

# Technical Memorandum

<b>Title</b>	<b>88 Mill Point Road (Zone Q) Development Proposal – Micro Simulation Modelling Results</b>		
	<b>Micro Simulation Modelling</b>		
<b>Client</b>	City of South Perth	<b>Project No</b>	CW966900
<b>Date</b>	3/11/2016	<b>Status</b>	Rev D
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## Introduction

Cardno have been engaged by the City of South Perth to utilise and update the existing 2021 Station Precinct Micro-Simulation Model (Version 1.4) to evaluate intersection delay at the intersection of Mill Point Road / Labouchere Road and Mill Point Road / Mends Street as a result of the proposed development at 88 Mill Point Road.

The models have previously been developed for the AM and PM peak hour periods, defined as:

- Weekday AM peak hour: 07:30 – 08:30
- Weekday PM peak hour: 16:30 – 17:30

## 88 Mill Point Road

As described in the Transport Assessment for 88 Mill Point Road (dated 23 August 2016), the proposed development is to include the following yields:

- 91 residential apartments comprising a mix of 2 and 3 bed-room apartments
- 524 m<sup>2</sup> café / delicatessen / bakery shop
- 317 m<sup>2</sup> high quality restaurant
- 1,474 m<sup>2</sup> Office
- 260 m<sup>2</sup> wellness centre
- 124 aged care suites (132 beds)
- Child care centre catering for 80 children

## Traffic Generation

Based on surveys and research undertaken for similar developments in similar locations, the following trip generation rates summarised in **Table 1** have been adopted for the purpose of this micro-simulation evaluation. It is noted that the Transport Assessment for the proposed 88 Mill Point Road development did not document the trip generation rates utilised in their report of August 2016.

**Table 1 Adopted Trip Generation Rates**

Land Use	AM Generation Rate		PM Generation Rate	
	City	TA for 88 MPR	City	TA for 88 MPR
Residential Apartments	0.28 trips / apartment	Unknown	0.39 trips / apartment	Unknown
High quality restaurant	0.60 trips / 100 m <sup>2</sup>	Unknown	5.39 trips / 100 m <sup>2</sup>	Unknown
Café	8.68 trips / 100 m <sup>2</sup>	Unknown	8.23 trips / 100 m <sup>2</sup>	Unknown
Office	1.38 trips / 100 m <sup>2</sup> GFA	Unknown	1.33 trips / 100 m <sup>2</sup> GFA	Unknown
Wellness centre	1.10 trips / 100 m <sup>2</sup>	Unknown	2.81 trips / 100 m <sup>2</sup>	Unknown
Child care centre	0.37 trips / child	Unknown	0.30 trips / child	Unknown
Aged Care	0.07 trips / suite	Unknown	0.10 trips / suite	Unknown

## Comments on IDM Data

Intersection Diagnostics Monitor (IDM) data can be collected by any signalised intersection controlled by the Sydney Coordinated Adaptive Traffic System (SCATS) and includes information pertaining to signal phasing and timing.

As westbound vehicles (to the Kwinana Freeway) that originate to the north of Mill Point Road can only reach the Kwinana Freeway by turning right at either of the 2 signalised intersections, limited route choice is available for these vehicles.

A summary of the average cycle times for these signalised intersections is shown in **Table 2**, along with information pertaining to the relevant phase lengths. It is noted that advice from Main Roads WA indicates that any increase to the amount of green time allocated to this phase for the intersection of Mill Point Road / Labouchere Road will not be supported by Main Roads WA.

**Table 2 Intersection Cycle Times and Phase Lengths**

Intersection	Average Cycle Time (s)		Average Right-Turn Phase Time (Northern Approach) (s)	
	AM	PM	AM	PM
Mill Point Road / Labouchere Road	120	130	22	22*
Mill Point Road / Mends Street	120	126	23	30*

\* Filtered right turn; no right turn arrow

## Model Scenarios

As part of this modelling exercise, the following scenarios have been modelled:

- Base 2021 (including all approved / committed developments, excluding 88 Mill Point Road)
- 2021 with development at 88 Mill Point Road

It is noted that both 2021 scenarios do not assume any changes to the existing road network within the study area.

