



Comhairle Contae **Lú**  
**Louth** County Council

Your Council

for Your

Community

AI VAISALA ROAD ASSET  
MANAGEMENT SOFTWARE 2023

# Funding/Cost

Louth County Council received €50K funding as a pilot programme obtained through the **Public Service Innovation Fund** PSIF operated by The Department of Public Expenditure and Reform

This covered

- Purchase and installation of five Samsung S21 5G Android phones.
- Data processing and Road AI Analysis for 2 years (€17,500 per annum plus vat)
- Initial Training and online zoom session once per month
- Initial installation carried out by Vaisala

Separately we purchased five 5G SIM cards with unlimited data @ €25 per month plus vat

Therefore annual cost

A1 Software = €17,500 plus VAT

5 no. SIM cards = €1,500 plus VAT

Total = €19,000 plus VAT @ 23% per annum

# Set up

- Road network exported as “shape file” to Vaisala
- Phones mounted on windscreen beside Rear view Mirror
- Plugged into the USB port, the 12V supply or cigarette lighter port
- Video footage captured using Camera on these phones.
- Phones interchangeable between any vehicle.
- Set up in 5 mins.

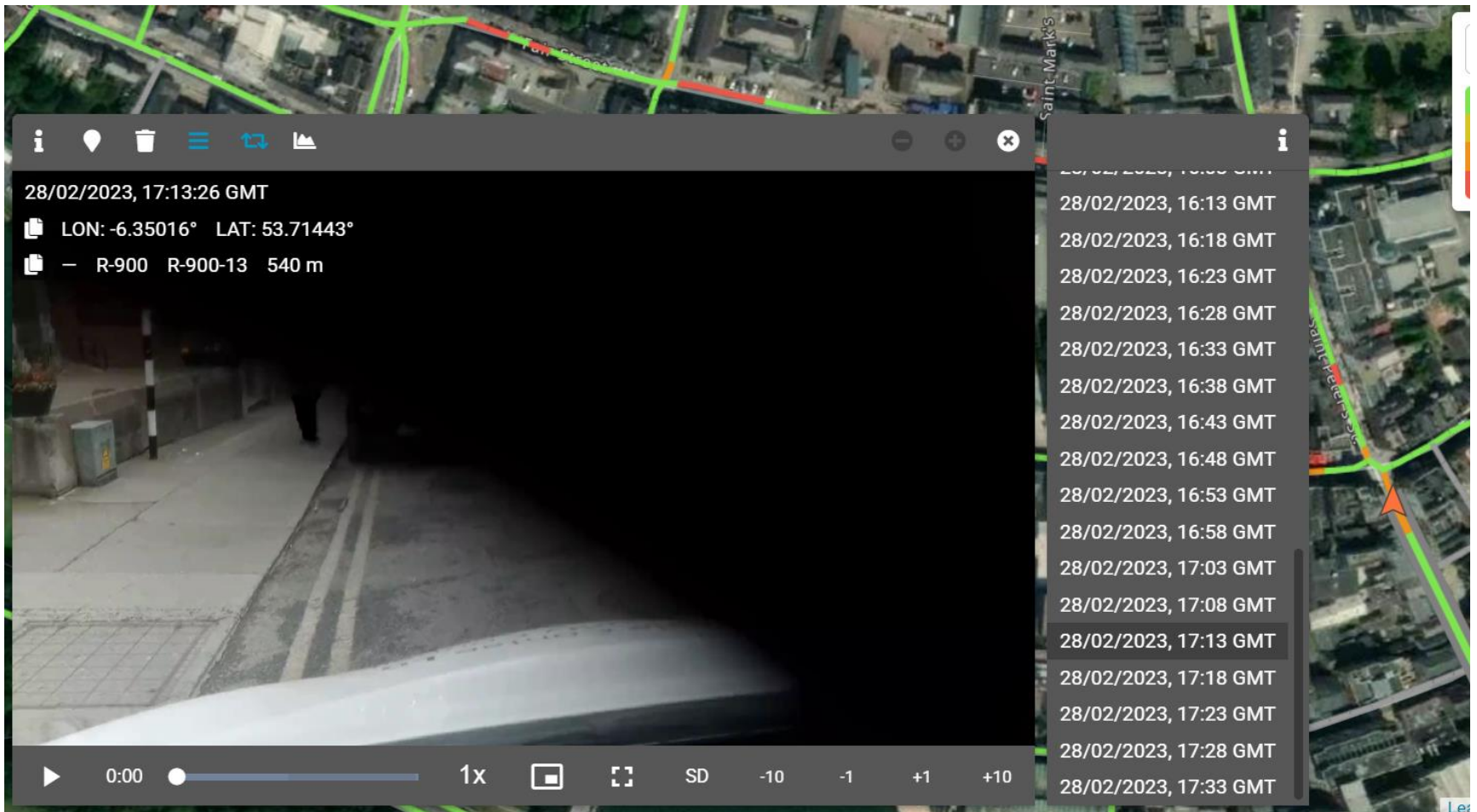
# Installation



# Driver Issues

- Camera pointing too high or too low. Two thirds road : One third Sky
- Fear that their driving would be scrutinised or be incriminating in event of an accident
- Camera pointing at them
- Union issues – information used for disciplinary purposes?
- The filter to limit glare was either not being used or incorrectly used
- Camera either not turned on or not turned off. Video footage from stationary vehicle in yard.
- Items left on dashboard causing glare.

# Example of Driver Issues: Glare filter covering Camera Lens



# Coverage

- Louth County Council Network is 1691 Km
- First cameras installed in June 2022.
- On 1<sup>st</sup> Dec 2022 506 Km surveyed = 30%
- On 19<sup>th</sup> Jan 2023 954 km surveyed = 56%
- Percentage increased after resolving issues with uploading videos.
- During Summer 2023 a graduate on a work experience programme drove missing routes (mostly Local Secondary and Tertiary roads)

