CEDR

Conférence Européenne des Directeurs des Routes

Conference of European Directors of Roads

SAFELUX

The Light We Need (2024)

(SAFELUX)

Quality Plan

Deliverable: D1.5

Date: 16 December 2025

AECOM

Newcastle University

Haskoning Enhancing Society Together

AETHON ENGINEERING

CEDR Research Call (2024)

SAFELUX

Road Lighting – The Light We Need

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Reviewer List

Name	Role
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Approval List

Name	Role
E. J. Fjeldaas	Chair of the Programme Executive Board of the CEDR Call 2024 The Light We Need
E. De Bisschop	CEDR PEB Project Manager for SAFELUX

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INTRODUCTION

SAFELUX is a consortium, including AECOM, Haskoning, AETHON, and Newcastle University that is conducting research to deliver good practice on reducing the impact of road lighting on diverse aspects of the environment whilst maintaining road safety. The project is part of the CEDR 2024 Research call.

SAFELUX is reviewing existing research and practices based upon available data and experience in an agile approach to define, gather, analyse and deliver new guidance for National Road Authorities**.**

Purpose

The purpose of this Quality Plan is to outline the processes and procedures to ensure that the project is compliant with the Definition of Research Needs (DoRN), delivers what is promised within the SAFELUX Submission Part A, is compliant with the requirements of the Research Services Agreement and ultimately all deliverables are suitably quality controlled. This quality plan is a live document and will be updated as required.

Reference documents

The following documents define the requirements, deliverables and the commitment to deliver the SAFELUX project and should be read in conjunction with this Quality Plan:

Ref 1.	Description of Research Needs
Ref 2.	Research Services Agreement
Ref 3.	SAFELUX Submission Part A
Ref 4.	Consortium Charter
Ref 5.	Consortium Memorandum of Agreement

1 PROJECT DEFINITION

The CEDR DoRN outlines key aims and objectives and defines the expected outputs of the research, as summarised in the following sections.

1.1 Aims and Objectives

The CEDR Call 2024 set out the challenges NRAs are facing and the need for evidence-based guidance to understand, balance, and support decision making. The SAFELUX team fully understand this lighting dilemma, and our objectives are to:

- Provide a strong body of evidence on the impacts of road lighting on the environment, road safety and energy consumption/light emissions.
- Provide practical guidance on the implementation of sustainable road lighting across Europe's roads, facilitated through a digital tool.
- Target measures to reduce illumination impact on nature, mitigating skyglow, improving road safety and reducing energy consumption.
- Provide a holistic approach and pilot selected use cases with two host NRAs.

SAFELUX will investigate questions such as:

- What are the true impacts of light pollution on nature?
- How can we decrease or mitigate the negative impacts of light pollution on nature?
- How do current national and international standards impact on options available?
- What measures can be adopted to improve energy efficiency? And what adverse impact may they cause?
- How can the cost of installation and operation be reduced without compromising safety?
- What guidance already exists, and is it still valid?
- What is the impact on road users and the community?

1.2 Deliverables

The expected outputs are:

- **Practices and Research** – provide a comprehensive review of practices and research across road authorities and other domains on how to decrease the negative impacts of light pollution on nature.
- **Guidelines –** show how different tools can reduce light pollution and help balance biodiversity, energy efficiency, and road safety.
- **Pilot Project** – test new ways to reduce light pollution and energy use whilst maintaining road safety.
- **Final Programme and Conference** – to bring together the findings and recommendations of the project to enable successful implementation.

1.3 Project Scope

The CEDR SAFELUX Submission Part A outlines the scope of the project and the proposed approach to be adopted by the project team. As a high-level overview, SAFELUX will be delivered using the work packages and approach outlined in Figure 1.

