Air quality

One of a series of background topic papers prepared by db symmetry in support of a public consultation on proposals for a strategic rail freight interchange in Blaby district, to the north-east of Hinckley in Leicestershire.

INTRODUCTION

1. In 2019 db symmetry will apply to the government for a Development Consent Order (DCO) for a proposed strategic rail freight interchange (SRFI) on a site in Blaby District, to the east of Hinckley in Leicestershire. The project is known as the Hinckley National Rail Freight Interchange (HNRFI).

2. A DCO is a special form of planning permission for large infrastructure projects. It can include a range of additional powers required to implement the proposals, such as powers to acquire land, undertake works to streets, trees and hedgerows and divert utility services.

3. This topic paper outlines the current assessment of the potential impact of the proposed Hinckley National Rail Freight Interchange on air quality. It has been prepared for db symmetry by consultant Hydrock.

4. The study area lies in Blaby District and close to the boundary with Hinckley and Bosworth Borough. Blaby District currently has four declared Air Quality Management Areas (AQMAs) within its boundary, although none of these is close to the development site. AQMAs are designated where there are exceedances of the annual average levels of a pollutant as defined by the National Air Quality Objectives (NAQOs). The closest AQMA is along the M1 corridor at Enderby and Narborough on the edge of Leicester, 8 km to the north-east of the site. There are no AQMAs in Hinckley and Bosworth Borough.

5. The main changes to air quality from the proposed development would be generated from the increase in the number of vehicle movements and freight train movements to and from the site.

6. There are a number of air quality monitoring sites in Blaby and in neighbouring Hinckley and Bosworth, which record concentrations of nitrogen dioxide (NO_2). These monitoring sites are being used to validate the air quality model that will be built for this assessment and ensure the model is accurate.

7. An air quality model will be used to assess the levels of air pollutants at the site as well as at sensitive locations nearby. In particular, the model will estimate current and potential future levels of pollutants (Nitrogen Dioxide and Particulate Matter (PM_{10} and $PM_{2.5}$)). A construction dust impact assessment will also be carried out to determine any potential impact on sensitive receptors in the area. The following sections will outline the scope of the assessment to be undertaken.

LAW, POLICY AND GUIDANCE

European Directives

8. The overriding policy document which governs air regulation is the EU Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC)[1], which came into force in 2008, and provides statutory limits on air quality. This presents statutory requirements for the protection of human health and ecosystems for the following pollutants: oxides of nitrogen (NOx), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particulate matter with a diameter of less than 10 microns (PM_{10}), particulate matter with a diameter of less than 2.5 microns ($PM_{2.5}$) carbon monoxide (CO), lead, benzene and ozone (O_3).

National law and policy

9. As a result of the above EU Directive, the Air Quality Standards Regulations 2010[2] were released. These set out how the Government has interpreted this Directive. One of the main additions is the regulatory framework on $PM_{2.5}$. The air quality standards are equal or better than EU targets.

10. Whilst central government is ultimately responsible for meeting these objectives, part of the Environment Act 1995[3] dictates that a local Authority is required to assess and periodically review their compliance with the non-binding objectives and any areas that repeatedly exceed the allowed limits should be designated Air Quality Management Areas (AQMAs).

11. This shapes the Air Quality criteria for the UK's National Planning Policy Framework which is supported by the Planning Practice Guidance. The 2018 National Planning Policy Framework[4] states that significant development should be focussed on

[1] EC, "Directive 2008/50/EC of the European Parliament and of the Council," May 21, 2008, 50.
[2] Air Quality Standards Regulations 2010.
[3] Environment Agency, "Environment Act 1995" (The Environment Agency, 2002), http://www.legislation.gov.uk/ukpga/1995/25/contents.
[4] Department for Communities and Local Government, "National Planning Policy Framework," 2018.

locations which are or can be made sustainable, primarily through offering a genuine choice of transport modes. It goes further to suggest that opportunities to improve air quality or mitigate impacts should be identified and that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.

12. Paragraphs 5.3 to 5.15 of the National Policy Statement (NPS) for National Networks provide guidance on generic air quality impacts and their assessment. Paragraph 5.7 of the NPS states that the environmental statement should describe:

- existing air quality levels;
- forecasts of air quality at the time of opening, assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme;
- any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of the impact of road traffic generated by the project.

13. Paragraphs 5.8 and 5.9 of the NPS for National Networks advises that the assessment should take Defra's national air quality projections into account and provide a judgement on whether the project would affect the UK's ability to comply with the European Air Quality Directive.

14. The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

Local policy

- Blaby District Local Plan[5] including 'Saved' Policies.
- Hinckley and Bosworth Borough Council planning policy[6], local plan and Local Development Framework Core Strategy; where in policy 20 a strategic intervention is to action air quality improvements in Hinckley Town Centre.
- Harborough District Council Local Plan 2011 – 2031[7] where an action is to mitigate against adverse impact on air quality through sustainable transport.

[5] Blaby District Council. 2013. Local Plan 1999.
[6] Hinckley and Bosworth Borough Council.2009. Local Development Framework Core Strategy.
7 Harborough District Council 2018.Harborough Local Plan 2011 to 2031.

THE SITE

15. Concentrations of air pollutants surrounding the site are identified in Table 1. This demonstrates the background air quality in a 1km area surrounding the land within the Draft DCO Boundary, however is unlikely to be representative of locations directly next to roads. These figures and local monitoring data are used as a starting point in which to assess the impact from the development. A contour plot of NO_2 and PM_{10} emissions in the area are shown in Figure 1 and Figure 2 respectively.

Table 1 - Background concentrations of air pollutants within a 1km radius from site

Pollutant		Period	National Air Quality Objectives (NAQO)	Annual Mean
Description	units			
Particles (PM_{10})	$\mu g/m^3$	Annual mean	40	15.11
Particles ($PM_{2.5}$)	$\mu g/m^3$	Annual mean	20	10.29
Nitrogen dioxide (NO_2)	$\mu g/m^3$	Annual mean	40	11.78
Nitrogen dioxide (NOx as NO_2)	$\mu g/m^3$	Annual mean	-	15.98
Ozone (O_3)	days above	8 hour mean	10	0
Sulphur dioxide (SO_2)	$\mu g/m^3$	Annual mean	-	1.31
Polycyclic aromatic hydrocarbons (PAH)	ng/m^3	Annual mean	0.25	0.08
Benzene	$\mu g/m^3$	Annual average (England and Wales)	5	0.42
Carbon monoxide (CO)	mg/m^3	Max daily running 8 hour mean (2010)	0.01	0.21
Lead (Pb)	$\mu g/m^3$	Annual mean	250	9.92

16. The main source of pollutants in the vicinity of the site comes from the surrounding transport network, including the M69 that runs along the eastern side of the application site and the railway that passes to the north-west. The potential for Air Quality impacts occurs at sensitive receptors surrounding the site.

17. The air quality monitoring diffusion tubes used in the assessment are maintained by Blaby District, Harborough and Hinckley and Bosworth Borough Council. The most recent available data from the tubes that fall within the potential impacted area are shown in the appendix Table 3 to Table 10.