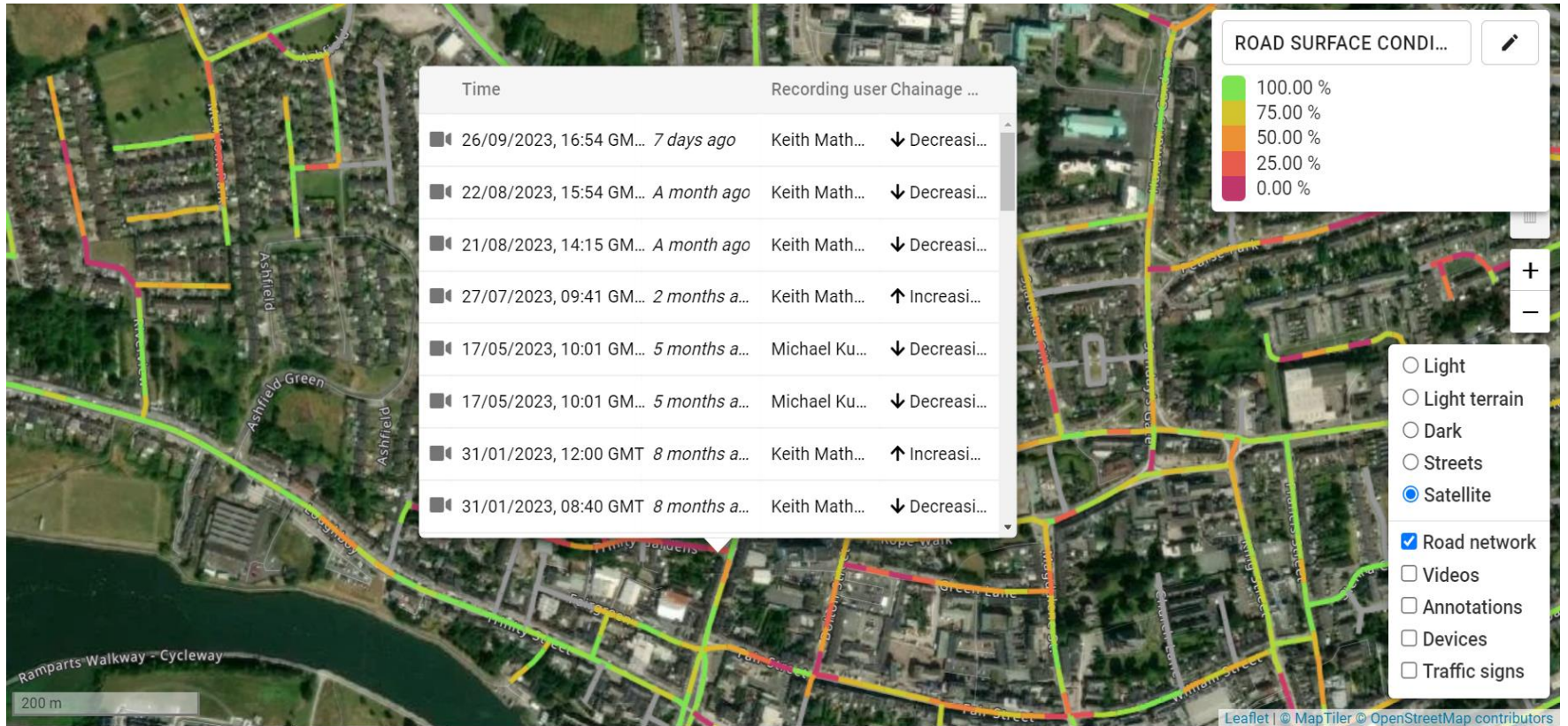




# Zooming in shows exact location and extent of problem areas



# When you click on a point on the road it shows the surveys from different dates



# AI Features:

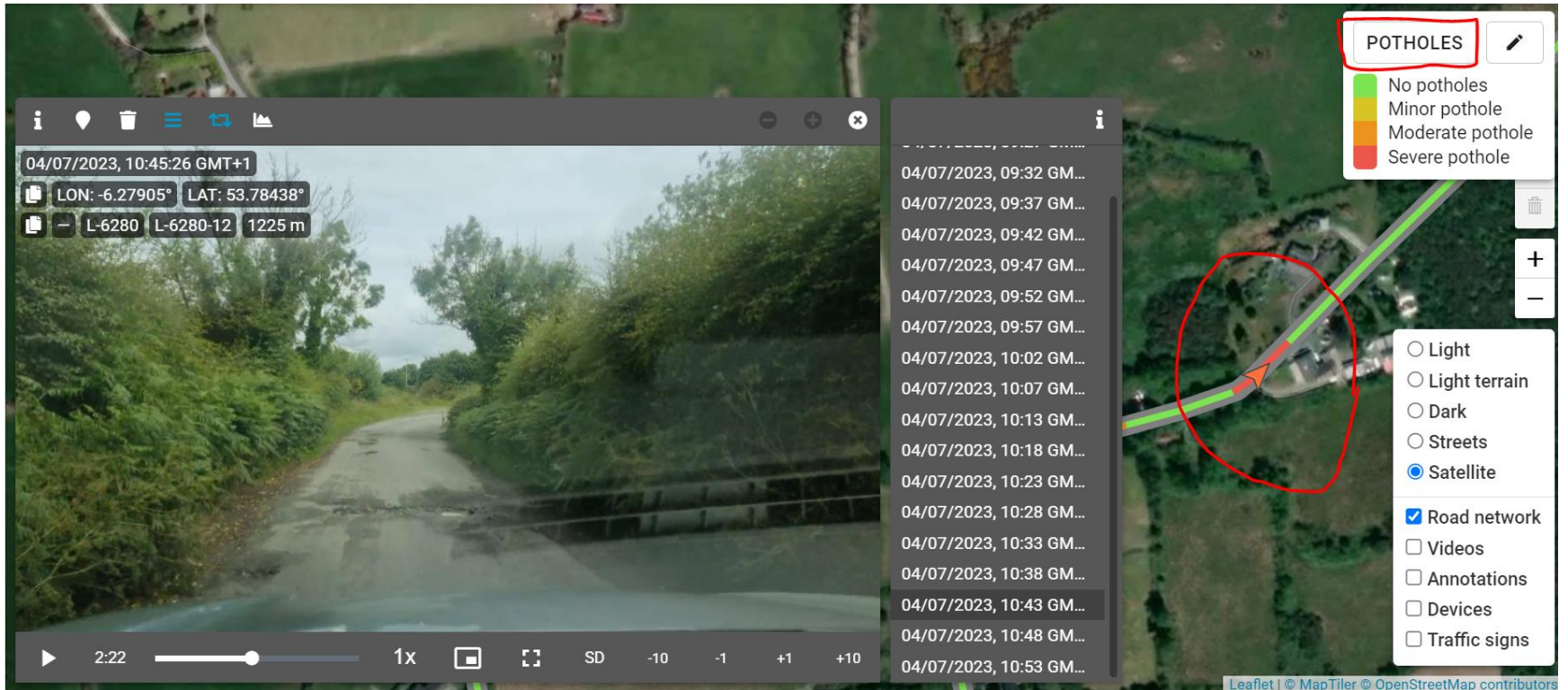
- Gives colour coded condition rated outputs for the following parameters
- Overall Road surface condition
- Potholes
- Structural defects
- Surfaces Defects
- Overall Line marking conditions
- Individual line marking conditions
- Surface water
- Sign conditions

# Potholes

Arrow shows location on the road

Condition shows red

Glare on windscreen – glare filter not properly adjusted but still gave correct condition rating



# Surface Defects

## Surface Condition Fretting (Red)

04/07/2023, 10:45:26 GMT+1

LON: -6.27905° LAT: 53.78438°

L-6280 L-6280-12 1225 m

04/07/2023, 09:32 GM...  
04/07/2023, 09:37 GM...  
04/07/2023, 09:42 GM...  
04/07/2023, 09:47 GM...  
04/07/2023, 09:52 GM...  
04/07/2023, 09:57 GM...  
04/07/2023, 10:02 GM...  
04/07/2023, 10:07 GM...  
04/07/2023, 10:13 GM...  
04/07/2023, 10:18 GM...  
04/07/2023, 10:23 GM...  
04/07/2023, 10:28 GM...  
04/07/2023, 10:33 GM...  
04/07/2023, 10:38 GM...  
04/07/2023, 10:43 GM...  
04/07/2023, 10:48 GM...  
04/07/2023, 10:53 GM...

