JABATAN KERJA RAYA MALAYSIA

KURSUS PENGENALAN PENILAIAN KESAN TRAFIK

(16-18 Oktober 2019)

Traffic Analysis Software

Bahagian Kejuruteraan Trafik, Cawangan Jalan, Ibu Pejabat JKR Malaysia

Megat Nazrin Helmy Shah Bin Mohd Nazri – 03 4051 8112

List of Traffic Analysis Software

- ***Strategic models*** – EMME (Sydney Travel Model STM).
- ***Highway assignment models*** – EMME, TransCAD, Dynameq, VISUM, Aimsun, CUBE, OmniTRANS.
- ***Microsimulation models*** – Paramics, VISSIM, Aimsun, Commuter (strictly speaking some of these software now employ nanoscopic agent-based simulation).
- ***Corridor models*** – LinSig, Transyt, SCATES.
- ***Single Intersection models*** – SIDRA.

EMME - INRO

WHAT CAN YOU DO WITH EMME?

- **Travel Demand Forecasting**

Implement virtually any zonal-aggregate travel demand model with any feedback structure, trip generation and distribution choice models. Apply trip chaining, capture multimodal accessibility and power leading activity-based and land-use models.

- **Transit Planning**

Evaluate changes to transit routes, frequency, quality of service, transit service competition or fare integration, crowding on transit vehicles and at stations, walkability / accessibility, park-and-ride, kiss-and-ride, transit system design and transit service planning with fare card data.

- **Traffic Planning**

Evaluate road network expansion and management schemes, toll schemes and toll revenue forecasts, accessibility studies, junction delay, traffic demand management, critical infrastructure, freight and good movements, and bicycle traffic.

- **Economic, emissions and environmental analyses**

Analyze vehicle cold starts, operating conditions, and other key data for emissions. Evaluate transit service quality by demographics, compare demand management techniques, perform investment-grade infrastructure and toll evaluation or forecast benefits to support cost/benefit or other project-ranking schemes.

- **Pedestrians, bikes, and active transport**

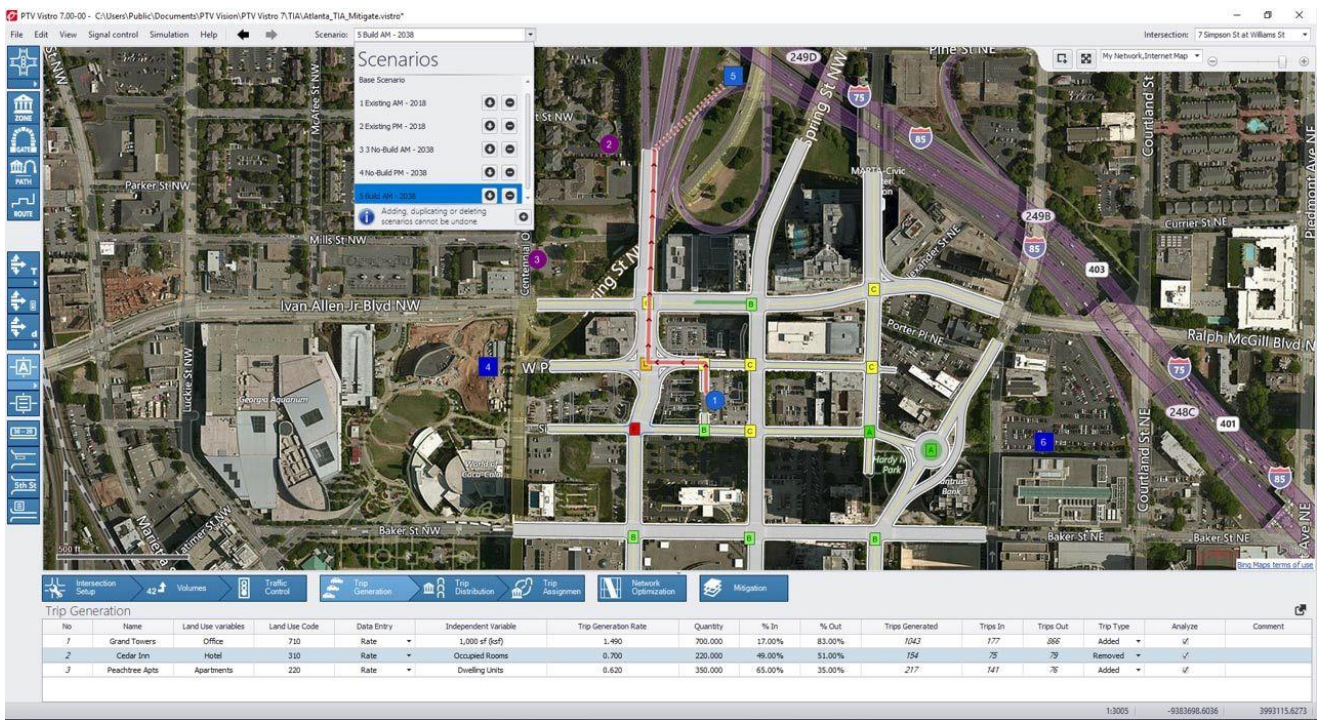
High-performance routing and assignment on all-streets networks to support topographic and urban form in route choice for non-motorized travel, true multimodal routing for walk access to and between transit services, and stochastic route choice models to forecast changes and prioritize infrastructure. Use results to plan safety, first-mile/last-mile accessibility, bike facilities and more

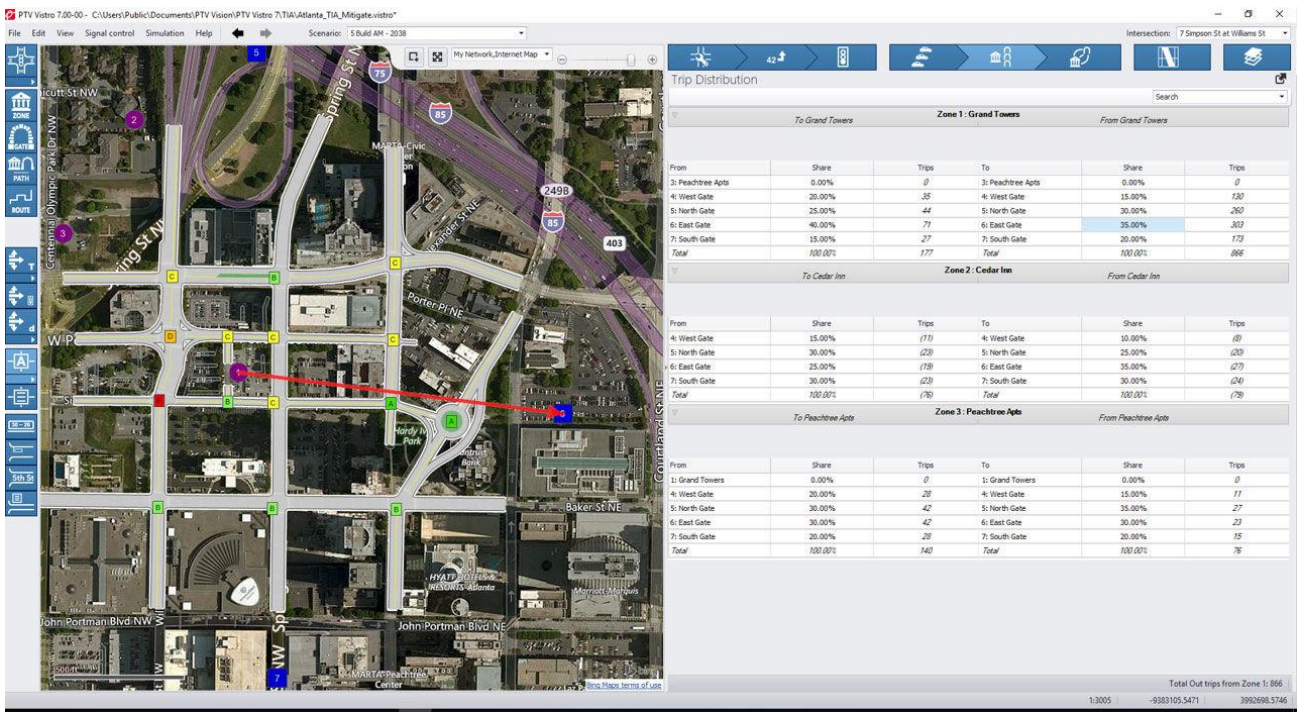
PTV Group

- PTV Vistro
- PTV Visim
- PTV Visum

Smart and user-friendly

PTV Vistro is a smart, user-friendly traffic software and is a complete traffic impact analysis tool with auto-generated reports, figures, fair share assessment, and traffic warrants. The powerful traffic engineering software converts to other PTV traffic platforms such as PTV Vissim for microsimulation and PTV Visum for macrosimulation.

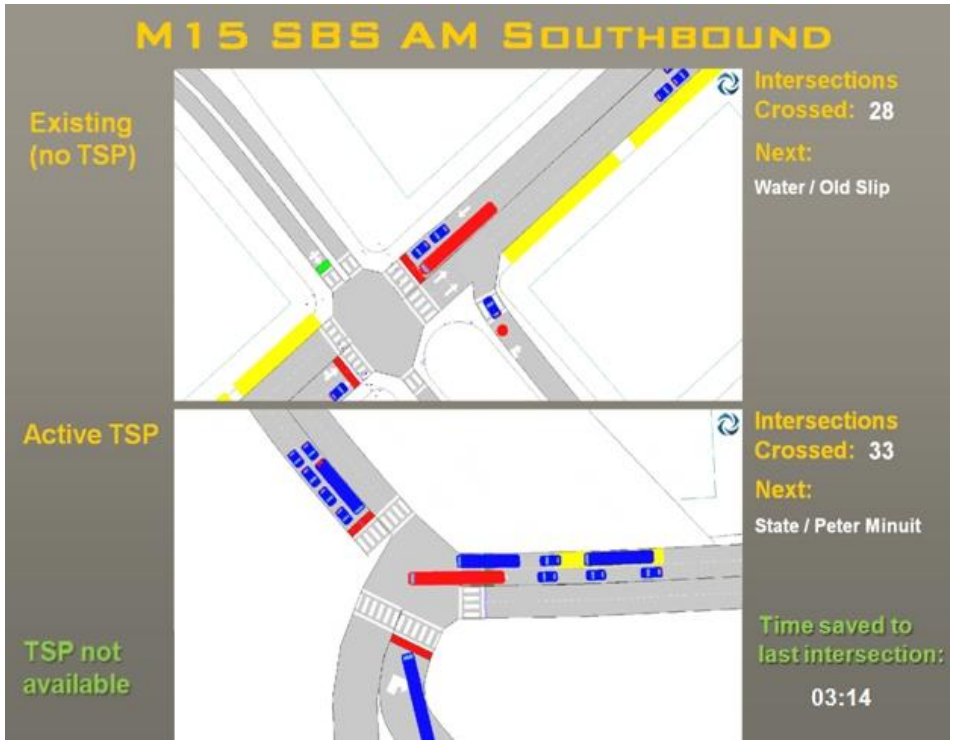


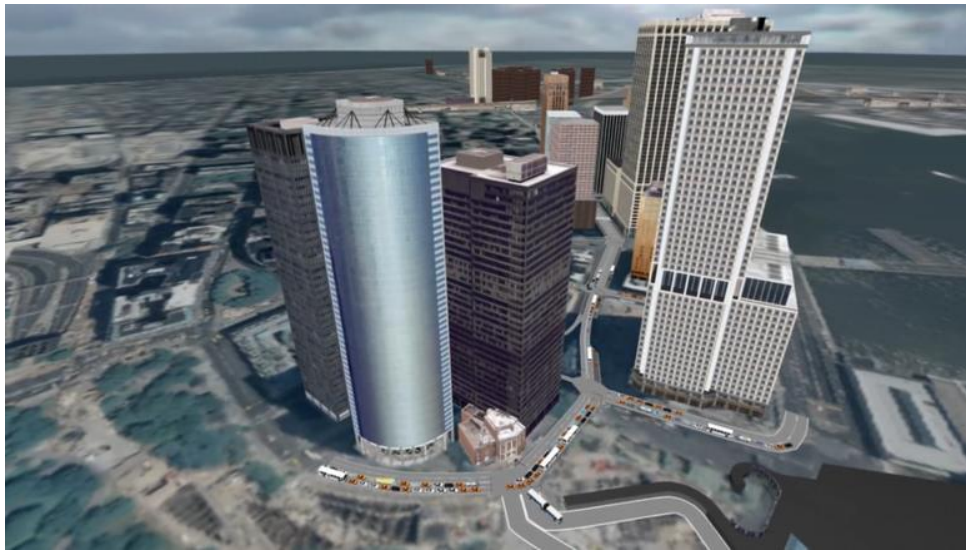


AIMSUN

- Aimsun Next software allows you to model transportation networks small and large: from a single intersection to an entire region.
- You can use Next software to build a digital twin of a city or highway, then simulate the trips that people want to make, and match them with the available transportation options such as taxis, buses, car-shares, bikes or even walking.
- Aimsun Next allows you to carry out traffic operations assessments of any scale and complexity. The applications are endless but some of the most common are:

➢ Assessment and optimisation of Transit Signal Priority (TSP) and Bus Rapid Transit (BRT) schemes
➢ Feasibility studies for High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) lanes
➢ Impact analysis of infrastructure design such as highway corridor improvement/construction
➢ Environmental impact analysis
➢ Toll and road pricing
➢ Evaluation of travel demand management (TDM) strategies
➢ Signal control plan optimisation (Aimsun Next-TRANSYT link) and adaptive control evaluation
➢ Safety analysis
➢ Evaluation of Variable Speed policies and other Intelligent Transportation Systems (ITS)
➢ Highway Capacity Manual (HCM) analysis
➢ Workzone management





Penggunaan SIDRA Dalam Rekabentuk Persimpangan

Introduction

- SIDRA synonyms for Signalised (and unsignalized) Intersection Design & Research Aid.
- It's a junction performance analytical tool.
- Professionally designed for the purpose of capacity, level of service (LOS), operating performance & travel quality analysis involving road traffic.
- Developed by the Australian Road Research Board.
- Produced by SIDRA SOLUTIONS under Akcelik & Associates Pty Ltd incorporated in Australia.

Parameters Used in SIDRA

A. Total Flow Period *(ex: 60 mins)*
   - *Usually over 1 hour period (peak hour)*

B. Peak Hour Factor/ Peak Flow Period *(ex: 0.95)*
   - *In an hour (for 15 minutes interval), normally has different traffic volume*

C. Basic Saturation Flow *(ex: 1950 pcu/hr)*
   - *Flow Rate per lane at which vehicles can pass through*

D. Signal Cycle Time *(ex: 60secs - 180secs)*

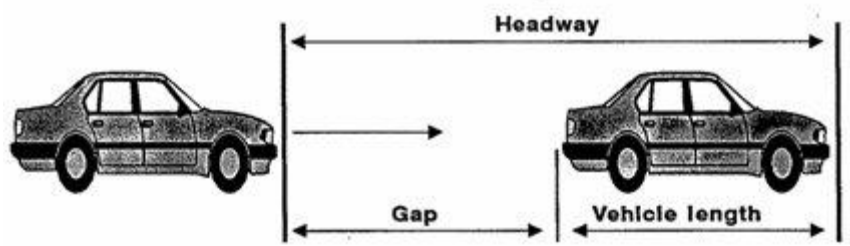
E. Intergreen Time *(ex: 3 – 4 secs)*
   - *Amber + All red time*

Parameters Used in SIDRA – cont'

F. Start Loss Time *(ex: 1 – 2 secs)*
G. End Gain Time *(ex: 1 – 2 secs)*
H. Minimum Green Time *(ex: 6 – 8 secs)*
I. Critical Gap Time *(ex: left turn = 3-5 secs; right turn = 5-7secs)*
    - *Distance between vehicles that required to pass through a junction*

Parameters Used in SIDRA – cont'

J. Follow up Headway *(ex: 2.0 secs)*
   - *Distance between the first and second vehicles to pass through a junction*



K. Practical Degree of Saturation *(ex: 95%)*

Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis

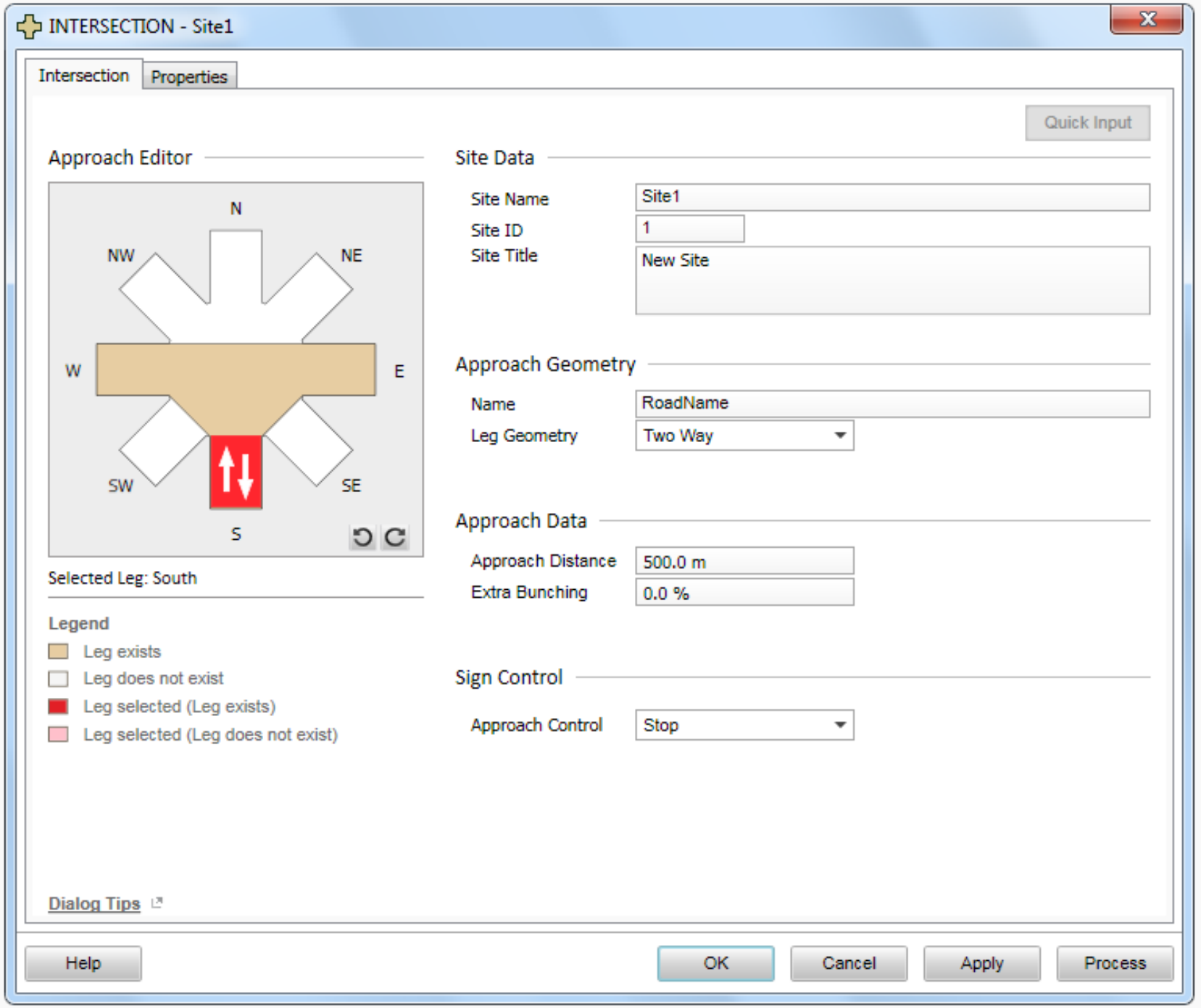
Input Parameters for SIDRA

Main Parameters:

