



# AM4INFRA

## DELIVERABLE REPORT

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## Publishable Executive Summary

Transport infrastructure is one of the main pillars of European society and economy. The design of infrastructure influences choices of transportation modes and thus is closely linked to social issues such as availability and affordability of mobility, to environmental aspects such as greenhouse gas emissions and nature protection, or health issues.

The purpose of the AM4INFRA initiative is to foster optimization of transport systems by developing and disseminating a common framework and language for the wide variety of European Infrastructure agencies. Part of this exercise is to stimulate mutual learning and understanding of a common idea of life cycle driven asset management through the means of living laboratories (living labs). Learning by doing is a key principle of the AM4INFRA project. For this reason, the project not only provides a framework, tools and guidelines for asset management, but also demonstrates them in practice. This occurs in three ‘living labs’ that provide a learning environment against the backdrop of practical situations on the TEN-T network: the Rome Ring Road (A90), the M4/M25 junction near London, and the E34 section between Antwerp, Eindhoven and Venlo.

These living labs provide a real life context which brings abstract concepts to the ground to practice cooperation on tangible problems.

*The “Living Lab” is a concept which aims to provide the opportunity to embed and verify elements of the AM4INFRA (Asset Management for Infrastructure) framework approach into real life scenarios and practices. This is a dynamic process where continuous learning is assimilated as the project evolves and provides a platform for key stakeholders to engage and collaborate on the long term management and coordination of transport infrastructure planning, investment and communication.*

For AM4INFRA these living labs have a regional specific context where relevant infrastructure problems play out and have been used to discuss and test how our AM4INFRA products would work in reality. So it is meant to test, validate and enrich our products using the specific practical knowledge available in such regional setting. It is not a case study: a case study although it may include actual real life data uses a retro- perspective to study how things worked.

In the context of the AM4INFRA project, three living labs have been held; (i) the Eindhoven Living Lab, (ii) the London Living Lab and (iii) the Rome Living Lab. The living labs cover the three central themes of the project; (i) cross border optimization (the Eindhoven Living Lab – WP1), (ii) cross network optimization through an examination of asset life cycle management and risk based approaches (the London Living Lab - WP2), and (iii) cross asset optimization (the Rome Living Lab – WP3). In total around 100 participants joined these living labs, representing over 20 infrastructure agencies or affiliate organizations.

‘Learning by doing’ is the motto for the AM4INFRA project and the living labs. This motto has certainly been put into practice and as such, these three living labs were initiated the enhancement of cross border optimization, cross network optimization and cross asset optimization in EU areas. Overall the use of living labs is proving to be an inspiring work format as it links abstract concepts to context specific problems and challenges. As the format involves lively dialogues, the results cover a wider array of topics than initially intended. In general however, responses of the participants provided valuable feedback.

The three living labs produced a number of conclusions from both a technical and soft skills perspective. Generally the application of living labs proved to be an avenue for strengthening the cooperation between infrastructure agencies and building a converging growing path provided inspiration, stimulated mutual learning and paved the way to a common language. In the Eindhoven Living Lab, the guidelines for the use of framework architecture for smart governance of transportation networks were validated showing many elements of the applied procedures and it also stimulated the conversation at a cross border level. In the London Living Lab, where Life Cycle Management across the networks was a central theme, dialogues were held bridging the gaps in understanding and approaches by the variety of agencies present. Finally, in Rome Living Lab, a comprehensive debate and approval of the asset data ontology map, delivered fertile ground for further cross-asset network optimization.

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The Living Labs provided stakeholders the opportunity to understand each other’s needs and paradigms and getting acquainted with their counterparts in neighbouring agencies. Follow-up living labs are already planned, beyond the scope of the AM4INFRA project. Taken together the living labs to date showed that these provide a viable and energetic path forward for the wide variety of agencies involved in optimizing our European transport networks. By expanding the scale of application of living labs the legacy of AM4INFRA will be leveraged, and more importantly the learning curve to optimize EU networks will be steepened in a broader sense.

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# 1 Purpose of the document

## 1.1 DOCUMENT STRUCTURE

See table of Contents.

## 1.2 DEVIATIONS FROM ORIGINAL DESCRIPTION IN THE GRANT AGREEMENT ANNEX 1 PART A

### 1.2.1 DESCRIPTION OF WORK RELATED TO DELIVERABLE IN GA ANNEX 1 – PART A

Living labs for three real life situations (cross-asset, cross network, cross border) (M1-24) [leader: RWS; participants: HE, ANAS]. Testing, validating and showing the results in a living lab around three real life situations. Demonstrate the potential of the common language in bringing this in practice in a living-lab which addresses real life fragmented infrastructure situations in need for cross asset, cross modal, cross border thinking and acting.

