

Funding for Innovation: Connected Vehicle Data



Department
for Transport

Application Form

The level of information provided should be proportionate to the size and complexity of the scheme proposed. As a guide, we would suggest around 10 to 15 pages including annexes would be appropriate.

A separate application form should be completed for each scheme.

Applicant Information

Local authority name(s)*: North Yorkshire County Council

Bid Manager Name and position: Fiona Stone – Network Project Officer

Name and position of officer with day to day responsibility for delivering the proposed scheme.

Contact telephone number: 01609 532799

Email address: Fiona.stone@northyorks.gov.uk

Postal address: Network Strategy, Business & Environmental Services, County Hall, Northallerton, North Yorkshire, DL7 8AH.

When authorities submit a bid for funding to the Department for Transport, as part of the Government's commitment to greater openness in the public sector under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, they must also publish a version excluding any commercially sensitive information on their own website within two working days of submitting the final bid to the Department for Transport. The Department for Transport reserves the right to deem the business case as non-compliant if this is not adhered to.

Please specify the web link where this bid will be published:

<http://www.northyorks.gov.uk/transportplans>

SECTION A - Scheme description and funding profile

A1. Scheme name: Road traffic sign inventory using Connected Vehicle Data

A2. Headline description:

Please enter a brief description of the proposed scheme (in no more than 250 words)

It is intended to work in conjunction with Vaisala to use their “Computer Vision” system to collect road traffic sign inventory information across North Yorkshire and input the data into Symology Insight (Highway Maintenance Information System).

The main elements are as follows:

1. Collect road traffic sign inventory on Category 2,3a, 3b network (2150km).
2. Attach highway network referencing to the data.
3. Input referenced data into our Symology Insight.
4. Identify which are the most effective vehicles to collect the data.
5. Identify data collection regime, including how often data will be collected.
6. Audit information to ensure consistency.

A3. Geographical area:

Please provide a short description of area covered by the bid (in no more than 50 words)

The area covered in the bid is the category 2, 3a and 3b highway network across North Yorkshire. The lengths of highway network where the Connected Vehicle Data will be collected is shown on the appended map.

Length of eligible road section: 2150 km.

Appendix: Map shown at Appendix A.

A5. Equality Analysis

An Equality Impact Assessment Screening Exercise has been completed and is attached at Appendix B.

SECTION B – The Business Case

B1. The Scheme – Summary/History (Maximum 300 words)

Computer Vision has been developed as a data production tool that utilises smartphone produced video and various other sensors. The smartphone application is used to collect raw data from a vehicle or hand held. The raw data is refined with elaborate image recognition algorithms and signal processing methods. Computer Vision is the ideal tool for intelligent infrastructure management providing up-to-date visual data for documenting, automated inventories of street furniture and road condition analysis. Computer Vision requires no additional hardware or equipment other than a smartphone.

At the core of Computer Vision runs a state-of-art digital image analysis system, enabling the automatic recognition of traffic infrastructure from collected video. In addition to video processing, sensor data from the smartphone is analysed to measure the overall condition of the road.

The three main benefits of the automated inventory are cost-efficiency, quality precision and that it can be integrated with existing processes. The process integration allows annual road surveys to be replaced with continuous data flow significantly reducing asset management expenditure.

Outline project plan:

- Digital infrastructure set up – cloud storage and retrieval facilities – API's etc.
- Establish a fleet of connected vehicles/users for data collection
- Implement anonymised Mobile Phone camera/video images.
- Conduct network survey over category 2, 3a and 3b highway network across North Yorkshire
- Deploy Computer Vision (CV) application to analyse collected video images and create road traffic sign inventory
- Human verification of effectiveness of Computer Vision technology
- Leverage AI capabilities of CV to optimize road traffic sign analysis
- Conversion of data analysis to Symology compatible format
- Delivery of Road Sign Inventory in Symology Format to client
- Network Survey
- Data Analysis
- Delivery of inventory exception report
- Completion and handover.

North Yorkshire County Council complies with the Data Protection Act 1988 and is currently working towards the new General Data Protection Regulation 2018. All County Council data capture devices and computers are encrypted and all staff undergo mandatory Data Protection training.

B2. The Strategic Case (Maximum 350 words)

North Yorkshire has a surfaced highway network of 8517km. The last inventory was carried out in 2009 at an average cost of £78.39/km and has not been updated due to this high cost. The Computer Vision system allows for a more affordable repeated collection of data via any vehicle on the highway network, which is fully auditable.

We intend to collect the road traffic signs on the category 2,3a & 3b roads (Screen shot of signs which will be collected – Appendix C). The Computer Vision system currently has the capability to collect and identify the road traffic signs, the project is to take a sample of road traffic sign data and to attach the locations to our highways network, either by using road/link/sections or a USRN and a grid reference. This data will then be imported into the Symology Insight and can be displayed on a map and in tabular form.

The expected benefits are that once the data has been imported into the Symology Insight any subsequent data will identify where signs have been damaged and works orders for replacements will be issued more efficiently and identify when they have been replaced.

Computer Vision will also be used to identify Streetworks Permit Signs (Traffic Management Permit Scheme Regulations 2008). This will identify where Promoters do not have a permit and can be issued with Fixed Penalty Notices.

