

Appendix 3.2 EMFAC-HK Model Assumptions

Estimation of Vehicular Emission for the Study Area with EMFAC-HK model

EMFAC-HK v4.3 model was adopted to estimate the vehicular emission rates of NO_x, NO₂, RSP and FSP. The input parameters and model assumptions made in EMFAC-HK model are summarized as follows.

A.1 Model Year

A.1.1 EMFAC-HK considers 45 years of model years for the estimation of vehicular emission. The model years start from 45 years preceding the year of interest to the year of interest as the final model year. The following table summarizes the starting and final model years of the assessment year implemented in EMFAC-HK.

Table 1 Starting and Final Model Years in EMFAC-HK

Scenario Year	Starting Model Year	Final Model Year
2033	1989	2033
2036	1992	2036
2042	1998	2042
2048	2004	2048

A.2 Vehicle Technology fraction

A.2.1 Exhaust technology fraction and evaporative technology fraction in the model are based on the default value.

A.2.2 The “2018 Licensed Vehicle by Age and Technology Group Fractions” provided in EPD’s website, was adopted in this assessment. Since the provided exhaust technology fractions are only up to Year 2018 at the time of the assessment, those after Year 2018 are projected in accordance with EPD’s *Guideline on Modelling Vehicle Emissions – Appendix 3 “Implementation Schedule of Vehicle Emission Standards in Hong Kong (updated as in May 2020)”* and Appendix 4 “EMFAC-HK Technology Group Indexes (Released in January 2021)”.

A.3 Vehicle Population

A.3.1 To determine the assessment year, default vehicle populations forecast in EMFAC-HK was adopted based on the recommendation in the EPD’s *Guideline on Modelling Vehicle Emissions*.

A.3.2 According to the Hong Kong Roadmap on Popularization of Electric Vehicles released by the Environment Bureau, the government will promote measures such as ceasing the new registration of fuel-propelled PC in Year 2035 or earlier. To consider the electric private cars (E-PCs) in the assessment, the vehicle populations forecast in EMFAC-HK are adjusted. The methodology for assessing the percentage of newly registered E-PC in Year 2033 is presented in **Annex A** and the detailed approach for applying the E-PC in the EMFAC-HK model is presented in **Annex B**.

A.4 Vehicle Accrual

A.4.1 The default accrual rates in EMFAC-HK are estimated from the local mileage

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data adjusted to reflect the total VKT for each vehicle class. The default value was used.

A.5 Travelling Speed

A.5.1 Based on the available speed information provided by traffic consultant, emission factors of each vehicle class were adopted according to the travelling speed of each road link at each hour. All the vehicle classes on the same road link were assumed to have the same travelling speed, except medium goods vehicles, heavy goods vehicles, buses and public light buses, which have speed limit.

A.5.2 In accordance with the Road Traffic Ordinance, for any road with design speed limit of 70 kph or above, the speed limit for medium goods vehicles, heavy goods vehicles and buses would be limited to not more than 70 kph. Thus, for medium goods vehicles, heavy goods vehicles and buses, the flow speed or 70 kph, whichever is lower, have been adopted. For the public light buses, the speed limit should be equal to that of the carriageway or 80 kph, whichever is lower, were adopted.

A.6 Temperature and Humidity Profile

A.6.1 For the estimation of air quality impact of short-term NO₂ (i.e., 1-hour NO₂), short-term and long-term RSP and FSP (i.e., daily RSP, annual RSP, daily FSP and annual FSP), the daily profile of lowest temperature and relative humidity data in each hour for each month (i.e., 24 hours data in each month and for 12 months) at Tsuen Wan automatic weather station for Year 2020 were adopted for the model input. A summary table for the temperature and relative humidity adopted is provided in **Annex C**.

A.6.2 For the estimation of air quality of long-term NO₂ (i.e., annual NO₂), the daily profile of average temperature and relative humidity data in each hour for each month (i.e., 24 hours data in each month and for 12 months) at Tsuen Wan automatic weather station for Year 2020 were adopted for the model input. A summary table for the temperature and relative humidity adopted is provided in **Annex C**.

A.7 Vehicle Kilometres Travel (VKT)

A.7.1 The “vehicle fleet” refers to all motor vehicles operating on roads within this assessment area. The modelled fleet was broken down into 18 vehicle classes based on the information in the Transport Monthly Digest and vehicle population provided by EPD.

A.7.2 Vehicle-kilometre-travelled (VKT) represents the total distance travelled on a weekday. The VKT is calculated by multiplying the number of vehicles, which based on the highest predicted hourly traffic flow, and the length of road travelled in the assessment area. The diurnal variation of VKT in the assessment area was provided by the traffic consultant.

A.8 Trips

A.8.1 Start emissions of all the concerned vehicle classes in the assessment were simulated by one of the following three methods: broad-brush approach, precise approach and hybrid approach, as follows:

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Broad-brush Approach

- A.8.1.1 Start emissions of vehicles were assigned on local / rural roads with post speed of 50 km/hr with the number of trips for each vehicle class assumed directly proportional to VKT (Trips per VKT) and is estimated by the following formula:

$$\frac{\text{Trip for local or rural roads within the study area} = \text{VKT for local or rural roads within the study area} \times \frac{\text{Trip for local or rural roads with Hong Kong}}{\text{VKT for all roads with Hong Kong} \times \text{Proportion of local or rural roads}}}{}$$

- A.8.1.2 Trips within Hong Kong and VKT within Hong Kong were obtained from the default values from EMFAC-HK. The proportion was calculated from the Annual Traffic Census 2021 prepared by Transport Department and is presented in **Annex D**. VKT within the study area was calculated by multiplying the number of vehicles by the distance travelled within the study area. The trips per VKT is also presented in **Annex D**.
- A.8.1.3 The highest NO_x (and the corresponding NO and NO₂), RSP and FSP start emission factors for each vehicle class among different soak time were adopted as a conservative approach.

Precise Approach

- A.8.1.4 Calculations of start emissions were referenced to the *Calculation of Start Emissions in Air Quality Impact Assessment* published by EPD. The start emission has been modelled according to the actual locations of termini or carpark.

Hybrid Approach

- A.8.1.5 The hybrid approach refers to the start emission assessed by a combination of the Broad-brush approach and “AREAPOLY” sources modelled by AERMOD. The start emissions within termini are calculated as “AREAPOLY” source while the start emissions from roads adjacent to the termini are calculated by the broad-brush approach (i.e., the start emissions allocate along the nearby open road which is local / rural roads with post speed of 50 km/h).

A.9 Method for Assessing Start Emissions of Different Vehicle Classes

- A.9.1 Bus and Public Light Bus (PLB) termini within the Public Transport Interchange (PTI), non-franchised buses (NFB) carparks, on-street PLB termini, Heavy Goods Vehicles (HGV) carparks and private cars carpark were identified within the study area. As the start emission factors of different vehicle classes are varied, different approaches (i.e., broad-brush, precise and hybrid approaches) have been adopted to simulate the start emissions induced by these vehicle classes. The detailed approach on assessing start emission for each vehicle class is discussed in the following sections:

Start Emission on Bus and PLB termini within the PTI and NFB Parking Sites

- A.9.2 For the bus and PLB termini, the number of trips for bus and PLB were obtained by on-site survey and information from the operators. Given that the start emission factors of bus are more significant than other vehicles, precise approach has been adopted for the bus termini. Also, start emission factors of

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franchised double-deck buses (FBDD) are more significant than franchised single-deck buses (FBSD), the start emission of FBDD is adopted in this assessment as a conservative approach. Based on the site survey, no buses would be parked on street.

- A.9.3 Other than bus termini, PLB termini were identified within the study area. To avoid any underestimation of air quality impact due to PLB termini located inside the PTI, precise approach has also been adopted to simulate the start emission of PLB termini inside the PTI.
- A.9.4 Non-franchised Buses (NFB) carparks were identified within the study area, but on-street NFB parking spaces were not identified within the study area. Given that the start emission factors of NFB are also significant, precise approach will also be adopted to simulate the start emissions of NFB induced by the NFB carparks. NFB parking spaces at the Lutheran School for the Deaf (NFB parking space of 3), Kwai Chung Crematorium (with NFB parking space of 2), Lai King Indoor Recreation Centre (with NFB parking space of 2), and Magnet Place Tower 2 (NFB parking space of 1) are available. However, no NFB parking was observed during site survey conducted on 28th January 2021 and these NFB parking spaces are expected for occasional pick-up and drop-off purpose. Therefore, the start emission of NFB from these NFB carparks will not be included in this assessment. For other NFB carparks including Tsuen Tsing Interchange (HGV7), Container Port Road (HGV15), Kwai Wo Street (HGV21), Riviera Garden (PT4), and Kwai Fong South Bus Terminus (PT10), precise approach has been adopted to simulate the start emission of NFB.

Sensitivity Test for Start Emission on Medium and Heavy Goods Vehicles

- A.9.5 Given that the start emission factors of HGV are significant and large number of identified HGV carparks within study area, both broad-brush approach and precise approach were adopted (i.e., assessing the start emission of HGV using broad-brush approach for carpark with HGV parking space less than or equal to 100 and precise approach for carpark with HGV parking space more than 100). The shortlisted HGV carparks for sensitivity test are summarized in **Table 2**.

Table 2 Selected HGV Carparks for Sensitivity Test

HGV carparks	HGV parking space	Building Category
Kerry Cargo Centre (ID 66)	450	Private Building
Kong Nam Industrial Building (ID 183)	72	Private Building
Texaco Road Carpark (ID 245)	75	Short Term Tenancy Sites

- A.9.6 Sensitivity test has been conducted to compare the impacts to the air-sensitive receivers (ASRs) due to the cold start emission of HGV from HGV carparks by using the broad-brush approach and precise approach which to demonstrate that broad-brush approach would be a reasonable approach to assess the emission impact for carpark with HGV parking space less than or equal to 100. The approach of the sensitivity test and its findings are presented in **Annex E**. The findings showed that the NO_x concentrations using the Broad-brush approach for carpark with HGV parking space of less than 100 were higher than that using the Precise approach, with the max. differences of around 9.84 µg/m³ (maximum hourly), 8.56 µg/m³ (19th highest hourly), and 1.62 µg/m³ (annual average). While for carpark with HGV parking space more than 100, the NO_x concentrations using Precise approach is higher than Broad-brush approach, with the differences of 3.02 µg/m³ (maximum hourly), 1.92 µg/m³ (19th highest hourly), and 0.35 µg/m³ (annual average). Therefore, the broad-

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brush approach was considered reasonable and suitable to adopt for carpark with HGV parking spaces less than or equal to 100. On the other hand, a precise approach is more appropriate to be adopted for carpark with HGV parking spaces of more than 100.

Start Emission on Private Car

- A.9.7 Compared with HGV, FBSD, and FBDD, the start emission factors of private cars are minimal. A broad-brush approach is adopted for assessing the start emission from private car. Given that the exhaust openings in Tsuen Wan Plaza (see **Annex F**) were a 17m separation distance from the nearest ASR, a precise approach is adopted for assessing the start emission of the private car carpark at Tsuen Wan Plaza.

Sensitivity Test for Start Emission on On-street PLB Termini

- A.9.8 Several overnight on-street PLB parking has been identified based on the on-site survey and the start emission at on-street PLB termini only occurred within an hour. Therefore, starting emissions emitted from these PLBs at on-street parking sites would be concentrated within this hour and emissions during the remaining hours were insignificant. A comparison of the predicted maximum hourly and annual NO_x concentrations at the selected ASRs between precise approach and hybrid approach has been conducted.
- A.9.9 For this comparison, Kwai Shing (Kwai Hau Street) PLB terminus (PLB12) is selected which has the largest number of start up among on-street PLB termini (i.e., 26 nos. start up) within the study area. Hybrid approach is to estimate the start emission from on-street PLB termini, which consists of two components: (1) the start emissions within on-street PLB termini are modelled by the "AREAPOLY" source for 1 hour only within a day and (2) the start emissions from roads adjacent to the on-street PLB termini are estimated by the broad-brush approach within a day (i.e., start emissions spread over the 700m distance for PLB from on-street PLB terminus). The sensitivity test demonstrated that the maximum hourly and annual NO_x concentrations calculated by the hybrid approach are greater than those concentrations calculated by the precise approach. Detailed results are presented in **Annex G**. The findings showed that the NO_x concentrations using the hybrid approach for Kwai Hau Street PLB terminus are higher than that using the precise approach, with maximum differences of around 42.93 µg/m³ (maximum hourly) and 0.26 µg/m³ (annual average). As such, the hybrid approach (i.e. the start emission from the PLB leaving the on-street parking site are estimated by the broad-brush approach) would be a reasonable approach for assessing the start emission for the on-street PLB termini.

Start Emissions on Taxi, Light Goods Vehicles, Private Light Buses and Motorcycle

- A.9.10 Other than the above-mentioned vehicle types, start emission for PC (except for Tsuen Wan Plaza), Taxi, LGV, motorcycle, private light buses and HGV (with HGV parking space less than 100) are assessed using broad-brush approach. Diurnal variations of daily trips were used to estimate the start emissions of petrol, LPG vehicles and diesel vehicles fitted with selective catalytic reduction (SCR) devices. Zero trip was assumed for roads without cold start as no cold start would be anticipated on these roads. **Annex H** illustrates the road extent for cold start trip under without Project, with Project (without direct noise remedies) and with Project (with direct noise remedies). The method for assessing the start emission for each vehicle classes are summarized in **Table 3**.

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Table 3 Method Adopted in the Assessment for Different Vehicle Classes

Vehicle Class	Method to be Adopted ^{[1] [2] [3]}
01 - Private Cars	Broad-brush approach and Precise approach ^[4]
02 – Taxi	Broad-brush approach
03 - Light Goods Vehicles <=2.5t	Broad-brush approach
04 - Light Goods Vehicles 2.5-3.5t	Broad-brush approach
05 - Light Goods Vehicles 3.5-5.5t	Broad-brush approach
06 - Medium & Heavy Goods Vehicles 5.5-15t	Broad-brush approach and Precise approach ^[5]
07 - Medium & Heavy Goods Vehicles 15-24t	Broad-brush approach and Precise approach ^[5]
08 - Public Light Buses	Broad-brush approach, Precise approach and Hybrid approach ^[6]
09 - Private Light Buses <=3.5t	Broad-brush approach
10 - Private Light Buses >3.5t	Broad-brush approach
11 - Non-franchised Buses <6.4t	Precise approach ^[7]
12 - Non-franchised Buses 6.4-15t	Precise approach ^[7]
13 - Non-franchised Buses 15-24t	Precise approach ^[7]
14 - Single Deck Franchised Buses	Precise approach ^[7]
15 - Double Deck Franchised Buses	Precise approach ^[7]
16 - Motorcycles	Broad-brush approach
17 – Medium & Heavy Goods Vehicles >24t	Broad-brush approach and Precise approach ^[5]
18 – Non-franchised Buses >24t	Precise approach ^[7]

Note:

- [1] Broad-brush approach refers to the start emissions of the corresponding vehicle classes allocated on all local roads and rural roads with a design speed limit of 50 km/hr within a 500m study area and the associated PATH grids (i.e., 1km × 1km) from the project boundary. The details of the broad-brush approach, which is modelled by the CALINE4 model, are presented in **Sections A.8.1.1- A.8.1.2**.
- [2] The details of the precise approach, which is modelled by the AERMOD model, are presented in **Sections A.8.1.4**.
- [3] Details of the hybrid approach are presented in **Section A.8.1.5**, which is applied to estimate the start emission from the on-street PLB termini.
- [4] Start emissions from PC have been considered in the broad-brush approach along all local roads and rural roads with design speed limit of 50km/hr (i.e., Note [1]) and the emissions within Tsuen Wan Plaza Carpark is additionally estimated using the precise approach.
- [5] Start emissions from all types of HGVs have been considered in the broad-brush approach along all local roads and rural roads with design speed limit of 50km/hr (i.e., Note [1]) and the emissions within the identified HGV parking sites with parking spaces >100 (i.e., ID 2 - Container Port Road South, ID 6 – Kwai Tai Road, ID 7 - Tsuen Tsing Interchange, ID 15 – Container Port Road, ID 21 - Kwai Wo Street, ID 66 - Kerry Cargo Center and ID 248 - Container Port Road South) are additionally distributed along the roads connecting to these parking sites using the precise approach.
- [6] Start emissions from PLB are considered in the broad-brush approach along all local roads and rural roads with design speed limit of 50km/h (i.e., Note [1]) and the emissions from the identified PLB termini within PT1 (i.e., PT1- Hoi Kwai Road, PT2 -Tsuen Wan West Station PT1 and PT4- Riviera Gardens PT1) are additionally distributed on the roads connecting to these parking sites by the precise approach. In addition, the hybrid approach is also applied to estimate the start emissions from on-street PLB termini (i.e., The start emissions within on-street PLB termini are modelled by the “AREAPOLY” source for 1 hour only within a day. And start emissions spread over the 700m distance for PLB from on-street PLB terminus was estimated by broad-brush approach).
- [7] Start emissions from NFB, FBSD, and FBDD have been considered in the precise approach and therefore start emissions from NFB, FBSD, and FBDD are excluded on all local roads and rural roads with post speed of 50 km/hr in the broad-brush approach.