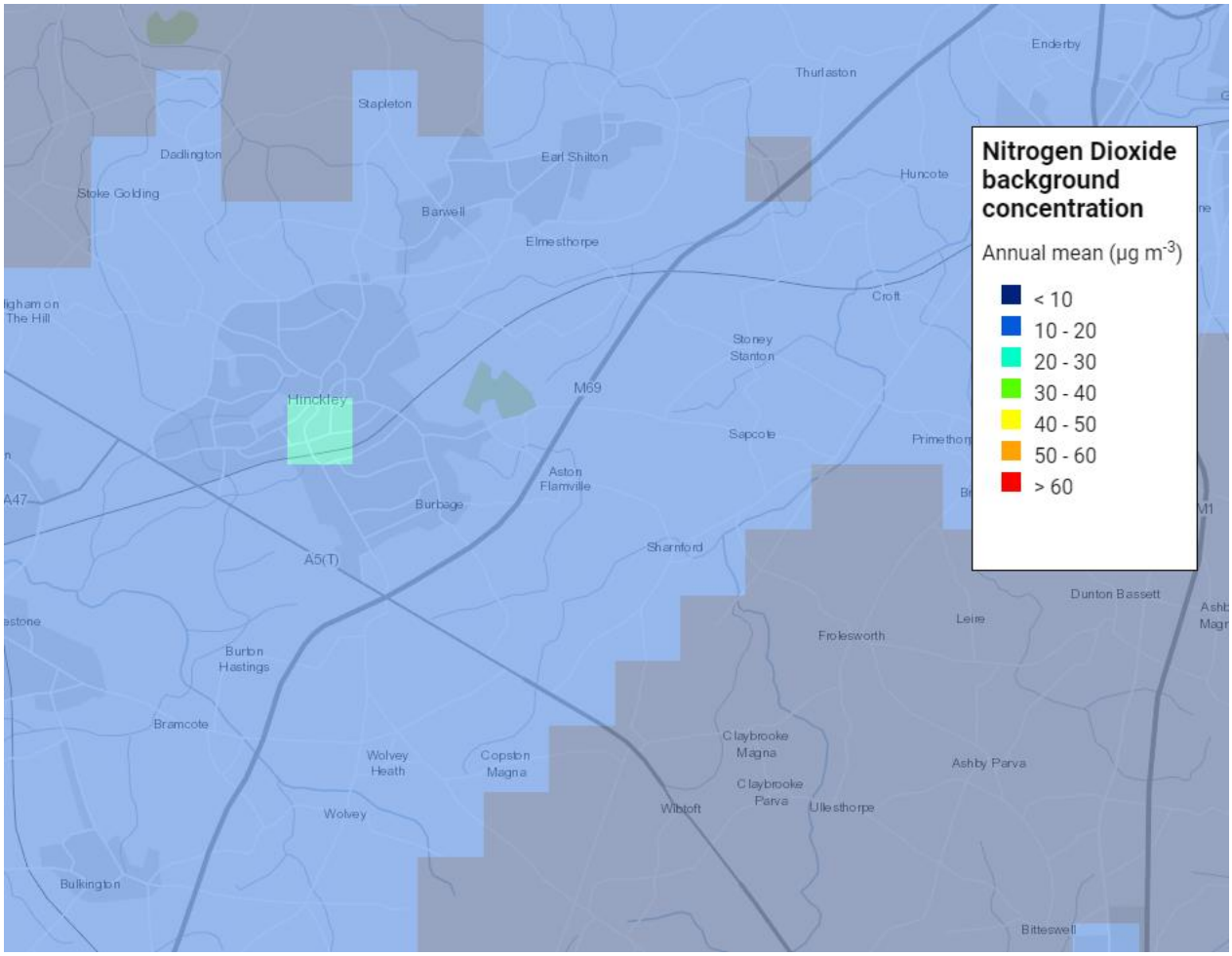

Figure 1 - Estimated background NO_2 concentrations as modelled by the National Atmospheric Emissions Inventory.

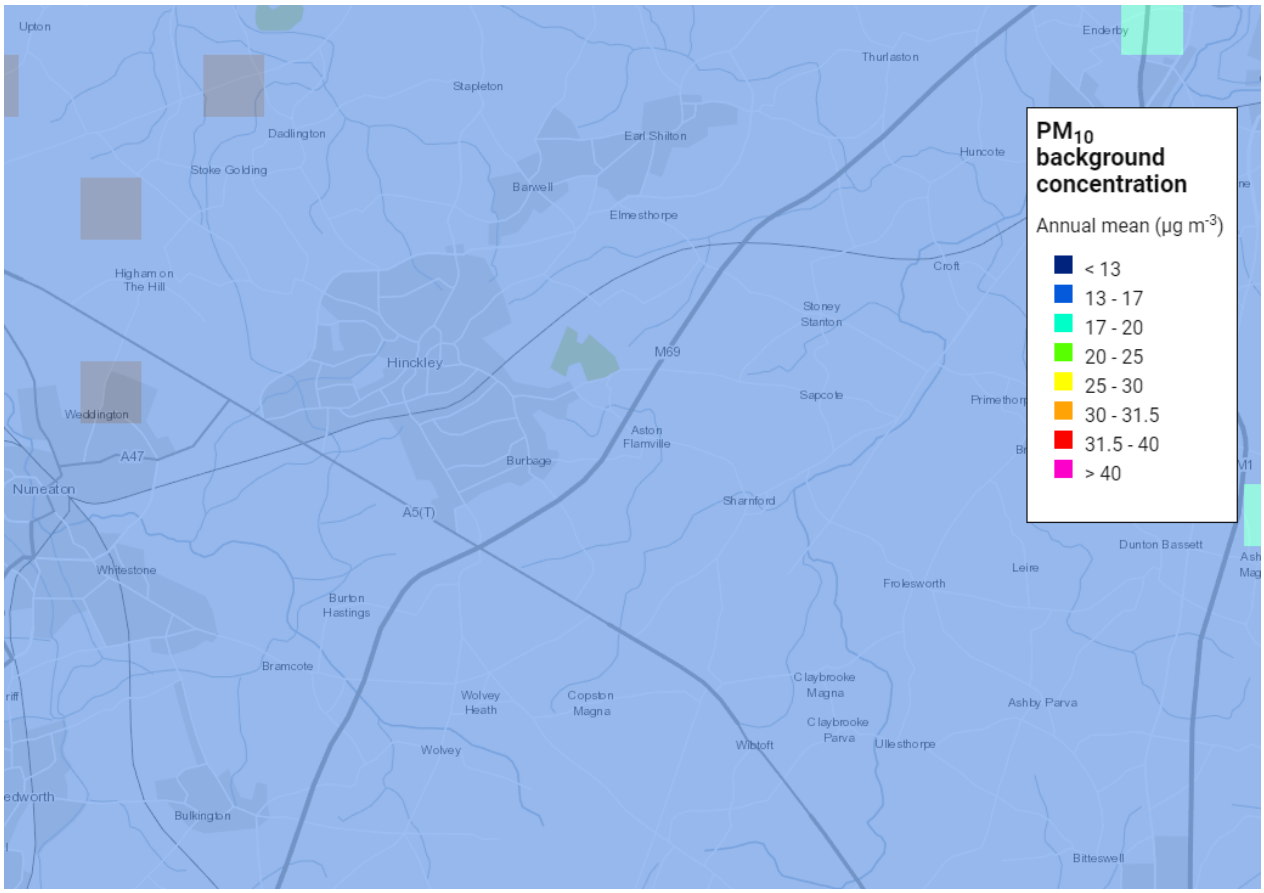

Figure 2 - Estimated background PM_{10} concentrations in the area as modelled by the National Atmospheric Emissions Inventory.

OUR APPROACH TO ASSESSMENT

18. The assessment will employ the methodologies and guidance set out in Local Air Quality Management Technical Guidance LAQM TG (16)[8] and the IAQM and Environmental Protection UK (EPUK) Land-Use Planning and Development Control planning for Air Quality guidance[9]. It will also accord with paras. 5.6 to 5.9 of the NPS for National Networks[10], summarised in the introduction to this topic paper.

19. The main purpose of the assessment is to determine the current conditions in the area and what effects future increases in vehicle movements might have on existing sensitive receptors. In addition, the potential for dust from the development site during construction will be assessed at nearby sensitive receptors.

20. The air quality assessment will use traffic data derived from a strategic model developed as part of the transport assessment. This will feed into a computer dispersion model which will aim to replicate a baseline year using the diffusion tube monitoring data. Once calibrated, the model will be adjusted with future years traffic data and the changes to NO_2, PM_{10} and $PM_{2.5}$ concentrations estimated. This will allow the assessment to look at the impact the development will have.

POTENTIAL ENVIRONMENTAL EFFECTS

Pollutants from traffic

21. Pollutants considered in the assessment will be NOx, NO_2, PM_{10} and $PM_{2.5}$. These are from road vehicles, trains and onsite heating systems.

22. The development is not located within, immediately adjacent to or within 200 m of a declared Air Quality Management Area (AQMA). However, due to its nature, the proposals will generate increases in HGV and employees' commuter traffic and trains and movement of containers, which have the potential for air quality impacts. It is therefore important to assess the local highway infrastructure and predicted vehicular increases to measure what effects the development will have on local air quality. The same is applicable to the local rail network which will be assessed for increases to the network within nearby AQMA's and at the rail interchange itself.

