TECHNICAL COMMITTEE 3.4 – ENVIRONMENTAL SUSTAINABILITY IN ROAD INFRASTRUCTURE AND TRANSPORT

3.4.1. Real-time evaluation of pollution and mitigation measures

Strategies / Objectives
• Identify traffic operations to minimize the health impact of vehicle emissions. • Investigate and assess how road administrations could help in order to improve air quality through a real time evaluation of pollution and use of low cost air quality sensors, and implement operational mitigation measures. • Take into account works carried out by *T.C.E.2 –Environment Considerations in Road Projects and Operations w*ithin Cycle 2016-2019. • Encourage coordination with other TCs and TFs, such as *T.C.1.4 – Climate change and resilience of road networks, T.F.2.1 – New mobility and its impact on Road Infrastructure and Transport, T.F.B.2 Automated vehicles and T.C. 2.4 – Road Network Operation/ITS, T.F.3.1 – Road Infrastructure and Transport Security, T.F.2.2 – Electric Road Systems,* and *T.F.4.1 – Road Design Standards.*

Air pollution problems are often observed in the roadside areas of metropolitan regions, where a lot of emission sources such as factories, business offices, residential houses and vehicles accumulate.

Such air pollutions are caused by emissions of SO2, NO2, CO, HC, PM10, PM2.5 etc. which are designated as air pollutants in most countries across the world.

In order to carry out air pollution abatement measures we have long-term evaluation values and short-term evaluation values as regulation standards of air pollutant emissions, and as a step of implementation of the measures we compare real-time evaluation values with the short-term values of regulation standards.

There are several low-cost air quality sensors being used across the world, and they are, of course, different from each other depending on the air pollutants to be evaluated. Such sensors should be assessed in terms of accuracy in measuring and cost.

We also need to prepare a menu of various traffic operation measures to be adopted when real-time values of air pollutant concentrations exceed the short-term regulation standards, and we will select some measures from the menu by examining their applicability to actual sites where air pollution problems occur.

In this Cycle, a full report is expected to be completed. Prior thereto, a Workshop will be carried out.

Outputs	Expected Deadlines
• Workshop	• September 2021
• Full report	• October 2022

3.4.2. Noise mitigation

Strategies / Objectives
• Identify improvements of pavement design, construction and maintenance in order to optimize the acoustic performance – as a joint collaborative effort between design, paving, construction and acoustic specialists. • Identify factors and criteria that may affect the choice of a solution to protect against road noise in accordance with the principles of sustainable development. • Update the database that includes traffic noise policy requirements across PIARC member countries. • Take into account works carried out by *T.C.E.2 –Environment Considerations in Road Projects and Operations w*ithin Cycle 2016-2019. • Encourage coordination with other TCs and TFs, such as *T.C. 2.4 – Road Network Operation/ITS, T.C.4.1 – Pavement,* and *T.F.4.1 – Road Design Standards, T.F.3.1 – Road Infrastructure and Transport Security, T.F.2.2 – Electric Road Systems,* and *T.F.4.1 – Road Design Standards.*

Road traffic noise problems emerge along trunk roads, which usually have large traffic volume including a number of heavy freight vehicles and have many residential houses in their roadside areas.

Road traffic noise mainly comprises engine noise, intake air noise, exhaust gas emission noise, Aeolian noise and tire-pavement noise (road noise), which are considered noise sources of the road traffic noise.

Such noise sources variously contribute to the road traffic noise depending on vehicle types and vehicle driving modes like low-speed driving or high-speed driving and further stable driving or accelerated driving.

In terms of tire-pavement noise (road noise) road pavement types and maintenance levels of pavement surface affect the noise level very much.

Pavement characteristics in tire-pavement noise differ from one pavement type to another. Asphalt pavements in general have a low noise profile compared to concrete pavements.

Within the asphalt pavements, so-called drainage pavement, which has a lot of pores in its structure, has a lower noise profile than the dense-graded asphalt pavement commonly used. This means the drainage pavement has a reduction effect on the road traffic noise, although the pavement has been developed for water being drained through the pores to avoid water staying on the pavement surface and then to enhance traffic safety during raining.

As to the road surface maintenance levels, unevenness degree of the pavement surface and micro-texture of the surface definitely affect the road noise level, and over-time degradation of the pavement surface make the noise level higher.

The concrete pavements have generally coarse surface micro-texture compared to the asphalt pavements, which is thus a factor that the former makes larger tire-pavement noise. And therefore surface treatments of the concrete pavements should be needed to make surface texture finer and thus to improve their noise emission performance.

In this Cycle, Workshop, as well as a briefing note are expected to be carried out. In addition, during this cycle, the Database will be updated.

Outputs	Expected Deadlines
• Workshop	• August 2021
• Briefing note	• February 2022
• Update Database	• June 2023

3.4.3. Road and road transport impact in wildlife habitats and their interconnections

Strategies / Objectives
• Understand how road and road transport impact in wildlife habitats and their interconnections. • Develop a road corridor landscape design and its role in ecological habitat connectivity. • Identify barrier effect mitigation for wildlife. • Encourage coordination with other TCs and TFs, such as *T.F.4.1 – Road Design Standards, T.F.3.1 – Road Infrastructure and Transport Security,* and *T.F.2.2 – Electric Road Systems.*

When road construction is implemented in the areas with affluent natural environment, the following various impacts take place in a vicinity of the road construction, which we should recognize:

- Natural habitats of wildlife disappear at the road construction site.
- The natural habitats are divided and fragmented into pieces of small habitats.
- Road traffic noise and vehicle emission gases affect fauna and flora in the roadside areas.
- Animals passing the road would collide with the running vehicles and might die, so-called road kills.
- Artificial constructions of roads do not match the natural environment and damage the natural scenery.

Planting areas, median-dividers and road slope surfaces of embankments and cuttings are preferably planted in order to harmonize the road construction with its local natural environment. At the same time, such areas above within the roads need to be designed in structures and devices in order to allow small animals to easily go through the areas, securing connectivity of wild habitats and forming so-called ecological network.

When wildlife habitats fragmented by the road construction, some of animal species will not be able to survive if living on such small fragmented habitats which cannot feed enough food. In such a case fauna passages are required to connect both sides of the road constructed, and we would need to investigate some knowledge and devices for the animals to easily use such fauna passages.

In this Cycle, a full report based on the collection of case studies is expected to be completed.

Outputs	Expected Deadlines
• Collection of case studies	• December 2021
• Full report	• December 2022