A.10 Estimation of Composite Vehicular Emission Factor

A.10.1 Referring to the EPD’s *Guideline on Modelling Vehicle Emissions*, “Emfac mode” was used for calculating emission factors in terms of grams of pollutants emitted per vehicle activity. It was applied for this Project, since it provides the emission factors according to the actual hourly travelling speeds of vehicles of each road.

A.10.2 Assuming that NO_x is comprised of NO and NO₂ only, the hourly emission of NO was calculated as the difference in emissions between NO_x and NO₂ extracted from EMFAC-HK for each vehicle type.

A.10.3 Both running exhaust and starting emissions were considered for road with post speed of 50km/hr. The 24-hour traffic flows and composite emission factors for

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each road adopted in the subsequent air dispersion modelling are presented in **Appendix 3.4**.

A.11 Vehicular Emission Burden by EMFAC-HK (for Determination of Assessment Year) – Operation Phase

A.11.1 Vehicular emission burdens (NO_x and RSP) for the Years of 2033, 2036, 2042 and 2048 were calculated based on the traffic forecast and composite emission factors. The results are summarized in **Table 4**. According to the result, Year 2033 was selected as the worst affected year for the air quality assessment of operation phase.

Table 4 Vehicular Emission Burden of Open Road Source during Operation Phase

Scenario Year	NO_x (g/day)	RSP(g/day)	FSP (g/day)
2033 ^[1]	563253	16880	15529
2036	451498	10956	10087
2042	476574	11419	10519
2048	490882	11654	10736
Note: [1] Slip Road C has been covered in the assessment for the assessment year of 2033, while it will be operated in Year 2036.			

***Annex A
Methodology on Assessing the
Percentage of Newly Registered
Electric Private Car in Assessment
Year 2033***

Methodology on Assessing the Percentage of Newly Registered Electric Private Cars in Assessment Year 2033

1. Introduction

According to the Hong Kong Roadmap on Popularization of Electric Vehicles released by the Environment Bureau, long-term policy and plans have been formulated to promote the goal of zero vehicle emission before the 2050s. In recent years, electric-private cars (E-PC) have become more popular in Hong Kong. The percentage of new registration of E-PC in Hong Kong has risen sharply from 0.1% in 2010 and 5.2% in 2015 to 12.4% in 2020. To achieve carbon neutrality before the 2050s and reduce roadside pollutants, the government will promote measures including ceasing the new registration of fuel-propelled PC in 2035 or earlier and promoting trials for electric public transport and commercial vehicles...etc.

This paper describes the methodology in assessing the percentage of newly registered electric-private cars (E-PCs) in the assessment year (i.e., 2033).

2. Methodology and Result

The percentage of new registration of E-PC in Hong Kong has risen sharply from 0.1% in 2010, 5.2% in 2015, 6.3% in 2019, 12.4% in 2020 and 24.4% in 2021 based on "Hong Kong Roadmap on Popularization of Electric Vehicles" and the information of the first registered vehicle listed in Transport Department¹. Assuming the percentage of E-PC among newly registered private cars in Hong Kong follows the linear growth, it means that it grows by the same proportion each year. The percentage of E-PC per year is calculated as follows:

$$P_t = P_{t-1} + \left(\frac{P_{\text{End Year}} - P_{\text{Start Year}}}{\text{End Year} - \text{Start Year}} \right)$$

Where P_t is the percentage of newly registered E-PC in a given year.

P_{t-1} is the percentage of newly registered E-PC in the year prior to a given year (i.e., 2022-2034)

$P_{\text{End Year}}$ is the percentage of newly registered E-PC at the end year of the assessment period (e.g., $P_{\text{End Year}}$ is 100% in 2035 when the assessment period is within 2022 - 2035).

$P_{\text{Start year}}$ is the percentage of newly registered E-PC at the start year of the assessment year (e.g., $P_{\text{Start year}}$ is 24.4% in 2021 when the assessment period is within 2022 - 2035).

End Year is the end year of the assessment period (e.g., the end year is 2035 if the assessment period is within 2022-2035).

Start Year is the start year of the assessment period (e.g., the start year is 2022 if the assessment period is within 2022-2035).

Based on the above formula, the percentage of the newly registered electric private car (E-PC) from 2010 to 2035 is shown in **Table 2.1** and **Figure 2.1**.

¹ The information of the first registered vehicle is extracted from Particulars of first registered vehicles of Transport Department
https://www.td.gov.hk/en/public_services/licences_and_permits/vehicle_first_registration/vehicle_particulars/index.html

Table 2.1 The Estimated Percentage of Newly Registered E-PC from 2010 to 2035.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Newly registered E-PC %	0.1	0.3	0.2	0.1	1.8	5.2	7.3	8.8	1.1
Year	2019	2020	2021	2022	2023	2024	2025	2026	2027
Newly registered E-PC %	6.3	12.4	24.4	29.8	35.2	40.6	46.0	51.4	56.8
Year	2028	2029	2030	2031	2032	2033	2034	2035	
Newly registered E-PC %	62.2	67.6	73.0	78.4	83.8	89.2	94.6	100	

Notes:

1. The percentages of newly registered E-PC in 2010, 2015 and 2020 are extracted from Figure 4 of "Hong Kong Roadmap on Popularization of Electric Vehicle".
2. The number of newly registered PC in 2011-2017 are extracted from Monthly Traffic and Transport Digest published by Transport Department.
3. The number of newly registered E-PC in 2011-2015 are extracted from Annex 1 to Legislative Council Question No.18 (https://gia.info.gov.hk/general/201606/22/P201606220411_0411_169203.pdf).
4. The number of newly registered E-PC in 2016 is extracted from Page 396 of Replies to initial written question raised by Finance Committee Members in examining the Estimates of Expenditure 2017-18. (https://www.eeb.gov.hk/sites/default/files/en/node4014/fcq_17-18e.pdf)
5. The number of newly registered E-PC in 2017 is extracted from Table 4.1 (e) of Monthly Traffic and Transport Digest published by Transport Department. ([https://www.td.gov.hk/en/transport in hong kong/transport figures/monthly traffic and transport digest/index.html](https://www.td.gov.hk/en/transport%20in%20hong%20kong/transport%20figures/monthly%20traffic%20and%20transport%20digest/index.html))
6. The percentages of the first registered vehicle in 2018-2021 are extracted from website of Transport Department ([https://www.td.gov.hk/en/public services/licences and permits/vehicle first registration/vehicle particulars/index.html](https://www.td.gov.hk/en/public%20services/licences%20and%20permits/vehicle%20first%20registration/vehicle%20particulars/index.html))
7. The 100% of newly registered E-PC in 2035 is based on the future policy listed in "Hong Kong Roadmap on Popularization of Electric Vehicle".
8. Assume that the percentage of newly registered E-PCs before 2010 is 0%.

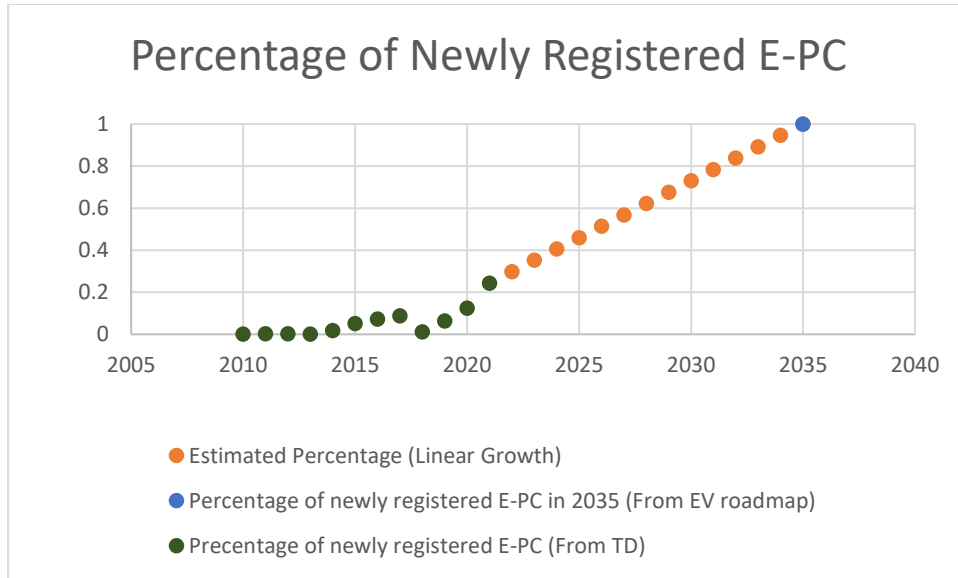


Figure 2.1 The Percentage of Newly Registered of Electric Private Car

To estimate the total percentage of E-PC adopted in Year 2033, the population of private car (PC) in Year 2033 is extracted from the "burden mode" output of EMFAC-HK. The total E-PC population in Year 2033 is the sum of the PC population in a given year multiplied by the corresponding percentage of newly registered E-PCs as listed in **Table 2.1**.

Annex B
Applying the Percentage of Newly
Registered Electric-Private
Cars (E-PCs) in EMFAC-HK

Applying the Percentage of Newly Registered Electric-Private Cars (E-PCs) in EMFAC-HK

1. Introduction

Referring to “The methodology of assessing the percentage of newly registered electric-private cars (E-PCs) in the assessment year 2033”, the percentage of E-PCs among newly registered private cars in Hong Kong follows the linear growth and is listed in the following table.

Table 1.1 The Estimated Percentage of Newly Registered E-PC from 2010 to 2035.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Newly registered E-PC %	0.1	0.3	0.2	0.1	1.8	5.2	7.3	8.8	1.1
Year	2019	2020	2021	2022	2023	2024	2025	2026	2027
Newly registered E-PC %	6.3	12.4	24.4	29.8	35.2	40.6	46.0	51.4	56.8
Year	2028	2029	2030	2031	2032	2033	2034	2035	
Newly registered E-PC %	62.2	67.6	73.0	78.4	83.8	89.2	94.6	100	

Notes:

1. The percentages of newly registered E-PC in 2010, 2015 and 2020 are extracted from Figure 4 of “Hong Kong Roadmap on Popularization of Electric Vehicle”.
2. The number of newly registered PC in 2011-2017 are extracted from Monthly Traffic and Transport Digest published by Transport Department.
3. The number of newly registered E-PC in 2011-2015 are extracted from Annex 1 to Legislative Council Question No.18 (https://gia.info.gov.hk/general/201606/22/P201606220411_0411_169203.pdf).
4. The number of newly registered E-PC in 2016 is extracted from Page 396 of Replies to initial written question raised by Finance Committee Members in examining the Estimates of Expenditure 2017-18. (https://www.eeb.gov.hk/sites/default/files/en/node4014/fcq_17-18e.pdf)
5. The number of newly registered E-PC in 2017 is extracted from Table 4.1 (e) of Monthly Traffic and Transport Digest published by Transport Department. ([https://www.td.gov.hk/en/transport in hong kong/transport figures/monthly traffic and transport digest/index.html](https://www.td.gov.hk/en/transport%20in%20hong%20kong/transport%20figures/monthly%20traffic%20and%20transport%20digest/index.html))
6. The percentages of the first registered vehicle in 2018-2021 are extracted from website of Transport Department [https://www.td.gov.hk/en/public services/licences and permits/vehicle first registration/vehicle particulars/index.html](https://www.td.gov.hk/en/public%20services/licences%20and%20permits/vehicle%20first%20registration/vehicle%20particulars/index.html)
7. The 100% of newly registered E-PC in 2035 is based on the future policy listed in “Hong Kong Roadmap on Popularization of Electric Vehicle”.
8. Assume that the percentage of newly registered E-PCs before 2010 is 0%.

This paper presents a method for applying the percentage of newly registered E-PCs in the EMFAC model.

2. Methodology and Procedures

EMFAC-HK v4.3 model was adopted to determine the vehicle emission factors of NO_x (i.e., initial NO + initial NO₂), FSP, and RSP for vehicle emissions arising from the open road within a 500 m study area.

Referring to the EPD’s Guideline on Modelling Vehicle Emissions, “EMFAC mode” is used for calculating emission factors in terms of grams of pollutants emitted per vehicle activity. It is selected for this study since it can provide the emission factors according to the actual hourly traveling speed of vehicles on each road. The traffic data is provided by the traffic consultant.

Before generating the starting and running exhaust emissions outputs, the petrol-powered private cars population in the EMFAC-HK is adjusted based on the newly registered E-PCs listed in **Table 1.1**. According to EMFAC-HK’s PC population data in Year 2033, petrol-powered PCs account for approximately 98.4% of the overall PC population (i.e., the petrol-powered PC population in 2033 =726630 and the overall PC population in 2033 = 738076). Petrol-powered PC remains the largest proportion of the fuel types. Therefore, this study only considers adjusting the petrol-powered PC population in the EMFAC-HK model. The adjusted population of petrol-powered private cars from Year 2010 to Year 2033 is calculated as follows:

$$P_t' = P_t \times (1 - EV_t\%)$$

Where P_t' is the adjusted population of petrol-powered private cars based on the newly registered E-PC in a given year.

P_t is the default population of petrol-powered private cars in a given year.

$EV_t\%$ is the Percentage of Newly Registered E-PCs from 2010 to 2035 listed in **Table 1.1** in a given year.

The default and adjusted populations of petrol-powered private cars are listed in **Table 2.1**.

Table 2.1 The default population and adjusted population of petrol-powered private cars in Year 2033

Age	Age01	Age02	Age03	Age04	Age05	Age06	Age07	Age08	Age09
Default	54059	52643	51806	57791	56930	56057	55012	53612	51684
Adjusted	5840	8531	11193	15608	18450	21196	23772	26063	27917
Age	Age10	Age11	Age12	Age13	Age14	Age15	Age16	Age17	Age18
Default	49010	35983	31558	26852	24874	19761	13471	8637	6530
Adjusted	29120	23323	22160	20306	21788	18512	13323	7877	6053
Age	Age19	Age20	Age21	Age22	Age23	Age24	Age25	Age26	Age27
Default	6179	4262	3065	2152	1486	1045	543	510	364
Adjusted	5857	4186	3062	2148	1482	1044	543	510	364
Age	Age28	Age29	Age30	Age31	Age32	Age33	Age34	Age35	Age36
Default	220	157	117	65	60	45	31	17	13
Adjusted	220	157	117	65	60	45	31	17	13
Age	Age37	Age38	Age39	Age40	Age41	Age42	Age43	Age44	Age45
Default	11	4	3	3	2	2	1	1	1
Adjusted	11	4	3	3	2	2	1	1	1
<p>Note:</p> <ol style="list-style-type: none"> Referring to Table 1.1, the percentage of newly registered E-PC is from 2010 to 2033 (i.e., Age 01 to Age 24). It is assumed that the percentage of newly registered E-PCs before 2010 is 0%. The default and adjusted population of petrol-powered private cars are rounded to the nearest integer. 									

Annex C
Summary of the Temperature and
Relative Humidity for Long-term and
Short-term Air Quality Impacts

Annex C

Station: Tsuen Wan

Temperature and Relative Humidity Data Adopted for Estimation of Long-term NO₂ (e.g. Annual NO₂)

Hours	January		February		March		April		May		June		July		August		September		October		November		December	
	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH
0000-0100	17	82	17	82	20	87	20	85	26	91	28	91	29	86	27	93	26	93	24	78	21	82	16	77
0100-0200	17	81	17	82	20	87	19	85	26	92	28	91	29	87	27	93	26	94	24	78	21	82	16	77
0200-0300	16	82	17	82	20	87	19	84	25	93	27	92	28	87	26	94	26	94	23	79	21	82	16	78
0300-0400	16	82	16	84	20	87	19	85	25	93	27	92	28	88	26	94	26	95	23	78	21	82	16	79
0400-0500	16	81	16	84	20	87	19	84	25	92	27	92	28	89	26	95	26	95	23	77	21	81	15	79
0500-0600	16	80	16	85	20	87	19	85	25	93	27	93	28	90	26	95	26	95	23	77	21	81	15	80
0600-0700	16	79	16	84	20	87	19	84	26	92	28	92	28	90	26	96	26	94	23	78	20	80	15	81
0700-0800	17	78	16	83	20	84	21	78	27	87	28	89	29	86	27	91	27	91	24	74	21	76	15	79
0800-0900	18	74	18	77	21	82	22	72	28	83	29	84	30	80	29	83	28	87	25	70	23	69	17	71
0900-1000	19	70	19	72	22	78	23	70	29	80	30	81	31	77	30	78	29	82	26	66	24	64	18	66
1000-1100	20	65	20	70	23	78	24	68	29	79	30	79	31	75	31	75	29	79	27	62	25	60	20	62
1100-1200	21	62	21	67	23	75	24	67	29	78	30	78	31	72	31	76	30	80	27	61	26	58	20	59
1200-1300	22	60	21	64	23	74	24	66	29	78	30	77	32	71	31	74	30	80	28	60	26	57	21	58
1300-1400	22	60	22	64	24	74	24	65	29	78	30	77	32	70	31	76	29	81	28	60	26	58	21	58
1400-1500	22	61	22	64	23	74	24	65	29	79	31	76	32	71	30	78	29	83	27	62	26	59	21	59
1500-1600	21	63	21	66	23	76	24	66	29	80	30	78	31	72	30	78	29	83	27	64	26	61	20	61
1600-1700	20	67	21	69	23	77	23	69	28	82	30	81	31	76	30	79	28	84	26	68	25	66	19	65
1700-1800	19	73	19	73	22	80	23	72	28	85	29	82	30	78	29	82	28	88	25	71	23	71	18	70
1800-1900	18	76	18	77	21	83	22	77	27	87	29	85	30	80	28	85	27	90	25	73	23	74	17	73
1900-2000	18	77	18	79	21	85	21	80	27	88	28	87	29	82	28	87	27	91	25	75	22	76	17	74
2000-2100	17	79	18	80	21	85	21	82	27	89	28	88	29	84	28	88	27	92	25	75	22	78	17	75
2100-2200	17	81	18	80	21	86	20	83	26	89	28	88	29	84	27	90	27	92	24	75	22	80	16	76
2200-2300	17	80	18	81	21	86	20	84	26	89	28	88	29	85	27	91	26	93	24	76	22	80	16	77
2300-0000	17	80	17	82	20	86	20	84	26	90	28	90	29	86	27	92	26	93	24	77	21	81	16	77