Dust from construction

23. There is potential for construction dust to impact on sensitive receptors neighbouring the proposed development. Table 2 lists the identified locations with Figure 1 showing them in relation to the development area.

24. An assessment to determine the impacts of dust caused by construction works will also be included in the report. This will be carried out in accordance with the Institute of Air

[8] Defra, "LAQM Technical Guidance LAQM.TG16," 16.
[9] [9] IAQM, "Land-Use Planning & Development Control: Planning for Air Quality."
[10] Department for Transport.2014. National Policy Statement for National Networks.

Quality Management (IAQM) guidance. The main stages of works are construction, demolition, and disturbance caused by dust and dirt emissions from construction vehicles arriving and leaving the site. The assessment will consider sensitive locations within 350m of the site boundary and within 50m of the construction vehicle route up to 500m from the site entrance.

Table 2 - List of construction dust receptors identified in the vicinity of the site

Name	X (Easting)	Y (Northing)	Description	Address (near)
CR1	446197	293937	Caravan and Castle Caravan Park	Woodfield Stables, Hinckley Rd, Sapcote
CR2	445945	293998	Residential Estate	Smithy Ln
CR3	444953	294616	Wood House Farm	Smithy Ln, Burbage
CR4	445548	295262	Bridge Farm	13 Burbage Common Rd
CR5	446454	295792	Farm	25 Billington Rd E, Elmesthorpe
CR6	446218	295851	Water Meadows Farm	25 Billington Rd E, Elmesthorpe
CR7	447101	295784	Wentworth Arms	13a Station Rd, Elmesthorpe
CR8	446834	296054	Badgers Mount	10 Station Rd, Elmesthorpe
CR9	446973	296040	Residential Estate	46 The Roundhills, Elmesthorpe
CR10	447169	295709	Residential Estate	9 Stanton Rd, Elmesthorpe
CR11	447056	295515	House	3 Burbage Common Rd, Elmesthorpe
CR12	446990	295379	Langton Farm	Langton Cottage, Burbage Common Rd
CR13	447358	294751	Highgate Lodge Farm	Unnamed Road
CR14	447046	294242	Red Hill Farm	Unnamed Road
CR15	446690	293906	Averley House Farm	Hinckley Rd

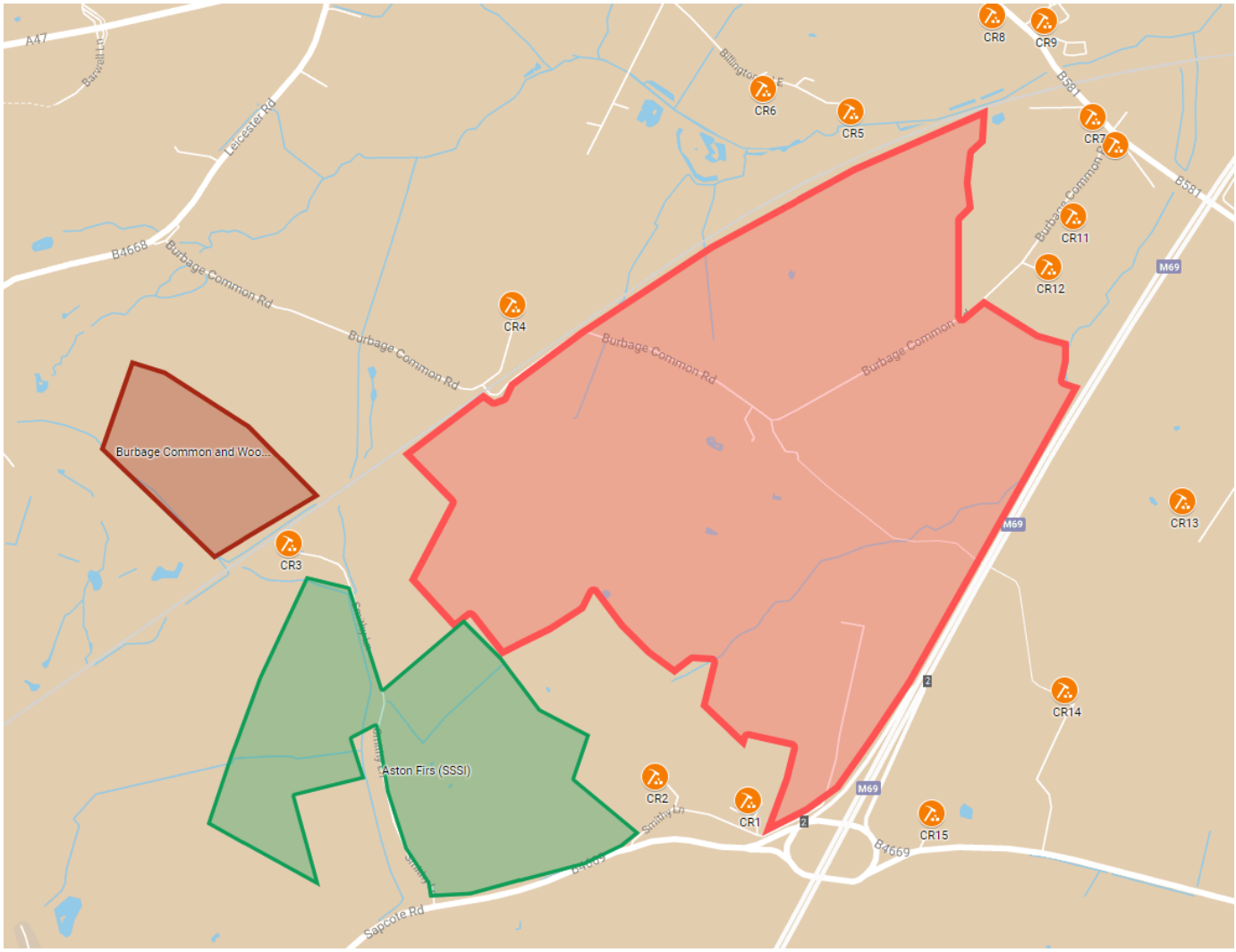

Figure 3 – Locations of receptors at risk of construction dust impacts in relation to the site, outlined in light red. Nearby Site ecological receptors are outlined in green (Site of Special Scientific Interest) and dark red (Local Nature Reserve).

THE LIKELY MAIN EFFECTS OF THE PROPOSALS

27. The likely impacts on air quality are from construction dust and the operational impacts associated with vehicle movements; the impacts from construction dust will only be short term. As stated in the following section and depending on the results of the assessment certain mitigation measures may be required to reduce the impacts.

PROPOSED APPROACH TO MITIGATION

Construction

28. A Construction Dust assessment will be undertaken of sensitive receptors identified. Impacts from dust can be mitigated by following guidance provided in the IAQM "Guidance on the assessment of dust from demolition and construction" document. Given the size of the construction site impacts are likely to be in the order of medium to high especially over the demolition phase. As a result, a complete and concise dust management plan should be implemented and adhered to. Key to this should be specific mitigation methods during the demolition period as well as onsite dust monitoring to ensure that mitigation is effective.

Operational

29. If impacts are found to be significant possible examples of mitigation recommended by the Institute of Air Quality Management (IAQM) are:

- Electric vehicle provisions;
- Support for and promotion of car clubs;
- Provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;

In addition further mitigation might include offsetting, examples of which are:

- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructure.

NEXT STEPS

30. In order to progress the ongoing assessment of the potential impact of the proposed Hinckley National Rail Freight Interchange on Air Quality, the following future work is proposed:

- Continue to undertake EIA assessment, with ongoing consultation, discussions and agreements being sought with relevant consultees.
- Develop a computer dispersion model informed by traffic figures from the strategic modelling carried out by the transport assessment. The purpose of the dispersion model is to predict future changes to pollutant concentrations at locations of interest or that are deemed to be at risk.
- Include rail transport impact within the computer dispersion model.
- Continue with the construction dust impact assessment.

APPENDIX

The following tables and figures show the locations of the monitoring locations in the local authority areas being considered in the assessment.

