Unit 8: Intelligent Transport Systems

Module 8-1

Intelligent Transport Systems for Traffic Control

Traffic Management Training Module

Austroads

Today’s presenter

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Outline of this Module

- ITS Modules
- Smart Motorways
- Variable Message Signs
- Variable Speed Limits
- Reversible Lanes
- Smart Parking
- Gating

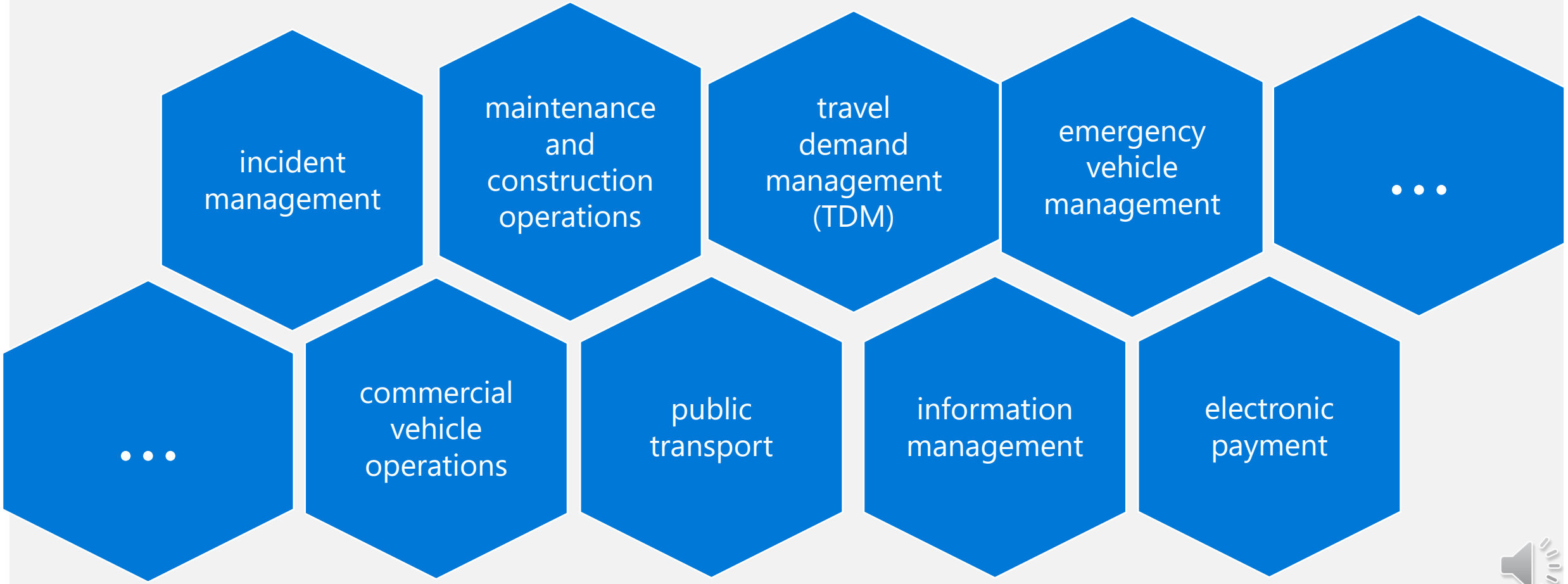
Section 8 of Guide to Traffic Management Part 9: Transport Control Systems – Strategies and Operations
Austroads (2020)

ITS

Intelligent Transport Systems (ITS) apply a variety of technologies to monitor, evaluate, and manage transport systems to enhance efficiency and safety.

- improve safety and mobility
- environment protection
- city liveability
- minimising costs to system owners, operators, and users

ITS Modules


incident management
maintenance and construction operations
travel demand management (TDM)
emergency vehicle management
• • •
• • •
commercial vehicle operations
public transport
information management
electronic payment

Smart Motorways

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Smart Motorways

- Intelligent information systems
- Communications systems
- Control systems
- Examples:

  (coordinated) ramp metering, variable speed limits, lane use control, incident detection, traveller information, closed circuit television surveillance

Smart Motorways

- Examples:

  ramp metering, transit lanes

  https://www.nzta.govt.nz/roads-and-rail/ramp-signals/videos/

Typical priority lane (left) allowing permitted vehicles to bypass the ramp signals

Source: https://www.nzta.govt.nz/roads-and-rail/ramp-signals/priority-lane-faqs/

Variable Message Signs

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Variable Message Signs

- VMS Operation
  - Manual input
  - Pre-defined response plans
  - Semi-automatic
  - Automatic

Variable Message Signs

Examples of dedicated drive time signs (left and centre) and motorway condition signs (right) in Victoria

Source: Austroads (2020)

Variable Message Signs

Example of LUMS in operation. Merge right from lane one (left lane) due to upcoming lane closures. Speed limit 100 km/h.

