

Guide to Traffic Impact Assessment Case Studies

Please note these case studies are for illustrative purposes only, they are not actual proposals

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Prepared by

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Case Studies

1. Case study 1: Urban context – impacts on over capacity base network
2. Case study 2: Large hardware retailer in under capacity road network
3. Case study 3: Large quarry in rural area
4. Case study 4: Small residential development in under capacity road network



Guide to Traffic Impact Assessment

Replaces the *Guidelines for Assessment of Road Impacts of Development (GARID)*

Guide to Traffic Impact Assessment 2017

This document will support planning and development decisions under the *Planning Act 2016* (and superseded planning legislation such as the *Sustainable Planning Act 2009*), the *State Development and Public Works Organisation Act 1971*, the *Environmental Protection Act 1994* and the *Economic Development Act 2012*.

This document will also support notifiable road use decisions under the *Mineral and Energy Resources (Common Provisions) Act 2014*, *Greenhouse Gas Storage Act 2009* and the *Petroleum Act 1923*.

Please note reference to legislation and supporting planning instruments such as the *State Development Assessment Provisions* may change.

Comments, suggestions for changes, further inclusions or errors can be submitted to planningpolicy@tmr.qld.gov.au.



WORKED CASE STUDY

Case Study 1: Urban context – impacts on over capacity base network

Step 1: Introduction

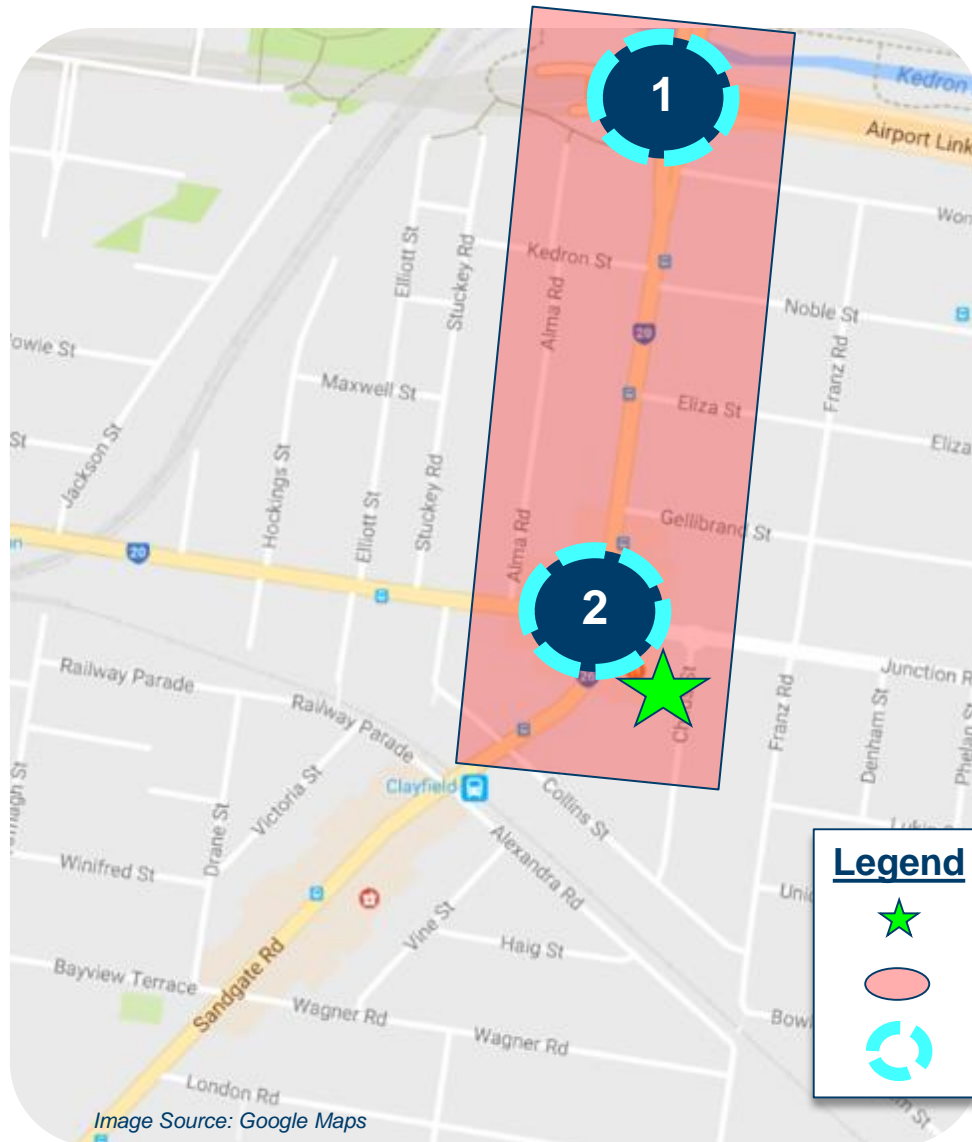




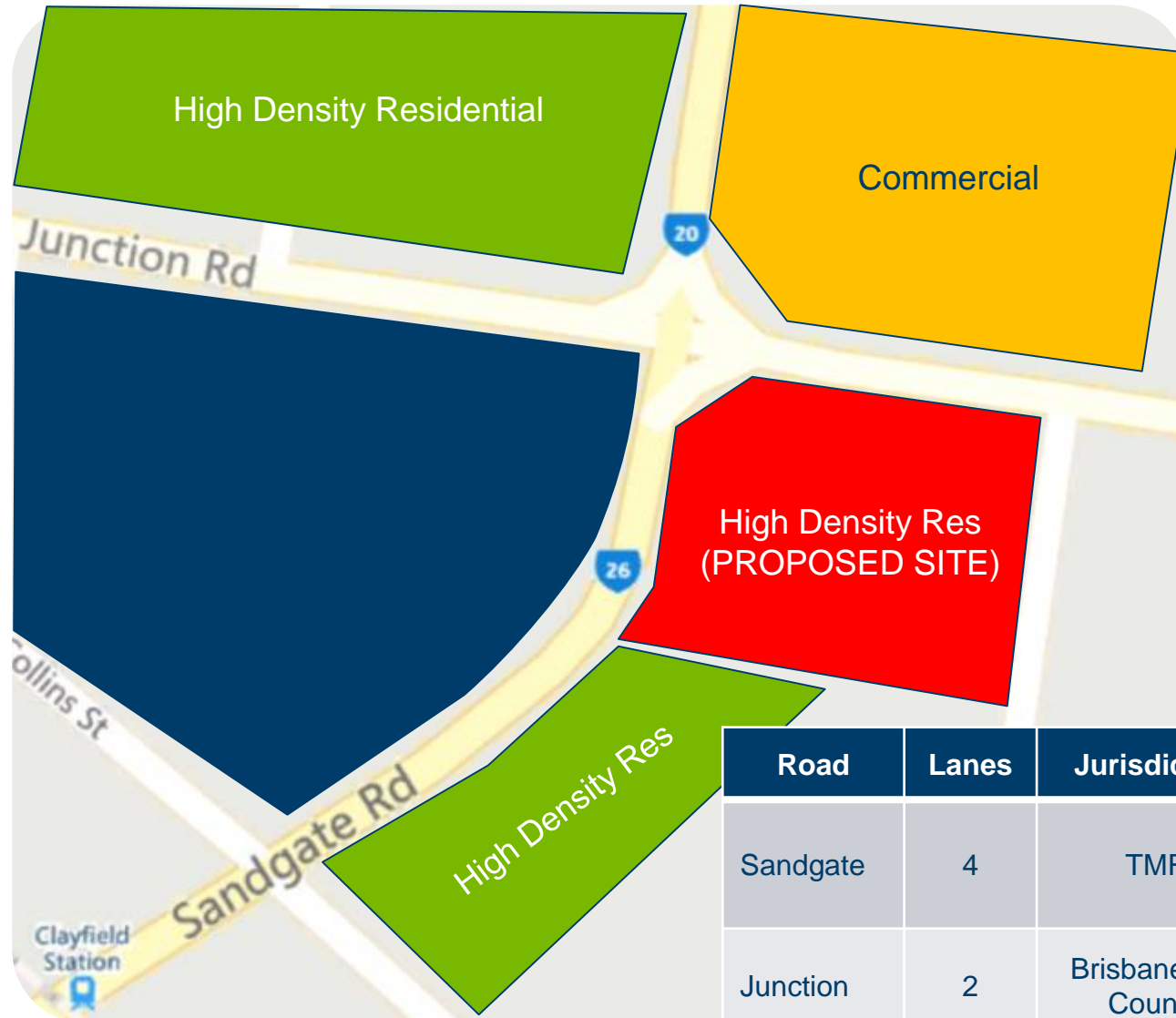
Image Source: Google Maps

Legend

-  Site Location
-  Study Area
-  Key Intersections

TIA Item	Assessment
Background Info	✓
Scope and Study Area	✓
Pre-lodgement Meeting Notes: <ul style="list-style-type: none"> - Over capacity road network - Built-up, dense environment 	

Step 2: Existing conditions



TIA Item	Assessment
Land use and Zoning	✓
Adjacent Land Uses/Approvals	✓
Surrounding Road Details	✓

Road	Lanes	Jurisdiction	Divided	Speed	Comment
Sandgate	4	TMR	Yes	70kph	Major Arterial
Junction	2	Brisbane City Council	Yes	60kph	Sub Arterial

Step 2: Existing conditions

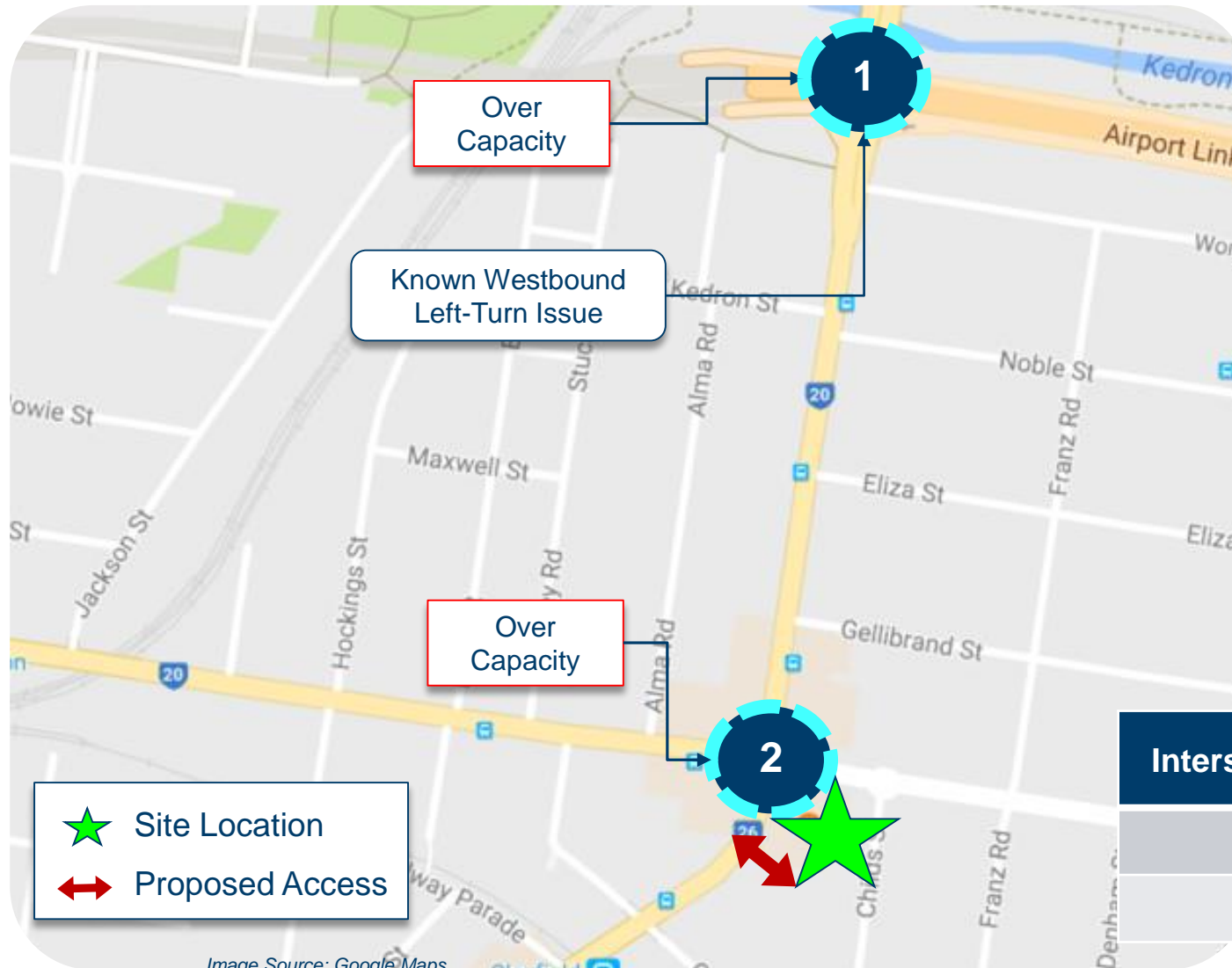
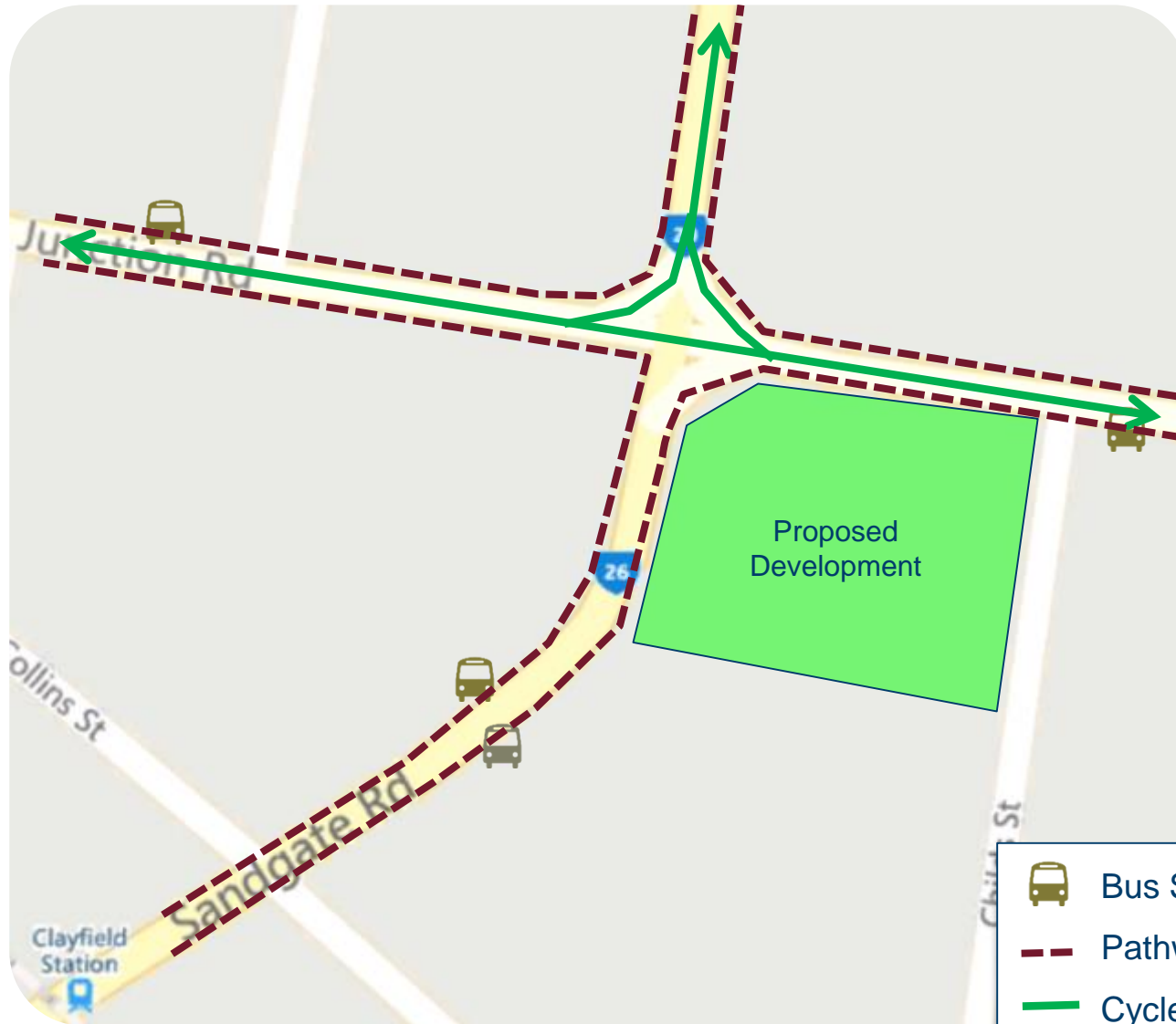