The living lab will experiment, test and showcase the working of results from step 1 and 2 in work package 1. The real life situations addressed will be selected on the basis of the following criteria:

- Cross asset: This means that a variety of assets will be part of the experiment.
- Cross network in terms of life cycle management and risk based: This means multiple types of interlinked networks will be part of the experiment through an examination of asset life cycle management and risk based approaches.
- Cross border: This means the networks subject to analysis will be of international nature crossing one or multiple borders.

### 1.2.2 TIME DEVIATIONS FROM ORIGINAL PLANNING IN GA ANNEX 1 – PART A

No time deviations from original planning.

### 1.2.3 CONTENT DEVIATIONS FROM ORIGINAL PLANNING IN GA ANNEX 1 – PART A

No content deviations from original planning.

## 2 Introduction / background

Transport infrastructure is the backbone of national economies, providing connections for people and goods, access to jobs and services, and enabling trade and economic growth. This highlights the role of infrastructures as one of the main pillars of European society and economy. Transportation networks are indispensable for the smooth functioning of society acting as important lifelines linking communities and goods. Transport infrastructure is, however, also complex. Decisions about these networks will inevitably have a variety of effects, short- and long-term, and will in their turn influence the use of these networks. Such effects are felt all through the network and will affect neighbouring systems run by different network agencies.

The purpose of the AM4INFRA project is to foster optimization of transport systems by developing and disseminating a common framework and language for the wide variety of European Infrastructure agencies. Part of this exercise is to embrace the *learning by doing* concept and stimulate mutual learning and understanding of a common idea of life cycle driven asset management through the means of living labs. These living labs provide a real life context which brings abstract concepts to the ground in order to practice cooperation on tangible problems.

In the AM4INFRA project three living labs were held; the Eindhoven Living Lab, the London Living Lab and the Rome Living Lab. The living labs covered the three central themes of the initiative; cross border optimization (Eindhoven), cross network optimization in terms life cycle management and risk based (London)) and cross asset optimization (Rome). In total around 100 participants joined these living labs, representing over 20 infrastructure agencies or affiliate organizations.

In this report, an overview and summary of results of these three living labs are provided. The set-up of each living lab followed the local needs, circumstances and priorities, and hence all three settings are very different. Although set against the different regional specific contexts these living labs have a commonality in their use of the AM4INFRA framework and the common language of life cycle asset management. In such way the common language could be tested and improved where needed.

This report initially provides a description of the set-up of the living labs (section 3), followed by a description of the living labs in more detail (section 4, 5 and 6). Each living lab is described in terms of activities, real life context, results and a photo impression. In section 7 the general conclusions of the Living Labs are provided.

### 3 Set-up of three Living Labs explained

The concept of living labs often prompts lively conversations on what these are and how these should be applied. In the AM4INFRA project the concept was seen through the lens of tying abstract concepts to real life context and by doing so providing a setting for learning by doing. More specifically the concept has been derived from the theoretical definition and translated to the AM4INFRA project.

#### Definition Living Lab

A living lab is a research concept. A living lab is a user-centred, open-innovation ecosystem, often operating in a territorial context (e.g. city, agglomeration, region), integrating concurrent research and innovation processes. (Living Labs: Arbiters of Mid- and Ground- Level Innovation. Technology Analysis and Strategic Management, 23(1), 2011 pp. 87-102).

#### For AM4INFRA a living lab means

Living Lab is a concept which aims to provide the opportunity to embed and verify elements of the AM4INFRA (Asset Management for Infrastructure) framework approach into real life scenarios and practices. In other words the labs provide a regional specific context where relevant infrastructure problems play out and which is used to discuss and test how our AM4INFRA products would work in reality. So it is meant to test, validate and enrich our products using the specific practical knowledge available in such regional setting. It is not a case study: a case study uses retro perspective to study how things worked instead of validating and discussing something new in a real life context among involved stakeholders. The living labs support dynamic process where continuous learning is assimilated as the project evolves and provides a platform for key stakeholders to engage and collaborate on the long term management and coordination of transport infrastructure planning, investment and communication.