Source: Austroads (2020)

Variable Speed Limits

Speed management can improve road safety by:

- reducing the speed differential between vehicles (i.e. more homogeneous flows)
- minimising lane changing and braking caused by speed differentials
- increasing the time for drivers to react to changing conditions
- reducing the likelihood of an impact, and reducing the crash severity if an impact does occur

Variable Speed Limits

Examples of existing weather-based VSL systems on motorways (1/2)

- M1 Pacific Motorway (Mount White), NSW

  to reduce speed through tight geometric sections during wet weather

- Great Western Highway (Meadow Flat to Yetholme), NSW

  to reduce speed when there is black ice formation

- Gateway Bridge, Queensland

  to reduce speed during high winds (over 50 km/h)

- M1 West Gate Bridge, Victoria

  to reduce speed when there are high winds

Variable Speed Limits

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Examples of existing weather-based VSL systems on motorways (2/2)

- Tasman Highway (including Tasman Bridge), Tasmania

  to reduce speed in response to ice, water on the road or high winds on the bridge, as well as other incidents and congestion events

- Southern Expressway, South Australia

  to reduce speed on a downhill section in response to an incident, maintenance work or inclement weather conditions

- South Eastern Freeway, South Australia

  to reduce speed in response to thick fog

Reversible Lanes

Overhead signals for lane reversal

Note: In this scenario the middle lane is reversible with the direction of allowable travel indicated by the changeable lane control signal. Here the lane is closed to traffic moving away from the camera.

Source: Austroads (2020)