Image Source: Google Maps

TIA Item	Assessment
Traffic Volumes	✓
Intersection and Network Performance	✓
Road Safety Issues	✓
Site Access	✓

Intersection	Recent Data Available?
1	Yes (2015 Data)
2	Yes (2015 Data)

Step 2: Existing conditions



TIA Item	Assessment
Public Transport	✓
Active Transport	✓
Parking	NA
Pavement	NA
Transport Infrastructure	NA

-  Bus Stop
-  Pathway
-  Cycle Lane

Step 3: Proposed development details






Image Source: www.q1.com.au



- ❖ **2018 Year of Opening**
- ❖ **25 Storey High Rise**
- ❖ **250 Residential Units**
- ❖ **100 Peak Hour Trips**
- ❖ **250 Parking Spaces**
- ❖ **Access via state-controlled road**

TIA Item	Assessment
Development Site Plan	✓
Operational Details	✓
Proposed Access and Parking	✓

Step 4: Development traffic

Trip Generation Rate	0.4 trips per unit		
Peak Hour Trips	100 peak hour trips		
IN/OUT Split 	AM		
	PM		

TIA Item	Assessment
Traffic Generation	✓
Trip Distribution	✓

Sourced from RMS Technical Direction

Image Source: huffingtonpost.com

Step 4: Development traffic



TIA Item	Assessment
Development Traffic Volumes on Network	✓
Notes: Distribution is based on: ❖ <i>Traffic Survey Data</i>	

Step 5: Impact assessment and mitigation

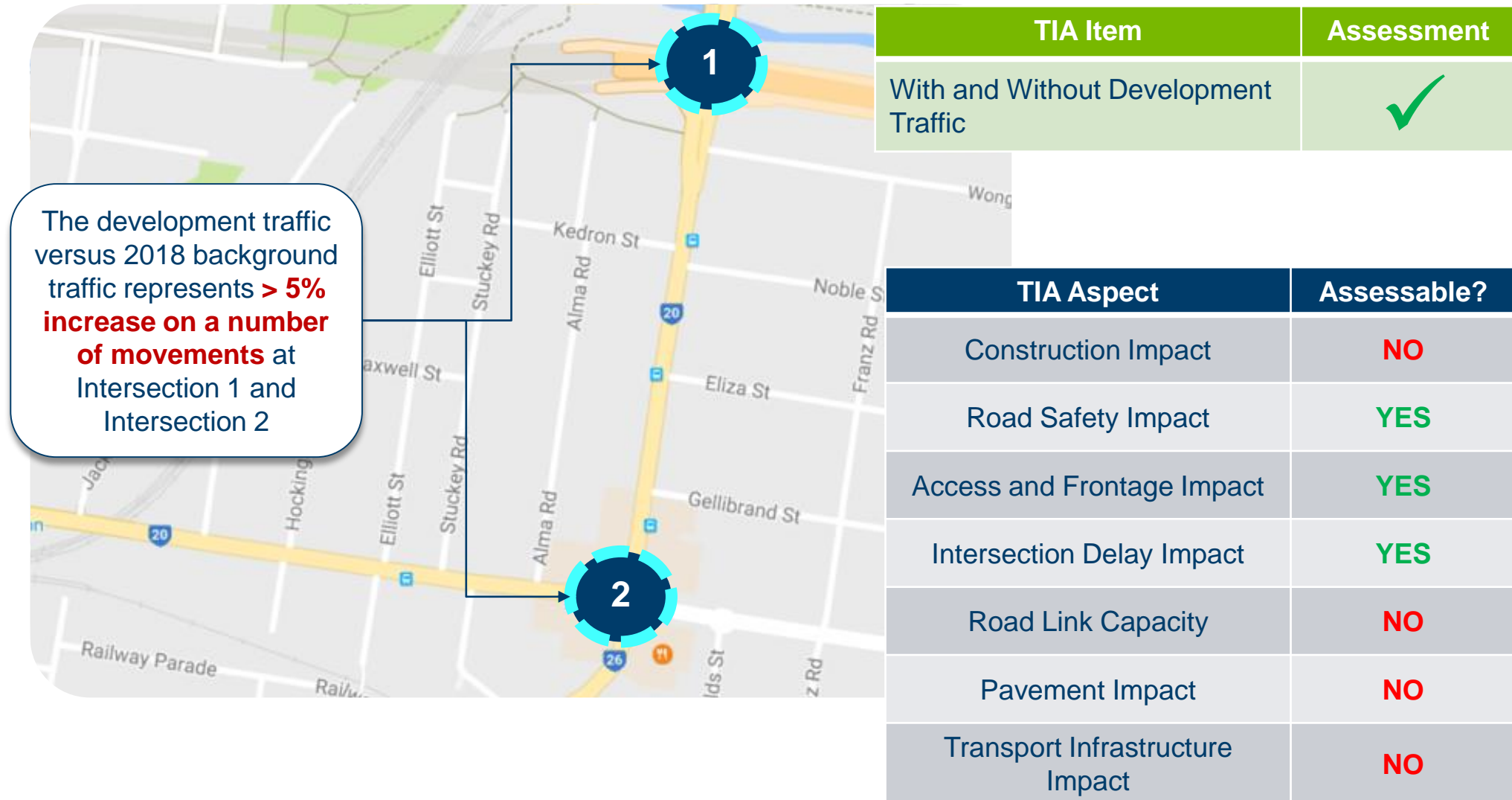



Image Source: Google Maps

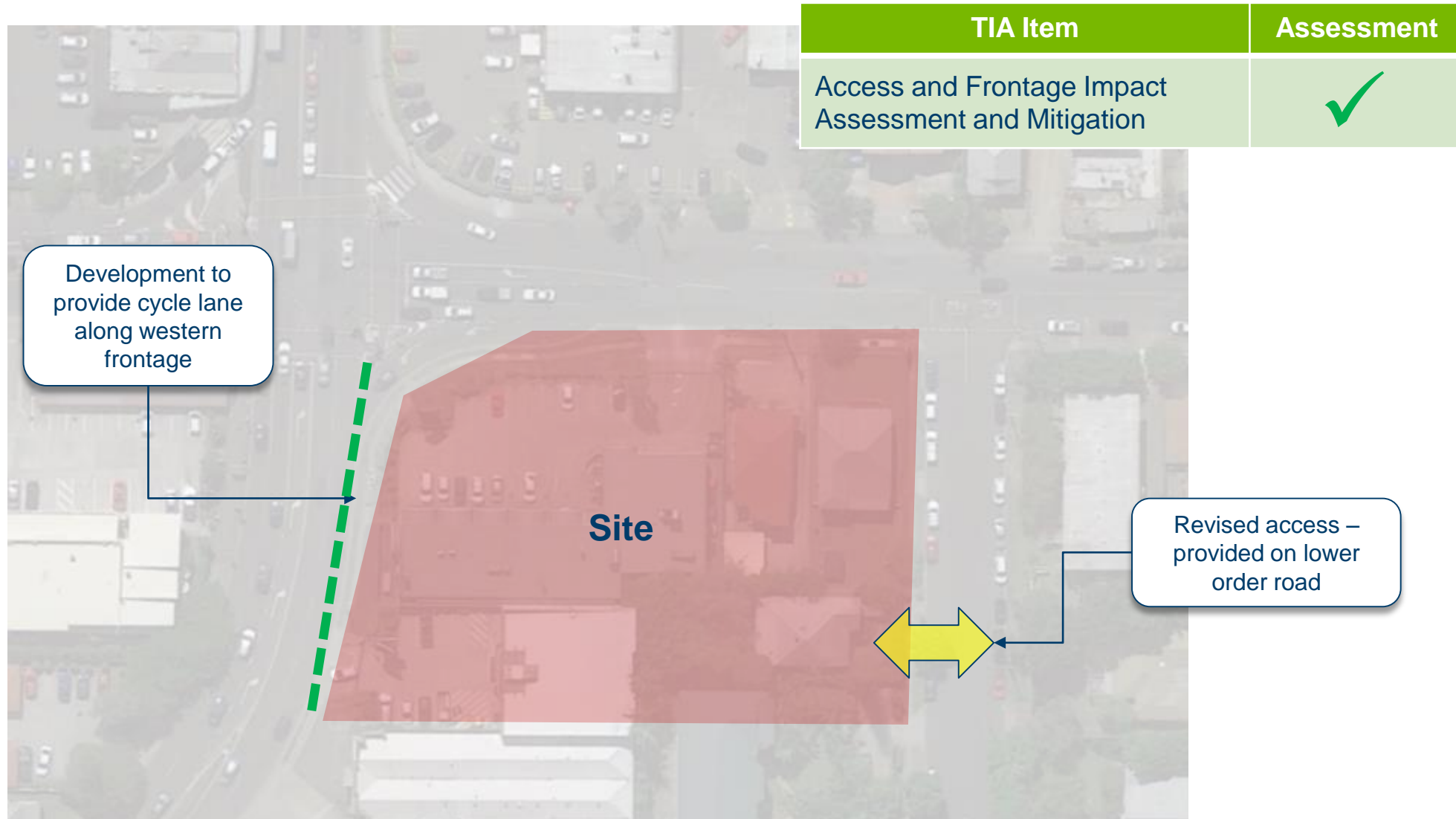
Step 5: Impact assessment and mitigation

Risk Item	Without development			With Development		
	Likelihood	Consequence	Result	Likelihood	Consequence	Result
Westbound left-turn at Intersection 1 queues into adjacent through lane during PM peak	5	2	M	5	2	M
Proposed site access directly from SCR – no ability to signalise access due to proximity to adjacent signalised intersection	1	1	L	4	2	M

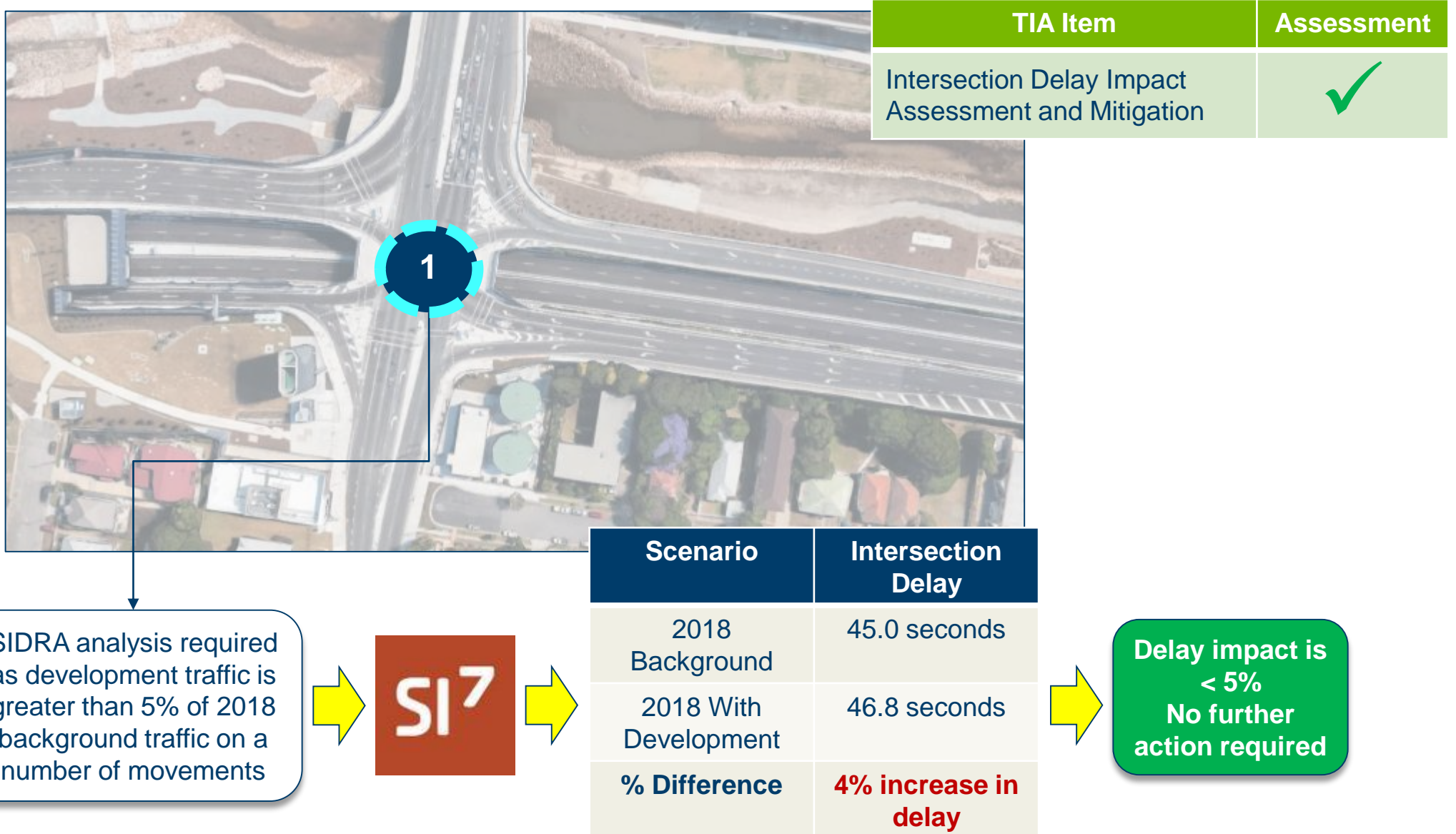
Risk Item	Mitigation	With Development + Mitigation		
		Likelihood	Consequence	Result
Westbound left-turn at Intersection 1 queues into adjacent through lane during PM peak	No Action	-	-	-
Proposed site access directly from SCR – no ability to signalise access due to proximity to adjacent signalised intersection	“Avoid” – Access to be taken from lower order road	1	1	L