Once the initial project is complete we would look to collect other inventory items on the whole highway network to update our Highways Infrastructure Asset Management Plan.

Using the County’s accredited Surveyors we intend to collect a sample of Coarse Visual Survey (CVI) data on our Category 4a, 4b & 5 network and to teach Computer Vision to replicate CVI data and use the data information to identify lengths of defective carriageway to develop programmes of maintenance and produce Local Indicators. This connected vehicle data will then replace the CVI surveys we carryout and because of the frequency/repeatability of the data collection any lengths of highway that are deteriorating rapidly and if they meet the criteria set out in our Network Management Plans we will be able to programme maintenance works.

B3. The Financial Case – Project Costs

Please complete the following tables. **Figures should be entered in £000s** (i.e. £10,000 = 10).

Table A: Funding profile (Nominal terms)

Please note: The information below is “commercial in confidence”

TOTAL	66.17
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£000s	2018-19	Total
<i>DfT Funding Sought</i>	50	50
<i>LA Contribution</i>	6.17	6.17
<i>Other Third Party Funding</i>	10	10

Notes:

- (1) Department for Transport funding must not go beyond 2018-19 financial year.
- (2) A local contribution of 24% (local authority and/or third party) of the project costs is required.

B4. The Financial Case - Local Contribution / Third Party Funding

The project identified in the bid does not have a total cost of more than £56170.00 and this allows for the local contribution of 11%. Third party funding has been committed to the project (Vaisala have also committed 13% to the project)

Over the past 82 years Vaisala has earned a reputation for delivering innovative, reliable, best in class measurement technologies across a diverse range of industries. Our products, systems and services are used around the world, and are also deployed on NASA's Curiosity Rover (Mars exploration vehicle), and on the International Space Station.

In support of North Yorkshire County Council's proposed application for funding for the above scheme in partnership with Vaisala, we can confirm that Vaisala will contribute to reducing the cost of our part of the project by providing a significant proportion of the resource required to deliver the project, up to the value of £10,000.00, at no cost to the project. This resource will be available for the development and verification of the Computer Vision solution in pursuance of the project goals, and is not transferrable to any other projects being undertaken by North Yorkshire County Council, or any other third party in connection with this or any other project.

I trust this provides a clear demonstration of our commitment to the project, and of our ongoing commitment to providing thought leadership and innovation in the transport technology sector.

B5. The Financial Case – Affordability and Financial Risk (maximum 200 words)

A comprehensive robust estimate of project costs has been created, all of which will be delivered within the 2018-19 financial year. There is a high degree of confidence that these costs have a sufficient risk allowance built in to allow for any cost increases.

NYCC has a robust programme management system in place including a Significant Scheme Variation Form (Sig SVF) process for all highways capital works. This requires staff delivering the schemes to seek approvals at Assistant Director level to incur significant cost overruns with oversight provided by the Capital projects Board which is chaired by the Corporate Director. Overall programme costs are generally balanced however any costs overruns on the overall programme will be accommodated from additional allocations from the Capital Works Programme budget or other County Council funds

It is anticipated that the main risk to project is not being able to attach a network to the data and not being able to import the information into Symology Insight. This has limited financial risk attached as any extra work would be absorbed by the Network Management Team.

B6. The Economic Case – Value for Money (maximum 200 words)

Within B2: The Strategic Case we have identified benefits which could generate revenue and savings. These include:

(a) the use of Computer Vision to identify where Streetworks where permit signs are not being displayed. In these instances we can issue a Fixed Penalty Notice for working without a Permit is £500 (reduced to £300 if paid within 29 days) or a Breach of Permit Conditions e.g. Not displaying a Permit Board, £120 (reduced to £80 if paid within 29 days).

(b) using Computer Vision to identify where signs have been damaged, works orders for replacements can be issued more efficiently and effectively enabling works to be coordinated reducing costs..

(c) additionally using Computer Vision to carry out surveys, we can isolate specific types of defects and monitor these to establish how rapidly they are deteriorating and if they meet the criteria set out in our Network Management Plans we will be able to programme maintenance works, which should help reduce the number of third party claims we receive.

B7. The Commercial Case (maximum 200 words)

The County Council has several options available for the procurement of the works.

(a) (Bids – section 8.2), *“If the estimated value of a contract exceeds £25,000 but is less than the appropriate EU Threshold, Bids must be invited from all potential Contractors in accordance with Rule 2.11, Tables 1-3. A notice advertising the opportunity shall be published through the E-Sourcing System and on Contracts Finder.... The form of advertising shall take into account the value, location and subject matter of the Contract....”*

(b) (Exception to Contract Procedure Rules - section 15.1 (c)) *“where a grant or other external funding is received by the Council, either in its own right or as an accountable body, and the terms of such grant or other external funding state that such grant or other external funding must be applied in accordance with the terms of such grant or other external funding;”*

Due to the contribution to the project by Vaisala we would see this (b) as the preferred option.

North Yorkshire County Council is confident that the scheme proposal is lawful. The project complies with the Public Contracts Regulations and European Union State Aid rules.

B8. Management Case - Delivery (maximum 200 words)

The creation of this project plan has required significant co-operation between the council and Vaisala. Approval has been gained from the Corporate Director, in conjunction with Executive Members for Business & Environmental Services to bid for this funding.