Table 3 – Locations of monitoring sites considered from Blaby district

Site	X	Y	Address
CM1	454482	298573	103 Packhorse Dr
Cm^3	453185	303310	146 Hinckley Rd, Leicester Forest East
CM4	453492	303315	1 Grange Ave, Leicester Forest East
DT1	455970	301146	34 Kingsway, Braunstone Town
DT2	456434	301783	28 Narborough Rd S, Braunstone Town
DT3	456365	301762	1 Cleveleys Ave, Braunstone Town
DT4	453606	299557	10 Moores Ln, Enderby
DT6	453570	303383	10 Hinckley Rd, Leicester Forest East
DT8	454521	298151	102 Leicester Rd
DT11	454482	298573	103 Packhorse Dr
DT12	454482	298573	103 Packhorse Dr
DT13	454482	298573	103 Packhorse Dr
DT14	454507	298338	32 Cumberwell Dr
DT16	453220	304273	Ratby Ln
DT17	453137	303321	18 Rutland Cl, Leicester Forest East
DT18	453488	303637	39 Packer Ave, Leicester Forest East
DT19	454968	298825	238 Blaby Rd, Enderby
DT20	455819	297954	1 Woodyard Ln, Whetstone
DT21	456148	297833	94 Enderby Rd, Whetstone
DT22	448004	291660	8 Coventry Rd, Sharnford
DT25	456470	301903	5 Narborough Rd S, Braunstone Town
DT26	455817	297937	152 Enderby Rd
DT29	454988	298619	281 Blaby Rd, Enderby
DT32	454554	294803	CO-OP Croft Road

Table 4 – Locations of monitoring sites considered from Blaby district

Site	X	Y	Address
DT34	456561	301876	7 Braunstone Ln E, Braunstone Town

DT35	456521	301896	2 Narborough Road South
DT36	456522	302032	Narborough Rd S, Braunstone Town
DT40	453468	299737	9 Mill Hill, Enderby
DT41	453439	299740	9 Mill Hill, Enderby
DT42	453789	299334	15 Blaby Rd, Enderby
DT43	453780	299360	2 Blaby Rd
DT44	453706	299455	2 Hall Walk, Enderby
DT45	454147	297493	16 Leicester Rd
DT48	454519	298148	98 Leicester Rd
DT49	453565	299609	12 Hall Walk, Enderby
DT50	450635	301965	Heathley Cottage, Desford Rd
DT51	452234	302753	257 Hinckley Rd, Leicester Forest East
DT52	452702	303145	02 Ellis Drive
DT53	453648	302974	4 Kennedy Way, Leicester Forest East
DT54	453592	303415	71 Hinckley Rd
DT55	453835	302971	15 Marriott Cl, Leicester Forest East,
DT56	454079	303535	Avalon, 9 Hinckley Rd
DT57	454096	303599	8 Ratby Ln, Leicester Forest East
DT58	455995	297859	122 Enderby Rd, Whetstone
DT60	454537	297774	39 Roy Close
DT61	454434	297987	105 Leicester Rd, Narborough

Table 5 - Results from monitoring sites considered from Blaby district for the period 2011 - 2017

Site	NO_2 annual mean concentration µg/m^3						
	2011	2012	2013	2014	2015	2016	2017
CM1	28.3	30.9	25.9	26.4	38.1	23	28.8
cm3				31.9	26.8	24.9	25.4
CM4				29.1	47.9	24.9	37.1
DT1			35	27	25	34.7	42.4
DT2	31	41	32	25	24	27.2	32.8
DT3	22	29	28	22	20	26.6	24.9
DT4			49	47	44	53.3	24
DT6	43	50	42	35	31	38	42.6
DT8	43	55	43	32	29	25.2	36.7
DT11	29	35	27	22	19		20
DT12	28	35	29	23	20		20.2
DT13	28	34	27	22	19		20.4
DT14	31	39	30	23	21	25.7	24.9
DT16	41	51	39	31	29	38.4	38.7
DT17	29	35	29	22	20	26	24.5
DT18	37	49	40	29	28	34.3	34.7
DT19	30	42	30	25	23	33	24.4
DT20	26	37	29	24	21	27.8	26.8
DT21	25	32	29	22	19	23.3	21.7
DT22	37	50	37	23	20	25.2	21.3
DT25	30	38	33	24	22	29.4	28.2
DT26	37	54	43	32	28	34.9	33.5
DT29				21	16	21.9	21.8
DT32				15	15	21.9	20.1

Table 6 - Results from monitoring sites considered from Blaby district for the period 2011 - 2017

Site	NO_2 annual mean concentration µg/m^3						
	2011	2012	2013	2014	2015	2016	2017
DT34					18	23.7	23.1
DT35					22	30.1	27.3
DT36					21	29.9	24.4
DT40					23	33.1	29.2
DT41					24	37.3	31.2
DT42					24	32.2	29
DT43					22	33.1	31.3
DT44					23	32.2	29.8
DT45					20	30	26.1
DT48							35.5
DT49							35.6
DT50							22.1
DT51							22.6
DT52							22.1
DT53							19.8
DT54							20.4
DT55							34
DT56							26.3
DT57							25.3
DT58							37.4
DT60							19.2
DT61							21.4

Table 7 – Locations of monitoring sites considered from Hinckley and Bosworth district

Site	X	Y	Address
1	442417	293808	Trinity Lane
2	442903	291349	1 Rufford Close
3	440106	293080	562 Coventry Road
5	440166	292984	Wheldon A5
6	442592	292938	207 Rugby Road
7	443624	293829	66 London Road
8	446696	296771	Earl Shilton Bypass
9	446320	297756	Wood Street earl Shilton
15	442291	293579	93 Rugby Road, Hinckley
16	442328	293264	171 Rugby Road, Hinckley

Table 8 – Results from monitoring sites considered from Hinckley and Bosworth district

Site	NO_2 annual mean concentration µg/m^3				
	2012	**2013**	**2014**	**2015**	**2016**
1	25.0	25.2	25.2	25.9	25.0
2	26.7	26.0	28.5	27.3	28.3
3	27.3	25.4	25.5	25.3	24.7
5	28.0	23.6	24.2	23.4	22.6
6	25.2	24.8	24.1	23.3	22.6
7	27.8	25.8	25.6	25.3	24.4
8	20.8	17.8	18.1	17.4	17.9
9	21.6	24.3	22.3	22.8	23.9
15					35.9
16					26.3

Table 9 - Locations of monitoring sites considered from Harborough district

Site	X	Y	Address
01n	454475	284560	Lutterworth Service Shop
11n	454539	284932	Day Nursery
16n	456810	283652	Walcote
18n	454443	284348	Jazz Hair
22n	454533	284872	77 Leicester Road, Lutterworth
23n	454428	284274	6 The Terrace, Rugby Road
24n	454410	284326	4 - 9 Regent Court
25n	454497	284618	26 Market Street, Lutterworth
26n	454432	284229	24 Rugby Road, Lutterworth
27n	454476	284178	17 Rugby Road, Lutterworth
30n	454318	284288	40 Regent Street, Lutterworth
32n	448065	287719	Alma House, Watling Street, Claybrooke Parva
33n	448948	286554	White House Farm, Watling Street

Table 10 – Results from monitoring sites considered from Harborough district

Site	NO_2 annual mean concentration µg/m^3				
	2012	**2013**	**2014**	**2015**	**2016**
01n	48.72	45.51	39.8	43.52	42.27
11n	34.8	36.24	35.8	36.11	26.59
16n	24.51	23.79	21.44	22.41	19
18n	43.34	42.15	39.2	37.52	34.1
22n	22.26	20.96	19.93	19.45	19.12
23n	31.47	34.18	27.6	28.87	28.49
24n	51.4	47.45	38.84	47.8	38.06
25n	31.06	37.8	34.87	34.38	28.18
26n	41.83	41.02	40.67	40.63	38.96
27n	33.85	32.85	29.8	32.32	27.05
30n			20.89	21	20.3
32n				25.27	29.93
33n				26.5	18.13

Figure 4 to Figure 14 show the locations of the monitoring sites, along with the roads which be assessed due to potential increases in vehicle numbers; this will be reassessed on completion of the transport assessment. The monitoring sites will be used as the main receptors for determining the impact from traffic and rail movements to and from the site.