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	

Step 5: Impact assessment and mitigation



Step 5: Impact assessment and mitigation



Step 5: Impact assessment and mitigation



TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

SIDRA analysis required as development traffic is greater than 5% of 2018 background traffic on a number of movements



Scenario	Intersection Delay
2018 Background	45.0 seconds
2018 With Development	54.0 seconds
% Difference	20% <u>increase</u> in delay

Delay impact is > 5% Investigate "Avoid, Manage or Mitigate" options

Step 5: Impact assessment and mitigation



TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

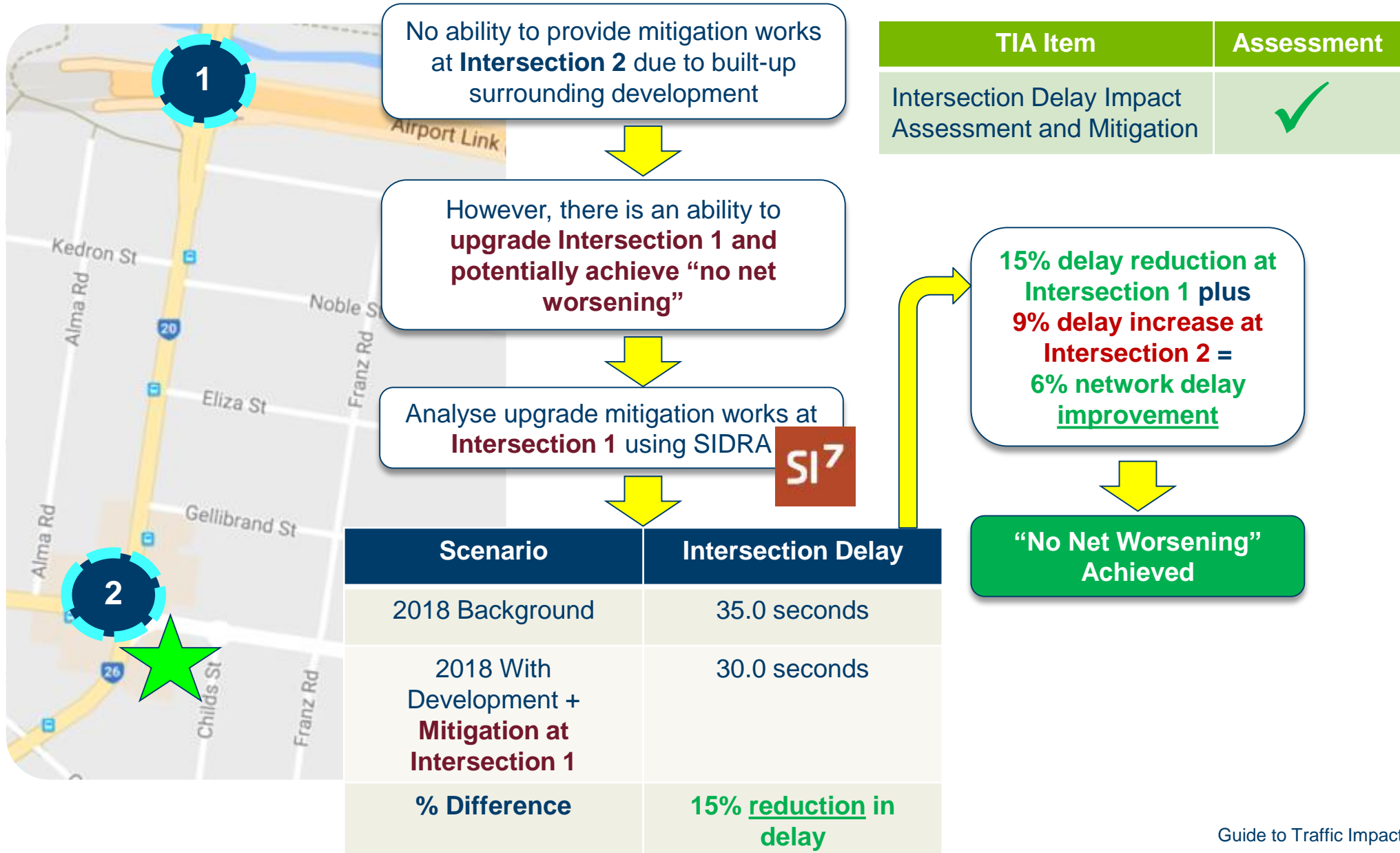
Proposed “**Manage**” option to include a reduction in on-site car parking as a Travel Demand Measure (TDM) – **reduces development trip generation by 15%**



Scenario	Intersection Delay
2018 Background	45.0 seconds
2018 With Development + TDM	50.0 seconds
% Difference	9% <u>increase</u> in delay

**Delay impact remains > 5%
Investigate further options to reduce delay impact**

Step 5: Impact assessment and mitigation



Step 5: Impact assessment and mitigation

Assess the need for a road safety assessment or audit for the proposed upgrade works at Intersection 1

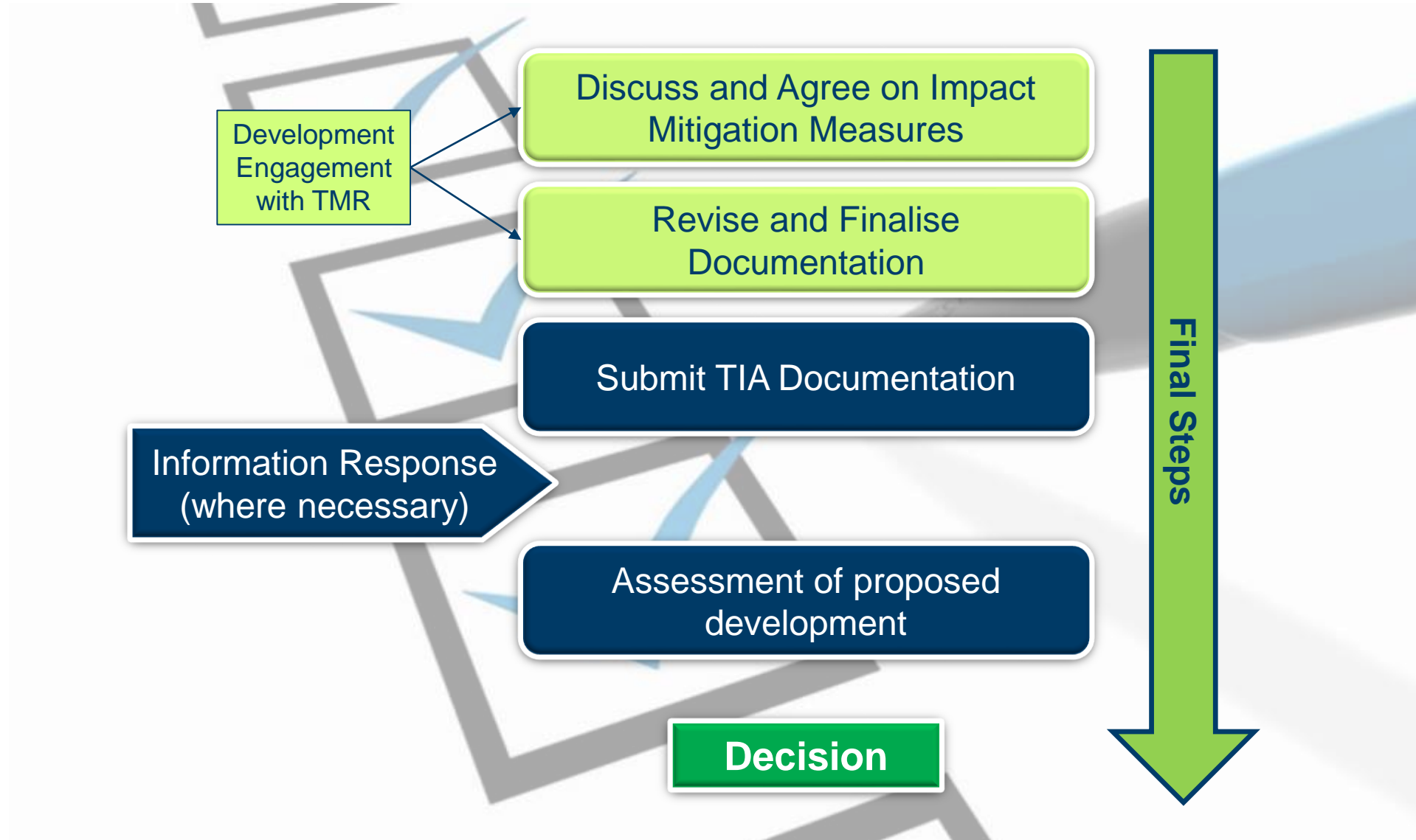
Traffic Volume (AADT)	Speed (kph)		
	Up to 50kph	60kph to 70kph	80kph +
≤ 8000	Low	Medium	Medium
≥ 8000	Medium	Medium	High

Development Type	Road Environment Safety Rating		
	Low	Medium	High
Major Development	Road Safety Assessment	Road Safety Audit	Road Safety Audit
Planning Act Development	Road Safety Assessment	Road Safety Assessment	Road Safety Audit

A Road Safety Assessment is required to be undertaken for the proposed upgrade works at Intersection 1

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Impact mitigation measures, finalisation and submission