Station: Tsuen Wan

Temperature and Relative Humidity Data Adopted for Estimation of Short-term NO₂ (e.g., hourly NO₂), Short-term RSP and FSP (e.g., Daily RSP and FSP), and Long-term RSP and FSP (e.g., Annual RSP and FSP)

Hours	January		February		March		April		May		June		July		August		September		October		November		December	
	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH	Temp	RH
0000-0100	10	52	10	49	17	58	16	46	23	82	25	84	26	82	25	82	25	79	22	46	17	67	8	52
0100-0200	9	47	10	60	17	61	16	44	22	83	25	85	27	78	25	85	25	80	22	48	17	59	8	48
0200-0300	8	56	10	63	17	59	16	40	22	83	24	85	27	74	25	85	24	81	22	53	16	61	8	48
0300-0400	9	45	9	64	17	57	15	41	22	84	24	86	27	74	25	86	24	83	21	44	16	54	7	49
0400-0500	10	48	8	68	17	59	15	35	23	86	25	85	26	76	25	86	24	82	21	42	16	50	7	48
0500-0600	9	42	8	69	17	63	14	41	23	85	24	85	26	78	25	90	24	82	21	44	16	52	7	35
0600-0700	9	36	8	55	16	67	15	41	23	84	24	85	26	81	25	89	25	81	21	44	15	56	7	50
0700-0800	10	42	9	64	16	61	17	33	24	75	24	82	27	76	25	79	26	80	21	44	16	51	7	44
0800-0900	11	34	11	35	16	62	17	26	24	72	24	75	27	71	25	71	25	77	21	44	16	48	9	35
0900-1000	11	32	13	37	16	54	18	24	24	63	24	65	27	64	25	63	25	66	22	37	17	40	10	36
1000-1100	11	31	15	38	17	51	18	25	24	60	24	68	26	60	26	62	25	67	23	39	20	40	12	32
1100-1200	14	30	16	31	18	49	16	18	24	62	25	65	27	57	27	60	25	67	23	39	21	40	13	33
1200-1300	15	26	16	32	19	50	16	28	24	62	26	61	27	56	25	57	26	69	24	40	22	39	14	31
1300-1400	15	25	17	32	19	53	16	24	25	61	26	63	28	56	26	60	26	66	23	42	22	37	14	28
1400-1500	14	25	16	33	19	50	16	28	25	60	26	61	27	59	26	62	25	68	23	44	22	38	14	27
1500-1600	14	28	14	35	19	47	16	29	26	64	27	64	27	54	25	59	26	70	23	46	21	45	14	30
1600-1700	13	27	12	33	19	53	17	32	25	67	26	67	27	62	25	67	26	74	23	49	21	48	13	30
1700-1800	12	39	11	44	19	53	17	34	24	73	25	70	27	67	26	71	26	76	22	45	19	55	11	40
1800-1900	12	50	10	45	18	58	17	50	24	77	25	72	25	73	26	73	26	78	22	41	18	53	10	46
1900-2000	11	55	11	54	18	60	17	54	24	79	25	72	26	71	25	76	25	78	21	40	17	47	10	38
2000-2100	11	55	11	54	18	56	17	55	24	81	25	74	26	76	25	78	25	78	21	41	17	49	8	46
2100-2200	10	59	11	57	18	54	17	46	23	81	26	78	26	79	25	82	25	77	21	42	17	45	7	45
2200-2300	10	48	10	59	18	54	17	40	23	83	25	79	26	80	25	80	25	79	20	46	18	52	8	54
2300-0000	11	45	10	56	18	56	16	44	23	83	25	81	25	81	25	82	25	79	21	41	18	59	9	43

Annex D
Proportion of Local and Rural Roads
within Hong Kong & Trip per VKT for
Hong Kong

Annex D

Proportion of Local and Rural Roads within Hong Kong

Region	Average Daily Vehicle-Kilometre in Year 2021		
	Major Roads	Minor Roads	Total
HK Island	4985988	1049363	6035351
Kowloon	7526046	1075236	8601283
New Territories	20916379	3194152	24110531
Total	33428413	5318751	38747164
Percentage	86.27%	13.73%	100%

Annex D

Year 2033	No. of Trips within HK			VKT within HK			VKT for Local and Rural Roads within HK			Trips per VKT
	Petrol	Diesel	LPG	Petrol	Diesel	LPG	Petrol	Diesel	LPG	
01 - Private Cars (PC)	1089835	17169	0	20578260	329132	0	2825395	45190	0	0.38564
02 - Taxi	2	0	73207	215	0	7865988	30	0	1080000	0.06778
03 - Light Goods Vehicles<=2.5t	82	2366	0	1337	39864	0	184	5473	0	0.43279
04 - Lt Goods Vehicles 2.5-3.5t	5731	228695	0	94141	3910428	0	12926	536902	0	0.42636
05 - Light Goods Vehicles>3.5t	0	84180	0	0	2129478	0	0	292377	0	0.28792
06 - Medium Goods Vehicles<=15t	0	54159	0	0	1166705	0	0	160189	0	0.33809
07 - Medium Goods Vehicles15-24t	0	106469	0	0	2293202	0	0	314857	0	0.33815
08 - Public Light Buses	0	14999	2294	0	904063	138219	0	124128	18977	0.12084
09 - Private Light Bus <=3.5t	134	1302	0	2574	42282	0	353	5805	0	0.23323
10 - Private Light Bus >3.5t	6	10465	742	100	289617	12699	14	39764	1744	0.27005
11 - Non-franchised Bus<=6.4t	0	10186	0	0	309460	0	0	42489	0	0.00000
12 - Non-franchised Bus 6.4-15t	0	7067	0	0	212018	0	0	29110	0	0.00000
13 - Non-franchised Bus 15-24t	0	15513	0	0	464277	0	0	63745	0	0.00000
14 - Franchised Bus (SD)	0	2934	0	0	49209	0	0	6756	0	0.00000
15 - Franchised Bus (DD)	0	62351	0	0	1329686	0	0	182566	0	0.00000
16 - Motorcycles (MC)	449342	0	0	1221711	0	0	167741	0	0	2.67879
17 - Heavy Goods Vehicles>24t	0	27814	0	0	600518	0	0	82451	0	0.33734
18 - Non-franchised Bus >24t	0	8	0	0	239	0	0	33	0	0.00000
19 - <Placeholder (P3)>	0	0	0	0	0	0	0	0	0	0.00000
20 - <Placeholder (P4)>	0	0	0	0	0	0	0	0	0	0.00000
21 - <Placeholder (P5)>	0	0	0	0	0	0	0	0	0	0.00000

Notes:

(1) Trips per VKT is adopted in broad-brush approach.

(2) Since the start emissions from Non-franchised Bus (NFB), Single Deck Franchised Bus (FBSD), and Double Deck Franchised Bus (FBDD) are not estimated by the broad-brush approach, the value of Trips per VKT for these vehicle classes is 0.

Annex E
Sensitivity Test for Cold Start
Emission on Medium & Heavy Goods
Vehicles

Annex E

HGV Carpark Sensitivity Test Results (Parking Space more than 100)

HGV Carpark : Kerry Cargo Center (ID 66)

ASR: Kerry Cargo Centre (A112) at 23mAG⁽¹⁾

Averaging Time	Total NOx (ug/m ³)		
	Precise Approach	Broad-brush Approach	Difference
Max. 1-hr	4.57	1.55	3.02
19th highest hr	3.09	1.17	1.92
Annual	0.43	0.08	0.35

Notes:

(1) As the ASR is located above the Carpark, the first assessment level is 23 mAG.

Detailed Calculation

Emission Inventory for AERMOD Model - Starting Emission of Kerry Cargo Center Carpark (Precise Approach)

Activity	Source ID	Type	X (m)	Y (m)	Release Height (mAG)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate	
													NO (g/s) or (g/m ² /s)	NO ₂ (g/m ² /s)
Starting Emission inside Kerry Cargo Center Carpark	HGVP601	AREAPOLY	830473.7	824820.3	0.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824888.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP602	AREAPOLY	830473.7	824820.3	5.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824888.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP603	AREAPOLY	830473.7	824820.3	10.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824888.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP604	AREAPOLY	830473.7	824820.3	15.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824888.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										

Annex E

Emission Inventory for AERMOD Model - Starting Emission of Kerry Cargo Center Carpark (Precise Approach)

Activity	Source ID	Type	X	Y	Release Height (mAG)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate	
			(m)	(m)									NO _x (g/s) or (g/m ² /s)	NO ₂ (g/s) or (g/m ² /s)
Starting Emission inside Kerry Cargo Center Carpark	HGVP6605	AREAPOLY	830473.7	824820.3	20.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6606	AREAPOLY	830473.7	824820.3	25.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6607	AREAPOLY	830473.7	824820.3	30.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6608	AREAPOLY	830473.7	824820.3	35.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6609	AREAPOLY	830473.7	824820.3	40.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										

Annex E

Emission Inventory for AERMOD Model - Starting Emission of Kerry Cargo Center Carpark (Precise Approach)

Activity	Source ID	Type	X	Y	Release Height (mAG)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate	
			(m)	(m)									NO	NO ₂
Starting Emission inside Kerry Cargo Center Carpark	HGVP610	AREAPOLY	830473.7	824820.3	45.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP611	AREAPOLY	830473.7	824820.3	50.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP612	AREAPOLY	830473.7	824820.3	55.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP613	AREAPOLY	830473.7	824820.3	60.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP614	AREAPOLY	830473.7	824820.3	65.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										

Annex E

Emission Inventory for AERMOD Model - Starting Emission of Kerry Cargo Center Carpark (Precise Approach)

Activity	Source ID	Type	X	Y	Release Height (mAG)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate	
			(m)	(m)									NO	NO ₂
Starting Emission inside Kerry Cargo Center Carpark	HGVP6615	AREAPOLY	830473.7	824820.3	70.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6616	AREAPOLY	830473.7	824820.3	75.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6617	AREAPOLY	830473.7	824820.3	80.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6618	AREAPOLY	830473.7	824820.3	85.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										
	HGVP6619	AREAPOLY	830473.7	824820.3	90.0	-	-	-	-	-	-	894.8	3.479E-06	1.646E-06
			830525.6	824898.2										
			830531.7	824894.3										
			830557.4	824939.8										
			830581.4	824971.1										
			830573.0	824991.7										
			830547.6	825004.7										
			830523.0	824995.2										
			830450.1	824882.0										
			830435.7	824845.2										
			830433.9	824845.9										
			830448.3	824882.9										
			830521.7	824996.8										
			830547.7	825006.9										
			830574.6	824993.2										
			830583.7	824970.7										
			830559.1	824938.7										
			830532.4	824891.5										
			830526.2	824895.5										
			830475.4	824819.2										

Widening of Tsuen Wan Road and the Associated Junction Improvement Works (HGV Sensitivity Test - More than 100, Broadbrush Approach)
 Summary of Composite Vehicular Emission Factors for CALINE4 Model

Down Road At Low 50 Equivalent Factor (Night and Traffic Profile)

No. of CALINE 4 Model Links	Link No.	Link Type (L)	X-Start	Y-Start	X-End	Y-End	Height	Width	Length	Hour 01		Hour 02		Hour 03		Hour 04		Hour 05		Hour 06		Hour 07		Hour 08		Hour 09		Hour 10		Hour 11		Hour 12		Hour 13		Hour 14		Hour 15		Hour 16		Hour 17		Hour 18		Hour 19		Hour 20		Hour 21		Hour 22		Hour 23		Hour 24	
										Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF	Flow	EF
1	341-342	1	85060.4	82477.9	85067.8	82482.1	0.0	18.5	16.9	76	0.154	55	0.147	42	0.179	35	0.191	36	0.203	33	0.215	30	0.226	222	0.227	266	0.221	278	0.215	287	0.177	240	0.130	196	0.122	205	0.111	229	0.100	226	0.090	228	0.080	229	0.222	228	0.177	187	0.144	147	0.118	138	0.101	128	0.071	100	0.014
2	149	1	85060.4	82479.2	85067.8	82481.7	0.0	13.1	38.5	238	0.081	171	0.090	138	0.086	104	0.106	106	0.115	102	0.123	96	0.133	437	0.141	786	0.113	702	0.164	444	0.217	593	0.222	609	0.232	681	0.242	751	0.225	748	0.209	770	0.191	810	0.153	865	0.113	736	0.095	582	0.109	561	0.090	528	0.071	416	0.080
3	149	1	85067.8	82481.7	85067.8	82481.7	0.0	13.4	38.1	238	0.081	171	0.090	138	0.086	104	0.106	106	0.115	102	0.123	96	0.133	437	0.141	786	0.113	702	0.164	444	0.217	593	0.222	609	0.232	681	0.242	751	0.225	748	0.209	770	0.191	810	0.153	865	0.113	736	0.095	582	0.109	561	0.090	528	0.071	416	0.080
4	149	1	85067.8	82481.7	85067.8	82481.7	0.0	13.4	37.3	238	0.081	171	0.090	138	0.086	104	0.106	106	0.115	102	0.123	96	0.133	437	0.141	786	0.113	702	0.164	444	0.217	593	0.222	609	0.232	681	0.242	751	0.225	748	0.209	770	0.191	810	0.153	865	0.113	736	0.095	582	0.109	561	0.090	528	0.071	416	0.080
5	149	1	85067.8	82481.7	85067.8	82481.7	0.0	19.1	44.7	238	0.081	171	0.090	138	0.086	104	0.106	106	0.115	102	0.123	96	0.133	437	0.141	786	0.113	702	0.164	444	0.217	593	0.222	609	0.232	681	0.242	751	0.225	748	0.209	770	0.191	810	0.153	865	0.113	736	0.095	582	0.109	561	0.090	528	0.071	416	0.080
6	150	1	85041.9	82503.8	85041.9	82503.8	0.0	14.8	24.5	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072
7	150	1	85041.9	82503.8	85041.9	82503.8	0.0	14.5	22.4	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072
8	150	1	85041.9	82503.8	85041.9	82503.8	0.0	14.5	25.5	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072
9	150	1	85059.6	82504.1	85059.6	82504.1	0.0	14.3	25.9	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072
10	150	1	85059.6	82504.1	85059.6	82504.1	0.0	14.3	25.9	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072
11	150	1	85059.6	82504.1	85059.6	82504.1	0.0	18.0	35.0	244	0.081	173	0.087	130	0.084	104	0.080	106	0.087	101	0.094	93	0.101	609	0.109	778	0.102	674	0.130	467	0.176	540	0.179	447	0.216	480	0.227	565	0.212	504	0.197	523	0.179	552	0.142	596	0.104	512	0.086	406	0.099	395	0.081	371	0.064	292	0.072

[[1]] Link Type No. 1: At grade, 2: Expressway, 3: FA, 4: Bridge

Widening of Tsuen Wan Road and the Associated Junction Improvement Works (HGV Sensitivity Test - More than 100, Broadbrush Approach)
 Summary of Composite Vehicular Emission Factors for CALINE4 Model

