KURSUS PENGENALAN PENILAIAN KESAN TRAFIK (8 -10 FEBRUARI 2021)

INTRODUCTION TO TRAFFIC IMPACT ASSESSMENT (TIA)

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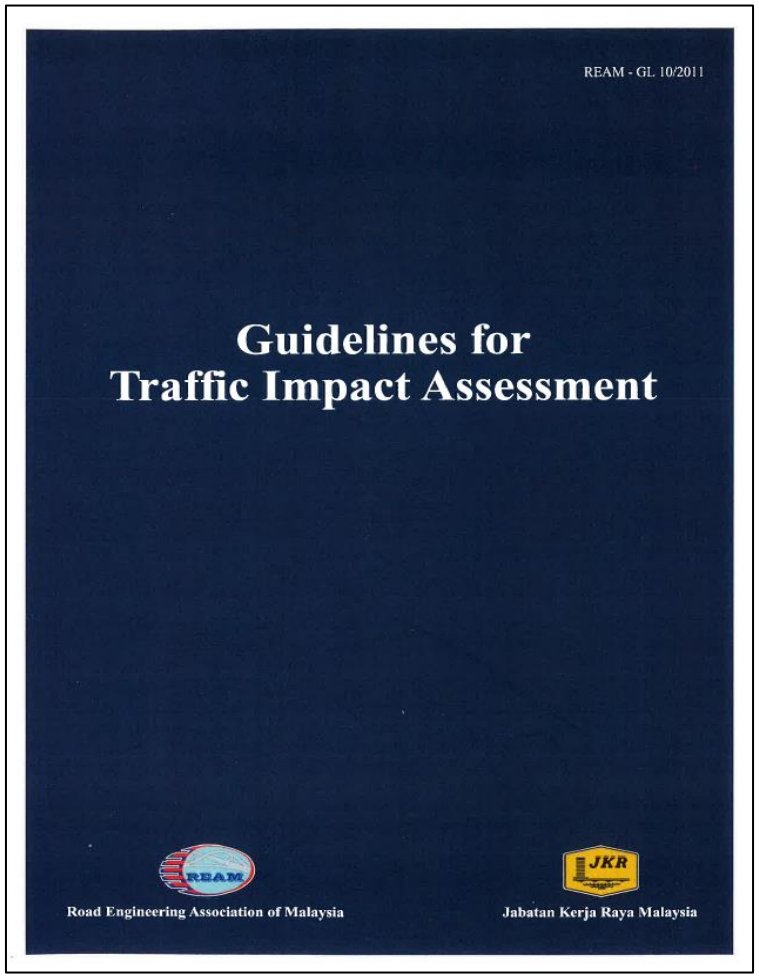
BAHAGIAN KEJURUTERAAN TRAFIK (BKT) CAWANGAN JALAN

WHAT IS TIA?

- Tool/method used to determine the impact of traffic generated from a proposed site development (upon full development) on the surrounding road and transportation systems

GUIDELINES FOR TRAFFIC IMPACT ASSESSMENT (TIA)



REAM-GL 10/2011: Guidelines for Trafic Impact Assessment

ATJ 38/2018: Guidelines For Traffic Impact Assessment

SAKPKR BIL. 22/2019 – 14 OGOS 2019

KETUA PENGARAH KERJA RAYA
DIRECTOR-GENERAL OF PUBLIC WORKS

Rujukan : JKR.KPKR:121.010/05 Jld. 17 (5)
Tarikh : 14 Ogos 2019

Semua Pengarah Kanan/Pengarah Cawangan Ibu Pejabat JKR
Semua Pengarah Kerja Raya Negeri
Semua Pengarah Kerja Raya Wilayah Persekutuan
Semua Pengarah/Pengurus Pembinaan
Pengarah JKR Unit Khas
Pengarah JKR KESEDAR
Pengarah JKR KETENGAH
Semua Jurutera Daerah

SURAT ARAHAN KPKR BIL. 22 / 2019

ARAHAN PENGGUNAAN - ARAHAN TEKNIK JALAN ATJ 38/2018:
GUIDELINES FOR TRAFFIC IMPACT ASSESSMENT

1.0 TUJUAN

1.1 Surat arahan ini bertujuan untuk memaklumkan arahan penggunaan **Arahan Teknik Jalan 38/2018: *GUIDELINES FOR TRAFFIC IMPACT ASSESSMENT*** sebagai garis panduan dengan mengambil kira keperluan semasa.

2.0 LATAR BELAKANG

2.1 Arahan Teknik Jalan ATJ 38/2018 ini dibangunkan bagi tujuan mewujudkan keseragaman dan konsistensi dalam melaksanakan prosedur Kajian Penilaian Kesan Trafik (TIA) di Malaysia.

2.2 Arahan Teknik Jalan ATJ 38/2018 ini telah dibentang dan diluluskan dalam Mesyuarat Jawatankuasa Pemandu Pengurusan Bil. 2/2019 pada 6 Mac 2019.

Jabatan Kerja Raya Malaysia
Public Works Department Malaysia
Aras 33, Menara Kerja Raya, Ibu Pejabat JKR Malaysia, Jalan Sultan Salahuddin, 50480 Kuala Lumpur
Tel.: 03- 2618 8421 Faks: 03-2618 8799 https://www.jkr.gov.my

2.3 Antara matlamat pembangunan Arahan Teknik Jalan ATJ 38/2018 ini adalah seperti berikut;

i. Menjadi panduan kepada pihak-pihak yang terlibat dalam menentukan keperluan kajian TIA (kriteria dan waran) bagi pelaksanaan projek pembinaan bangunan dan jalan raya di Malaysia;

ii. Memastikan keseragaman dalam mengenalpasti kesan trafik yang dijana oleh cadangan pembangunan serta mengenalpasti langkah-langkah yang bersesuaian untuk mengurangkan kesan trafik tersebut; dan

iii. Memberi maklumat kepada Pihak Berkuasa Melulus *(Approving Authority)* bagi tujuan membuat keputusan berhubung keadaan infrastruktur pengangkutan sedia ada di sekitar kawasan pembangunan serta penambahbaikan yang dicadangkan.

3.0 ARAHAN PENGGUNAAN

3.1 Dengan Surat Arahan ini, **SEMUA** projek bangunan dan jalan yang memerlukan Kajian Penilaian Kesan Trafik (TIA) dikehendaki menggunakan **Arahan Teknik Jalan 38/2018: *GUIDELINES FOR TRAFFIC IMPACT ASSESSMENT*** sebagai garis panduan agar reka bentuk dan kriteria elemen adalah memenuhi standard dan spesifikasi yang ditetapkan. Surat arahan ini terpakai bagi projek pembinaan bangunan dan jalan yang dikendalikan oleh JKR Malaysia.

3.2 Sebarang pertanyaan berhubung dengan Arahan Teknik Jalan ATJ 38/2018 ini boleh diajukan melalui emel **ussj.jkr@1govuc.gov.my** atau secara bertulis kepada Unit Standard dan Spesifikasi, Bahagian Pembangunan Inovasi dan Standard, Pakar Kejuruteraan Jalan dan Jambatan, Cawangan Jalan, JKR Malaysia.

MATLAMAT PEMBANGUNAN ATJ 38/2018: GUIDELINES FOR TRAFFIC IMPACT ASSESSMENT

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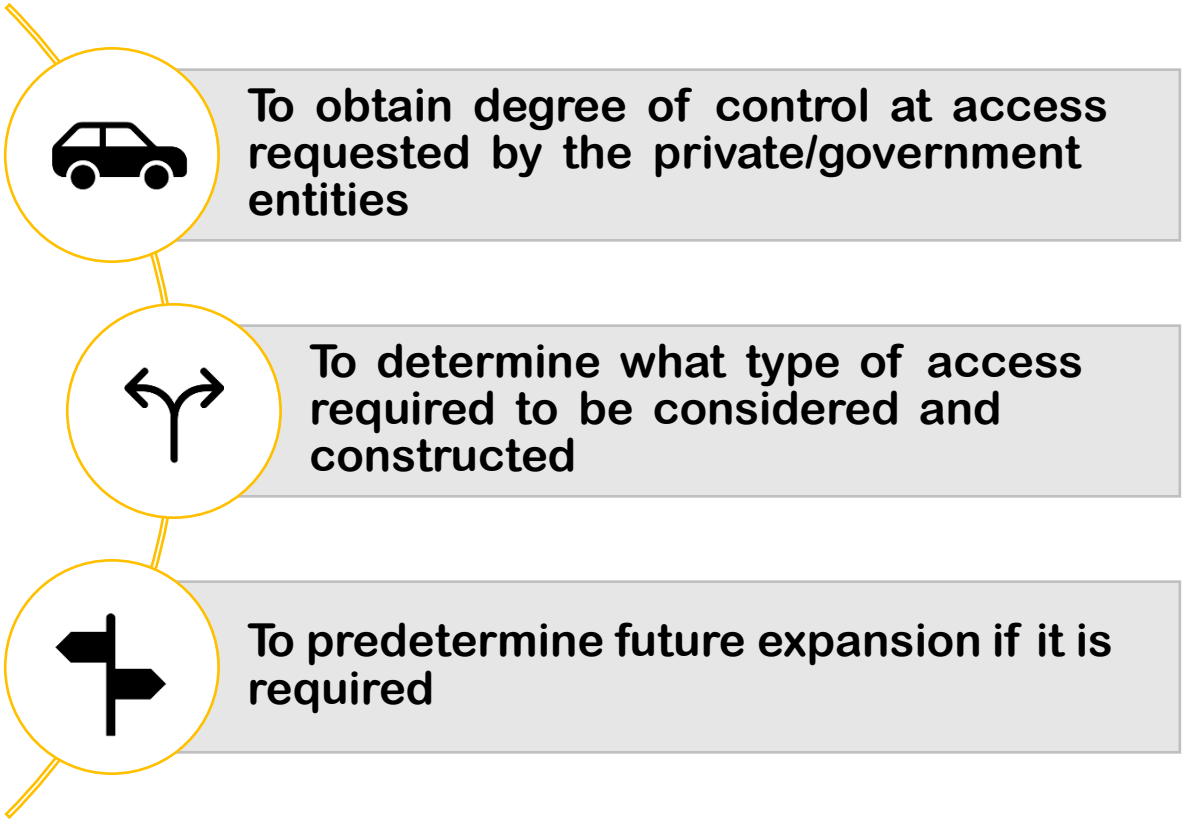
WHY DO WE NEED TIA?