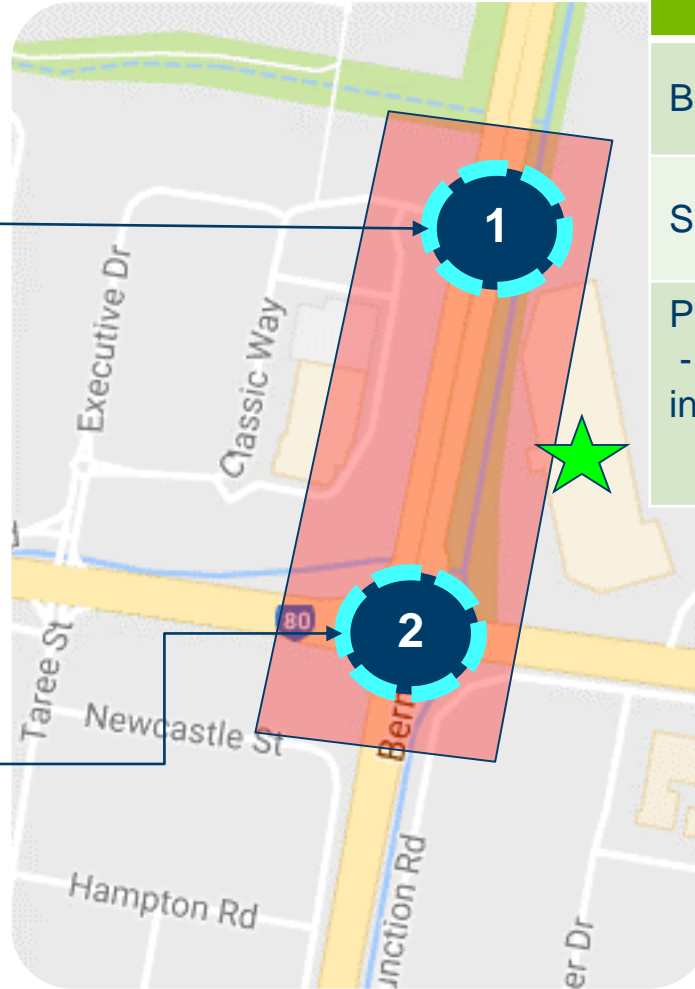
WORKED CASE STUDY

Case Study 2: Large hardware retailer in under capacity road network

Step 1: Introduction



Image Source: Google Maps

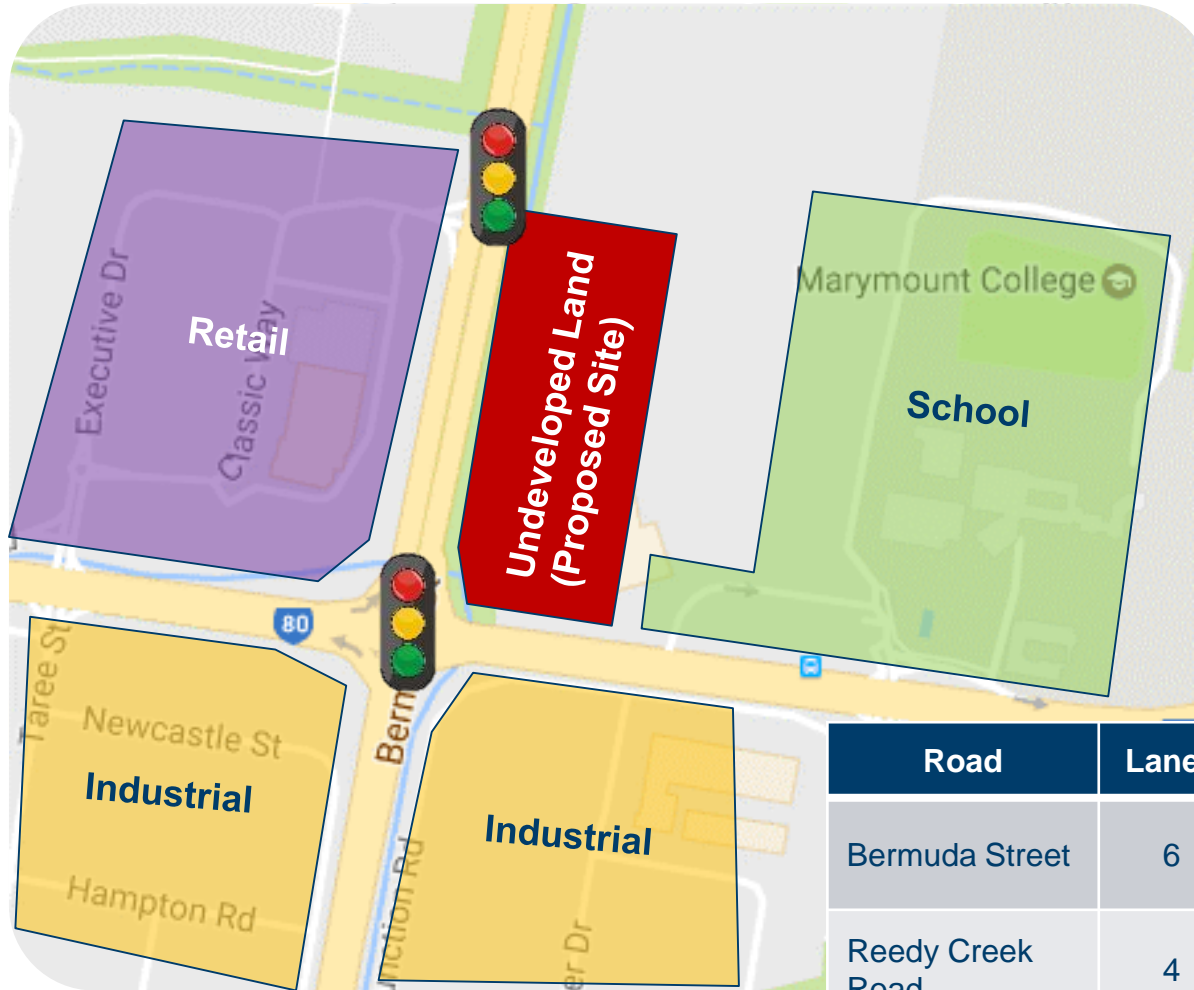


TIA Item	Assessment
Background Info	✓
Scope and Study Area	✓
Pre-lodgement Meeting Notes: - analysis required for the signalised intersections of Intersection 1 and Intersection 2	

Legend

- ★ Site Location
- Study Area
- ⦿ Key Intersections

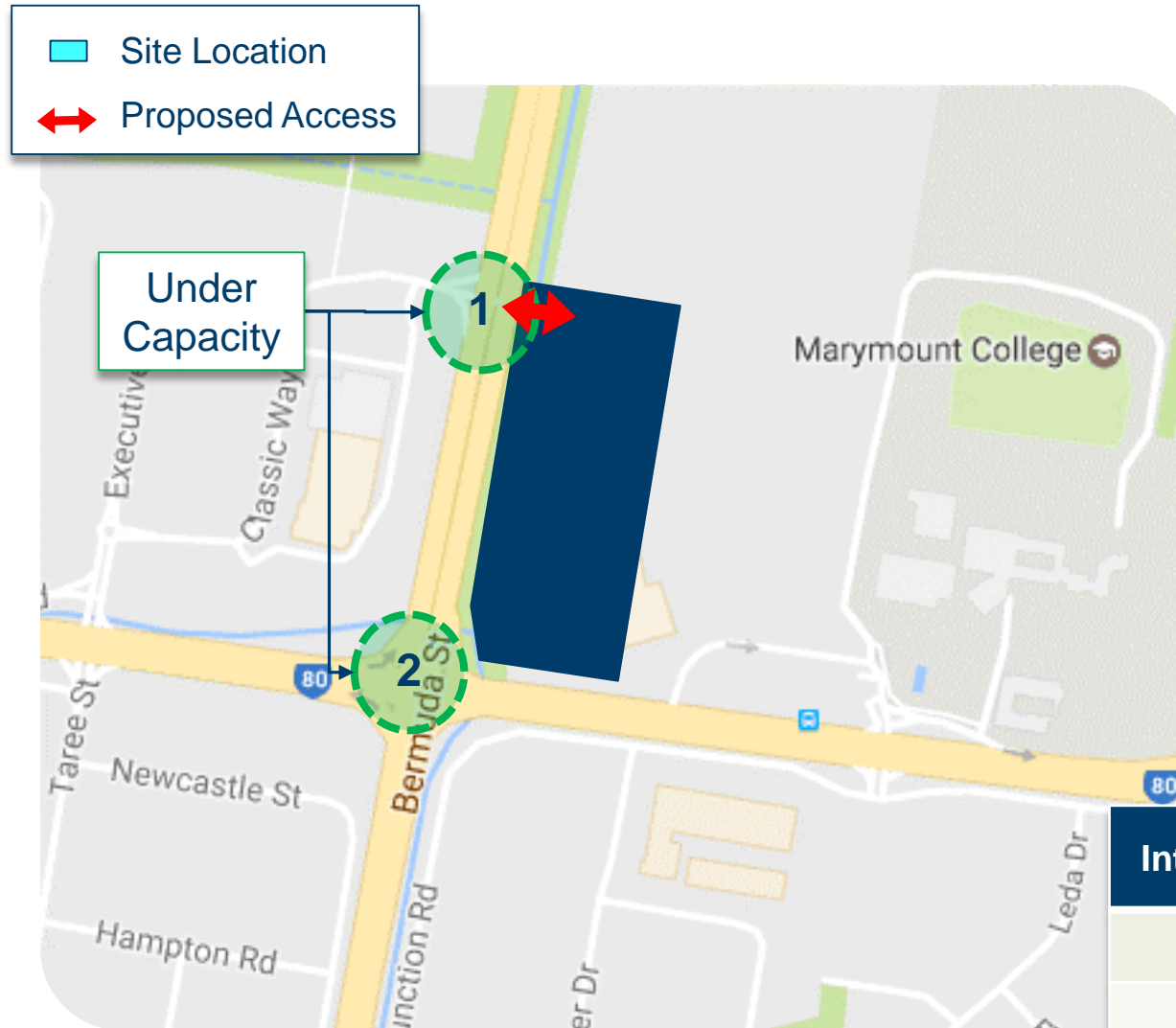
Step 2: Existing conditions



TIA Item	Assessment
Land use and Zoning	✓
Adjacent Land Uses/Approvals	✓
Surrounding Road Details	✓

Road	Lanes	Jurisdiction	Divided	Speed	Comment
Bermuda Street	6	TMR	Yes	70kph	Major Arterial
Reedy Creek Road	4	TMR	Yes	80kph	Major Arterial

Step 2: Existing conditions



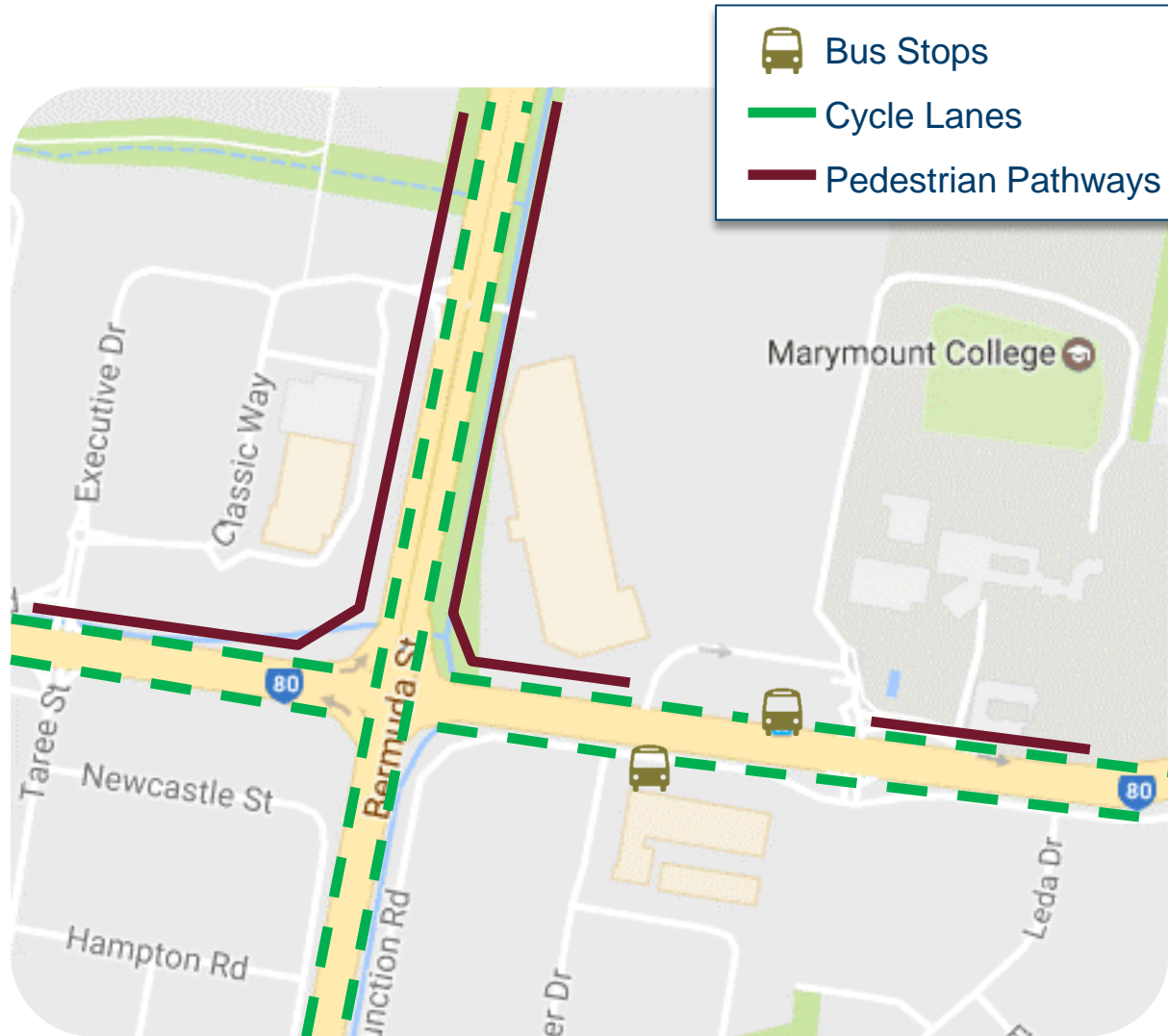
TIA Item	Assessment
Traffic Volumes	✓
Intersection and Network Performance	✓
Road Safety Issues	✓
Site Access	✓

Notes:

- No current road safety issues;
- Recent traffic survey data used.

Intersection	Recent Data Available?
1	Yes (2015 Data)
2	Yes (2015 Data)

Step 2: Existing conditions



TIA Item	Assessment
Public Transport	✓
Active Transport	✓
Parking	NA
Pavement	NA
Transport Infrastructure	NA



Step 3: Proposed development details

- ❖ **2018 Year of Opening**
- ❖ **12,600m² GFA Bulky Goods Retailer**
- ❖ **340 Peak Vehicle Trips**
- ❖ **350 Parking Spaces**
- ❖ **Access on major road**



TIA Item	Assessment
Development Site Plan	✓
Operational Details	✓
Proposed Access and Parking	✓
Notes: the morning site peak hour during weekdays does not generally coincide with the network peak hour	

Step 4: Development traffic

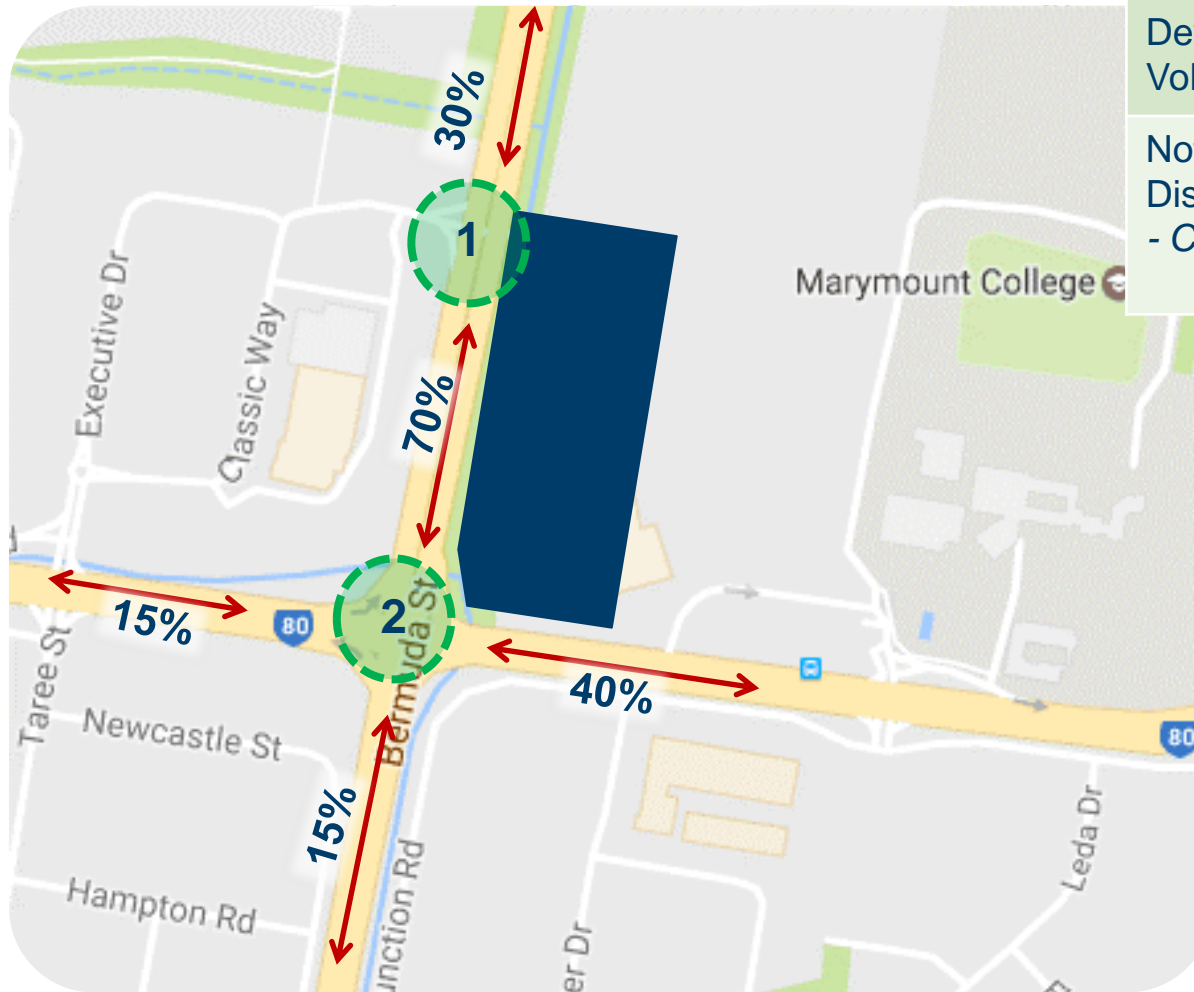
Item	Result	
Trip Generation Rate	2.7 trips per 100m ²	
Peak Hour Trips	2.7 x 12,600m ² GFA = 340 peak hour trips	
IN/OUT Split	AM	PM
		