Down Road All Day (AD) Emission Factor (g/mile/veh) and Traffic Data

No. of CALINE 4 Model Links	Link No.	Link Type (L)	X-Start	Y-Start	X-End	Y-End	Height	Width	Length	Hour 01		Hour 02		Hour 03		Hour 04		Hour 05		Hour 06		Hour 07		Hour 08		Hour 09		Hour 10		Hour 11		Hour 12		Hour 13		Hour 14		Hour 15		Hour 16		Hour 17		Hour 18		Hour 19		Hour 20		Hour 21		Hour 22		Hour 23		Hour 24	
										Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F
1	341-342	1	85060.4	82477.9	85077.6	82482.1	0.0	18.5	76.3	76	0.072	55	0.078	42	0.084	35	0.090	36	0.096	113	0.103	100	0.116	222	0.111	266	0.104	278	0.118	287	0.149	240	0.135	196	0.133	205	0.155	229	0.143	226	0.134	228	0.134	229	0.136	228	0.080	187	0.077	147	0.083	138	0.071	128	0.077	100	0.083
2	343	1	85061.1	82478.2	85078.9	82483.4	0.0	13.1	38.5	238	0.028	171	0.040	120	0.046	104	0.050	106	0.054	152	0.058	136	0.063	417	0.066	786	0.062	702	0.077	444	0.102	593	0.106	409	0.109	481	0.114	751	0.105	748	0.088	770	0.090	810	0.072	865	0.070	736	0.064	582	0.051	641	0.042	528	0.031	416	0.037
3	349	1	85067.6	82481.7	85071.0	82485.4	0.0	13.4	38.8	238	0.028	171	0.040	120	0.046	104	0.050	106	0.054	152	0.058	136	0.063	417	0.066	786	0.062	702	0.077	444	0.102	593	0.106	409	0.109	481	0.114	751	0.105	748	0.088	770	0.090	810	0.072	865	0.070	736	0.064	582	0.051	641	0.042	528	0.031	416	0.037
4	349	1	85067.0	82485.4	85059.7	82481.0	0.0	13.4	37.3	238	0.028	171	0.040	120	0.046	104	0.050	106	0.054	152	0.058	136	0.063	417	0.066	786	0.062	702	0.077	444	0.102	593	0.106	409	0.109	481	0.114	751	0.105	748	0.088	770	0.090	810	0.072	865	0.070	736	0.064	582	0.051	641	0.042	528	0.031	416	0.037
5	349	1	85067.0	82485.8	85059.2	82480.4	0.0	19.1	44.7	238	0.028	171	0.040	120	0.046	104	0.050	106	0.054	152	0.058	136	0.063	417	0.066	786	0.062	702	0.077	444	0.102	593	0.106	409	0.109	481	0.114	751	0.105	748	0.088	770	0.090	810	0.072	865	0.070	736	0.064	582	0.051	641	0.042	528	0.031	416	0.037
6	350	1	85071.8	82538.4	85059.3	82533.3	0.0	14.8	24.5	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034
7	350	1	85064.9	82500.3	85044.6	82504.5	0.0	14.5	32.4	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034
8	350	1	85064.6	82496.5	85039.6	82501.1	0.0	14.5	35.5	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034
9	350	1	85059.6	82504.1	85042.9	82488.4	0.0	14.3	25.9	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034
10	350	1	85059.1	82486.4	85043.1	82483.0	0.0	18.0	35.0	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034
11	350	1	85059.1	82481.0	85043.2	82482.2	0.0	18.7	45.4	244	0.028	173	0.032	130	0.035	104	0.038	106	0.041	151	0.044	203	0.048	609	0.051	778	0.048	474	0.061	467	0.082	540	0.084	447	0.101	480	0.107	565	0.099	504	0.092	523	0.084	552	0.067	596	0.049	512	0.040	406	0.046	395	0.038	371	0.030	292	0.034

[[1]] Link Type No. 1 = All grade, 2 = Expressway, 3 = FA, 6 = Bridge

Annex E

HGV Carpark Sensitivity Test Results (Parking Space less than 100)

HGV Carpark: Kong Nam Industrial Building Carpark (ID 183)

ASR: Southeast Industrial Building (A6) at 9mAG⁽¹⁾ ASR: Kong Nam Industrial Building (A8a) at 4mAG⁽²⁾ ASR: Kong Nam Industrial Building (A8b) at 16mAG⁽³⁾

Averaging Time	Total NOx (ug/m ³)			Averaging Time	Total NOx (ug/m ³)			Averaging Time	Total NOx (ug/m ³)		
	Precise Approach	Broad-brush Approach	Difference		Precise Approach	Broad-brush Approach	Difference		Precise Approach	Broad-brush Approach	Difference
Max. 1-hr	1.50	4.17	-2.67	Max. 1-hr	1.84	6.71	-4.87	Max. 1-hr	2.29	3.36	-1.07
19th highest hr	1.10	2.35	-1.24	19th highest hr	1.40	4.23	-2.82	19th highest hr	1.66	2.72	-1.05
Annual	0.07	0.34	-0.27	Annual	0.13	0.82	-0.69	Annual	0.11	0.37	-0.25

ASR: Basketball Court at Hoi On Road (A9) at 1.5mAG ASR: Summit Terrace Tower 2 (A19) at 15mAG⁽⁴⁾ ASR: Tsuen Tak Gardens Block D (A20) at 1.5mAG

Averaging Time	Total NOx (ug/m ³)			Averaging Time	Total NOx (ug/m ³)			Averaging Time	Total NOx (ug/m ³)		
	Precise Approach	Broad-brush Approach	Difference		Precise Approach	Broad-brush Approach	Difference		Precise Approach	Broad-brush Approach	Difference
Max. 1-hr	3.87	5.84	-1.96	Max. 1-hr	0.57	4.89	-4.32	Max. 1-hr	1.04	7.46	-6.43
19th highest hr	1.71	3.80	-2.09	19th highest hr	0.29	3.98	-3.69	19th highest hr	0.32	5.73	-5.40
Annual	0.05	0.64	-0.58	Annual	0.02	0.51	-0.49	Annual	0.02	1.31	-1.29

Notes:

- (1) As the ASR is located above the Carpark, the first assessment level is 9 mAG.
- (2) No air-sensitive uses below 4 mAG were identified for the facade of A8a facing Castle Peak Road - Tsuen Wan Road.
- (3) No air-sensitive uses below 16 mAG were identified for the facade of A8b facing Hoi On Road.
- (4) ASR is located on podium, the first assessment level is 15 mAG.

Detailed Calculation

Emission Inventory for AERMOD Model - Starting Emission of Kong Nam Industrial Building Carpark (Precise Approach)

Activity	Source ID	Type	X		Release Height (mAG)	Sylnit (m)	Sznit (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate	
			(m)	(m)								NO _x	NO ₂
			(g/s) or (kg/m ³)										
Starting Emission inside Kong Nam Industrial Building Carpark	HGVP18301	AREA	828841.0	825990.1	5.0	-	-	51.8	2.0	159.1	247.3	4.443E-06	2.104E-06
	HGVP18302	AREA	828841.0	825990.1	7.0	-	-	51.8	2.0	159.1	4.443E-06	2.104E-06	
	HGVP18303	AREA	828841.0	825990.1	9.0	-	-	51.8	2.0	159.1	4.443E-06	2.104E-06	
	HGVP18304	AREA	828841.0	825990.1	10.0	-	-	51.8	2.0	159.1	4.443E-06	2.104E-06	
	HGVP18305	AREA	828841.0	825990.1	12.0	-	-	51.8	2.0	159.1	4.443E-06	2.104E-06	
	HGVP18306	AREA	828841.0	825990.1	14.0	-	-	51.8	2.0	159.1	4.443E-06	2.104E-06	
	HGVP18307	AREA	828750.3	826035.6	0.0	-	-	2.0	10.0	159.2	4.443E-06	2.104E-06	
	HGVP18308	AREA	828750.3	826035.6	2.0	-	-	2.0	10.0	159.2	4.443E-06	2.104E-06	
	HGVP18309	AREA	828750.3	826035.6	4.0	-	-	2.0	10.0	159.2	4.443E-06	2.104E-06	
	HGVP18310	AREA	828781.9	826063.6	0.0	-	-	10.0	2.0	158.5	4.443E-06	2.104E-06	
	HGVP18311	AREA	828781.9	826063.6	2.0	-	-	10.0	2.0	158.5	4.443E-06	2.104E-06	
	HGVP18312	AREA	828781.9	826063.6	4.0	-	-	10.0	2.0	158.5	4.443E-06	2.104E-06	
	HSE18301	AREA	828748.3	826040.4	3.9	-	-	16.5	20.0	158.3	4.843E-07	2.303E-07	
	HSE18302	AREA	828728.3	826054.9	3.9	-	-	21.6	29.1	143.9	4.604E-07	2.189E-07	
	HSE18303	AREA	828786.8	826096.9	3.9	-	-	82.5	13.8	149.1	7.278E-07	3.461E-07	
	HSE18304	AREA	828788.5	826101.2	3.9	-	-	7.4	14.8	125.3	6.426E-07	3.055E-07	
HSE18305	AREA	828801.6	826108.9	3.9	-	-	12.9	10.2	141.9	9.867E-07	4.692E-07		
HSE18306	AREA	828814.4	826116.0	3.9	-	-	13.6	11.0	153.2	9.328E-07	4.436E-07		
HSE18307	AREA	828834.3	826120.8	3.9	-	-	19.1	12.1	168.3	8.217E-07	3.907E-07		
HSE18308	AREA	828846.0	826129.0	3.9	-	-	16.0	14.3	150.7	6.990E-07	3.324E-07		
HSE18309	AREA	828855.5	826138.5	3.9	-	-	15.7	12.2	132.0	2.082E-07	9.902E-08		
HSE18310	AREA	828873.9	826169.7	3.9	-	-	37.4	12.0	120.6	2.057E-07	9.781E-08		
Starting Emission outside Kong Nam Industrial Building Carpark	A1	VOLUME	828918.8	826221.5	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A2	VOLUME	828923.5	826225.7	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A3	VOLUME	828928.1	826229.9	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A4	VOLUME	828932.8	826234.1	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A5	VOLUME	828937.4	826238.2	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A6	VOLUME	828942.1	826242.4	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A7	VOLUME	828946.8	826246.6	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A8	VOLUME	828951.4	826250.7	0.0	2.88	3.26	-	-	-	-	5.252E-05	2.502E-05
	A9	VOLUME	828956.1	826254.9	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A10	VOLUME	828960.7	826259.1	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A11	VOLUME	828965.4	826263.2	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A12	VOLUME	828970.0	826267.4	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A13	VOLUME	828974.7	826271.6	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A14	VOLUME	828979.3	826275.8	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A15	VOLUME	828984.0	826279.9	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	A16	VOLUME	828988.6	826284.1	0.0	2.88	3.26	-	-	-	-	2.626E-05	1.251E-05
	HSE18313	AREA	828931.8	826241.9	3.9	-	-	29.5	12.3	137.8	2.064E-07	9.814E-08	
	HSE18314	AREA	828950.4	826255.2	3.9	-	-	22.2	12.4	144.6	1.995E-07	9.487E-08	
	HSE18315	AREA	828965.8	826263.8	3.9	-	-	16.9	12.4	151.0	2.022E-07	9.605E-08	
	HSE18316	AREA	828982.9	826273.1	3.9	-	-	19.2	13.6	153.1	1.818E-07	8.643E-08	
	HSE18317	AREA	829006.8	826280.7	3.9	-	-	24.0	13.6	162.7	1.838E-07	8.738E-08	
	HSE18318	AREA	829034.9	826286.3	3.9	-	-	27.9	14.2	169.4	1.767E-07	8.401E-08	
	HSE18319	AREA	829072.2	826284.4	3.9	-	-	37.0	24.6	176.2	1.015E-07	4.826E-08	
	HSE18320	AREA	829073.4	826285.7	3.9	-	-	19.0	51.1	92.0	1.312E-07	6.236E-08	
	HSE18321	AREA	829168.9	826286.8	3.9	-	-	45.8	23.3	178.8	1.077E-07	5.121E-08	
	HSE18322	AREA	828950.7	826129.0	3.9	-	-	14.6	13.3	99.1	5.002E-07	2.379E-07	
	HSE18323	AREA	828867.1	826126.3	3.9	-	-	14.5	14.8	128.1	5.242E-07	2.493E-07	
	HSE18333	AREA	828881.6	826114.3	3.9	-	-	15.6	18.1	159.0	4.786E-07	2.276E-07	
	HSE18334	AREA	828885.5	826099.2	3.9	-	-	13.2	10.1	136.3	5.615E-07	2.670E-07	
	HSE18335	AREA	828893.5	826089.9	3.9	-	-	12.6	18.3	156.0	5.848E-07	2.781E-07	
	HSE18336	AREA	828901.3	826072.4	3.9	-	-	12.8	14.5	164.1	6.044E-07	2.874E-07	
	HSE18337	AREA	828905.2	826058.2	3.9	-	-	12.4	46.8	165.3	6.067E-07	2.885E-07	
	HSE18338	AREA	828919.4	826044.1	3.9	-	-	17.6	36.4	161.8	4.214E-07	2.004E-07	
	HSE18339	AREA	828930.3	825980.4	3.9	-	-	17.3	47.0	155.9	4.332E-07	2.060E-07	
	HSE18340	AREA	828947.5	825938.1	3.9	-	-	14.6	39.8	145.5	5.150E-07	2.449E-07	
	HSE18341	AREA	828969.1	825905.7	3.9	-	-	13.7	63.1	137.8	5.458E-07	2.595E-07	
HSE18342	AREA	829010.9	825858.9	3.9	-	-	12.8	66.9	134.2	5.856E-07	2.785E-07		

Annex E

HGV Carpark Sensitivity Test Results (Parking Space less than 100)

HGV Carpark: Texaco Road Carpark (ID 245)

ASR: Aurora Tower 1 (A57) at 1.5mAG

ASR: Gunzeta Ltd (A58) at 1.5mAG

ASR: Texaco Road Industrial Centre (A59) at 12mAG⁽¹⁾

ASR: Proposed Industrial Building (A60) at 1.5mAG

Averaging Time	Total Nox (ug/m ³)			Difference	Averaging Time	Total Nox (ug/m ³)			Difference	Averaging Time	Total Nox (ug/m ³)			Difference	Averaging Time	Total Nox (ug/m ³)			Difference
	Precise Approach	Broad-brush Approach				Precise Approach	Broad-brush Approach				Precise Approach	Broad-brush Approach				Precise Approach	Broad-brush Approach		
Max. 1-hr	5.83	7.68	-1.84	Max. 1-hr	7.32	9.26	-1.94	Max. 1-hr	1.72	2.95	-1.24	Max. 1-hr	2.95	7.94	-4.99				
19th highest hr	2.44	6.28	-3.84	19th highest hr	3.64	7.99	-4.35	19th highest hr	1.11	2.08	-0.97	19th highest hr	1.94	6.57	-4.64				
Annual	0.18	1.78	-1.60	Annual	0.23	1.39	-1.16	Annual	0.04	0.24	-0.20	Annual	0.04	0.77	-0.73				

ASR: Riviera Gardens Block 1 Hoi Po Mansion (A92) at 5mAG⁽²⁾

ASR: Shak Chung Shsn Memorial Catholic Primary School (A94) at 1.5mAG

ASR: City Point Block 1 (A97) at 22mAG⁽³⁾

Averaging Time	Total Nox (ug/m ³)			Difference	Averaging Time	Total Nox (ug/m ³)			Difference	Averaging Time	Total Nox (ug/m ³)			Difference	
	Precise Approach	Broad-brush Approach				Precise Approach	Broad-brush Approach				Precise Approach	Broad-brush Approach			
Max. 1-hr	2.12	11.97	-9.84	Max. 1-hr	1.83	3.21	-1.39	Max. 1-hr	2.06	5.63	-3.57	Max. 1-hr	0.58	2.08	-1.50
19th highest hr	0.62	9.18	-8.56	19th highest hr	1.21	2.55	-1.34	19th highest hr	1.69	4.11	-2.42	19th highest hr	0.46	1.64	-1.18
Annual	0.03	1.66	-1.62	Annual	0.12	0.36	-0.24	Annual	0.17	0.77	-0.60	Annual	0.04	0.15	-0.12

Notes:

(1) As the ASR is located above the Carpark, the first assessment level is 12 mAG.

(2) ASR is located on podium, the first assessment level is 5 mAG.

(3) ASR is located on podium, the first assessment level is 22 mAG.

