Bike Life 2021

Digitising Methodology

| 01

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NTA

Client Reference

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Contents

1. Introduction

Bike Life is the biggest assessment of cycling in urban areas in the UK and Ireland. It is delivered by Sustrans in collaboration with 16 other cities and urban areas. Each city reports on progress towards making cycling an attractive and everyday means of travel.

The 2019 report was the first to be produced for Dublin, by Sustrans, in partnership with the National Transport Authority (NTA) of Ireland. An updated report is to be produced for 2021.

Jacobs was engaged to develop an updated dataset of cycle infrastructure in the Dublin Metropolitan Area in line with the categorisation criteria set out in the Bike Life 2021 project. The dataset will comply with the S1 requirements defined by Sustrans for Bike Life 2021.

2. Data & Software

2.1 Data Received

The following datasets were received from the NTA :

- dublin_metro_bikelife_20200206
- DublinMetropolitanBoundary.shp

2.2 Survey Data Commissioned

Jacobs commissioned a survey across the Dublin Metropolitan Area (DMA) to record new cycle infrastructure implemented since 2019. NTA supplied data indicating the locations of new and upgraded cycle infrastructure. Nationwide Data Collection (NDC) were appointed to carry out these surveys.

Survey data was captured as attributed point data, with a point at the start and end of types of cycle infrastructure defined by Sustrans in the Bike Life S1 guidance documentation.

The following attributes were required to be captured during the surveys:

Data Fields Summary Field Name	**Data Type**	**Comment**
cdo	varchar	Dropdown list with 5 core CDO short names
twoway	Boolean	Identifies two-way infrastructure
surfacechange	Boolean	DMA specific attribute
bollardprotected	Boolean	Identifies bollard protected cycle lanes (requested by NTA)
temporary	Boolean	Identifies temporary measures
mandatory	Boolean	Identifies if cycle lane is mandatory
width	Number	width of cycle or shared pedestrian/cycle facility (requested by NTA)

Survey data was supplied in the form of excel tables, .kml files, and a photo taken at each identified point. The data was arranged in the format of point location coordinates and segments connecting them. Each segment was classified using a 7-column system (T1 – T7), with width recorded in column T7. Definitions of column classification were included in the 'Tables' tab of each dataset. A comments field was included, in which the surveyors recorded any issues encountered during data collection.

The following image shows an example of the input data:

Route_No	Point_loc	X	Y	Length_M	T1	T2	T3	T4	T5	T6	T7_M	Comments_Site Notes	Screenshot
55-1	Start	53.253014	-6.214423	151	-	-	-	-	-	-	-	No Cycle Lane	55-1.JPG
55-1	End	53.253797	-6.216164										
55-2	Start	53.253813	-6.216205	449	2	2	2	2	2	2	1.2		55-2.JPG
55-2	End	53.256651	-6.220841										
55-3	Start	53.256675	-6.220875	161	2	2	2	2	2	1	1.2		55-3.JPG
55-3	End	53.257837	-6.222171										
55-4	Start	53.257864	-6.222204	403	2	2	2	2	2	2	1.2		55-4.JPG
55-4	End	53.260586	-6.226059										
55-5	Start	53.260595	-6.226076	65	4	2	2	1	2	1	1.2		55-5.JPG
55-5	End	53.260968	-6.226735										
55-6	Start	53.260986	-6.226772	377	2	1	2	2	2	1	1.2		55-6.JPG
55-6	End	53.264051	-6.228955										
55-7	Start	53.264113	-6.228857	154	4	2	2	1	2	1	1.5		55-7.JPG
55-7	End	53.263002	-6.227513										
55-8	Start	53.262998	-6.2275	278	2	2	2	2	2	1	1.5		55-8.JPG
55-8	End	53.260684	-6.226064										
55-9	Start	53.260683	-6.226054	418	2	2	2	2	2	2	1.5		55-9.JPG
55-9	End	53.257875	-6.222075										
55-10	Start	53.257863	-6.222069	158	2	2	2	2	2	1	1.5		55-10.JPG
55-10	End	53.256762	-6.220767										
55-11	Start	53.25675	-6.22076	504	2	2	2	2	2	2	1.5		55-11.JPG
55-11	End	53.253628	-6.215371										

The following image shows the tables that define the content of columns T1 – T7:

Table 1	Short Name	Description	Primary Users
1	BusLane	Bus lanes that legally permit people to cycle in them. Identifiable by blue signs.	Buses, taxis, cyclists
2	CycleLane	Cycle routes painted on the carriageway as a dashed (advisory) or solid (mandatory) white line.	Cyclists
3	SharedUse	Pavements, adjacent to the carriageway that are shared by pedestrians and people who cycle. Notably different from TrafficFree routes as they run adjacent to roads.	Pedestrians, cyclists
4	SegregatedCycleLane	Cycle routes on the carriageway that are physically separated from traffic and pedestrians by a kerb or something similar. This includes Orca Rediweld and flexible delineator posts.	Cyclists
5	TrafficFree	Traffic free cycle routes are away from roads and pass through parks, alongside canals, on former railway lines or similar. Traffic free paths should be waterproof surfaces that cycles are legally permitted on. Other users of the paths include (but are not limited to) pedestrians and wheelchair users. Paths advertised for cycling on electronic and paper city cycle maps are included in this classification type. This includes any short link paths shown, for example in parks. This is regardless of whether:they have a formal cycle route designation they are signposted or not they have feature access barriers or not	Pedestrians, cyclists
Table 2	Short Name	Options	Description
1	two-way	TRUE	Cycle route which permits travel in both directions
2		FALSE	
Table 3	Short Name	Options	Description
1	surface Change	TRUE	cycle tracks level with the footpath distinguished by a different surface
2		FALSE	
Table 4	Short Name	Options	Description
1	Bollard protected	TRUE	Cycle routes on the carriageway that are physically separated from traffic and pedestrians by bollards
2		FALSE	
Table 5	Short Name	Options	Description
1	temporary	TRUE	Cycle routes on the carriageway that are physically separated from traffic and pedestrians using temporary segregation
2		FALSE	
Table 6	Short Name	Options	Description
1	mandatory	TRUE	Cycle lane has a solid line (mandatory) as opposed to dashed line (advisory)
2		FALSE	
Table 7	Short Name	Options	Description
1	width	Number	Width of cycle provision in metres. If bollard protected, measure to inside of bollard.

2.3 Software

ArcGIS Pro (2.4.0) was the desktop GIS software used for all GIS data processing operations for the project. ArcGIS Pro was chosen as it can integrate all required formats of GIS data and perform all spatial and tabular processing operations required.

3. Processes

The data processing for the project was broken into two stages:

1. Generation of attributed line segments from survey data received
2. Integration of 2021 data with 2019 data to generate single continuous dataset

3.1 Survey Data Processing

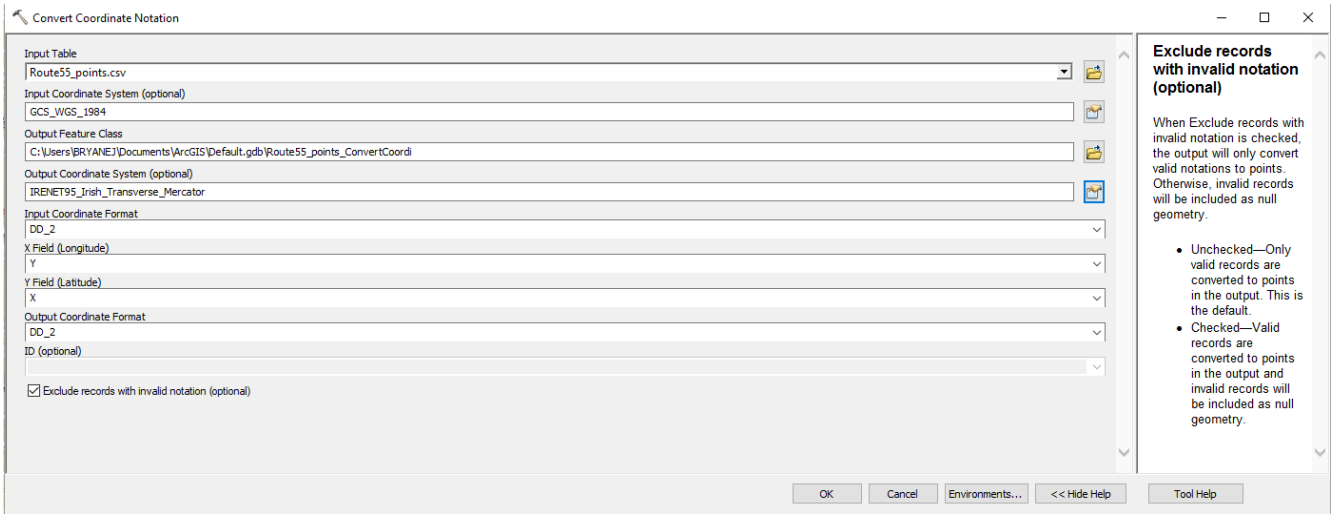
There three stages were required to generate route segments from the survey data received. These were:

1. Generating point locations for each route
2. Digitizing line segments between points
3. Applying attributes to line segments

3.1.1 Generating Point locations

The first stage required is to create a point layer of start and end points for each segment. The process was as follows:

- Convert input excel table to .csv
- Open the .csv in ArcGIS Pro in Irish Transverse Mercator (ITM) projection IRENET95
- Generate a temporary point layer using the 'Convert Coordinate Notation (Data Management)' tool, example in the below image

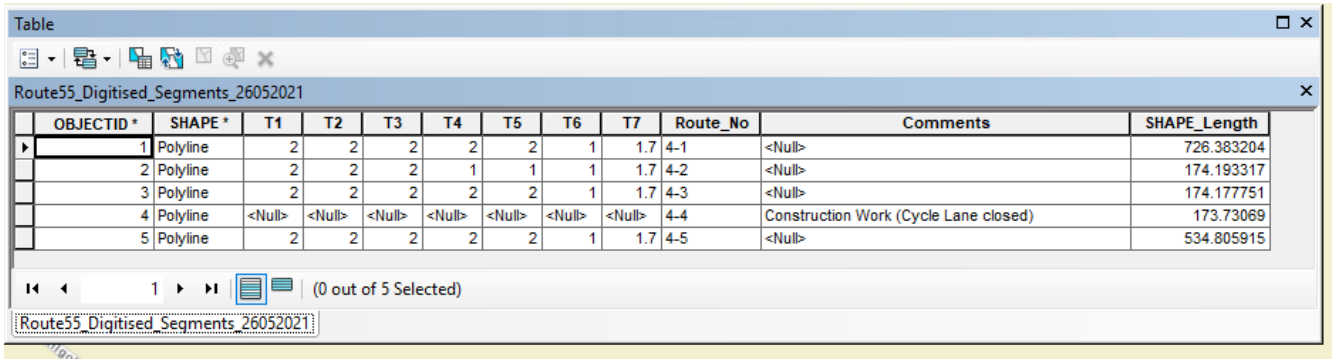


- Check the point locations have appeared/projected correctly against the base mapping

3.1.2 Digitising Line Segments

Once the point locations were generated, an empty line feature class was generated with attributes formatted to match the input data, containing the following columns:

- T1 – T7 (Double)
- Route_No (Text)
- Comments (Text)



OBJECTID *	SHAPE *	T1	T2	T3	T4	T5	T6	T7	Route_No	Comments	SHAPE_Length
1	Polyline	2	2	2	2	2	1	1.7	4-1	<Null>	726.383204
2	Polyline	2	2	2	1	1	1	1.7	4-2	<Null>	174.193317
3	Polyline	2	2	2	2	2	1	1.7	4-3	<Null>	174.177751
4	Polyline	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	4-4	Construction Work (Cycle Lane closed)	173.73069
5	Polyline	2	2	2	2	2	1	1.7	4-5	<Null>	534.805915

Make sure the layer is editable, then begin digitizing the segments using the input data and points for reference.

Individual line segments were digitised for each piece of infrastructure, with a new line segment starting where cycle infrastructure type changes along a route. Line segments were digitised on both sides of the road and were digitised along the direction of travel. Where the cycle infrastructure is two-way, this was indicated in the attributes

The segments were digitised using Ordnance Survey Ireland (OSI) base mapping as a guide. Line segments were digitised between the start and end points of the survey data received from NDC, and checked against base mapping and aerial imagery for consistency

3.1.3 Applying Attributes

Once line segments were digitised, the route number attribute defined by NDC was input into the 'Route_No' field. This attribute was used as a basis for a table join in ArcGIS Pro to import the attributes from the source data table into the feature class attribute table.

3.2 Data Integration

As the full cycle infrastructure network was not surveyed for the purposes of this project, it was necessary to combine the 2021 data with the 2019 data to generate a complete dataset of cycle infrastructure for the DMA. The routes surveyed for the 2021 data consisted of a combination of newly constructed cycle infrastructure and existing infrastructure that had been upgraded in since the 2019 Bike Life data was generated.

The integration process was as follows:

- Generate a working copy of the 2019 dataset
- Run spatial query to select 2019 routes in proximity to 2021 routes
- Review selected 2019 routes and delete route segments that represent infrastructure surveyed in 2021

- Use the 'Merge' tool in ArcGIS Pro to merge the edited copy of the 2019 data with the 2021 data. The option to 'Add source information to output' was used to ensure that the provenance of the line segments was captured in the attributes ('MERGE_SRC' attribute field)

- Merged dataset was exported to final deliverable shapefile