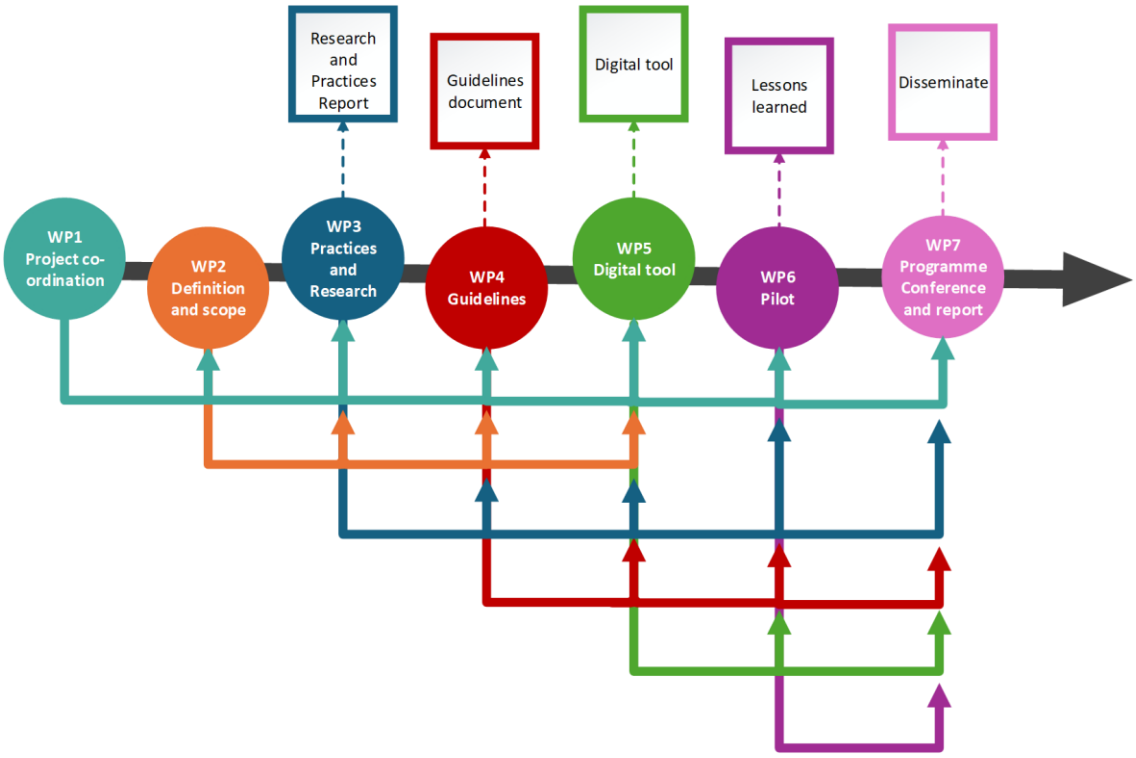


Figure 1. SAFELUX methodology and structured approach.

2 ROLES, RESPONSIBILITIES AND GOVERNANCE

2.1 Project Contact List

The following outlines the contacts for the key roles and those responsible for specific project activities:

Role	Organisation	Name	Contact email
Project Coordination	AECOM	Scott Stephenson	scott.stephenson@aecom.com
Lead Verifier	AECOM	Jamie Uff	jamie.uff@aecom.com
WP1 – Project Co-ordination	AECOM	Scott Stephenson	scott.stephenson@aecom.com
WP2 – Definition and scope	AECOM	Scott Stephenson	scott.stephenson@aecom.com
WP3 – Practices and Research	Newcastle University	Darren Evans	darren.evans@newcastle.ac.uk
WP4 – Guidelines	Haskoning	Daan Lagerberg	Daan.lagerberg@haskoning.com
WP5 – Digital Tool	AETHON	Alexandros Papacharalampous	a.papacharalampous@aethon.gr
WP6 – Pilot Delivery	Haskoning	Shubham Soni	shubham.soni@haskoning.com
WP7 – Programme conference and report	AECOM	Scott Stephenson	scott.stephenson@aecom.com

2.2 Project Organisation

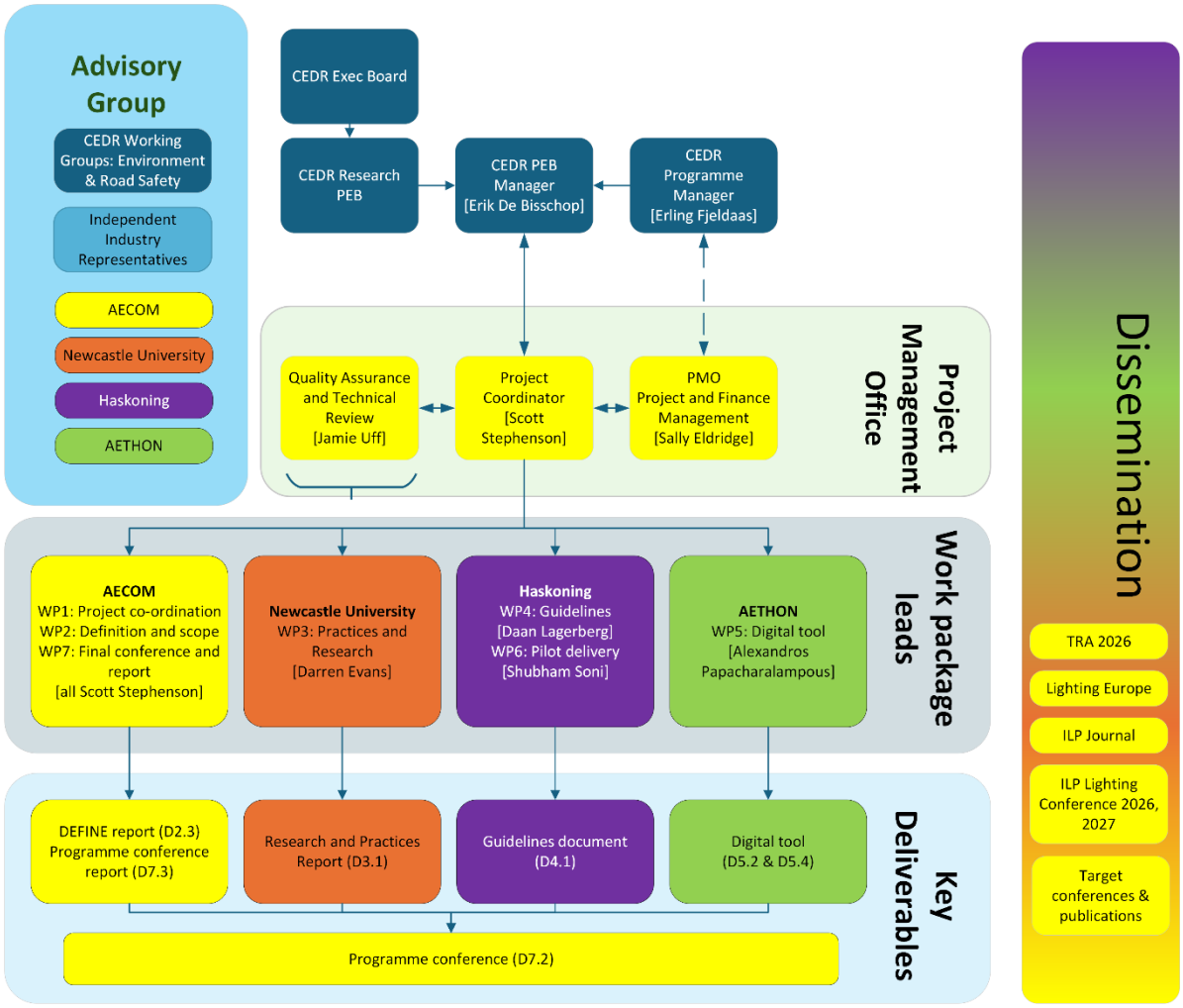


Figure 2. SAFELUX project consortium and CEDR delivery structure.