1. **Intersection**
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


INTERSECTION - Site1
Intersection
Properties
Quick Input
Approach Editor
N
NW
NE
W
E
SW
SE
S
Selected Leg: South
Legend
Leg exists
Leg does not exist
Leg selected (Leg exists)
Leg selected (Leg does not exist)
Site Data
Site Name
Site1
Site ID
1
Site Title
New Site
Approach Geometry
Name
RoadName
Leg Geometry
Two Way
Approach Data
Approach Distance
500.0 m
Extra Bunching
0.0 %
Sign Control
Approach Control
Stop
Dialog Tips
Help
OK
Cancel
Apply
Process

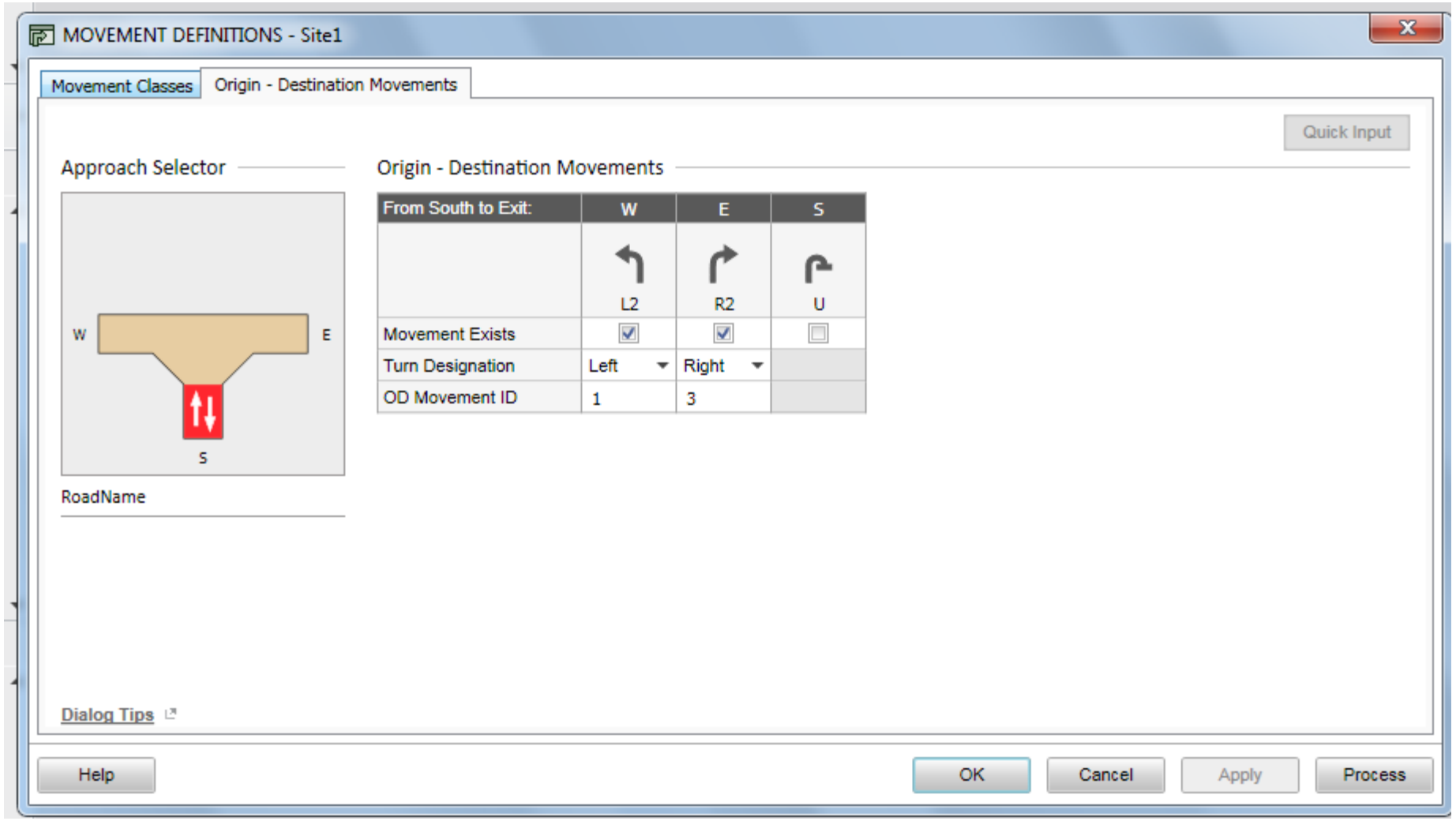
Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. **Movement Definitions**
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


MOVEMENT DEFINITIONS - Site1
Movement Classes
Origin - Destination Movements
Quick Input
Approach Selector
W
E
S
RoadName
Origin - Destination Movements
From South to Exit:
W
E
S
L2
R2
U
Movement Exists
Turn Designation
Left
Right
OD Movement ID
1
3
Dialog Tips
Help
OK
Cancel
Apply
Process

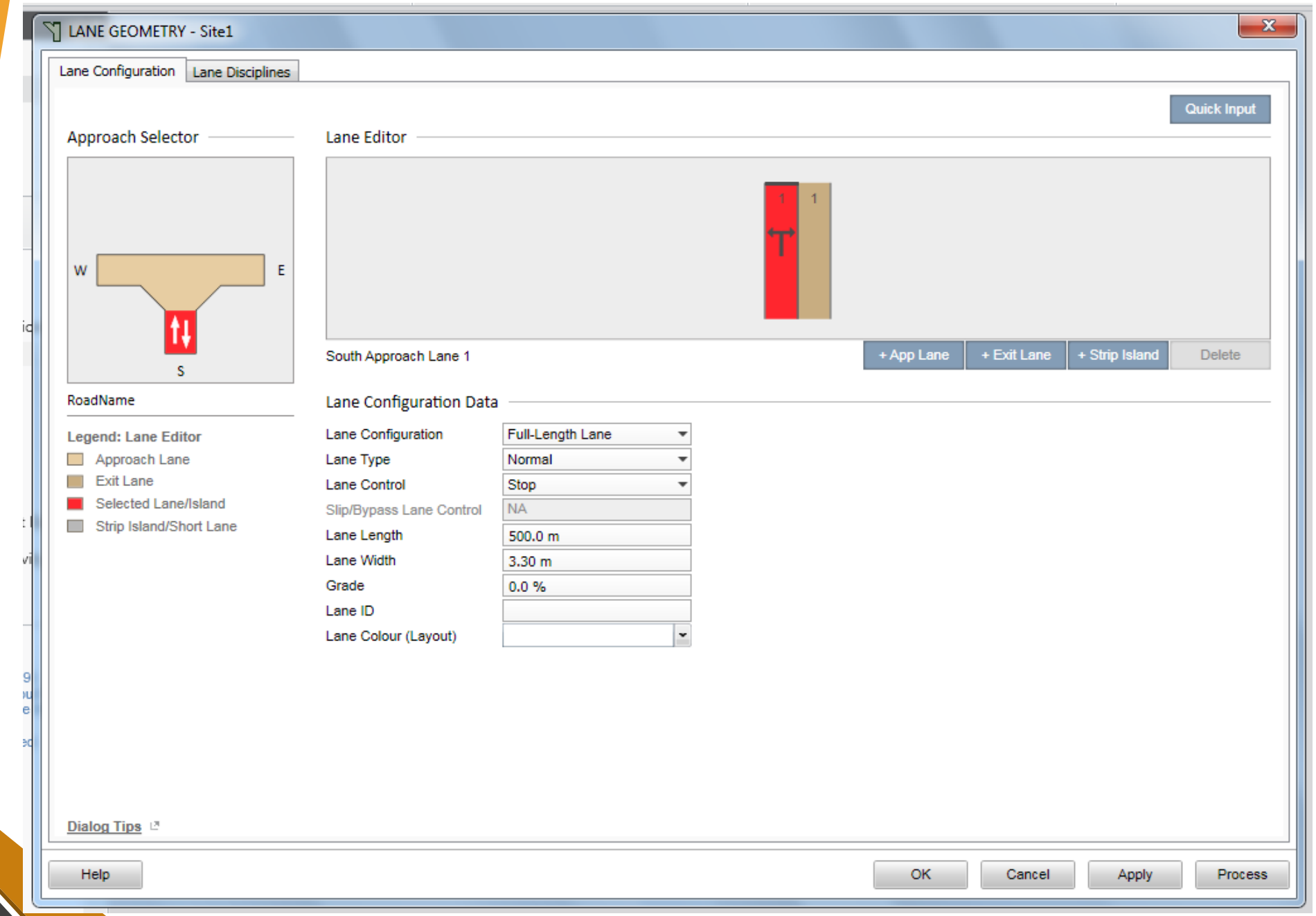
Input Parameters for SIDRA

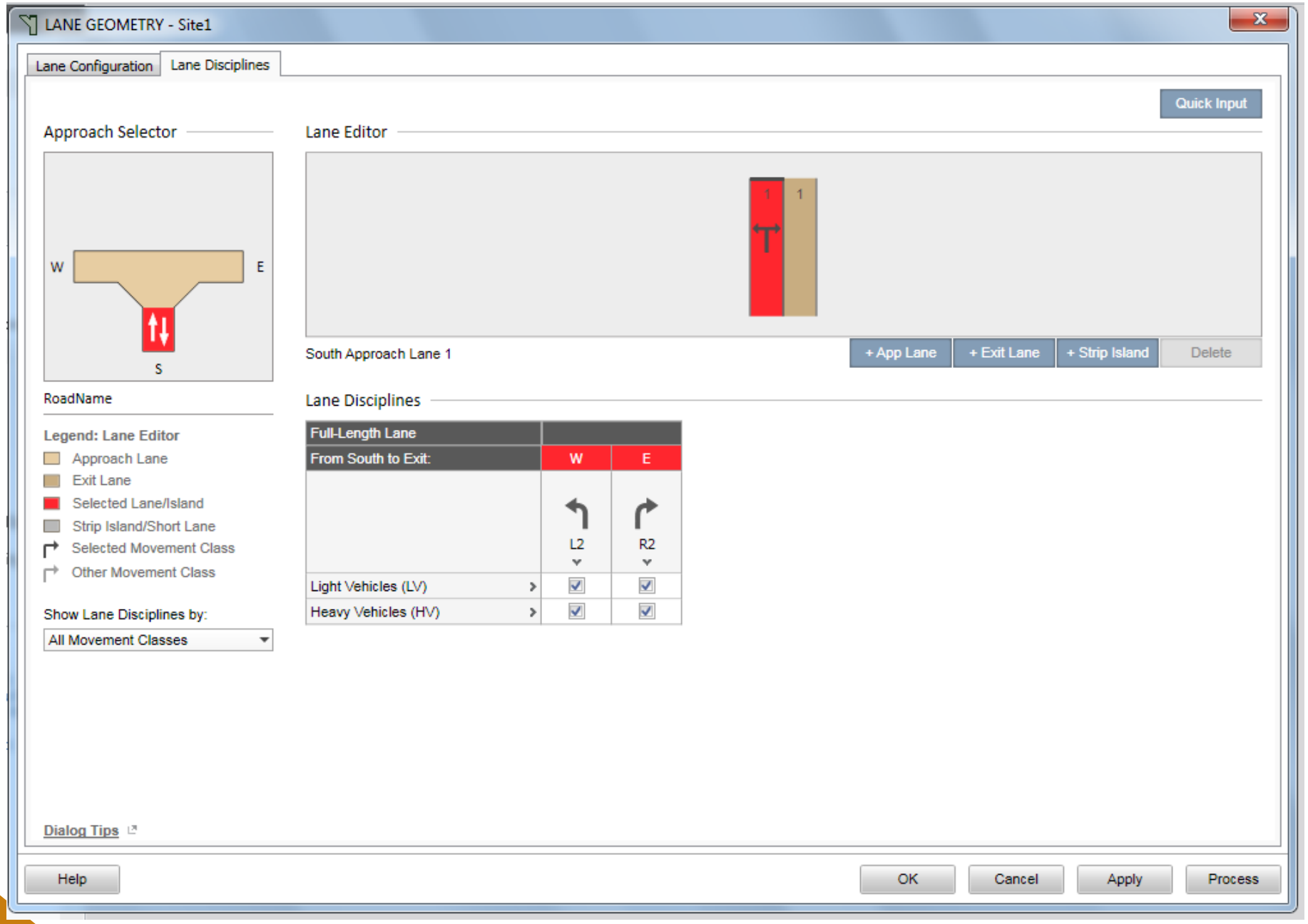
Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


LANE GEOMETRY - Site1
Lane Configuration
Lane Disciplines
Quick Input
Approach Selector
W
E
S
RoadName
Legend: Lane Editor
Approach Lane
Exit Lane
Selected Lane/Island
Strip Island/Short Lane
Lane Editor
1
1
South Approach Lane 1
+ App Lane
+ Exit Lane
+ Strip Island
Delete
Lane Configuration Data
Lane Configuration
Full-Length Lane
Lane Type
Normal
Lane Control
Stop
Slip/Bypass Lane Control
NA
Lane Length
500.0 m
Lane Width
3.30 m
Grade
0.0 %
Lane ID
Lane Colour (Layout)
Dialog Tips
Help
OK
Cancel
Apply
Process


LANE GEOMETRY - Site1
Lane Configuration
Lane Disciplines
Quick Input
Approach Selector
W
E
S
RoadName
Legend: Lane Editor
Approach Lane
Exit Lane
Selected Lane/Island
Strip Island/Short Lane
Selected Movement Class
Other Movement Class
Show Lane Disciplines by:
All Movement Classes
Lane Editor
1
1
South Approach Lane 1
+ App Lane
+ Exit Lane
+ Strip Island
Delete
Lane Disciplines
Full-Length Lane
From South to Exit:
W
E
L2
R2
Light Vehicles (LV)
Heavy Vehicles (HV)
Dialog Tips
Help
OK
Cancel
Apply
Process

Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

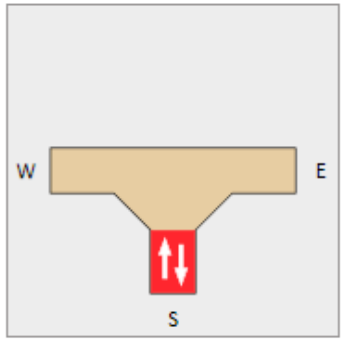
1. Model Settings
2. Demand & Sensitivity Analysis

LANE DATA - Site1

Lane Data | Flow Proportions | Lane Blockage

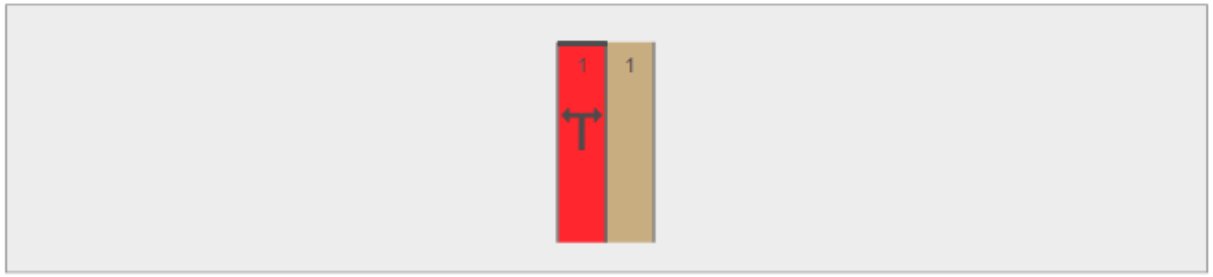
Quick Input

Approach Selector



RoadName

Lane Selector



South Approach Lane 1

Apply Lane Blockage

From South to Exit:	W	E
	L2	R2
Exit Lane 1	☐	☐

Check box indicates that, if checked, the movement in the selected lane may be blocked by the queue in the Exit Lane.

