

Joint Transoft Solutions - SIDRA SOLUTIONS Webinar
November 2025

SIDRA - TORUS Integration:
Transforming Roundabout Design and Analysis

SIDRA Capacity and Performance Analysis for Roundabouts

Prepared by: Rahmi Akçelik
Presenter: Mark Besley

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 1 - This presentation titled **SIDRA Capacity and Performance Analysis for Roundabouts** was given at the Joint Transoft Solutions - SIDRA SOLUTIONS Webinar "SIDRA - TORUS Integration: Transforming Roundabout Design and Analysis" held in November 2025. The presentation was prepared by Rahmi Akçelik.

Presentation Contents

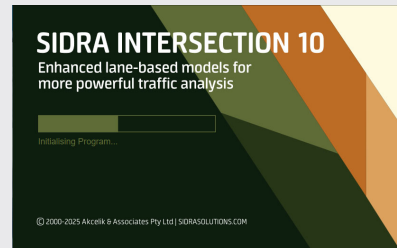


A short overview of **SIDRA INTERSECTION** software for roundabout capacity and performance analysis for single intersections, corridors and networks

1. Software Status
2. SIDRA **Multimodal Capacity and Performance Model**
3. SIDRA Site and Network **Templates** for Roundabouts
4. A **Traffic Impact Assessment Example** (comparing roundabout design scenarios)
5. SIDRA Roundabout Capacity and Performance **Model Extensions for HCM**
6. A **Roundabout Corridor Example**

This presentation is based on the **US HCM Software Setup** of SIDRA INTERSECTION with **US Customary Units**.

Current major version



Slide 2 - We will be going through six sections listed here.

SIDRA Multimodal Capacity and Performance Analysis for Roundabouts



1. Software Status



3 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 3 - We'll get straight into talking about the software status.

About SIDRA

Signalised (and unsignalised) Intersection Design and Research Aid

First released in 1984



Continuous development
in response to user feedback



SIDRA INTERSECTION 10

Micro-analytical software for
modelling **Intersections** and
Networks.

Current Version: **10**
(**25th** major SIDRA version
since its first release)

Current development:

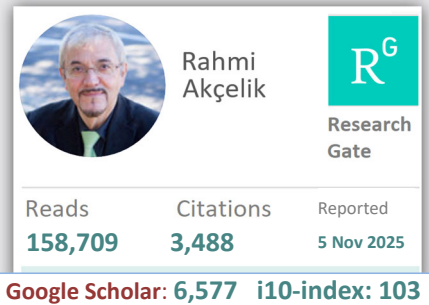
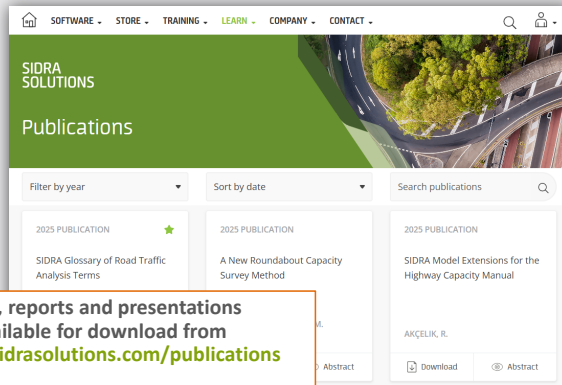
- SIDRA INTERSECTION **Version 11**

Slide 4 - SIDRA has been around since 1984, and we've had continuous development since then in response to user feedback. The current version is Version 10, in fact our 25th major SIDRA version, and we're currently working towards Version 11.

STRONG RESEARCH BASE of SIDRA

Analytical traffic modelling: **Empirical and theoretical methods combined**

40+ years at Australian Road Research Board (1979-1999)
and **Akcelik & Associates (since 1999)**



5 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

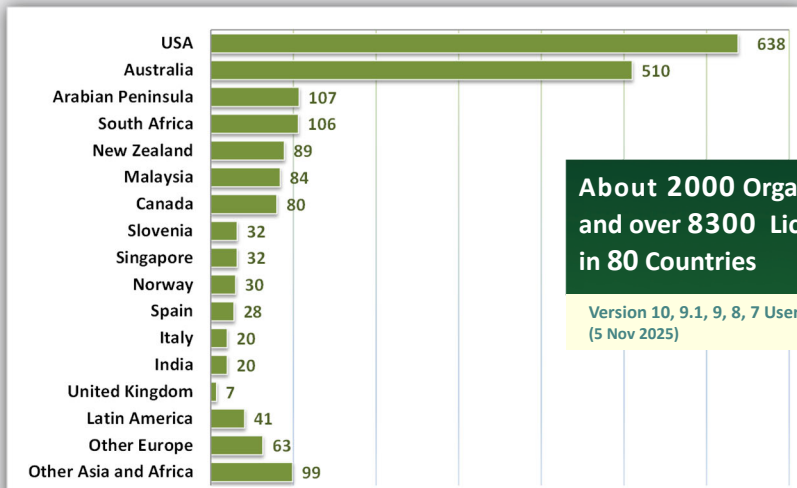
SIDRA
SOLUTIONS

Slide 5 - SIDRA has a very strong research base, with analytical traffic modeling combining empirical and theoretical models. It's been under development for well over 40 years, 20 years at the Australian Road Research Board, and since 1999 with Akcelik and Associates.

You can see the large contribution by Rahmi Akçelik to traffic theory and knowledge, and large numbers of reads, citations, and various indices reported there. Much of this work done over many years is available on our SIDRA SOLUTIONS website and Research Gate. You can see the links here.

i10-index is a metric used by Google representing the number of publications that a researcher has authored that have been cited at least 10 times.

SIDRA INTERSECTION Users



**About 2000 Organisations
and over 8300 Licences
in 80 Countries**

Version 10, 9.1, 9, 8, 7 Users Only
(5 Nov 2025)

Slide 6 - We have about 2,000 organizations using SIDRA around the world in 80 countries. This only counts since SIDRA Version 7, so it doesn't go back over the full history of, but we consider these to be relatively active users.

SIDRA Multimodal Capacity and Performance Analysis for Roundabouts



2. SIDRA Multimodal Capacity and Performance Model



7 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 7 - We'll now talk about the SIDRA capacity and performance model and its multimodal nature.

Vehicle Movement Classes

Approach Movements
by Movement Class as a basis of
all data and modelling

- Light Vehicles
 - Heavy Vehicles
 - Buses
 - Bicycles
 - Large Trucks
 - Light Rail / Trams
 - Six User-Defined Classes
- Traditional
(HCM)

Combined with the lane-based method,
Movement Classes allow modeling of
Bus Priority Lanes, Bicycle Lanes, and
more detailed analysis including
gap acceptance model by Movement Class



RH versions of photos from Sydney, Australia

8 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 8 - Approach Movements by Movement Class are the basis of all input data to SIDRA and modeling within the software.