Detailed Calculation

Emission Inventory for AERMOD Model - Starting Emission of Texaco RoadCarpark (Precise Approach)

Activity	Source ID	Type	X (m)	Y (m)	Release Height (mAG)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Area (m ²)	Max. Hourly Emission Rate		
													NO	NO ₂	
													(g/s)	(g/m ² /s)	
Starting Emission inside Texaco Road Carpark	HGVP24501	AREAPOLY	829875.0	825100.6	0.0	-	-	-	-	-	-	-	6530.0	3.142E-07	1.536E-07
			829891.4	825119.9											
			829893.3	825208.0											
			829851.4	825224.6											
			829847.4	825231.3											
			829841.3	825233.8											
			829836.7	825233.2											
			829830.0	825229.2											
			829819.5	825220.9											
			829785.5	825187.4											
Starting Emission outside Texaco Road Carpark	HSE24501	AREA	829882.2	825186.5	3.9	-	-	-	7.4	20.0	159.8	-	6.559E-07	3.213E-07	
	HSE24502	AREA	829880.8	825192.7	3.9	-	-	-	13.8	35.5	162.1	-	1.011E-06	4.969E-07	
	HSE24503	AREA	829865.7	825240.3	3.9	-	-	-	17.8	49.5	158.9	-	7.663E-07	3.759E-07	
	HSE24504	AREA	829840.6	825250.1	3.9	-	-	-	15.0	19.9	107.2	-	7.389E-07	3.625E-07	
	HSE24505	AREA	829834.8	825248.8	3.9	-	-	-	19.9	13.8	148.2	-	8.025E-07	3.936E-07	
	HSE24506	AREA	829816.7	825237.4	3.9	-	-	-	69.2	13.8	136.2	-	7.957E-07	3.903E-07	
	HSE24507	AREA	829766.6	825189.4	3.9	-	-	-	42.5	13.8	134.7	-	8.066E-07	3.956E-07	
	HSE24508	AREA	829735.9	825158.8	3.9	-	-	-	27.5	14.6	128.3	-	7.673E-07	3.764E-07	
	HSE24509	AREA	829717.9	825135.7	3.9	-	-	-	26.3	14.6	114.2	-	7.486E-07	3.652E-07	
	HSE24510	AREA	829706.7	825110.4	3.9	-	-	-	21.1	14.6	102.9	-	7.502E-07	3.680E-07	
	HSE24511	AREA	829701.8	825088.4	3.9	-	-	-	19.5	14.6	91.1	-	7.733E-07	3.733E-07	
	HSE24512	AREA	829715.9	825069.8	3.9	-	-	-	14.6	21.0	171.4	-	7.540E-07	3.698E-07	
	HSE24513	AREA	829718.7	825050.4	3.9	-	-	-	14.6	27.6	160.0	-	7.656E-07	3.755E-07	
	HSE24514	AREA	829727.2	825026.3	3.9	-	-	-	14.6	30.1	143.8	-	7.516E-07	3.687E-07	
	HSE24515	AREA	829743.9	825002.9	3.9	-	-	-	14.2	182.0	132.5	-	7.754E-07	3.804E-07	
	HSE24521	AREA	829886.1	825269.4	3.9	-	-	-	31.0	19.0	104.8	-	1.449E-07	7.108E-08	
	HSE24522	AREA	829888.0	825312.2	3.9	-	-	-	111.9	14.6	160.0	-	1.862E-07	9.132E-08	
	HSE24523	AREA	829987.9	825318.7	3.9	-	-	-	20.7	14.5	161.6	-	1.932E-07	9.428E-08	
	HSE24524	AREA	830055.3	825348.2	3.9	-	-	-	73.6	17.2	159.1	-	1.609E-07	7.891E-08	
	HSE24525	AREA	830075.4	825352.9	3.9	-	-	-	20.4	14.0	158.6	-	7.700E-08	3.777E-08	
	HSE24526	AREA	830112.1	825373.5	3.9	-	-	-	43.0	14.0	150.9	-	7.862E-08	3.856E-08	
	HSE24527	AREA	830288.2	825418.9	3.9	-	-	-	207.1	13.0	148.2	-	8.468E-08	4.153E-08	
	HSE24531	AREA	830054.9	825362.4	3.9	-	-	-	21.3	14.5	99.9	-	1.124E-07	5.515E-08	
	HSE24532	AREA	830018.0	825395.5	3.9	-	-	-	17.2	55.1	119.1	-	9.581E-08	4.700E-08	
	HSE24533	AREA	829990.9	825408.2	3.9	-	-	-	16.2	29.5	116.1	-	1.004E-07	4.923E-08	
	HSE24534	AREA	829848.6	825490.2	3.9	-	-	-	15.8	164.9	120.0	-	1.046E-07	5.132E-08	

Texaco Road (FID 245)

Running Emission - Terminating and Bypass HGVs

Average Travelling Distance within Parking Site =	200	m
Average Travelling Speed =	15	km/h

Hour	Frequency	Heavy Goods Vehicle <15t																
		Running Emission Factor (g/km-vehicle)				Running Emission Within Parking Site (g)												
		NO	NO ₂	RSP	FSP	TSP	NO	NO ₂	RSP	FSP	TSP							
0000 - 0100	0	8.682E-01	4.214E-01	3.470E-02	3.190E-02		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Average Travelling Distance within Parking Site =	200	m
Average Travelling Speed =	15	km/h

Hour	Frequency	Heavy Goods Vehicle 15-24t																
		Running Emission Factor (g/km-vehicle)				Running Emission Within Parking Site (g)												
		NO	NO ₂	RSP	FSP	TSP	NO	NO ₂	RSP	FSP	TSP							
0000 - 0100	0	1.742E+00	8.174E-01	5.530E-02	5.080E-02		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Hour	Frequency	Heavy Goods Vehicle >24t																
		Running Emission Factor (g/km-vehicle)				Running Emission Within Parking Site (g)												
		NO	NO ₂	RSP	FSP	TSP	NO	NO ₂	RSP	FSP	TSP							
0000 - 0100	0	1.792E+00	8.173E-01	5.290E-02	4.860E-02		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Texaco Road (FID 245)

Total Hourly Emission

Hour	Emission Within Parking Site									
	Total Emission (g)					Total Emission Rate (g/s)				
	NO	NO ₂	RSP	FSP	TSP	NO	NO ₂	RSP	FSP	TSP
0000 - 0100	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Widening of Tsuen Wan Road and the Associated Junction Improvement Works (HGV Sensitivity) Test - Less than 100, Broadbrush Approach
 Summary of Composite Vehicular Emission Factors for CALINE4 Model

Open Road Flow 30: Diverging Traffic (Approach and Traffic Phase)

No. of CALINE 4 Model	Link No.	Link Type	Yield					Height	Width	Flow																																																
			X_start	X_end	Y_end	Hdg	Wdg			Flow 11	Flow 12	Flow 13	Flow 14	Flow 15	Flow 16	Flow 17	Flow 18	Flow 19	Flow 20	Flow 21	Flow 22	Flow 23	Flow 24	Flow 25	Flow 26	Flow 27	Flow 28	Flow 29	Flow 30	Flow 31	Flow 32	Flow 33	Flow 34																									
1	322	1	BK026A	BK026B	BK026C	BK026D	BK026E	0.0	11.7	71.7	111	0.00	79	0.029	98	0.033	46	0.036	47	0.029	66	0.041	132	0.046	261	0.090	313	0.075	256	0.068	227	0.090	221	0.090	356	0.083	358	0.090	390	0.084	392	0.079	426	0.068	468	0.075	544	0.036	480	0.028	397	0.022	395	0.025	367	0.020	286	0.021

Link Type No. 3 - A, Approach 3-T, R - Bridge

HGV Carpark Sensitivity Test for Different Modelling Approaches

Kerry Cargo Center Carpark (ID 66)
- with parking space more than 100

Broad-brush Approach

Broad Brush Approach:
Start Emission released on open roads (using CALINE) with a spread distance of 700m from the identified HGV carpark (ID 66).

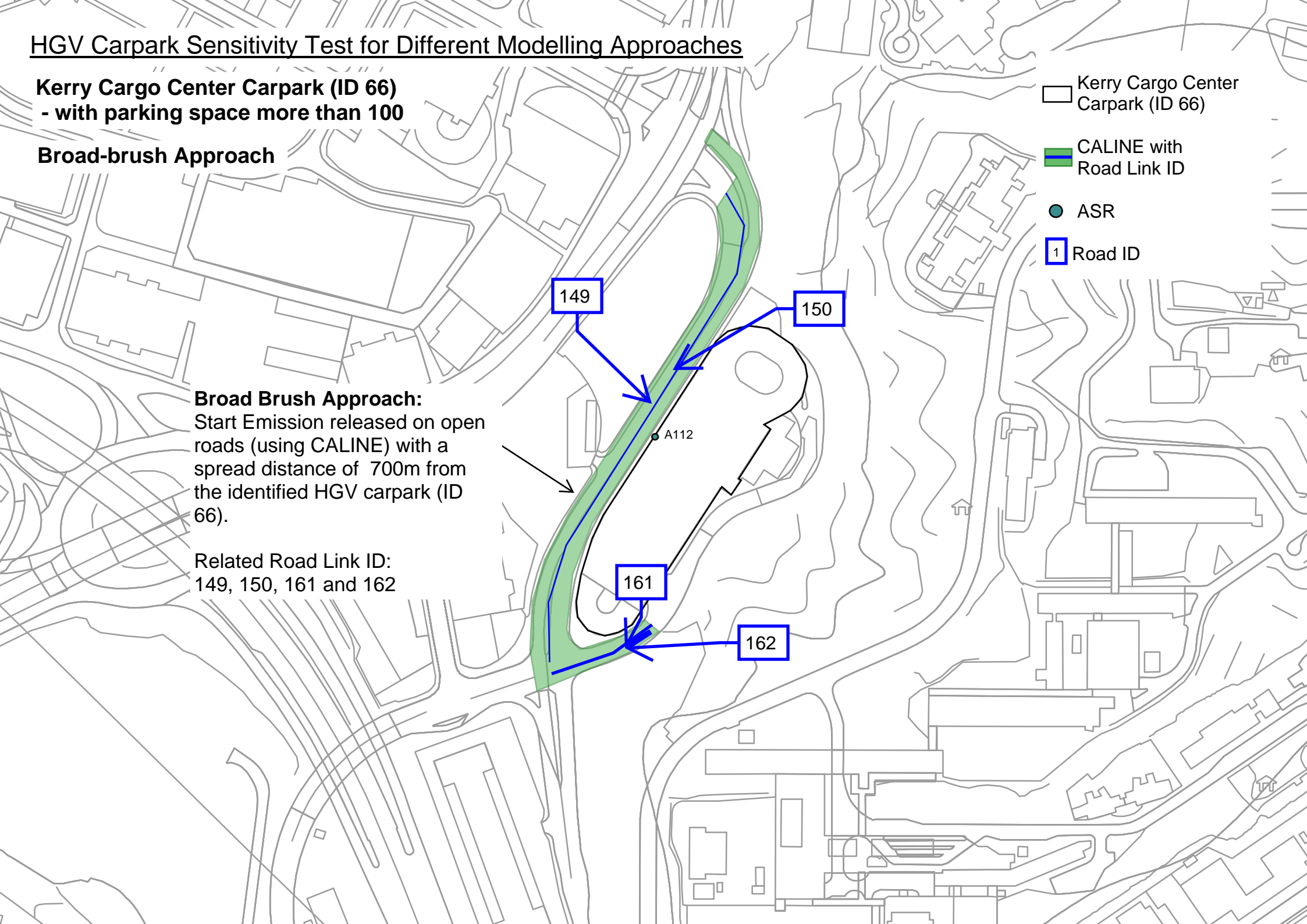
Related Road Link ID:
149, 150, 161 and 162

□ Kerry Cargo Center Carpark (ID 66)

▬ CALINE with Road Link ID

● ASR

□ 1 Road ID



HGV Carpark Sensitivity Test for Different Modelling Approaches

Kerry Cargo Center Carpark (ID 66)
- with parking space more than 100

Precise Approach

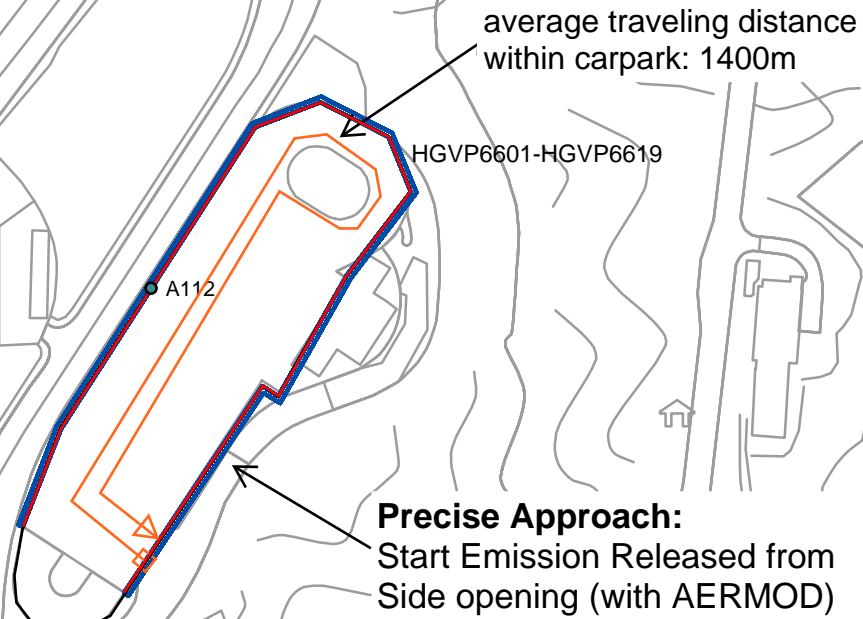
□ Kerry Cargo Center Carpark (ID 66)

— Side Opening

□ Emission from Carpark

● ASR

→ Average traveling route



HGV Carpark Sensitivity Test for Different Modelling Approaches

Kong Nam Industrial Building Carpark (ID 183) - with parking space less than 100





Broad-brush Approach

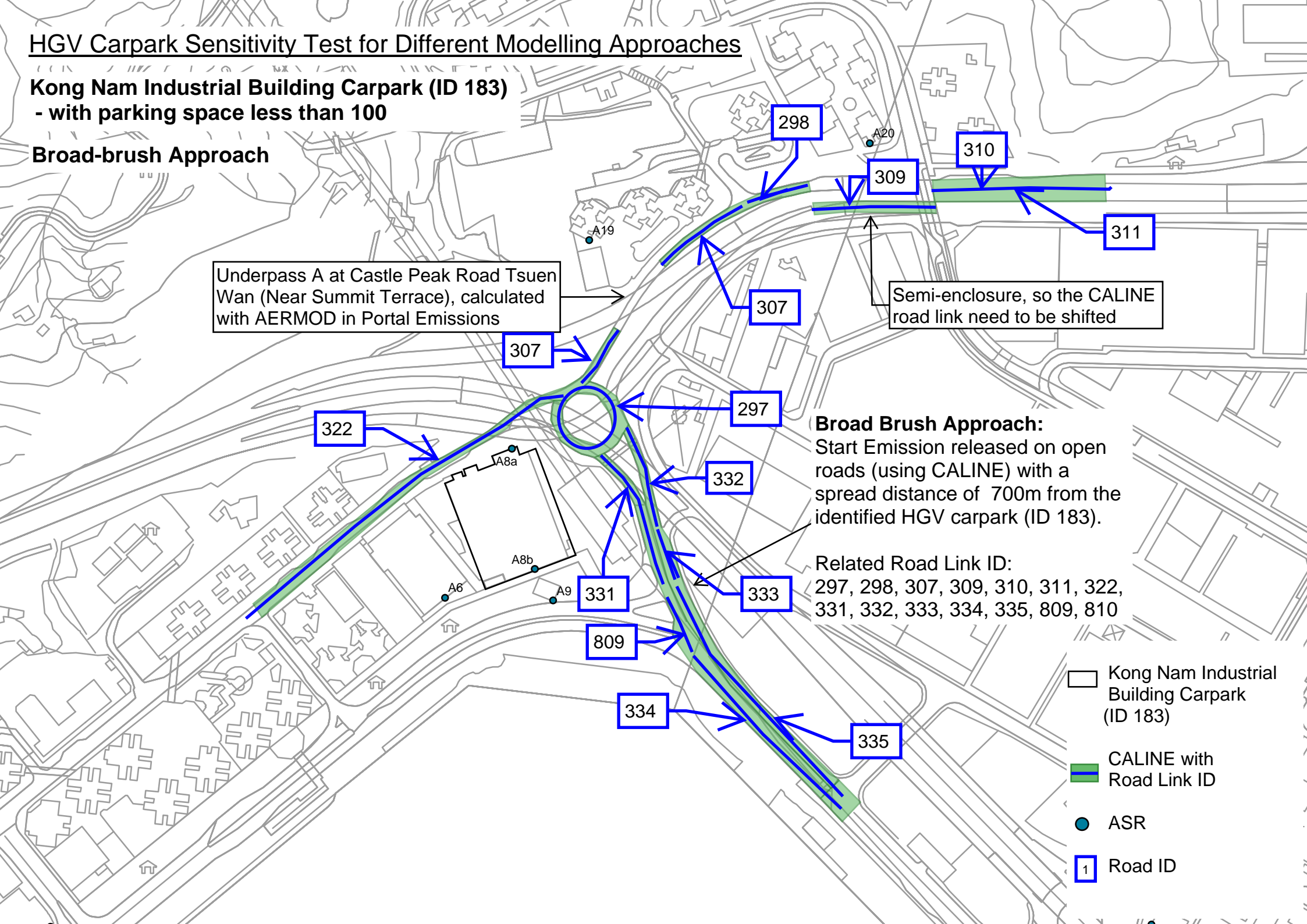
Underpass A at Castle Peak Road Tsuen Wan (Near Summit Terrace), calculated with AERMOD in Portal Emissions

Semi-enclosure, so the CALINE road link need to be shifted

Broad Brush Approach:
Start Emission released on open roads (using CALINE) with a spread distance of 700m from the identified HGV carpark (ID 183).