Dialog Tips

Help | OK | Cancel | Apply | Process

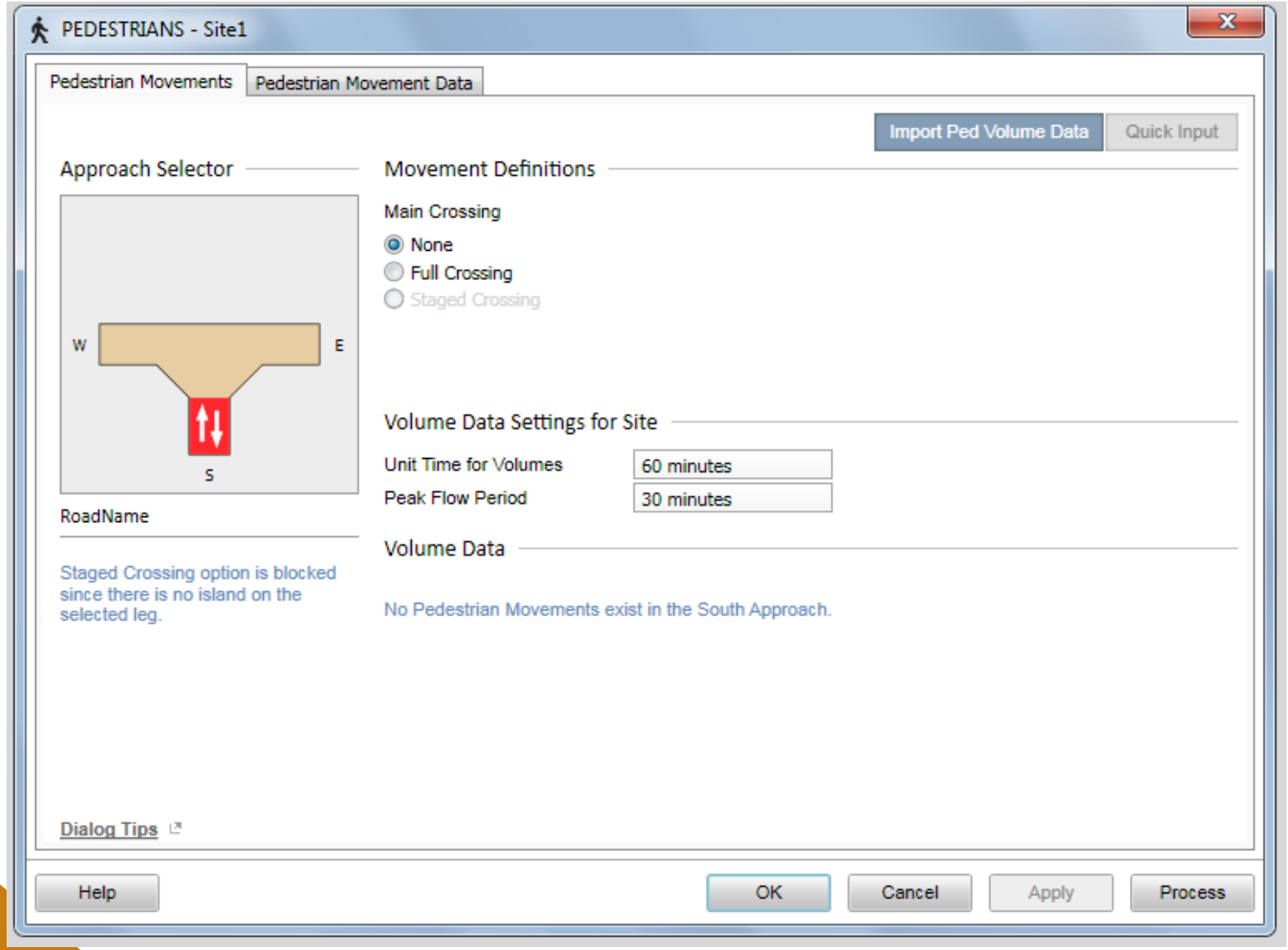
Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


PEDESTRIANS - Site1
Pedestrian Movements
Pedestrian Movement Data
Import Ped Volume Data
Quick Input
Approach Selector
W
E
S
RoadName
Staged Crossing option is blocked since there is no island on the selected leg.
Movement Definitions
Main Crossing
None
Full Crossing
Staged Crossing
Volume Data Settings for Site
Unit Time for Volumes
60 minutes
Peak Flow Period
30 minutes
Volume Data
No Pedestrian Movements exist in the South Approach.
Dialog Tips
Help
OK
Cancel
Apply
Process

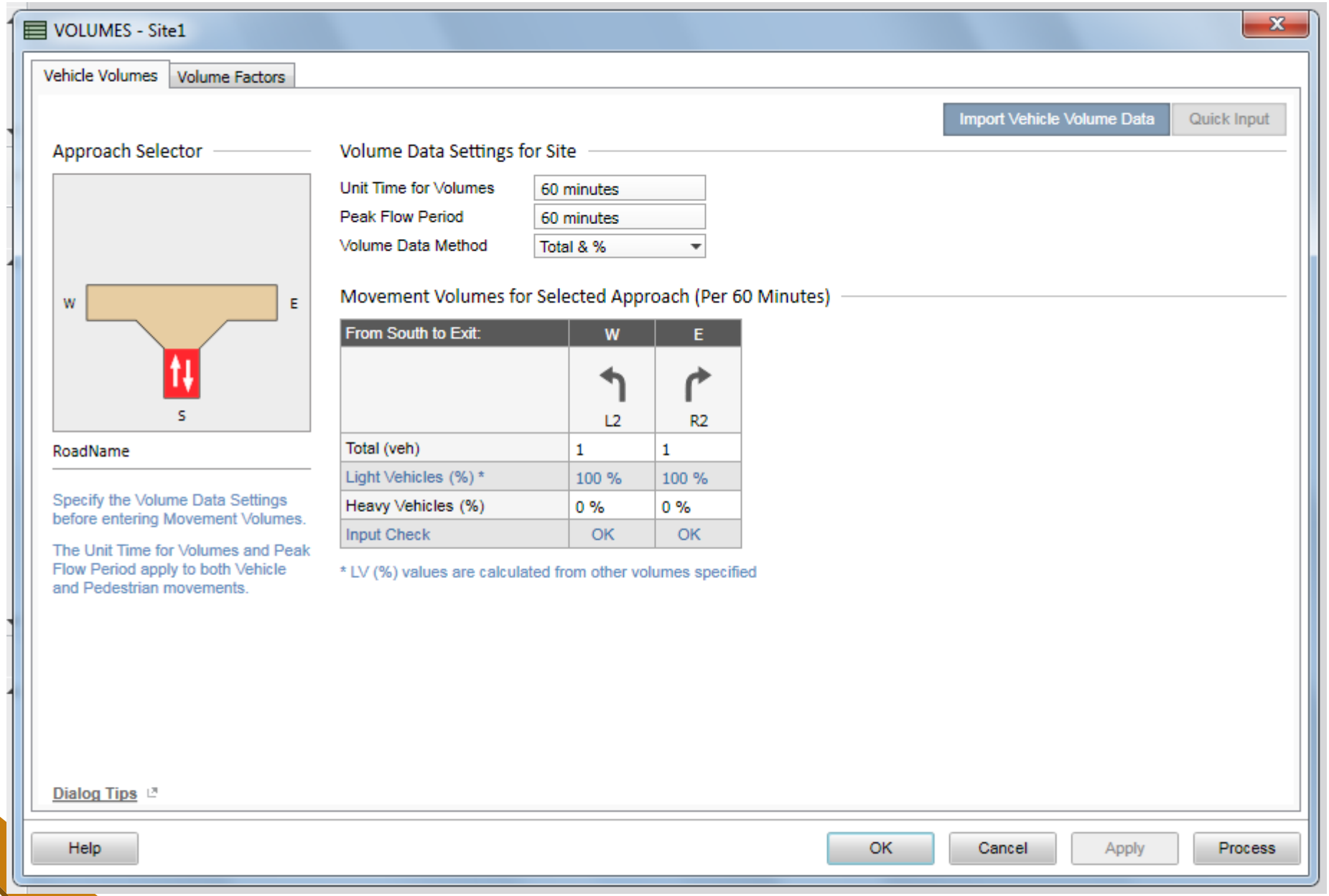
Input Parameters for SIDRA

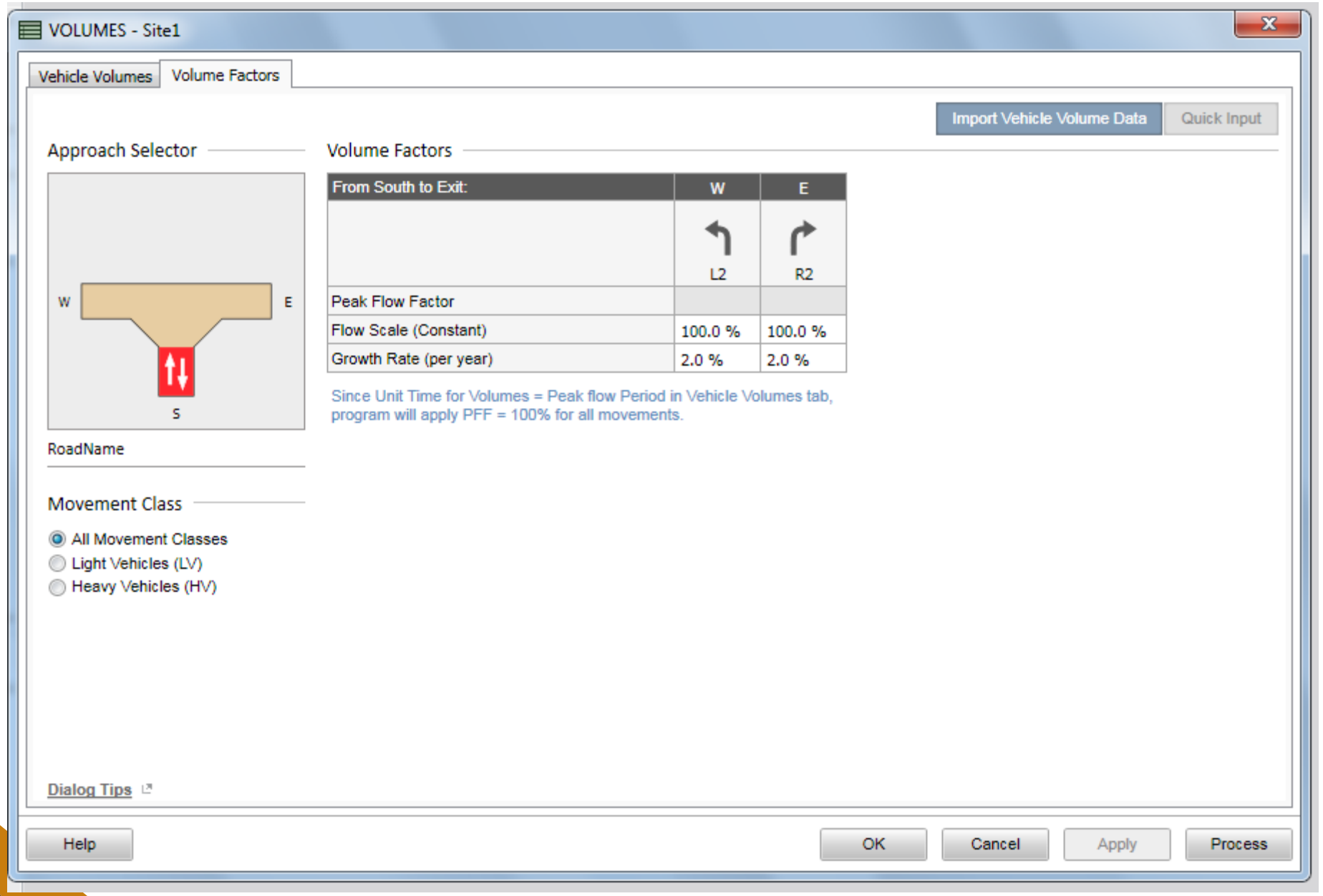
Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


VOLUMES - Site1
Vehicle Volumes
Volume Factors
Import Vehicle Volume Data
Quick Input
Approach Selector
W
E
S
RoadName
Specify the Volume Data Settings before entering Movement Volumes.
The Unit Time for Volumes and Peak Flow Period apply to both Vehicle and Pedestrian movements.
Volume Data Settings for Site
Unit Time for Volumes
60 minutes
Peak Flow Period
60 minutes
Volume Data Method
Total & %
Movement Volumes for Selected Approach (Per 60 Minutes)
From South to Exit:
W
E
L2
R2
Total (veh)
1
1
Light Vehicles (%) *
100 %
100 %
Heavy Vehicles (%)
0 %
0 %
Input Check
OK
OK
* LV (%) values are calculated from other volumes specified
Dialog Tips
Help
OK
Cancel
Apply
Process


VOLUMES - Site1
Vehicle Volumes
Volume Factors
Import Vehicle Volume Data
Quick Input
Approach Selector
W
E
S
RoadName
Volume Factors
From South to Exit:
W
E
L2
R2
Peak Flow Factor
Flow Scale (Constant)
100.0 %
100.0 %
Growth Rate (per year)
2.0 %
2.0 %
Since Unit Time for Volumes = Peak flow Period in Vehicle Volumes tab, program will apply PFF = 100% for all movements.
Movement Class
All Movement Classes
Light Vehicles (LV)
Heavy Vehicles (HV)
Dialog Tips
Help
OK
Cancel
Apply
Process

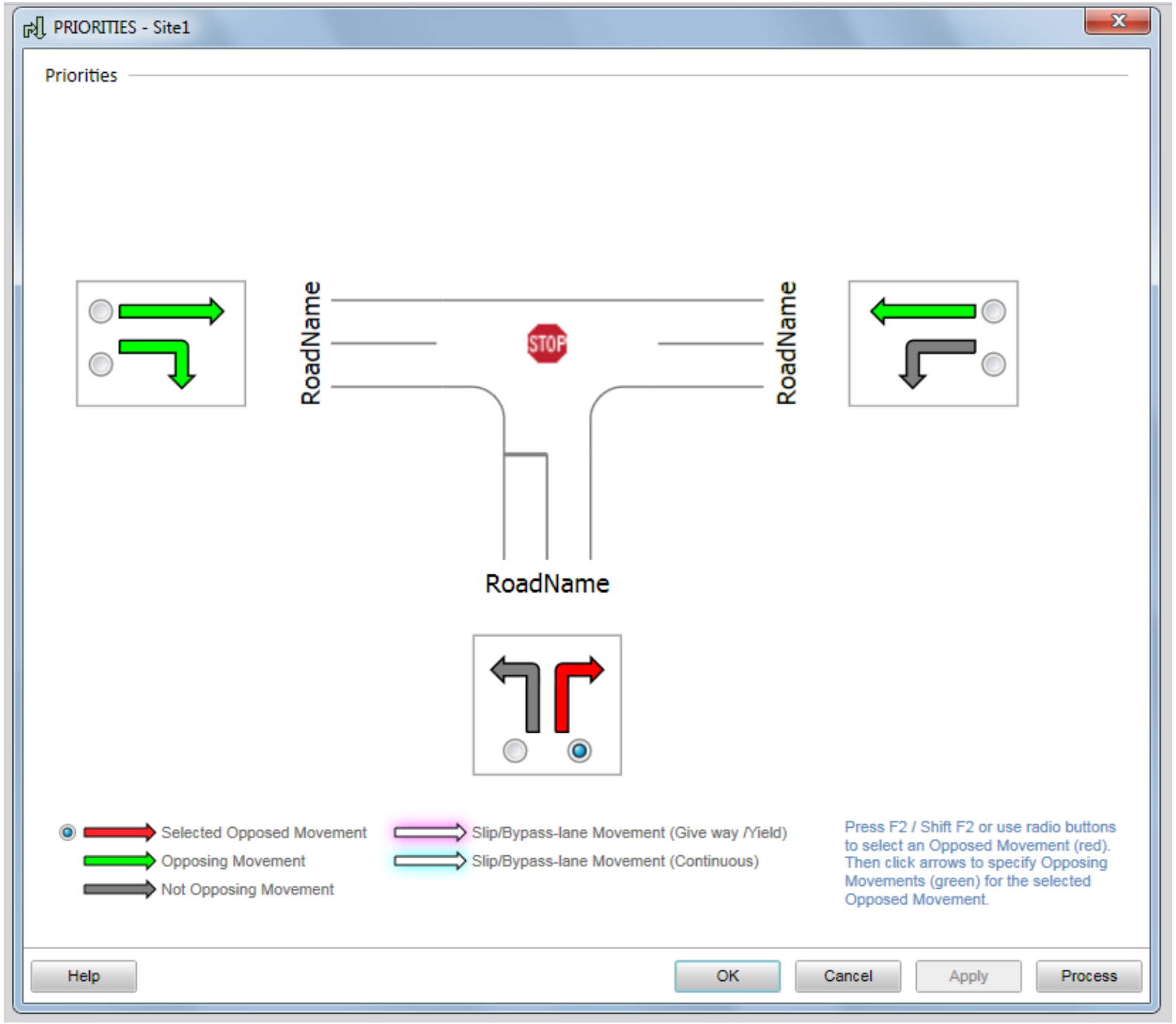
Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


PRIORITIES - Site1
Priorities
RoadName
STOP
RoadName
RoadName
Selected Opposed Movement
Opposing Movement
Not Opposing Movement
Slip/Bypass-lane Movement (Give way /Yield)
Slip/Bypass-lane Movement (Continuous)
Press F2 / Shift F2 or use radio buttons to select an Opposed Movement (red). Then click arrows to specify Opposing Movements (green) for the selected Opposed Movement.
Help
OK
Cancel
Apply
Process

What happen when it is a Signalised Junction?

Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

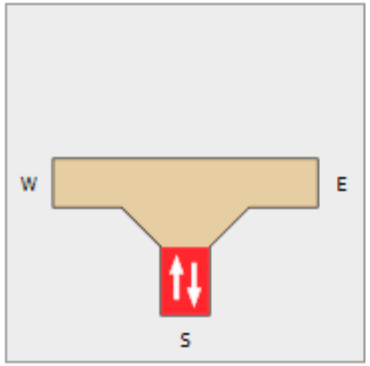
1. Model Settings
2. Demand & Sensitivity Analysis

GAP ACCEPTANCE - Site1

Gap Acceptance Data | Two-Way Sign Control | Settings

Reset to Defaults | Quick Input

Approach Selector



RoadName

Gap Acceptance Data

From South to Exit:	W	E
	L2	R2
Apply TWSC Calibration	☐	☐
Critical Gap	5.00 sec	7.00 sec
Follow-up Headway	3.00 sec	4.00 sec
Minimum Departures	0.1 veh/mir	0.1 veh/mir
Exiting Flow Effect	50 %	50 %
Percent Opposed by Nearest Lane Only	100.0 %	0.0 %
Opposing Peds (Unsig)	Pr (Flow)	Pr (Flow)

Dialog Tips

Help | OK | Cancel | Apply | Process

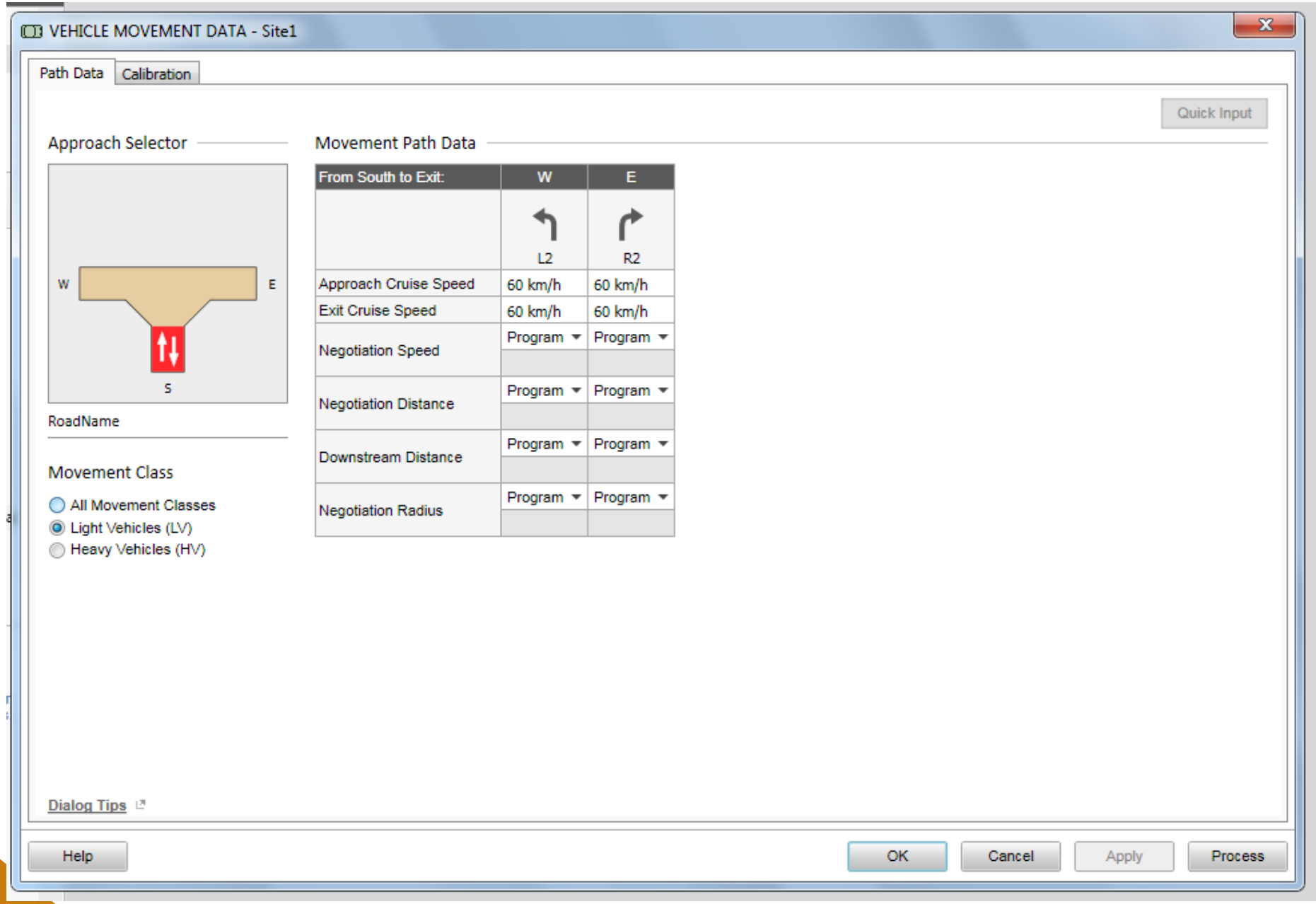
Input Parameters for SIDRA

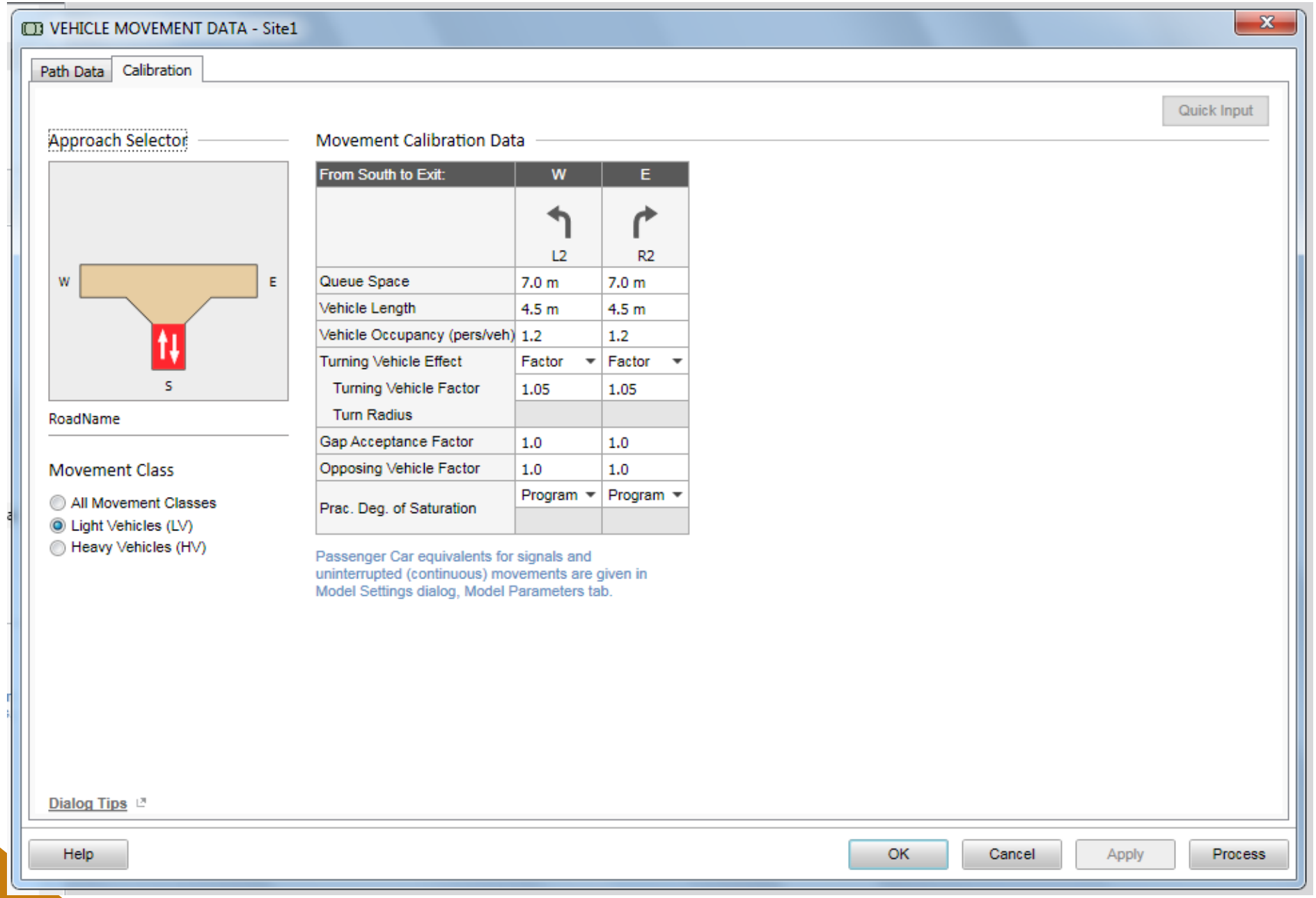
Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


VEHICLE MOVEMENT DATA - Site1
Path Data
Calibration
Quick Input
Approach Selector
W
E
S
RoadName
Movement Class
All Movement Classes
Light Vehicles (LV)
Heavy Vehicles (HV)
Movement Path Data
From South to Exit:
W
E
L2
R2
Approach Cruise Speed
60 km/h
60 km/h
Exit Cruise Speed
60 km/h
60 km/h
Negotiation Speed
Program
Program
Negotiation Distance
Program
Program
Downstream Distance
Program
Program
Negotiation Radius
Program
Program
Dialog Tips
Help
OK
Cancel
Apply
Process


VEHICLE MOVEMENT DATA - Site1
Path Data
Calibration
Quick Input
Approach Selector
W
E
S
RoadName
Movement Class
All Movement Classes
Light Vehicles (LV)
Heavy Vehicles (HV)
Movement Calibration Data
From South to Exit:
W
E
L2
R2
Queue Space
7.0 m
7.0 m
Vehicle Length
4.5 m
4.5 m
Vehicle Occupancy (pers/veh)
1.2
1.2
Turning Vehicle Effect
Factor
Factor
Turning Vehicle Factor
1.05
1.05
Turn Radius
Gap Acceptance Factor
1.0
1.0
Opposing Vehicle Factor
1.0
1.0
Prac. Deg. of Saturation
Program
Program
Passenger Car equivalents for signals and uninterrupted (continuous) movements are given in Model Settings dialog, Model Parameters tab.
Dialog Tips
Help
OK
Cancel
Apply
Process

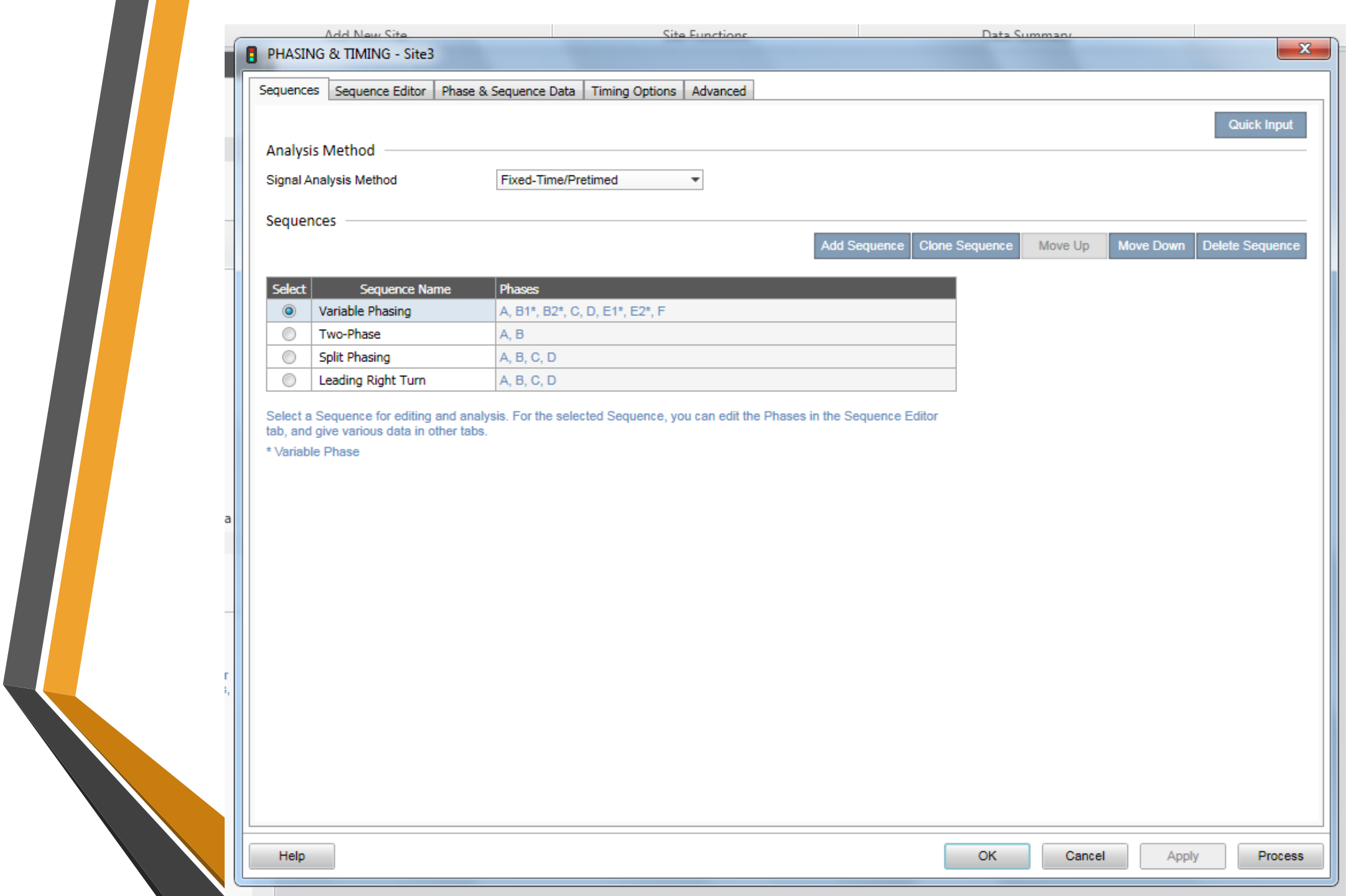
Input Parameters for SIDRA

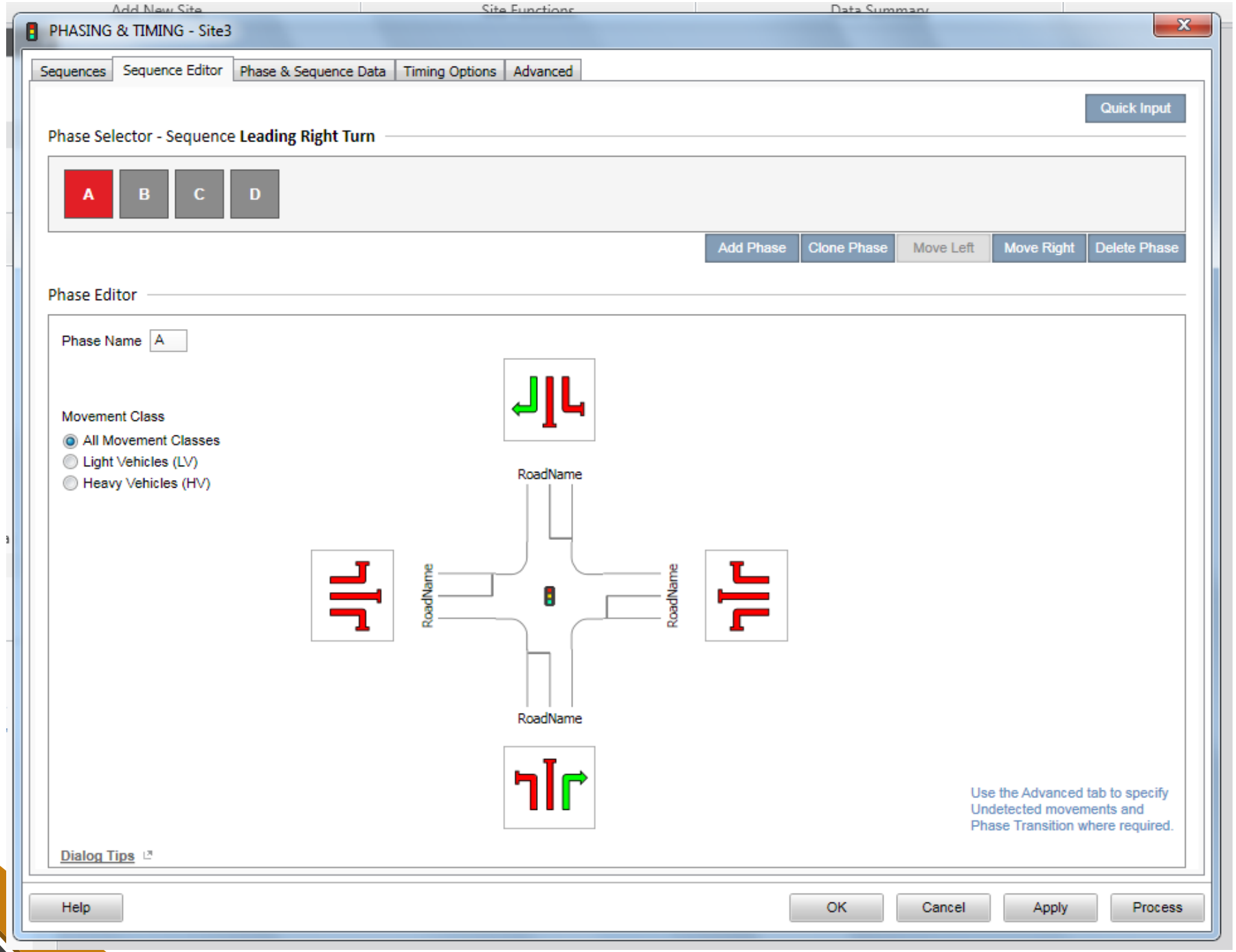
Main Parameters:

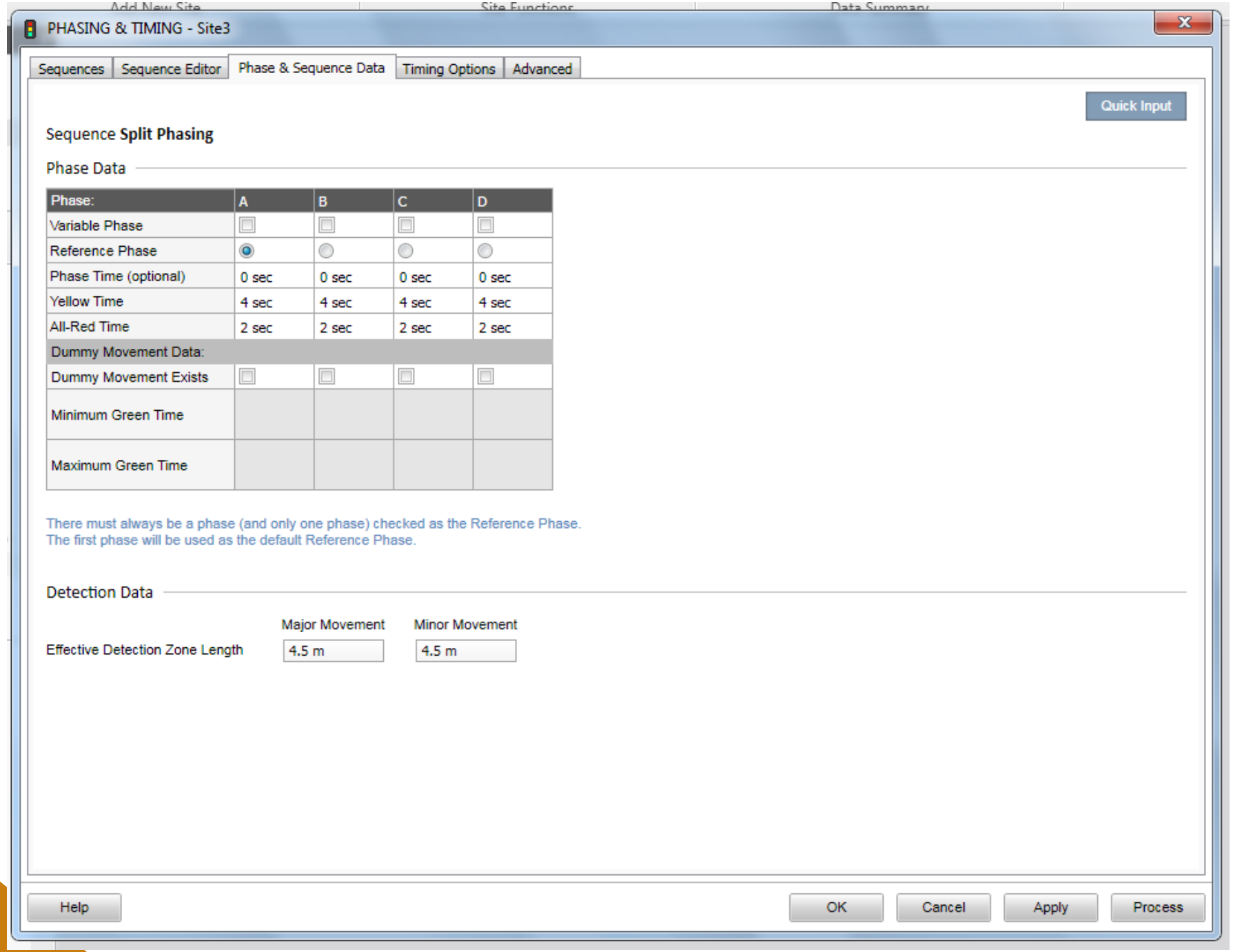
1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

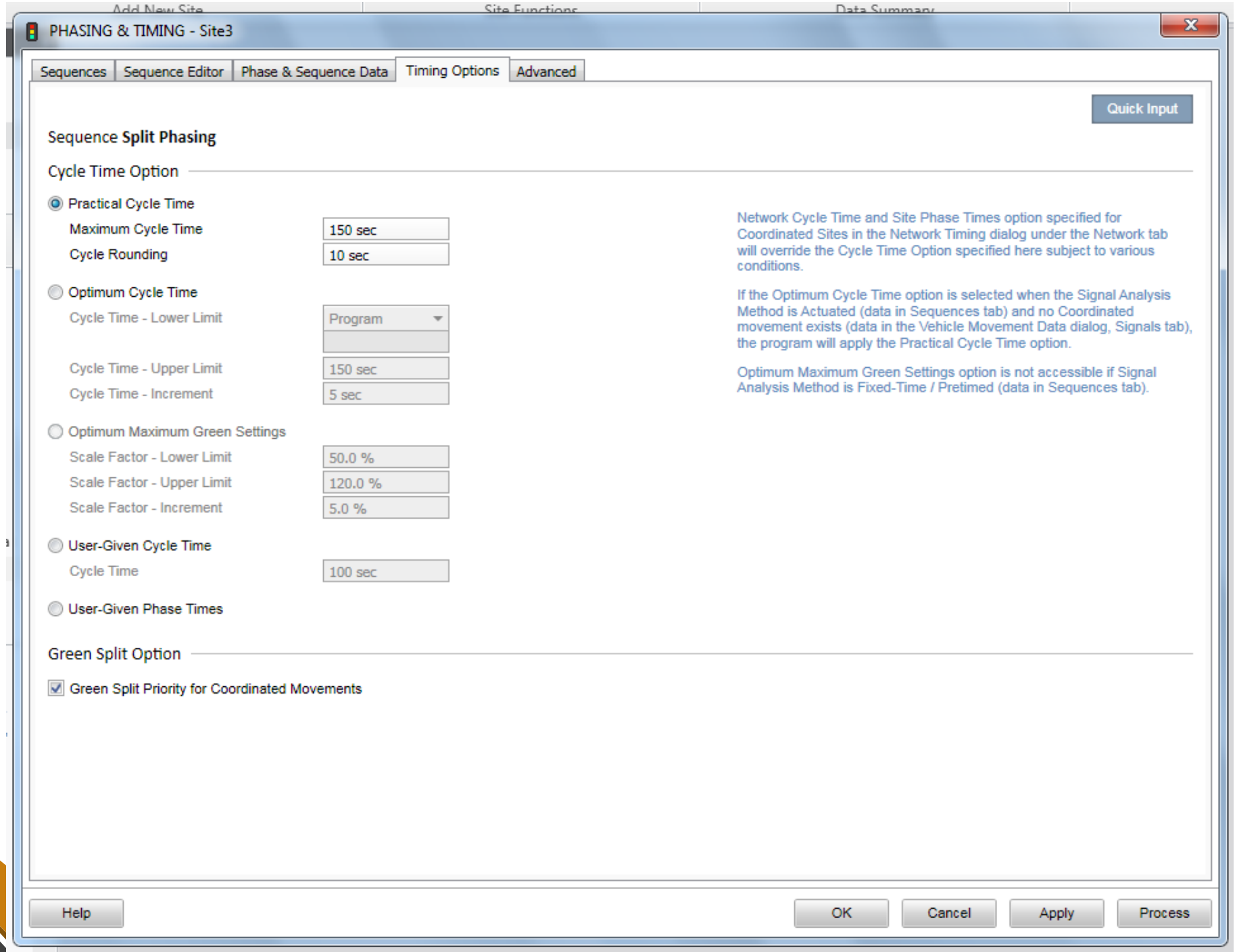
Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis


PHASING & TIMING - Site3
Sequences
Sequence Editor
Phase & Sequence Data
Timing Options
Advanced
Quick Input
Analysis Method
Signal Analysis Method
Fixed-Time/Pretimed
Sequences
Add Sequence
Clone Sequence
Move Up
Move Down
Delete Sequence
Select
Sequence Name
Phases
Variable Phasing
A, B1*, B2*, C, D, E1*, E2*, F
Two-Phase
A, B
Split Phasing
A, B, C, D
Leading Right Turn
A, B, C, D
Select a Sequence for editing and analysis. For the selected Sequence, you can edit the Phases in the Sequence Editor tab, and give various data in other tabs.
* Variable Phase
Help
OK
Cancel
Apply
Process


PHASING & TIMING - Site3
Sequences
Sequence Editor
Phase & Sequence Data
Timing Options
Advanced
Quick Input
Phase Selector - Sequence Leading Right Turn
A
B
C
D
Add Phase
Clone Phase
Move Left
Move Right
Delete Phase
Phase Editor
Phase Name
A
Movement Class
All Movement Classes
Light Vehicles (LV)
Heavy Vehicles (HV)
RoadName
RoadName
RoadName
Use the Advanced tab to specify Undetected movements and Phase Transition where required.
Dialog Tips
Help
OK
Cancel
Apply
Process


PHASING & TIMING - Site3
Sequences
Sequence Editor
Phase & Sequence Data
Timing Options
Advanced
Quick Input
Sequence Split Phasing
Phase Data
Phase:
A
B
C
D
Variable Phase
Reference Phase
Phase Time (optional)
0 sec
Yellow Time
4 sec
All-Red Time
2 sec
Dummy Movement Data:
Dummy Movement Exists
Minimum Green Time
Maximum Green Time
There must always be a phase (and only one phase) checked as the Reference Phase.
The first phase will be used as the default Reference Phase.
Detection Data
Major Movement
Minor Movement
Effective Detection Zone Length
4.5 m
Help
OK
Cancel
Apply
Process


PHASING & TIMING - Site3
Sequences
Sequence Editor
Phase & Sequence Data
Timing Options
Advanced
Quick Input
Sequence Split Phasing
Cycle Time Option
Practical Cycle Time
Maximum Cycle Time
150 sec
Cycle Rounding
10 sec
Optimum Cycle Time
Cycle Time - Lower Limit
Program
Cycle Time - Upper Limit
150 sec
Cycle Time - Increment
5 sec
Optimum Maximum Green Settings
Scale Factor - Lower Limit
50.0 %
Scale Factor - Upper Limit
120.0 %
Scale Factor - Increment
5.0 %
User-Given Cycle Time
Cycle Time
100 sec
User-Given Phase Times
Network Cycle Time and Site Phase Times option specified for Coordinated Sites in the Network Timing dialog under the Network tab will override the Cycle Time Option specified here subject to various conditions.
If the Optimum Cycle Time option is selected when the Signal Analysis Method is Actuated (data in Sequences tab) and no Coordinated movement exists (data in the Vehicle Movement Data dialog, Signals tab), the program will apply the Practical Cycle Time option.
Optimum Maximum Green Settings option is not accessible if Signal Analysis Method is Fixed-Time / Pretimed (data in Sequences tab).
Green Split Option
Green Split Priority for Coordinated Movements
Help
OK
Cancel
Apply
Process

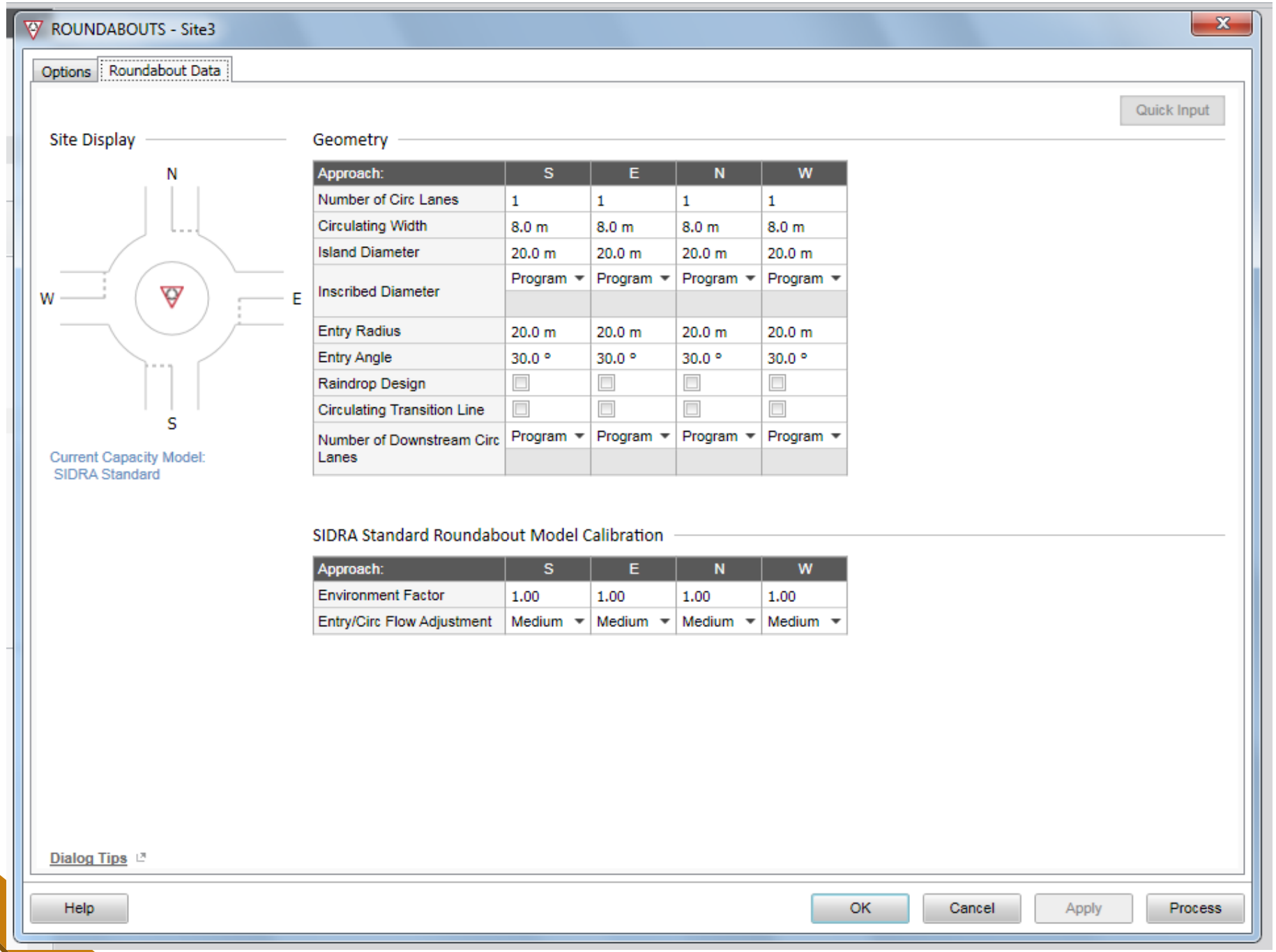
Input Parameters for SIDRA

Main Parameters:

1. Intersection
2. Movement Definitions
3. Lane Geometry
4. Lane Data
5. Pedestrians
6. Volume
7. Priorities
8. Gap-Acceptance Data
9. Vehicle Movement Data
10. Phasing & Timing
11. Roundabouts

Other Parameters:

1. Model Settings
2. Demand & Sensitivity Analysis

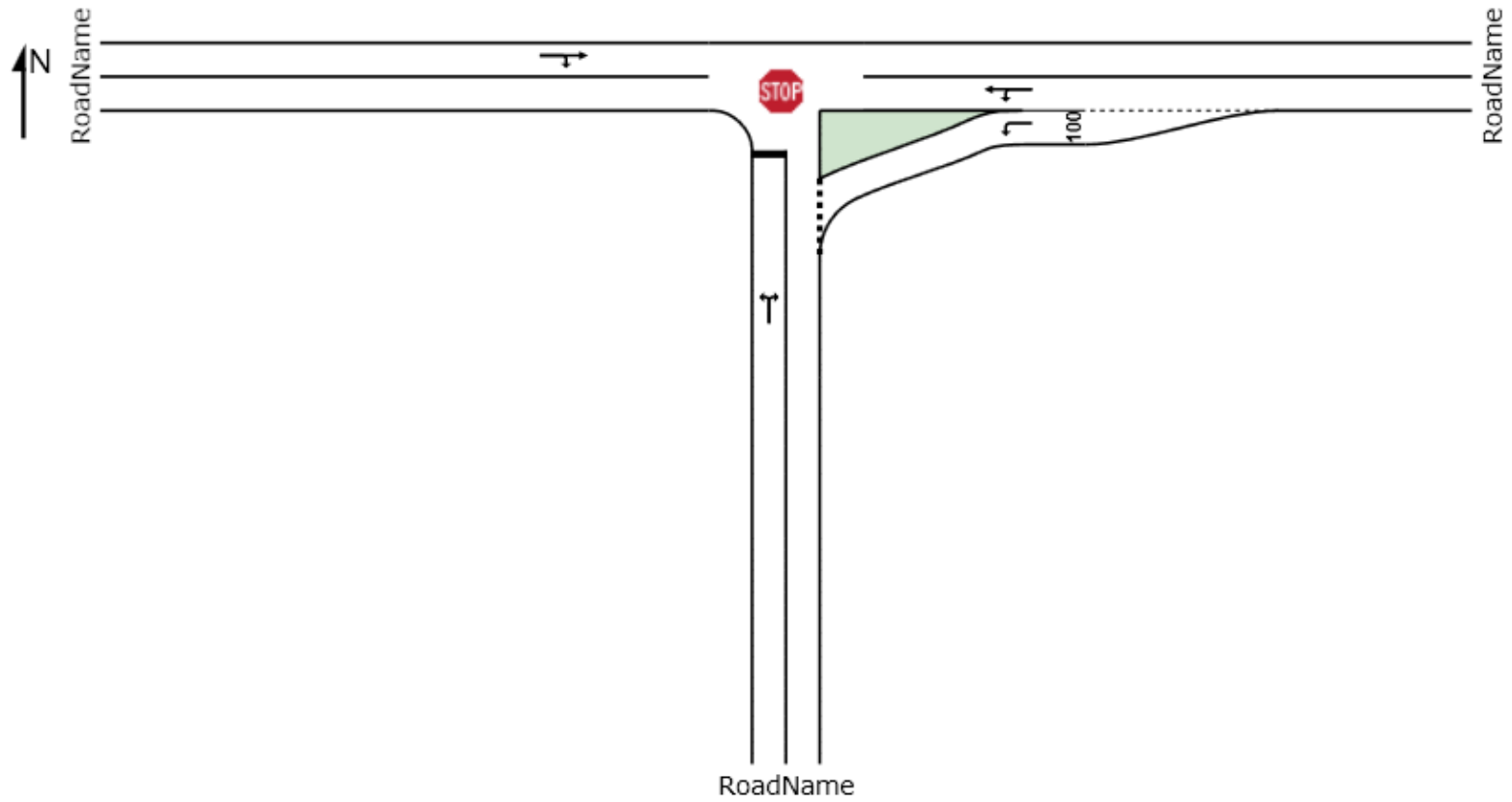

ROUNDABOUTS - Site3
Options
Roundabout Data
Quick Input
Site Display
N
W
E
S
Current Capacity Model:
SIDRA Standard
Geometry
Approach: | S | E | N | W
Number of Circ Lanes | 1 | 1 | 1 | 1
Circulating Width | 8.0 m | 8.0 m | 8.0 m | 8.0 m
Island Diameter | 20.0 m | 20.0 m | 20.0 m | 20.0 m
Inscribed Diameter | Program | Program | Program | Program
Entry Radius | 20.0 m | 20.0 m | 20.0 m | 20.0 m
Entry Angle | 30.0 ° | 30.0 ° | 30.0 ° | 30.0 °
Raindrop Design
Circulating Transition Line
Number of Downstream Circ Lanes | Program | Program | Program | Program
SIDRA Standard Roundabout Model Calibration
Approach: | S | E | N | W
Environment Factor | 1.00 | 1.00 | 1.00 | 1.00
Entry/Circ Flow Adjustment | Medium | Medium | Medium | Medium
Dialog Tips
Help
OK
Cancel
Apply
Process