2.3 Project Management

The programme can be found in Appendix A and reflects proposed changes to milestones and deliverables as discussed during the project kick-off and subsequent PEB PM meetings.

- The programme will be reviewed across the SAFELUX team at monthly progress meetings.
- The programme will be reviewed with the PEB PM at monthly progress meetings.
- The programme is available to the PEB through the PEB PM.

2.4 Schedule of Key Milestones and deliverables

The schedule of milestones and deliverables is provided in detail in Appendix B.

At project kick-off the PEB requested an adjustment in the schedule of delivery to accommodate adequate review time and less congestion in the number of documents submitted in any single month. In addition, Deliverable D3.1 was moved to January to allow adequate time to perform the work. The updated schedule of deliverables and milestones was subsequently shared with the PEB.

To assist with PEB planning and to achieve these milestones and deliverables, at the start of each work package a more detailed schedule will be agreed with the PEB regarding the following:

- Deliverables:
    - Date of issue of first draft for PEB review.
    - Length of review period for PEB (default is 2 weeks).
    - Date of issue of final version.
- Proposed scheduling of workshops and meetings with PEB or Knowledge Network.

3 PROGRESS REPORTING

3.1 Progress Reporting – Reports

Project progress is tracked using the following documents, to be produced alongside the monthly progress meetings:

- Monthly progress Dashboard (see example in Appendix C).
- Monthly PEB progress meeting minutes.
- PEB progress meeting Rolling Action Tracker.
- SAFELUX programme chart (see example in Appendix A).
- Risk register (see example in Appendix E).

The latest versions of these documents are shared with the PEB at least 48hrs prior to the monthly PEB Progress Meeting.

Each work package leader contributes to the monthly Dashboard progress report using a standard proforma, see example in Appendix C. This provides in-month progress including percentage complete against each milestone and deliverable, as well as tracking whether the overall work package is complete/on track/issues-monitor/action required. The report also looks ahead at planned activities for the following month and captures emerging risks and opportunities, and any future dissemination opportunities to promote the project.

Important items from this report are then discussed at the monthly progress meetings.

3.1 Progress Reporting – Meetings

Two monthly progress meetings are held:

- A SAFELUX work package leaders progress meeting.
- A SAFELUX PEB progress meeting.

A ***SAFELUX work package leaders progress meeting*** is held once per month to discuss project progress and compile the monthly Dashboard progress report ahead of the monthly SAFELUX PEB progress meeting. The SAFELUX WP leaders meeting will typically be on the 3rd Friday of the month, where items discussed will include:

1. Progress reporting
2. Programme management and planning
3. Budget reporting and planning
4. PEB planning/reporting/feedback
5. Risk Management
6. Advisory Group / Project Partner Engagement
7. AOB

This standard agenda will develop as the project progresses, avoiding any distraction with current technical matters that are dealt with in other dedicated technical meetings.

Approximately one week later, a dedicated ***SAFELUX PEB progress meeting*** will be held (typically on the 4th Thursday of the month). This provides continuity of reporting from the work package leaders progress meeting in the previous week, allows for emerging items for discussion to be elevated quickly, and supports improved future PEB planning.

The following will be invited to the monthly SAFELUX PEB progress meeting:

- CEDR Call 2024 Programme Manager (Erling Johannes Fjeldaas).
- SAFELUX PEB Project Manager (Erik De Bisschop).
- CEDR Programme Manager (Naida Muirhead).
- SAFELUX Project Coordinator (Scott Stephenson, AECOM).
- SAFELUX Project Management support (Anna Jackson, AECOM).
- Active SAFELUX WP leaders.

In addition, all SAFELUX PEB Progress Meetings remain open to all PEB members who wish to attend.

The Project Coordinator will produce minutes and actions from the PEB PM and issue to the PEB PM within one week.

3.2 Project Cost and Risk Management

3.2.1 Cost Management

In compliance with the Research Services Agreement, the invoice profile of the project is based upon accepted deliverables and achievement of milestones. The cost profile of each of the partner organisations is outlined in SAFELUX Submission Part A and B. The spend profile is also outlined on the payment schedule (see Appendix D), which is a constituent part of the monthly progress report.

This enables the project coordinator to monitor progress on an “earned value” basis and compare against reported progress and therefore able to identify early signs of any performance issues.

The monthly report also provides an indication of progress against CEDR’s invoice/payment stages, the project programme, and any significant variation from the expected profile.

3.2.2 Risk Management

The project team have implemented a comprehensive risk management process, which looks to identify risks and opportunities such that they can be resolved at the earliest opportunity. A master risk and opportunity register (see example screenshot in Appendix E) is managed by the programme manager, with any risks that may constitute a change in scope being escalated, as per an agreed contingency risk process.