Smart Parking

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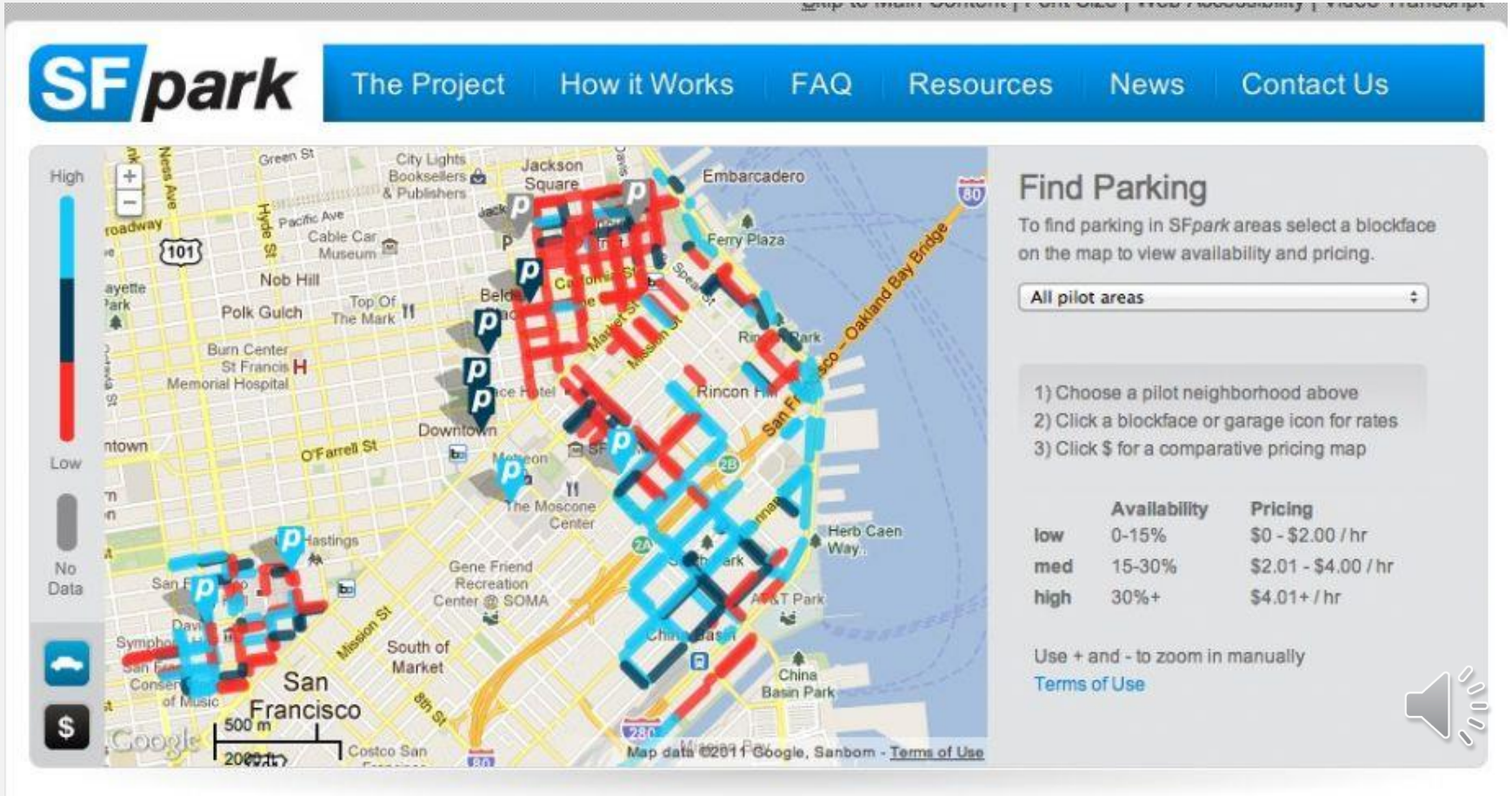
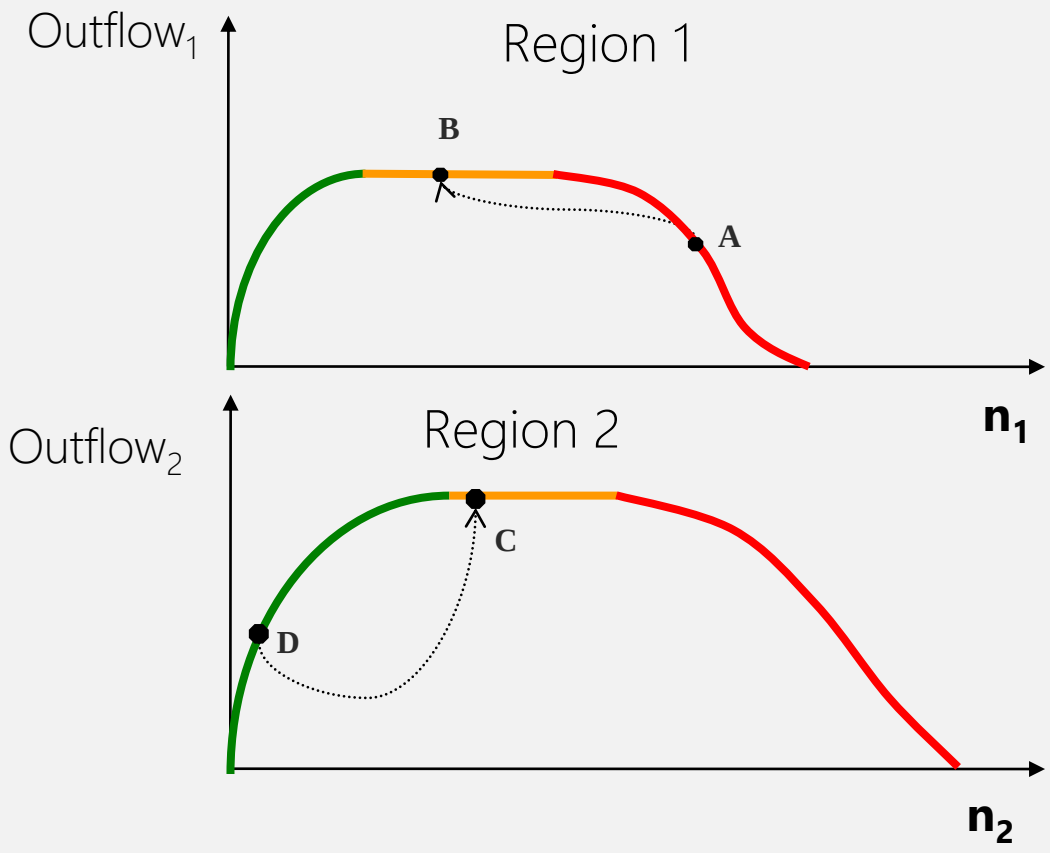
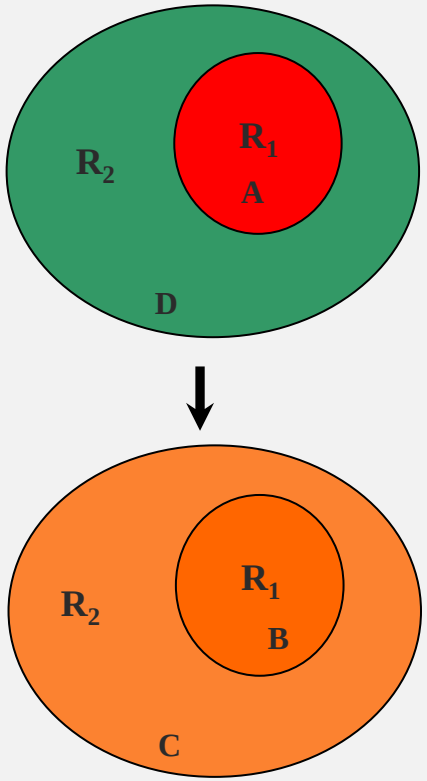
https://vimeo.com/13867453



Perimeter Flow Control (Gating)