TIA Item	Assessment
Traffic Generation	✓
Trip Distribution	✓

Sourced from RMS Technical Note

Image Source: huffingtonpost.com

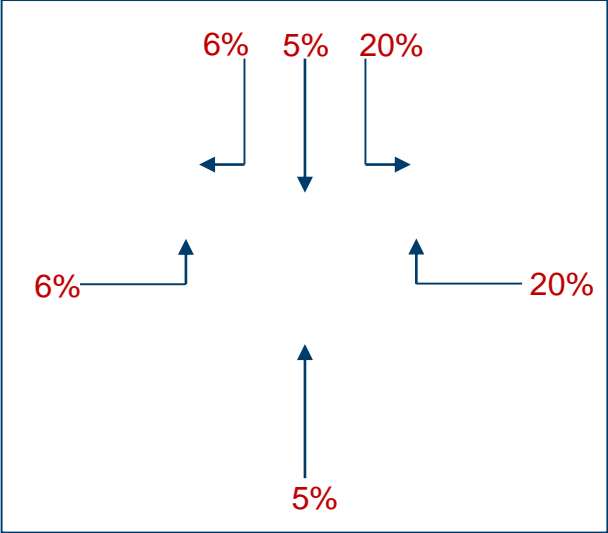
Step 4: Development traffic



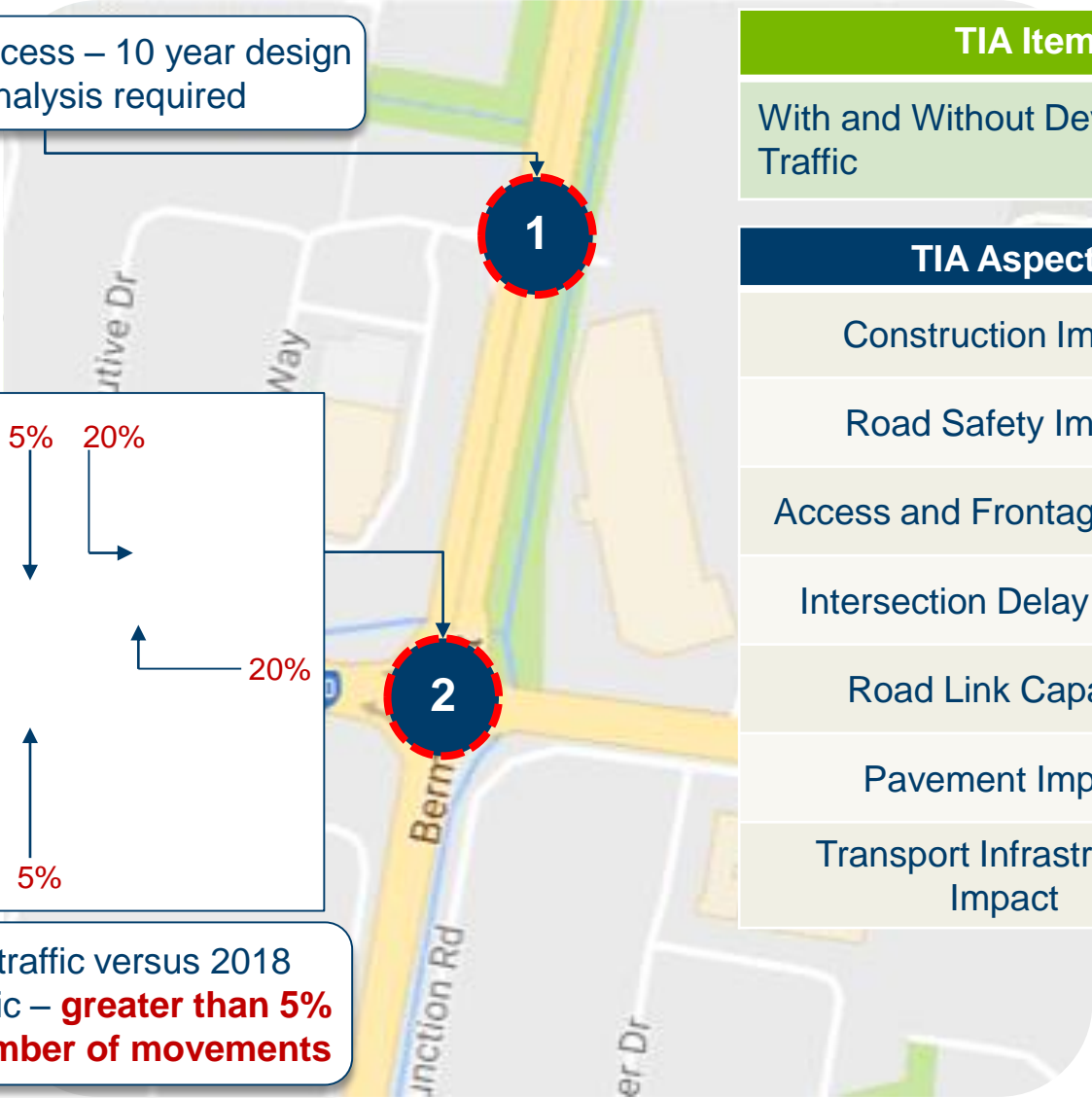
TIA Item	Assessment
Development Traffic Volumes on Network	✓
Notes: Distribution is based on: - Catchment Analysis	

Step 5: Impact assessment and mitigation

Development access – 10 year design horizon analysis required



Development traffic versus 2018 background traffic – **greater than 5% impact on a number of movements**



TIA Item	Assessment
With and Without Development Traffic	✓

TIA Aspect	Assessable?
Construction Impact	NO
Road Safety Impact	YES
Access and Frontage Impact	YES
Intersection Delay Impact	YES
Road Link Capacity	NO
Pavement Impact	NO
Transport Infrastructure Impact	NO

Step 5: Impact assessment and mitigation

Risk Item	Without Development			With Development		
	Likelihood	Consequence	Result	Likelihood	Consequence	Result
Westbound right-turn at Intersection 2 queuing into adjacent through lane	1	2	L	5	2	M

Risk Item	Mitigation	With Development + Mitigation		
		Likelihood	Consequence	Result
Westbound right-turn at Intersection 2 queuing into adjacent through lane	Extend or duplicate the right-turn lane to cater for the increased right-turn demand	1	2	L

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Step 5: Impact assessment and mitigation

Traffic Volume (AADT)	Speed (kph)		
	Up to 50kph	60kph to 70kph	80kph +
≤ 8000	Low	Medium	Medium
≥ 8000	Medium	Medium	High

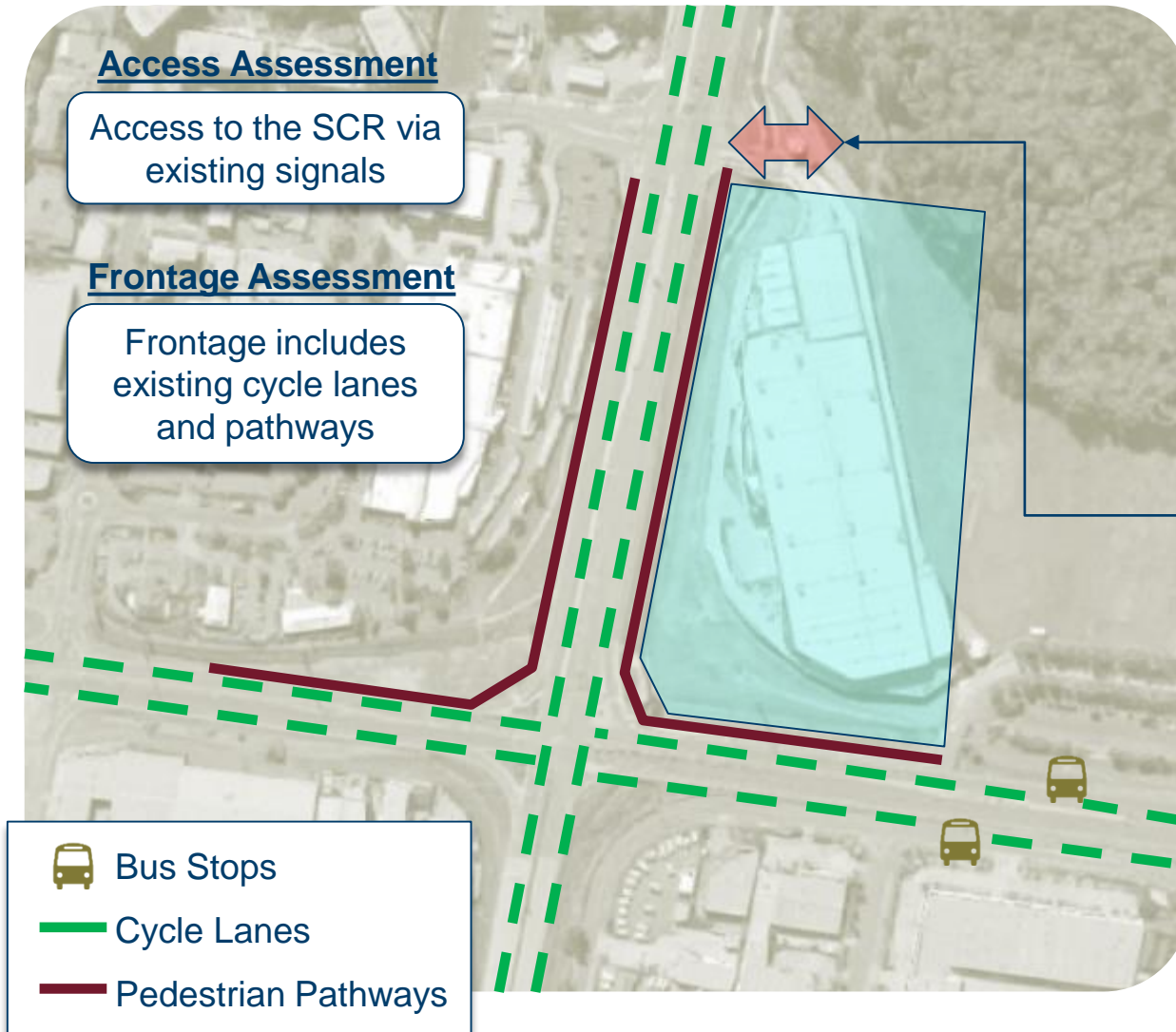
Reedy Creek Road Traffic Volumes ≥ 8000
Reedy Creek Road Speed Limit 80kph

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Development Type	Road Environment Safety Rating		
	Low	Medium	High
Major Development	Road Safety Assessment	Road Safety Audit	Road Safety Audit
Planning Act Development	Road Safety Assessment	Road Safety Assessment	Road Safety Audit

A Road Safety Audit is required to be undertaken for the extension/ duplication of right-turn lane

Step 5: Impact assessment and mitigation

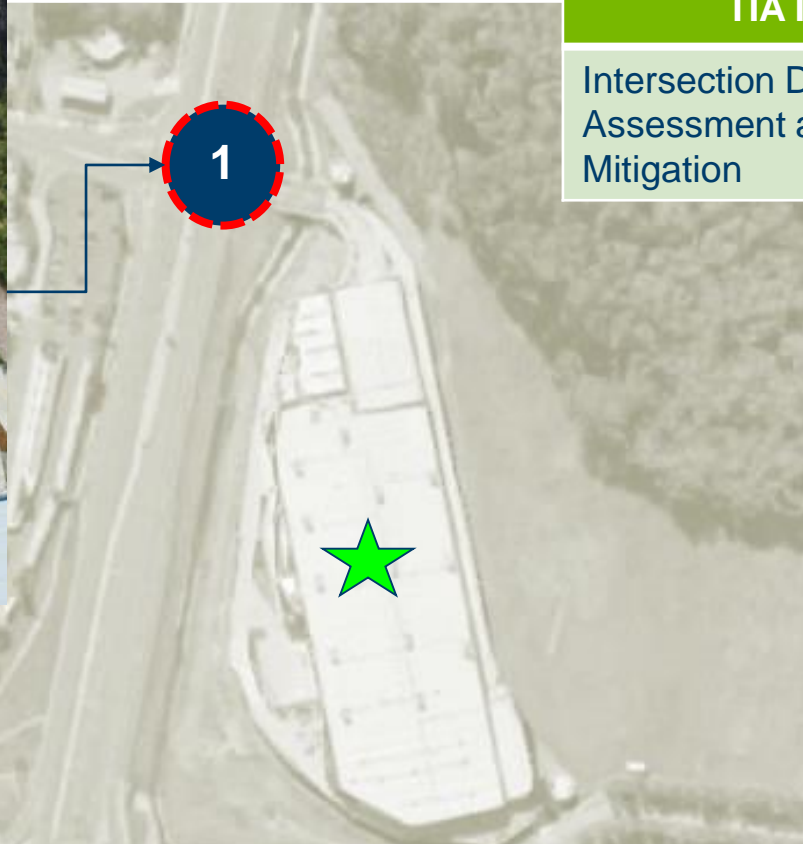


TIA Item	Assessment
Access and Frontage Impact Assessment and Mitigation	✓



The development site proposes Channelised Right-turn (CHR) and Channelised Left-turn (CHL) lane treatments plus upgrade to existing signals to gain access to Bermuda Street

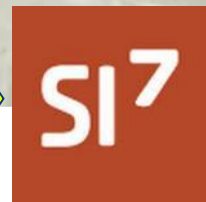
Step 5: Impact assessment and mitigation



TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

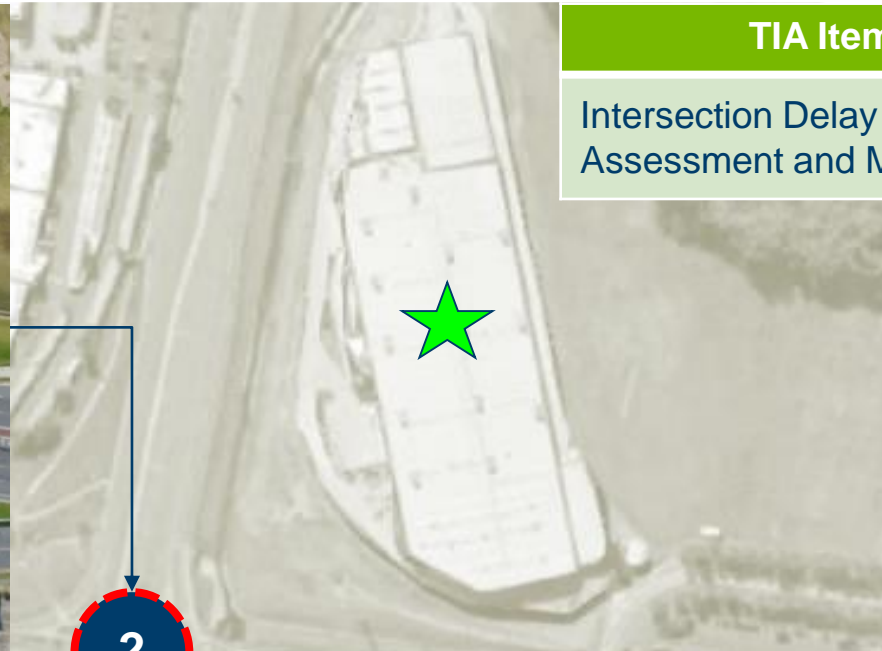


Access must operate within acceptable performance limits (degree of saturation, delay and queues) for a 10-year design horizon



Scenario	Within Acceptable Limits?
2018 With Development	✓
2028 With Development	✓

Step 5: Impact assessment and mitigation



TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

2

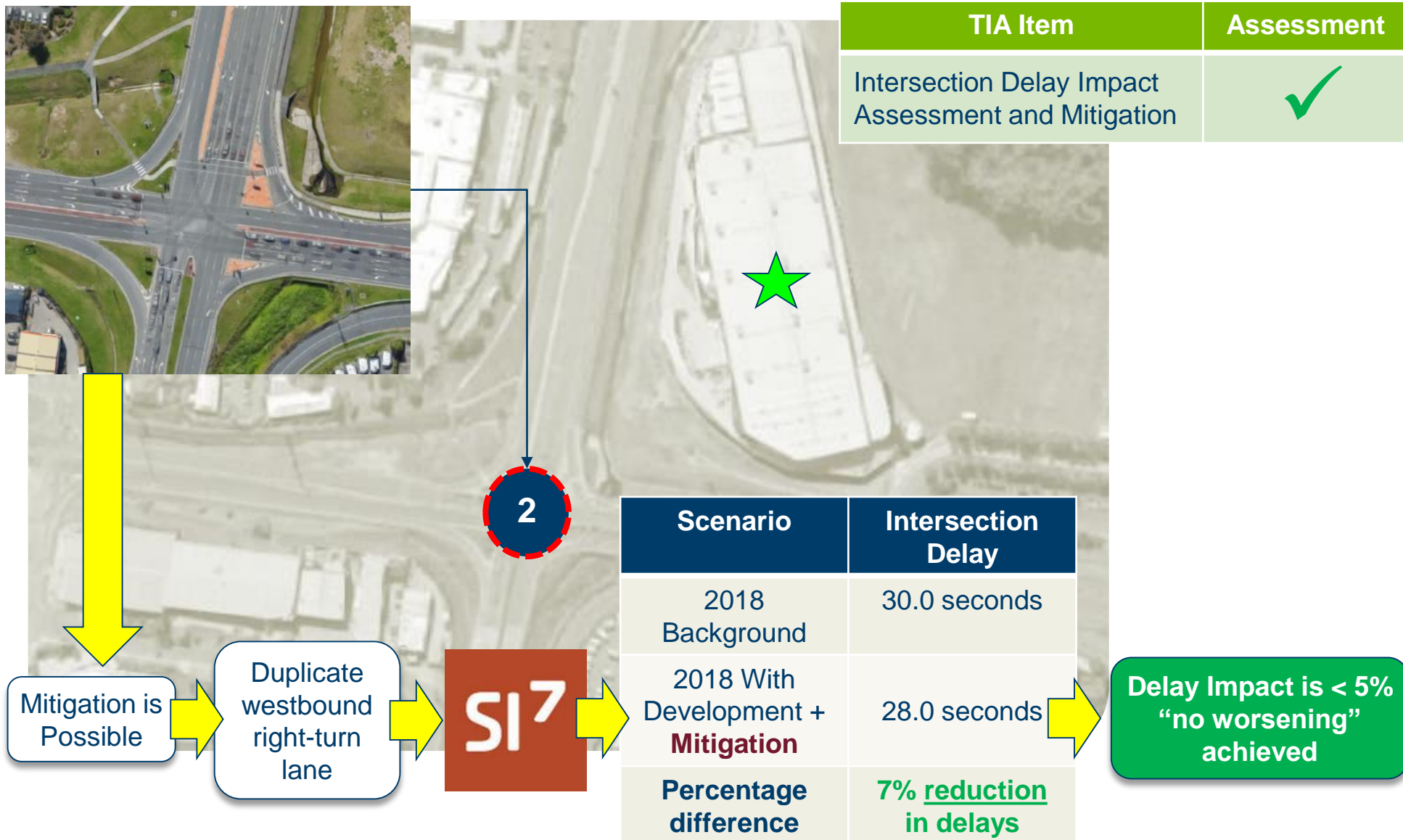
SIDRA analysis required as development traffic is greater than 5% of 2018 background traffic on a number of movements



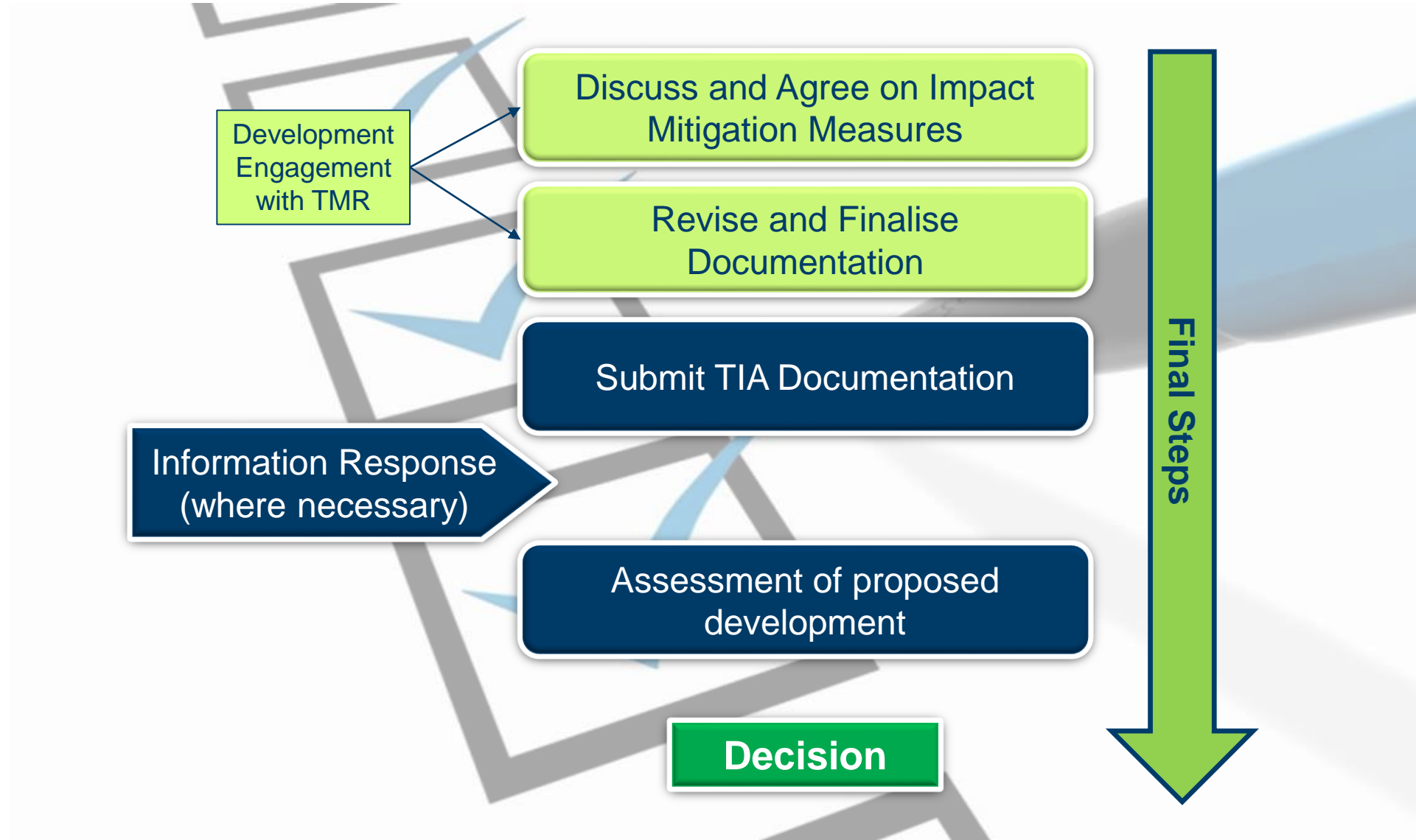
Scenario	Intersection Delay
2018 Background	30.0 seconds
2018 With Development	36.0 seconds
Percentage difference	20% increase in delay

Delay Impact is > 5% Investigate "Avoid, Manage or Mitigate" options to reduce delay impact

Step 5: Impact assessment and mitigation



Impact mitigation measures, finalisation and submission



WORKED CASE STUDY

Case Study 3: Large quarry in rural area

Step 1: Introduction

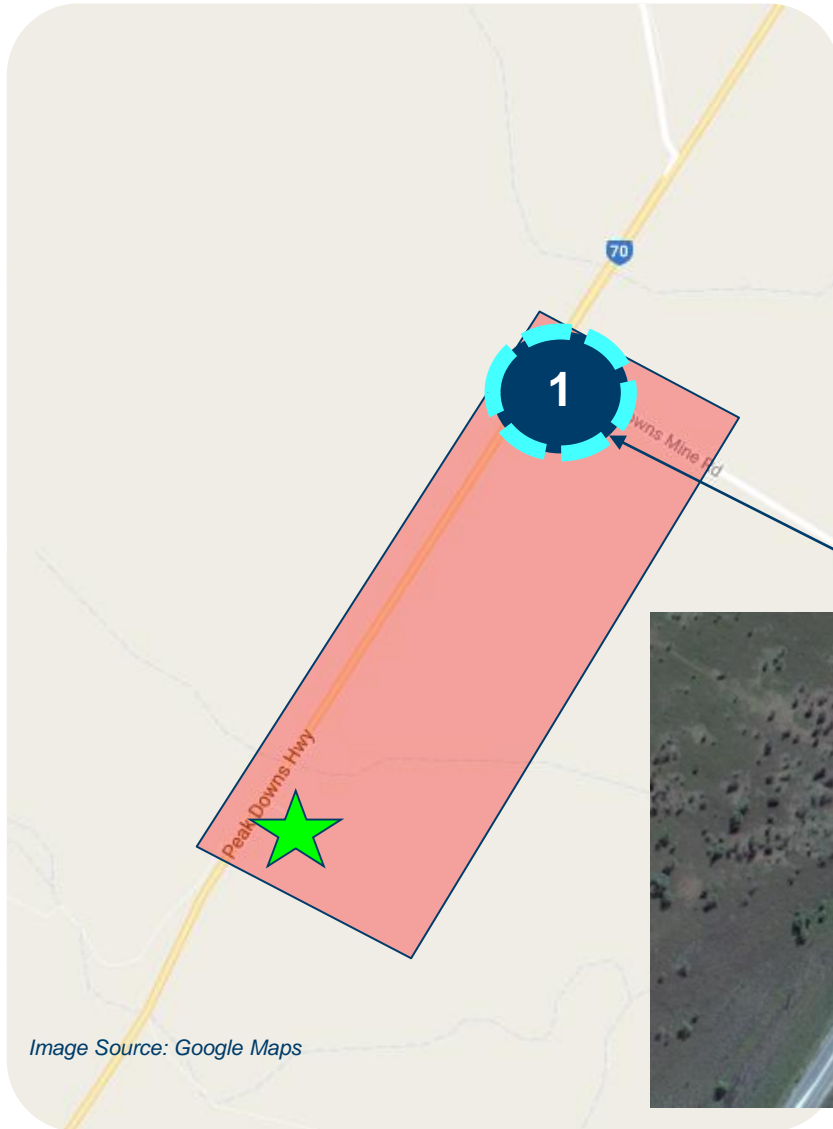


Image Source: Google Maps

TIA Item	Assessment
Background Info	✓
Scope and Study Area	✓
Pre-lodgement Meeting Notes: - analysis required for the priority controlled Intersection 1	