**SURFACE DEFECTS**

- No surface defects
- Moderate transverse cracking
- Severe transverse cracking
- Moderate longitudinal cracking
- Severe longitudinal cracking
- Bleeding
- Severe fretting

Light  
 Light terrain  
 Dark  
 Streets  
 Satellite  
 Road network  
 Videos  
 Annotations  
 Devices  
 Traffic signs

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18:26

# Structural Defects

Surface Condition showing edge deterioration (buff)

No alligator cracking (orange)

No subsidence (red)

04/07/2023, 10:45:26 GMT+1

LON: -6.27905° LAT: 53.78438°

L-6280 L-6280-12 1225 m

04/07/2023, 09:32 GM...  
04/07/2023, 09:37 GM...  
04/07/2023, 09:42 GM...  
04/07/2023, 09:47 GM...  
04/07/2023, 09:52 GM...  
04/07/2023, 09:57 GM...  
04/07/2023, 10:02 GM...  
04/07/2023, 10:07 GM...  
04/07/2023, 10:13 GM...  
04/07/2023, 10:18 GM...  
04/07/2023, 10:23 GM...  
04/07/2023, 10:28 GM...  
04/07/2023, 10:33 GM...  
04/07/2023, 10:38 GM...  
04/07/2023, 10:43 GM...  
04/07/2023, 10:48 GM...  
04/07/2023, 10:53 GM...

**STRUCTURAL DEFECTS**

- No structural defects
- Edge deterioration
- Alligator cracking
- Subsidence

Light  
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 Road n  
 Videos  
 Annota  
 Device:  
 Traffic

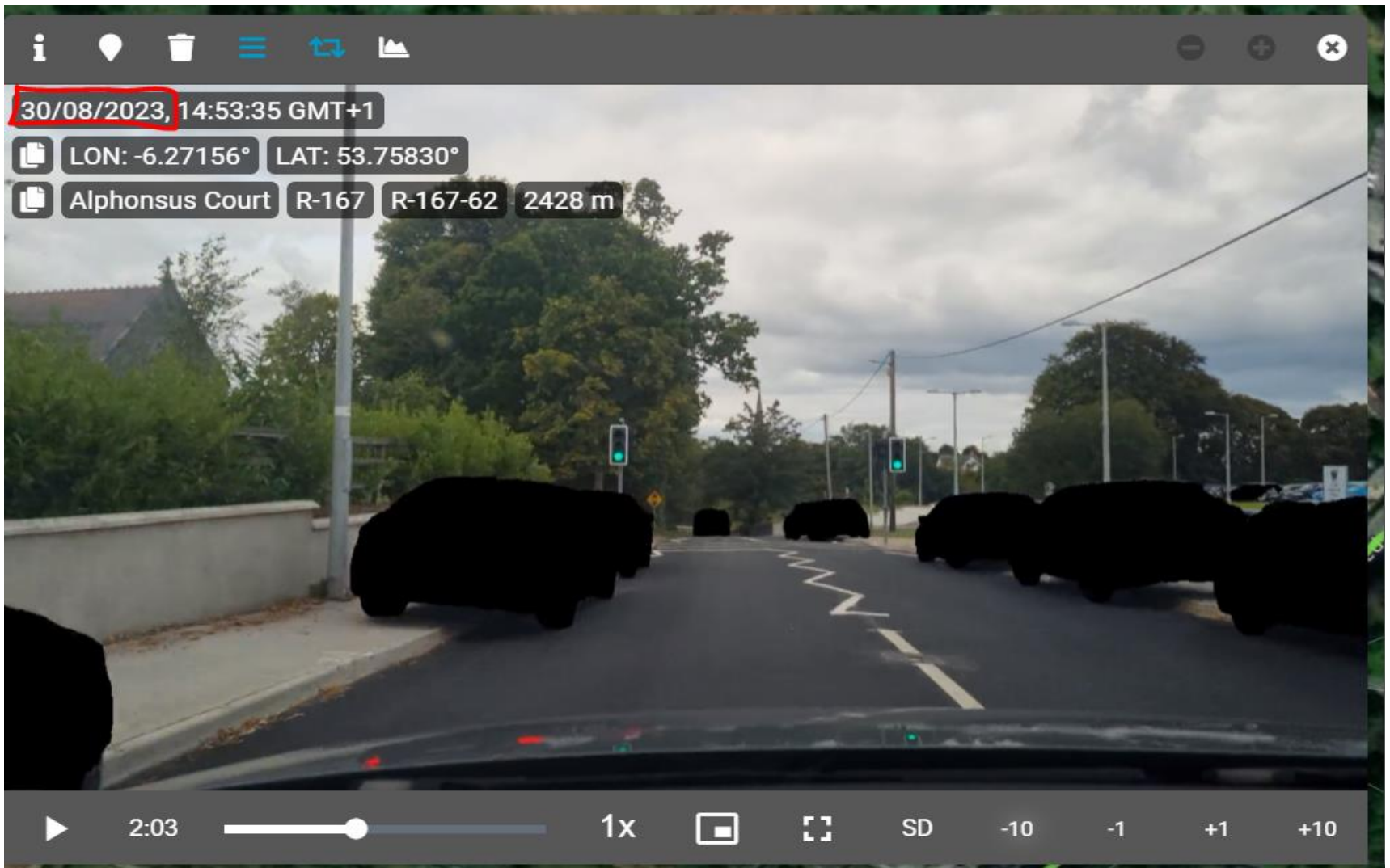
2:22 1x SD -10 -1 +1 +10

# Public Liability Claims

Google maps imagery May 2023 - can be dated perhaps as far back as 2009



AI gives the potential to have evidence from a variety of Dates to fight PL claims





# Work Orders

Can issue individual Work Orders



#1 [Open in map](#)