The project plan is attached as a Gantt chart in a separate document (Appendix D). This plan has been formulated based on a proposed start date of March 2018; however this is clearly dependent on the date of notification from the DfT of the results of the bid, and of the provision of the funds. The project is due to take only 9 months to complete, so the start date can easily be amended to match the timescales imposed by the award of the DfT funding, with little risk of approaching the end of the 2018/19 financial year. Milestones have been identified in the project plan using red type for each significant section of the works.

County Councillor Don Mackenzie, Executive Member for Highways, Road Safety, Access to the Countryside and Public Transport has stated: “North Yorkshire County Council is fully committed to delivering the connected vehicle data programme. This is an excellent opportunity to develop a new innovative asset management data capture system and be at the forefront of taking the service into a new era”.

B9. Management Case – Governance (maximum 300 words)

Appendix E shows the management and reporting structure. The Senior Responsible Officer for the project is David Bowe, Corporate Director of Business and Environmental Services (BES). Responsibility for the delivery of the project lies with the Highways and Transportation Service Unit of BES, managed by Barrie Mason, Assistant Director of Highways and Transportation. The delivery of the programme will be overseen by the Highways and Transportation Heads of Services consisting of the Assistant Director of Highways and Transportation (Barrie Mason), Head of Highway Operations (Mike Roberts), Head of Commercial Services (Andrew Binner) and the Head of Network Strategy (Allan McVeigh). This structure manages the delivery of c. £40m per year of capital highway maintenance schemes and £23m revenue based programmes.

Delivery of the connected vehicle data project is the overall responsibility of the Head of Network Strategy and Fiona Stone Network Project Officer acting a Project Manager

During the development process of the bid for the connected vehicle data project, a working group was established consisting of representatives from Network Management Team, Commercial Service Unit, Vaisala and Symology. This group will continue to meet regularly throughout the delivery of the project, to monitor and report on progress and make decisions. Approval has been sought from Executive Members for Business and Environmental Services to bid for the connected vehicle data funding.

The Network Management Team are experienced and well placed to deliver the project. They currently manage a number of engineering functions for the council, including collection and analysing of SCANNER, CVI, DVI and SCRIM road condition data and production of the capital programme of highway works.

B10. Management Case - Risk Management

Appendix F shows the risk register for the Connected Vehicle Data project, identifying the four main risks to the project, the risk owners and identified control measures. The probability and impact values are also explained.

SECTION C – Monitoring, Evaluation and Benefits Realisation

C1. Benefits Realisation (maximum 250 words)

The aim of the project is to realise benefits in terms of creating an updated road traffic sign inventory on the Category 2,3a & 3b network to assist in damage replacement, updating our Highways Infrastructure Asset Management Plan (HIAMP) and contributing to our Whole Government Accounting submission. An additional benefit is the monitoring of Streetworks to ensure that all Promoters have the correct permit signs in place.

The responsibility for monitoring of the benefits achieved by the scheme will be held by the County Council's Network Management Team who collect all the highway inventory and condition data to produce the HIAMP, works programmes and report on these to senior management.

It is hoped that the completed project will lead to the future development of the connect vehicle data and become an example of what can be achieved through continual collection of the inventory items and condition of the highway network.

C2. Monitoring and Evaluation (maximum 150 words)

Monitoring and evaluation of the connected vehicle data project will be undertaken by the Network Management Team. After the initial the data has been collected and imported into Symology Insight repeated collection of samples of the data will be used to identify if any sections have been missed and thereby ensure complete coverage and to audit the repeatability of the data collection.

North Yorkshire County Council officers will also contribute to platforms for sharing and disseminating the lessons learned, as directed by the Department for Transport.

SECTION D: Declarations

D1. Senior Responsible Owner Declaration

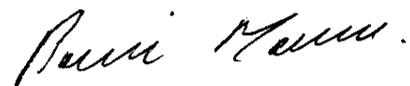
As Senior Responsible Owner for Road traffic sign inventory using Connected Vehicle Data I hereby submit this request for approval to DfT on behalf of North Yorkshire County Council and confirm that I have the necessary authority to do so.

I confirm that North Yorkshire County Council will have all the necessary powers in place to ensure the planned timescales in the application can be realised.

Name: Barrie Mason

Signed:

Position: Assistant Director Highways and Transportation.



D2. Section 151 Officer Declaration

As Section 151 Officer for North Yorkshire County Council I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that North Yorkshire County Council

- has allocated sufficient budget to deliver this scheme on the basis of its proposed funding contribution
- will allocate sufficient staff and other necessary resources to deliver this scheme on time and on budget
- accepts responsibility for meeting any costs over and above the DfT contribution requested, including potential cost overruns and the underwriting of any funding contributions expected from third parties
- accepts responsibility for meeting any ongoing revenue requirements in relation to the scheme
- accepts that no further increase in DfT funding will be considered beyond the maximum contribution requested
- has the necessary governance / assurance arrangements in place
- has identified a procurement strategy that is legally compliant and is likely to achieve the best value for money outcome
- will ensure that a robust and effective stakeholder and communications plan is put in place.