Risks and opportunities can be raised either by:

- Work package monthly Dashboard report (see Appendix C)
- By individuals during/following technical/progress/PEB meetings

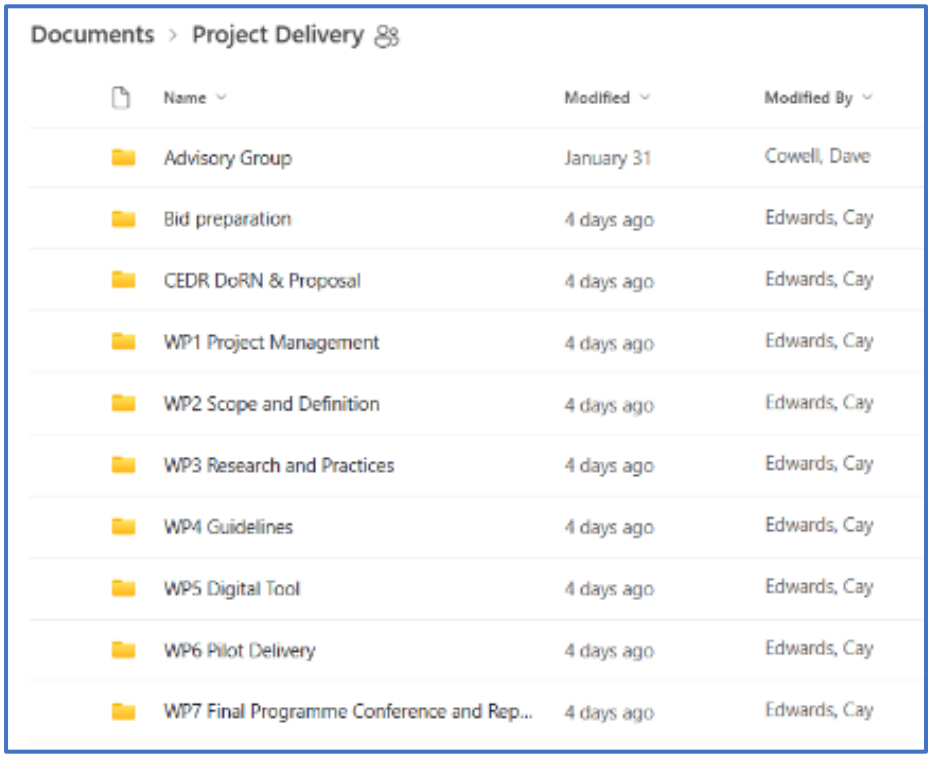
High level risks are then reviewed monthly at the progress meeting by the project partners and the overall list monitored and managed by the project coordinator on a weekly basis.

4 PROJECT DOCUMENT MANAGEMENT AND COMMUNICATION

The use of Microsoft TEAMS supports the geographic dispersion of the project team for means of communication and document management.

4.1 Project document management

A project specific folder structure has been developed on TEAMS which provides open accessible storage for working documents and deliverables, as per the area of work:



Documents > Project Delivery

Name	Modified	Modified By
Advisory Group	January 31	Cowell, Dave
Bid preparation	4 days ago	Edwards, Cay
CEDR DoRN & Proposal	4 days ago	Edwards, Cay
WP1 Project Management	4 days ago	Edwards, Cay
WP2 Scope and Definition	4 days ago	Edwards, Cay
WP3 Research and Practices	4 days ago	Edwards, Cay
WP4 Guidelines	4 days ago	Edwards, Cay
WP5 Digital Tool	4 days ago	Edwards, Cay
WP6 Pilot Delivery	4 days ago	Edwards, Cay
WP7 Final Programme Conference and Rep...	4 days ago	Edwards, Cay

Figure 3. MS TEAMS folder structure.

4.2 Project Communications

4.2.1 Internal communication

The project team quickly adopted TEAMS chat, email and online meetings to facilitate the technical development of the project and monthly reporting.

4.2.2 External communication

As part of WP1, a stakeholder engagement plan has been developed. outlines the approach of how and who we will and intend to engage with during the project. The plan delivers a clear overview of the proposed stakeholders, and the optimal method for engaging with them.

4.2.3 External Publications

Any project reports or ad-hoc documents will arise throughout the progress of the project. CEDR have firm guidelines in terms of material going into the public domain or to other audiences, such as academic papers. A publication protocol has been developed, as requested at the PEB kick-off meeting (see Appendix F).

The project has committed to make all research material available to all through an online platform. CEDR have requested a route access to the material. It is envisaged that project generated material will be subject to this protocol.

5 QUALITY OF DELIVERABLES

SAFELUX recognise the CEDR reputation and the need to provide quality in delivery. Therefore, a quality management process, based upon AECOM's own ISO accredited processes, is being adopted.

The quality assurance steps are outlined below and replicated in the publication protocol process (see Appendix F):