You can see that SIDRA includes six vehicle Movement Classes including Buses, Bicycles, Large Trucks and Light Rail. You can see them listed here, rather than the traditional HCM method, which only has Light and Heavy Vehicles. - In addition, SIDRA allows definition of up to six user-defined classes.

Combining these with a lane-based method, the Movement Classes allow modeling of things like bus priority and bicycle lanes and signals, and allow more detailed analysis because, for example, you can do the gap acceptance modeling by Movement Class.

Pedestrians in SIDRA (General)

- Output reports and displays include analysis results for **vehicles (by Movement Class)**, as well as **Pedestrians** and **Persons**.
- Modeling pedestrians at **Roundabouts**, **Two-Way Sign Control**, **Unsignalized (Zebra) Crossings** as well as **Signalized Intersections and Crossings**.
- Effect of pedestrians on vehicle movement **capacity and performance** and **signal timings**.



Source: ITE Journal

Slide 9 - Output reports and displays include results for vehicles by Movement Class and also pedestrians and persons, so we evaluate those three levels. Pedestrians are modeled at all types of intersections, including roundabouts, sign control, zebra crossings, unsignalized crossings, as well, of course, as signalized intersections and crossings.

Pedestrians affect vehicle movement capacities and performance, and at signals, they also will have effects on signal timings due to pedestrian minimum crossing time requirements.

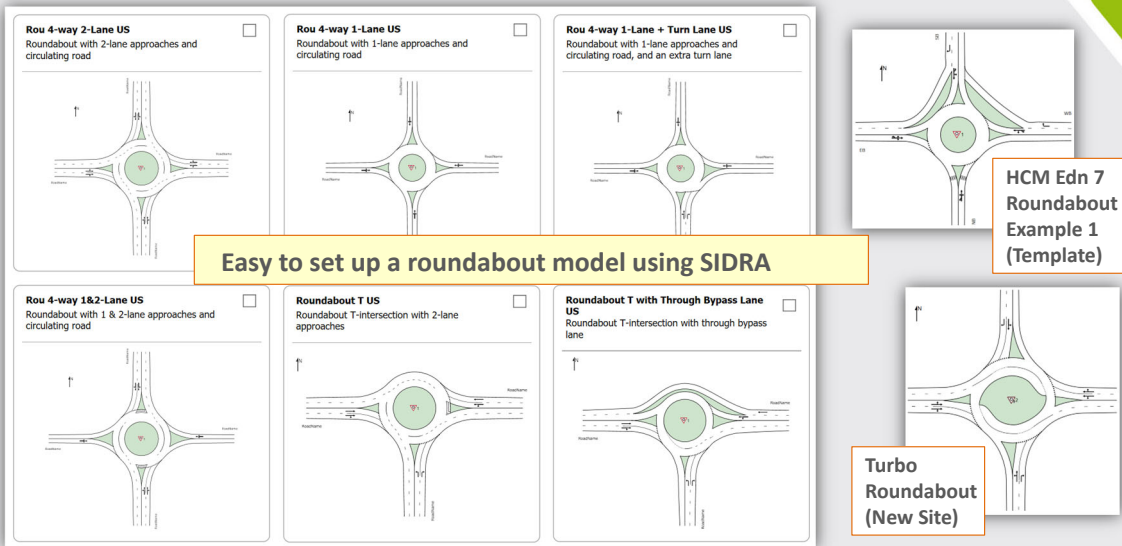


3. SIDRA Site and Network **Templates** for Roundabouts



Slide 10 - To make it easy to set up roundabouts within SIDRA, we provide many Site and Network templates.

A selection of SIDRA Roundabout Site Templates



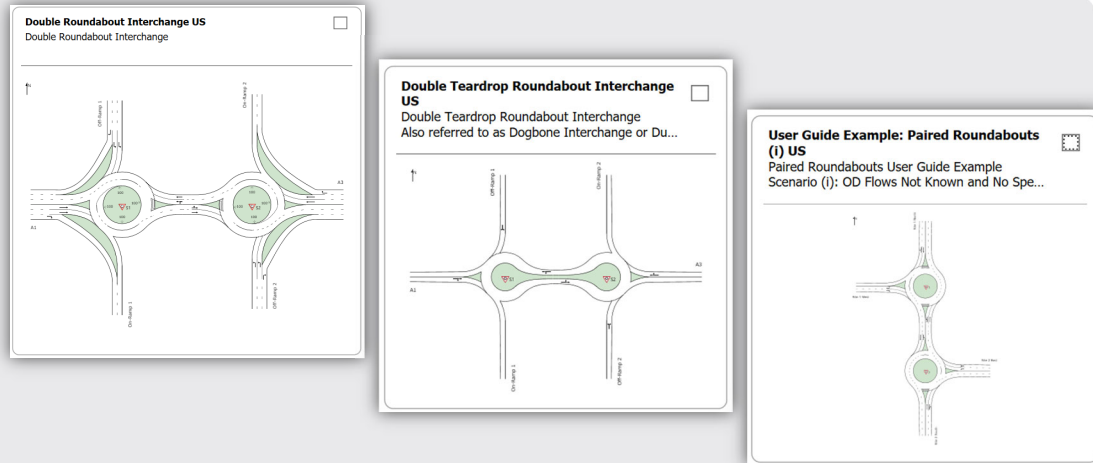
11 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 11 - A site in SIDRA corresponds to an intersection generally, and you can see just a few of them here. All of the MUTCD roundabouts are set up as templates. Some unusual cases like bypass lanes are also included. There's also a template for the HCM Edition 7 roundabout template, and in Version 10, we've also introduced modeling of turbo roundabouts.

A selection of SIDRA Roundabout Network Templates



12 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 12 - Roundabouts, of course, can be used to create interchanges. We have a number of SIDRA network templates, which allow for modeling of various types of interchanges.

You can see a few pictures here. Also, paired roundabouts, something like a staggered T, are also included. And again, these would save you a lot of time with setting up.



4. A Traffic Impact Assessment Example (comparing roundabout design scenarios)



Slide 13 - We will now work through a traffic impact assessment example, which compares some roundabout design scenarios replacing a two-way stop.