Related Road Link ID:
297, 298, 307, 309, 310, 311, 322, 331, 332, 333, 334, 335, 809, 810

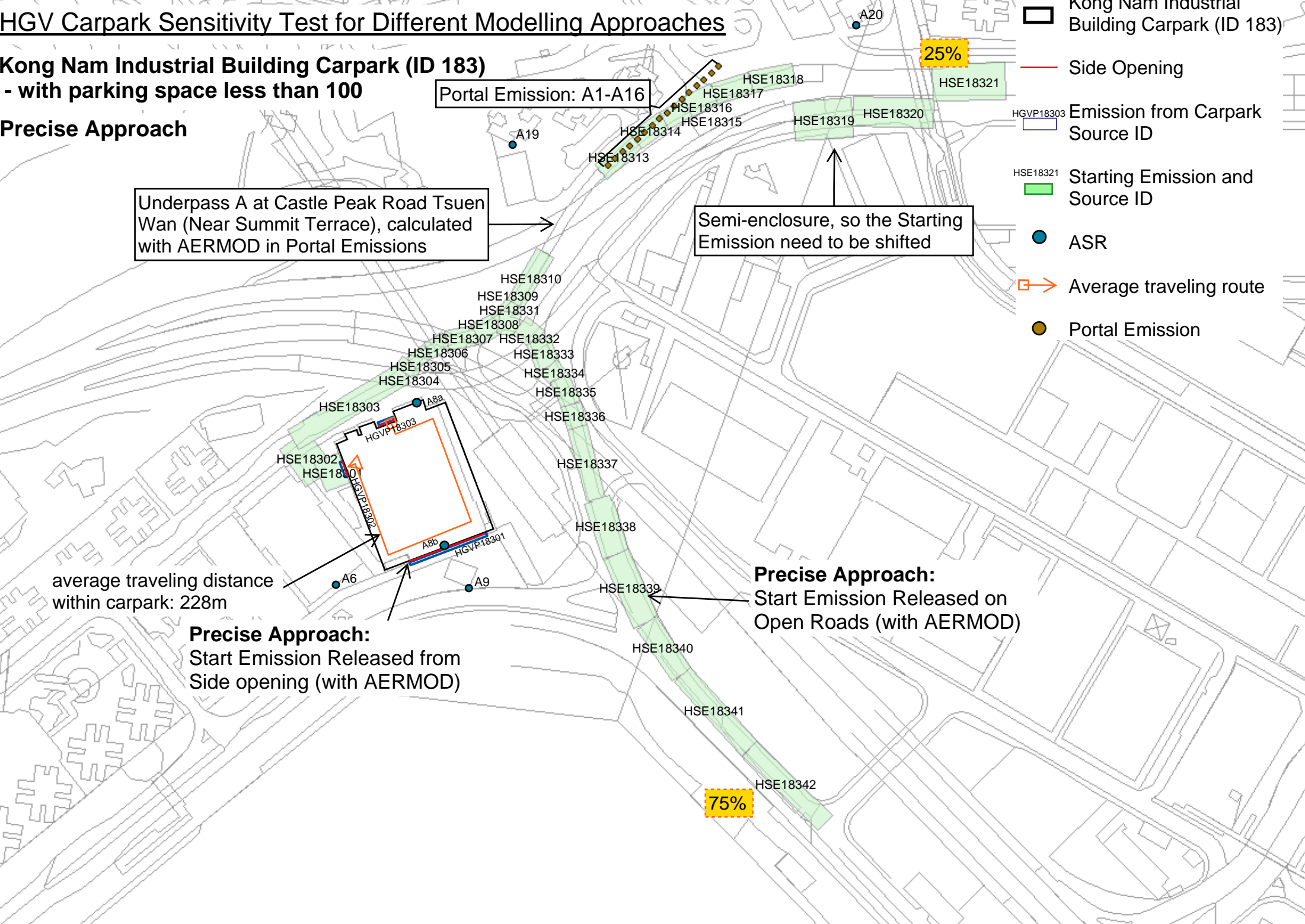
-  Kong Nam Industrial Building Carpark (ID 183)
-  CALINE with Road Link ID
-  ASR
-  Road ID



HGV Carpark Sensitivity Test for Different Modelling Approaches

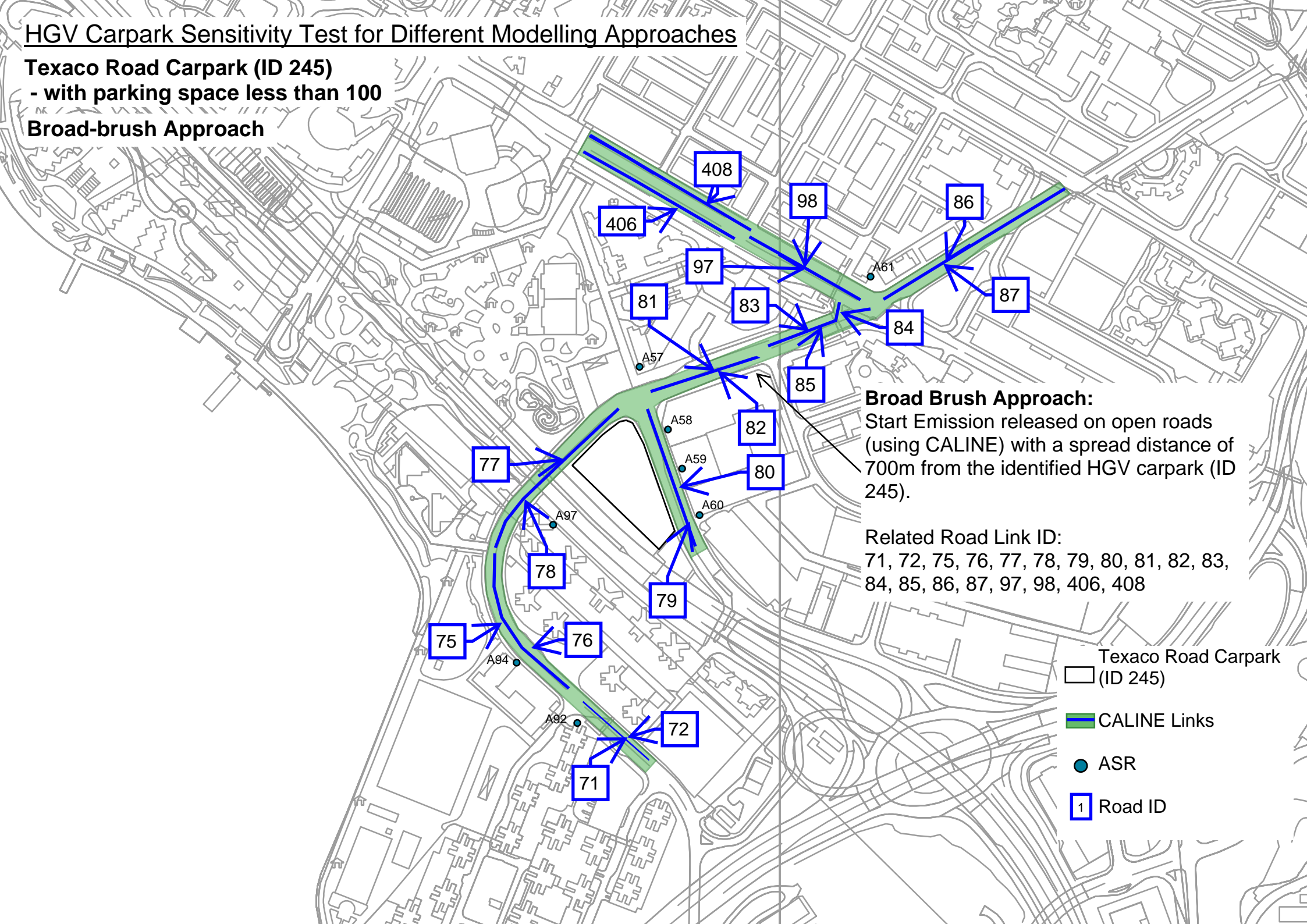
Kong Nam Industrial Building Carpark (ID 183) - with parking space less than 100

Precise Approach



HGVS Carpark Sensitivity Test for Different Modelling Approaches

Texaco Road Carpark (ID 245)
- with parking space less than 100
Broad-brush Approach



HGV Carpark Sensitivity Test for Different Modelling Approaches

Texaco Road Carpark (ID 245)
- with parking space less than 100

Precise Approach

average traveling distance
within carpark: 200m

12%

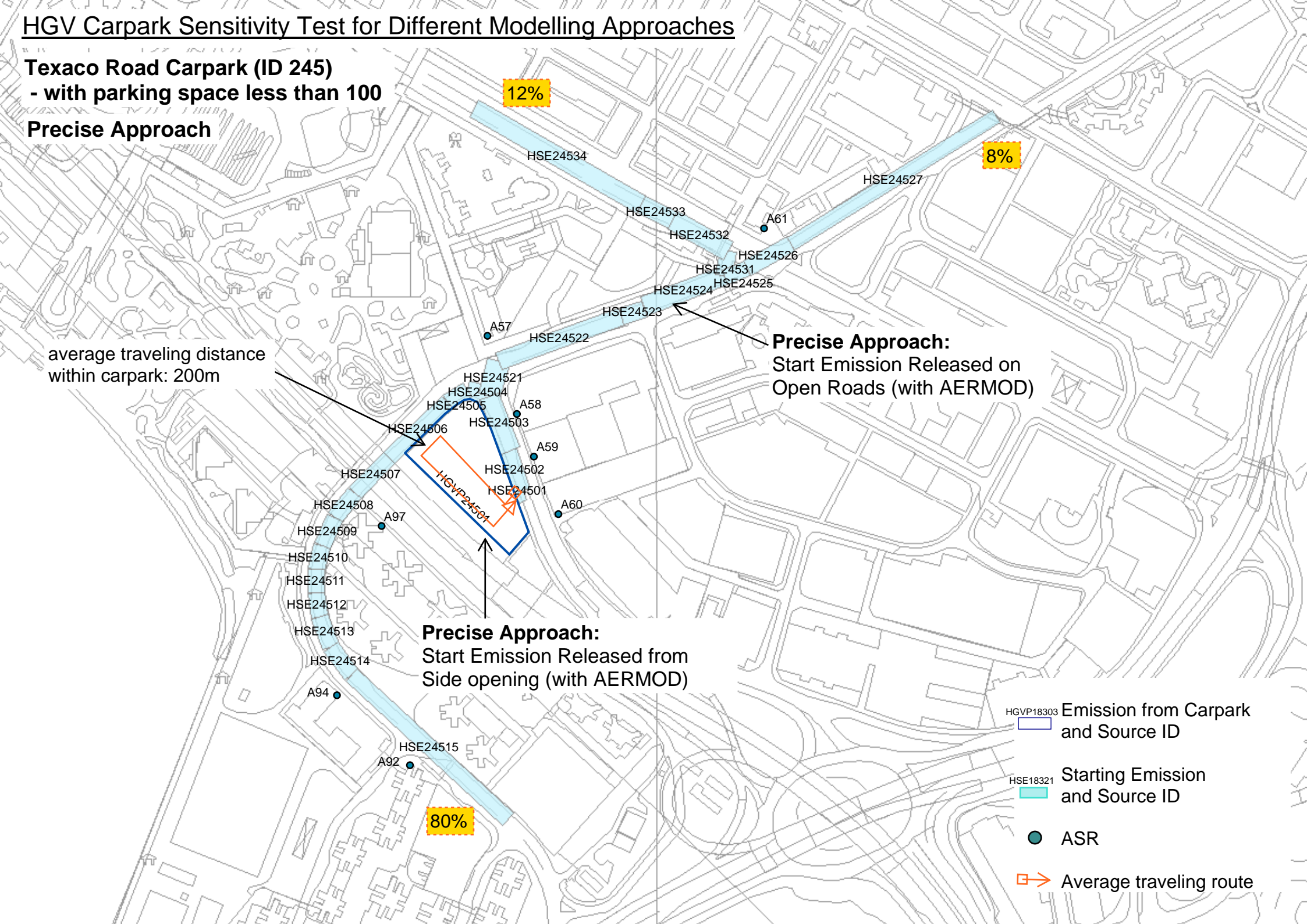
8%

Precise Approach:
Start Emission Released on
Open Roads (with AERMOD)

Precise Approach:
Start Emission Released from
Side opening (with AERMOD)

80%

- HGVP18303 Emission from Carpark and Source ID
- HSE18321 Starting Emission and Source ID
- ASR
- Average traveling route



Annex F
Location of Exhaust Openings in
Tsuen Wan Plaza Carpark

PC Carpark for Precise Approach

Tsuen Wan Plaza Carpark

□ Tsuen Wan Plaza Carpark

▣ Average traveling route

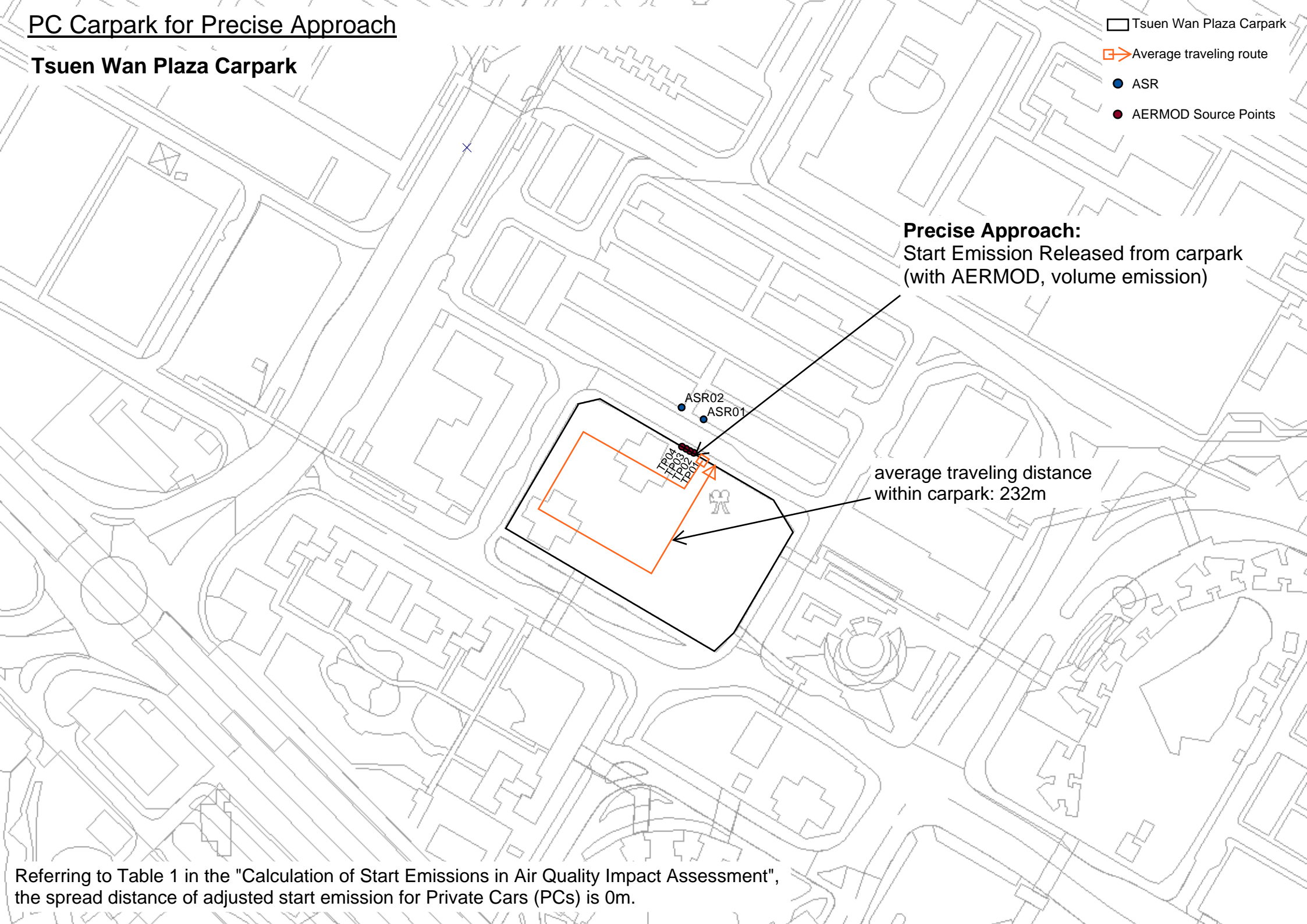
● ASR

● AERMOD Source Points

Precise Approach:

Start Emission Released from carpark
(with AERMOD, volume emission)

average traveling distance
within carpark: 232m



Referring to Table 1 in the "Calculation of Start Emissions in Air Quality Impact Assessment", the spread distance of adjusted start emission for Private Cars (PCs) is 0m.

Annex G
Sensitivity Test for Cold Start
Emission on On-street PLB Termini

Annex G

PLB Carpark Sensitivity Test Results

Kwai Hau Street PLB Terminus (PLB12)

ASR1 at 5mAG⁽¹⁾

ASR2 at 1.5mAG

Averaging Time	Total NOx (ug/m ³)		Difference	Averaging Time	Total NOx (ug/m ³)		Difference
	Precise Approach	Hybrid Approach			Precise Approach	Hybrid Approach	
Max. 1-hr	25.65	68.58	-42.93	Max. 1-hr	3.98	5.38	-1.40
Annual	0.82	1.08	-0.26	Annual	0.05	0.22	-0.17

Notes:

(1) As the first assessment level is 5 mAG for this ASR.