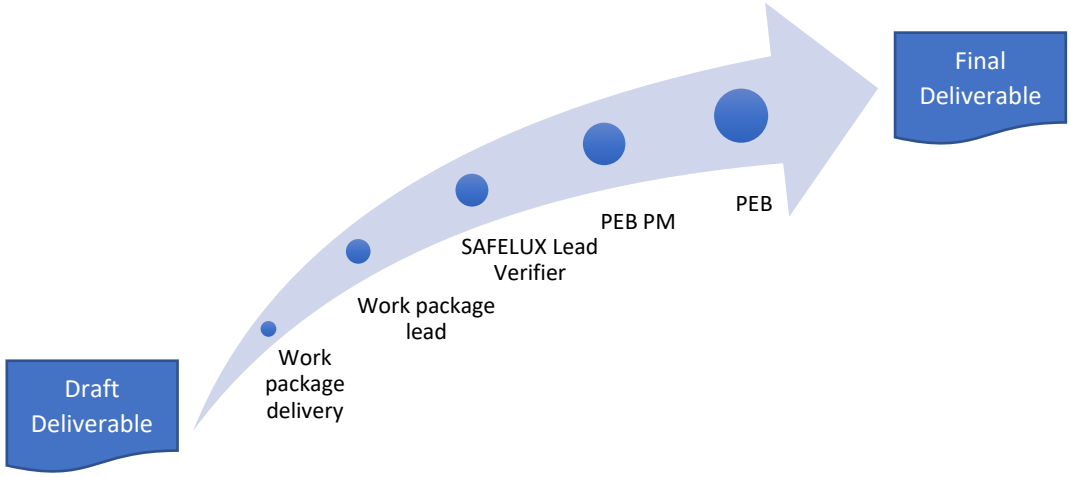
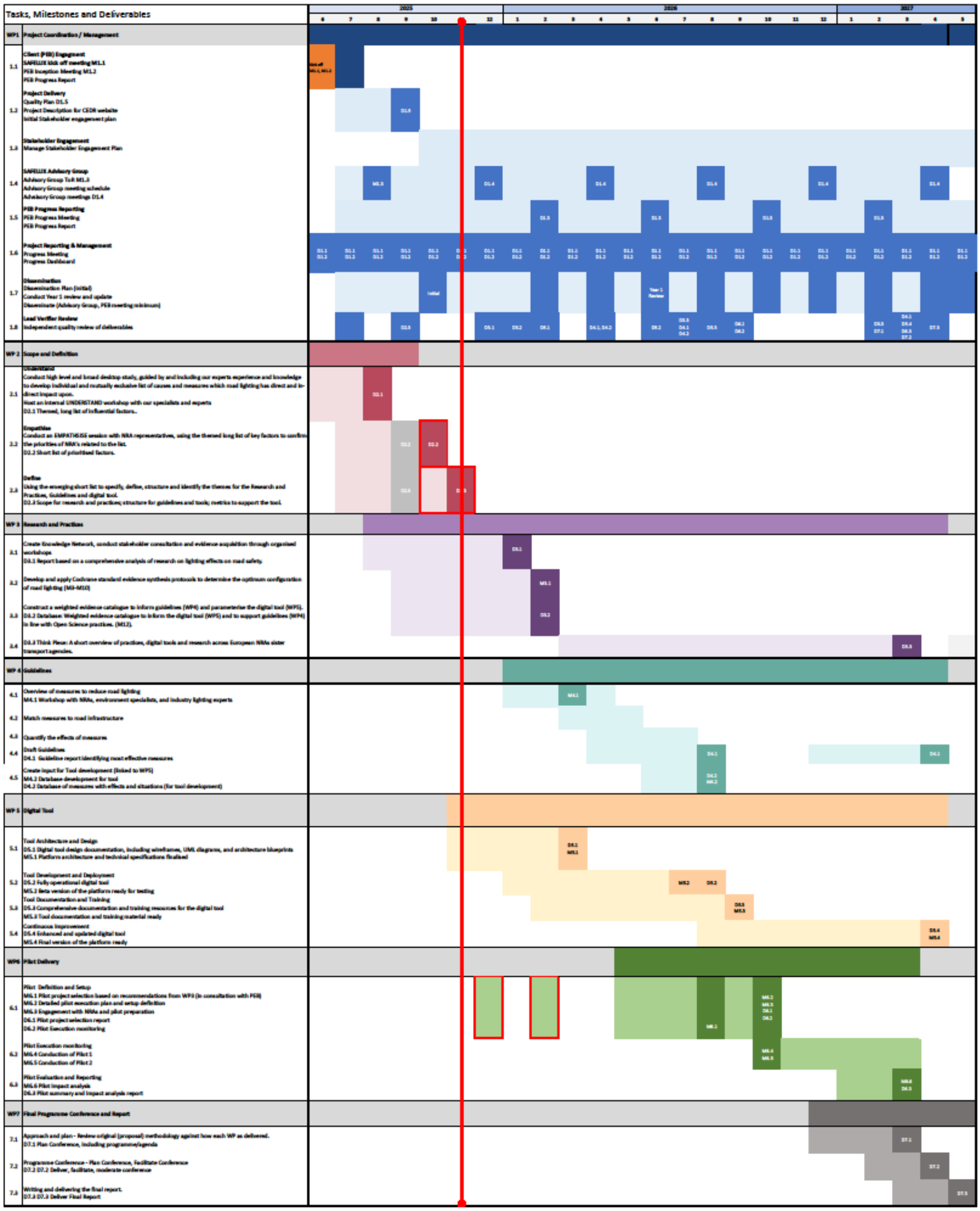


Figure 4. Quality assurance steps.

6 APPENDIXES

Appendix A – Programme (updated November 2025)



Appendix B – Schedule of Milestones and Deliverables (updated November 2025)

The following table illustrates the milestones and deliverables as scheduled within the SAFELUX Submission Part A and incorporating the proposed changes following project kick-off.