## Approved / Committed Developments

The following committed or approved developments have been accounted for in the Base 2021 (Version 1.4) model demands:

- 12-16 Charles Street
- 7 Lyall Street
- One Richardson (1-3 Richardson Street)
- 6 Lyall Street
- Pinnacles South Perth (30-34 Charles Street)
- South Bank (98 Mill Point Road)
- Southstone Apartments (1 Stone Street)
- Aurelia (96 Mill Point Road)
- 14-18 Hardy Street
- Glasshouse (31 Labouchere Road and 24 Lyall Street)
- 13 Stone Street
- Civic Heart
- Echelon (77-79 South Perth Esplanade)
- 5-7 Harper Terrace
- 26-28A Charles Street
- 2 Harper Terrace
- 152B Mill Point Road
- Millstream Arcade (21 – 23 Mends Street)
- 19 Labouchere Road
- 11 Melville Parade

## Model Results

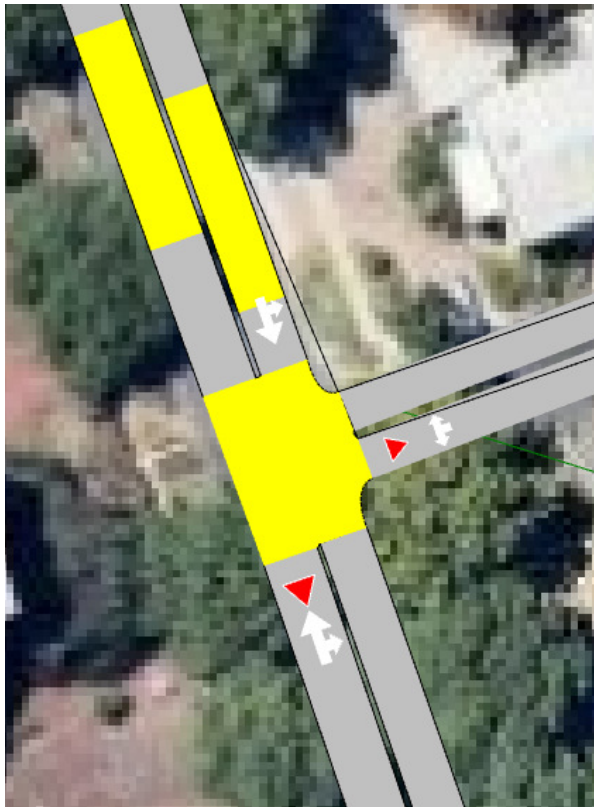
Model outputs, in terms of Link Volume Plots (LVPs) and Link Delay Plots (LDPs) are have been extracted and are shown in **Figure 2 - Figure 5** for the 2021 AM scenarios and in **Figure 6 - Figure 9** for the 2021 PM scenarios.

It is noted that as the models have been set up to allow for dynamic feedback intervals every 15 minutes, increases in model demand inputs can potentially result in localised improvements at some network locations (e.g. northbound on Harper Road) as the travel times for different routes are updated several times over the model period. It is, therefore, emphasised that the LDPs should be interpreted in conjunction with the LVPs to identify where the overall network times have been primarily impacted by the proposed development. It is noted that as the element of 'randomness' in micro-simulation models is, to varying degrees, influenced by all simulation inputs, the dynamic traffic assignment algorithms for each scenario will result in minor variations within the model outputs. The plots for the scenarios that exclude 88 Mill Point Road have therefore been developed after the zone and centroid connector representing 88 Mill Point Road were included in the model and may, therefore, not necessarily be similar to previous model output plots (i.e. from previous versions of the model).

As shown in **Figure 1**, the intersection of Ferry Street / Mill Point Road has been coded as a 'yellow box' which ensures that vehicles do not queue within the intersection, thereby reducing the risk of vehicles turning right from Mill Point Road to Ferry Street being unable to turn due to the southbound queues at the intersection of Mill Point Road / Labouchere Road extending past the intersection of Ferry Street / Mill Point Road.

It is also noted that the existing bus stop on Mill Point Road that is located directly opposite of Ferry Street has been assumed to be relocated slightly to the north to avoid blocking the intersection of Ferry Street / Mill Point Road.