Detailed Calculation

Emission Inventory for AERMOD Model - Starting Emission of Kwai Hau Street PLB Carpark (Precise Approach)

Carpark/Terminus	Source ID	Bus Terminus	Type	X (m)	Y (m)	Release Height (mAG)	Length of X Side (m)	Length of Y Side (m)	Angle (degree)	Synit (m)	Sznit (m)	Operation Period (hr)	Area for PTI	Max. Hourly Emission Rate	
														NO	NO ₂
														(g/s) or (g/m ² /s)	
Emission inside Carpark/Terminus															
Kwai Hau Street (PLB 12)	PLB1201	PLB1201	AREA	830924.3	824886.3	0.0	48.5	19.3	145.2	-	-	24	937	5.846E-06	9.320E-07
Start Emission outside Terminus															
Kwai Hau Street (Minibus - Diesel)	PSE1201	PSE1201	AREA	830887.7	824867.5	2.6	6.0	5.6	147.7	-	-	237	24	2.095E-06	8.147E-07
	PSE1202	PSE1202	AREA	830950.6	824916.2	2.6	82.3	9.6	145.8	-	-	237	24	1.211E-06	4.709E-07
	PSE1203	PSE1203	AREA	830963.4	824927.7	2.6	17.8	9.6	138.2	-	-	237	24	1.226E-06	4.769E-07
	PSE1204	PSE1204	AREA	830972.0	824940.4	2.6	16.5	9.6	124.4	-	-	237	24	1.252E-06	4.868E-07
	PSE1205	PSE1205	AREA	830977.2	824955.3	2.6	17.0	9.6	109.8	-	-	237	24	1.215E-06	4.725E-07
	PSE1206	PSE1206	AREA	830979.3	824970.0	2.6	15.7	9.6	98.7	-	-	237	24	1.237E-06	4.811E-07
	PSE1207	PSE1207	AREA	830979.4	825088.1	2.6	8.9	119.2	175.5	-	-	237	24	1.256E-06	4.886E-07
	PSE1208	PSE1208	AREA	831003.4	825103.6	2.6	24.1	11.6	154.9	-	-	237	24	1.002E-06	3.895E-07
	PSE1209	PSE1209	AREA	831016.1	825113.8	2.6	17.5	11.6	141.7	-	-	237	24	1.034E-06	4.020E-07
	PSE1210	PSE1210	AREA	831027.0	825127.7	2.6	19.0	11.6	128.8	-	-	237	24	1.066E-06	3.911E-07
	PSE1211	PSE1211	AREA	831039.0	825148.5	2.6	24.9	11.6	120.0	-	-	237	24	1.010E-06	3.930E-07
	PSE1212	PSE1212	AREA	831050.3	825164.2	2.6	18.7	11.6	126.1	-	-	237	24	1.020E-06	3.966E-07
	PSE1213	PSE1213	AREA	831065.4	825176.9	2.6	18.3	11.6	140.3	-	-	237	24	9.886E-07	3.845E-07
	PSE1214	PSE1214	AREA	831084.6	825185.5	2.6	19.4	11.6	156.7	-	-	237	24	9.865E-07	3.837E-07
	PSE1215	PSE1215	AREA	831106.7	825189.4	2.6	21.0	11.6	170.4	-	-	237	24	1.006E-06	3.913E-07
	PSE1216	PSE1216	AREA	831108.1	825189.4	2.6	11.6	22.0	95.2	-	-	237	24	1.004E-06	3.904E-07
	PSE1217	PSE1217	AREA	831131.8	825187.0	2.6	11.6	19.5	112.1	-	-	237	24	9.806E-07	3.814E-07
	PSE1218	PSE1218	AREA	831150.5	825178.6	2.6	10.3	19.3	124.4	-	-	237	24	1.114E-06	4.334E-07
	PSE1219	PSE1219	AREA	831167.9	825166.7	2.6	10.8	21.2	142.3	-	-	237	24	1.069E-06	4.159E-07
	PSE1220	PSE1220	AREA	831181.4	825148.9	2.6	10.8	10.2	154.5	-	-	237	24	1.059E-06	4.117E-07
	PSE1221	PSE1221	AREA	831185.9	825139.5	2.6	10.8	81.8	157.5	-	-	237	24	1.083E-06	4.211E-07
	PSE1222	PSE1222	AREA	831218.5	825064.4	2.6	13.4	35.7	157.3	-	-	237	24	8.789E-07	3.418E-07
	PSE1223	PSE1223	AREA	831229.5	825034.3	2.6	12.8	24.9	122.0	-	-	237	24	3.024E-07	1.176E-07
PSE1231	PSE1231	AREA	831232.9	825029.0	2.6	13.5	9.5	179.1	-	-	237	24	6.093E-07	2.370E-07	
PSE1232	PSE1232	AREA	831222.0	825024.7	2.6	14.9	13.5	141.2	-	-	237	24	5.836E-07	2.270E-07	
Kwai Hau Street (Minibus - LPG)	PSE1241	PSE1241	AREA	830887.7	824867.5	2.6	6.0	5.6	147.7	-	-	237	24	8.767E-06	4.401E-08
	PSE1242	PSE1242	AREA	830950.6	824916.2	2.6	82.3	9.6	145.8	-	-	237	24	5.067E-06	2.544E-08
	PSE1243	PSE1243	AREA	830963.4	824927.7	2.6	17.8	9.6	138.2	-	-	237	24	5.132E-06	2.576E-08
	PSE1244	PSE1244	AREA	830971.6	824940.0	2.6	15.9	9.6	124.4	-	-	237	24	5.106E-06	2.563E-08

Kwai Hau Street (Minibus, FID12)

Running Emission

Table with 3 columns: Average Travelling Distance within PTI = 56 m, Average Travelling Speed = 15 km/h.

Table with 12 columns: Hour, Frequency, Running Emission Factor (g/km-vehicle) for NO, NO2, RSP, FSP, TSP, and Running Emission Within PTI (g) for NO, NO2, RSP, FSP, TSP.

Idling Emission

Table with 2 rows: No. of PLB (Diesel) to No. of PLB (LPG Ratio) = 6.5, Idling Time for Non-terminating Public Light Buses = 5 min.

Table with 21 columns: Hour, Frequency, Hot Idling Emission Factor (g/min) for NO, NO2, RSP, FSP, TSP, Hot Idling Emission (g) for NO, NO2, RSP, FSP, TSP, Public Light Bus (LPG) Hot Idling Emission Factor (g/min) for NO, NO2, RSP, FSP, TSP, and Public Light Bus (LPG) Hot Idling Emission (g) for NO, NO2, RSP, FSP, TSP.

Kwai Hau Street (Minibus, FID12)

Total Hourly Emission

Table with 11 columns: Hour, Total Emission (g) (Running + Idling + Starting) for NO, NO2, RSP, FSP, TSP, and Total Emission Rate (g/s) for NO, NO2, RSP, FSP, TSP.

Kwai Hau Street (Minibus, FID12)

Starting Emission

Table with 2 columns: No. of PLB (Diesel) to No. of PLB (LPG) Ratio (1) =, and 6.5

Table with 15 columns: Starting Emission Factor (g/trip) for pollutants: NO, NO2, RSP, FSP, TSP

Table with 21 columns: Hour Siting Time (min), 5, 10, 20, 30, 40, 50, 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720

Table with 5 columns: Total Starting Emission of PLB (LPG) (g) for pollutants: NO, NO2, RSP, FSP, TSP

Remark: [1] Number of cold starts were derived based on on-site observations at the PTIs and operators' published schedules, while siting time were obtained based on on-site observations at PTIs.

[2] Population ratio of PLB (Diesel) to PLB (LPG) was extracted from Year 2028 data of EMFAC-1K.

Kwai Hau Street (Minibus, FID12)

Cold Idling Emission

Table with 2 columns: Idling Time for Terminating Public Light Buses = 5 min, Max. Idling Time for Adjusting Starting Emission = 1 min

Main emission table with multiple columns for Public Light Bus (LPG) Cold and Hot Idling Emission (g) and Frequency

Table with 2 columns: Average Distance from Starting Place to PTI Egress = 28 m, Average Spread Distance outside PTI = 122 m

Large table with multiple columns for Adjusted Starting Emission Within PTI (g), Adjusted Starting Emission Outside PTI (g), and Starting Emission Rate Outside PTI (g/s)

24-hr Emission Rate and Hourly Profile of AERMOD Model - Starting Emission from Kwai Hau Street PLB Terminus (Precise Approach)

Time	24-hr Emission Rate (g/s)		Hourly Profile	
	NO	NO ₂	NO	NO ₂
0000 - 0100	2.80E-04	3.88E-05	5.10E-02	4.44E-02
0100 - 0200	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0200 - 0300	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0300 - 0400	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0400 - 0500	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0500 - 0600	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0600 - 0700	5.48E-03	8.73E-04	1.00E+00	1.00E+00
0700 - 0800	1.96E-03	2.71E-04	3.57E-01	3.11E-01
0800 - 0900	1.96E-03	2.71E-04	3.57E-01	3.11E-01
0900 - 1000	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1000 - 1100	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1100 - 1200	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1200 - 1300	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1300 - 1400	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1400 - 1500	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1500 - 1600	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1600 - 1700	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1700 - 1800	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1800 - 1900	1.96E-03	2.71E-04	3.57E-01	3.11E-01
1900 - 2000	1.96E-03	2.71E-04	3.57E-01	3.11E-01
2000 - 2100	1.96E-03	2.71E-04	3.57E-01	3.11E-01
2100 - 2200	1.96E-03	2.71E-04	3.57E-01	3.11E-01
2200 - 2300	1.86E-03	2.58E-04	3.40E-01	2.96E-01
2300 - 2400	8.39E-04	1.16E-04	1.53E-01	1.33E-01

24-hr Emission Rate and Hourly Profile of AERMOD Model - Starting Emission from Kwai Hau Street PLB Terminus (Hybrid Approach)

Time	24-hr Emission Rate (g/s)		Hourly Profile	
	NO	NO ₂	NO	NO ₂
0000 - 0100	2.80E-04	3.88E-05	1.45E-02	9.86E-03
0100 - 0200	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0200 - 0300	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0300 - 0400	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0400 - 0500	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0500 - 0600	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0600 - 0700	1.93E-02	3.95E-03	1.00E+00	1.00E+00
0700 - 0800	1.96E-03	2.71E-04	1.01E-01	6.86E-02
0800 - 0900	1.96E-03	2.71E-04	1.01E-01	6.86E-02
0900 - 1000	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1000 - 1100	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1100 - 1200	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1200 - 1300	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1300 - 1400	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1400 - 1500	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1500 - 1600	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1600 - 1700	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1700 - 1800	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1800 - 1900	1.96E-03	2.71E-04	1.01E-01	6.86E-02
1900 - 2000	1.96E-03	2.71E-04	1.01E-01	6.86E-02
2000 - 2100	1.96E-03	2.71E-04	1.01E-01	6.86E-02
2100 - 2200	1.96E-03	2.71E-04	1.01E-01	6.86E-02
2200 - 2300	1.86E-03	2.58E-04	9.67E-02	6.53E-02
2300 - 2400	8.39E-04	1.16E-04	4.35E-02	2.94E-02

Number of Cold Starts of Public Light Bus in Kwai Hau Street PLB Terminus

Time	Cold Start (min)																	
	5	10	20	30	40	50	60	120	180	240	300	360	420	480	540	600	660	720
0000 - 0100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0100 - 0200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0200 - 0300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0300 - 0400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0400 - 0500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0500 - 0600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0600 - 0700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	0.0	0.0
0700 - 0800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0800 - 0900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0900 - 1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1000 - 1100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1100 - 1200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1200 - 1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1300 - 1400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1400 - 1500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1500 - 1600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1600 - 1700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1700 - 1800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1800 - 1900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1900 - 2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000 - 2100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2100 - 2200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2200 - 2300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2300 - 2400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0

Widening of Tsuan Wan Road and the Associated Junction Improvement Works (PLB Sensitivity Test - Broadbrush Approach)
 Summary of Composite Vehicular Emission Factors for CALINE4 Model

Down Road At Low NO Emission Factor (High and Traffic Profile)

No. of CALINE4 Model Links	Link No.	Link Type (L)	X-Start	Y-Start	X-End	Y-End	Height	Width	Length	Hour 01		Hour 02		Hour 03		Hour 04		Hour 05		Hour 06		Hour 07		Hour 08		Hour 09		Hour 10		Hour 11		Hour 12		Hour 13		Hour 14		Hour 15		Hour 16		Hour 17		Hour 18		Hour 19		Hour 20		Hour 21		Hour 22		Hour 23		Hour 24	
										Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F
1	231-232	1	83907.8	82641.0	83192.2	82512.2	0.0	17.5	493	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
2	231-232	1	83966.2	82684.0	83192.2	82512.0	0.0	17.5	543	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
3	231-232	1	83930.7	82610.0	83192.2	82512.0	0.0	17.5	534	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
4	231-232	1	83192.2	82512.0	83192.2	82512.0	0.0	17.5	418	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
5	231-232	1	83114.5	82575.1	83192.2	82512.0	0.0	16.4	223	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
6	231-234	1	83174.4	82516.5	83282.2	82567.7	0.0	16.8	258	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
7	231-234	1	83282.2	82567.7	83221.1	82524.1	0.0	20.0	405	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
8	231-234	1	83192.2	82512.0	83174.4	82516.5	0.0	16.4	252	72	0.276	51	0.276	37	0.276	33	0.274	30	0.273	42	0.273	82	0.273	143	0.271	184	0.268	145	0.265	127	0.276	129	0.262	112	0.264	110	0.276	113	0.266	121	0.272	126	0.267	146	0.265	172	0.262	146	0.264	133	0.260	139	0.267	129	0.263	100	0.262
9	241-244	1	82966.2	82598.1	82942.0	82482.0	0.0	13.7	142.4	110	0.120	78	0.119	58	0.118	44	0.118	44	0.117	65	0.116	129	0.115	257	0.114	320	0.097	259	0.088	244	0.085	214	0.104	219	0.089	218	0.084	237	0.075	238	0.081	256	0.078	288	0.068	340	0.091	305	0.100	241	0.101	241	0.112	332	0.106	380	0.106
10	241-244	1	82966.2	82598.1	82942.0	82482.0	0.0	13.7	139.6	110	0.120	78	0.119	58	0.118	44	0.118	44	0.117	65	0.116	129	0.115	257	0.114	320	0.097	259	0.088	244	0.085	214	0.104	219	0.089	218	0.084	237	0.075	238	0.081	256	0.078	288	0.068	340	0.091	305	0.100	241	0.101	241	0.112	332	0.106	380	0.106
11	241-244	1	82966.2	82598.1	82942.0	82482.0	0.0	13.7	139.6	110	0.120	78	0.119	58	0.118	44	0.118	44	0.117	65	0.116	129	0.115	257	0.114	320	0.097	259	0.088	244	0.085	214	0.104	219	0.089	218	0.084	237	0.075	238	0.081	256	0.078	288	0.068	340	0.091	305	0.100	241	0.101	241	0.112	332	0.106	380	0.106

[1] Link Type No. 1: At grade, 2: Expressway, 3: RA, 4: Bridge

Widening of Tsuan Wan Road and the Associated Junction Improvement Works (PLB Sensitivity Test - Broadbrush Approach)
 Summary of Composite Vehicular Emission Factors for CALINE4 Model