#### **Cross-asset, cross-network, Cross-border**

The living labs were designed to cover three major themes of the project, namely cross-asset, cross-network, cross-border optimization in terms of performance, risk and cost. These three themes correspond with the three content driven work packages, where Work Package 1 covers cross border issues, Work Package 2 the cross network issues in terms of life cycle management and risk based approaches, and Work Package 3 the cross asset issues. In practical terms respective responsible institutions of each of the work packages managed the set-up and organization of the respective Labs:

|                       |                                   |
|-----------------------|-----------------------------------|
| Eindhoven Living Lab: | Work Package 1, Rijkswaterstaat,  |
| London Living Lab:    | Work Package 2, Highways England, |
| Rome Living Lab:      | Work Package 3, ANAS.             |

The Rome and Eindhoven living labs were both held as one-day events. The London living lab was a two day event. The London living lab was scheduled back-to-back with the Executive Board of the CEDR which allowed many executives to join this living lab. As this was the third living lab in the series, it also provided the opportunity to share the results of the previous labs (Rome and Eindhoven) with the board members of CEDR and other participants. This formal engagement with the CEDR EB through the London living lab contributed to the leverage, impact and dissemination of the project results in AM4INFRA Work Package 4.

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**Dissemination actions**

Shortly after each living lab (one or two weeks) a webinar was held to share, consolidate and disseminate the gained insights. Although the three living labs were held in the national languages, the webinars were conducted in English thereby maximising the opportunities for participation of and by a broader audience. A description of the living lab was also shared through digital newsletters.

The webinars are recorded and can be found at:

<http://www.am4infra.eu/living-lab-a90-rome/>

<http://www.am4infra.eu/living-lab-e34-eindhoven/>

<http://www.am4infra.eu/living-lab-m4-london/>

The newsletters can be found at: <http://www.am4infra.eu/news/>

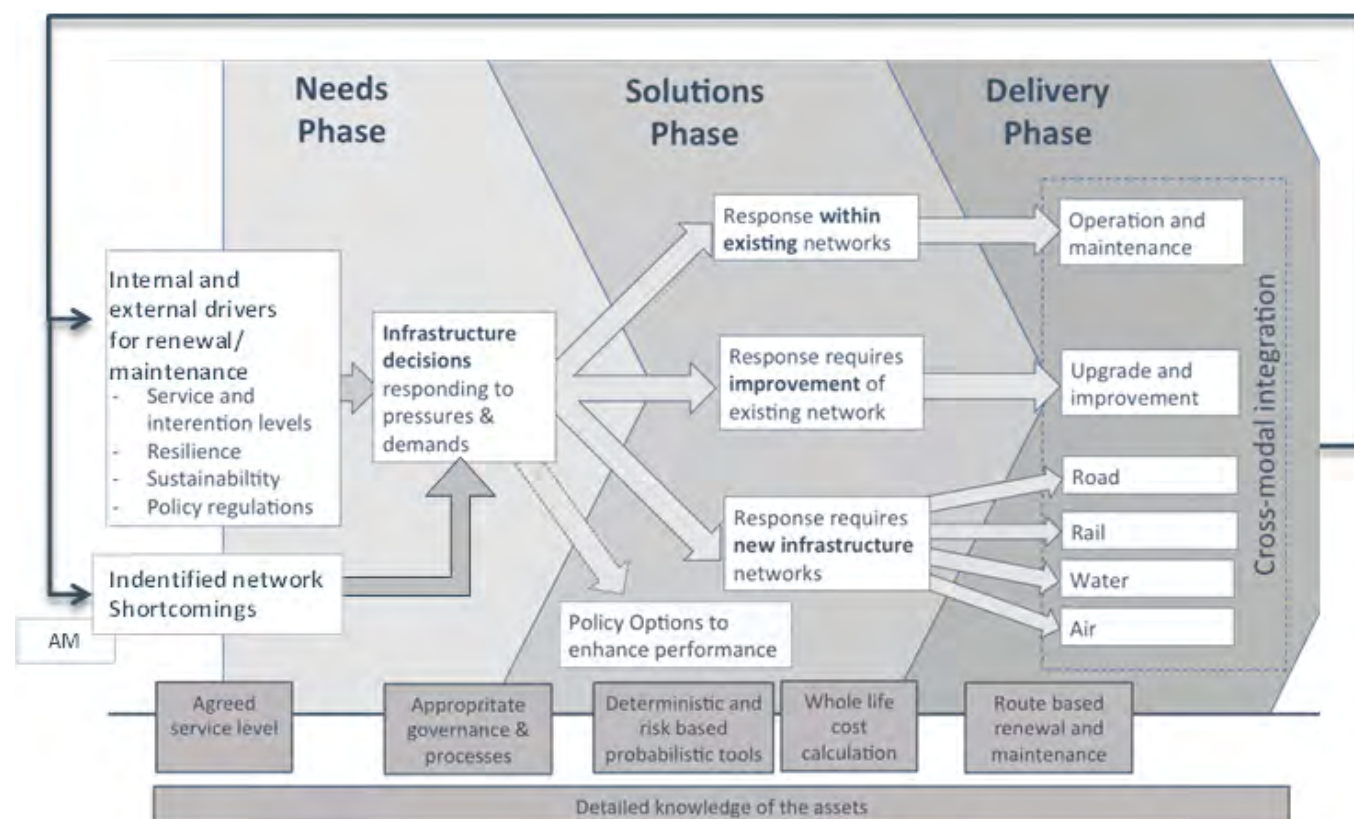
## 4 Living Lab E34-Eindhoven (cross-border)