- Identifies the need for mitigation measures to reduce congestion, and to maintain or improve road safety
- Provide a framework in site planning decisions regarding traffic and transportation issues
- Assessing and apportioning a developer's contribution to road improvement

FOR ACCESS CONTROL



Source: ATJ 8/86 (Pindaan 2015)

THE IMPORTANCE OF TIA

- When impact are not accurately projected through traffic analysis process, the best decision may not be made
- Poor decision can result in traffic congestion, safety issues, or unnecessary improvements

TRAFFIC CONGESTION AROUND THE WORLD

TIA AND THE LEGISLATION

5.1 ***Road Transport Act 1987, Act 333***

"***Construction of access and drains and laying of public utility installations to existing road***

Section 85.(1) No person shall:-

(a) construct any access road (including paths, driveways or other means of access, whether public or private) to join any road:
(b) construct a drain to join a drain constructed alongside a road;
(c) carry out any works of any description in, upon, over or under any road,

unless plans containing details of the layout thereof (including such particulars as may be prescribed) have been submitted to and approved by the Minister charged with the responsibility for works in relation to a Federal road, or the appropriate authority in relation to a road other than a Federal road, and the Minister or the appropriate authority, as the case may be, may refuse such application or allow it on such conditions as he or it may impose."

And,

"Subsection (8) The Minister or the appropriate authority, as the case may be, may make rules to regulate and control the carrying out or construction of any works referred to in subsection (1)."

Note: From the above Road Transport Act, the submission would have to be made and approval sought from the appropriate approving authorities before any connections or changes to an existing road system can be made. TIA is one of the report that will assist the authority concerned in considering and approving the application and may be imposed as a requirement by the Approving Authority, together with the Developer's submission.

Kelulusan perlu diperolehi daripada Pihak Berkuasa Melulus sebelum pembinaan akses baharu atau perubahan yang akan berlaku terhadap rangkaian jalan sedia ada

Source: ATJ 38/2018: Guidelines For Traffic Impact Assessment

TIA AND THE LEGISLATION

5.2 *Town and Country Planning Act 1976, Act 172*

Application for Planning Permission states that:

*"**Section 21(1)** An application for planning permission in respect of a development shall be made to the local planning authority and shall be in such form and shall contain such particulars and be accompanied by such documents, plans, and fees as may be prescribed.*

Section 21(3) *Where the development involves the erection of a building, the local planning authority may give written directions to the applicant in respect of any of the following matters, that is:*

(g) any other matter that the local planning authority considers necessary for purposes of planning.

Development Proposal Report

***Section 21A (1)** In addition to the documents and plans required to be submitted under **subsection 21(1)** for planning permission, the applicant shall submit a Development Proposal Report which shall contain the following:*

(g) such matters as may be prescribed by the local planning authority."

Note: From the above Town and Country Planning Act 1976, *a* developer, in submitting his application for planning permission, must include in his submission a document called Development Proposal Report. This Report is required under section 21A of the Town and Country Planning Act 1976 (Act 172). Under subsection 21(3)(g), the local authority may require a Traffic Impact Assessment (TIA) to be submitted together with the application. This Guideline will assist the local planning authority in determining when a TIA is required and the details of the report to be submitted.

Pihak Berkuasa Melulus boleh mengarahkan kajian TIA disediakan sebagai salah satu syarat kelulusan Kebenaran Merancang

Source: ATJ 38/2018: Guidelines For Traffic Impact Assessment

TIA AND THE LEGISLATION

ATJ 3/2011 – Garis Panduan Memproses Permohonan Pembangunan Tepi Jalan Persekutuan

Klausa 1.3 Pegawai Yang Diberi Kuasa Meluluskan Permohonan

Berdasarkan Seksyen 5 (Akta Perwakilan Kuasa 1956: Akta 358), Menteri mewakilkan kuasanya di bawah Seksyen 85: Akta Pengangkutan Jalan 1987 berkenaan Jalan Persekutuan kepada Pegawai yang diperturunkan bagi meluluskan permohonan untuk membina jalan masuk ke Jalan Persekutuan kepada Pengarah Negeri melalui Warta Kerajaan P.U. (B) 44.

PARTIES INVOLVED IN TIA

DEVELOPER

- Owner of the development or re-development project, or any party appointed by the owner to carry out the project on his behalf

APPROVING AUTHORITY

- Local authority or the respective road authority

TIA ASSESSOR

- Traffic/Road Engineering Consultant

TRAFFIC/ROAD ENGINEERING CONSULTANT

2.1.5.2 Perunding berdaftar di bawah kod bidang 330000 atau 340000 atau kod bidang perkhidmatan perunding yang diluluskan oleh Kerajaan dari semasa ke semasa.

2.1.6 Agensi hendaklah memastikan bahawa perunding yang dilantik hanya dibenarkan untuk memberi perkhidmatan berdasarkan kod-kod bidang yang telah didaftarkan sahaja iaitu sebagaimana dinyatakan di dalam sijil pendaftaran MOF firma masing-masing.

2.1.7 Perolehan perkhidmatan/nasihat kepakaran yang ditawarkan oleh firma perunding yang tidak berdaftar dengan Kementerian Kewangan atau tidak berdaftar di bawah kod bidang perkhidmatan perunding yang telah diluluskan oleh Kementerian Kewangan adalah **tidak dibenarkan.**

KOD BIDANG

(b) Pengangkutan

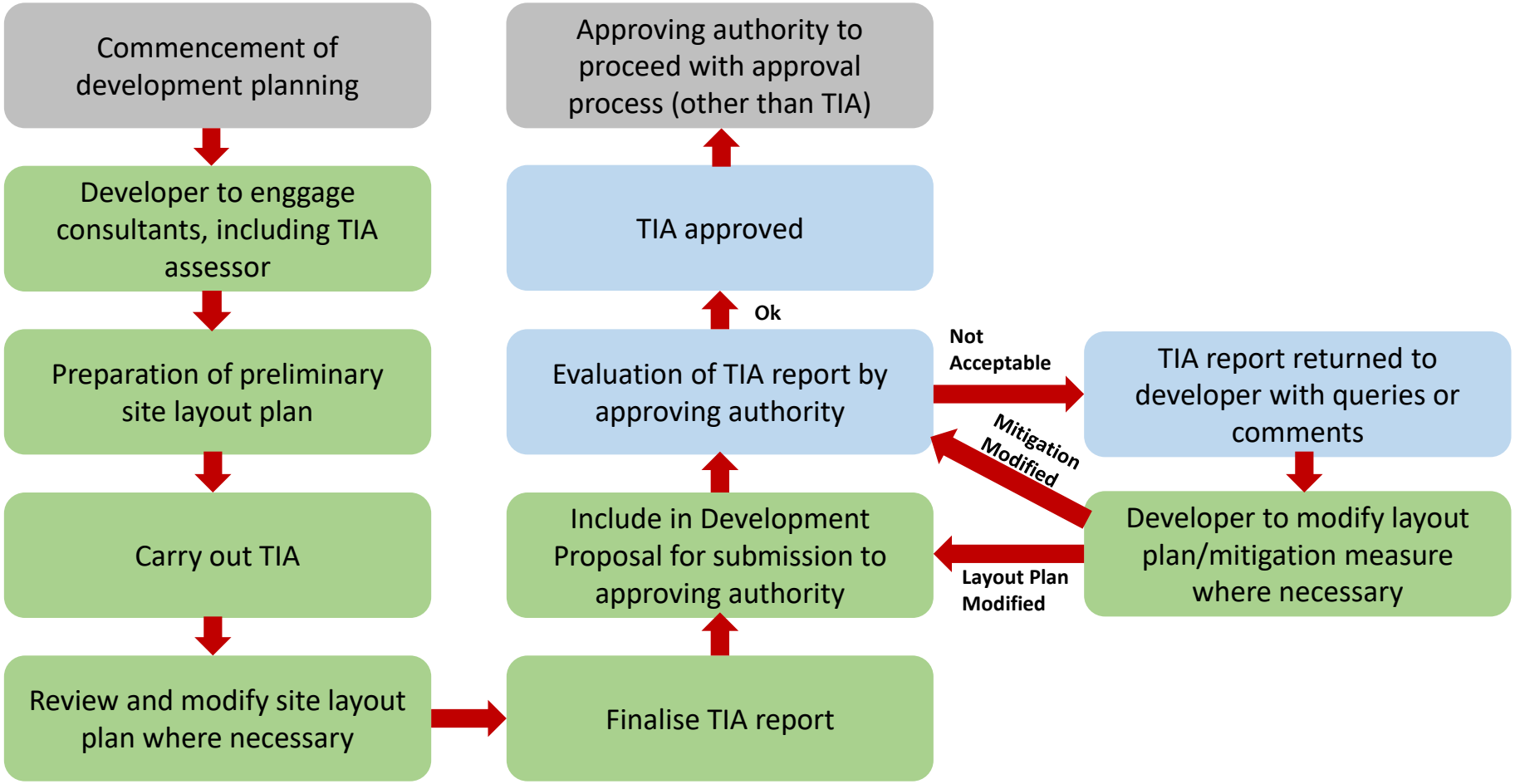
340201 - Kajian Rangkaian Pengangkutan
340202 - Kajian Trafik

Source: 1PP & Manual Perolehan Perkhidmatan Perunding Edisi 2011 (Pindaan Kedua)

CRITERIA FOR THE APPOINTMENT OF TRAFFIC ENGINEERING CONSULTANT

- A qualified Civil Engineer specializing in traffic/ highway/ transport engineering who is registered with the Board of Engineers, Malaysia as a PEPC
- Have minimum of six (6) years' experience in traffic engineering, of which a minimum of three (3) years' experience in Traffic Impact Assessment (TIA); and
- Have attended a formal training course in Traffic Study/TIA e.g.: Course on TIA, Traffic Study, Trip Generation Manual, Traffic Engineering Software and others that are organized by approved institutions/agencies.

BASIC PROCESS OF TIA



WHEN IS TIA REQUIRED?