Name: Michael Leah

Signed:



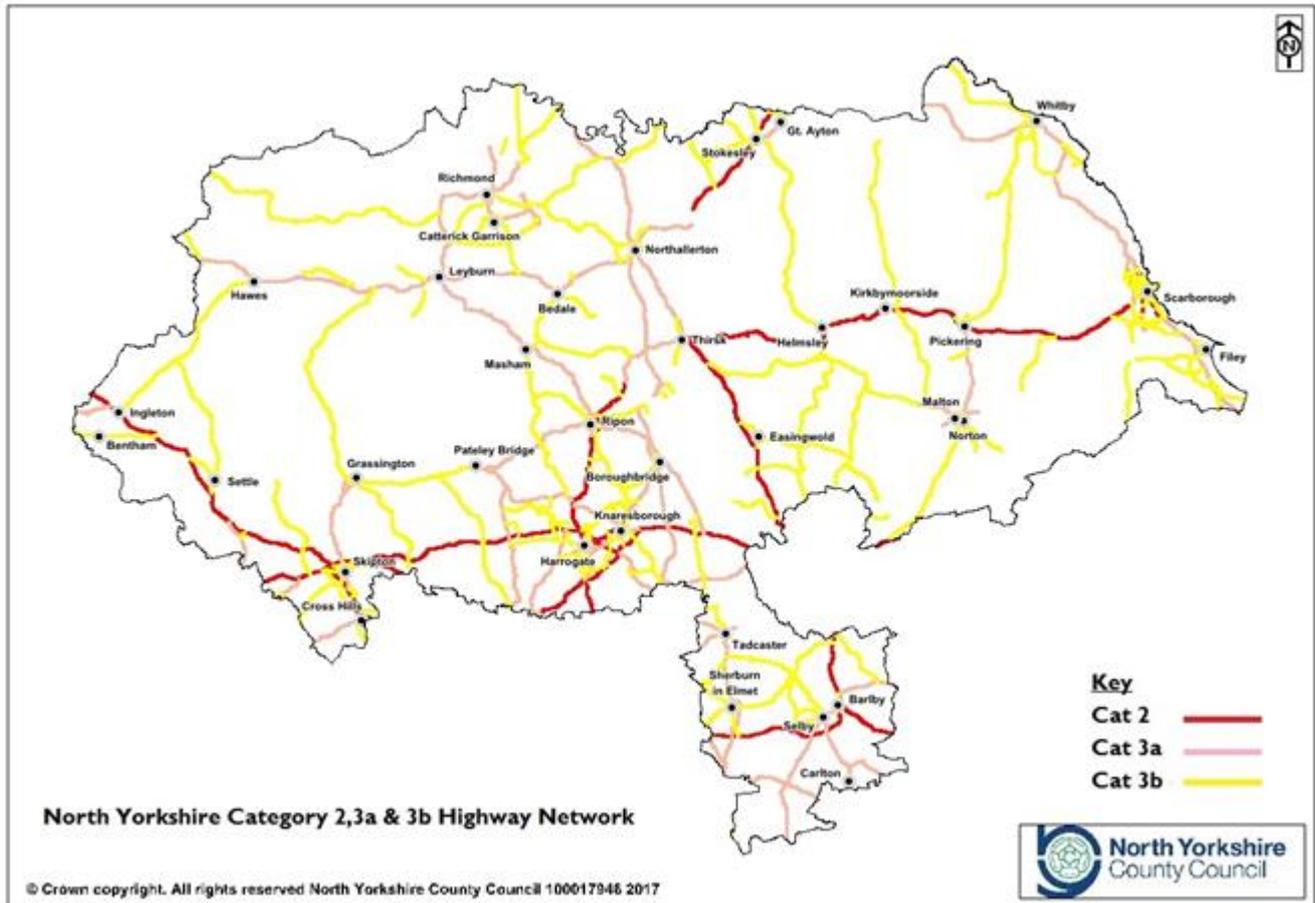
Submission of bids:

The deadline for bid submission is **23.59 on 16 February 2018**.

An electronic copy only of the bid including any supporting material should be submitted to:
Traffic.Comp@dft.gsi.gov.uk

APPENDICES

APPENDIX A – Map showing road network to have road traffic sign inventory.