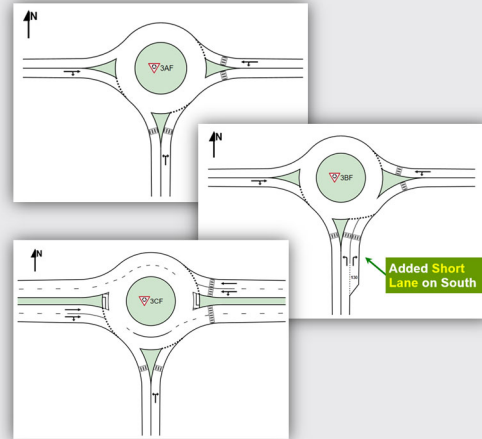
A Traffic Impact Assessment Example

A Case Study of Traffic Impact Assessment using SIDRA INTERSECTION 10

This example will be used to discuss:

- **Assessment of design scenarios** to mitigate increased **delays, queues and emissions** due to **development traffic** increases and flow pattern changes, including the effect of **pedestrian movements**.
- **Design measures** for improving capacity and performance (additional lanes, slip lanes, etc).

SIDRA Standard (HCM) Roundabout Capacity Model option has been used for the capacity and performance results given for this example.



14 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

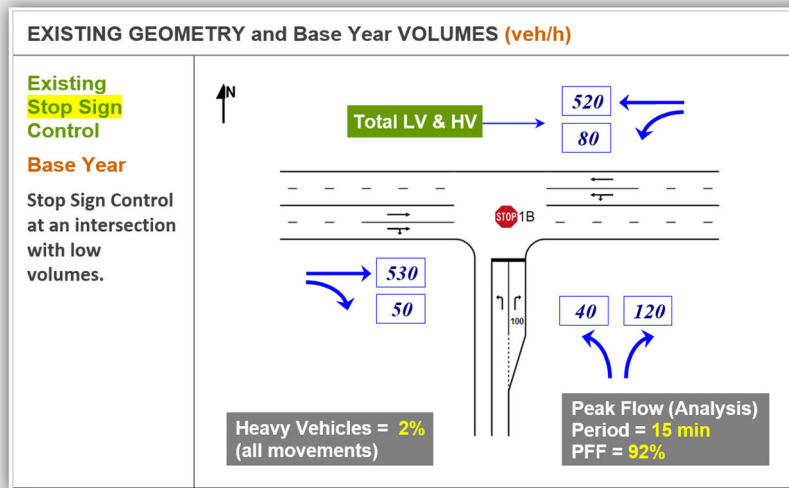
SIDRA
SOLUTIONS

Slide 14 - So we'll have a look at this example outputs from SIDRA Intersection Version 10, and we'll discuss the assessment of those design scenarios to mitigate increases in delays and queues, emissions due to development, traffic increases, and to flow pattern changes.

And also, the future design may include effect of pedestrian movements. Design measures for improving capacity and performance will be examined; things like additional lanes, adding slip lanes, and so on.

The **SIDRA Standard (HCM)** is the SIDRA Standard model calibrated for US research data used in developing the HCM Edition 6/7 model. In this TIA example, **EF = 1.05** was used for the two single lane roundabout options. For the two-lane roundabout option, **EF = 1.2** with Development Volumes, **EF = 1.1** for the FUTURE (with development Volumes).

A Traffic Impact Assessment Example



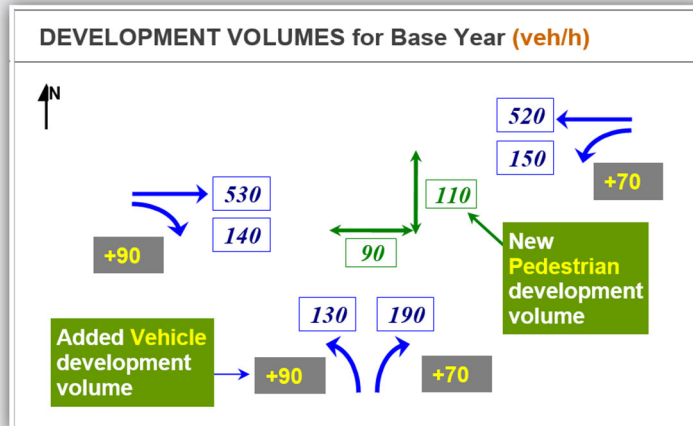
15 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

**SIDRA
SOLUTIONS**

Slide 15 - So the example starts off with this one: it's a stop sign controlled T-intersection. You can see the traffic volumes for the base here.

A Traffic Impact Assessment Example



DEVELOPMENT VOLUMES for Future Year (veh/h)

DESIGN LIFE ANALYSIS:

- Number of Years = **10**
(results for FINAL YEAR)
- Growth Model = **Compound**
- Growth Rate = **3% per year**

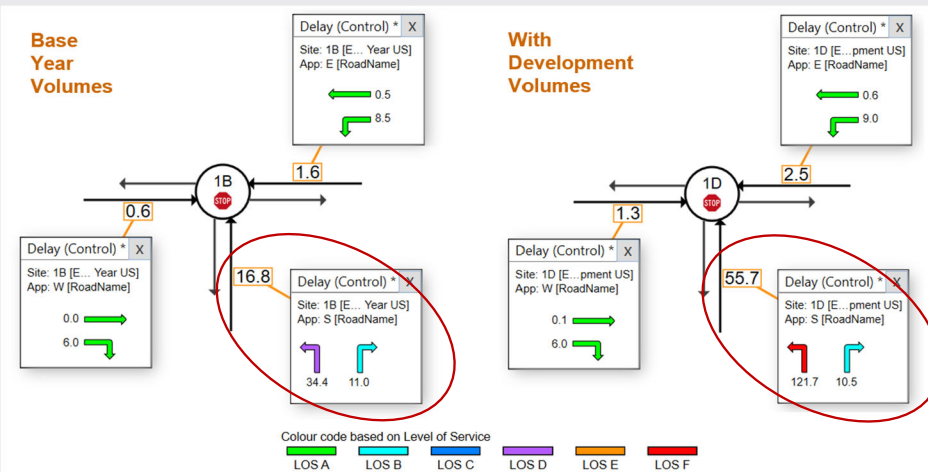
Slide 16 - In the following slides, we'll have a look at the performance under various volume and design scenarios. This will show you that the stop sign is working okay in the base conditions here with low volumes. Those are the volumes you can see shown in blue in this slide.

But the development volumes will be added due to increased volumes. For example, this could be due to the extension of a nearby shopping centre. For example, extra 90 vehicles will turn right into the stem of the T intersection as you see here.

We'll also be looking at a design life analysis for 10 years with 3 percent compound growth.

A Traffic Impact Assessment Example

The effect of development volume on Average Delays and LOS for Existing Stop Sign Control



17 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 17 - So, with the development and the growth, what happens? Firstly, let's look at the development volume and what happens to the average delays and level of service for the existing stop sign control.

For the base year volumes on the left, you can see there the worst movement, as usual, is the left turn out of the stem of the T at the stop sign. It has an acceptable level of service D, but with the development volumes, it deteriorates to LOS F with significantly increased delay over 120 seconds. Obviously, that is an unacceptable level of delay.

