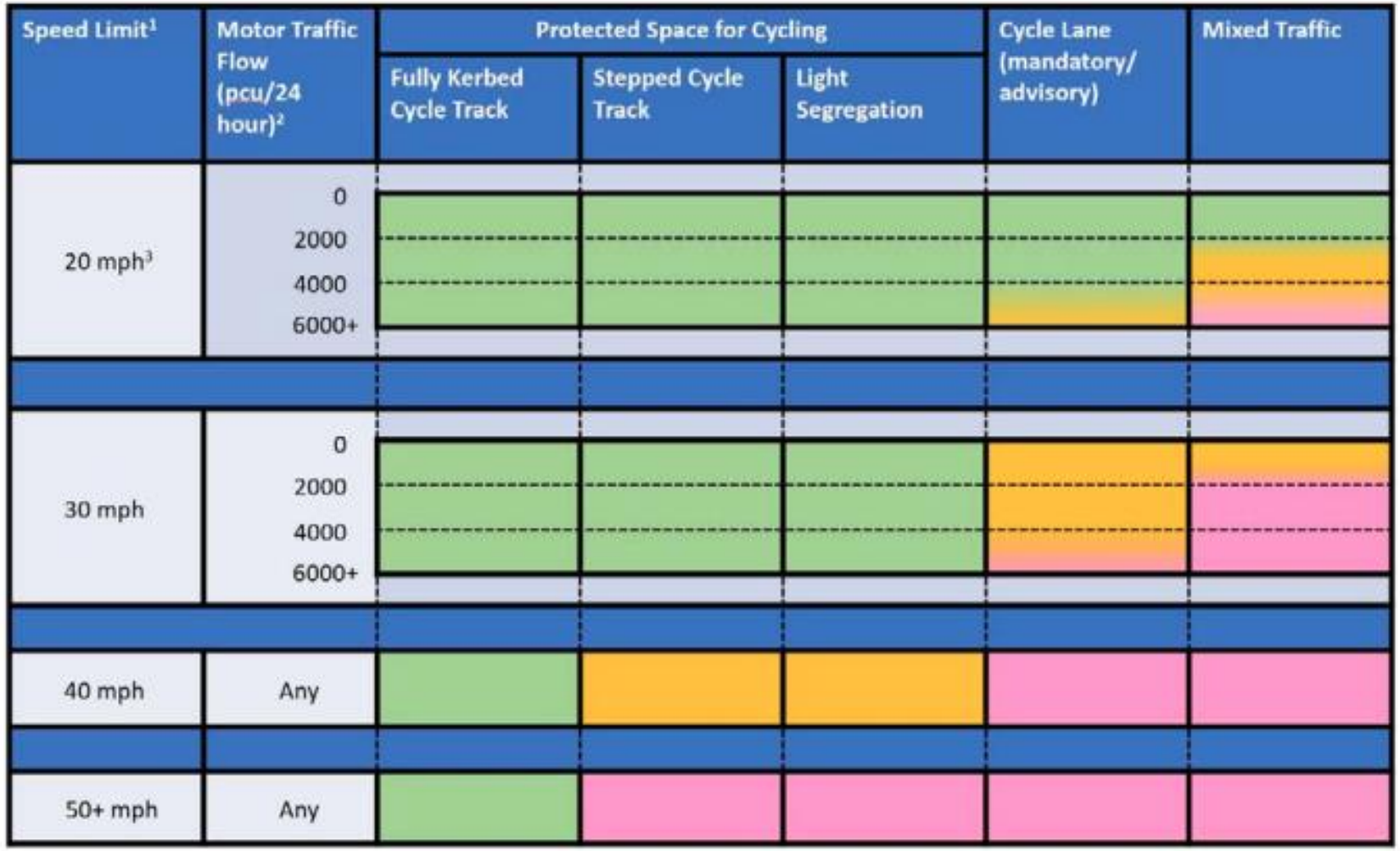
The tag `highway=footway` is used for mapping minor pathways which are used mainly or exclusively by pedestrians.

If you are mapping footpaths in the UK (specifically England and Wales) see UK public rights of way.

Use `footway=sidewalk` along with `highway=footway` to tag sidewalks (also known as pavement/footway in the UK or a footpath in Australia) as distinct ways from the carriageway.

The `sidewalk=*` key can be used to indicate the presence or absence of a sidewalk (pavement/footway/footpath) *alongside a street* where the footway runs parallel to the carriageway.

Figure 7. Footpaths, footways, implied footways, and kerbs in central Leeds as defined by the Inclusive Mobility guide.