Appendix B - Equality Impact Assessment Screening Form

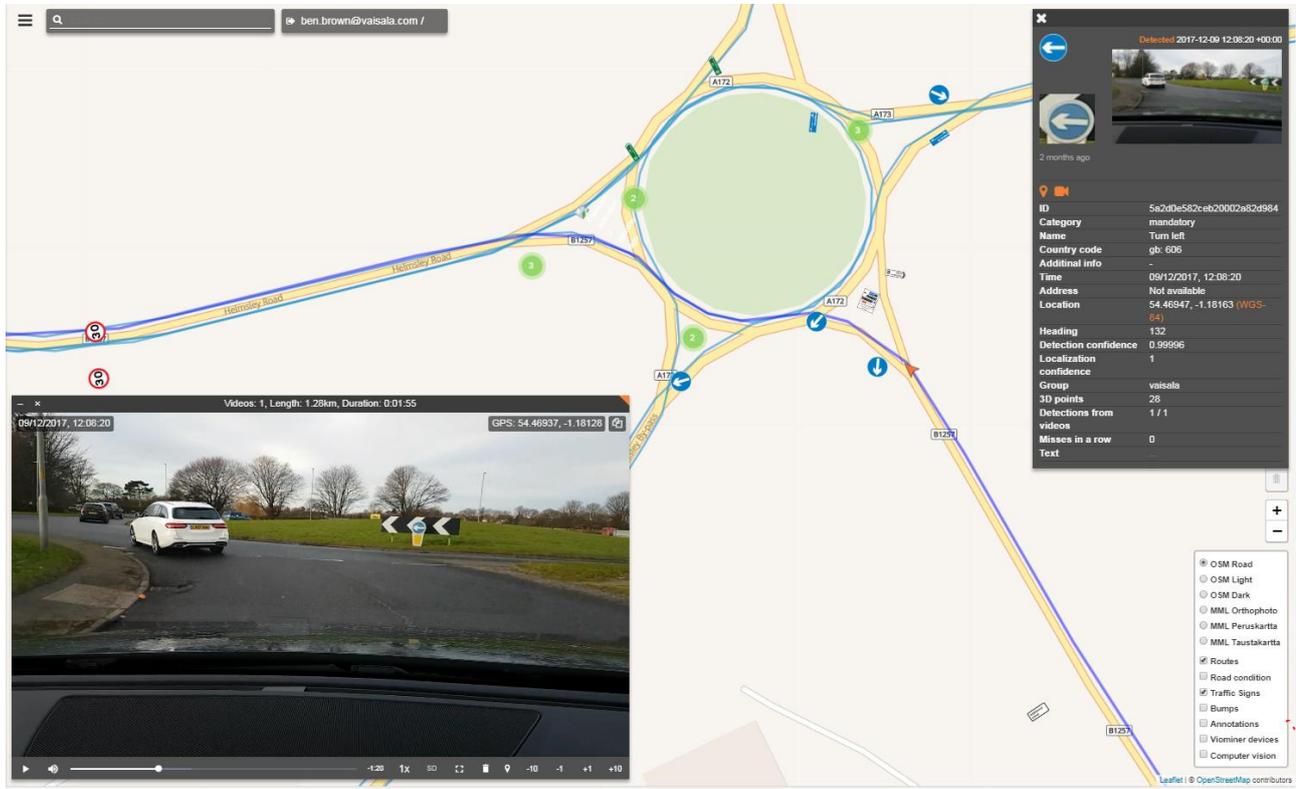
<p>Initial equality impact assessment screening form (As of October 2015 this form replaces 'Record of decision not to carry out an EIA')</p> <p>This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.</p>			
Directorate	Business and Environmental Services		
Service area	Network Strategy		
Proposal being screened	Funding for innovation: Connected Vehicle Data		
Officer(s) carrying out screening	Fiona Stone		
What are you proposing to do?	To confirm a project to collect road traffic sign inventory if successful in bidding to the DfT for funding under the Connected Vehicle Data Fund		
Why are you proposing this? What are the desired outcomes?	To identify the finalised project of road traffic sign inventory collection and input into a UK Pavement Management System to be submitted in the bid to the DfT.		
Does the proposal involve a significant commitment or removal of resources? Please give details.	If the bid is successful, all funding must be spent in 2018/19, with all data collected and available for use in this financial year.		
<p>Impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYCC's additional agreed characteristic As part of this assessment, please consider the following questions:</p> <ul style="list-style-type: none"> • To what extent is this service used by particular groups of people with protected characteristics? • Does the proposal relate to functions that previous consultation has identified as important? • Do different groups have different needs or experiences in the area the proposal relates to? <p>If for any characteristic it is considered that there is likely to be a significant adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your Equality rep for advice if you are in any doubt.</p>			
Protected characteristic	Yes	No	Don't know/No info available
Age		✓	
Disability		✓	
Sex (Gender)		✓	
Race		✓	
Sexual orientation		✓	
Gender reassignment		✓	
Religion or belief		✓	
Pregnancy or maternity		✓	
Marriage or civil partnership		✓	
NYCC additional characteristic			
People in rural areas		✓	
People on a low income		✓	
Carer (unpaid family or friend)		✓	
Does the proposal relate to an area where there are known inequalities/probable impacts (e.g. disabled people's access to public transport)? Please give details.	No		
Will the proposal have a significant effect on how other organisations	None		

<p>operate? (e.g. partners, funding criteria, etc.). Do any of these organisations support people with protected characteristics? Please explain why you have reached this conclusion.</p>				
<p>Decision (Please tick one option)</p>	<p>EIA not relevant or proportionate:</p>	<input checked="" type="checkbox"/>	<p>Continue to full EIA:</p>	
<p>Reason for decision</p>	<p>The work being proposed will have wide benefits for residents and visitors and there is no reason for the programme to cause any negative impact on anybody from within the protected characteristic groups. Further consideration of the equalities implications will be undertaken prior to a final decision in February 2018 on which bids to submit</p>			
<p>Signed (Assistant Director or equivalent)</p>	<p>Barrie Mason</p>			

APPENDIX C- Screen shot of connected vehicle data

The Computer Vision system provides a facility to conduct video surveys of the network, and automatically processes video data to identify road traffic signs. These signs are then visualized on the user interface where detailed images can be accessed to enable asset managers to review condition of signs where defects are identified.

Figure 1 User Interface with access to video archive and traffic signs identified on map



Various filtering tools are available within the GUI to enable isolation of data by date and time, type of traffic sign etc.