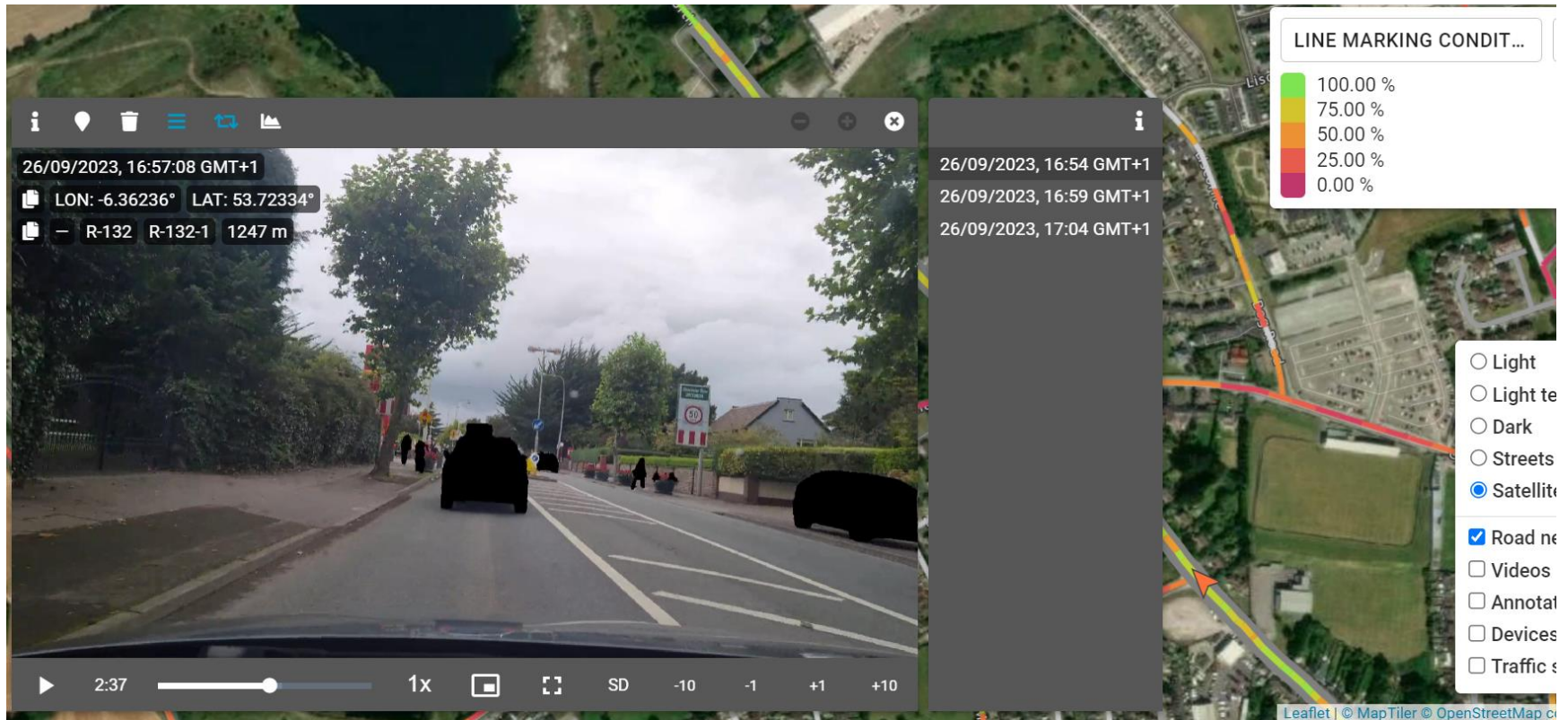
Time	25/11/2022, 14:24:12
Location	53.71737°, -6.35378°
Address	<no name>, L-10009-64, 158
Sensor	Louth_County_Council_0001
User	declan.macmahon@louthcoco.ie
Tags	Sagging
Status	Open
Link	<a href="#">View Details and Attachments for this work order</a>

Text -





# Line markings with a green condition rating



# Line markings with a red condition rating

30/01/2023, 15:43:15 GMT

LON: -6.35930° LAT: 53.72430°

R-166 R-166-3 2836 m

0:04 1x SD -10 -1 +1 +10

LINE MARKING CONDIT...

- 100.00 %
- 75.00 %
- 50.00 %
- 25.00 %
- 0.00 %

- Light
- Light t
- Dark
- Streets
- Satelli
- Road n
- Videos
- Annote
- Device
- Traffic

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# Reports

Can issue report for roads or for segment of roads.