Milestones

No	Milestones	Original due date	Revised due date	Conflicts
1	**M1.1: Project Kick-off meeting** - Initial meeting of consortium to reconfirm roles, responsibilities, resourcing, finances and agree programme and initial tasks	Jun-25		
2	**M1.2: PEB Inception meeting** - First meeting with the PEB to introduce the consortium, review the proposal, gather initial feedback (to inform quality plan), review risk register and programme, confirm PEB PM and PEB meeting schedule.	Jun-25		
3	**M1.3: Advisory Group meeting** - Confirm Advisory Group membership, Terms of Reference and schedule meetings with the group.	Aug-26	Dec-25	Swiss National Day (Switzerland) - August 1st, August Bank Holiday (Ireland) - August 7th, Assumption Day (Belgium) - August 15th, Summer Bank Holiday (UK) - August 28th
4	**M4.1:** Workshop with NRAs, environment specialists, and industry lighting experts.	Mar-26	Jan-26	St. Patrick's Day (Ireland) - March 17th. Brought forward to align with PEB meeting
5	**M4.2:** Database development for tool.	Aug-26		Swiss National Day (Switzerland) - August 1st, August Bank Holiday (Ireland) - August 7th, Assumption Day (Belgium) - August 15th, Summer Bank Holiday (UK) - August 28th
6	**M5.1:** Platform architecture and technical specifications finalised.	Mar-26		St. Patrick's Day (Ireland) - March 17th
7	**M5.2:** Beta version of the platform ready for testing	Jun-26		June Bank Holiday (Ireland) - June 5th
8	**M5.3:** Tool documentation and training material ready.	Jul-26		National Day (Belgium) - July 21st
9	**M5.4:** Final version of the platform ready.	Apr-27		Good Friday (Netherlands, Switzerland, UK) - April 7th Easter Monday (Belgium, Ireland, Netherlands, Norway, Switzerland, UK) - April 10th
10	**M6.1:** Pilot project selection based on recommendations from WP3 (in consultation with PEB).	Aug-26		Swiss National Day (Switzerland) - August 1st, August Bank Holiday (Ireland) - August 7th, Assumption Day (Belgium) - August 15th, Summer Bank Holiday (UK) - August 28th
11	**M6.2:** Detailed pilot execution plan and setup definition.	Oct-26		October Bank Holiday (Ireland) - October 30th
12	**M6.3:** Engagement with NRAs and pilot preparation.	Oct-26		October Bank Holiday (Ireland) - October 30th
13	**M6.4:** Conduction of Pilot 1.	Oct-26		October Bank Holiday (Ireland) - October 30th
14	**M6.5:** Conduction of Pilot 2.	Oct-26		October Bank Holiday (Ireland) - October 30th
15	**M6.6:** Pilot impact analysis.	Mar-27		St. Patrick's Day (Ireland) - March 17th

Deliverables

No	Deliverable / Report title	Original due date	Revised due date	Mitigation
1	**D1.1: Project Team Progress reporting** - Monthly meeting including agenda, minutes, dashboard, programme, risk register, finance. (Monthly)	Monthly		
2	**D1.2: PEB PM Progress reporting** - Monthly meeting including agenda, minutes, dashboard, programme, risk register, PEB feedback. (Monthly)	Monthly		
3	**D1.3: PEB meeting** - Planning and delivery of progress reporting and key work package updates (Every 4 – 6 months)	Every 4-6 months		
4	**D1.4: Advisory Group meeting** - Planning and delivery of independent advisory group meeting (Every 4 – 6 months)	Every 4-6 months		
5	**D1.5: Quality Plan** - A plan of how the project will be delivered reflecting any updated information and clarifications following the PEB Inception meeting. (Month 2)	Aug-25	Sep-25	Extend PEB review to September. This is a project management document which has specific interest to Naida, Erling and Erik so lacks the need for wider involvement
6	**D2.1:** Themed, long list of influential factors	Jul-25	Aug-25	Electronic review of long list by PEB. Extend review period to 3 weeks. Extend process through July and August
7	**D2.2:** Short list of prioritised factors.	Aug-25	Sep-25	Conduct hybrid workshop to review long list. Workshop is suggested to coincide with kick off of the knowledge network. Late August / Early September. Turnaround results as fast as possible
8	**D2.3:** Scope for research and practices; structure for guidelines and tools; metrics to support the tool.	Aug-25	Oct-25	Reliant on short list of prioritised factors and discussion at workshop. Workshop was delayed until 1st Oct.
9	**D3.1:** Report based on a comprehensive analysis of research on lighting effects on road safety.	Aug-25	Jan-26	Should be reprofiled anyway
10	**D3.2:** Database: Weighted evidence catalogue to inform the digital tool (WP5) and to support guidelines (WP4) in line with Open Science practices.	Feb-26		
11	**D3.3:** Think Piece: A short overview of practices, digital tools and research across European NRAs sister transport agencies.	Apr-27		
12	**D4.1:** Guideline report identifying most effective measures.	Aug-26		PEB review into September. This is a critical document for the PEB to review. We will submit the document for review at the end of August 2026, for PEB review in September.
13	**D4.2:** Database of measures with effects and situations (for tool development).	Aug-26		PEB review into September. This is a critical document for the PEB to review. We will submit the document for review at the end of August 2026, for PEB review in September.
14	**D5.1:** Digital tool design documentation, including wireframes, UML diagrams, and architecture blueprints.	Mar-26		
15	**D5.2**: Fully operational digital tool.	Jul-26	Aug-26	Delay to September
16	**D5.3:** Comprehensive documentation and training resources for the digital tool.	Jul-26	Sep-26	Delay to September
17	**D5.4:** Enhanced and updated digital tool.	Apr-27		
18	**D6.1:** Pilot project selection report.	Oct-26		
19	**D6.2:** Detailed pilot execution plan for pilot implementation.	Oct-26		
20	**D6.3:** Pilot summary and impact analysis report.	Mar-27		
21	**D7.1:** Plan Conference, including programme/agenda.	Mar-27		
22	**D7.2:** Deliver, facilitate, moderate conference.	Apr-27		
23	**D7.3:** Deliver Final Report.	May-27		

Appendix C – SAFELUX PEB PM Dashboard

SAFELUX monthly Dashboard

Work Plan Name:	SAFELUX	Month:	
Task Lead:	Scott Stephenson		

1 - Overall project status

STATUS:
On Target
RAG Trend:
=

2 - Work package updates

WP1 Project management	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP2 Scope and definition	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP3 Research and practices	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP4 Guidelines	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP5 Digital tool	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP6 Pilot	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP6 Pilot	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	
WP7 Programme conference	
Ongoing activities & discussions	
Actions	
Decisions for the PEB	