Figure 2 Traffic Sign Filter



The CV system creates an inventory of Traffic Signs that can be exported.

Figure 3 Traffic Sign Inventory

id	longitude	latitude	elevation	label	name	code	additional_info	category	heading	number_of_videos	accuracy	detection_confiden
5a2d0e352ceb20003382d95c	-1.182807988	54.46960089	122.8476473	additional-panel-text-blue	Additional panel with text blue		additional-panel-text-blue	additional-panels	89	2	4	0.998539925
5a2d0e352ceb20003382d95f	-1.182463513	54.46969998	115	direction-sign-local					122	3		0.985768378
5a2d0e352ceb20003382d961	-1.184416478	54.46934265	122.2690938	maximum-speed-limit-30	Maximum speed limit (30)	670V30		prohibitory	81	2	4.407211765	0.999849916
5a2d0e352ceb20003382d962	-1.184428787	54.46944793	122.4841025	maximum-speed-limit-30	Maximum speed limit (30)	670V30		prohibitory	79	2	5.387386275	0.999953389
5a2d0e352ceb20003382d964	-1.185835133	54.46938215	120.4701539	no-large-goods-vehicle	No heavy goods vehicles	622.1A		prohibitory	103	2	4	0.998806119
5a2d0e352ceb20003382d966	-1.188519951	54.47053453	120.9155113	no-large-goods-vehicle	No heavy goods vehicles	622.1A		prohibitory	111	2	4	0.99846697
5a2d0e352ceb20003382d96b	-1.187942843	54.47046984	119.1194286	pass-on-left-side	Pass on left side	610		mandatory	135	2	4	0.99978304
5a2d0e352ceb20003382d96d	-1.1884859	54.4706127	119.246063	pass-on-left-side	Pass on left side	610		mandatory	112	2	4	0.99984886
5a2d0e352ceb20003382d96e	-1.186968983	54.46995743	121.0464686	pedestrians-and-cyclists	Compulsory track for pedestrians	956		mandatory	130	2	4	0.99979854
5a2d0e352ceb20003382d96f	-1.187190668	54.47006217	121.3424669	pedestrians-and-cyclists	Compulsory track for pedestrians	956		mandatory	133	2	4	0.99976754
5a2d0e352ceb20003382d970	-1.187076628	54.4700282	120.7880449	pedestrians-and-cyclists-dual	Compulsory track for pedestrians	957		mandatory	131	2	4	0.99866439
5a2d0e352ceb20003382d971	-1.186385498	54.46952767	119.9858769	roundabout-ahead	Roundabout ahead	510		warning	115	2	4	0.99921842
5a2d0e352ceb20003382d972	-1.18259427	54.469564	122	slippery-road-surface	Slippery road surface	557		warning	100	2		0.999759972
5a2d0e352ceb20003382d973	-1.186124646	54.4694429	119.790767	slippery-road-surface	Slippery road surface	557		warning	107	2	4	0.998616623
5a2d0e352ceb20003382d974	-1.188189379	54.47062045	119.749244	turn-left	Turn left	606		mandatory	124	2	4	0.99999166
5a2d0e352ceb20003382d976	-1.186123398	54.46944265	120.5439855	yield-sign	Give Way	602		priority	108	2	4	0.956582844
5a2d0e402ceb20002682d95c	-1.141325944	54.48901038	129.4897482	at-the-junction-white	At the junction white	2902-white		indication	217	3	4	0.99867717
5a2d0e402ceb20002682d95d	-1.14121894	54.48912842	132.9285899	at-the-junction-white	At the junction white	2902-white		indication	218	3	4	0.999742806
5a2d0e442ceb20002682d95c	-1.182028691	54.47005316	115.3248471	at-the-junction-green	At the junction green	2902-green		indication	243	3	4	0.999285996
5a2d0e4d2ceb20002682d96c	-1.187180625	54.46990584	120.068446	on-approaches-to-junctions-c-w	On approaches to junction white	on-approaches-to-junctions-c-w		indication	131	2	4	0.998281717