### 4.1 DESCRIPTION OF ACTIVITIES

The Eindhoven Living Lab took place on the 21<sup>st</sup> of February in Antwerp (B). The focal point of the Eindhoven Living Lab was cross-border optimization. Cross border optimization of networks involves at least two institutions, one at each side of the border. In order to make such optimization possible these institutions should find a smart way to cooperate. This cooperation should aim to find a good balance in coordinating activities to make the networks function together as one entity whilst avoiding adding complexity to the ongoing operations of the individual entities. Managing networks is challenging and requires a balance between meeting the individual needs of the agency versus the more encompassing regional needs of neighbouring NIAs. To find such a balance, the following four questions were addressed:

1. Which **maintenance activities** deliver most value when optimized over the national borders?
2. How can **you ‘cross-border’ optimize these activities** respecting the national institutional settings and systems (e.g. use of metadata and AM building blocks)?
3. What **officers should collaborate** on this in the future to succeed in cross-border optimization?
4. What are **other success factors can be** identified by stakeholders?

These questions played a central role in the Eindhoven Living Lab and were addressed against the background of the Framework (deliverable D1.1) and the Guidelines for the Framework as set out in deliverable D1.2. Figure 4.1 shows the Framework architecture.



**Figure 4.1 :** Framework as provided in Deliverable D1.2 with the three development phases and the 6 building blocks (D2.2).

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The aim of the Eindhoven living lab was to demonstrate and verify the applicability and practicality of the guidelines, and to establish if any further improvements are needed.

The activities for the living lab centred around 6 topics and one overarching theme. The overarching theme was a comparison of asset management maturity, the topics covered:

1. Parking lots for trucks,
2. New infrastructure,
3. Cross-modal city-initiatives (Antwerp, Eindhoven),
4. Maintenance and operation,
5. Data and security,
6. Sustainability.

## 4.2 DESCRIPTION OF THE REAL LIFE CONTEXT E34-EINDHOVEN

### Context

The European route E 34 is part of the United Nations International E-road network. It connects Zeebrugge, the major seaport of Bruges, with Bad Oeynhausen, a German spa town located beside the River Weser at the eastern edge of North Rhine-Westphalia. At Bad Oeynhausen the E 34 links to the E 30, a major pan European east-west artery. It also passes, relatively briefly, through the Netherlands, following the southern by-pass of Eindhoven. Within Germany the route follows from south-west to north-east the full length of North Rhine-Westphalia. The section of interest for this living lab is the section linking the Antwerp region through the Netherlands up to Venlo (NL).

### Current Issues

The section of the E34 under consideration is a key European route which is heavily used by freight trucks. Congestion is the key issue on this route in all of the three countries. Typically the quality of the road is varying from place to place and does not seem to be aligned well along the international route. Moreover the transit traffic interacts with local and regional traffic and induces regional mobility problems. Access of trucks to Germany is restricted in the weekends, parking availability along the road is not always sufficient. Additionally the use of the route seems to be affected by policy actions in Belgium where toll system for trucks was implemented. With regard to Work Package 1 the cross-border optimization typically plays out here. The service level optimization over the route is not balanced which means that it is not clear if the cumulative spent resources deliver optimized results over the entire route.

### Key Stakeholders

The two responsible road agencies for the stretch of cross-border road under consideration are: AWW of Flanders and RWS of the Netherlands. Although a much wider variety of other stakeholders are involved along this route, the primary focus in the living lab is on the dialogue between these two major network operators.