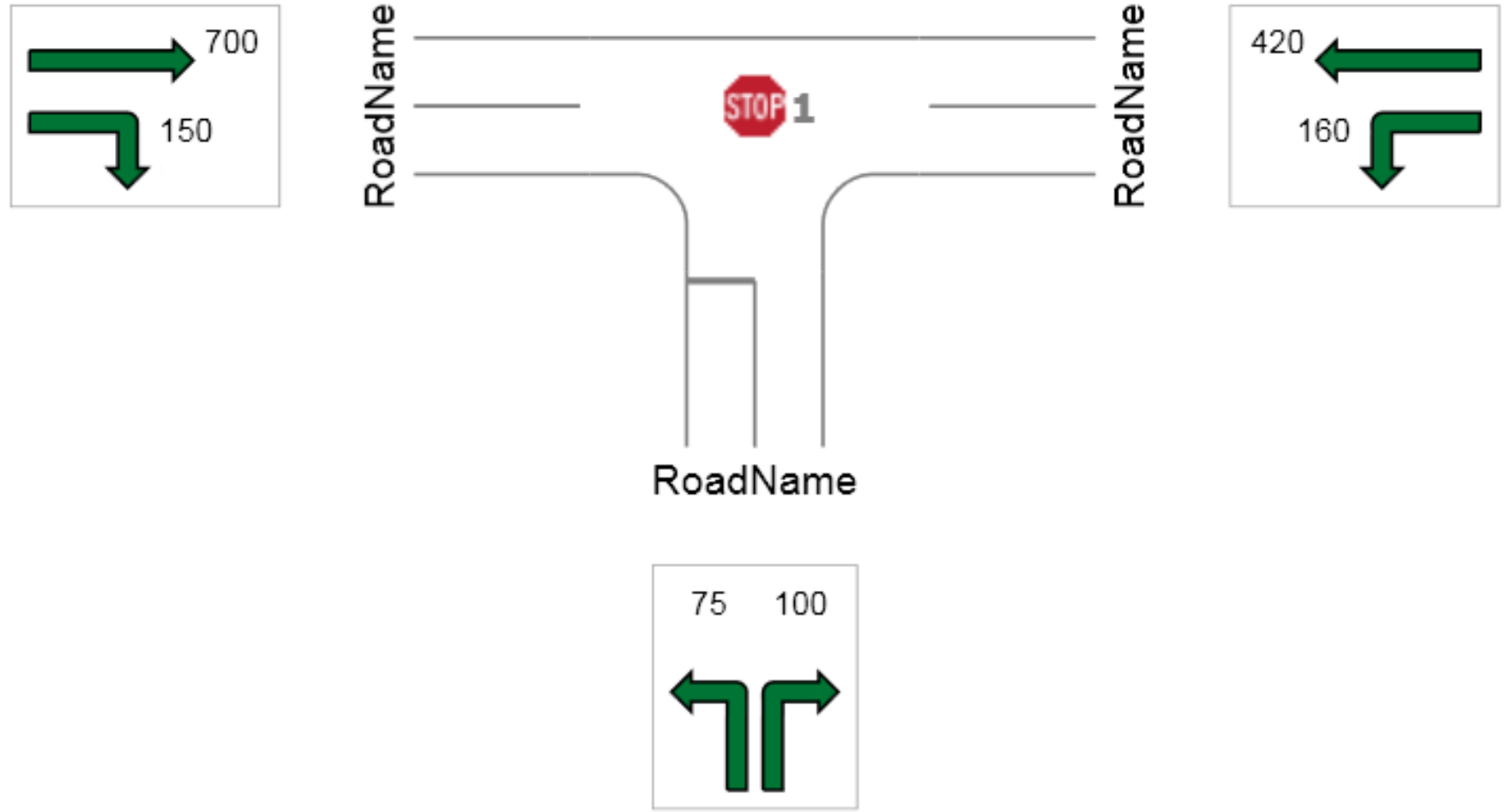
CASE STUDY 1: PERSIMPANGAN KEUTAMAAN

SITE LAYOUT

Site: Site1

New Site
Stop (Two-Way)




700
150
RoadName
STOP 1
RoadName
420
160
RoadName
75
100

Results

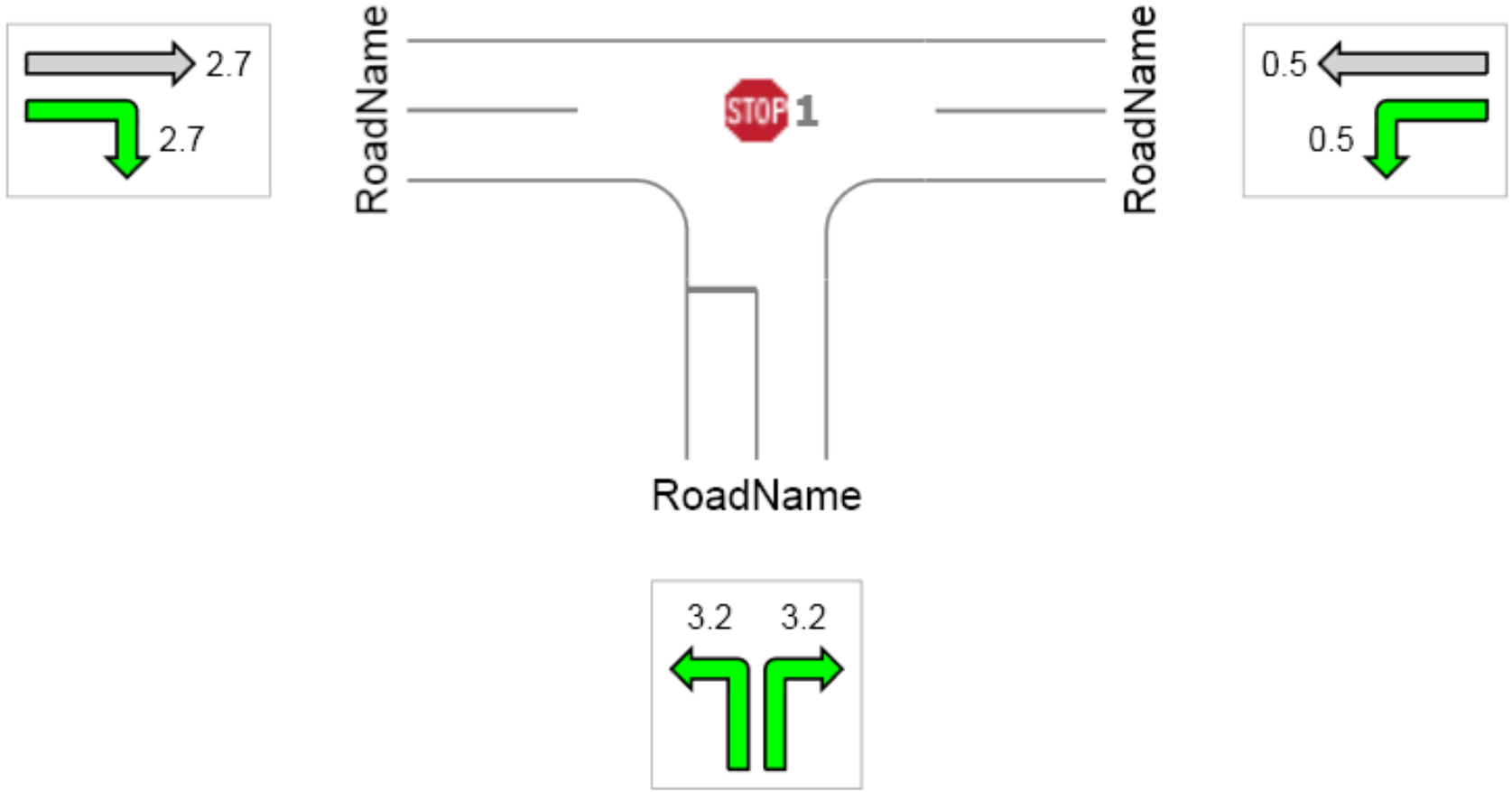
LEVEL OF SERVICE

Table 4.1 Level of Service Criteria for Unsignalised Intersections

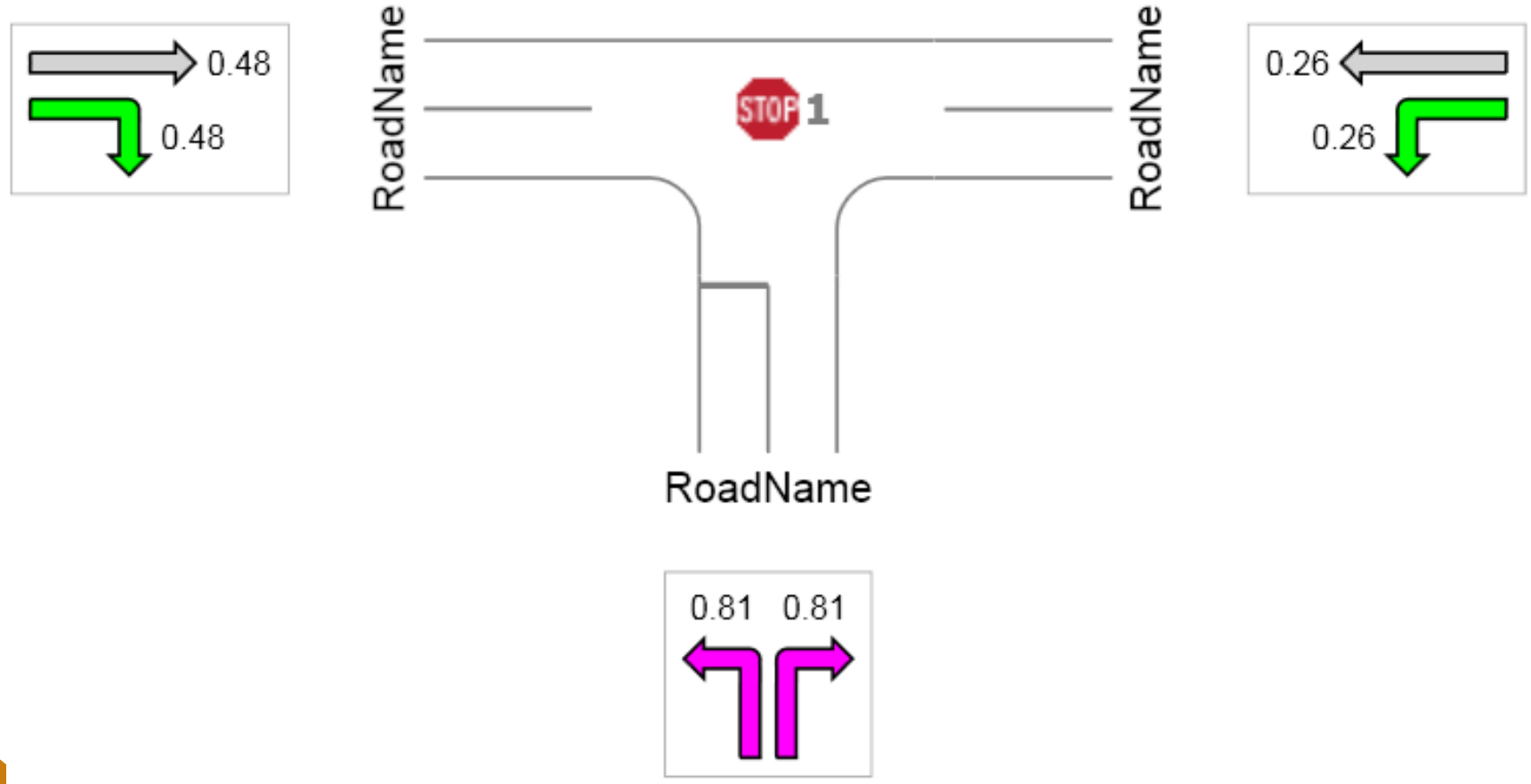
Level of service	Average controlled delay (sec/veh)
A	0 – 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