Provision suitable for most people

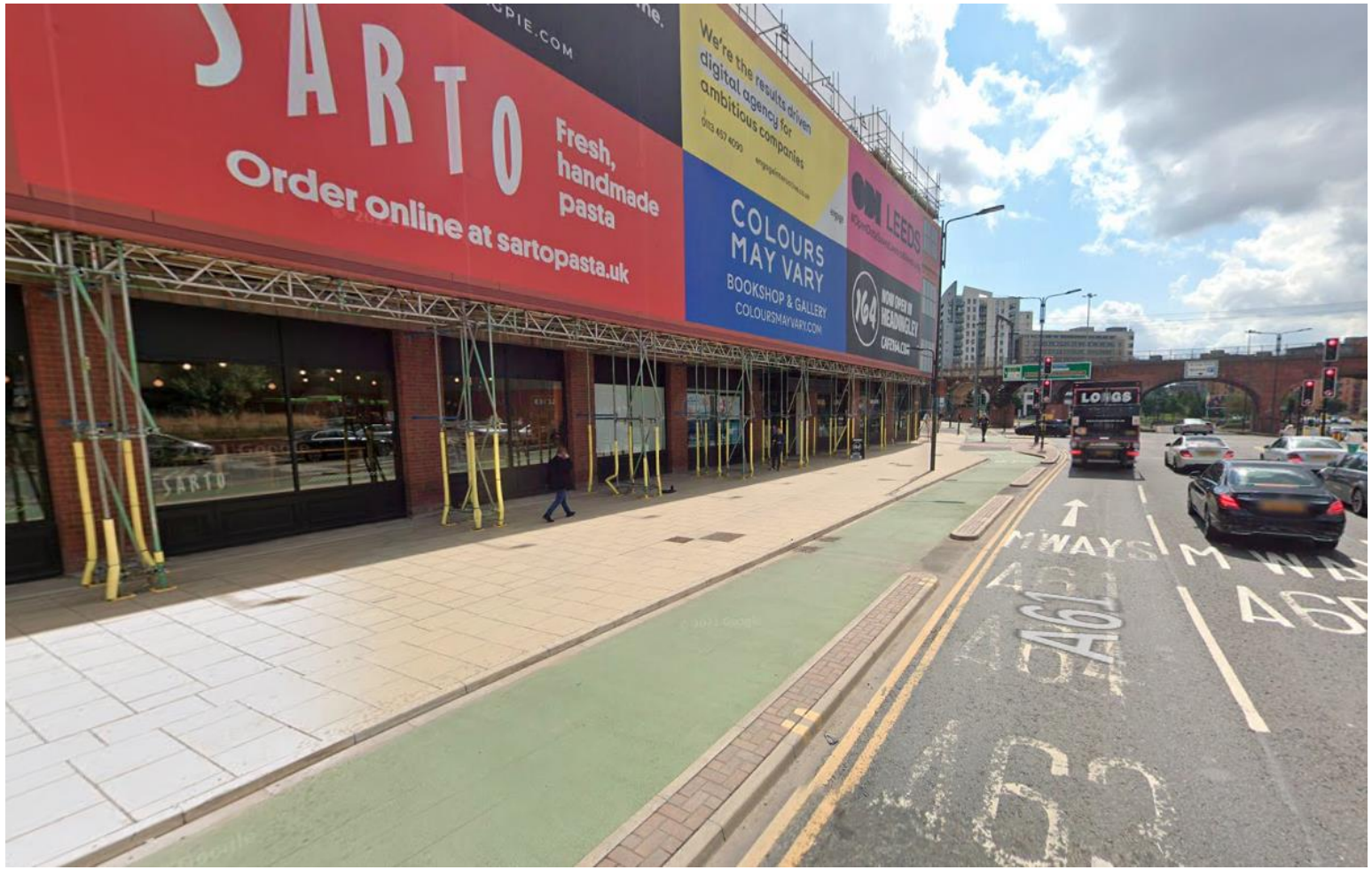
Provision not suitable for all people and will exclude some potential users and/or have safety concerns

Provision suitable for few people and will exclude most potential users and/or have safety concerns

Notes:

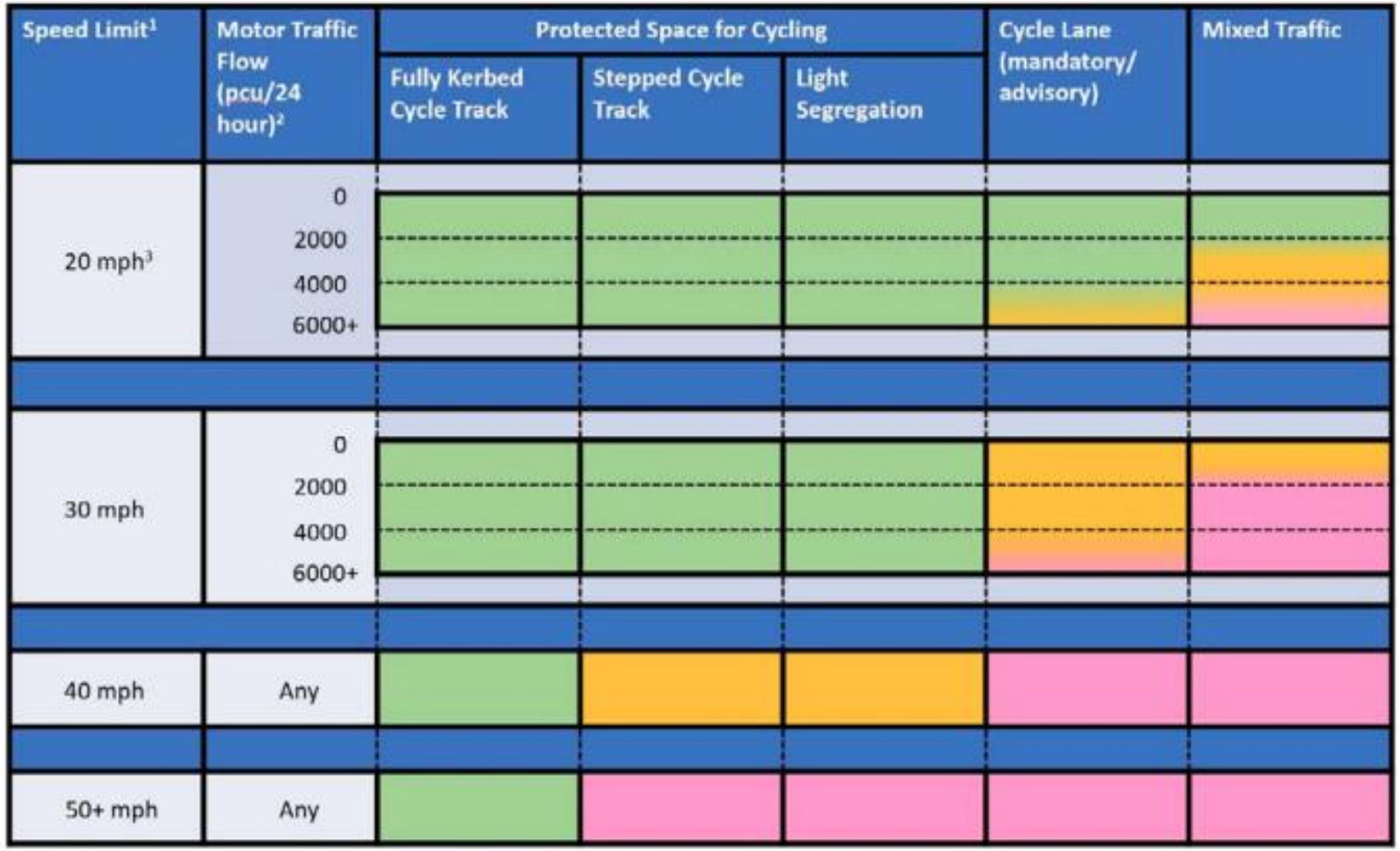
1. If the 85th percentile speed is more than 10% above the speed limit the next highest speed limit should be applied
2. The recommended provision assumes that the peak hour motor traffic flow is no more than 10% of the 24 hour flow
3. In rural areas achieving speeds of 20mph may be difficult, and so shared routes with speeds of up to 30mph will be generally acceptable with motor vehicle flows of up to 1,000 pcu per day

Appropriate protection from motor traffic on highways, Figure 4.1, LTN1/20Cycleinfrastructuredesign (2020)



OSM ID	Tags
775795921	highway=cycleway
668997030	bicycle=yes colour=green cycleway=buffered_lane cycleway:surface=asphalt foot=no highway=cycleway lit=yes motor_vehicle=no oneway=no segregated=yes source=survey surface=asphalt tracktype=grade1

Google Maps (2022), St. Peter's Street (A61), Leeds, Google Maps [online], available: https://www.google.co.uk/maps/@53.7969675,-1.534297,3a,90y,130.15h,83.96t/data=!3m6!1e1!3m4!1sUcNbWSgw8-1KabskOpNE-w!2e0!7i16384!8i8192



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Appropriate protection from motor traffic on highways, Figure 4.1, LTN1/20Cycleinfrastructuredesign (2020)

- Open-source
- Reproducible
- Extensible

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- Extensible

https://github.com/udsleeds/openinfra

https://udsleeds.github.io/openinfra/