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Figure 4.1: Context of the Living Lab Eindhoven

## 4.3 RESULTS

The results of the Eindhoven living lab have been defined by the participants. These results have been shared through a webinar which was open for a wider audience (in English). In summary the Eindhoven Living lab delivered the following results:

### Conclusions for E34 context

1. Need for cross border alignment for:
  - a. Planning of renovation works
  - b. Future functionality
  - c. Truck parking facilities
2. Joint Opportunity (-and issues) map
3. Get cross-border acquainted
4. Shortlist of priorities and required participants for follow up Living Labs

### General Conclusions

1. Cross-border issues are not isolated elements (not in time, not in type of work, not in institutional players)
2. Cross-border issues easily propagate deep into national networks (alternative routes/cross modal solutions/parking facilities)
3. Be aware of Institutional asymmetry (mandate, responsibility, work culture etc)
4. Language is important (by meaning and terminology)
5. Cross border dialogue has been stimulated

## 4.4 PHOTO ILLUSTRATION OF EINDHOVEN LIVING LAB



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## 5 Living Lab London (cross-network)

### 5.1 DESCRIPTION OF ACTIVITIES

The London Living Lab took place in Old Windsor, close to London’s Heathrow airport on 8-9 March 2018. The living lab was organized as a two-day session back-to-back to the CEDR Executive Board meeting. The executives joined the Living Lab. The program covered the following topics:

1. Results of the Rome Living Lab
2. Results of the Eindhoven living Lab
3. Living Lab London:
  - a. Purpose
  - b. Location
  - c. Structure
4. Session on requirements of key infrastructure asset owners
  - a. M25 (DBFOContract)
  - b. Transport for London (TfL)
  - c. Project 13 – BIM (The Institution of Civil Engineers)

Day 2: Six table based workshops and Living Lab legacy: input was gathered from the CEDR Executive Board together with an outlook of the topics.

### 5.2 DESCRIPTION OF THE REAL LIFE CONTEXT

M4 motorway is the main strategic route between London, the South West of England, and Wales. It connects directly to the M25 motorway and Heathrow Airport.

Key issues in place are:

- Heavy congestion (traffic) on the Strategic Road Network resulting in poor journey reliability,
- Regular maintenance works planned along the route,
- Construction of a Smart Motorway scheme (hard shoulder becomes a running lane and bridge/lane widening where required).
- Endeavouring to meet transport network users needs

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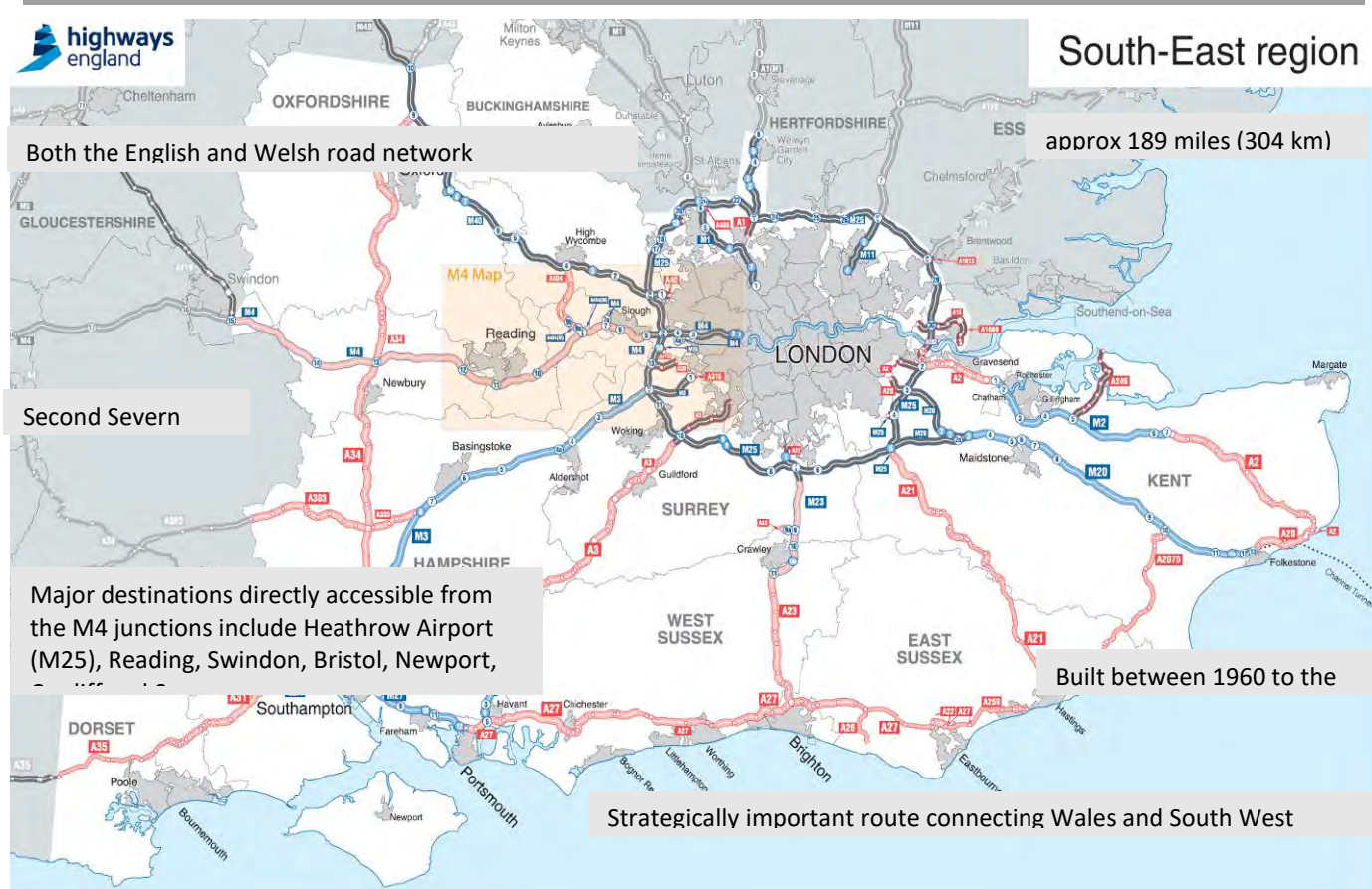