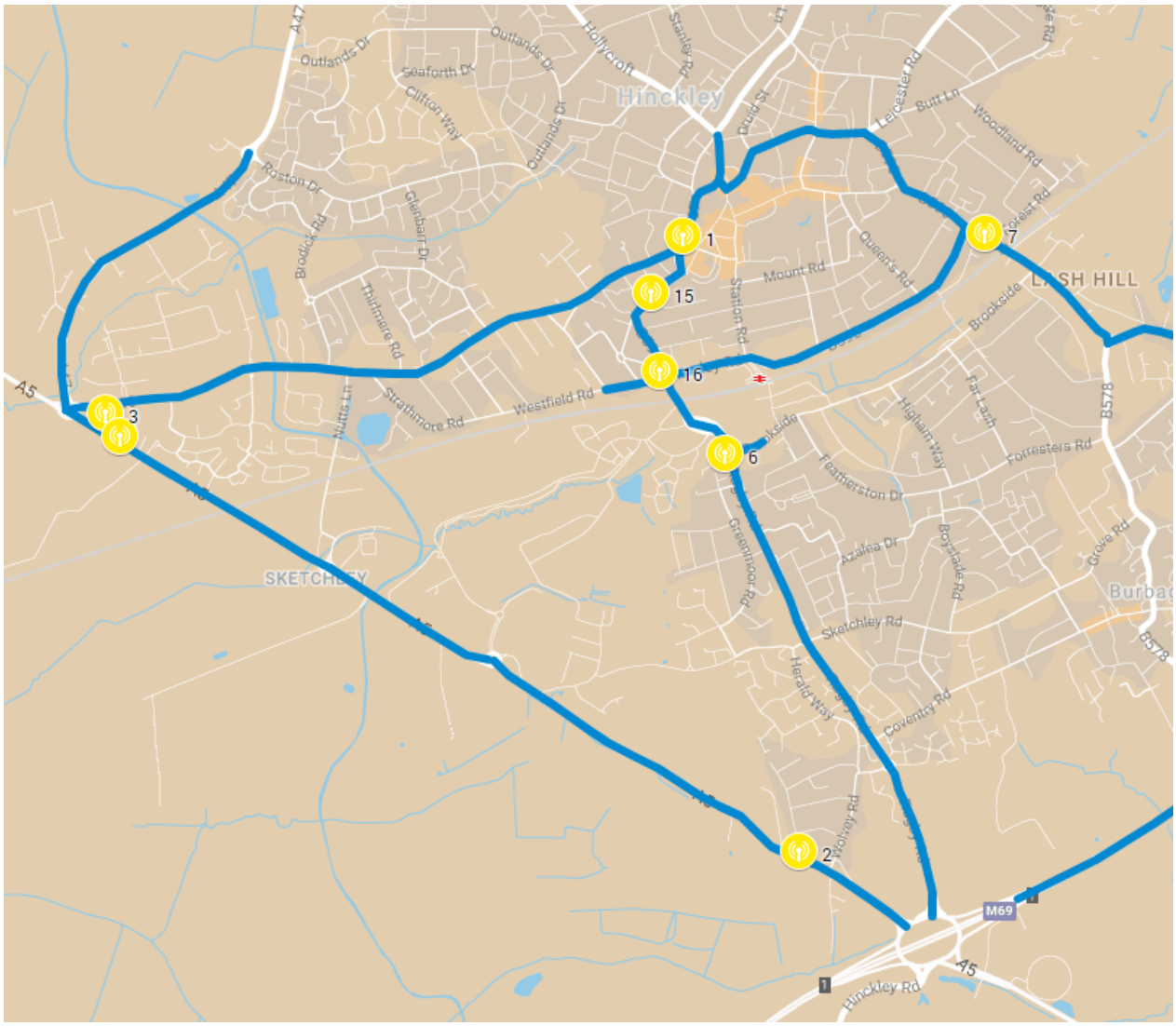

Figure 4 - Location of receptors in Hinckley and Bosworth Borough Council ©Google 2018

Figure 5 - Location of receptors in Hinckley and Bosworth Borough Council ©Google 2018