*Note : Adapted from MHCM 2006

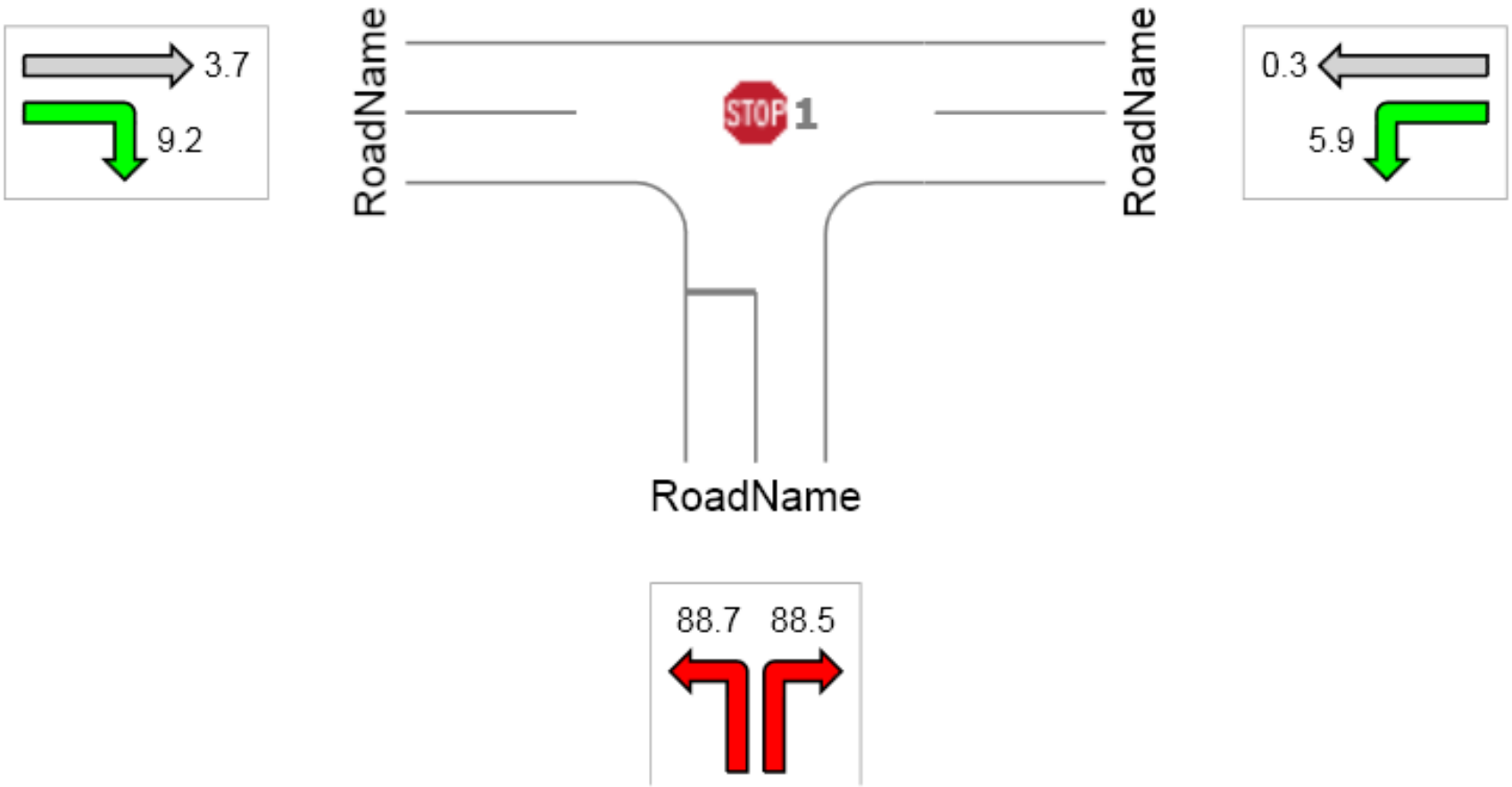
QUEUE



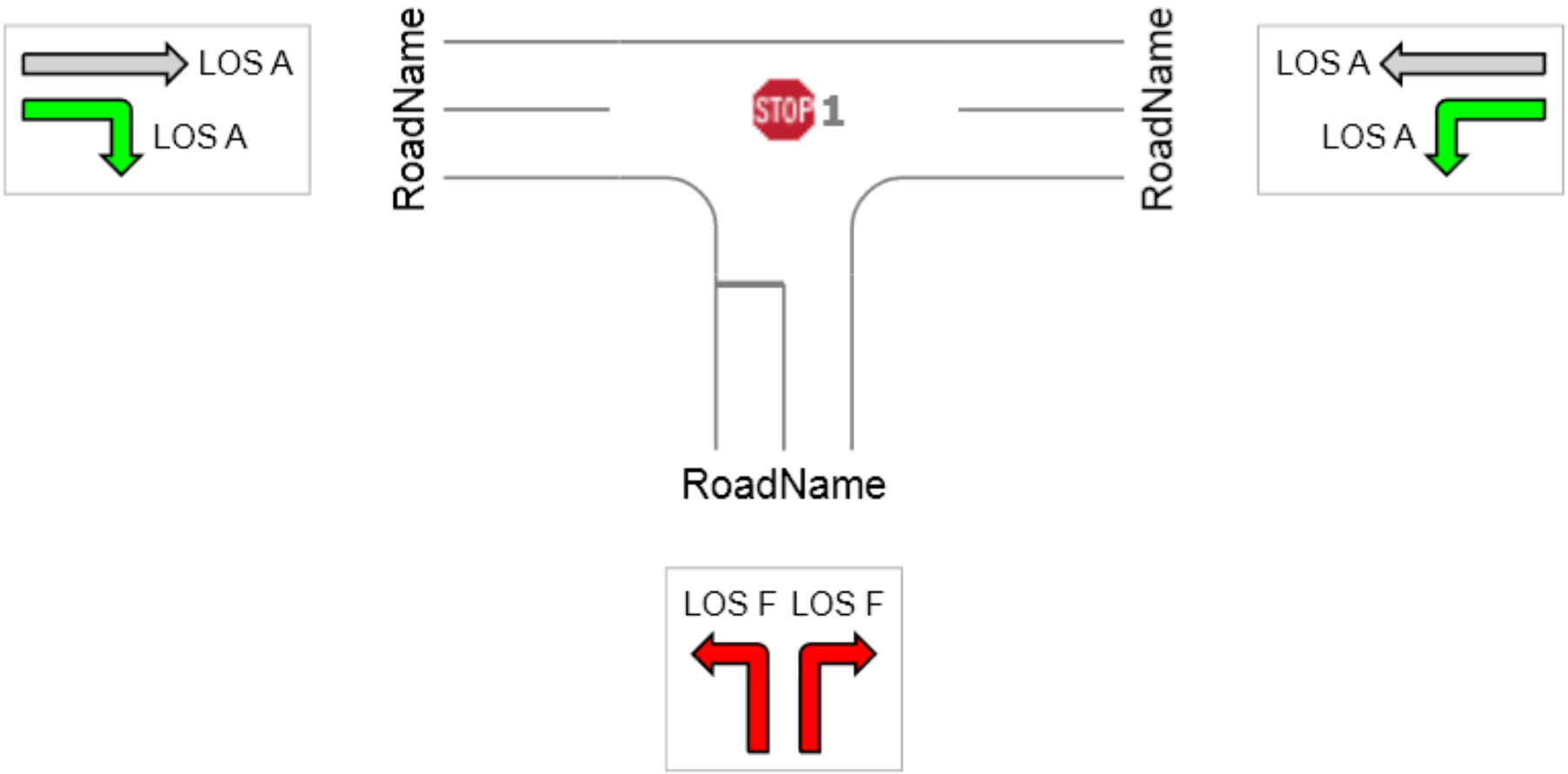
DEGREE OF SATURATION



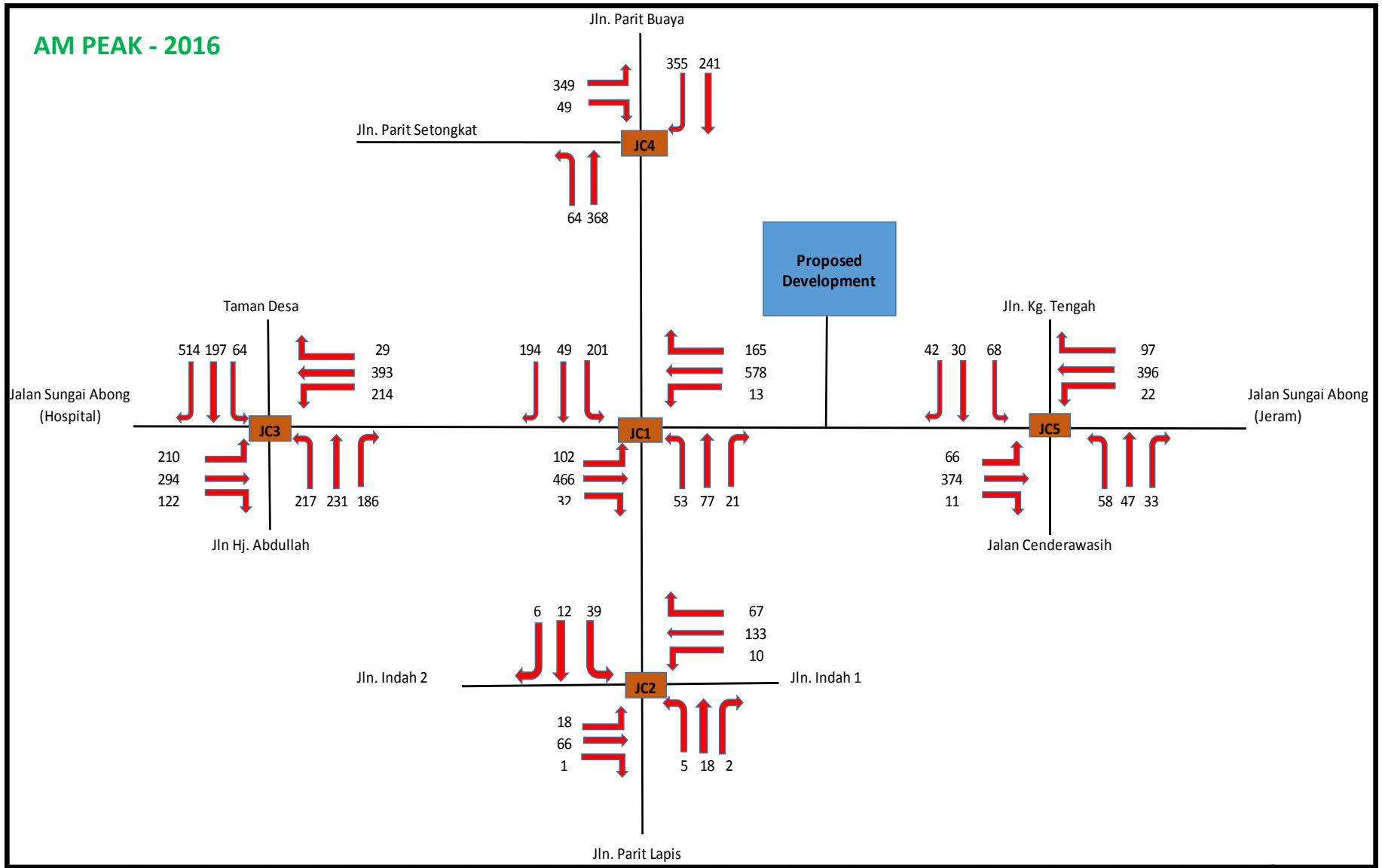
DELAY



LEVEL OF SERVICE



CASE STUDY 2: PERSIMPANGAN LAMPU ISYARAT & PERSIMPANGAN KEUTAMAAN



DATA ALIRAN TRAFIK PADA WAKTU PUNCAK PAGI
***(AM PEAK HOUR)* PADA TAHUN 2016**

LAGENDA

Arah & Isipadu Trafik (pcu/hr)

RAJAH

3.1

PRESTASI (LOS) PERSIMPANGAN
J1, J2, J3, J4 & J5
PADA TAHUN 2016

LEVEL OF SERVICE

Table 3.1 Levels of Service for Signalised Intersections

Level of service	Controlled delay per vehicle (sec)
A	= 10.0
B	> 10.0 – 20.0
C	> 20.0 – 35.0
D	> 35.0 – 55.0
E	> 55.0 - 80.0
F	> 80.0

*Source adapted from MHCM 2006

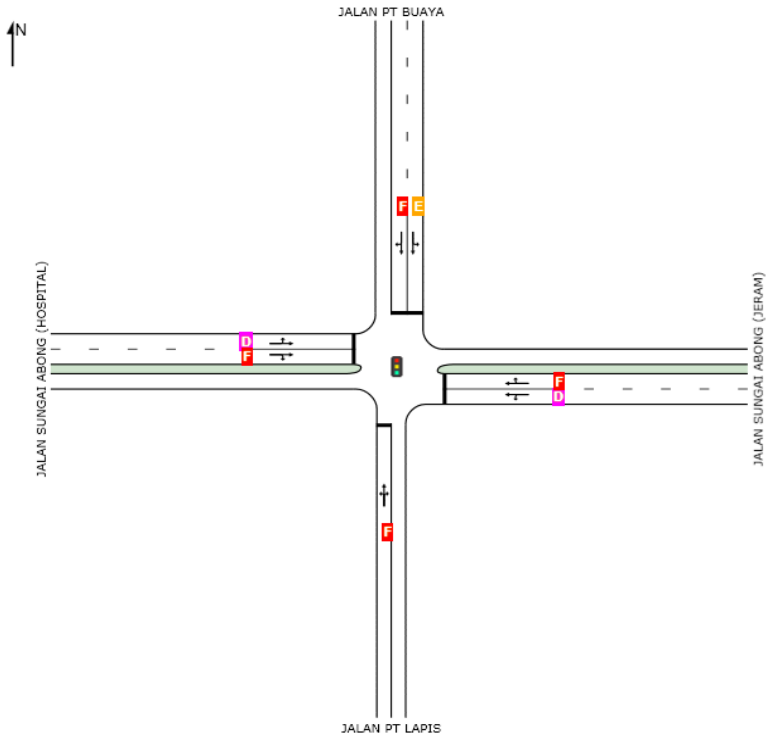
LEVEL OF SERVICE

Site: J1 - AM PEAK 2016

EXISTING
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied.
The results are given for the selected output sequence.

All Movement Classes

	South	East	North	West	Intersection
LOS	F	F	F	E	F



LANE SUMMARY

Site: J1 - AM PEAK 2016

EXISTING
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time) Variable Sequence Analysis applied.
The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total	Demand Flows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: JALAN PT LAPIS													
Lane 1	151	0.0	162	0.930	100	96.6	LOS F	13.1	91.7	Full	215	0.0	0.0
Approach	151	0.0		0.930		96.6	LOS F	13.1	91.7				
East: JALAN SUNGAI ABONG (JERAM)													
Lane 1	127	0.0	660	0.192	20	37.6	LOS D	6.4	45.1	Full	500	0.0	0.0
Lane 2	629	0.0	654	0.961	100	90.5	LOS F	60.6	424.0	Full	500	0.0	0.0
Approach	756	0.0		0.961		81.6	LOS F	60.6	424.0				
North: JALAN PT BUAYA													
Lane 1	201	0.0	260	0.773	84	76.6	LOS E	14.9	104.5	Full	700	0.0	0.0
Lane 2	243	0.0	263	0.926	100	93.8	LOS F	21.1	147.6	Full	700	0.0	0.0
Approach	444	0.0		0.926		86.0	LOS F	21.1	147.6				
West: JALAN SUNGAI ABONG (HOSPITAL)													
Lane 1	102	0.0	508	0.201	21	50.2	LOS D	5.7	39.8	Full	380	0.0	0.0
Lane 2	498	0.0	531	0.937	100	82.3	LOS F	44.3	310.0	Full	380	0.0	0.0
Approach	600	0.0		0.937		76.8	LOS E	44.3	310.0				
Intersection	1951	0.0		0.961		82.3	LOS F	60.6	424.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PRESTASI PERSIMPANGAN SEDIA ADA PADA WAKTU PUNCAK PAGI (TAHUN 2016) – J1

LAGENDA

A → : Arah & Tahap Perkhidmatan Jalan

RAJAH 3.3

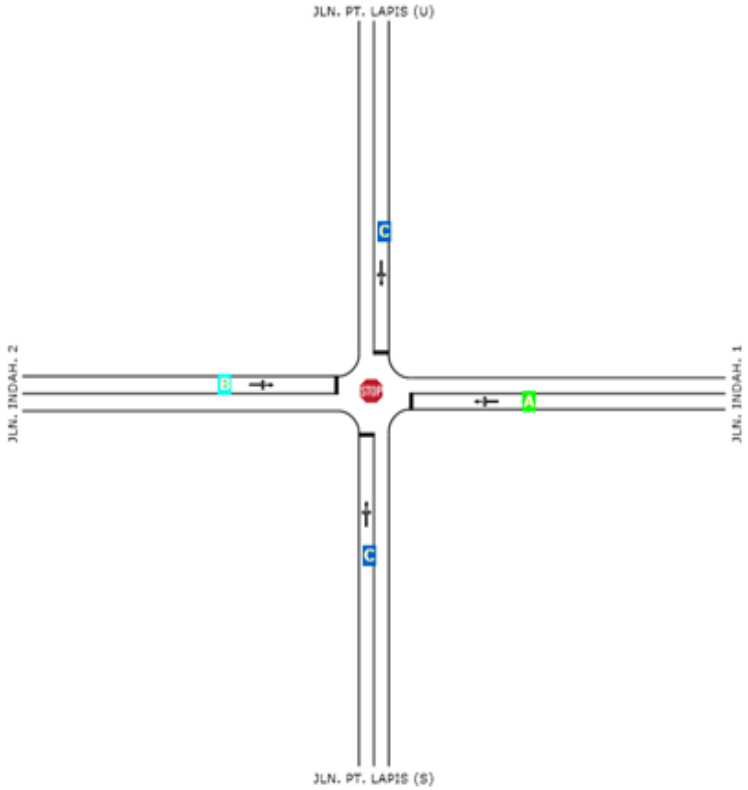
LEVEL OF SERVICE

Site: J2 AM PEAK 2016

EXISTING
Stop (All-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	C	A	C	B	B



LANE SUMMARY

Site: J2 AM PEAK 2016

EXISTING
Stop (All-Way)

Lane Use and Performance

	Demand Flows Total	Demand Flows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: JLN. PT. LAPIS (S)													
Lane 1	25	0.0	337	0.074	100	17.3	LOS C	0.2	1.7	Full	500	0.0	0.0
Approach	25	0.0		0.074		17.3	LOS C	0.2	1.7				
East: JLN. INDAH. 1													
Lane 1	210	0.0	985	0.213	100	7.6	LOS A	0.7	4.6	Full	30	0.0	0.0
Approach	210	0.0		0.213		7.6	LOS A	0.7	4.6				
North: JLN. PT. LAPIS (U)													
Lane 1	57	0.0	273	0.209	100	22.5	LOS C	0.8	5.4	Full	215	0.0	0.0
Approach	57	0.0		0.209		22.5	LOS C	0.8	5.4				
West: JLN. INDAH. 2													
Lane 1	85	0.0	761	0.112	100	11.1	LOS B	0.3	2.3	Full	200	0.0	0.0
Approach	85	0.0		0.112		11.1	LOS B	0.3	2.3				
Intersection	377	0.0		0.213		11.3	LOS B	0.8	5.4				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PRESTASI PERSIMPANGAN SEDIA ADA PADA WAKTU PUNCAK PAGI (TAHUN 2016) – J2

LAGENDA

A → : Arah & Tahap Perkhidmatan Jalan

RAJAH 3.5

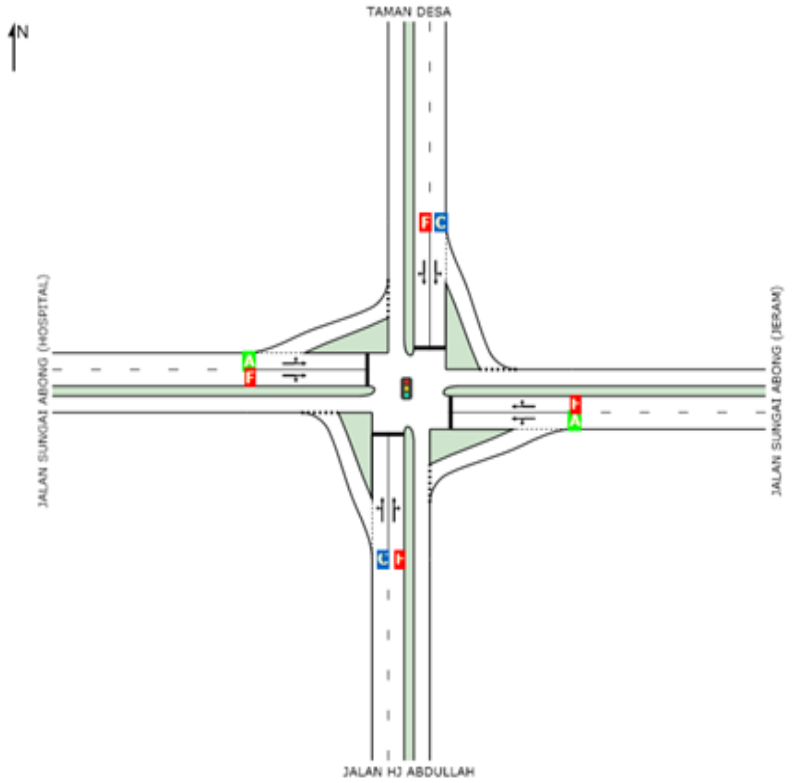
LEVEL OF SERVICE

Site: J3 - AM PEAK 2016

EXISTING
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)Variable Sequenc
The results are given for the selected output sequence.