Figure 5.1: Wider context of the London Living Lab

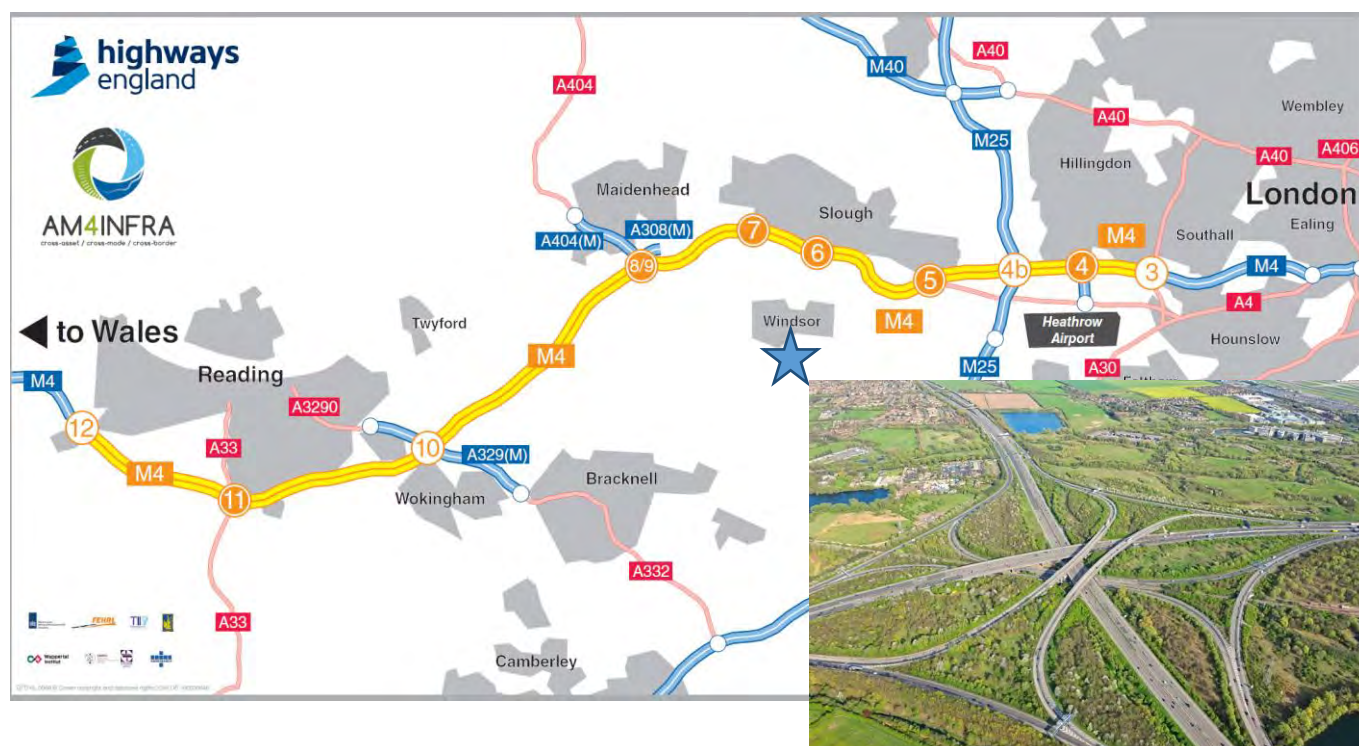


Figure 5.2: M4 focal point of London Living Lab

## 5.3 RESULTS

The results of the London Living Lab have been defined by the participants including the attending CEDR executive board attendees. These results have been shared through a webinar which was open for a wider audience (in English). The results are a reflection of responses of the key stakeholders and the dialogues held in 6 groups covering a wider set of themes. In summary the London Living lab delivered the following results:

### Key responses from Stakeholders

There were three key themes covered in the workshop, i.e.