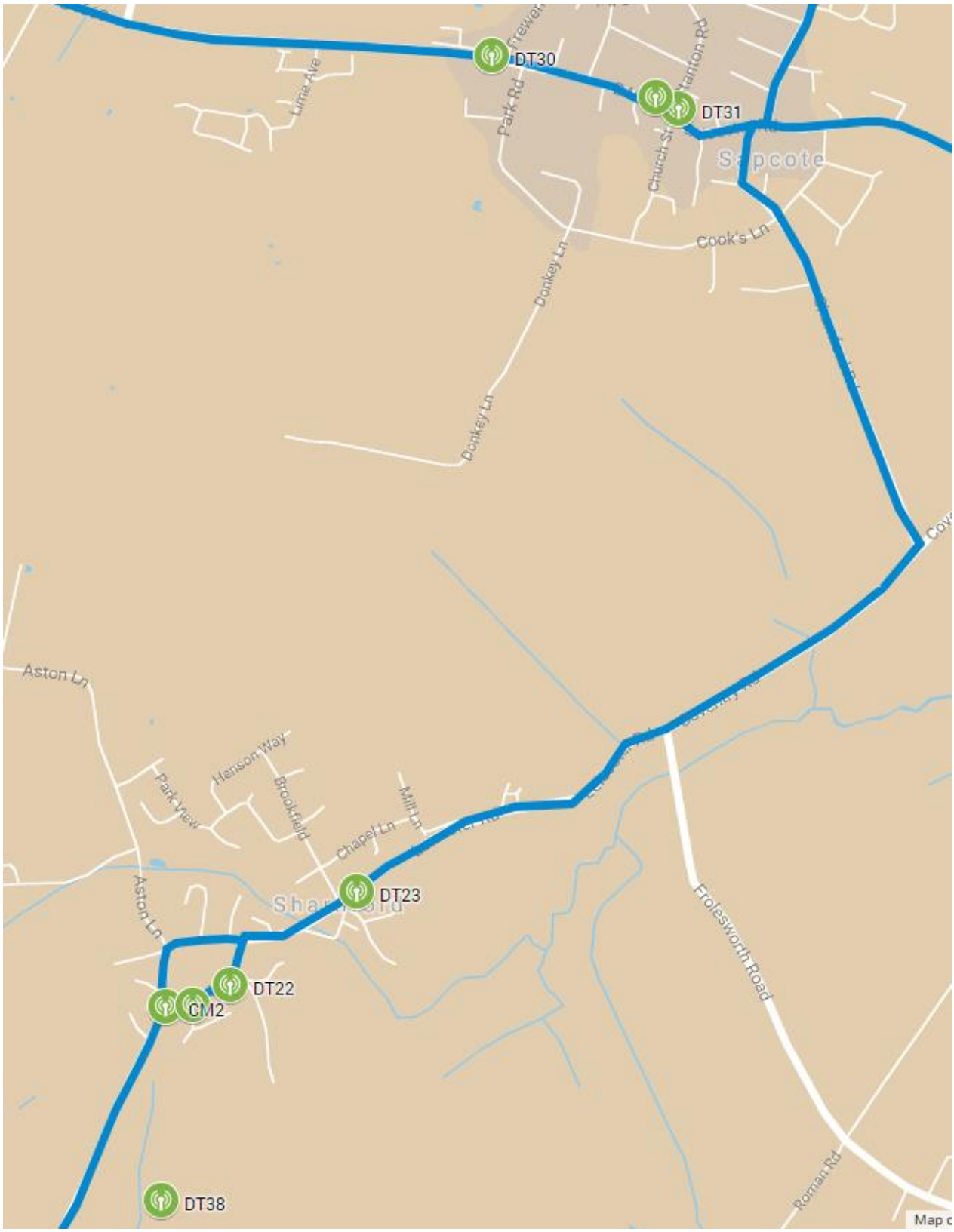

Figure 6 - Location of receptor points in Blaby District Council ©Google 2018

Figure 7 - Location of receptor points in Blaby District Council ©Google 2018

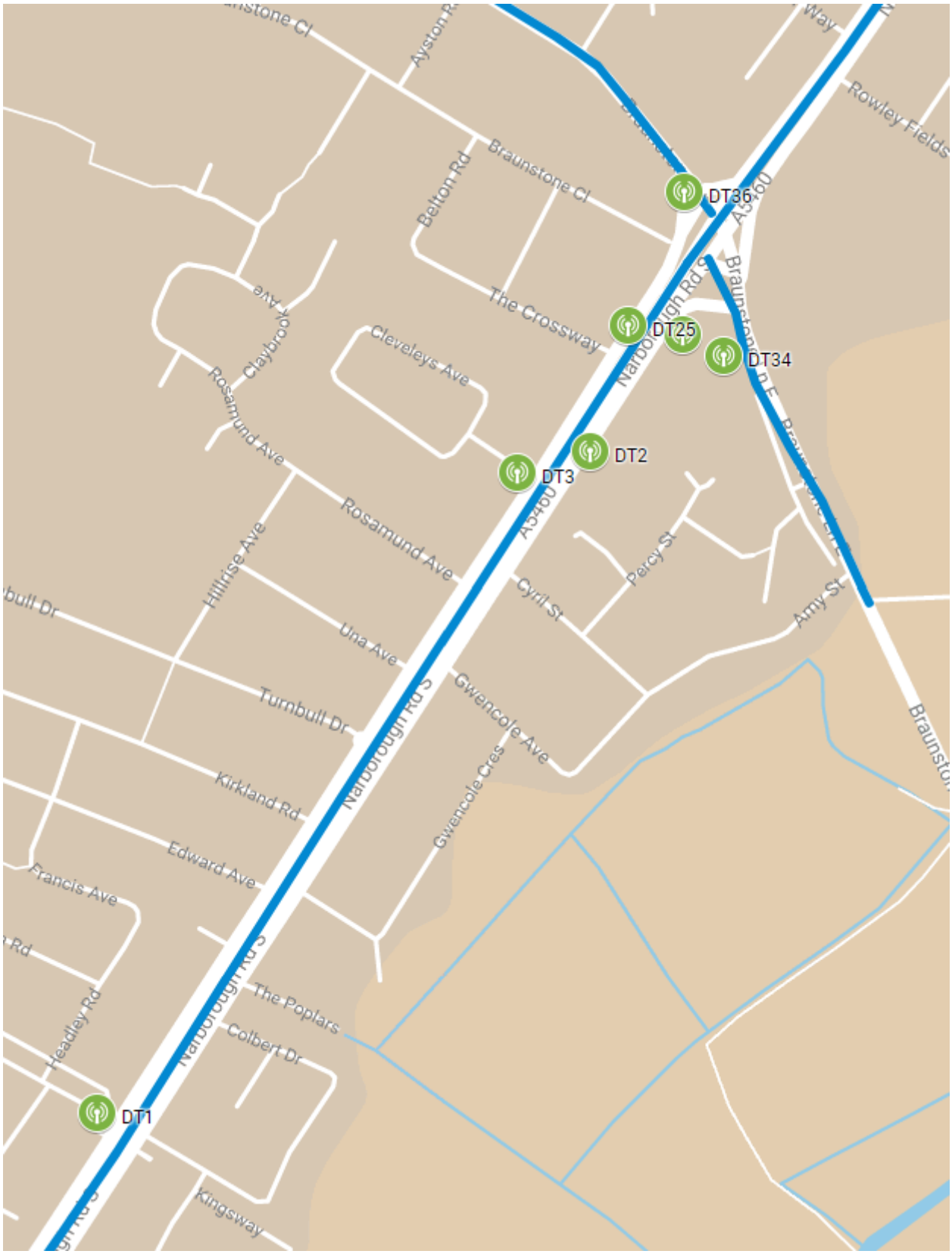

Figure 8 - Location of receptor points in Blaby District Council ©Google 2018

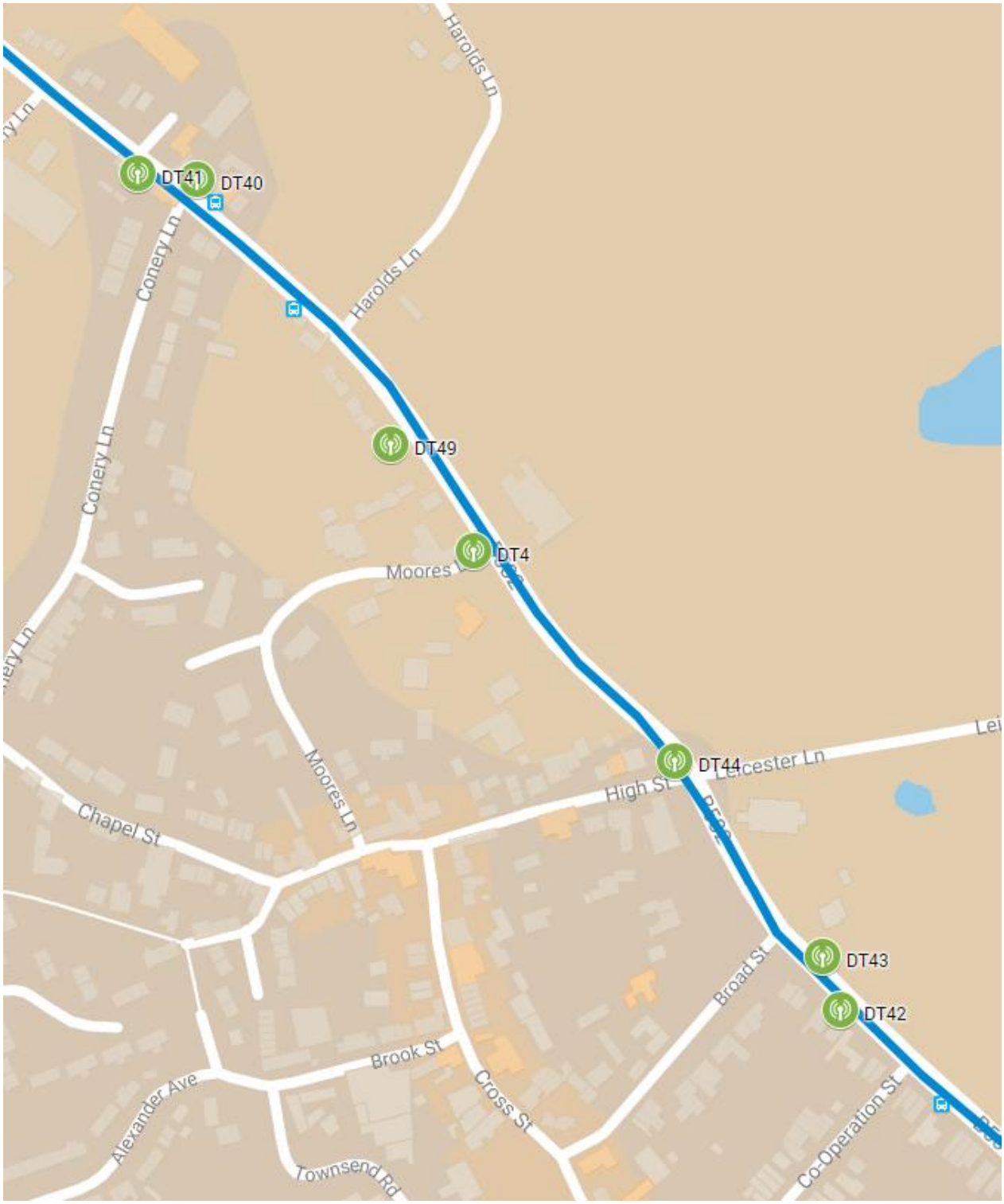