- When a development generates a specified number of peak hour trips
- When a development contains a specified number of dwelling units or specified built-up floor area
- At the judgment or discretion of the appropriate authorities under unusual situation

CRITERIA WARRANTING TIA

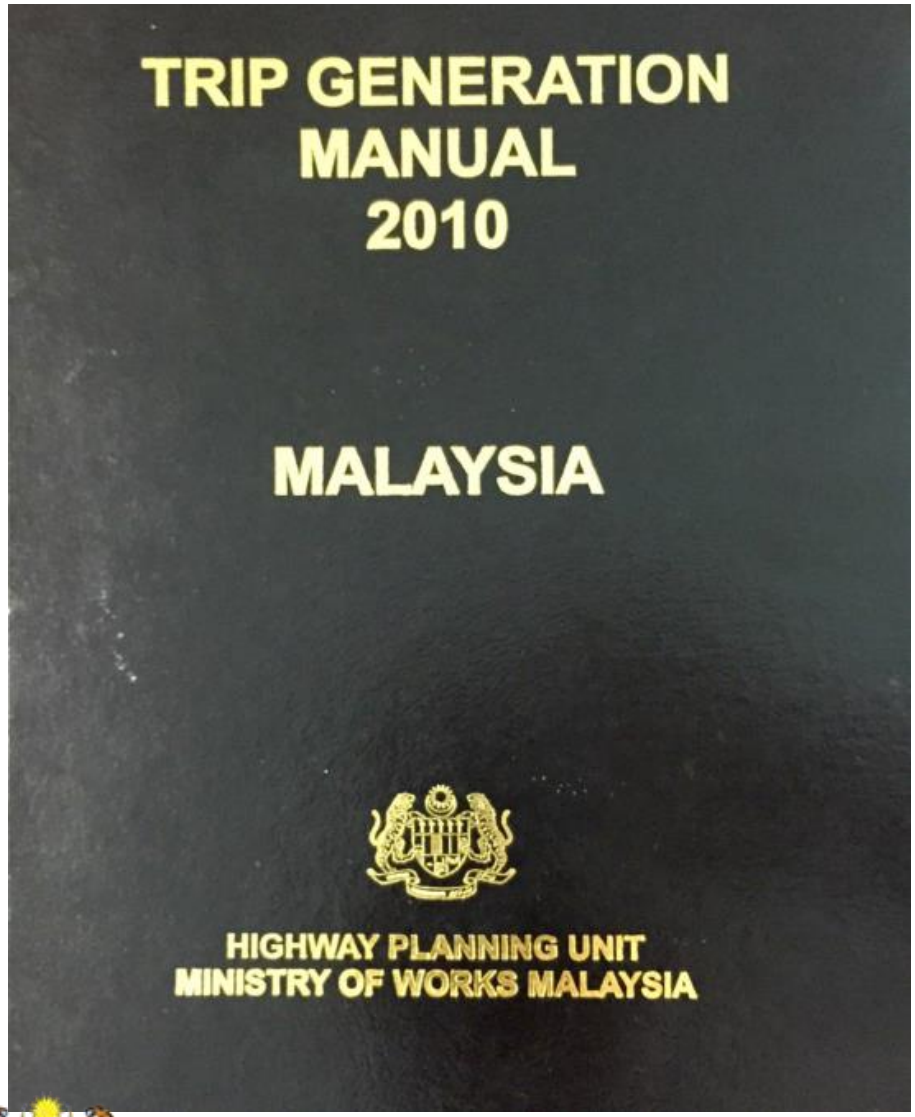
* The criteria and their corresponding trigger levels for warranting TIA shall be:

NO.	CRITERIA	TRIGGER LEVELS
1.	Peak Hour Trip Generation (Commuter Peak)	150 added vehicles per hour (2-way)
2.	Off-Peak Hour Trip Generation (Generator peak occurs at the off-peak period)	200 added vehicles per hour (2-way)
3.	Size of residential development	200 dwelling units
4.	Size of commercial development	45,000 sq.ft. (gross floor area)
5	Requirement of Approving Authority	May impose specific trigger levels as deemed necessary

CRITERIA WARRANTING TIA

- TIA study is required if any of the criteria reached the prescribed trigger level
- Trip generation rates shall be based on the Trip Generation Manual Malaysia published by the Highway Planning Division of the Ministry of Works, Malaysia

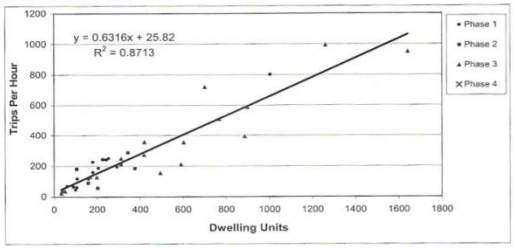
TRIP GENERATION MANUAL 2010



Residential
Terrace Link, Town House
Trips per Dwelling Units

CODE
01 01 01/02

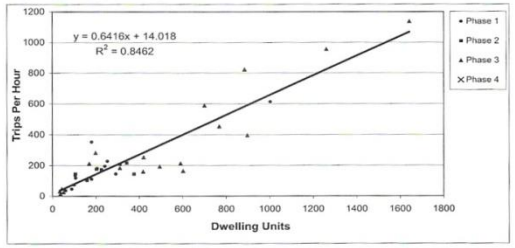
AM Peak Hour Of Commuter



Number Of Sites :	38	Percent In/Out :	30 / 70
Average Rate :	0.78	Regression Equation:	y = 0.6316x + 25.82
Minimum Rate :	0.29		
Maximum Rate :	1.73	R-Squarred:	0.8713
Standard Deviation :	0.2812		

Vehicle Type	Vehicle Composition	PCU Factor	PCU Conversion Factor
Car/Taxi	62.35	1.00	0.62
Motorcycle	28.13	0.33	0.09
Small Lorry	7.48	1.75	0.13
Big Lorry	0.33	2.25	0.01
Bus	1.71	2.25	0.04
Total	**100.00%**		**0.89**

PM Peak Hour Of Commuter



Number Of Sites :	38	Percent In/Out :	59 / 41
Average Rate :	0.76	Regression Equation:	y = 0.6416x + 14.018
Minimum Rate :	0.27		
Maximum Rate :	1.96	R-Squarred:	0.8462
Standard Deviation :	0.3532		

Vehicle Type	Vehicle Composition	PCU Factor	PCU Conversion Factor
Car/Taxi	60.40	1.00	0.60
Motorcycle	31.85	0.33	0.11
Small Lorry	6.48	1.75	0.11
Big Lorry	0.27	2.25	0.01
Bus	1.01	2.25	0.02
Total	**100.00%**		**0.85**

Figure 1-2(a): Example of Summary Sheet (Peak Hour of Commuter)

ATJ 3/2011 – Garis Panduan Untuk Memproses Permohonan Pembangunan Tepi Jalan Persekutuan

memperelokkan dan/atau menaikkan taraf jalan termasuk persimpangan dan lain-lain berkaitan hendaklah ditanggung sepenuhnya oleh pemaju dan diserahkan kepada Kerajaan.

2.1.7 Penetapan jenis persimpangan yang perlu diadakan mestilah atau berasaskan kepada jumlah lalulintas yang akan dijanakan. Untuk skim pembangunan yang melibatkan lebih daripada 200 *unit dwellers* atau 4100 meter persegi keluasan lantai kasar (*gross floor area*) pembangunan komersial, satu laporan penilaian impak lalulintas oleh Jurutera Profesional **wajib** disediakan.

2.1.8 Rekabentuk persimpangan yang dicadangkan mestilah mengikut piawaian JKR semasa yang terkandung dalam Arahan Teknik-Arahan Teknik Jalan JKR. Ia mestilah direkabentuk mengikut

WHEN IS TIA REQUIRED?

* **ATJ 3/2011 – Garis Panduan Untuk Memproses Permohonan Pembangunan Tepi Jalan Persekutuan**

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SCOPE OF TIA

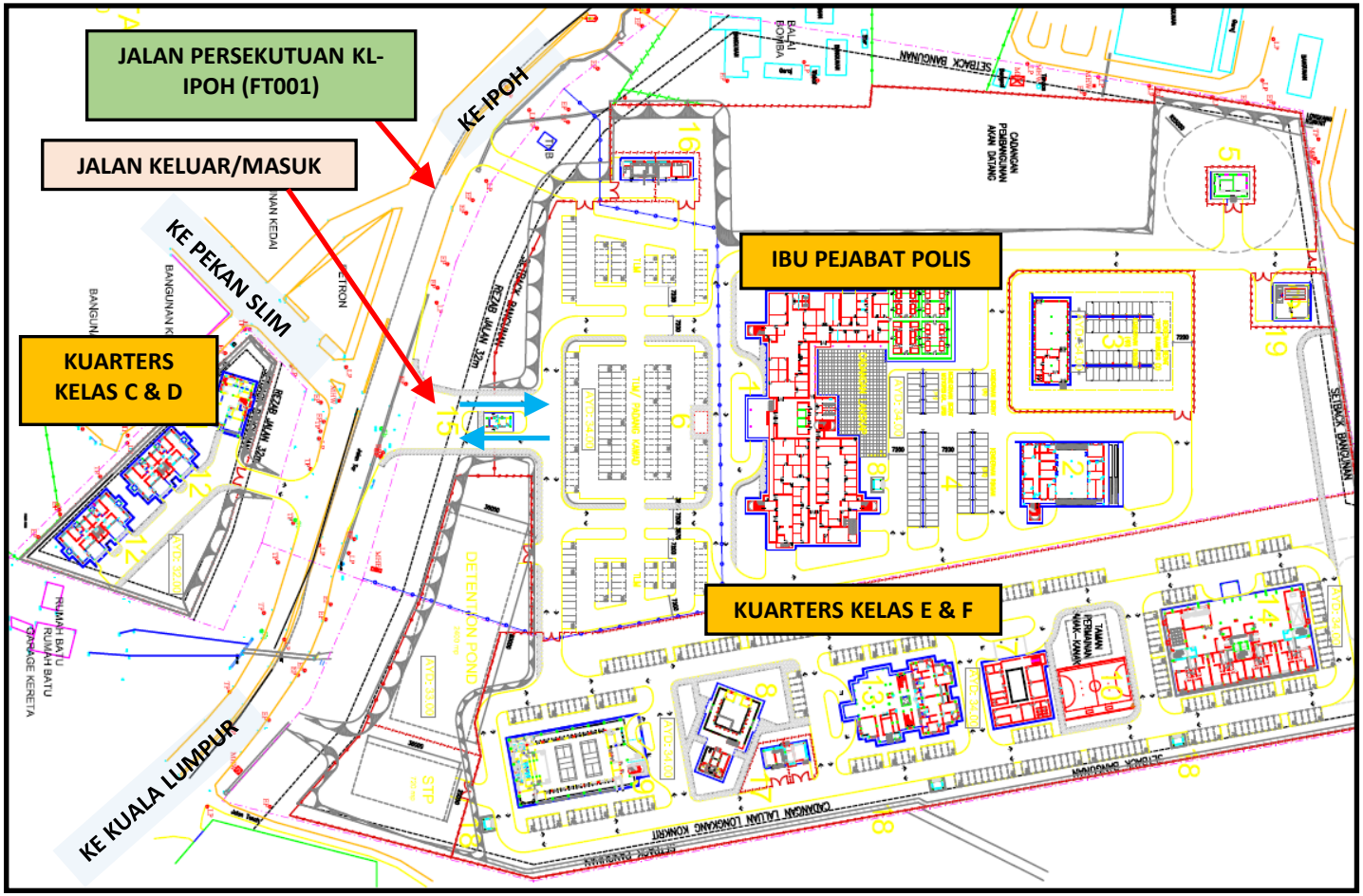
1. Definition of the study area/boundary
2. Determining existing traffic condition/pattern, which includes primary and secondary data collection
3. Trip forecasting with sequential steps of Trip Generation, Trip Distribution and Trip Assignment
4. Analysis of impacts on traffic in area of study
5. Mitigation measures proposals

