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22 November 2022

This report has been superseded; for the latest report visit nzta.govt.nz/resources/carbon-emissions-baselines-for-infrastructure-projects/

To: Waka Kotahi NZ Transport Agency
PO Box 5084, Wellington 6140

Addendum to Report:
Carbon Emission Baseline Recommendations for NZ Infrastructure Projects

1.1 Update to background data

Following the publication of the Carbon Emission Baseline Recommendations for New Zealand Infrastructure Projects on 17 January 2022 there has been an update to the database. The updates to the data are as follows:

- The emissions data for two Road/Busway/Path projects were updated following a review conducted by Waka Kotahi
- 5 new Road/Busway/Path projects were added to the database from analysis conducted in the UK and Ireland.

1.2 Impact of update on results

The updates to the database have resulted in changes in the following tables in Section 1.2.1, 1.2.2 and 1.2.3 from the report. The updates only affect the Road/Busway/Path project type.

1.2.1 Road construction emissions and the Impact of Major Structures or Earthworks

Table 1 Average and range of road construction emissions for footprints that include, or do not include, major structures or earthworks.

	Number of Footprints	Mean average total emissions (tCO_2e)	Median average total emissions (tCO_2e)	Smallest footprint in range (tCO_2e)	Largest footprint in range (tCO_2e)
With Major Structures or Earthworks	23	317,584	123,616	3,133	2,031,607
No Major Structures or Earthworks	105	43,999	21,145	603	304,549

Table 2 Average and range of emissions per lane km road construction emissions for footprints that include, or do not include, major structures or earthworks.

	Number of Footprints	Mean average emissions per lane km (tCO_2e/lane km)	Median average emissions per lane km (tCO_2e/lane km)	Smallest emissions per lane km (tCO_2e/lane km)	Largest emissions per lane km (tCO_2e/lane km)
With Major Structures or Earthworks	23	6,524	5,716	1,060	18,322
No Major Structures or Earthworks	105	2,747	2,231	7	13,265

1.2.2 Road Construction Emissions per Project Type

Table 3 Average and range of total emissions, by infrastructure type, for road construction footprints (only update to Road/Busway/Path)

	Number of Footprints	Mean average total emissions (tCO_2e)	Median average total emissions (tCO_2e)	Smallest footprint in range (tCO_2e)	Largest footprint in range (tCO_2e)
Road/Busway/Path	62	131,937	116,508	2,256	981,432

Table 4 Average and range of emissions per lane km, by infrastructure type, for road construction footprints (only update to Road/Busway/Path)

	Number of Footprints	Mean average emissions per lane km (tCO_2e/ lane km)	Median average emissions per lane km (tCO_2e/lane km)	Smallest emissions per lane km (tCO_2e/lane km)	Largest emissions per lane km (tCO_2e/lane km)
Road/Busway/Path	62	4,008	3,267	105	13,337

1.2.3 Recommended baseline

Table 5 Summary of infrastructure construction emission baseline recommendations.

Category	Subcategory	Footprints in study	Emissions Baseline Recommendation (tCO_2e/lane km)	Level of Confidence in Baseline
Road/Busway/Path Construction	With major structures or earthworks	11	4,624	Low
	No major structures or earthworks	36	3,958	High

1.3 Further Analysis

Due to the different standards and specifications used in different countries the carbon footprint of similar infrastructure varies. For example, we have observed the footprint of infrastructure is often higher in the United Kingdom per lane km due to the specification standards used. A separate analysis of emissions per project type for Australia and New Zealand projects only has been undertaken, as these values are considered more representative of NZ project carbon footprints. It should be noted that there are a smaller number of carbon footprints in this analysis, so results should be considered in the context of these limitations. The results are summarised in Table 6 below.

Table 6 Average and range of emissions per lane km, by infrastructure type, for road construction footprints in Australia and New Zealand

	Number of Footprints	Mean average emissions per lane km (tCO_2e/ lane km)	Median average emissions per lane km (tCO_2e/lane km)	Smallest emissions per lane km (tCO_2e/lane km)	Largest emissions per lane km (tCO_2e/lane km)
Road/Busway/Path	24	3082	2,964	5714	105
Shared path only	4	3621	2,053	10353	25
Intersection improvements – at grade	5	2340	1,206	7548	558
Intersection improvements – grade separated	2	4322	4,322	5570	3074
Railway	18	9194	9,388	9398	5889
Bridge	3	9029	5,717	18322	3047
Tunnel	2	9425	9,425	11099	7751
Safety and traffic flow improvements	2	1079	1,079	1699	459

1.4 Future Development

The database will continue to be updated with projects to refine the carbon baselines further and improve the accuracy of the results. An update to the Carbon Emission Baseline Recommendations for New Zealand Infrastructure Projects incorporating additional projects will be issued in early 2023