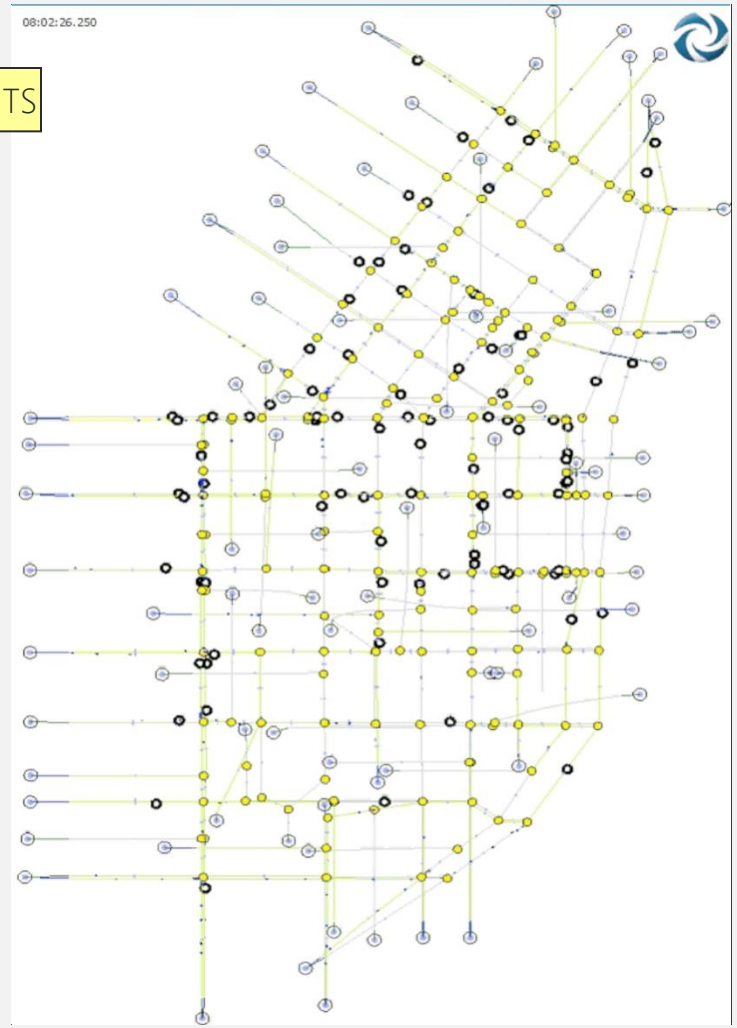
Large-scale Urban Traffic Control





Perimeter Flow Control (Gating)

PRE-TIMED TRAFFIC LIGHTS



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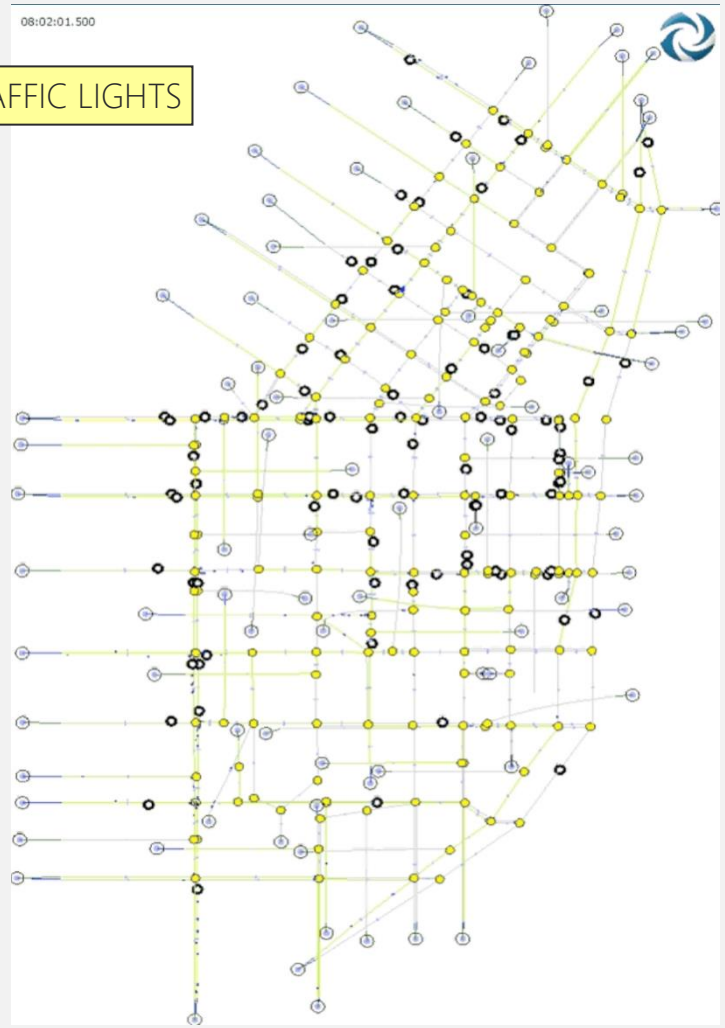
SMART TRAFFIC LIGHTS



Perimeter Flow Control (Gating)