1 DEFINITION OF THE STUDY AREA

- Study area should contain all site access points and major intersections (signalised and unsignalised) adjacent to the site
- Information of land use and development in surrounding area of project
- Include a site plan noting existing lanes configurations and street furniture

Example Of Study Area

Site Plan


JALAN PERSEKUTUAN KL-IPOH (FT001)
KE IPOH
JALAN KELUAR/MASUK
KE PEKAN SLIM
KUARTERS KELAS C & D
IBU PEJABAT POLIS
KUARTERS KELAS E & F
KE KUALA LUMPUR

2 DETERMINING EXISTING TRAFFIC CONDITION

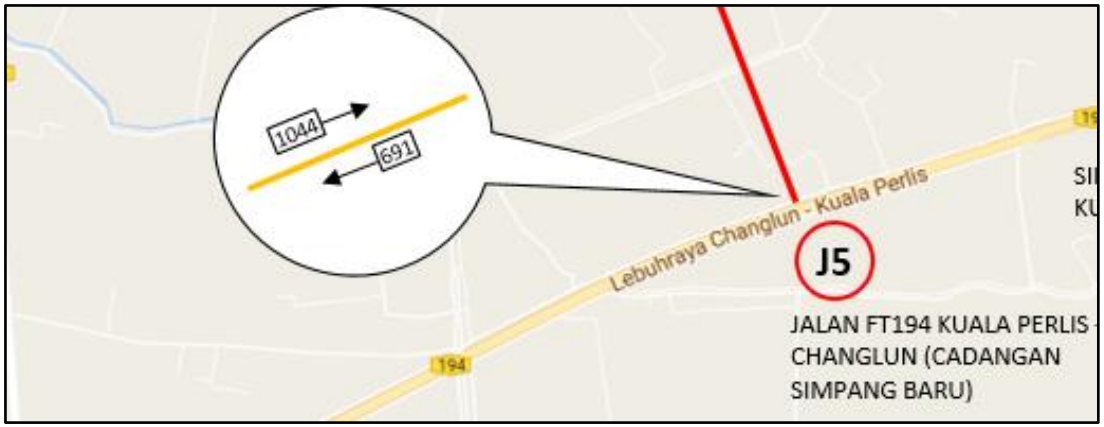
- To understand current traffic condition of the study area
- To determine peak hour period. Peak hour period also can be determined from RTVM or from on-site observation.
- Normally there's two peak hour period; AM peak and PM peak
- Traffic counts every 15 minutes, in all directions

DETERMINING EXISTING TRAFFIC CONDITION

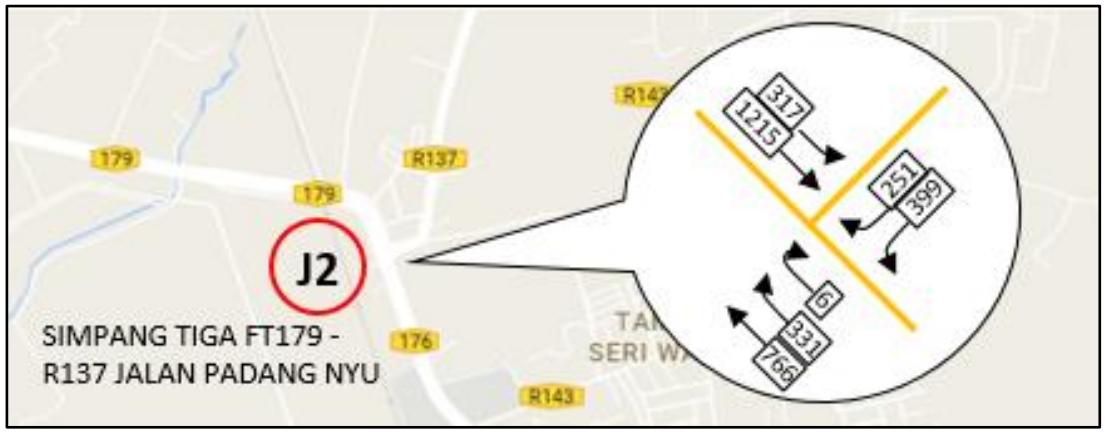
- Should be conducted on a typical working weekday
- Should not be conducted during irregular seasons when travel pattern is not normal (PKP, public & school holidays)
- Additional information needed – road geometry information (lane width, length of storage lane/ACDC, median width), phasing time of traffic light

TYPES OF TRAFFIC COUNT

1. Traffic Count at Screen Line



2. Traffic Count at Intersection



Traffic Counts at Intersection

Traffic Counts - Form

[Borang (BPJ) J.K.R.335-Pin.5/93]

Ringkasan Harian
Rekod Kiraan Manual

Negeri : NEGERI SEMBILAN Daerah : SEREMBAN

No. Stesen : *15-Minute Peak Hours Traffic Count* Jenis Kajian :

Lokasi Stesen : J1

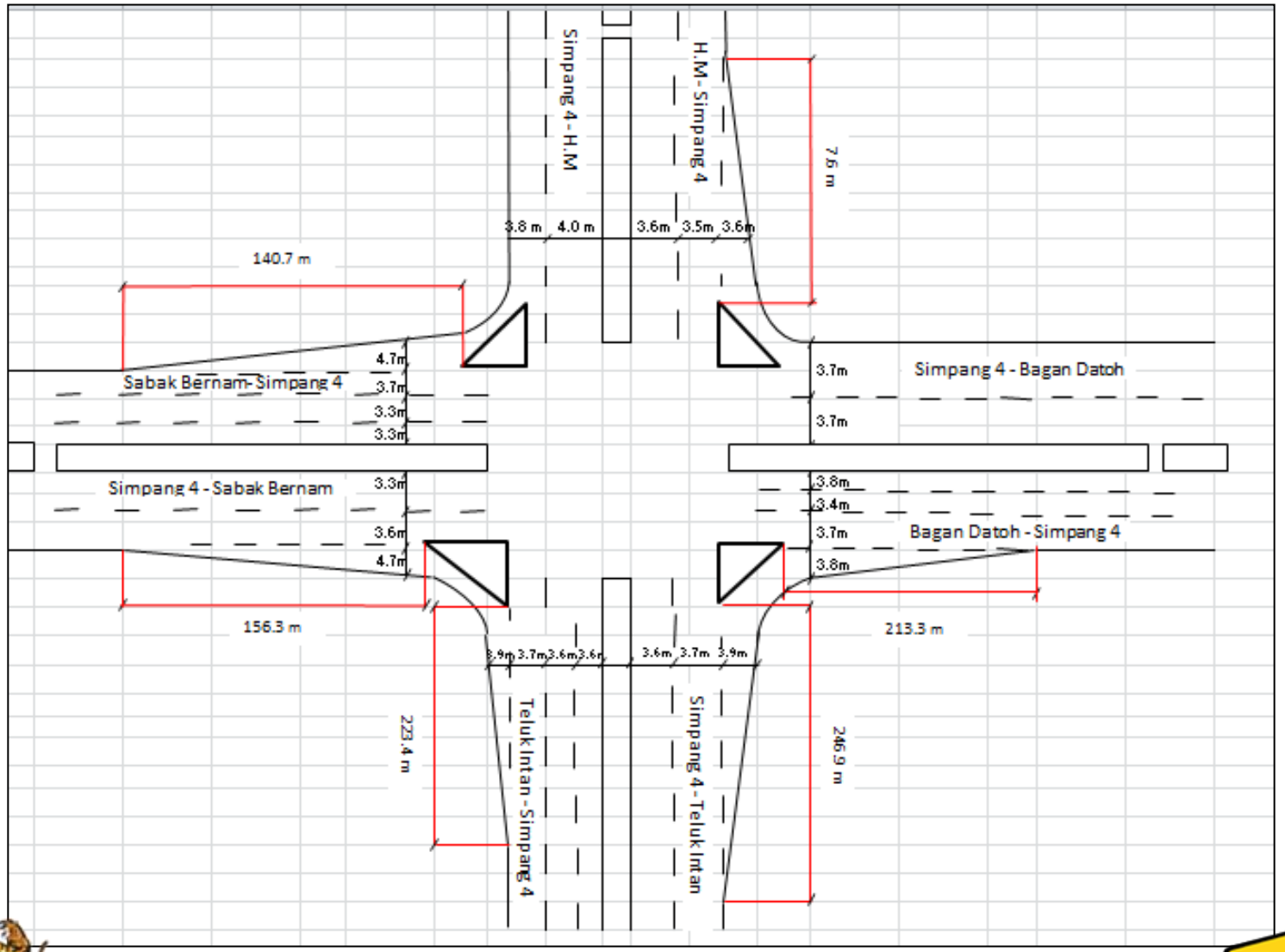
Lalulintas dari : BALAI POLIS Ke LABU Arah