Optional intervals - 50m intervals used below

SegmentCod	RouteNumber	RoadClass	RoadName	MunicipalID	From meters	To meters	Length	Direction	Longitude	Latitude	Time (UTC)	Map link	Coverage	No. of measurements	Filter	Pavement condition	Pavement cr
L-62742-0	L-62742	LT		Municipal District c	0.00	50.00	50.00		-6.39230	53.81395	2023/07/03 11:15:39	<a href="#">HYPERLINK</a>	100.00%	2.00		23.64%	1
L-62742-0	L-62742	LT		Municipal District c	50.00	100.00	50.00		-6.39155	53.81398	2023/07/03 11:15:30	<a href="#">HYPERLINK</a>	100.00%	2.00		30.16%	2
L-62742-0	L-62742	LT		Municipal District c	100.00	150.00	50.00		-6.39082	53.81385	2023/07/03 11:15:22	<a href="#">HYPERLINK</a>	100.00%	2.00		35.67%	3
L-62742-0	L-62742	LT		Municipal District c	150.00	200.00	50.00		-6.39009	53.81378	2023/07/03 11:15:14	<a href="#">HYPERLINK</a>	100.00%	2.00		74.86%	5
L-62742-0	L-62742	LT		Municipal District c	200.00	250.00	50.00		-6.38935	53.81388	2023/07/03 11:15:08	<a href="#">HYPERLINK</a>	100.00%	2.00		87.96%	5
L-62742-0	L-62742	LT		Municipal District c	250.00	300.00	50.00		-6.38861	53.81395	2023/07/03 11:15:01	<a href="#">HYPERLINK</a>	100.00%	2.00		81.16%	5
L-62742-0	L-62742	LT		Municipal District c	300.00	350.00	50.00		-6.38786	53.81389	2023/07/03 11:14:56	<a href="#">HYPERLINK</a>	100.00%	2.00		66.93%	4
L-62742-0	L-62742	LT		Municipal District c	350.00	400.00	50.00		-6.38711	53.81379	2023/07/03 11:14:49	<a href="#">HYPERLINK</a>	100.00%	1.40		80.33%	5
L-62742-0	L-62742	LT		Municipal District c	400.00	450.00	50.00		-6.38637	53.81370	2023/07/03 11:14:42	<a href="#">HYPERLINK</a>	100.00%	2.00		92.85%	5
L-62742-0	L-62742	LT		Municipal District c	450.00	500.00	50.00		-6.38563	53.81377	2023/07/03 11:14:37	<a href="#">HYPERLINK</a>	100.00%	2.00		86.65%	5
L-62742-0	L-62742	LT		Municipal District c	500.00	550.00	50.00		-6.38493	53.81394	2023/07/03 11:14:30	<a href="#">HYPERLINK</a>	100.00%	2.00		79.02%	5
L-62742-0	L-62742	LT		Municipal District c	550.00	600.00	50.00		-6.38424	53.81413	2023/07/03 11:14:23	<a href="#">HYPERLINK</a>	100.00%	2.00		89.43%	5
L-62742-0	L-62742	LT		Municipal District c	600.00	650.00	50.00		-6.38349	53.81419	2023/07/03 11:14:16	<a href="#">HYPERLINK</a>	100.00%	2.00		74.27%	4
L-62742-0	L-62742	LT		Municipal District c	650.00	700.00	50.00		-6.38274	53.81428	2023/07/03 11:14:07	<a href="#">HYPERLINK</a>	100.00%	2.00		71.38%	4
L-62742-0	L-62742	LT		Municipal District c	700.00	750.00	50.00		-6.38200	53.81437	2023/07/03 11:13:57	<a href="#">HYPERLINK</a>	100.00%	2.00		63.99%	3
L-62742-0	L-62742	LT		Municipal District c	750.00	800.00	50.00		-6.38126	53.81446	2023/07/03 11:13:51	<a href="#">HYPERLINK</a>	100.00%	2.00		72.40%	5
L-62742-0	L-62742	LT		Municipal District c	800.00	850.00	50.00		-6.38051	53.81455	2023/07/03 11:13:43	<a href="#">HYPERLINK</a>	100.00%	2.00		74.17%	4
L-62742-0	L-62742	LT		Municipal District c	850.00	900.00	50.00		-6.37977	53.81465	2023/07/03 11:13:35	<a href="#">HYPERLINK</a>	100.00%	2.00		86.96%	5
L-62742-0	L-62742	LT		Municipal District c	900.00	950.00	50.00		-6.37908	53.81457	2023/07/03 11:13:28	<a href="#">HYPERLINK</a>	100.00%	2.00		97.81%	5
L-62742-0	L-62742	LT		Municipal District c	950.00	1000.00	50.00		-6.37854	53.81425	2023/07/03 11:13:20	<a href="#">HYPERLINK</a>	100.00%	2.00		79.24%	5
L-62742-0	L-62742	LT		Municipal District c	1000.00	1050.00	50.00		-6.37785	53.81412	2023/07/03 11:13:13	<a href="#">HYPERLINK</a>	100.00%	2.00		88.88%	5
L-62742-0	L-62742	LT		Municipal District c	1050.00	1100.00	50.00		-6.37709	53.81415	2023/07/03 11:13:03	<a href="#">HYPERLINK</a>	100.00%	2.04		85.90%	5
L-62742-0	L-62742	LT		Municipal District c	1100.00	1150.00	50.00		-6.37632	53.81419	2023/07/03 11:12:54	<a href="#">HYPERLINK</a>	100.00%	2.00		95.68%	5
L-62742-0	L-62742	LT		Municipal District c	1150.00	1200.00	50.00		-6.37563	53.81411	2023/07/03 11:12:45	<a href="#">HYPERLINK</a>	100.00%	2.00		86.78%	5
L-62742-0	L-62742	LT		Municipal District c	1200.00	1250.00	50.00		-6.37509	53.81381	2023/07/03 11:12:34	<a href="#">HYPERLINK</a>	100.00%	2.00		85.67%	5
L-62742-0	L-62742	LT		Municipal District c	1250.00	1300.00	50.00		-6.37432	53.81380	2023/07/03 11:12:19	<a href="#">HYPERLINK</a>	100.00%	2.00		92.31%	5
L-62742-0	L-62742	LT		Municipal District c	1300.00	1350.00	50.00		-6.37357	53.81378	2023/07/03 11:11:55	<a href="#">HYPERLINK</a>	80.00%	2.00		96.33%	5