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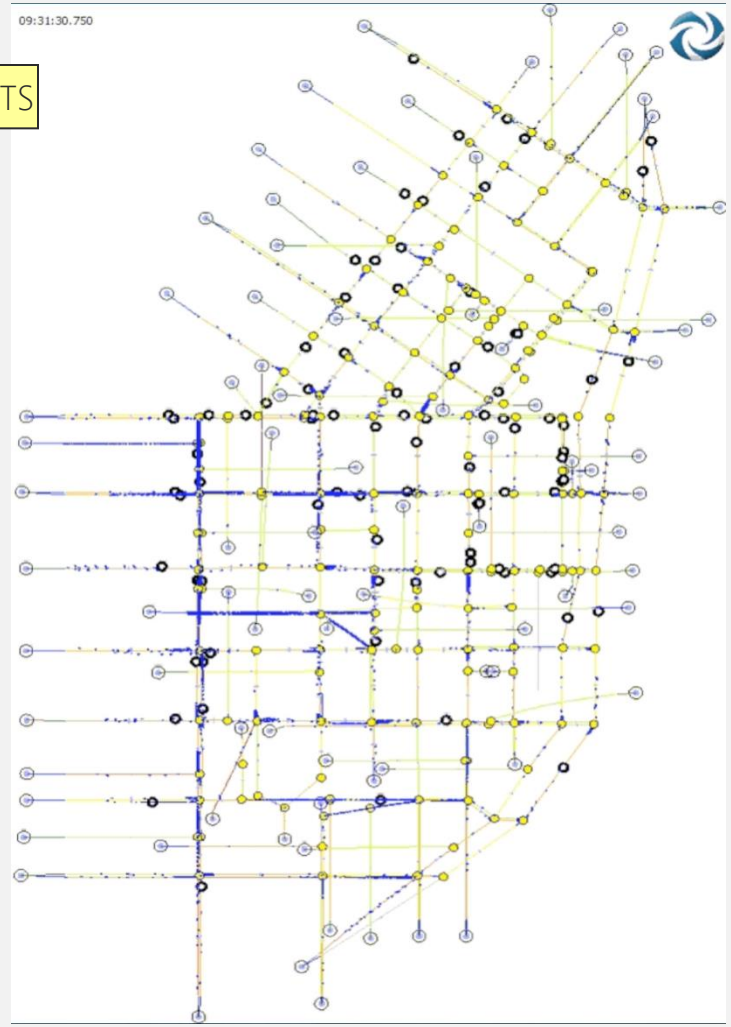

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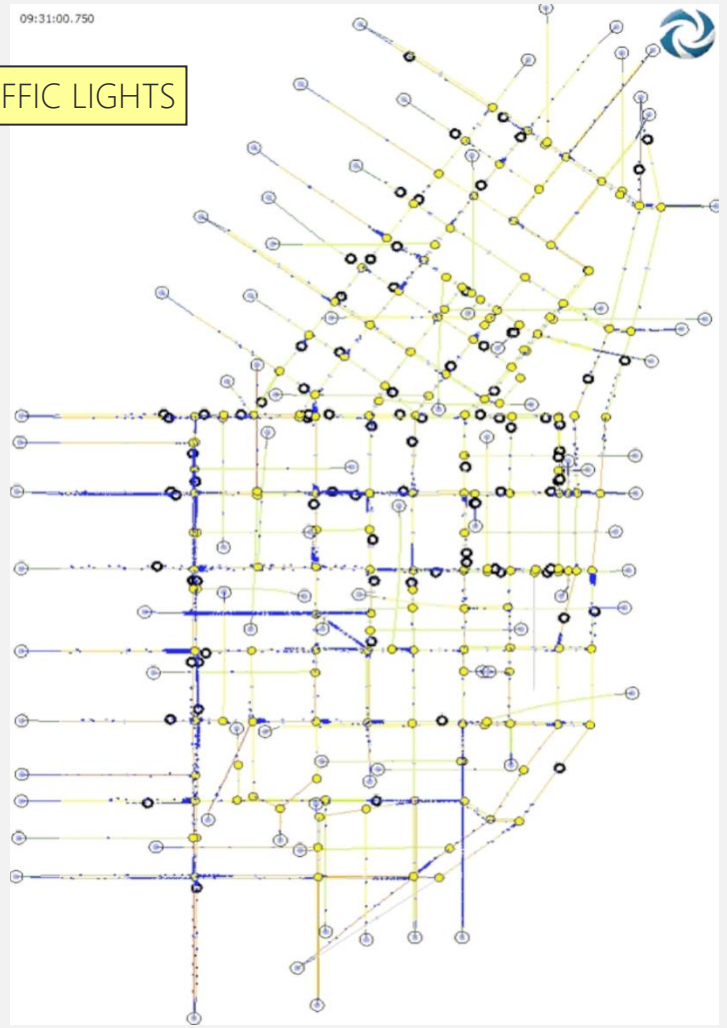

Perimeter Flow Control (Gating)