Bilangan Lorong : 4

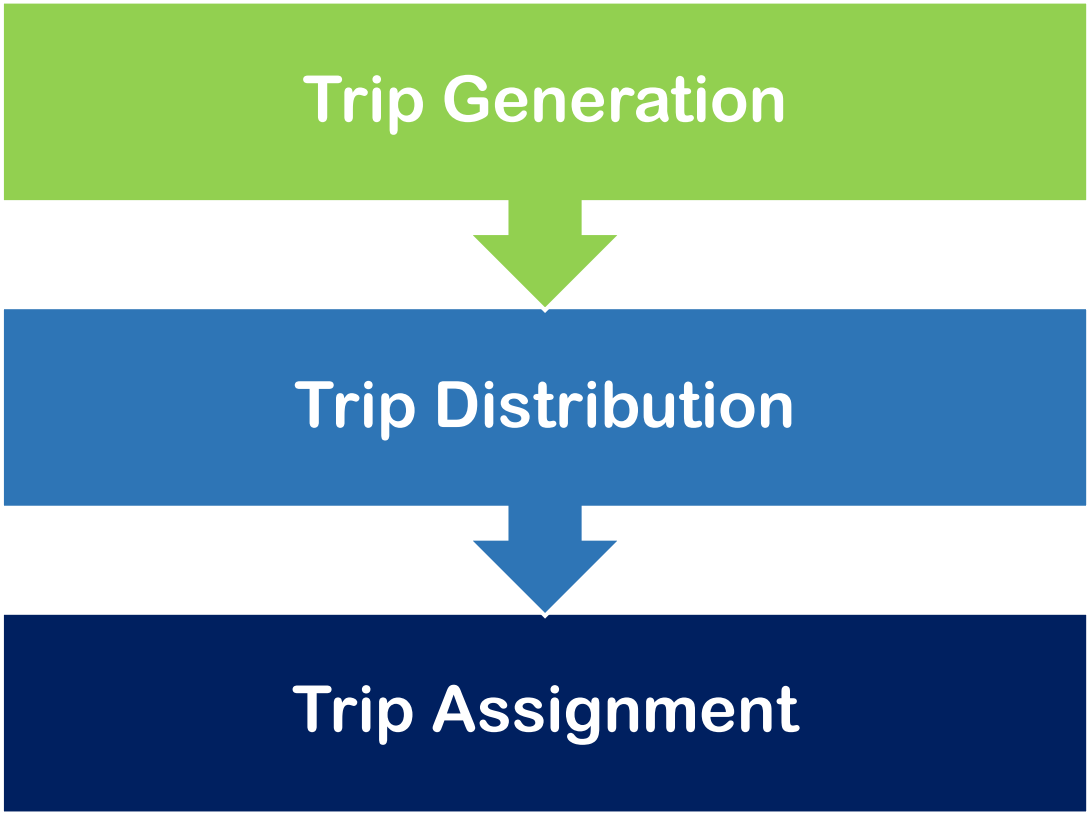
Hari : Tarikh : 2 7 / 1 0 / 1 5 Disediakan oleh : MOHD ALI (019-9915462)

Jam Permu-laan	(1) Motokar dan Teksi	(2) Van Kecil dan Utiliti (Ringan – 2 gandar)	(3) Lori dan Van Besar (Berat – 2 gandar)	(4) Lori dengan 3 Gandar atau treler (Berat dan melebihi 2 gandar)	(5) Bas	(6) Motosikal	Jumlah
0600							
0615							
0630							
0645							
0700							
0715							
0730							
0745							
0800							
0815							
0830							
0845							
0900							

Additional Information Needed



3 TRIP FORECASTING WITH SEQUENTIAL STEPS

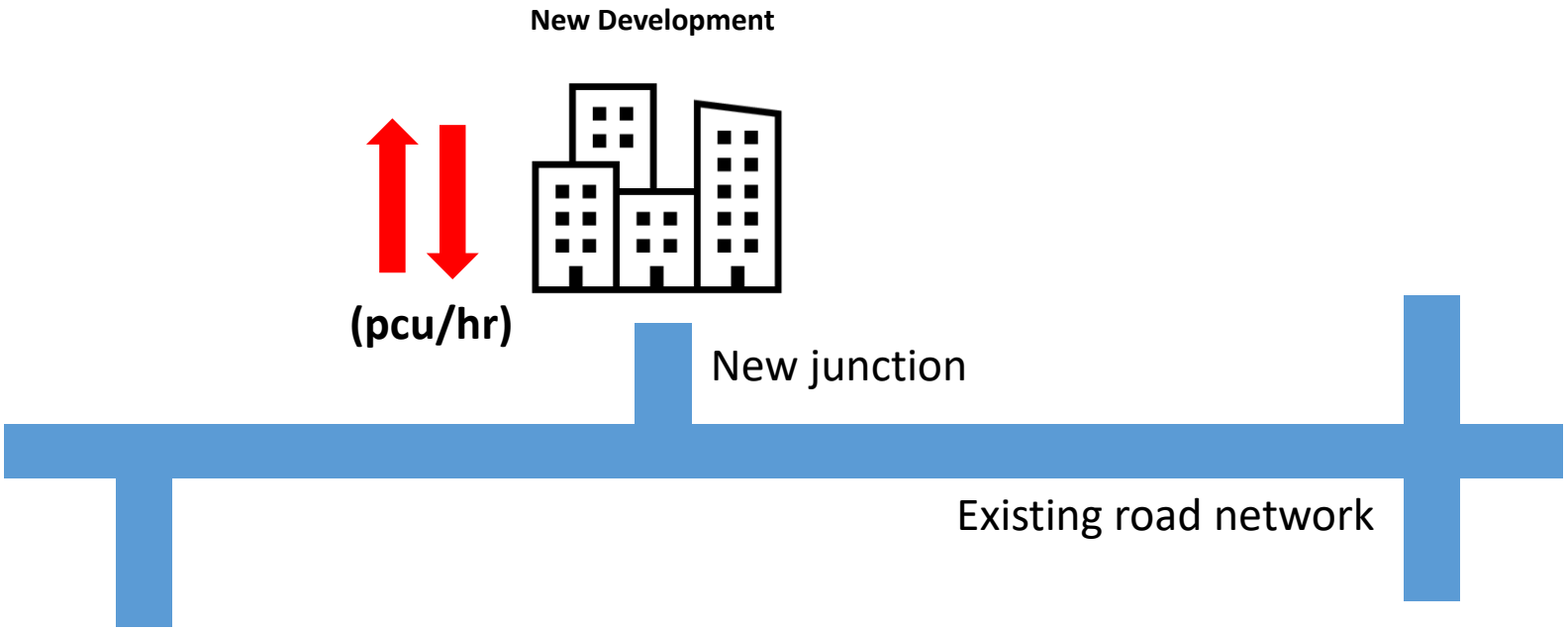


Trip Generation

Process of estimating the amount of traffic to be generated by a proposed development

Legend

Trip generated from new development (IN/OUT)

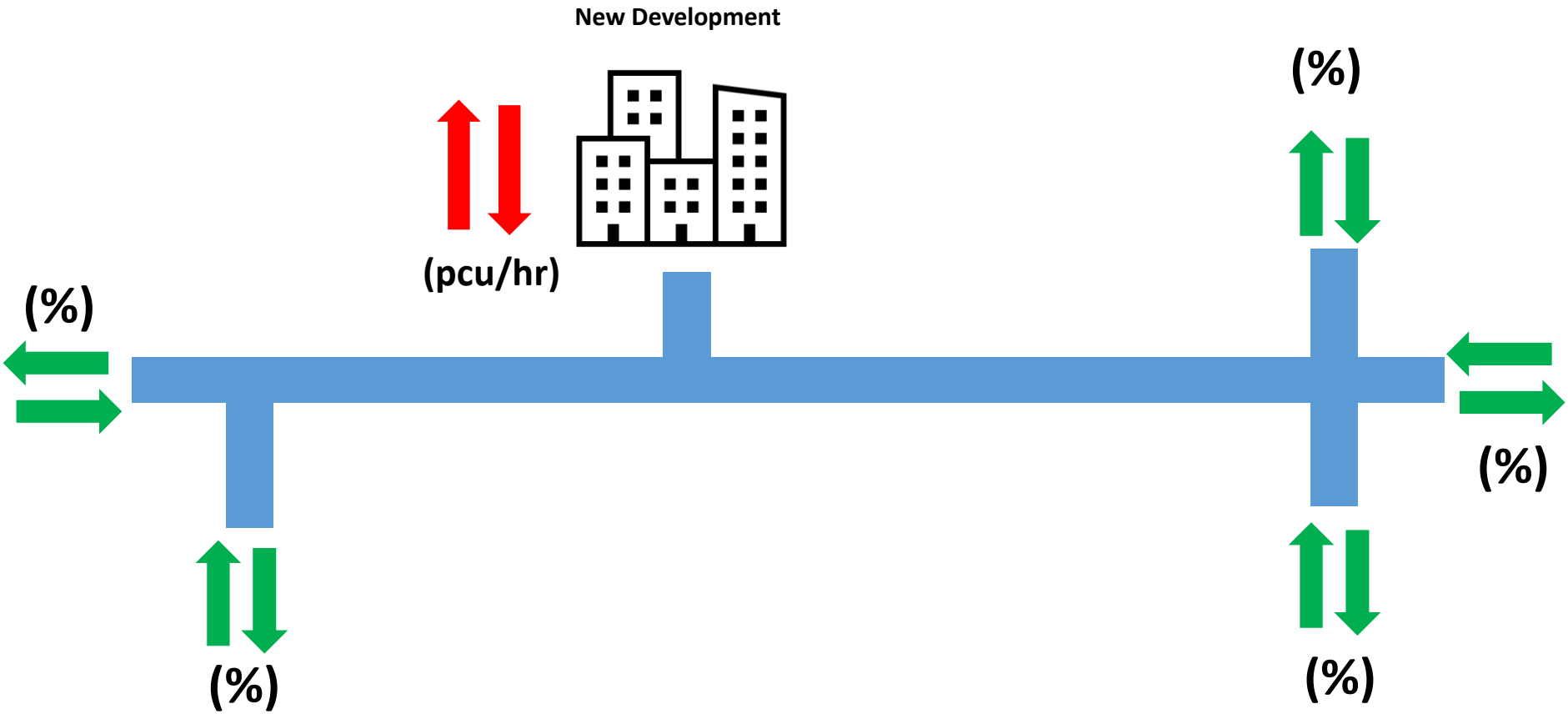


Trip Distribution

Distributing the generated traffic to the road network using existing traffic distribution pattern