A Traffic Impact Assessment Example

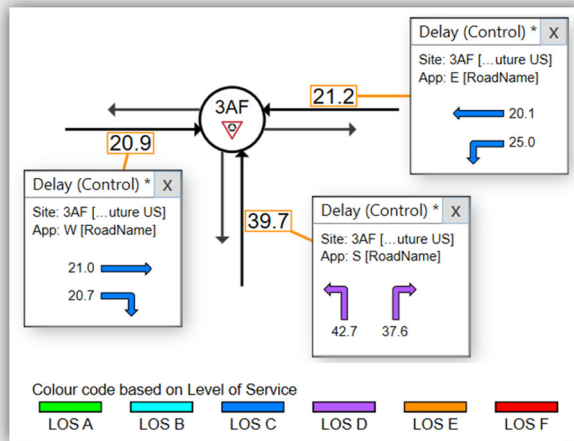
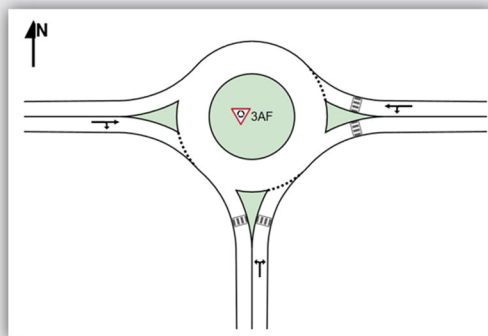
Design Options With Development (Future: 10 Years): 1-Lane Roundabout

Vehicle delay: Average = **24.7 s (LOS C)**

High v/c Ratios on all Approaches:

$x > x_p$ (0.85)

Total CO2 = **291 t/y**



18 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 18 - We need to look at some sort of mitigation by design, and we're thinking of assessing what happens if we change this intersection to a roundabout. First, we're looking at a single lane roundabout you can see on the left here, and how it performs with the future volumes on the right.

You can see a SIDRA output graphic showing level of service D on the stem of the T intersection, which are the worst delays.

We might say that's acceptable, but we note the high V/C ratios. We do like to keep the V/C ratios under a target value of 0.85 for roundabouts, which is what we call the practical degree of saturation. Also note the CO2 emission value shown here.

So we have an overall level of service C based on average intersection delay, probably okay, but V/C ratios are high and delays on the South are still a bit high.

A Traffic Impact Assessment Example

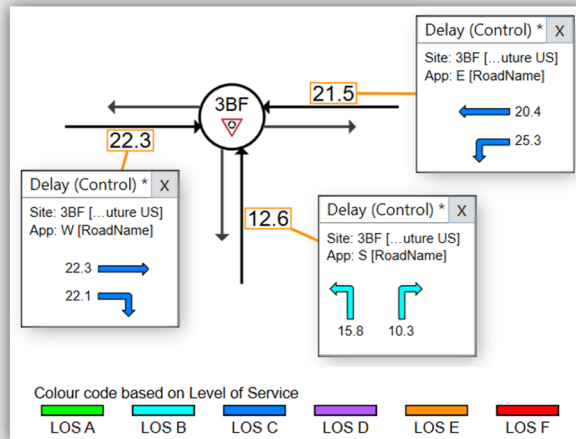
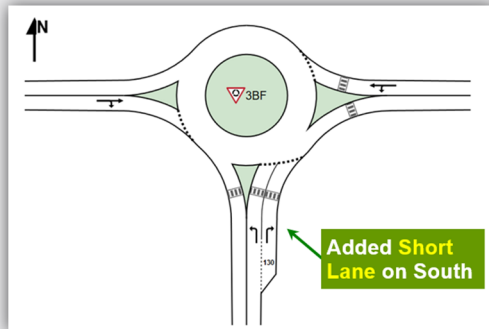
Design Options With Development (Future: 10 Years): 1-Lane+ Roundabout

Vehicle delay: Average = 20.1 s (LOS C)

High v/c Ratios on E & W Approaches:

$x > x_p$ (0.85)

Total CO2 = 285 t/y



19 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 19 - The next option we looked at with SIDRA was to try out an added short right turn lane on the South. So we cloned the single-lane roundabout Site and added a 130-foot short lane.

You can see that, certainly, this gives us a big improvement in the delay values on the South, but we still noted high V/C ratios, still above the target value of 0.85.

A Traffic Impact Assessment Example

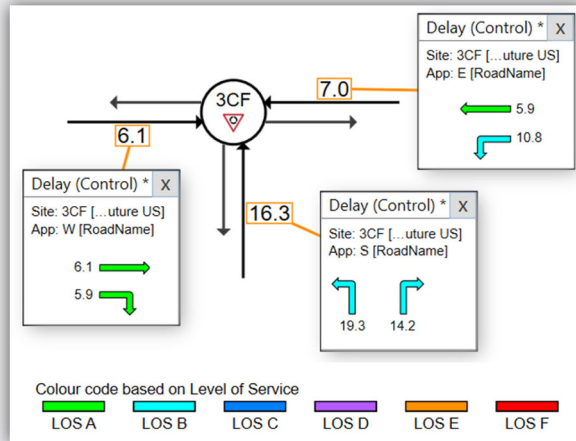
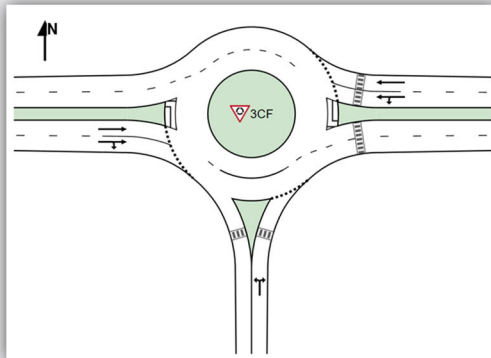
Design Options With Development (Future: 10 Years): 2-Lane Roundabout

Vehicle delay: Average = **8.4 s (LOS A)**

Low to medium v/c Ratios on all Approaches:

$x < x_p$ (0.85)

Total CO2 = **261 t/y**



20 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 20 - A further design option was to look at keeping the main road as a four-lane road at the roundabout. So, it's now a two-lane roundabout with single lane approach and exit lanes on the South. This brings the delays down significantly on all approaches. Average for the intersection as a whole is now only 8.4 seconds corresponding to LOS A.