- (i) Transport for London (TfL): Surface Transport uses a risk based approach to compare and prioritise investment across a diverse range of assets.
- (ii) M25 DBFO PPP project: Contract terms for asset management (AM) and the payment mechanism help drive the good approaches to AM investment and whole lifecycle thinking (WLC; lane availability, road condition, route performance, exceptional circumstances and critical incident adjustments).
- (iii) Project 13\*: BIM and asset management maturity: Project 13 has focus to deliver a step change in the way projects are managed so that the focus is on long-term value not simply lowest cost (\*this project is sponsored by UK’s Institution of Civil Engineers).

### Results from Living Lab London Dialogue sessions:

Living Lab London Dialogue sessions: participants worked in 6 small groups to discuss 10 dialogue. The 6 AM4INFRA framework Building Blocks were included in the exercise and key themes were: Lifecycle renewals/whole life costs; and Risk based approach to asset management.



Figure 5.3: Life cycle management and risk based approach framework – Six Building Blocks

The following are some questions asked and the feedback gathered. They were suitably structured to get informative reactions.

*Q: How would you prevent an operating company from performing transportation assets at their best from a Whole Life perspective?*

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- Lack of scrutiny or follow up
  - Don't provide useful tools or information
  - Don't talk to each other
  - Create boring processes with no financial incentive
  - Don't provide suitable funds and impose budget constraints
  - Don't consider performance and make sure specification stops any innovation
  - Focus on short term measures and maximise political interference

*Q: Choose 3 phrases/words from sheet that intrigue you as a group and discuss their meaning and implications*

- Efficiency: bring knowledge between authorities and industry to the same level. Issue of regulatory frameworks holding back new thinking.
- Sustainability: empty word, very political. Understanding is varied.
- Sensors, Machine learning, Artificial Intelligence: too much data? Objective trigger points for intervention. Big data, social media can have big impact, predictions on processes relating to network.

*Q: “Current software providers provide cost effective software for Asset Management Systems” Discuss this as a group. Is it true?*

- NOT TRUE: Early stage is growing
- NOT TRUE: No one has tested these systems, mainly because of lack of discussions with stakeholders during the development stage of software
- NOT TRUE: Different organisations as different network - bespoke systems required

*Q: How much freedom do you have to invest money in assets to help deliver the best Whole Life Cost?*

- 3 enemies of roads: water, trucks, and minister of finance!
- Project conditions culture rules in an organisation
- Investment, extraordinary maintenance, and ordinary maintenance have different, non-integrated budgets
- Might be difficult to influence as the funding is from ONE POT
- Gov't: constraints on capital cost; budgets size decided in silos

### **General conclusions Living Lab London**

- The Lab provided a good opportunity to discuss detailed topics and learn from each other
- Helped understanding of the practical links between the 6 building blocks (data, systems/tools, organisations and WLC and managing risk)
- Management level / strategic systems are important influence on the effectiveness of asset management, not just operational and tactical levels.

## 5.4 PHOTO IMPRESSION LIVING LAB LONDON



## 6 Living Lab Rome (cross-asset)

### 6.1 DESCRIPTION OF ACTIVITIES

On 31<sup>st</sup> January 2018 ANAS organised the Rome Living Lab A90 at the ANAS headquarters, according to the scheduled activities of AM4INFRA. The proposed goals of the Rome Living Lab, as per the project description of activities and the Grant Agreement were the following:

- To identify a specific road stretch of a TEN-T itinerary in order to perform an on field application for the designed asset management information system model,
- To perform on the selected itinerary a case study regarding the application of asset information management system,
- To collect results and lesson learnt from case study outcomes,
- To identify possible additional user and functional requirements to update the asset information management system BBP,
- To collect any possible input from the stakeholders on the living lab.

The core of activities of the Living Lab are captured from two round-table sessions:

#### Round Table with the stakeholders – Part 1

Proof of concept of the deliverables of WP3:

- a) Asset Information Management Core System Ontology map
- b) System functionality and architecture

#### Round Table with the stakeholders –Part 2

Simulation of a data collection and integration shared environment, related to the mobility on the GRA including different road stretches:

- a) Assessment of the GRA context for different asset managers
- b) Asset data analysis
- c) Proposed multi-operator PFIs: discussion and proposals
- d) Introduction to scenarios based on the sharing of key information and KPIs

### 6.2 DESCRIPTION OF THE REAL LIFE CONTEXT

**Context:** The ring road of Rome is the real life context for the Living Lab Rome. This ring road is 68 km long and serves over 100.000 vehicles a day. Figure 6.2 shows the map of the ring road. This road plays a key role for the accessibility of the inner city with over 30 junctions providing access to it. Particularly at play in this living lab is the variety of road agencies involved.