Legend

- ★ Site Location
- Study Area
- ⦿ Key Intersections

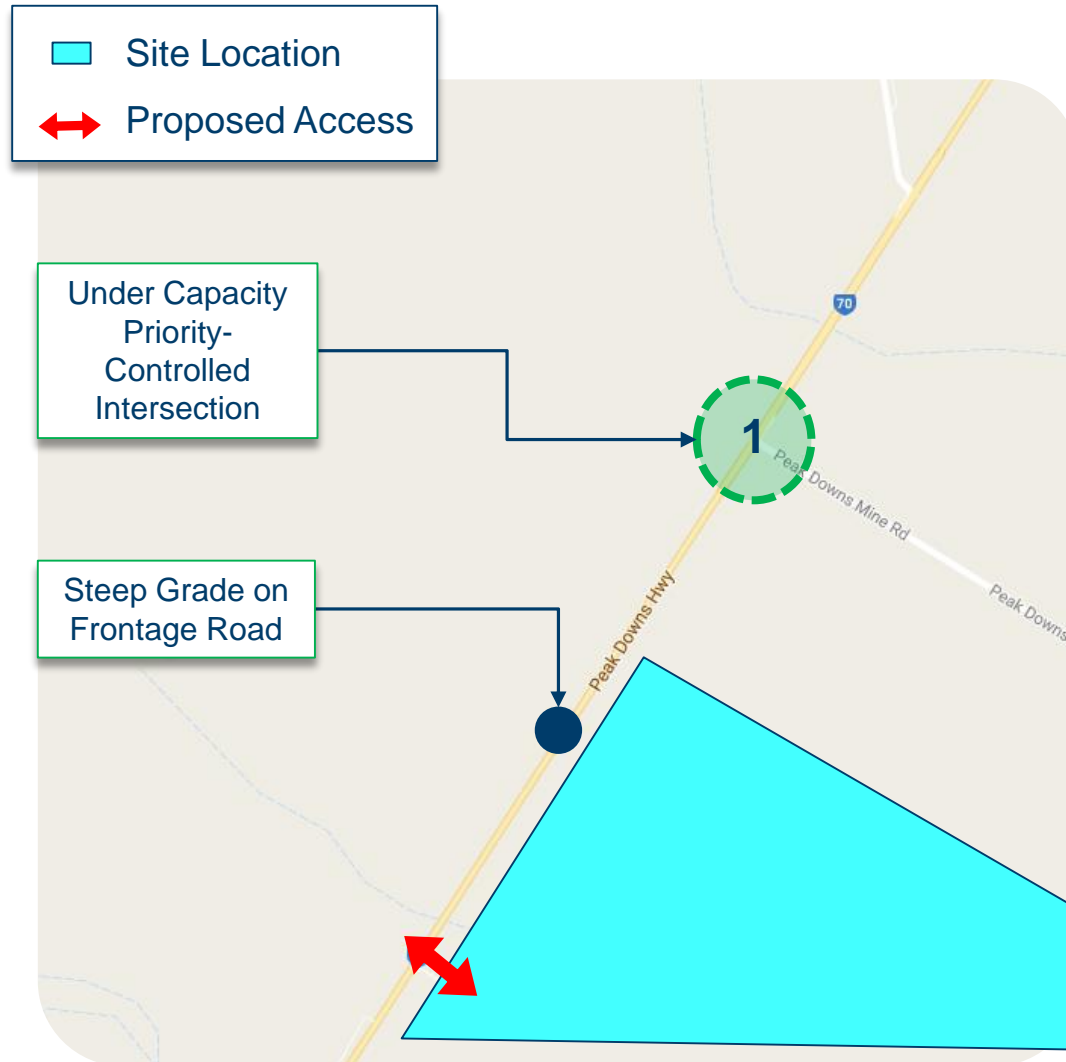
Step 2: Existing conditions



TIA Item	Assessment
Land use and Zoning	✓
Adjacent Land Uses/ Approvals	✓
Surrounding Road Details	✓

Road	Lanes	Jurisdiction	Divided	Speed	Comment
Peak Downs Highway	2	TMR	No	100kph	State Highway
Peak Downs Mine Road	2	Council	No	80kph	

Step 2: Existing conditions



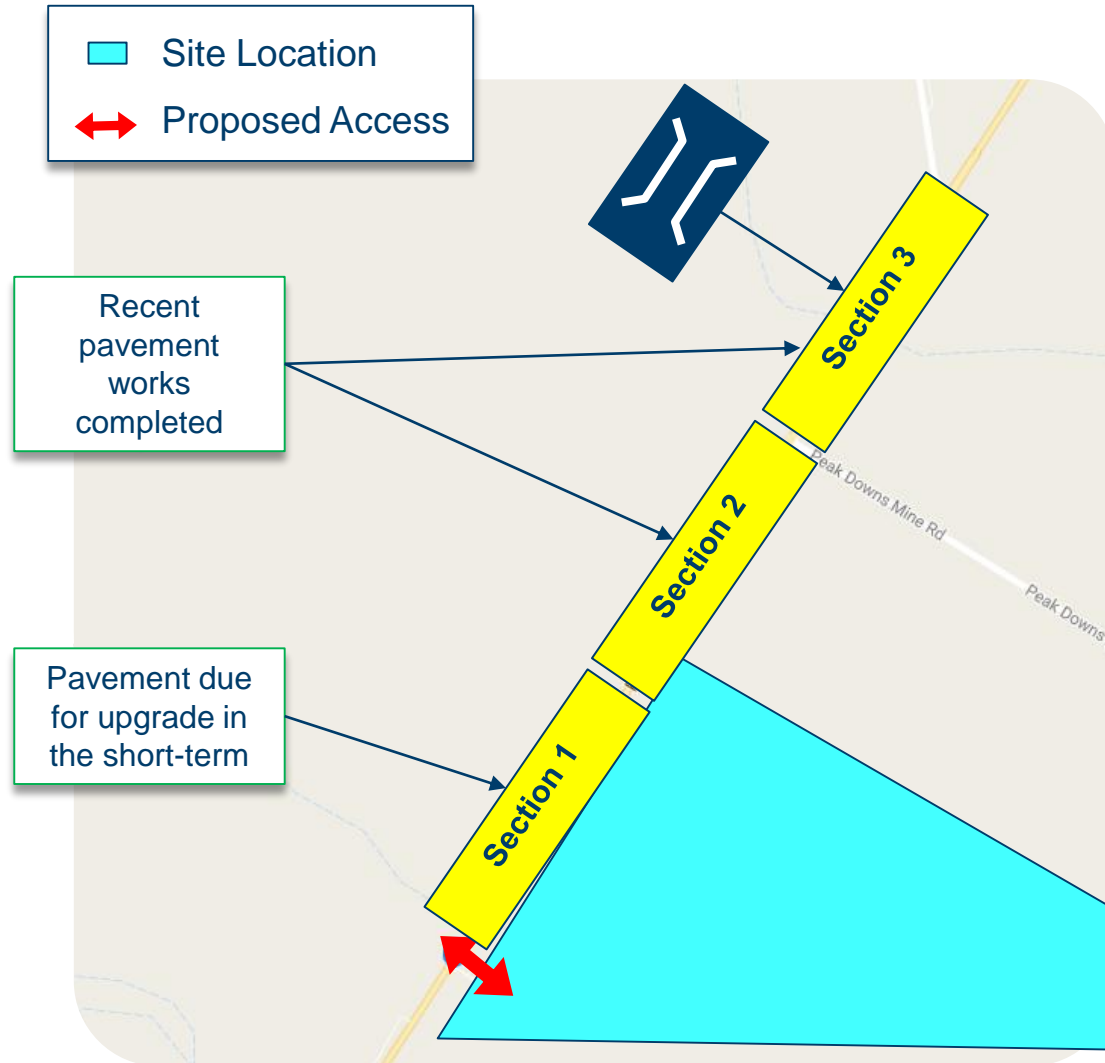
TIA Item	Assessment
Traffic Volumes	✓
Intersection and Network Performance	✓
Road Safety Issues	✓
Site Access	✓

Notes:

- No current road safety issues;
- Recent traffic survey data used;
- Steep grade on frontage road to the north of the site.

Intersection	Recent Data Available?
1	Yes (2015 Data)

Step 2: Existing conditions



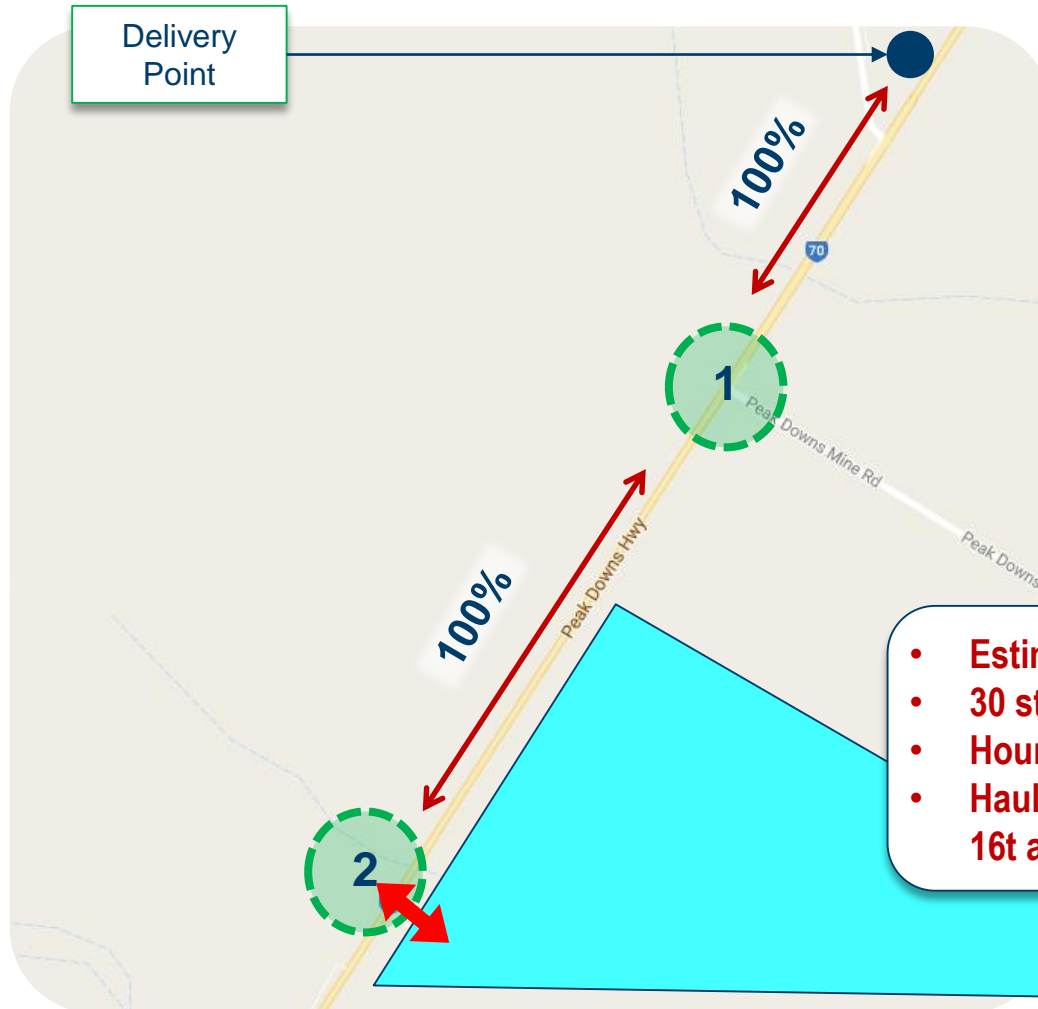
TIA Item	Assessment
Public Transport	NA
Active Transport	NA
Parking	NA
Pavement	✓
Transport Infrastructure	✓
Notes:	
<ul style="list-style-type: none"> - Historic bridge to the north of the site; - Three key pavement sections. 	

Step 3: Proposed development details



TIA Item	Assessment
Development Site Plan	✓
Operational Details	✓
Proposed Access and Parking	✓

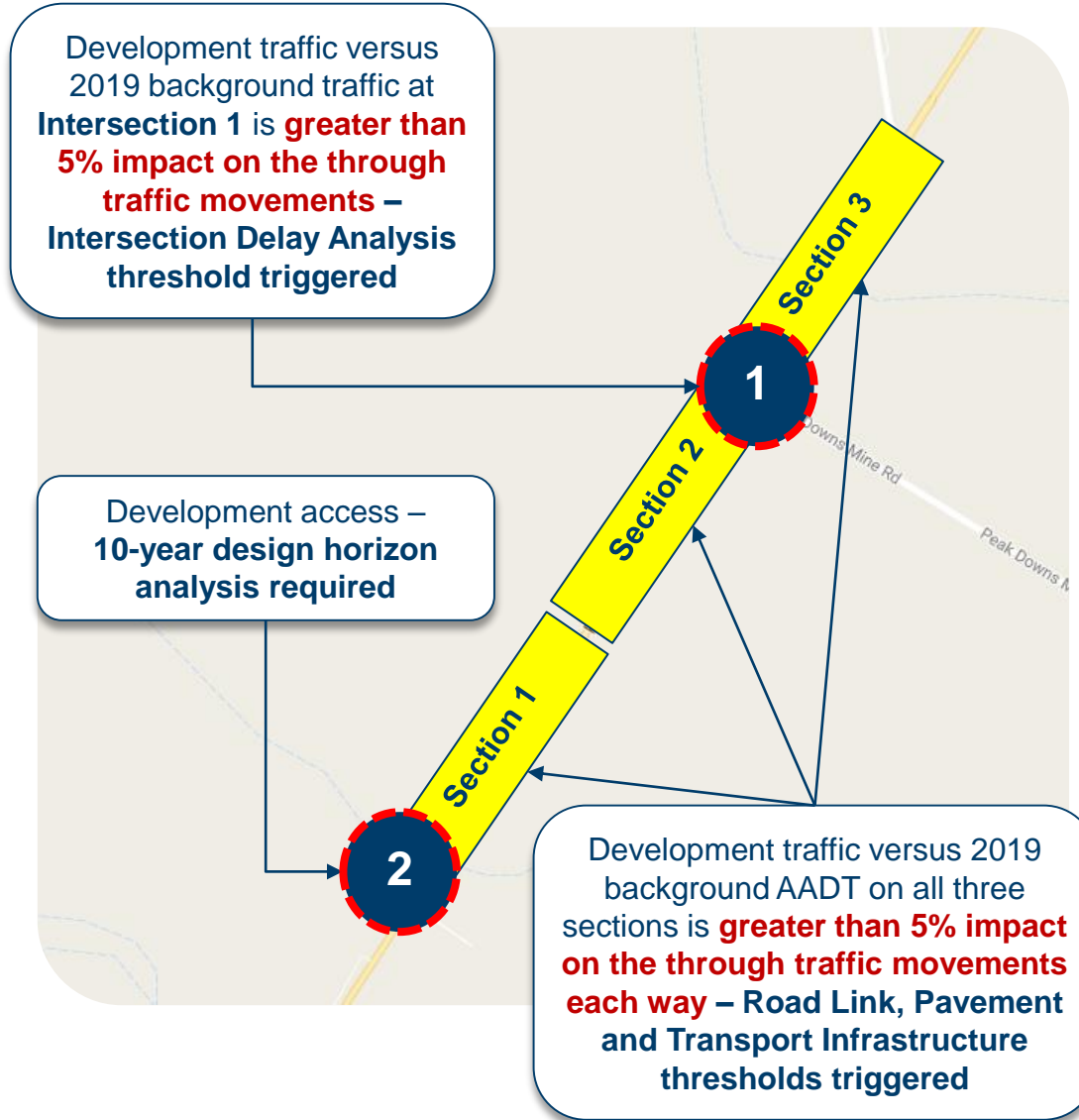
Step 4: Development traffic



TIA Item	Assessment
Development Traffic Volumes on Network	✓
Notes: Distribution is based on: - <i>Delivery point</i>	

- **Estimated quarry output = 250,000 tonnes / year**
- **30 staff present during construction and operation phases**
- **Hours of operation = 6am to 6pm, Monday to Friday**
- **Haulage via 42.5t GVM tri-axle semi tippers with a tare of 16t and net payload weight of 26.5t**