Legend

Existing traffic pattern to/from the development

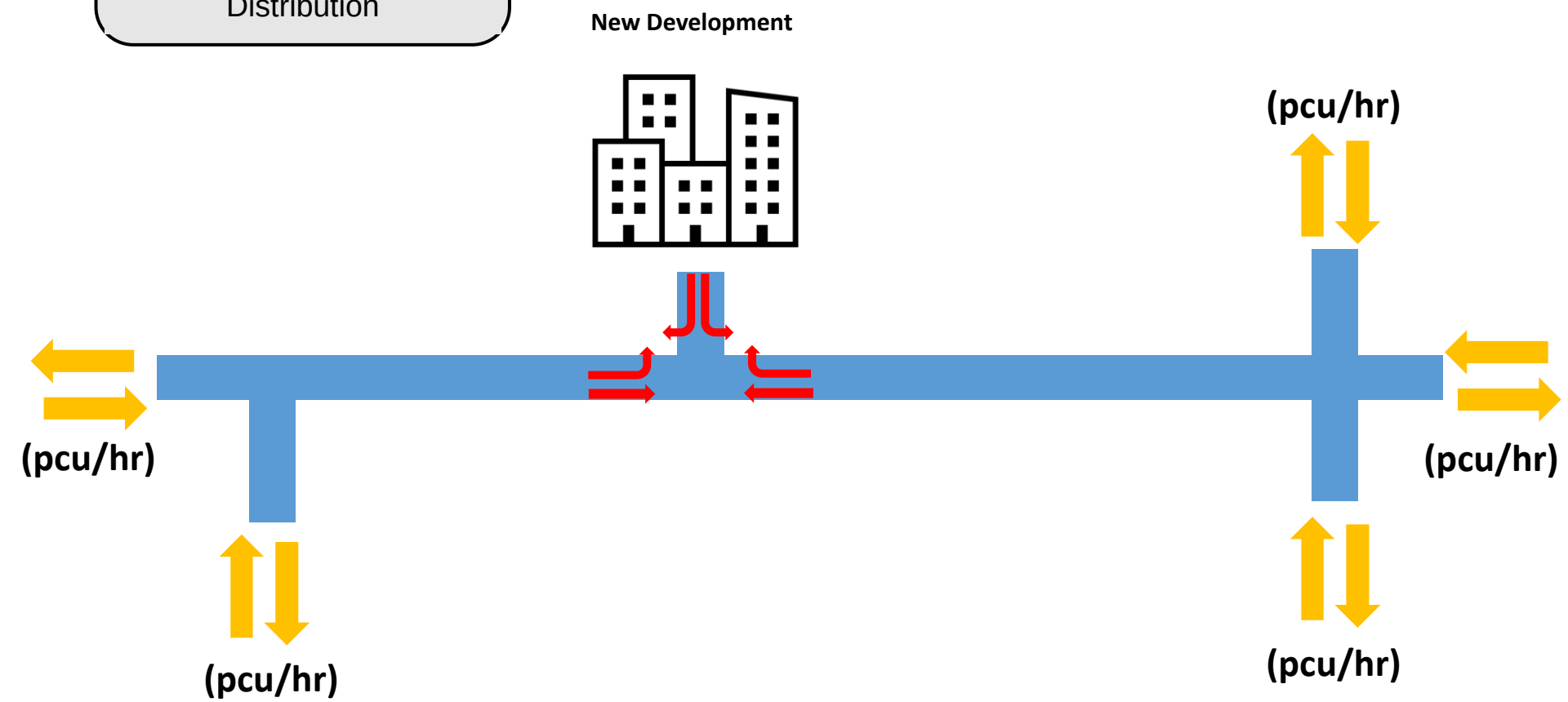


Trip Assignment

Traffic generated from development to be assigned to the road network based on Trip Distribution

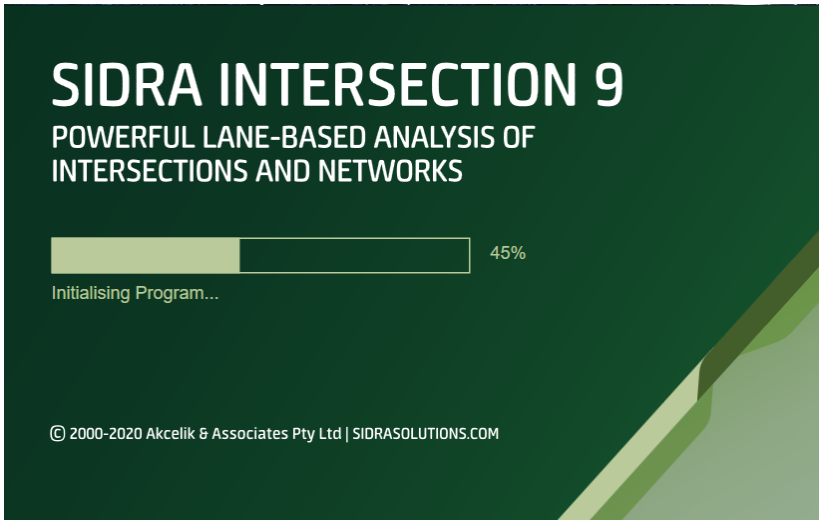
Legend

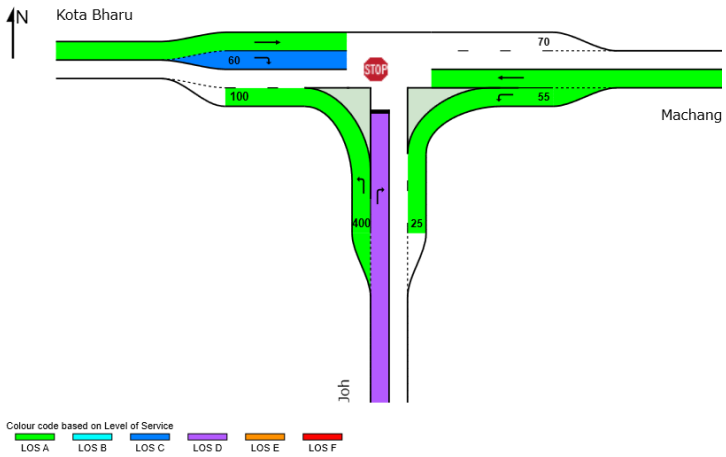
Existing traffic + traffic from the new development



Performance Analysis

- Should be performed at all proposed site access locations and all intersections adjacent to the site
- Junction performance analysis software - SIDRA





4 ANALYSIS OF IMPACTS ON TRAFFIC

Base Year (e.g. 2020)

- Proposed development project information (Development location, type, component, density, planned completion date, etc.) for the base (current) year.
- Data Collection (Traffic count, road characteristics, average annual traffic growth rate, etc.)
- Existing/Current Traffic Condition (AM Peak, PM Peak) – **known as Baseline Traffic Condition**

Submission Year (e.g. 2021)

- Submission of Development Proposal Report (TIA Report) to Approving Authority for Planning Permission Approval.

* **Note:**

Validity period of TIA Report is 2 years from the date of TIA study in BY. If more than 2 years, the TIA Report must be updated to reflect the latest traffic conditions of the locality.

Completion Year (e.g. 2023)

- Proposed development fully completed and operational.
- Projected traffic volume with 3 scenarios:

a) Without development (Non-Site Traffic only)
b) With development (Non-Site Traffic + Site Traffic)
c) With development and mitigation measures

- Assessment and mitigation for access, intersection delay, road link capacity, and transport infrastructure.

* **Note:**

- Project completion period (inclusive of time taken for Planning Permission Approval to be obtained and actual construction works) is assumed to be 2 years & commencement of project immediately after Planning Permission Approval obtained in SY. However, if project completion period is expected to be more than 2 years, this will have to be determined and reflected accordingly in the TIA Report.

- For staged developments, traffic impact must be assessed during operational year for each stage.

Projection Year (e.g. 2033)

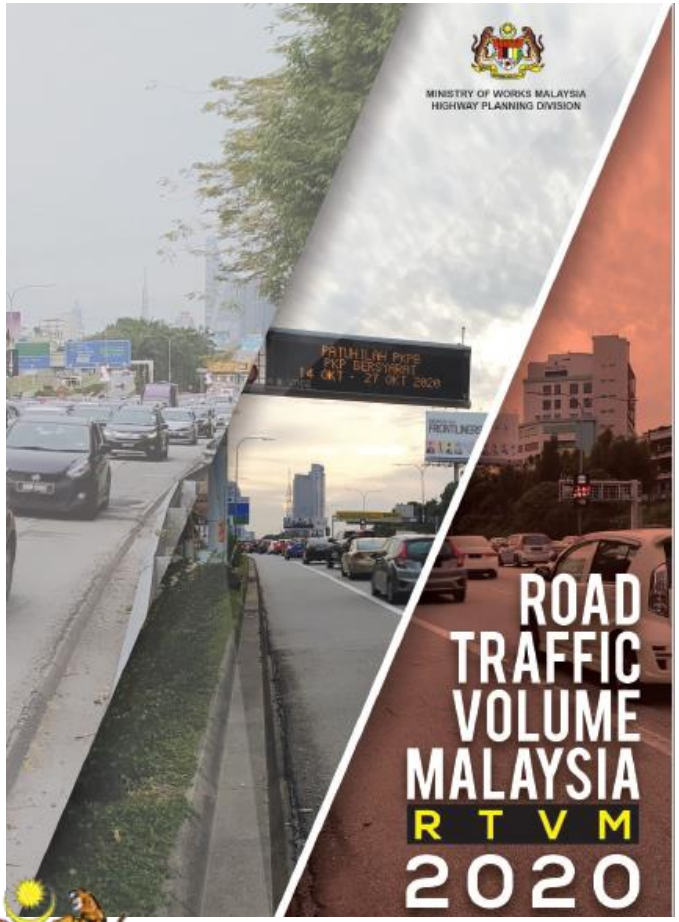
- Forecast the traffic impacts 10 years upon completion.
- Projected traffic volume with 3 scenarios:

a) Without development (Non-Site Traffic only) – **known as Baseline Traffic Condition in IAY**
b) With development (Non-Site Traffic + Site Traffic)
c) With development and mitigation measures

- Assessment and mitigation for access, intersection delay, road link capacity, and transport infrastructure.