Down Road All Day 2025 Emission Factor (g/mile/veh) and Traffic Profile

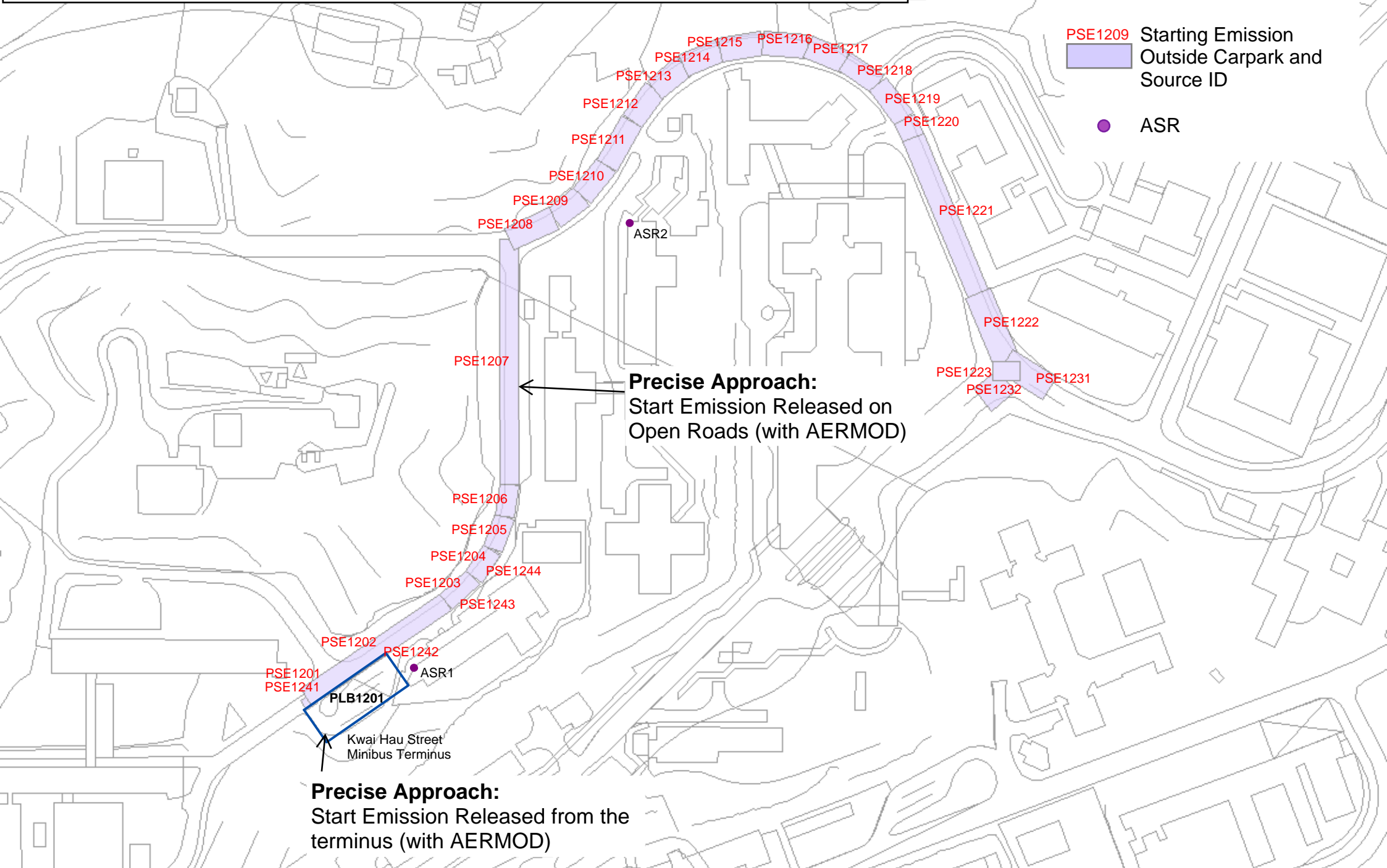
No. of CALINE 4 Model Links	Link No.	Link Type (L)	X_Start	Y_Start	X_End	Y_End	Height	Width	Length	Hour 01		Hour 02		Hour 03		Hour 04		Hour 05		Hour 06		Hour 07		Hour 08		Hour 09		Hour 10		Hour 11		Hour 12		Hour 13		Hour 14		Hour 15		Hour 16		Hour 17		Hour 18		Hour 19		Hour 20		Hour 21		Hour 22		Hour 23		Hour 24			
										Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F	Flow	E/F		
1	231-232	1	83907.8	82681.0	83192.2	82512.2	0.0	17.5	493	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
2	231-232	1	82986.2	82684.0	83192.2	82512.0	0.0	17.5	543	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
3	231-232	1	83103.7	82510.0	83192.2	82510.0	0.0	17.5	514	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
4	231-232	1	83103.7	82512.0	83192.2	82512.0	0.0	17.5	418	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
5	231-232	1	83143.5	82510.0	83192.2	82510.0	0.0	16.4	223	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
6	231-234	1	83174.4	82511.5	83202.2	82507.7	0.0	16.8	252	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
7	231-234	1	83202.2	82501.7	83221.1	82524.1	0.0	20.0	403	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
8	231-234	1	83194.6	82501.0	83174.4	82541.5	0.0	16.4	252	72	0.046	51	0.046	37	0.046	33	0.046	30	0.046	27	0.046	22	0.046	163	0.047	164	0.046	145	0.042	127	0.039	129	0.046	112	0.041	110	0.040	113	0.037	121	0.039	126	0.037	146	0.041	172	0.043	146	0.044	133	0.045	139	0.046	129	0.046	100	0.045		
9	245-244	1	82986.2	82508.0	82541.5	82482.0	0.0	13.7	142.4	110	0.027	38	0.027	38	0.027	44	0.026	44	0.026	40	0.026	35	0.026	129	0.026	257	0.026	320	0.027	299	0.027	284	0.019	274	0.023	279	0.020	278	0.019	237	0.017	238	0.019	256	0.017	288	0.019	340	0.021	305	0.022	241	0.021	241	0.025	232	0.024	180	0.024
10	245-244	1	82986.2	82482.0	82986.2	82482.0	0.0	13.7	142.4	110	0.027	38	0.027	38	0.027	44	0.026	44	0.026	40	0.026	35	0.026	129	0.026	257	0.026	320	0.027	299	0.027	284	0.019	274	0.023	279	0.020	278	0.019	237	0.017	238	0.019	256	0.017	288	0.019	340	0.021	305	0.022	241	0.021	241	0.025	232	0.024	180	0.024
11	245-244	1	82986.2	82482.0	82986.2	82482.0	0.0	13.7	142.4	110	0.027	38	0.027	38	0.027	44	0.026	44	0.026	40	0.026	35	0.026	129	0.026	257	0.026	320	0.027	299	0.027	284	0.019	274	0.023	279	0.020	278	0.019	237	0.017	238	0.019	256	0.017	288	0.019	340	0.021	305	0.022	241	0.021	241	0.025	232	0.024	180	0.024

[[1]] Link Type No. 1 = All grade, 2 = Freeway, 3 = FA, 4 = Bridge

Precise Method:
PLB1201 (Starting Emission Within Carpark, AERMOD) &
PSE1201-PSE1244 (Starting Emission Outside Carpark, 150m (PLB LPG) and 700m
(PLB Diesel) spread distance, AERMOD)

Kwai Hau Street PLB Terminus (ID: PLB12)

- PLB1201 Starting Emission Within Carpark and Source ID
- PSE1209 Starting Emission Outside Carpark and Source ID
- ASR



Precise Approach:
Start Emission Released on
Open Roads (with AERMOD)

Precise Approach:
Start Emission Released from the
terminus (with AERMOD)

Hybrid Approach:
PLB1201 (All Starting Emission, AERMOD) &
nearby roads (Broad-brushed Starting Emission, CALINE)

- Starting Emission Within Carpark and Source ID (AERMOD)
- Starting Emission Estimated by Broad-brush (CALINE)
- ASR
- Road ID

average traveling distance within carpark: 1400m

231

232

233

234

243

244

ASR2

ASR1

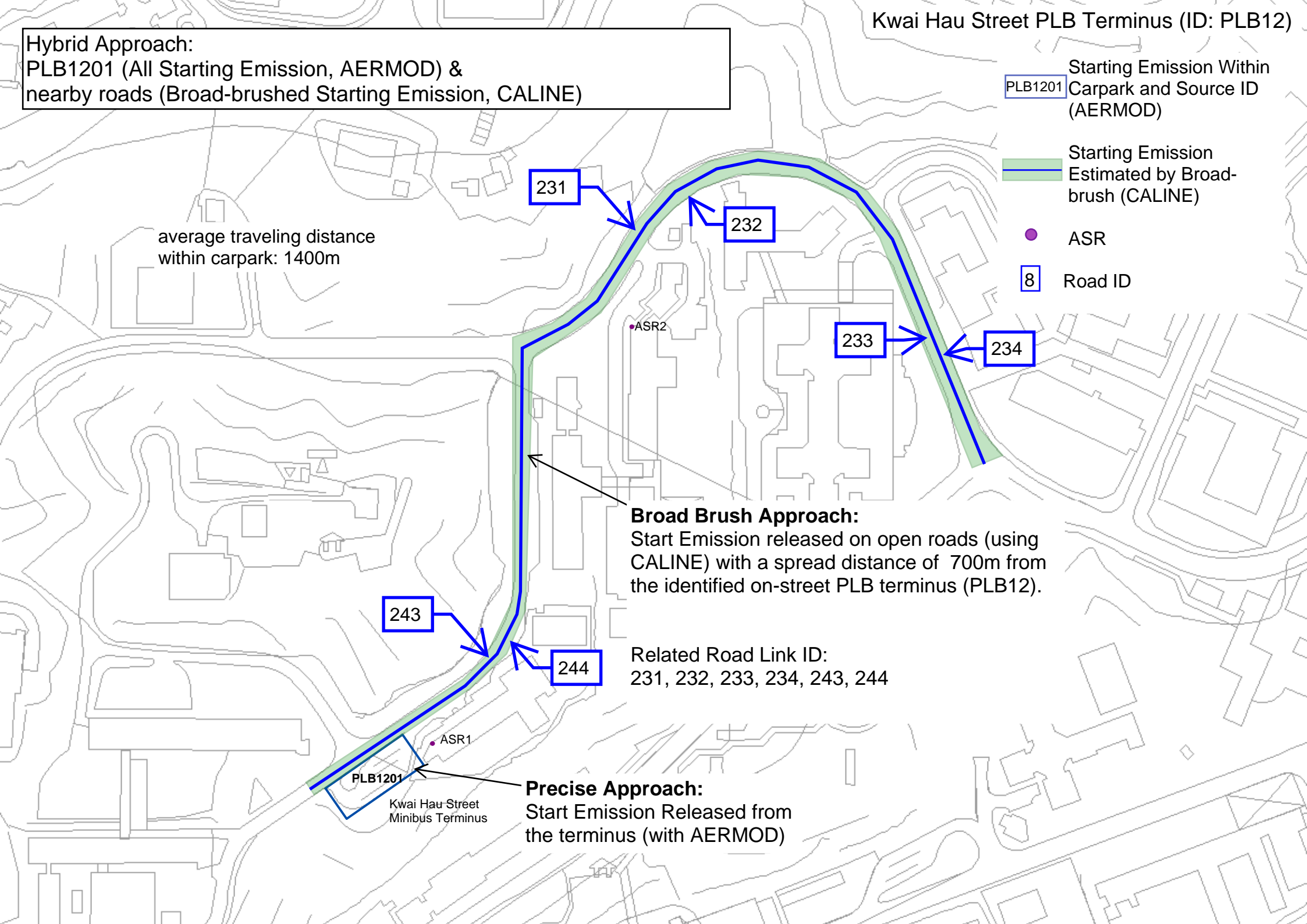
PLB1201

Kwai Hau Street Minibus Terminus

Broad Brush Approach:
Start Emission released on open roads (using CALINE) with a spread distance of 700m from the identified on-street PLB terminus (PLB12).

Related Road Link ID:
231, 232, 233, 234, 243, 244

Precise Approach:
Start Emission Released from the terminus (with AERMOD)

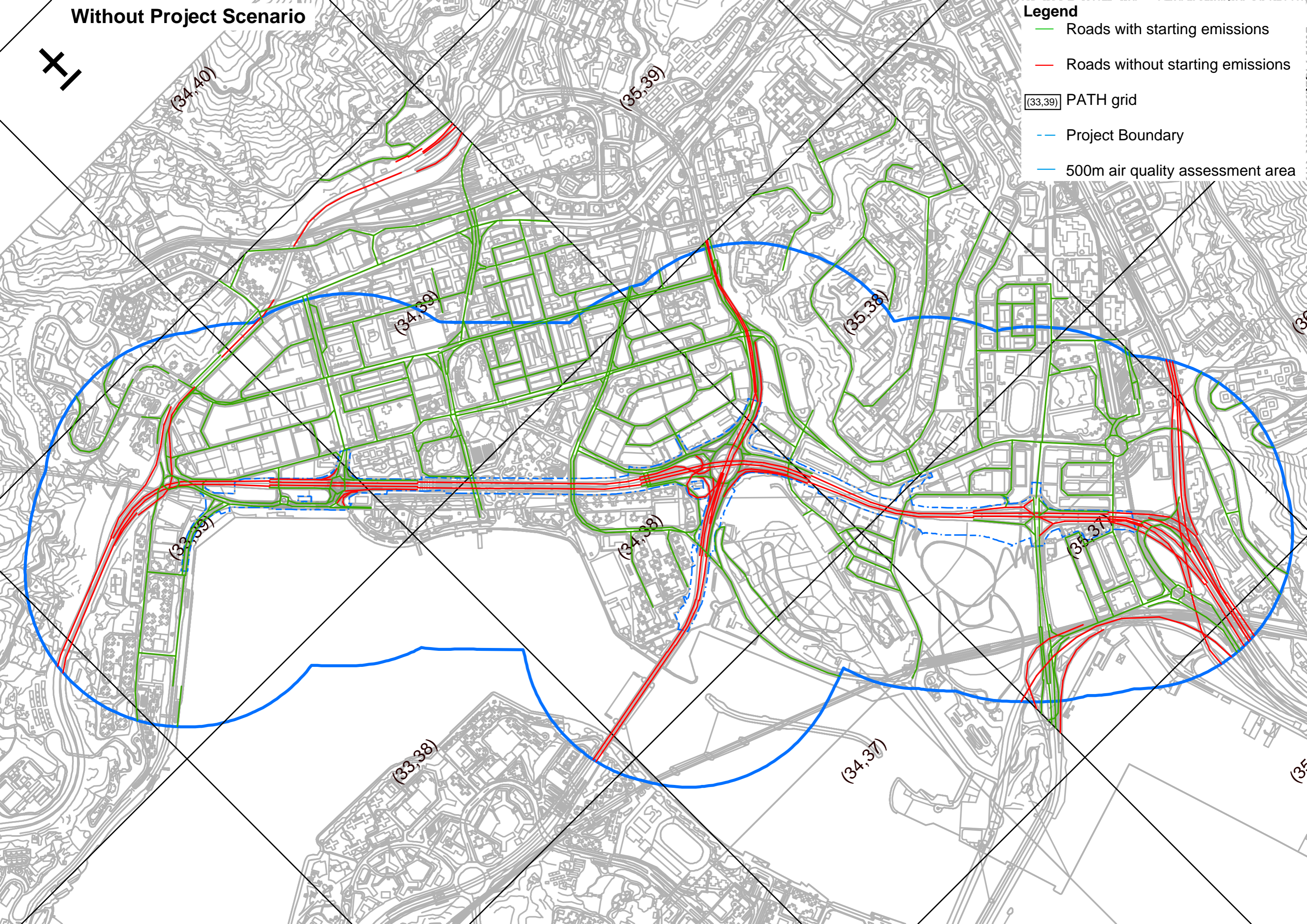


Annex H
The Road Extent for With and Without
Cold Start Trip

Without Project Scenario



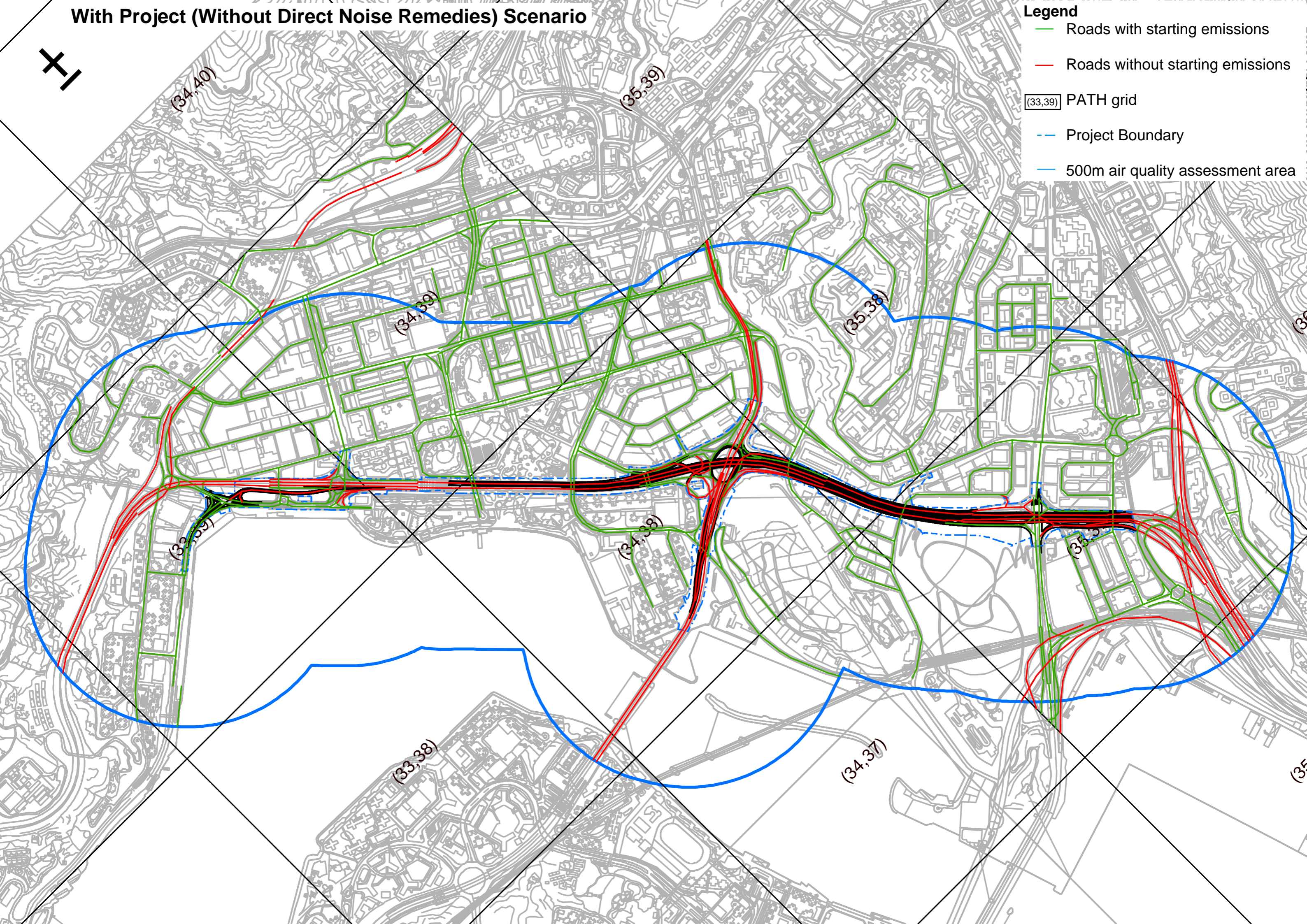
- Legend**
- Roads with starting emissions (green line)
 - Roads without starting emissions (red line)
 - ▭ (33,39) PATH grid (black grid lines)
 - - - Project Boundary (dashed blue line)
 - 500m air quality assessment area (solid blue line)



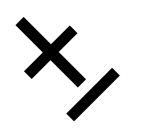
With Project (Without Direct Noise Remedies) Scenario



- Legend**
- Roads with starting emissions (green line)
 - Roads without starting emissions (red line)
 - ▭ (33,39) PATH grid (black line)
 - - - Project Boundary (dashed blue line)
 - 500m air quality assessment area (solid blue line)



With Project (With Direct Noise Remedies) Scenario



- Legend**
- Roads with starting emissions (green line)
 - Roads without starting emissions (red line)
 - ▭ (33,39) PATH grid (black line)
 - - - Project Boundary (dashed blue line)
 - 500m air quality assessment area (solid blue line)