5a2d0e4e2ceb20002682d971	-1.188789262	54.47052902	120.1565734	slippery-road-surface	Slippery road surface	557		warning	98	2	4	0.997562408
5a2d0e572ceb20002682d969	-1.218362744	54.52214308	97.37344745	background-marker	Background marker	515		marker-signs	14	2	4	0.986465216
5a2d0e572ceb20002682d979	-1.178607393	54.46715864	134.5447638	accident-area-or-accident-ahead	Accident area / accident ahead	562		warning	121	1	10.65605174	0.961601555
5a2d0e572ceb20002682d97a	-1.180774404	54.46858719	127.1093521	additional-panel-text-white	Additional panel with text white	additional-panel-text-white	additional-panels	146	1	12		0.994273484
5a2d0e572ceb20002682d97b	-1.178608116	54.46715882	134.0941435	additional-panel-text-white	Additional panel with text white	additional-panel-text-white	additional-panels	121	1	10.65605174	0.96820581	
5a2d0e572ceb20002682d97c	-1.188397451	54.47093849	112.5060621	maximum-speed-limit-20	Maximum speed limit (20)	670V20		prohibitory	183	2	3	0.988259127
5a2d0e572ceb20002682d97d	-1.18787553	54.47075098	117.3387392	no-large-goods-vehicle	No heavy goods vehicles	622.1A		prohibitory	243	1	4	0.99697522
5a2d0e572ceb20002682d97e	-1.189518219	54.47072256	116	no-large-goods-vehicle	No heavy goods vehicles	622.1A		prohibitory	169	1		0.996243358
5a2d0e572ceb20002682d981	-1.218362451	54.52214538	97.48215053	turn-left	Turn left	606		mandatory	15	2	4	0.998985334
5a2d0e572ceb20002682d97f	-1.18796657	54.47095254	117.4066813	no-large-goods-vehicle	No heavy goods vehicles	622.1A		prohibitory	237	2	4	0.978107631
5a2d0e572ceb20002682d980	-1.180013652	54.46787698	130.0069619	on-approaches-to-junctions-c-w	On approaches to junction white	on-approaches-to-junctions-c-w		indication	138	1	9.364231076	0.998784721
5a2d0e572ceb20002682d981	-1.188069018	54.47086136	113.3835742	parking-place	Parking place	801		indication	237	2	4	0.99960065
5a2d0e572ceb20002682d982	-1.181398007	54.4693683	124.165074	pass-on-left-side	Pass on left side	610		mandatory	140	1	6	0.99998212
5a2d0e572ceb20002682d983	-1.188442198	54.47082757	112.7747766	pass-on-left-side	Pass on left side	610		mandatory	197	2	3	0.999879241
5a2d0e582ceb20002682d984	-1.181634243	54.4694716	122.9986485	turn-left	Turn left	606		mandatory	132	1	6	0.999869979
5a2d0e5a2ceb20003382d977	-1.167146549	54.47145541	116.5073542	at-the-junction-white	At the junction white	2902-white		indication	250	2	3	0.99875426
5a2d0e5a2ceb20003382d978	-1.167149146	54.47144194	116.6538459	at-the-junction-white	At the junction white	2902-white		indication	249	2	3	0.996434927
5a2d0e5a2ceb20003382d979	-1.167487266	54.47153778	115.8366173	at-the-junction-white	At the junction white	2902-white		indication	253	2	3	0.99997735
5a2d0e5a2ceb20003382d97a	-1.181472361	54.46994973	113.778694	at-the-junction-white	At the junction white	2902-white		indication	284	3	3	0.999948621
5a2d0e5a2ceb20003382d97b	-1.112796151	54.46984901	142.7476832	at-the-junction-white	At the junction white	2902-white		indication	286	2	6	0.999930143
5a2d0e5a2ceb20003382d97c	-1.189337003	54.46947667	115.2082075	background-marker	Background marker	515		marker-signs	244	3	3	0.993380177