Figure 9 - Location of receptors in Blaby District Council ©Google 2018

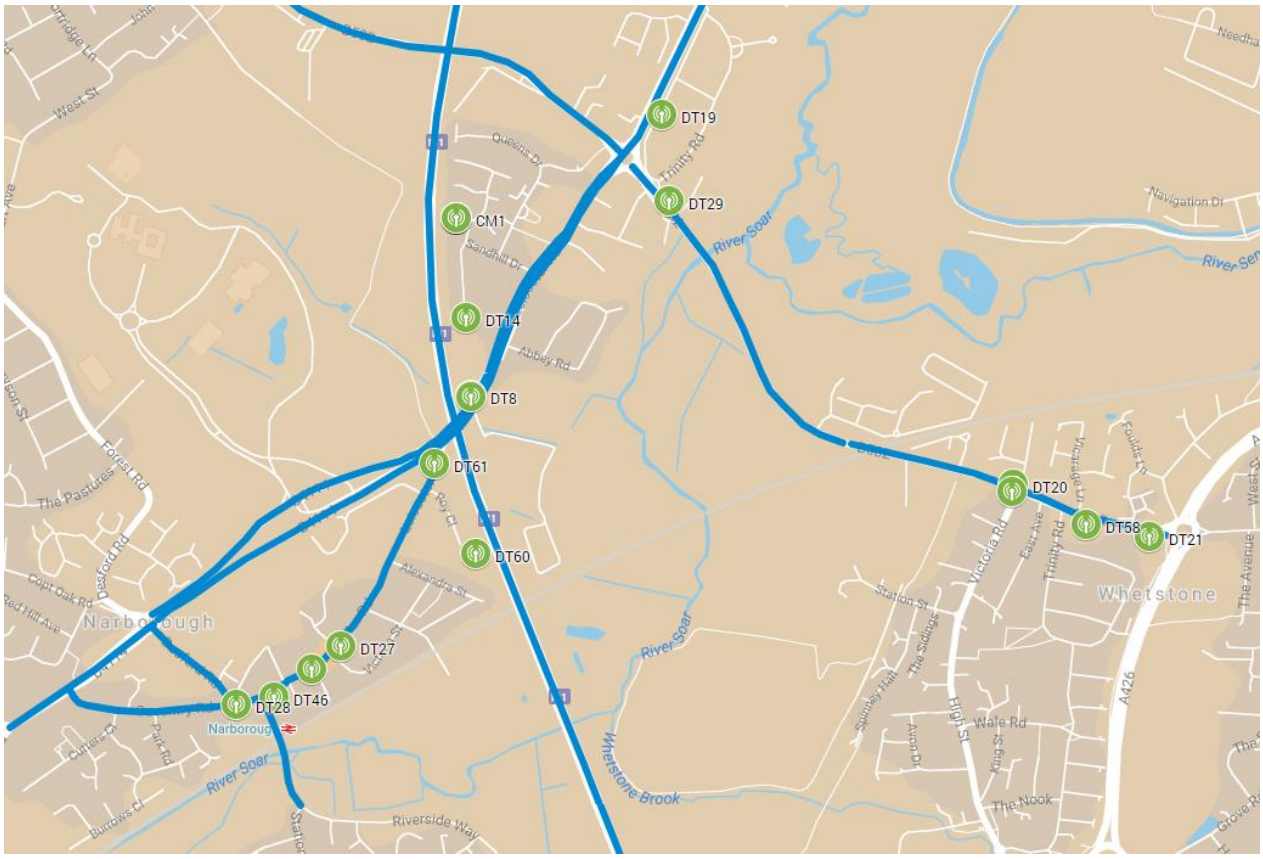

Figure 10 - Location of receptors in Blaby District Council ©Google 2018

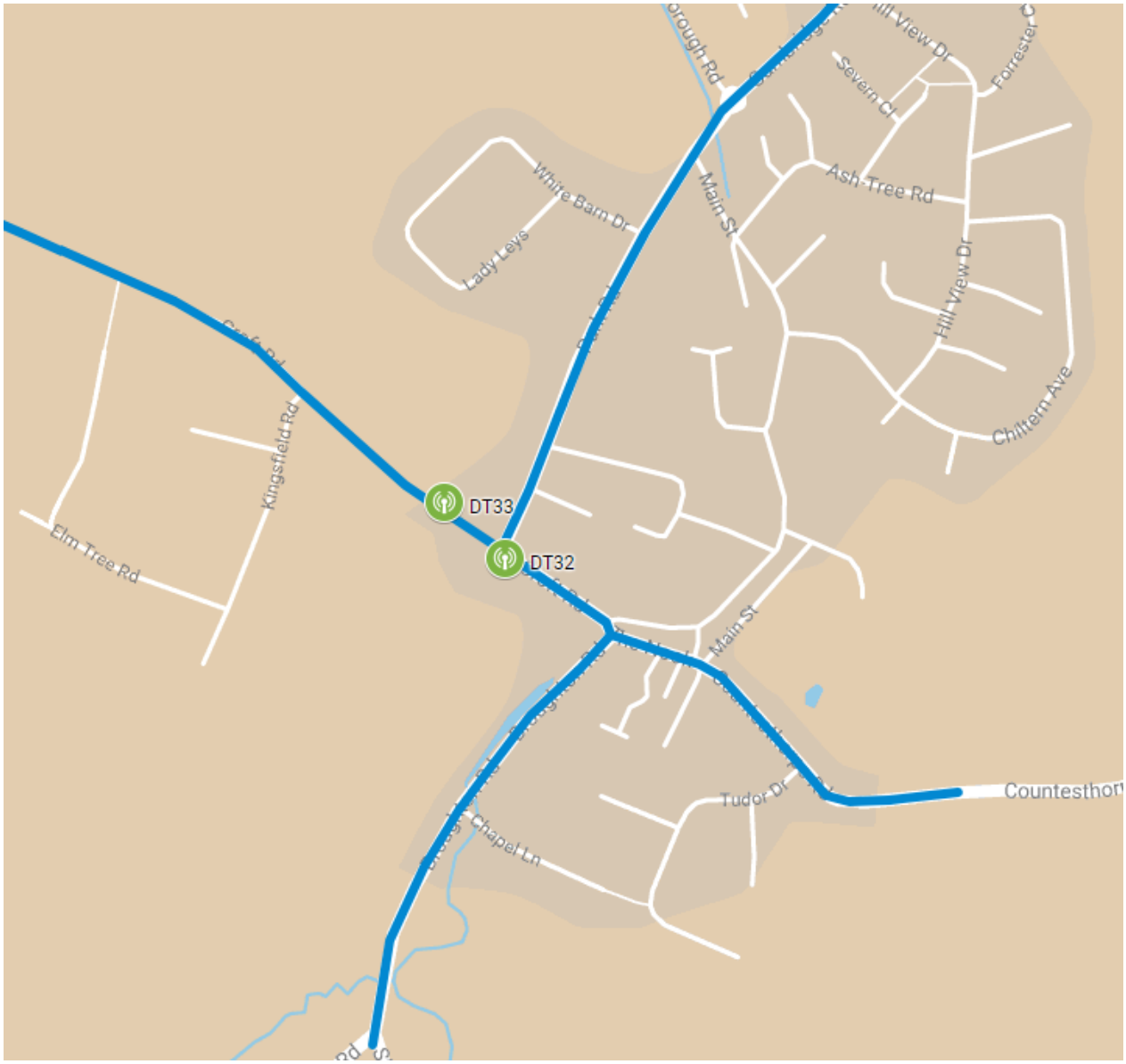

Figure 11 - Location of receptors in Blaby District Council ©Google 2018

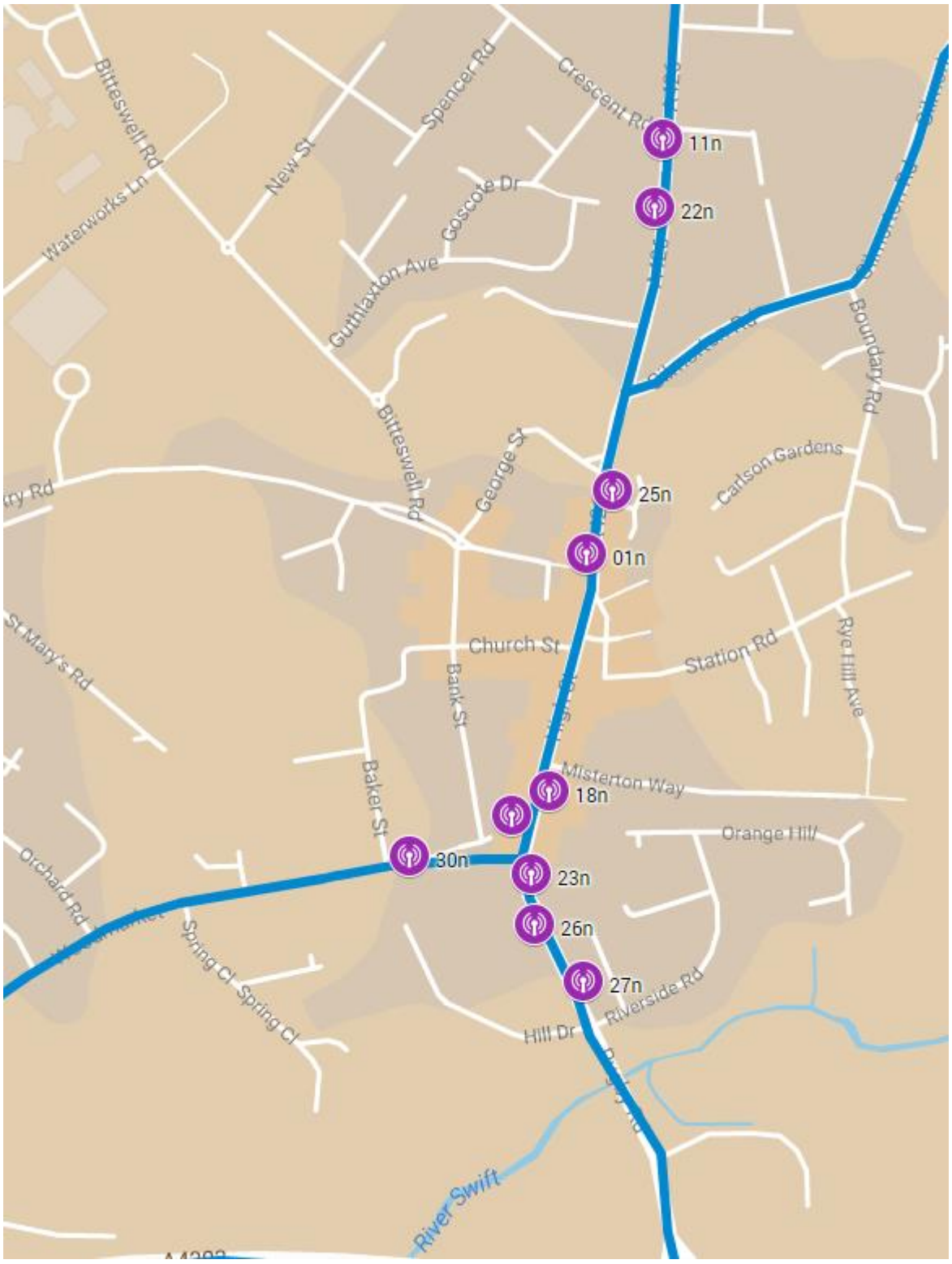