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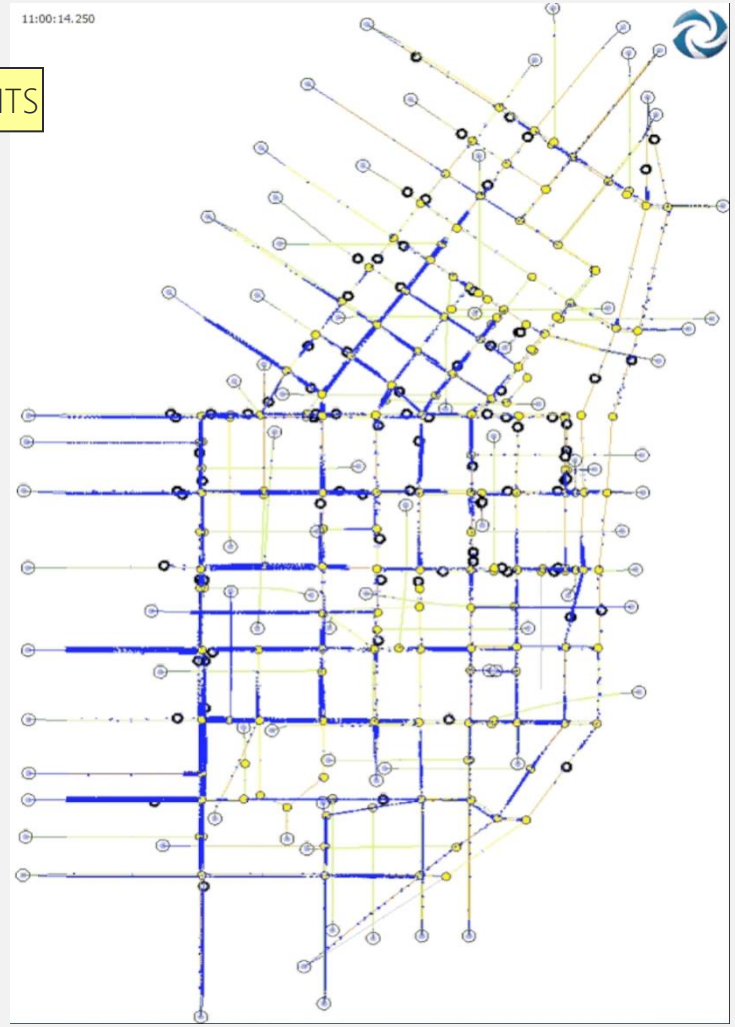

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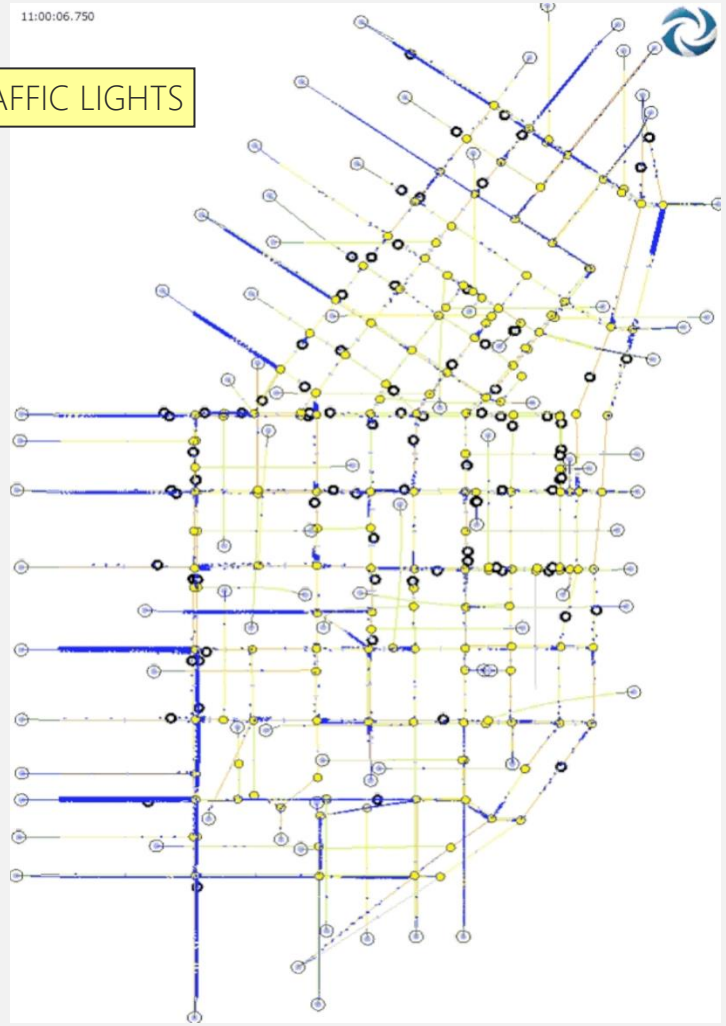
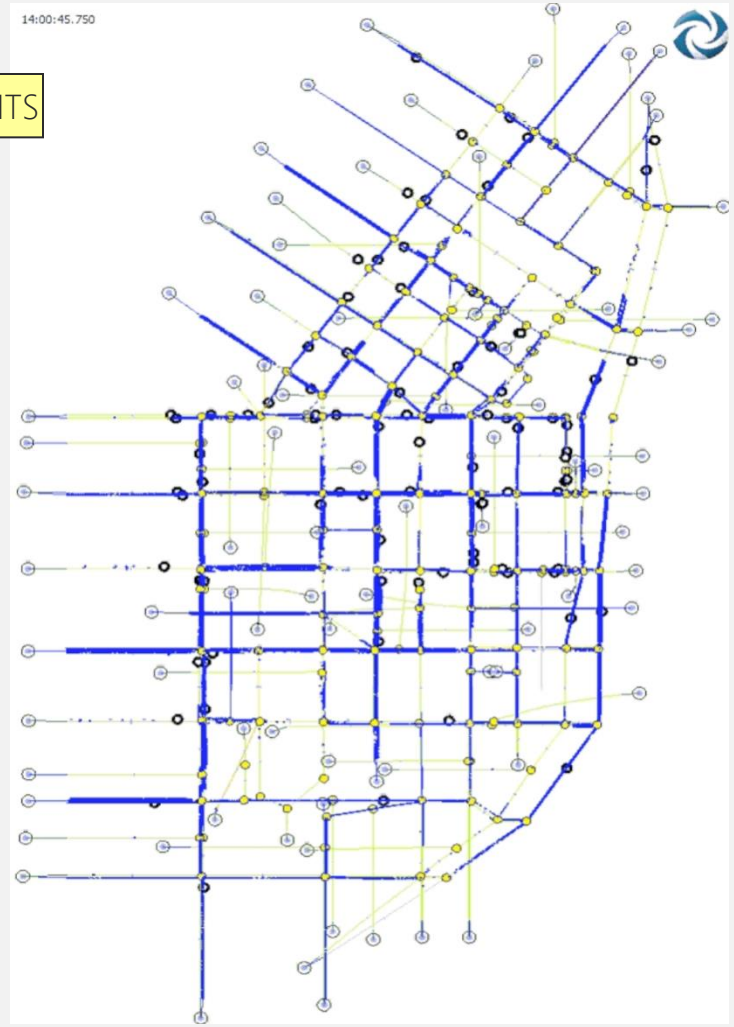