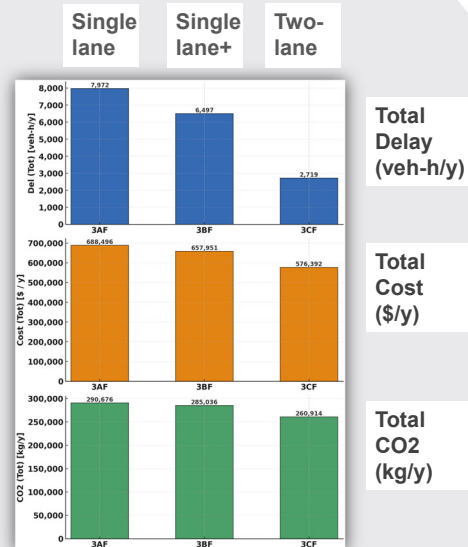
The worst delay is still on the South approach, which is just under 20 seconds for the left turn which corresponds to LOS B. So, this is very much an acceptable solution and would allow us plenty of scope for future traffic growth.

A Traffic Impact Assessment Example

PROJECT SUMMARY Report and Graphs

How much better?

- **Short Right Turn lane added to Single-lane**
 - Delay ↓ 18.5%**
 - Cost ↓ 4.4%**
 - CO2 ↓ 1.9%**
- **Two-lane vs single lane**
 - Delay ↓ 65.9%**
 - Cost ↓ 16.3%**
 - CO2 ↓ 10.2%**
- **Two-lane vs Single-lane with short Right Turn lane**
 - Delay ↓ 58.1%**
 - Cost ↓ 12.4%**
 - CO2 ↓ 8.5%**



Slide 21 - These bar charts compare the design options, giving us an indication of the different measures. We're looking here at annual values of total delay, total operating cost and total emissions of CO2.

For example, we can see that the two-lane design option compared with the single-lane design gives very significant decreases in delays, operating cost and CO2 emissions (66%, 16% and 10%).



5. SIDRA Roundabout Capacity and Performance Model Extensions for HCM



For a full list of extensions to HCM offered by
SIDRA INTERSECTION, refer to:
<https://www.sidrasolutions.com/software/sidra-intersection/features/introduction/highway-capacity-manual-hcm-sidra-intersection>

Slide 22 - Let's now talk about the SIDRA roundabout capacity and performance models, and in particular how those compare to the HCM. SIDRA offers a lot of extensions above what the HCM can do including the effect of roundabout geometry on capacity.

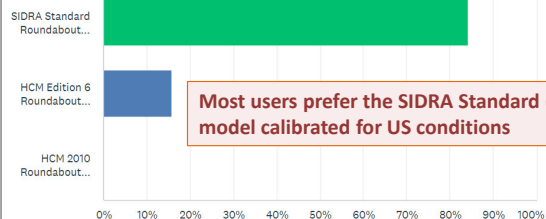
"SIDRA Standard (HCM) Model" for Roundabouts

The most popular roundabout analysis software in the USA

According to the TRB document **Roundabout Practices, A Synthesis of Highway Practice (NCHRP SYNTHESIS 488)**, SIDRA INTERSECTION is the most widely-used software tool in the USA for roundabout analysis.

[Download from <https://www.nap.edu>]

If you are using a US HCM software setup of SIDRA INTERSECTION, which roundabout capacity model option do you use for roundabout analysis?



Most users prefer the SIDRA Standard (HCM) model calibrated for US conditions

ANSWER CHOICES	RESPONSES
SIDRA Standard Roundabout Capacity Model	84.21%
HCM Edition 6 Roundabout Capacity Model	15.79%

Slide 23 - I'll first note that SIDRA is the most popular roundabout analysis software in the United States, according to a TRB report. The reference is shown here.

This report indicated that 84 percent of the modelers using SIDRA preferred the SIDRA roundabout capacity model although the HCM Edition 6 model (now in Edition 7) was available within SIDRA.

So let's have a look at some of the features of the SIDRA model that are not included in the HCM capacity and performance models for roundabouts.

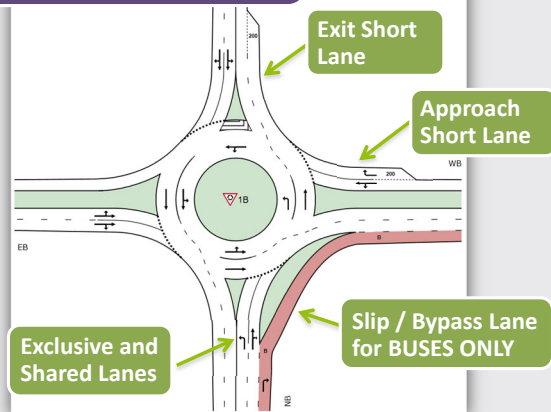
Lane-based model with approach and exit short lanes

LANE-BASED MODEL

More realistic and reliable than modeling by approaches and lane groups.

- **General:**
Unequal lane flows, De facto exclusive lanes, Short lanes, Slip/Bypass lanes
- **Roundabouts:**
Unequal circulating lane flows, Dominant and Subdominant lanes
- **NETWORK (Corridor) Model:**
Lane back of queue, lane blockage, capacity constraint, midblock lane changes, signal platoon arrival and departure patterns, extra bunching

Individual approach, exit and circulating lanes have different characteristics



24 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 24 - Firstly, SIDRA uses a lane-based model that gives us more reliable and realistic modeling than aggregations by approach, movements or lanes for all traffic facilities. A lane-based model allows for the effects of conditions like unequal lane flows, de facto exclusive lanes, approach and exit short lanes, and slip/bypass lanes at an intersection.

All these conditions are very variable as they depend on many factors including intersection geometry, volumes and signal timings. Note that a de facto exclusive lane is where a lane is specified as a shared lane but actually only used by one traffic movement.

Lane-based model is important for roundabouts for additional reasons such as unequal circulating lane flows in a multi-lane roundabout, unequal lane capacities due to dominant and subdominant entry lanes, and so on.

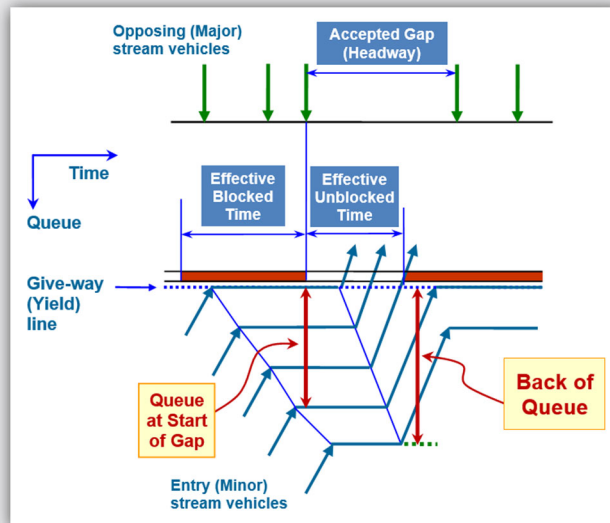
For network modelling in SIDRA, lane-based modeling is also essential for accurate modeling of back of queue, lane blockage, lane capacity constraint for oversaturated lanes, midblock lane changes on multi-lane roads, and signal platoon arrival or departure patterns for signals.