All Movement Classes

	South	East	North	West	Intersection
LOS	F	F	F	D	F



LANE SUMMARY

Site: J3 - AM PEAK 2016

EXISTING
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: JALAN HJ ABDULLAH													
Lane 1	217	0.0	905	0.240	21	24.1	LOS C	8.1	56.5	Full	500	0.0	0.0
Lane 2	417	0.0	369	1.131	100	331.0	LOS F	76.8	537.4	Full	500	0.0	11.5
Approach	634	0.0		1.131		226.0	LOS F	76.8	537.4				
East: JALAN SUNGAI ABONG (JERAM)													
Lane 1	272	0.0	1306	0.208	20	6.5	LOS A	3.3	23.2	Full	380	0.0	0.0
Lane 2	364	0.0	350	1.041	100	184.6	LOS F	47.8	334.7	Full	380	0.0	0.0
Approach	636	0.0		1.041		108.4	LOS F	47.8	334.7				
North: TAMAN DESA													
Lane 1	135	0.0	593	0.228	20	33.3	LOS C	5.7	39.7	Full	350	0.0	0.0
Lane 2	640	0.0	562	1.138	100	340.9	LOS F	122.3	856.2	Full	350	0.0	89.0
Approach	775	0.0		1.138		287.3	LOS F	122.3	856.2				
West: JALAN SUNGAI ABONG (HOSPITAL)													
Lane 1	323	0.0	1709	0.189	20	4.0	LOS A	1.1	7.9	Full	500	0.0	0.0
Lane 2	303	0.0	320	0.946	100	96.5	LOS F	27.6	192.9	Full	500	0.0	0.0
Approach	626	0.0		0.946		48.8	LOS D	27.6	192.9				
Intersection	2671	0.0		1.138		174.2	LOS F	122.3	856.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PRESTASI PERSIMPANGAN SEDIA ADA PADA WAKTU PUNCAK PAGI (TAHUN 2016) – J3

LAGENDA

A → : Arah & Tahap Perkhidmatan Jalan

RAJAH 3.7

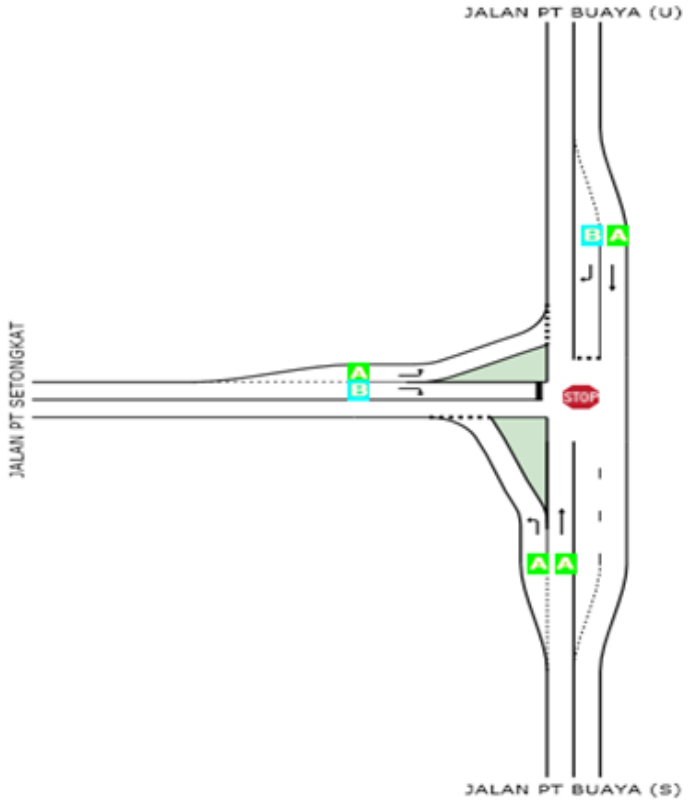
LEVEL OF SERVICE

Site: J4 - AM PEAK 2016

EXISTING
Stop (Two-Way)

All Movement Classes

	South	North	West	Intersection
LOS	A	A	A	NA



LANE SUMMARY

Site: J4 - AM PEAK 2016

EXISTING
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: JALAN PT BUAYA (S)													
Lane 1	64	0.0	1177	0.054	100	6.8	LOS A	0.2	1.5	Short	60	0.0	0.0
Lane 2	368	0.0	1950	0.189	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	432	0.0		0.189		1.0	LOS A	0.2	1.5				
North: JALAN PT BUAYA (U)													
Lane 1	241	0.0	1950	0.124	100	4.4	LOS A	0.0	0.0	Full	400	0.0	0.0
Lane 2	355	0.0	687	0.516	100	11.1	LOS B	3.0	21.0	Short	60	0.0	0.0
Approach	596	0.0		0.516		8.4	LOS A	3.0	21.0				
West: JALAN PT SETONGKAT													
Lane 1	349	0.0	1161	0.301	100	7.3	LOS A	1.4	9.6	Short	60	0.0	0.0
Lane 2	49	0.0	545	0.090	100	12.1	LOS B	0.3	2.1	Full	400	0.0	0.0
Approach	398	0.0		0.301		7.9	LOS A	1.4	9.6				
Intersection	1426	0.0		0.516		6.0	NA	3.0	21.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

JKR

PRESTASI PERSIMPANGAN SEDIA ADA PADA WAKTU PUNCAK PAGI (TAHUN 2016) – J4

LAGENDA

A → : **Arah & Tahap Perkhidmatan Jalan**

RAJAH 3.9

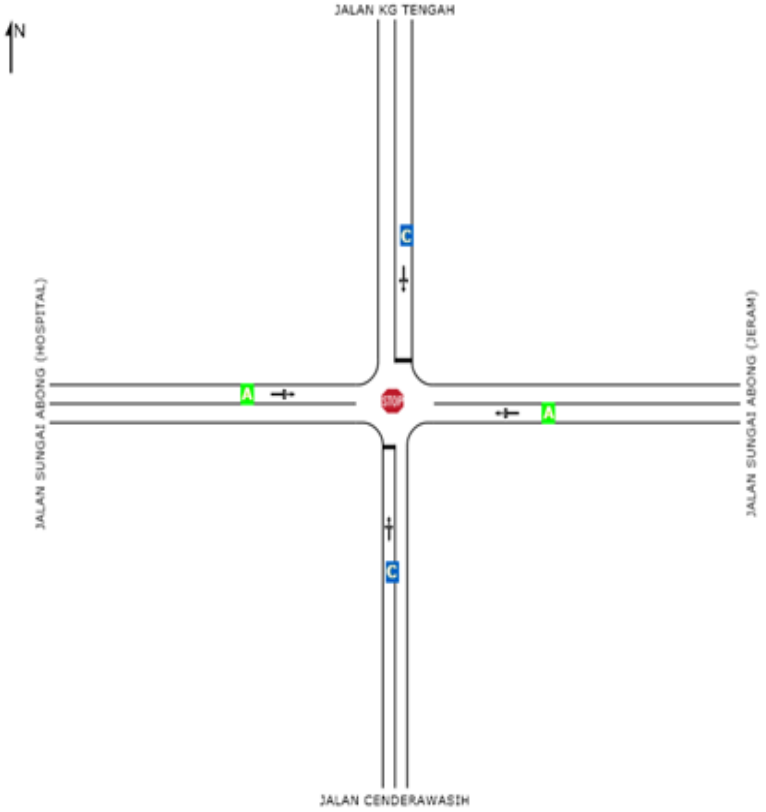
LEVEL OF SERVICE

Site: J5 - AM PEAK 2016

EXISTING
Stop (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	C	NA	C	NA	NA



LANE SUMMARY

Site: J5 - AM PEAK 2016

EXISTING
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Veh	Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: JALAN CENDERAWASIH													
Lane 1	138	0.0	434	0.318	100	16.1	LOS C	1.3	9.1	Full	500	0.0	0.0
Approach	138	0.0		0.318		16.1	LOS C	1.3	9.1				
East: JALAN SUNGAI ABONG (JERAM)													
Lane 1	515	0.0	1728	0.298	100	3.7	LOS A	2.5	17.2	Full	500	0.0	0.0
Approach	515	0.0		0.298		3.7	NA	2.5	17.2				
North: JALAN KG TENGAH													
Lane 1	140	0.0	444	0.316	100	15.9	LOS C	1.3	9.0	Full	500	0.0	0.0
Approach	140	0.0		0.316		15.9	LOS C	1.3	9.0				
West: JALAN SUNGAI ABONG (HOSPITAL)													
Lane 1	451	0.0	1924	0.234	100	3.0	LOS A	1.9	13.6	Full	500	0.0	0.0
Approach	451	0.0		0.234		3.0	NA	1.9	13.6				
Intersection	1244	0.0		0.318		6.2	NA	2.5	17.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PRESTASI PERSIMPANGAN SEDIA ADA PADA WAKTU PUNCAK PAGI (TAHUN 2016) – J5

LAGENDA

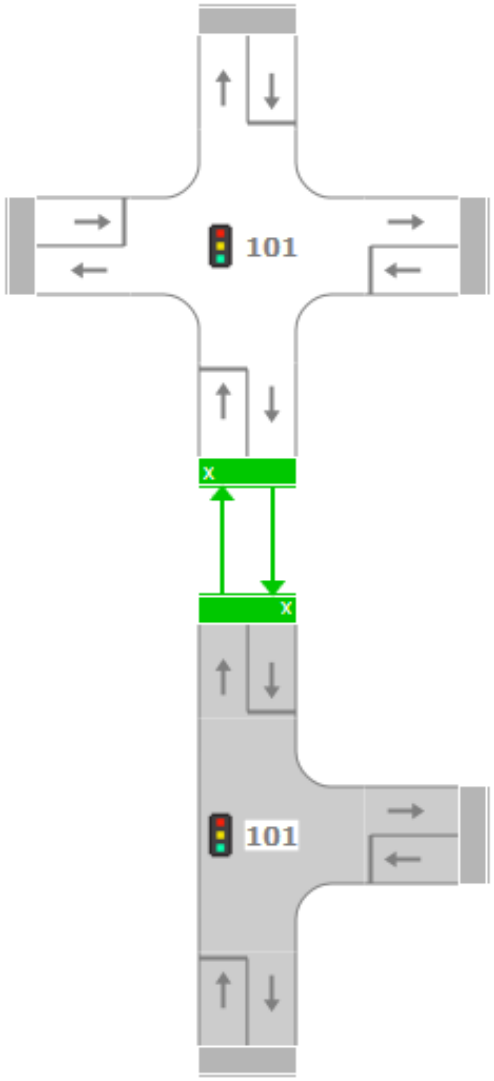
A → : Arah & Tahap Perkhidmatan Jalan

RAJAH 3.11

Other Types of Sidra Analysis

SYNCHRONISED JUNCTION

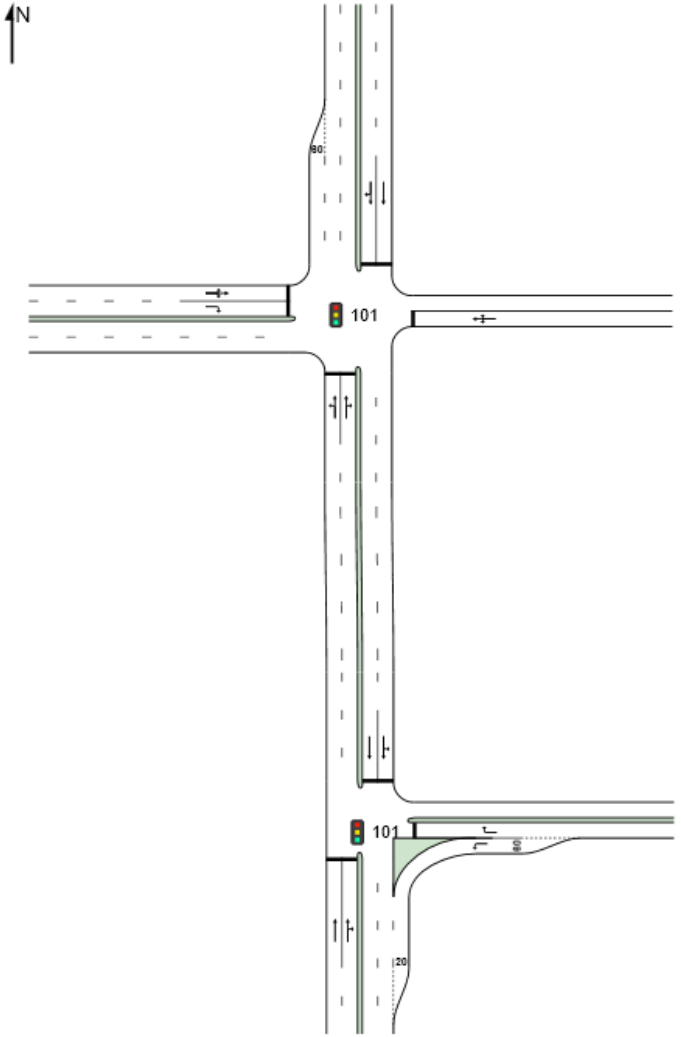
NETWORK CONFIGURATION



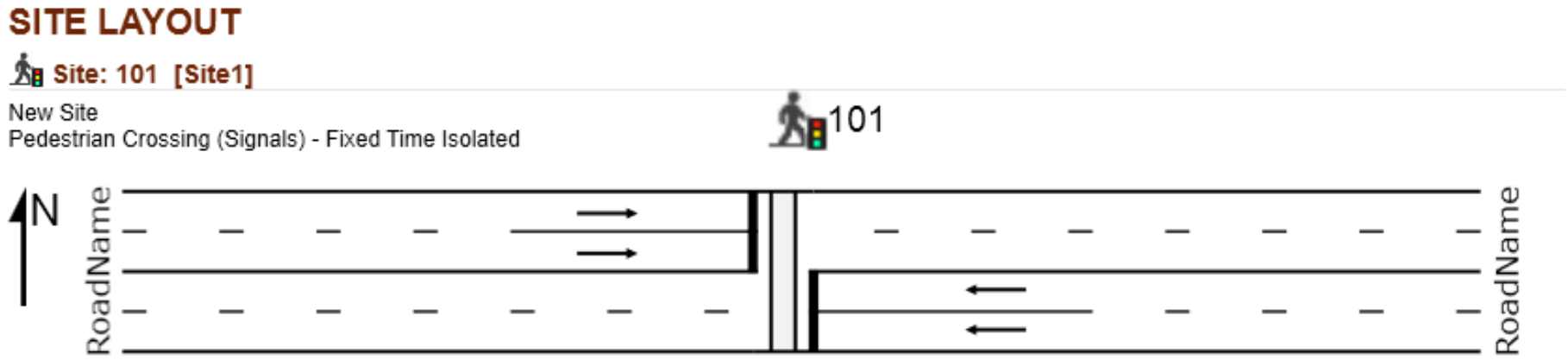
NETWORK LAYOUT

Network: N101 [Network1]

New Network



PEDESTRIAN CROSSING

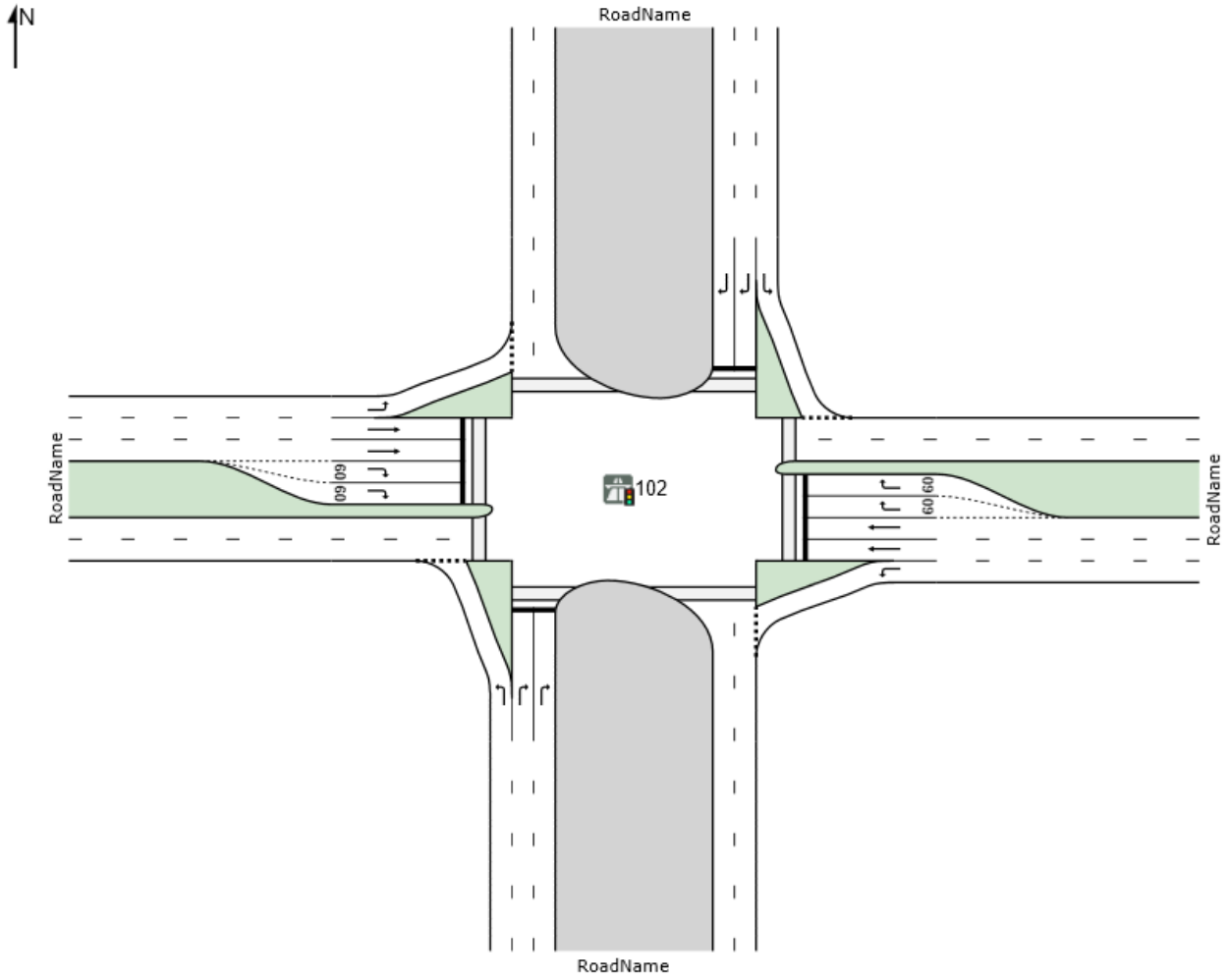


DIAMOND INTERCHANGE

SITE LAYOUT

Site: 102 [Site2]

New Site
Single Point Interchange (Signals) - Fixed Time Isolated




SEKIAN
TERIMAKASIH