3 - Work Plan Milestones & Deliverables

D1.1	Project Team Progress reporting	On Target	0%
D1.2	PEB PM Progress reporting	On Target	0%
D1.3	PEB meeting	On Target	0%
D1.4	Advisory Group meeting	On Target	0%
D1.5	Quality Plan	On Target	0%
M1.1	Project Kick-off meeting	On Target	0%
M1.2	PEB Inception meeting	On Target	0%
M1.3	Advisory Group meeting	On Target	0%
D2.1	Long list of influential factors	On Target	0%
D2.2	Short list of prioritised factors	On Target	0%
D2.3	Scope for research and practices	On Target	0%
D3.1	Report based analysis on lighting effects on road safety	On Target	0%
D3.2	Database	On Target	0%
D3.3	Think Piece	On Target	0%
D4.1	Guideline report identifying most effective measures	On Target	0%
D4.2	Database of measures with effects and situations	On Target	0%
M4.1	Workshop with NRAs, environment specialists, and industry lighting	On Target	0%
M4.2	Database development for tool	On Target	0%
D5.1	Digital tool design documentation, including wireframes, UML diagr	On Target	0%
D5.2	Fully operational digital tool	On Target	0%
D5.3	Comprehensive documentation and training resources for the digita	On Target	0%
D5.4	Enhanced and updated digital tool	On Target	0%
M5.1	Platform architecture and technical specifications finalised	On Target	0%
M5.2	Beta version of the platform ready for testing	On Target	0%
M5.3	Tool documentation and training material ready	On Target	0%
M5.4	Final version of the platform ready	On Target	0%
D6.2	Detailed pilot execution plan for pilot implementation	On Target	0%
D6.3	Pilot summary and impact analysis report	On Target	0%
M6.1	Pilot project selection based on recommendations from WP3 (in co	On Target	0%
M6.2	Detailed pilot execution plan and setup definition	On Target	0%
M6.3	Engagement with NRAs and pilot preparation	On Target	0%
M6.4	Conduction of Pilot 1	On Target	0%
M6.5	Conduction of Pilot 2	On Target	0%
M6.6	Pilot impact analysis	On Target	0%
D7.1	Plan Conference, including programme/agenda	On Target	0%
D7.2	Deliver, facilitate, moderate conference	On Target	0%
D7.3	Deliver Final Report	On Target	0%

Project budget: € 756,975.95

Estimated earned value:

4 - Early Warnings/Change Controls

Change	
Reason for Change	
Timeframe	
Impact	

5 - Risks

Risk	Description:	Risk ID:
New Risk	x risk has occurred and needs considertation.	M1.1

6 - Further Matters / Engagement

7 - Benefits and Knowledge Transfer

Report completed by: Date:

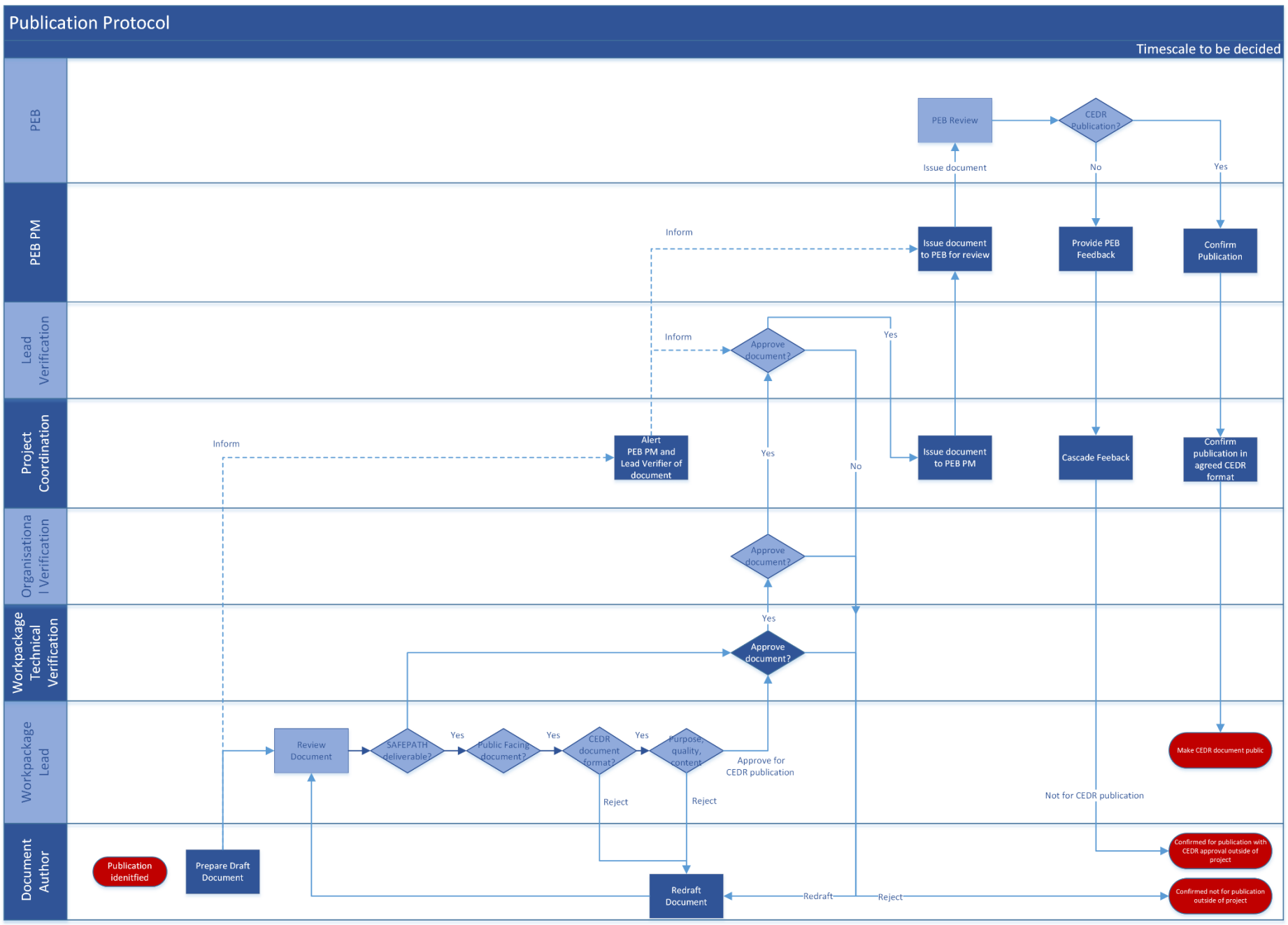
Appendix D – Payment schedule (updated October 2025)