Traffic Forecast

- Future traffic volume to be estimated using the average annual traffic growth rate from Road Traffic Volume Malaysia (RTVM)



KEDAH

ANNUAL TRAFFIC GROWTH RATE FOR YEAR 2020

POKOK SENA

Station Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Normal Growth (%/yr)	Rsqr
KR101	46,813	42,213	46,801	54,634	55,909	54,311	50,687	51,716	51,811	45,779	0.90	0.09
KR102	22,888	23,422	29,246	25,587	29,875	26,755	24,451	24,884	27,533	23,948	0.29	0.01
KR103	19,143	14,737	21,353	17,789	15,940	17,873	15,967	16,152	18,445	16,008	-1.00	0.74

KOTA SETAR

Station Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Normal Growth (%/yr)	Rsqr
KR105	27,783	33,955	37,715	38,710	37,417	34,667	37,829	38,763	34,766	30,472	0.60	0.27
KR106	21,717	24,217	25,894	25,197	26,817	27,313	28,852	29,374	31,347	28,129	3.15	0.81
KR107	38,074	41,811	46,195	45,140	39,654	39,136	38,402	39,319	38,587	33,131	-1.90	0.37
KR108	45,001	45,944	44,954	45,114	40,335	39,302	37,928	37,624	30,391	25,299	-5.80	0.81
KR109	26,744	32,255	28,764	27,154	32,632	31,501	32,929	32,961	31,602	27,536	0.82	0.08
KR110	23,023	24,145	23,108	21,379	21,374	21,275	23,093	22,215	18,590	15,621	-3.20	0.56
KR111	24,310	21,367	18,226	24,533	18,361	18,144	21,668	21,321	21,323	18,143	-1.40	0.12

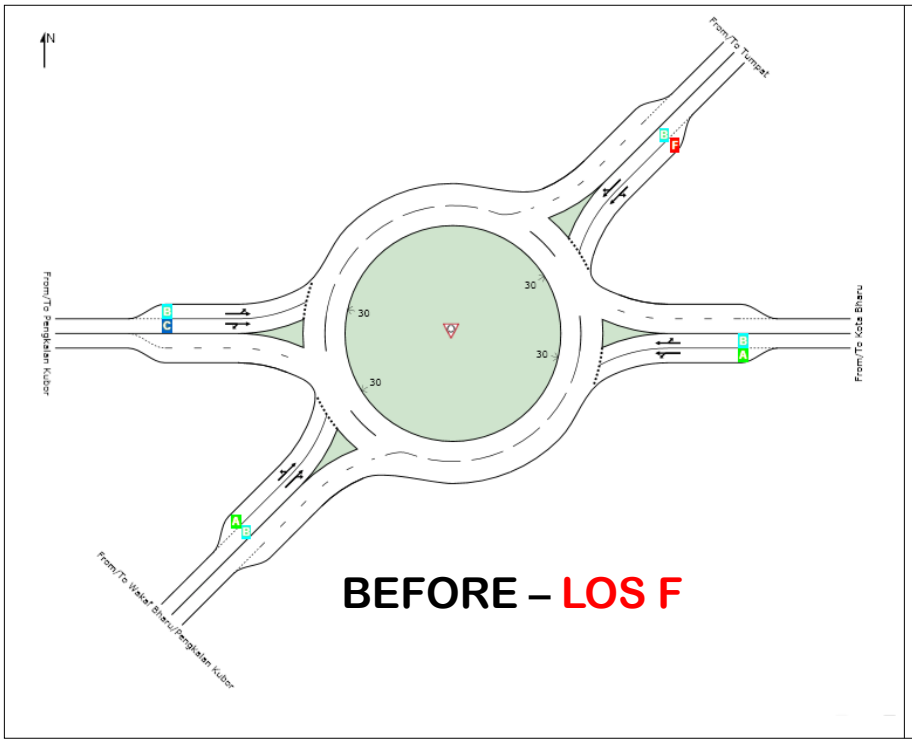
KUBANG PASU

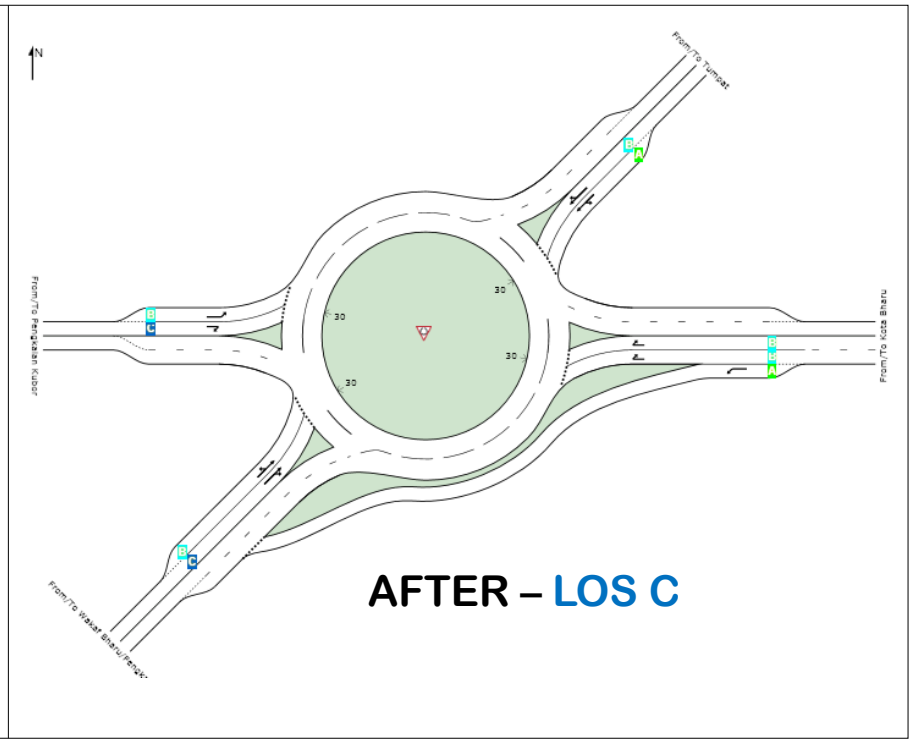
Station Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Normal Growth (%/yr)	Rsqr
KR201	28,098	34,230	36,690	36,720	29,834	31,898	30,906	31,270	24,127	20,530	-4.00	0.43
KR202	32,311	42,822	47,474	34,003	39,660	38,036	39,669	40,387	31,183	27,076	-2.50	0.21
KR203	21,549	22,093	25,439	20,458	21,373	20,115	20,992	20,509	16,122	13,585	-4.50	0.60
KR204	14,174	18,542	18,806	15,486	13,730	15,175	15,884	16,127	16,374	14,275	-0.80	0.06
KR207	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17,184	16,759	N/A	N/A
KR208	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13,214	12,887	N/A	N/A

5 MITIGATION MEASURES PROPOSALS

- Recommendations for site access and transportation improvements
- For example – improvements in road geometry, traffic signal timing, traffic management
- All costs for the mitigation measures shall be borne by developer

Example Of Mitigation Measures





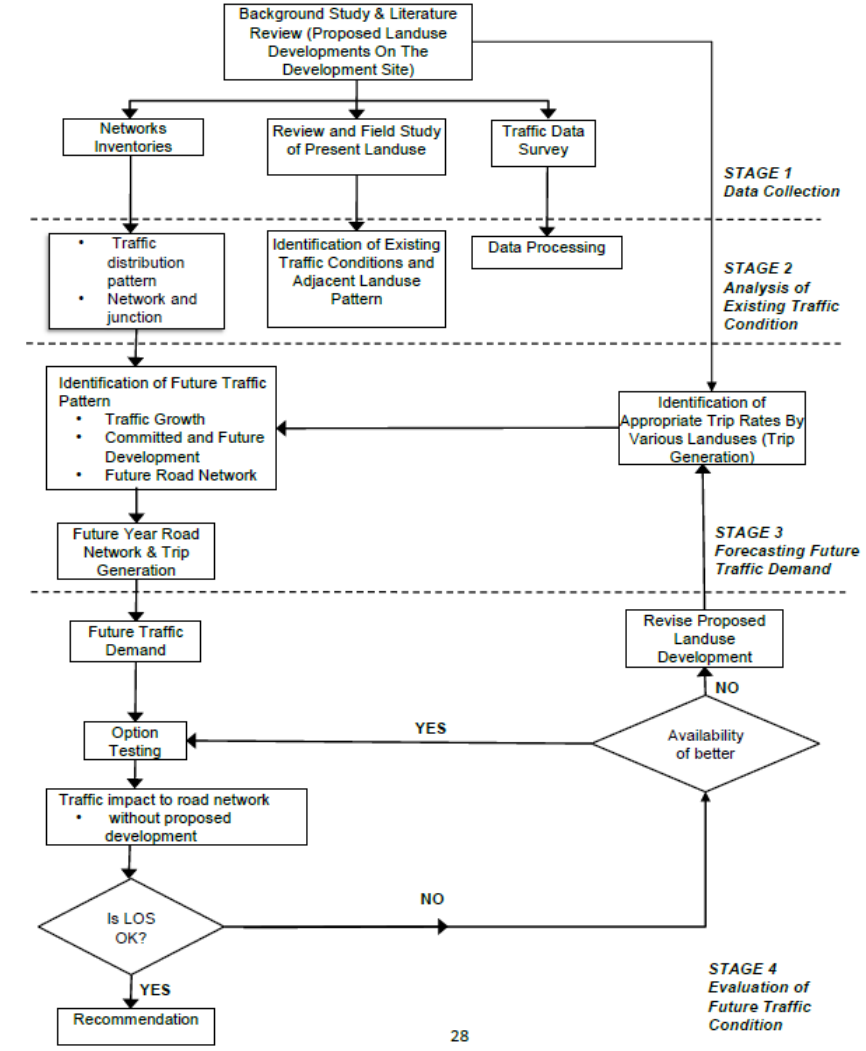
Example Of Mitigation Measures

1. **Change the intersection layout**
   - Increase number of lane(s)
   - Change the lane sharing (vehicles movement)
   - Provide acceleration, deceleration and storage lane(s)