Importance of Back of Queue model

Back of Queue estimation is important for **Short Lane** and **NETWORK Modeling**.

Gap-acceptance cycles method helps to model **Back of Queue** for Roundabouts and Sign control.

NOT in the HCM for roundabouts and sign control



25 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

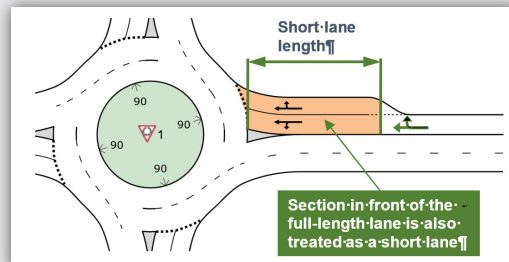
Slide 25 - Consistent "Back of Queue" modeling is important for approach short lane capacities and overflows into adjacent lanes at all intersection types, and for blockage of upstream lanes in networks due to queues in downstream lanes.

SIDRA uses a unique gap-acceptance cycles method to model Back of Queue for roundabouts and sign control in a way that is consistent with other intersection types. This is not available in the HCM.

Short Lane Capacities at Roundabouts

- ❖ Unique **Back of Queue** and **Gap Acceptance Cycle** models are used in **SIDRA INTERSECTION**.
- ❖ **Short gap acceptance cycles** at **roundabouts** and **two-way sign control** give large short lane capacities.
- ❖ In contrast, capacities are reduced after short lane queues are discharged at **signalized intersections** with long green times and long signal cycles.
- ❖ The short lane model is **flow-dependent** rather than pure geometric model of **FLARES** in the UK (TRL) model.

NOT in the HCM Roundabout Capacity Model



26 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

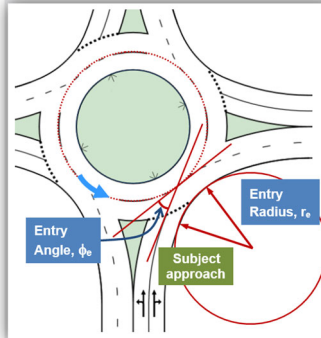
Slide 26 - The gap acceptance cycles method estimates more accurate capacities for short lanes. It can estimate larger capacities for short lanes at roundabouts because gap acceptance cycles are shorter than those at signals. This means that the short lane space can be filled and emptied more often which results higher capacities.

This also means that short lane capacities are dependent on demand flow levels as well as the short lane length (queue space). This is more effective than modeling short lane capacities only as a function of the short lane length.

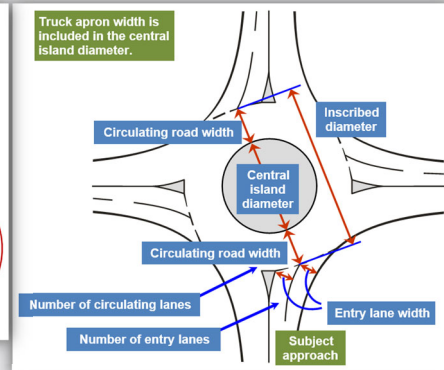
Geometry parameters in the SIDRA Roundabout Capacity Model

The **SIDRA Standard (HCM)** Roundabout Capacity Model includes a large number of roundabout **GEOMETRY** parameters:

- Number of entry lanes
- Entry Lane Width
- Approach lane configuration including bypass lanes
- Number of circulating lanes
- Central Island Diameter
- Circulating Road Width
- Inscribed Diameter
- Entry Radius, Entry Angle
- Approach short lanes
- Number of exit lanes
- Exit short lanes



NOT in the HCM Roundabout Capacity Model



Slide 27 - The SIDRA Standard (HCM) Roundabout Capacity Model includes a large number of roundabout GEOMETRY parameters that are not in the HCM Roundabout Capacity Model.

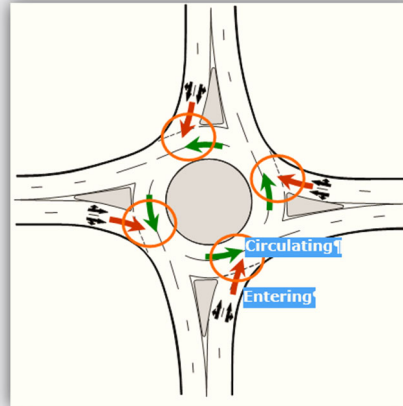
Capacity model with roundabout approach interactions

Roundabout is analyzed as a **closed system** with interactions among roundabout entries

- **Capacity constraint**
- **Bunched headway distribution model** for the circulating flow
- **Priority sharing**
- **Unbalanced flow conditions**
- **Lane balance** of circulating flow rates

NOT in the HCM Roundabout Capacity Model

NOT as series of T intersections ...



28 of 38

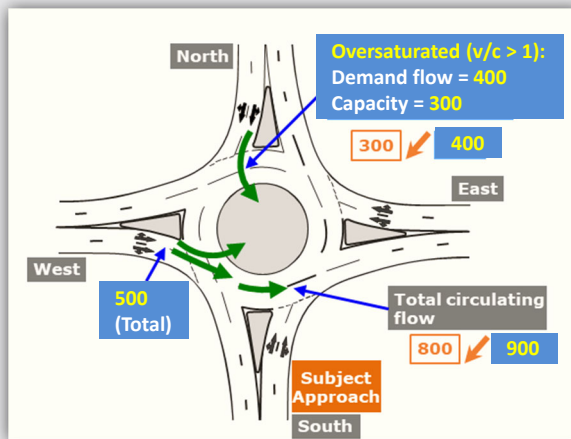
SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

**SIDRA
SOLUTIONS**

Slide 28 - A roundabout in SIDRA analysed as a closed system with interactions among roundabout entries; it's not modelled as a series of separate T intersections. This allows us to look at features within the whole roundabout, such as capacity constraints limiting the flow entering the circulating road, bunching, headway distribution within the circulating flow, priority sharing, unbalanced flow conditions, and the lane balance of circulating flows within a multi-lane circulating round area.

These are not in the HCM model.

Capacity Constraint for Oversaturated Lanes



NOT in the HCM Roundabout Capacity Model

Capacity Constraint:

Circulating flow rate is reduced if any upstream entry lane is **oversaturated**, i.e. **demand exceeds capacity** and therefore **Entry Flow Rate = Capacity**.