Perimeter Flow Control (Gating)

PRE-TIMED TRAFFIC LIGHTS



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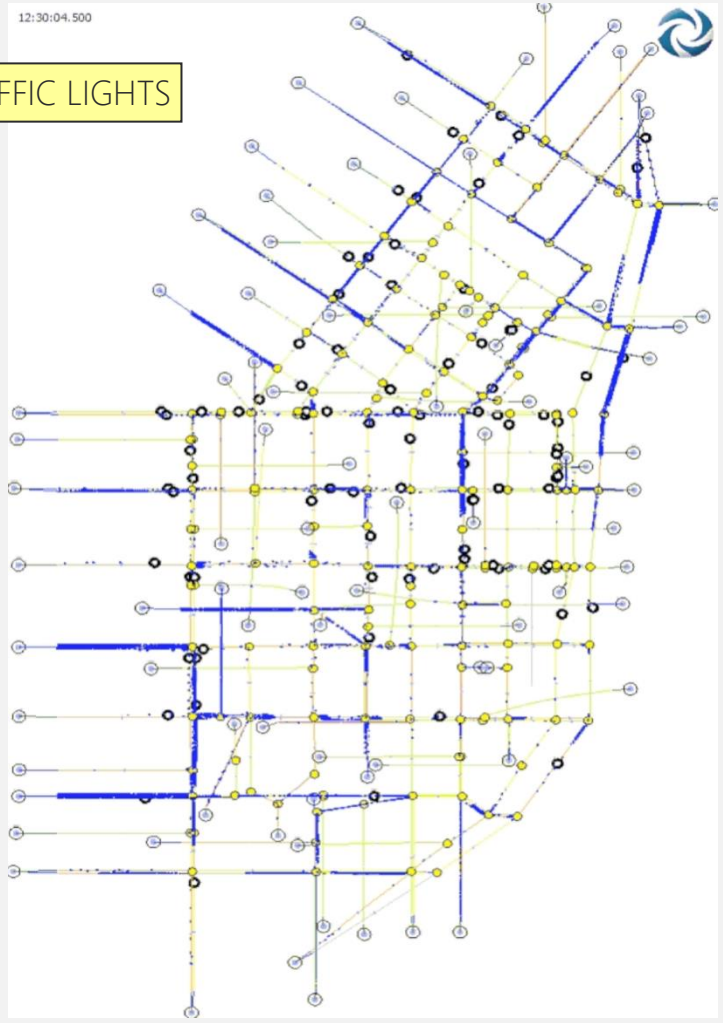
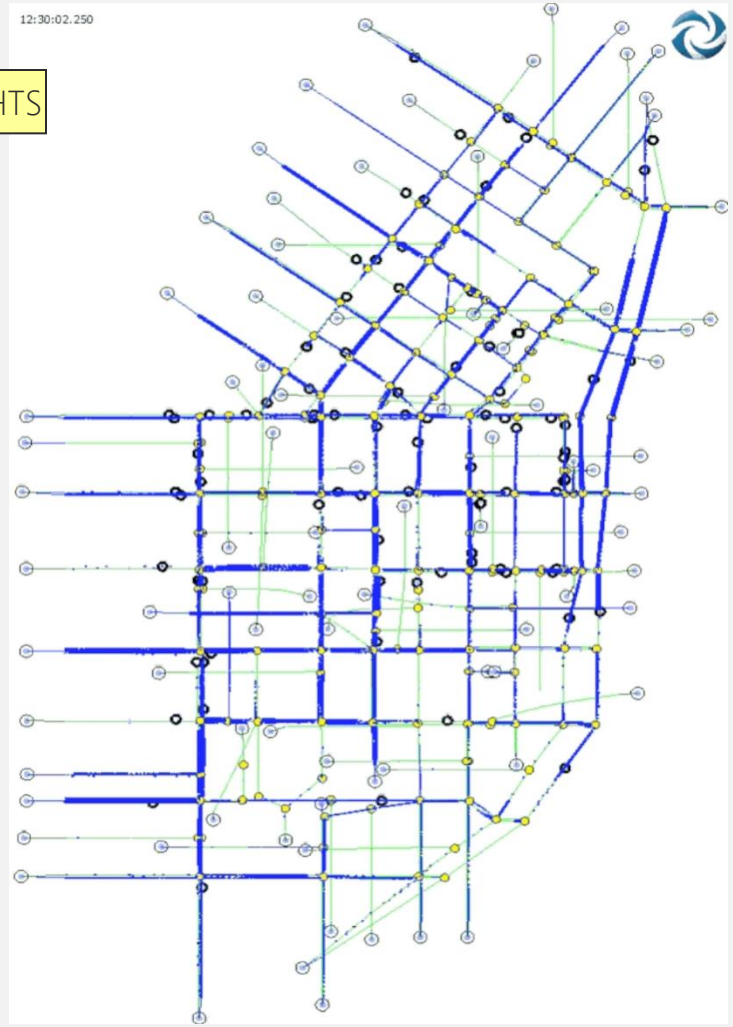