Figure 12 - Location of receptors in Harborough District Council ©Google 2018

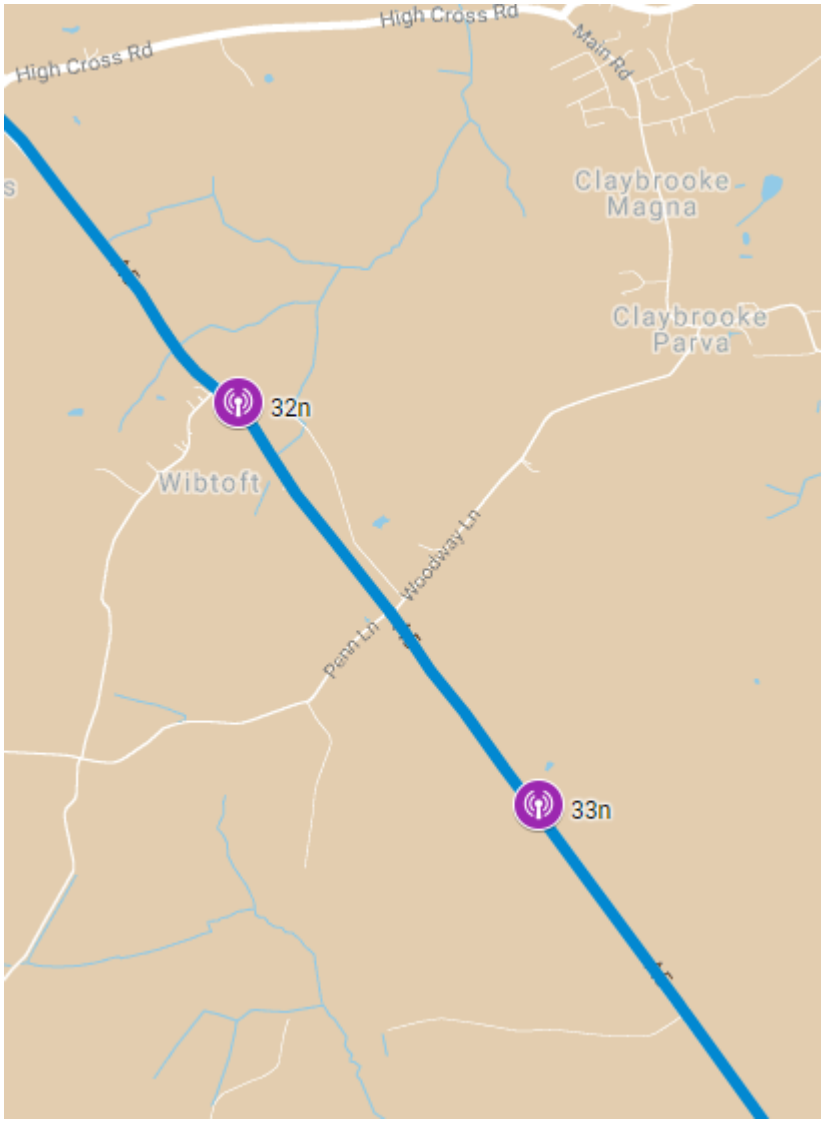

Figure 13 - Location of receptors in Harborough District Council ©Google 2018

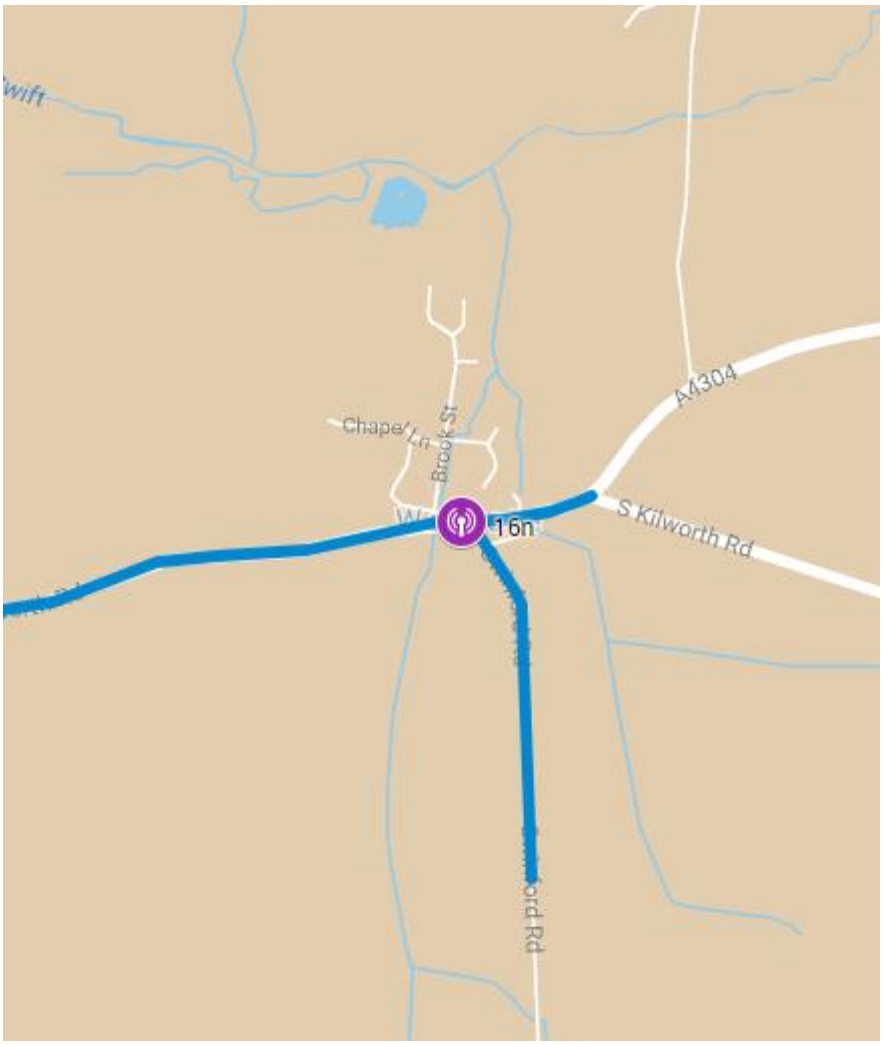

Figure 14 - Location of receptor in Harborough District Council ©Google 2018

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