Example:

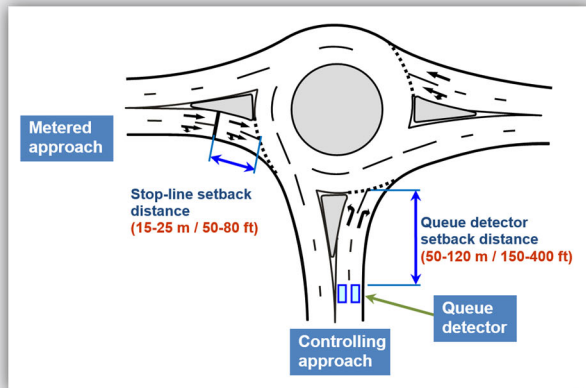
Circulating flow for South approach = $500 + 300 = 800$
(reduced due to **capacity constraint**)

Slide 29 - A capacity constraint example is shown here where only the capacity flow can enter from the oversaturated lane. So, the demand flow is 400 veh/h but only 300 veh/h can enter. This is all accounted for in SIDRA circulating flow calculations.

Roundabout Metering Signals

Congestion caused by **UNBALANCED** flow patterns at roundabouts can be alleviated using metering signals

NOT in the HCM



AKÇELİK, R. (2011). **Roundabout metering signals: capacity, performance and timing.** Paper presented at the 6th International Symposium on Highway Capacity and Quality of Service, Transportation Research Board, Stockholm, Sweden.
www.sidrasolutions.com/publications

30 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 30 - Unbalanced flow patterns can cause significant capacity losses at a roundabout. This is not in the Highway Capacity Manual. SIDRA also allows you to model metering signals on one leg to alleviate the effect of unbalanced flow patterns.



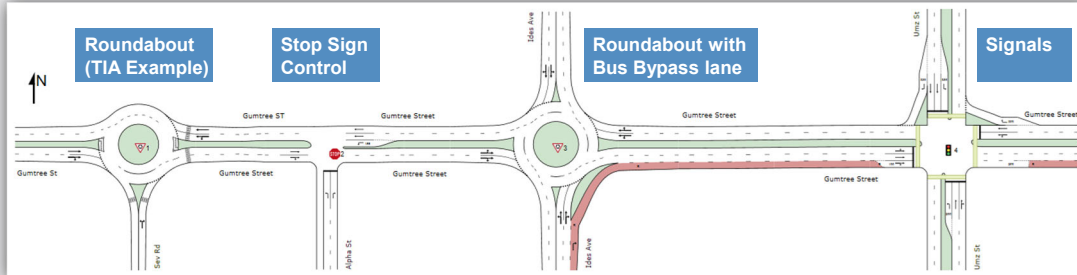
6. A Roundabout Corridor Example



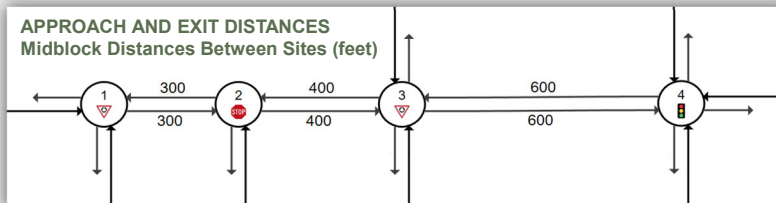
Slide 31 - Let's finish with a quick look through a roundabout corridor example.

A Roundabout Corridor Example

SIDRA Network Layout Display



APPROACH AND EXIT DISTANCES
Midblock Distances Between Sites (feet)



External
Approach
Distance =
1600 ft (all)

32 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

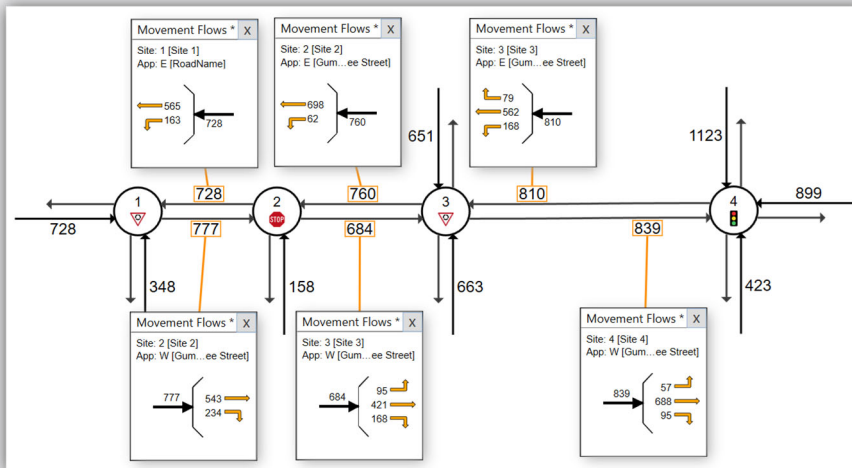
SIDRA
SOLUTIONS

Slide 32 - This network with four intersections consists of two roundabouts with a T intersection controlled by stop sign on the side road, and a signalized intersection at the East end. The roundabout at the West end is the two-lane roundabout solutions discussed in the Traffic Impact Assessment example.

The approach distances indicate a corridor of closely-spaced intersections.

A Roundabout Corridor Example

MOVEMENT FLOWS FOR NETWORK (DEMAND) - With Development Volumes Internal Approach Movement Demand Flow Rates (veh/h)



33 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

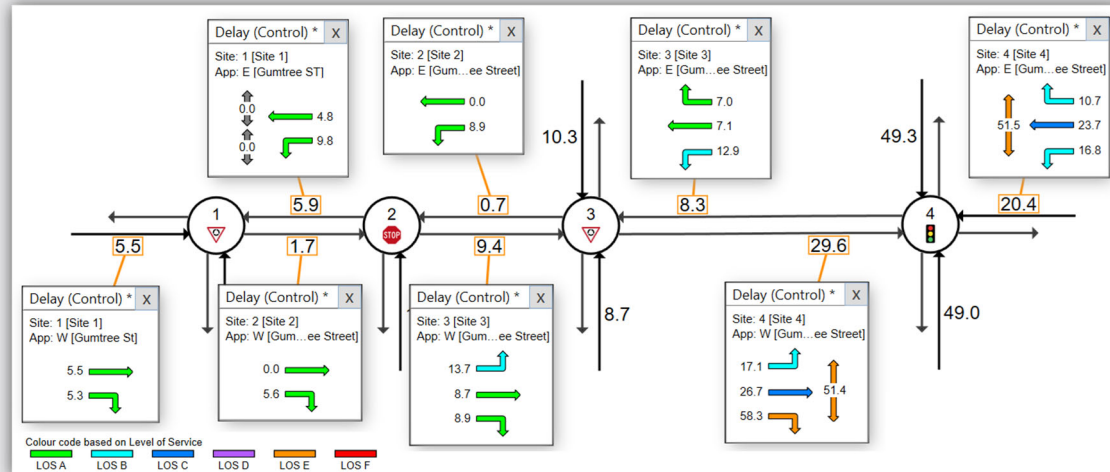
SIDRA
SOLUTIONS

Slide 33 - The movement demand flows are shown in this slide. In the SIDRA interactive display, you can see the approach total, or show the individual movement values by popping up these outputs.