Perimeter Flow Control (Gating)

PRE-TIMED TRAFFIC LIGHTS



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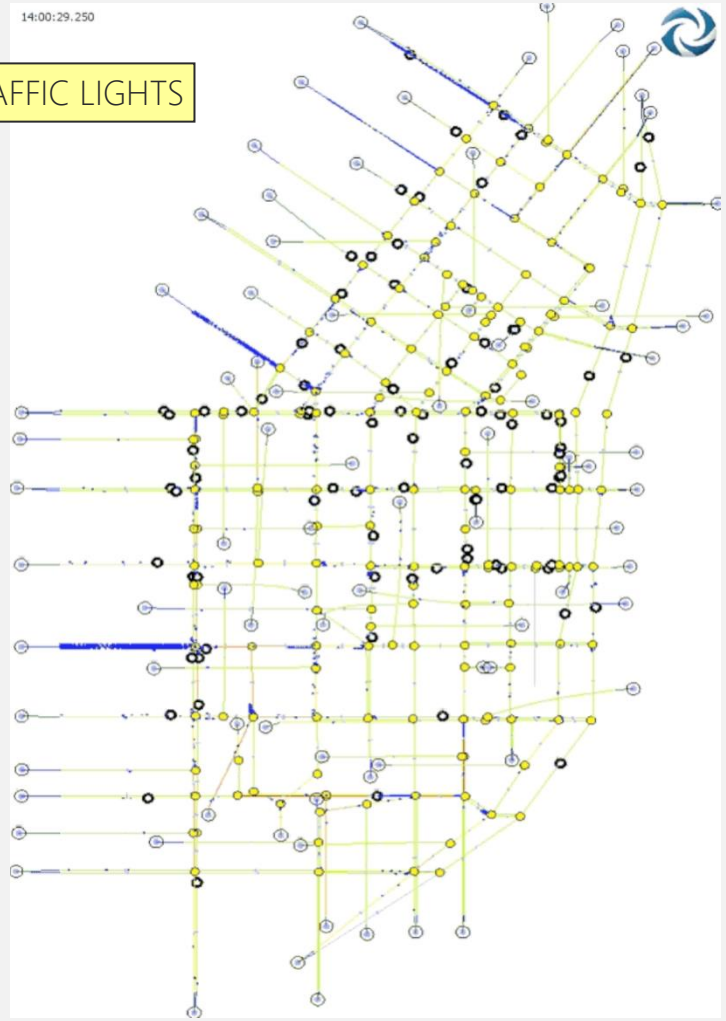

Time to Reflect

Q1. True/False: Gating can improve the network-wide traffic performance?

A. True

B. False

Time to Reflect

Q1. True/False: Gating can improve the network-wide traffic performance?

A. True

References

Austroads (2020). Guide to Traffic Management Part 2: Traffic Theory Concepts. AGTM02-20, Austroads, Sydney, NSW. https://austroads.com.au/publications/traffic-management/agtm02/media/AGTM02-20-Part-2-Traffic-Theory-Concepts.pdf

Austroads (2020). Guide to Traffic Management Part 9: Transport Control Systems – Strategies and Operations. AGTM09-20, Austroads, Sydney, NSW. https://austroads.com.au/publications/traffic-management/agtm09/media/AGTM09-20_Part_9_Transport_Control_Systems_Strategies_and_Operations.pdf

Thank you for participating