2. **Upgrading**
   - From unsignalized to signalized junction
   - From roundabout to signalized roundabout
   - From roundabout to signalized junction
   - From signalized junction to interchange (grade separation)

3. **Re-study the Phasing & Timing if signalised junction is involved**

TIA APPROACH (ATJ 38/2018)



LEVEL OF SERVICE (LOS)

- Qualitative description of operating conditions within a traffic stream based on service measure including traffic flow, travel speed, freedom to manoeuvre safely, driver comfort and convenience
- LOS A representing the best operating conditions, and LOS F the worst

LEVEL OF SERVICE (LOS)

LOS A - Free flow with low traffic volumes and high speeds

LOS B - Stable traffic flow with high degree of freedom to select speed and operating condition

LOS C - Restricted flow that remains stable but drivers are restricted in their freedom to select their own speed, change lane, or pass

LOS D - High density and unstable flow, which speed and freedom to manoeuvre are severely restricted

LOS E - Unstable flow or/at near capacity level with poor level of comfort and convenience

LOS F - Forced traffic flow in which the amount of traffic approaching a point exceed the amount that can be served, poor time travel, low comfort and convenience

(Source: HPU, KKR & ATJ 8/86)

LEVEL OF SERVICE (LOS)

1 ROAD/MID-BLOCK (MHCM 2011)

- 2 lane highway:
  - (1) Percent Time-Spent-Following (PTSF)
  - (2) Average Travel Speed (km/h) (ATS)
- Multilane highway:
  - (1) Density;
  - (2) Speed; and
  - (3) Volume to capacity (v/c) ratio.

2 INTERSECTION (MHCM 2006)

- Defined in terms of delay as a measure of:
  - Driver discomfort/ frustration
  - Fuel consumption
  - Lost travel time

TRAFFIC CONDITIONS TO BE ACHIEVED BY MITIGATION MEASURES

BASELINE TRAFFIC CONDITION IN IAY ** (LOS)	MINIMUM TRAFFIC CONDITION (WITH DEVELOPMENT) AFTER MITIGATION MEASURES IN IAY *** (LOS)
A	C
B	C
C	C
D	D
E	D (exception E) *
F	D (exception E) *

* See sections 11.3 and 11.4 below.

** BASELINE TRAFFIC CONDITION IN IAY refers to traffic condition without development in IAY.
IAY means Impact Analysis Year.
IAY is to be 10 years after the projected CY.

*** These requirements are applicable to road segments and each element of the intersections individually.

See section 10.3.1 for definition of terms.

Source: ATJ 38/2018: Guidelines For Traffic Impact Assessment

TIA REPORT OUTLINE

No.	Item	Description
1.	**Report Cover**	• Project title • Client name • Consultant name • PEPC stamp and signature • Date of submission
2.	**Executive Summary**	• Brief description of proposed development • Summary of traffic impact analysis • Brief description of proposed mitigation measures and the extent they can mitigate the impact.
3.	**Introduction**	• Description of proposed development • Traffic impact study methodology

TIA REPORT OUTLINE

4.	**Defining the study area/boundary**	• Scope of study • Records of discussion and agreement with Developer and Approving Authority • Description of road network within the agreed area of study • Map of road network in area of study
5.	**Determining existing traffic**	• Description of traffic generators in and around the study area • Identification of other developments with planning approval but not yet implemented • Identification of committed transportation projects in the study area. • Identification of designated links and intersections • Examination of historical data (including traffic accident) • Volume survey of current traffic flows in designated links and intersections within the study area • Survey of pedestrian flows at critical locations.

TIA REPORT OUTLINE

6.	**Land use study**	• Description of current planning policies of the Approving Authority for the site of the proposed development including parking standards • Description of current usage of the site proposed development • Description of land use of the proposed development, including site area and development phasing • Breakdown of types and units of building in the proposed development • Site and layout plans
7.	**Trip Generation**	• Computation of trip generation (non-site traffic and site traffic) • Estimation of trip generation for peak hours (with weekday and development peak if necessary) • Justification of the values used • Computation of peak traffic volume, i.e. combination of Site and Non-Site traffic

TIA REPORT OUTLINE

		• Specification of trip attraction by phase (if appropriate) • Justification for methodology adopted for trip distribution and assignment • Estimation of traffic growth rate over time for both Site and Non-Site traffic
8.	**Impact Analysis**	• Description of capacity analysis technique • Details of traffic impact analysis result • List of locations where mitigation of traffic impact needs to be addressed
9.	**Mitigation Measures**	• Description of proposed mitigation measures • Preliminary plans of mitigation measures • Details of computations and analysis showing that the mitigation criteria as given in **Section 11** of this Guideline have been met
10.	**Conclusion**	

VALIDITY PERIOD OF TIA REPORT

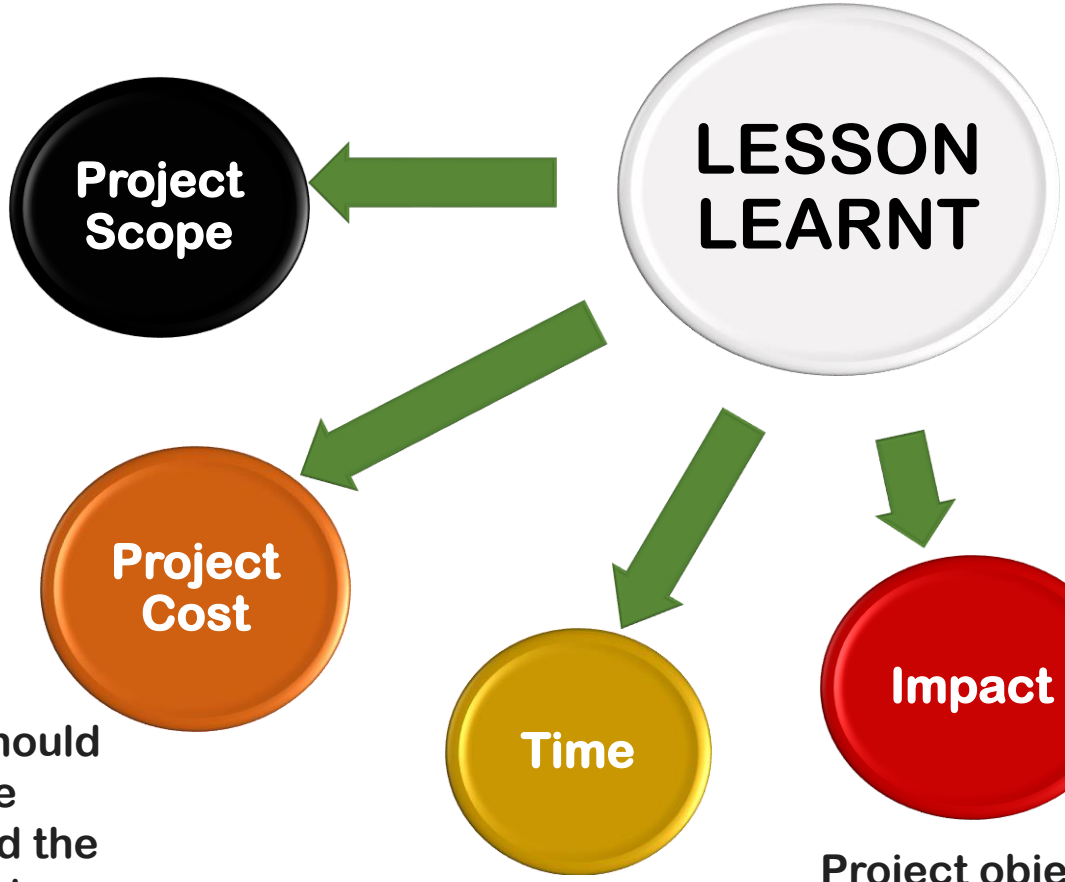
Two (2) years

from date of TIA Study in Base Year

TIA VS. TRAFFIC STUDY

TRAFFIC IMPACT ASSESSMENT (TIA)	TRAFFIC STUDY
Determine the impact of traffic generated from a proposed site development to the surrounding road and transportation system	Detailed examination and analysis of a road network and transportation system supported by data collection
For building projects	For new/upgrading road projects
Micro analysis, for specific area	Macro analysis, larger study area

LESSON LEARNT



The scope of the project should take into account the proposals from TIA/traffic studies

The project's cost should take into account the traffic study cost and the design output (based on traffic study)

To avoid extension of design period if TIA is not considered in early stage (redesign)

Project objectives are fully achieved

SUSTAINABLE TRANSPORTATION

- Traffic Demand Management
- Travel Plan
- Car Club
- Bike Sharing
- Vehicle Entry Permit, Certificate of Entitlement (COE), Off Peak Car/Weekend Car Schemes, Electronic Road Pricing System - Singapore
- Public Transport – Integrated fees, Zoning charges, Day Pass, Monthly Passes

REFERENCES

- ATJ 38/2018 – Guidelines For Traffic Impact Assessment
- ATJ 3/2011 – Garis Panduan Memproses Permohonan Pembangunan Tepi Jalan Persekutuan
- Highway Capacity Manual Malaysia (MHCM) 2006 & 2011
- Road Traffic Volume Malaysia (RTVM)
- Trip Generation Manual 2010 Malaysia
- 1PP & Manual Perolehan Perkhidmatan Perunding Edisi 2011 (Pindaan Kedua)


Q&A

THANK YOU