## Information Given

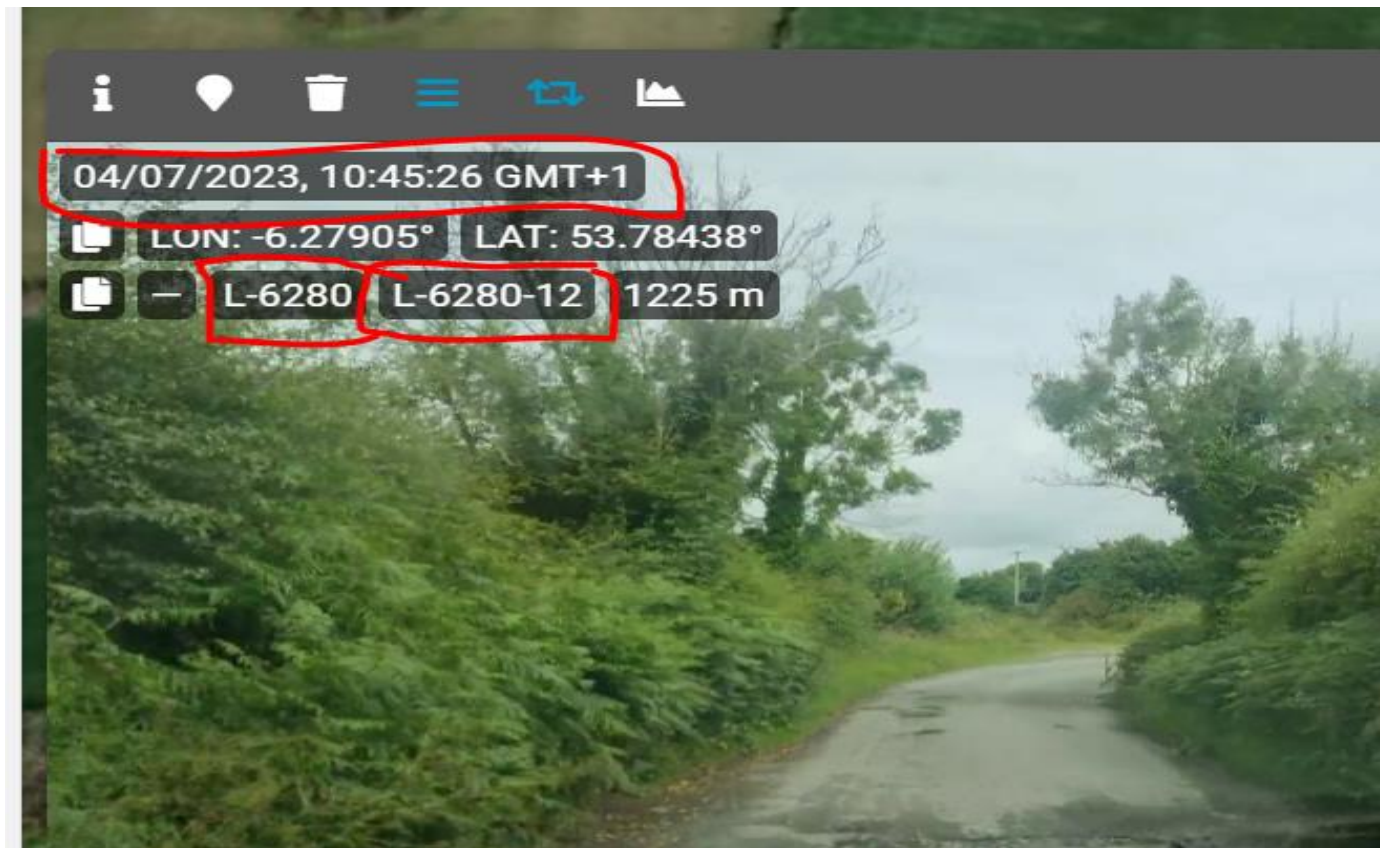
Date and time

Road Number

Road segment number

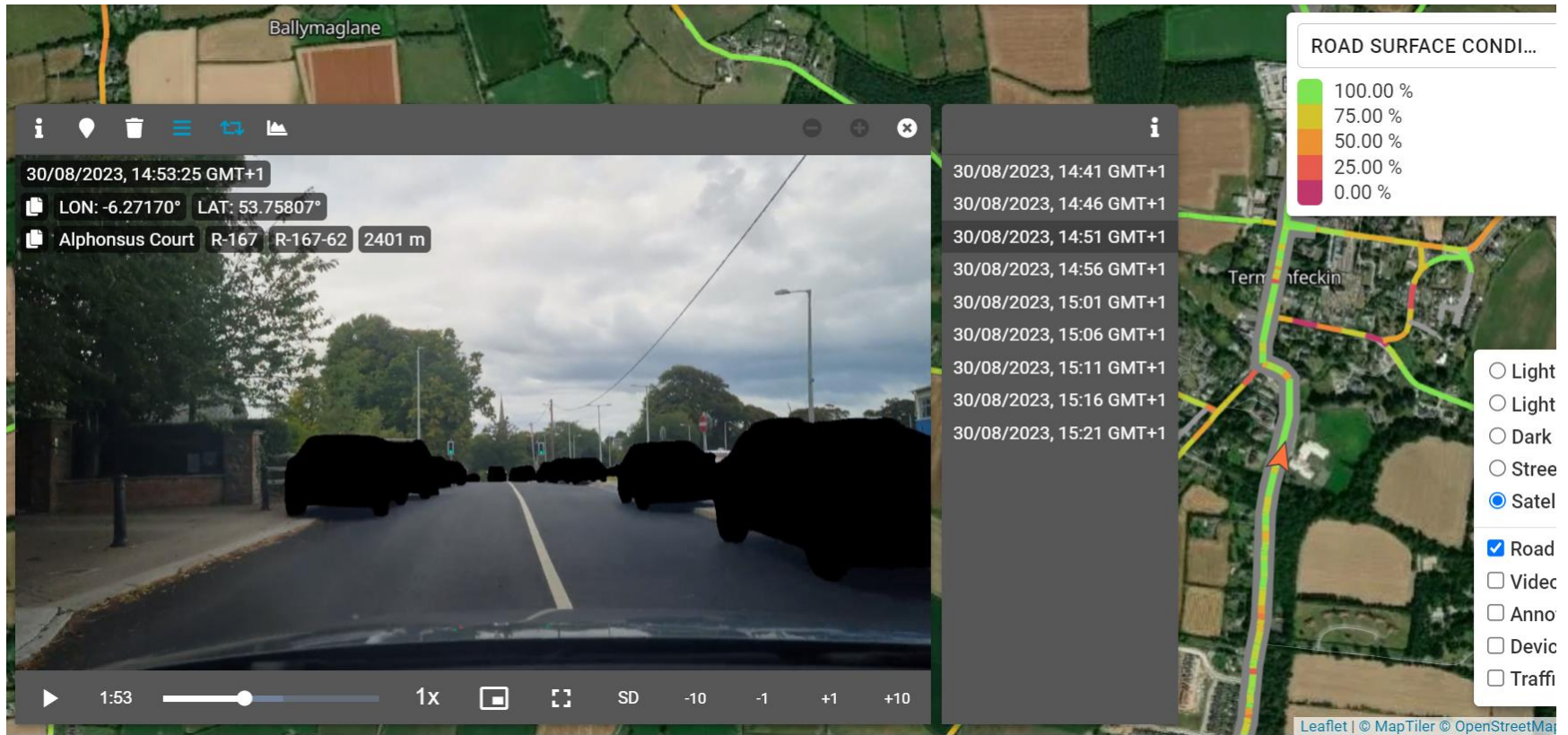
Chainage

Information and data obtained from the Shape File uploaded

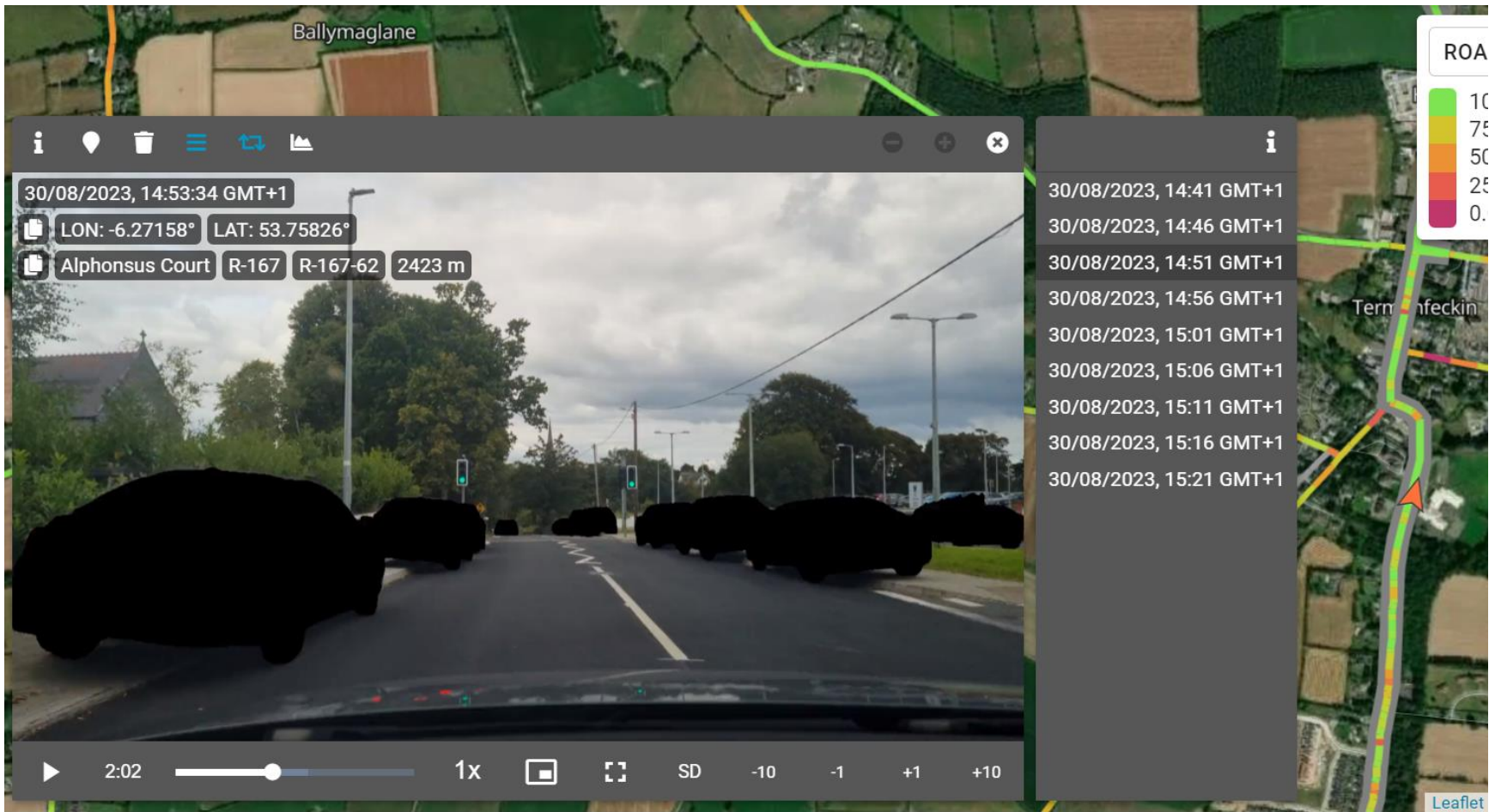


# Active Travel

Being used by our active travel section to highlight issues at schools.  
Footpaths being blocked by parents parking on footpath at  
Termonfeckin School



# Active Travel Issues





## Barnattin Reservoir – Road Structural Survey

Requested by Uisce Eireann to report on any evidence of structural defects of road over Barnattin reservoir dam

We sent report including

Colour Coded Condition rating for STRUCTURAL DEFECTS,

Worse defect was edge deterioration (buff)

No alligator cracking (orange)

No subsidence (red)

Screen shots for every 10m chainage



# Screen shot on road over Barnattin Reservoir Dam

The screenshot displays a road inspection software interface. On the left, a video player shows a road over a dam with a timestamp of 12/01/2023, 10:43:39 GMT. The video player includes a progress bar at 3:39 and playback controls. Above the video, location data is shown: LON: -6.40655°, LAT: 53.75046°, and road details: L-6311, L-6311-0, 1731 m. On the right, a structural defects map shows the road with a color-coded overlay. A legend titled 