Figure 6.1: Map of the ring road of Rome

#### Current Issues:

Extensively used road, vital for Rome and wider urban area

Highly interlinked with a variety of networks operated by a variety of agencies

Potential for improvement through systematic refinement and balancing of performance of assets.

**Key Stakeholders:** The following list involves the toll authorities, the road agencies, the public broadcasting company as well as the public sector involved in the Rome Living Lab and provides their interactions.

- AISCAT - Association of the Toll Concession Companies of Italy
- Autostrada dei Parchi - Private concessionaire company responsible for the operation and management of 281 km of toll motorway, including the Eastern road section getting to Rome downtown
- ASTRAL - Public operator of the non-tolled roads and motorways belonging to the Lazio Region
- Municipality of Rome - Municipality of Rome, Department of Roads
- ANAS - Headquarters Public concessionaire company responsible for designing, building and operating the road and highway “network of national interest” (24.000 km throughout Italy) and the Regional office of the Lazio Region Department of ANAS responsible for operating the Rome Ring Road (A90-GRA), the Rome-Fiumicino airport motorway and some other 500 km of ordinary roads, including two penetration stretches to Rome downtown
- RAI - National public broadcasting company

## 6.3 RESULTS

The results of the Rome living lab have been defined by the participants and a summary of the Rome Living lab delivered the following results:

*Conclusions for WP3 approach and methodology:*

- a. A comprehensive debate on the ontology map, which has been approved by the IT people who have been able to discuss it;
- b. Some 2-3 specific suggestions related to the ontology map that is going to be included in the final report:  
Ontology Map: “Risk” concept to be connected also to maintenance works and levels of service (LoS), introducing a double view for risk (asset oriented and road user oriented);  
Asset Data Dictionary: new datasets to be introduced in the asset inventory data group, considering elements related to telecommunication and ITS systems installed on the network.

*The road itinerary based on a common AM-LCC approach:*

- c. The agreement on the corridor and the criteria of the case study;
- d. A first identification of constraints/threats with respect to the common approach.

*The agenda for the activities to be carried out before new meeting of the living lab group:*

In this follow-up meeting the results will be further elaborated. This meeting is planned to be held on the 11<sup>th</sup> of April in Rome.

## 6.4 PHOTO IMPRESSION LIVING LAB ROME



## D1.3 – Three Living Labs: ‘Learning by Doing’



## 7 General Conclusions Living Labs

‘Learning by doing’ is the motto for the Living Labs of the AM4INFRA project. This motto has certainly been put into practice. Overall the use of living labs proved to be an inspiring work format as it linked abstract concepts to context specific problems and challenges. As the format involved lively dialogues, the results did at time cover a wider array of topics than initially brought in. In general however, valuable feedback was gained from the interaction with and between participants. One common denominator was that it all starts with getting acquainted with one another, with colleagues at the neighbouring network agency, and finding common ground to make further steps. In such way the living labs provided fruitful ground to make these first steps.

Generally the application of living labs showed to be an avenue for strengthening the cooperation between infrastructure agencies and building a converging growing path provided inspiration, stimulated mutual learning and paved to way to a common language. In the Eindhoven Living Lab, the guidelines for the use of framework architecture for smart governance of transportation networks were validated showing many elements of the applied procedures and it also stimulated the conversation at a cross border level. In the London Living Lab, where Life Cycle Management across the networks was a central theme, dialogues were held bridging the gaps in understanding and approaches by the variety of agencies present. Finally, in Rome Living Lab, a comprehensive debate and approval of the asset data ontology map, delivered fertile ground for further cross-asset network optimization.

As was clear from the start, these Living Labs were seen as a kick-off of a more enduring effort. Follow-up living labs are already planned, beyond the scope of the AM4INFRA project. For the involved institutions and their representatives this was seen as a viable path to further enhance cooperation and optimization of networks. Preferably the scale of application of living labs were to be expanded as a means of leveraging the legacy of AM4INFRA, and more importantly as a means to optimize EU networks in a broader sense and to steepen the learning curve. To ensure consolidation of results and further expansion of reach and effect it is recommended to continue on this path. Further concretisation of this continuation is under preparation and consideration of the CEDR network and associated partners. Taken together the living labs to date showed that these provide a viable and energetic path forward for the wide variety of agencies involved in optimizing our European transport networks.