**Figure 1** Modelled 'Yellow Box' for Intersection of Mill Point Road / Ferry Street and Relocated Bus Stop



Source: 2021 Station Precinct Micro-Simulation Model (version 1.4)

Figure 2 2021 AM Link Delay Plot (seconds) – Committed Developments Only (Excluding 88 Mill Point Road)



**Figure 3 2021 AM Link Delay Plot (seconds) – Committed Developments and 88 Mill Point Road**



**Figure 4 2021 AM Link Volume Plot (vehicles) – Committed Developments Only (Excluding 88 Mill Point Road)**



Figure 5 2021 AM Link Volume Plot (vehicles) – Committed Developments and 88 Mill Point Road





**Figure 6 2021 PM Link Delay Plot (seconds) – Committed Developments Only (Excluding 88 Mill Point Road)**



Figure 7 2021 PM Link Delay Plot (seconds) – Committed Developments and 88 Mill Point Road



Figure 8 2021 PM Link Volume Plot (vehicles) – Committed Developments Only (Excluding 88 Mill Point Road)



Figure 9 2021 PM Link Volume Plot (vehicles) – Committed Developments and 88 Mill Point Road



A summary of the average intersection delays is shown in **Table 3**.

**Table 3 Intersection Average Delays – 2021**

Scenario			Southbound Delay (s)	
			Mill Point Road / Labouchere Road	Mill Point Road / Mends Street
2021 Developments (excluding 88 MPR)	Committed Only	AM	86	322*
		PM	64	325*
2021 Developments including 88 MPR	Committed	AM	151	346*
		PM	93	321*

\* Queue lengths occasionally extending to South Perth Esplanade and therefore exceed the delay times in the above table

## Queue Lengths

The maximum modelled southbound queue lengths for the 2021 scenarios for the intersections of Mill Point Road / Labouchere Road and Mill Point Road / Mends Street are summarised in **Table 4**.

**Table 4 Intersection Maximum Queue Lengths – 2021**

Scenario			Maximum Southbound Queue Length (vehicles)	
			Mill Point Road / Labouchere Road	Mill Point Road / Mends Street
2021 Developments (excluding 88 MPR)	Committed Only	AM	19	27*
		PM	14	27*
2021 Developments including 88 MPR	Committed	AM	28	27*
		PM	20	27*

\* Queue lengths occasionally extending to South Perth Esplanade and therefore exceed the delay times in the above table

## Discussion of Results

The increase in traffic volumes within the study area due to the proposed development of 88 Mill Point Road were found to have a substantial impact on queues and delays on the southbound intersection approach for the intersection of Mill Point Road / Labouchere Road for both the AM and PM peak hours due to the limited opportunities for these vehicles to get to the Kwinana Freeway. While the intersection of Mill Point Road / Mends Street is also impacted, this intersection is not impacted to the same extent of the intersection of Mill Point Road / Labouchere Road.

As the southbound queue lengths on Mill Point Road currently extend past Ferry Street (as shown in **Figure 10** and **Figure 11**), this could result in vehicles queuing through the intersection of Ferry Street / Mill Point Road, which would result in northbound vehicles on Mill Point Road being unable to turn right from Mill Point Road to Ferry Street.

In extreme circumstances, this has the potential to cause queues that extend from Ferry Street to the intersection of Mill Point Road / Labouchere Road.

**Figure 10 Existing Southbound Queue Lengths on Mill Point Road Extending Past Ferry Street**



**Figure 11 Existing Southbound Queue Lengths on Mill Point Road Extending Past Ferry Street**



## Conclusion

The impact of the proposed 88 Mill Point Road development was primarily found to be at the intersection of Mill Point Road / Labouchere Road and to a lesser extent at the intersection of Mill Point Road / Mends Street.

Due to the cumulative traffic impacts by the proposed developments in the 2021 Scenarios on the key intersections within the study area and the constrained nature of the area, it is not considered feasible to adequately increase the capacity of the key intersections within the study area.

Alternatively, if the proposed development is to be considered for approval, it is recommended that the development of an area-wide Development Contribution Plan (DCP) be undertaken to include funding for the following (but not limited to) potential items:

- > Promotion of alternate transport modes and provision of additional pedestrian and cycling infrastructure
- > Increase frequencies of key public transport services within the study area (including ferries)
- > Undertake a parking study to ensure appropriate (reduced) parking requirements are promoted for the area, as well as identify effective on-street / off-street parking management strategies and enforcement.
- > Undertake area-wide transport study to maximise connectivity and safety for local residents and visitors to pass through and walk/cycle around the Precinct.
- > Capital works as required in the immediate area.