A Roundabout Corridor Example

DELAY - AVERAGE (CONTROL) - With Development Volumes
Average control delay per vehicle, or average pedestrian delay (seconds)

Includes
Geometric Delay



34 of 38

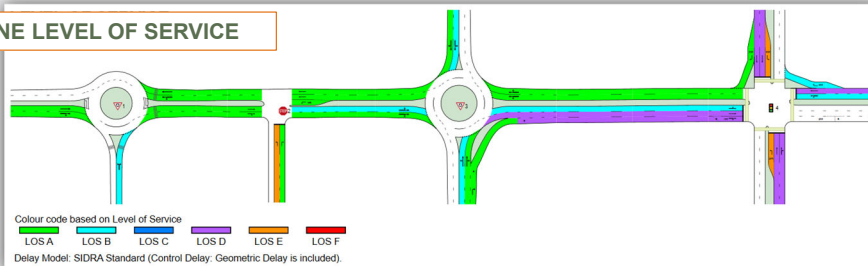
SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 34 - Once you've processed your network, you can have a look at the delay estimates. You can see colours coded by level of service. Note that vehicle and pedestrian movement Level of Service criteria are different.

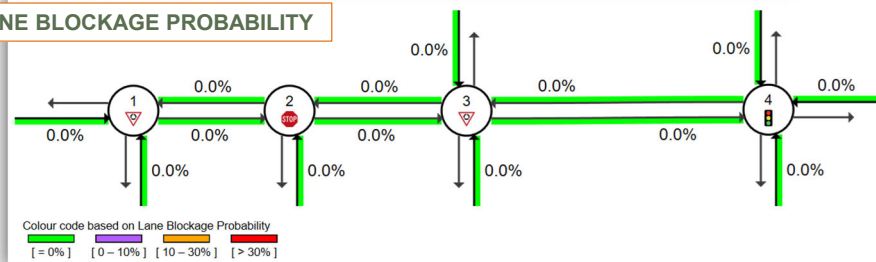
A Roundabout Corridor Example

LANE LEVEL OF SERVICE



With
Development
Volumes

LANE BLOCKAGE PROBABILITY



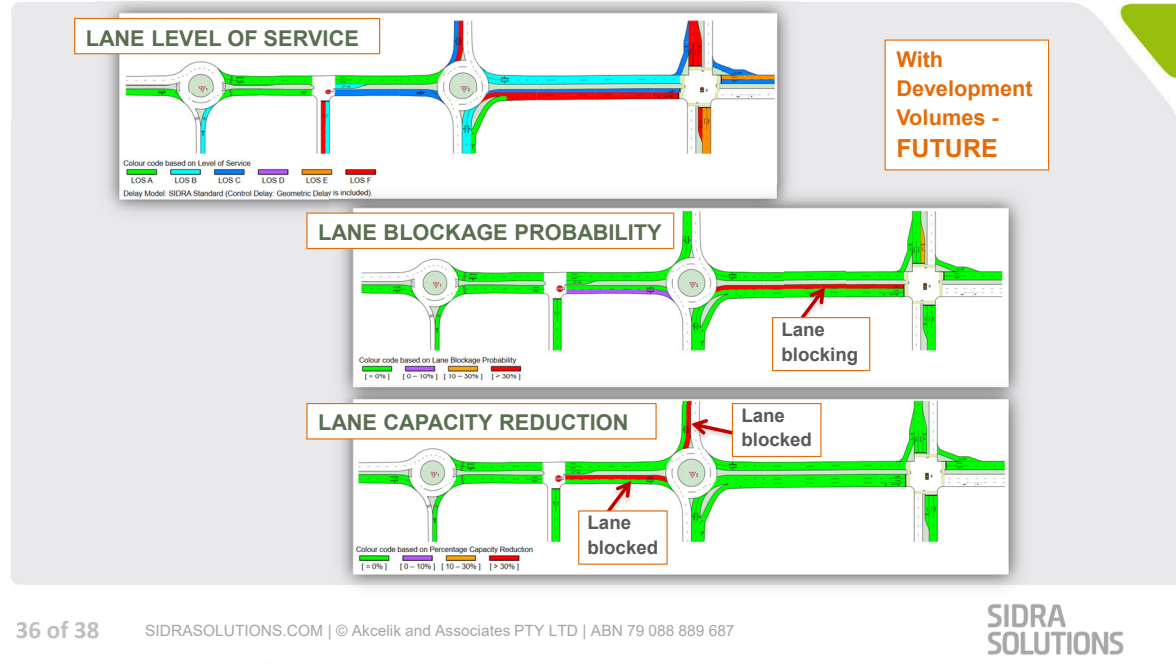
35 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

SIDRA
SOLUTIONS

Slide 35 - The lane level of service and blockage probabilities are also estimated. The colour coding draws our attention to the parts of the network where vehicles may be having more difficulties.

A Roundabout Corridor Example



Slide 36 - You can see that future conditions with the effect of development volumes in this corridor get a lot worse. Reds highlighting bad levels of service with some lanes indicating LOS F here.

You can also see the queue extending back from the signalized intersection to the roundabout resulting in capacity reduction for the movements entering the roundabout from the West and North approaches.

As a further design example, we could consider improvements to the signalized intersection including providing an Exclusive Left Turn lane on the West approach to eliminate lane blockage caused by the queue formed there.

About the Presentation

Prepared by:

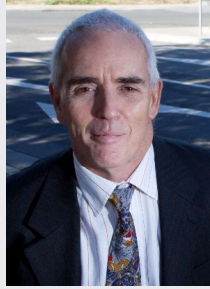
Rahmi Akçelik



rahmi.akcelik@sidrasolutions.com

Presenter:

Mark Besley



mark.besley@sidrasolutions.com

37 of 38

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

**SIDRA
SOLUTIONS**

Slide 37 - This presentation was prepared by Rahmi Akçelik and presented by Mark Besley who are Directors of Akcelik & Associates Pty Ltd, trading as SIDRA SOLUTIONS.

END OF PRESENTATION

Thank you!

SIDRASOLUTIONS.COM | © Akcelik and Associates PTY LTD | ABN 79 088 889 687

**SIDRA
SOLUTIONS**

Slide 38 - End of presentation. Thank you.