'STRUCTURAL DEFECTS' lists: No structural defects (green), Edge deterioration (yellow), Alligator cracking (orange), and Subsidence (red). A timeline on the right side of the map lists timestamps from 12/01/2023, 10:34 GMT to 12/01/2023, 12:00 GMT. A settings panel on the right includes options for Light, Light terrain, Dark, Streets, Satellite (selected), Road network (checked), Videos, Annotations, Devices, and Traffic signs. The bottom right corner contains the text 'Leaflet | © MapTiler © OpenStreetMap contributors'.

12/01/2023, 10:43:39 GMT

LON: -6.40655° LAT: 53.75046°

L-6311 L-6311-0 1731 m

12/01/2023, 10:34 GMT

12/01/2023, 10:39 GMT

12/01/2023, 10:45 GMT

12/01/2023, 10:50 GMT

12/01/2023, 10:55 GMT

12/01/2023, 11:00 GMT

12/01/2023, 11:05 GMT

12/01/2023, 11:10 GMT

12/01/2023, 11:15 GMT

12/01/2023, 11:20 GMT

12/01/2023, 11:25 GMT

12/01/2023, 11:30 GMT

12/01/2023, 11:35 GMT

12/01/2023, 11:40 GMT

12/01/2023, 11:45 GMT

12/01/2023, 11:50 GMT

12/01/2023, 11:55 GMT

12/01/2023, 12:00 GMT

STRUCTURAL DEFECTS

- No structural defects
- Edge deterioration
- Alligator cracking
- Subsidence

- Light
- Light terrain
- Dark
- Streets
- Satellite
- Road network
- Videos
- Annotations
- Devices
- Traffic signs

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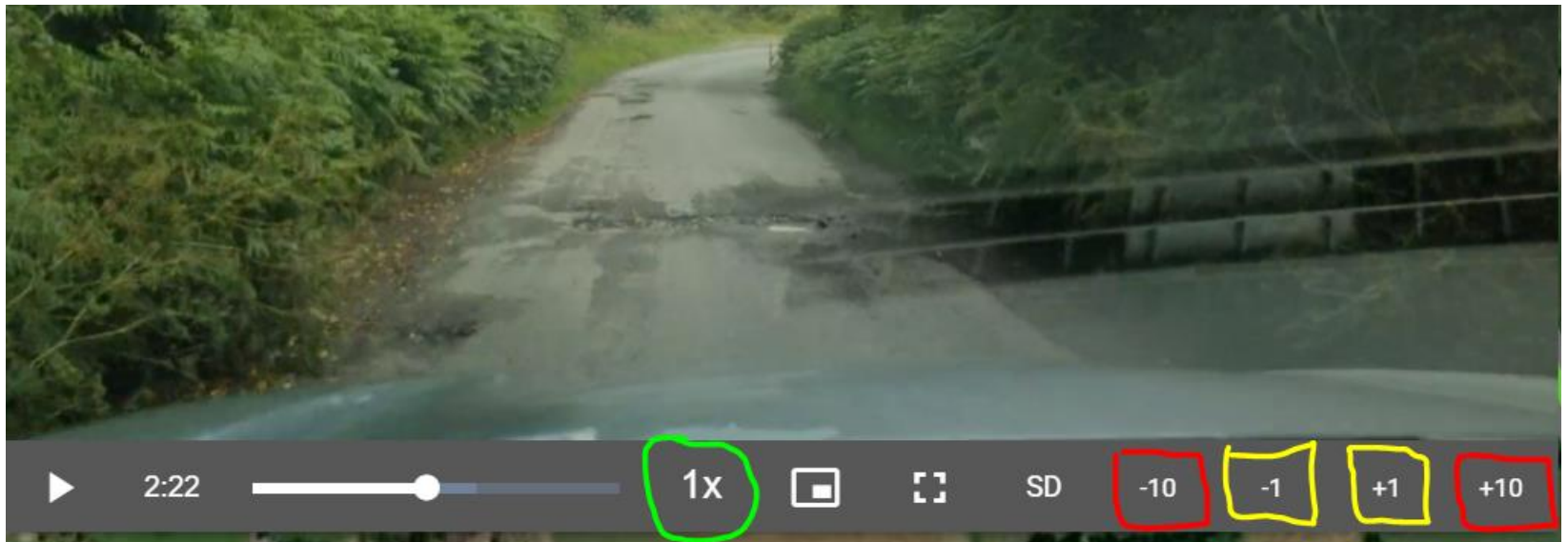
## Useful features