(Green text highlights changes from original proposal).

No	Due date	Amount	Associated milestones/deliverables
1	Oct-25	€ 100,437.50	Milestones: M1.1, M1.2 Deliverables: D1.1, D1.2, D1.3, D1.5, D2.1, D2.2, D2.3
2	Feb-26	€ 121,865.80	Milestones: M1.3, M4.1 Deliverables: D1.1, D1.2, D1.3, D1.4, D3.1
3	May-26	€ 107,517.40	Milestones: M3.1, M5.1 Deliverables: D1.1, D1.2, D1.3, D1.4, D3.2, D5.1
4	Oct-26	€ 170,918.80	Milestones: M4.2, M5.2, M5.3, M6.1 Deliverables: D1.1, D1.2, D1.3, D1.4, D4.1, D4.2, D5.2, D5.3
5	Jan-27	€ 105,385.29	Milestones: M6.2, M6.3, M6.4, M6.5 Deliverables: D1.1, D1.2, D1.3, D1.4, D6.1, D6.2
6	May-27	€ 150,851.16	Milestones: M5.4, M6.6 Deliverables: D1.1, D1.2, D1.3, D1.4, D3.3, D5.4, D6.3, D7.1, D7.2, D7.3
	Total	€ 756,975.95	

Appendix E– Example Risk and Opportunities Register

Risk Register

Risk Register			Version:	Proposal	Date	05-Feb-25	Review
Risk ID	Description	Overall Risk	Probability	Impact	Mitigation	Risk Owner	Inception
R7	Delays in Pilot test due to technical / organisational issues out of the control of the project team.	H	M	H	Early engagement with NRA's as described in work package 6 . Regular contact and feedback from host NRA to get early warning of any issues arising. The work package includes some flexibility around the pilot test period.	PC All partners NRA pilot host PEB	
R9	Pilot: Adverse weather conditions (e.g. heavy rain, snow, extreme temperatures) may delay fieldwork or disrupt data collection and analysis leading to delay in project	M	M	M	We have adopted flexible scheduling to the pilot. Ensure the specification of monitoring equipment and other devices can cope with different conditions such as, seasonal adjustment, automated light pollution measurement devices. Consider a range of sites for the pilot and look at chosing other alternatives, in consultation with the PEB.	PC All partners PEB	
R10	Potential negative public perception to the pilot, if it is seen not to have any measurable impact on light pollution to meet public expectations.	L	L	M	Clear and accurate information provided to NRA's for publication to the public. Providing regular updates to NRA. Consider survey to offer feedback and ensure concerns are addressed.	PC All partners NRA pilot host	
R13	Scalability and Performance Bottlenecks: The digital tool may not scale effectively when handling large datasets, numerous users, or complex scenario testing, leading to slow performance.	M	L	M	Use a microservices architecture with cloud scalability. Conduct performance testing at key milestones. Implement database optimization techniques and load balancing.	AETHON	
R14	User Adoption and Usability Challenges: NRAs and other stakeholders may find the tool difficult to use, leading to lower adoption and reduced impact.	M	M	H	Conduct requirements elicitation and early user testing with stakeholders to refine UI/UX. Provide comprehensive training, user manuals, and interactive tutorials. Implement an iterative design approach with feedback loops.	AETHON NRAs	
R15	Software development delays: Unforeseen technical challenges may delay development, testing, or deployment.	H	M	H	Use a microservices architecture for modular and independent development of components. Assign buffer time in the project timeline. Regular progress tracking and risk assessments.	AETHON	
R16	Regulatory changes impacting project scope: New environmental, data, or road safety regulations may alter project requirements.	L	L	M	Monitor regulatory updates regularly. Establish flexibility in project scope to adjust to changes. Maintain close communication with regulatory bodies.	PC All partners	
R17	The scope of each Pilot is undefined. The host NRA may require additonal support not covered by the description in WP6. This scope creep could compromise budget, time and overall project deliverables.	H	M	H	Early engagement with NRA's as described in work package 6 . Regular contact and feedback from host NRA to get early warning of any issues arising. The work package includes some flexibility around the pilot test period.	PC All partners NRA pilot host PEB	
R18	The location of the Pilot is undefined. There will be a high dependency on the information provided by the host NRA as no site	H	M	H	Early engagement with NRA's as described in work package 6 . Regular contact and feedback from host NRA to get early understanding of site/ location	PC All partners NRA pilot host PEB	

Appendix F – Publication Protocol