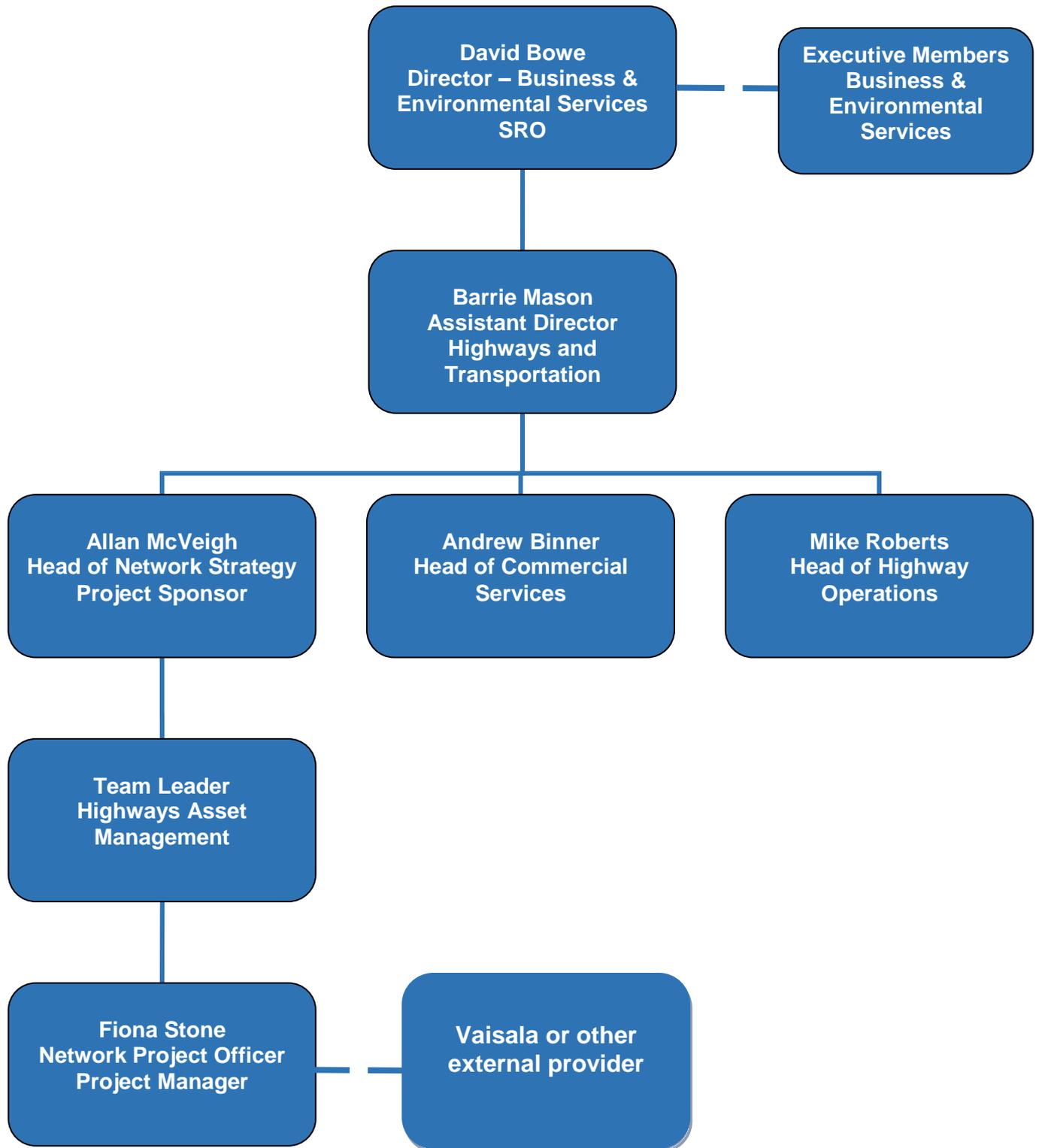
Computer Vision
Traffic Sign Inventory

DfT Funding for Innovation 2018

VAISALA

PDF - Computer Vision – (double click to view)

Appendix E – Organogram Showing Governance Arrangements



Appendix F – Risk Register

Connected Vehicle Data Risk Register - February 2018											Last Update: 06 February 2018	
Ref No	Risk	Probability	Impact	Initial Risk Assessment	Controls	Probability	Impact	Post Mitigation Risk Assessment	Narrative of Key Changes & Actions Completed	Owner	Status	Notes
Project Delivery												
1	Cost Overrun Any costs over and above those awarded by the DfT would need to be paid from NYCC internal budgets, as no further funding will be available.	3	3	M	All estimated costs listed above have been provided by Vaisala as part of the bid. In order to comply with the Council's procurement rules it is likely that we will have to go out for three quotes and will endeavour to obtain the best value for the bid.	1	2	L	6 February 2018 - New Risk Entry	Fiona Stone/ Vaisala	Open	
2	Timescale Overrun Funding is only being requested for 2018/19 so any overrun into the future would need to be funded by NYCC from internal budgets	3	3	M	The draft project plan for this work suggests that all the driven element can be completed within a three month time period. This collected data will then need to be referenced to the highway network which is anticipated to be completed within the timescale allowed by the DfT.	1	2	L	6 February 2018 - New Risk Entry	Fiona Stone/ Vaisala	Open	
3	Data Compataility It is anticipated that the main risk to delivery in 2018/19 is the connected vehicle data not being able to attach to the highways network and not being compatible with Symology Insight	5	5	H	The software can already identify the majority of the road traffic signs so by deciding to collecting of the road traffic signs on the category 2,3a & 3b network we have a longer timeframe to attached the network to the data and import it into Symology Insight	3	3	M	6 February 2018 - New Risk Entry	Fiona Stone/ Vaisala	Open	
4	Internal Resource Availability The collection of the data will be carried out by the Network surveyors and can be incorporated with other work carried out on the highway network. Monitoring will need to be in place to ensure that all highways identified in the project are surveyed.	1	3	M	sufficient resource has already been identified within the team to progress this project . The project has been given a high level of priority by all management involved. The Network Surveyors' programme of work will be devised to ensure that the collect all the data required on the identified highway network	1	1	L	6 February 2018 - New Risk Entry	Fiona Stone/ Vaisala	Open	

Weighting Risks Impact/Probability

		IMPACT				
		1	2	3	4	5
PROBABILITY	1	L	L	M	M	M
	2	L	M	M	M	H
	3	L	M	M	H	H
	4	L	M	H	H	H
	5	M	M	H	H	H

Description	
H	High
M	Medium
L	Low
I	Insignificant or no record

Evaluation criteria

Evaluation – assess the impact of the event and the probability the event occur:

o **Impact** (in term of annual cost, time and performance):

- 1 = Insignificant impact (<£1,000)
- 2 = Minor impact (<10,000)
- 3 = Moderate impact (<£25,000)
- 4 = Significant impact (<£.50,000)
- 5 = Major impact (>£50,000)

o **Probability** (likelihood the event occur during the contract period):

- 1 = Rare=up to 10 percent probability (*May occur only in exceptional circumstances*)
- 2 = Unlikely=10-30 percent probability (*Could occur at some time*)
- 3 = Possible=30-60 percent probability (*Might occur at some time*)
- 4 = Likely=60 -90 percent probability (*probably will occur at some time*)
- 5 = High= 90-100 percent probability (*risk highly likely to occur*)

Description – you should consider:

- _____ o The Identification of the event (i.e. : Inflation increase over the estimated figures)
- _____ o The factors that could cause it to occur (i.e.: due to...)
- _____ o The element of the project that could be affected (i.e.: affecting labour cost)
- _____ o How it could affect the project or how could it be related to other risks (i.e.: causing delay to the delivery of the works)
- _____ o Any residual effects (i.e.: full inflation risk for capital works)