-1 or +1 one frame

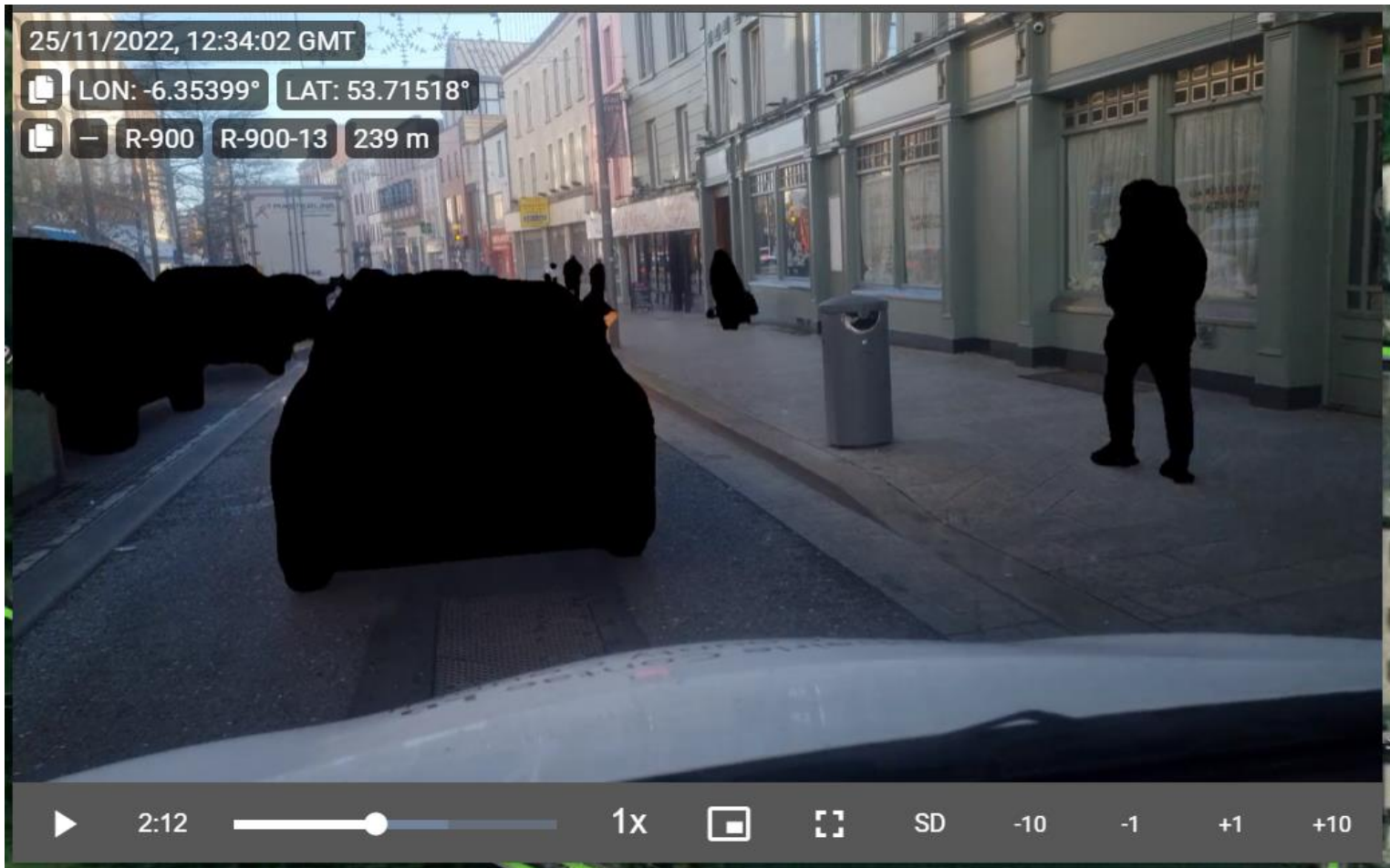
-10 or +10 frames

Video speed

Full screen option






# Anonomised Data



# Overall Phone Status Data

## Summary

TOTAL 5 OPTIMAL PERFORMANCE  3 DEGRADED PERFORMANCE  1 CRITICAL ERROR  1

Device model	 User	Alias						Updated
samsung SM-G991B	 Louth_County_Council_0001	Pat Savage 						5 months ago
samsung SM-G991B	 Louth_County_Council_0002	Mark McArdle TBA 						A month ago
samsung SM-G991B	 Louth_County_Council_0003	Michael Kuc 28-4-23 						2 months ago
samsung SM-G991B	 Louth_County_Council_0004	Michael Kuc 28-4-23 						A month ago
samsung SM-G991B	 Louth_County_Council_0005	Keith Mathews 19-5-23 						7 days ago

# Individual Phone Status Data

Device: 43e98e985693f843

5 months ago

A year ago

Pat Savage

OFFLINE

## LOCATION

GPS	Enabled	✓
Available	–	●
Accuracy	–	●

## BATTERY

Charge	63.00 %	⚠
Temperature	36.20 °C	✓
Status	Discharging	⚠
Plugged	Unplugged	⚠
Health	Good	✓

## UPLOAD

Upload speed	1287.86 kB/s	●
Video files in buffer	1	✓
Sensor files in buffer	0	✓

## CONNECTIONS

## RECORDING USER

## STORAGE



EDIT

CLOSE

## PRO's

- Gives more up to date information than Google Maps which may date back to 2009
- Give evidence for Public Liability Claims
- Using it to assess road condition as part of ranking for CIS schemes
- Gives colour coded outputs for a range of parameters
- Non technical person or student could use it. We had
  - Litter Warden
  - Drivers
  - Overseer's
  - Engineers
- Good customer service from Vaisala staff Henry Brocklehurst and Richard Keep.
- Anonomized data of vehicles and people

# CONs

In the following conditions the video footage may give poor/misleading data

- wet roads
- shadows on roads
- poor light,
- fog
- driving into a low sun,

Straightforward fix: Instruct drivers not to use cameras in these conditions.

Best conditions. Overcast, dry conditions in middle of day

However surveys in very wet weather can be good to give ponding locations.

When there is a ghost island or a median it will only survey one side of the road at a time. Road must be driven in both directions.

Issues with downloading data.

- Connectivity: Sometimes had to be done from office.
- Sometimes simple fix. Vaisala icon not activated

Similar routes tend to be driven repeatedly.

- After a while change camera to different vehicles in different area offices
- Ultimately someone has to be tasked with picking up roads not surveyed.
- A graduate on a work experience program completed the gaps



# Summary

PSCI is a subjective survey and provides surface information only

AI provides an objective survey and information on more parameters namely.

- Overall Road surface condition
- Potholes
- Structural defects
- Surface Defects
- Overall Line marking conditions
- Individual line marking conditions
- Surface water
- Sign conditions

Not fool proof and common sense needs to be used by drivers when recording

A digital twin of the network is produced.

- It is dynamic as it is constantly updating as routes are being driven on a daily basis
- Provides colour coded condition rating of various parameters
- Allows for planned asset management and repair



Comhairle Contae Lú  
**Louth** County Council

Declan Mac Mahon  
Senior Executive Engineer  
Roads and Local Services  
Louth County Council

Email: [declan.macmahon@louthcoco.ie](mailto:declan.macmahon@louthcoco.ie)