Step 5: Impact assessment and mitigation



TIA Item	Assessment
With and Without Development Traffic	✓

TIA Aspect	Assessable?
Construction Impact	YES
Road Safety Impact	YES
Access and Frontage Impact	YES
Intersection Delay Impact	YES
Road Link Capacity	YES
Pavement Impact	YES
Transport Infrastructure Impact	YES

Step 5: Impact assessment and mitigation

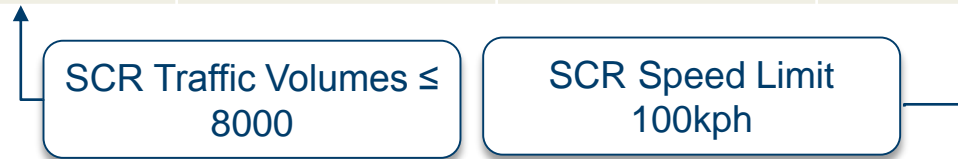
Risk Item	Without Development			With Development		
	Likelihood	Consequence	Result	Likelihood	Consequence	Result
Southbound left-turn vehicles at the site access slowing to execute turn on high-speed road	1	1	L	5	2	M
Right turn movements from the site onto a high-speed road	1	1	L	5	2	M

Risk Item	Mitigation	With Development + Mitigation		
		Likelihood	Consequence	Result
Southbound left-turn vehicles at the site access slowing to execute turn on high-speed road	Channelised left-turn lane	1	2	L
Right turn movements from the site onto a high-speed road	Upgrade access to a seagull treatment	1	2	L

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Step 5: Impact assessment and mitigation

Traffic Volume (AADT)	Speed (kph)		
	Up to 50kph	60kph to 70kph	80kph +
≤ 8000	Low	Medium	Medium
≥ 8000	Medium	Medium	High

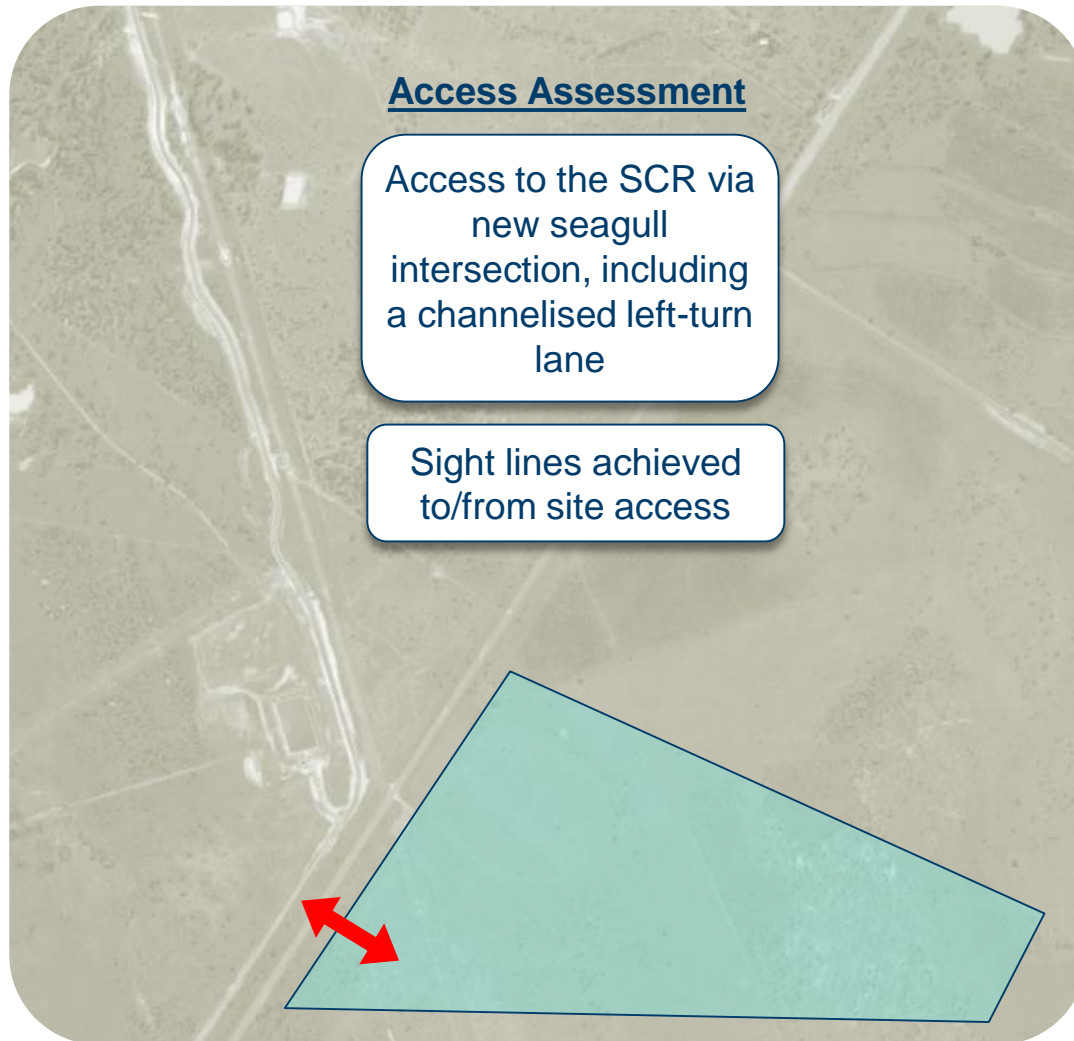


TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Development Type	Road Environment Safety Rating		
	Low	Medium	High
Major Development	Road Safety Assessment	Road Safety Audit	Road Safety Audit
Planning Act Development	Road Safety Assessment	Road Safety Assessment	Road Safety Audit

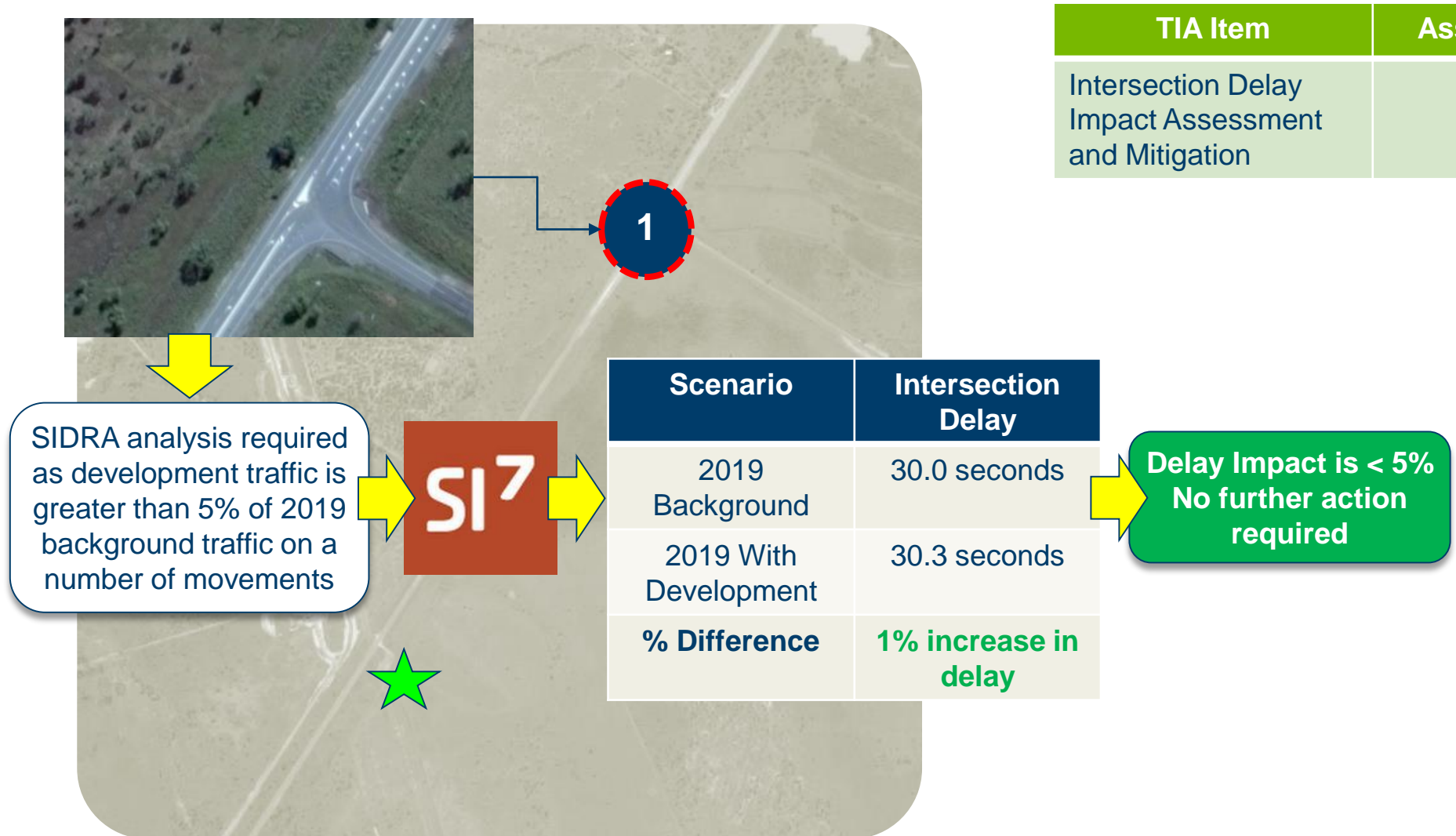
A Road Safety Audit is required to be undertaken for the proposed access upgrade works

Step 5: Impact assessment and mitigation



TIA Item	Assessment
Access and Frontage Impact Assessment and Mitigation	✓

Step 5: Impact assessment and mitigation



TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

Step 5: Impact assessment and mitigation

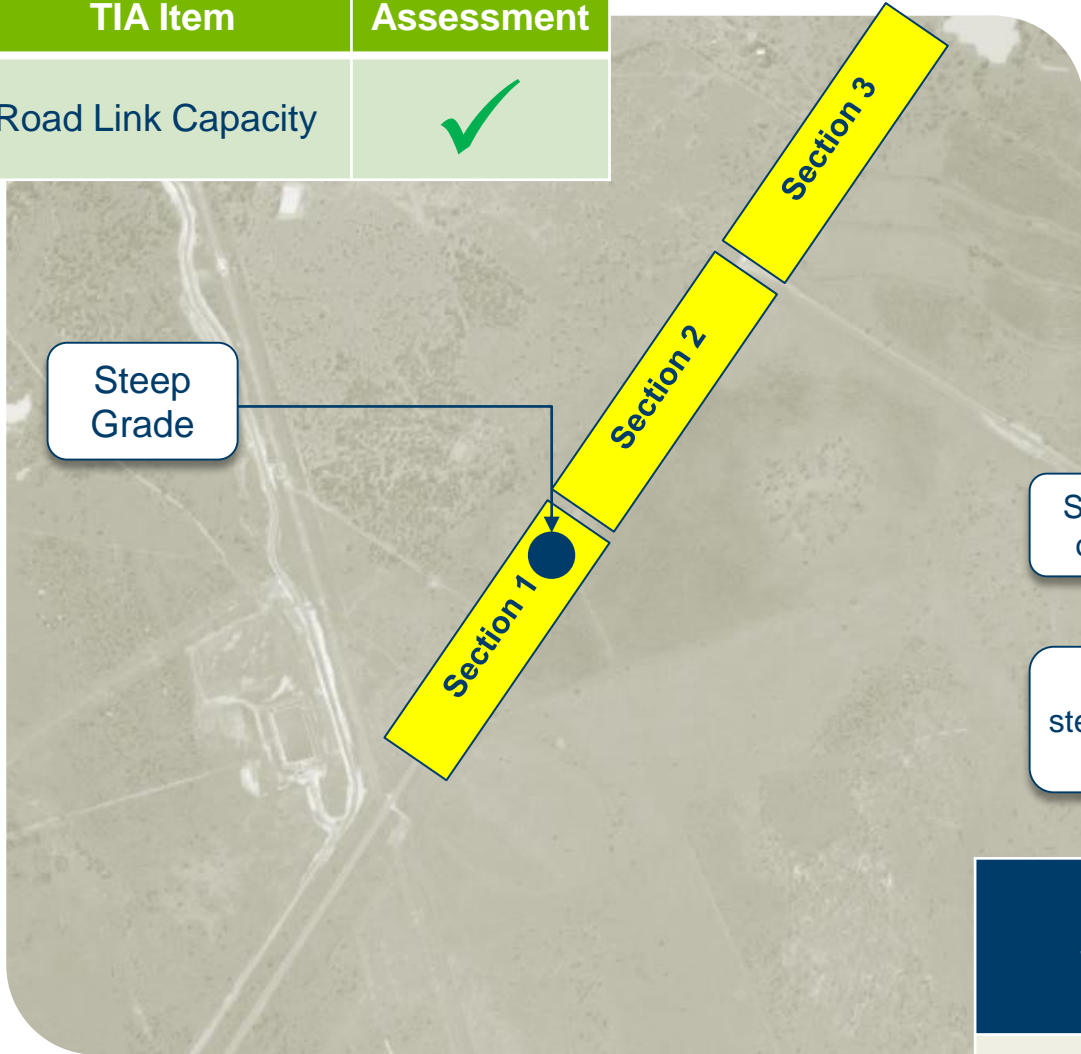


TIA Item	Assessment
Intersection Delay Impact Assessment and Mitigation	✓

Scenario	Within Acceptable Limits?
2019 With Development	✓
2029 With Development	✓

Step 5: Impact assessment and mitigation

TIA Item	Assessment
Road Link Capacity	✓



Section	2022 Background	2022 Development
	LOS	LOS
1	A	B
2	A	A
3	A	A

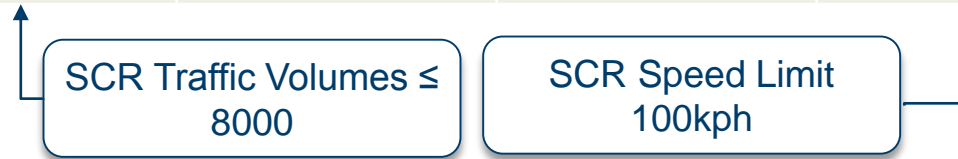
Section 1 LOS **decreased**. Mitigation is possible by adding overtaking lanes at steep grade location on frontage road

TRARR Assessment shows that overtaking lanes at the steep grade location mitigates the effects of the development on Section 1

Section	2022 Development + Mitigation
	LOS
1	A

Step 5: Impact assessment and mitigation

Traffic Volume (AADT)	Speed (kph)		
	Up to 50kph	60kph to 70kph	80kph +
≤ 8000	Low	Medium	Medium
≥ 8000	Medium	Medium	High



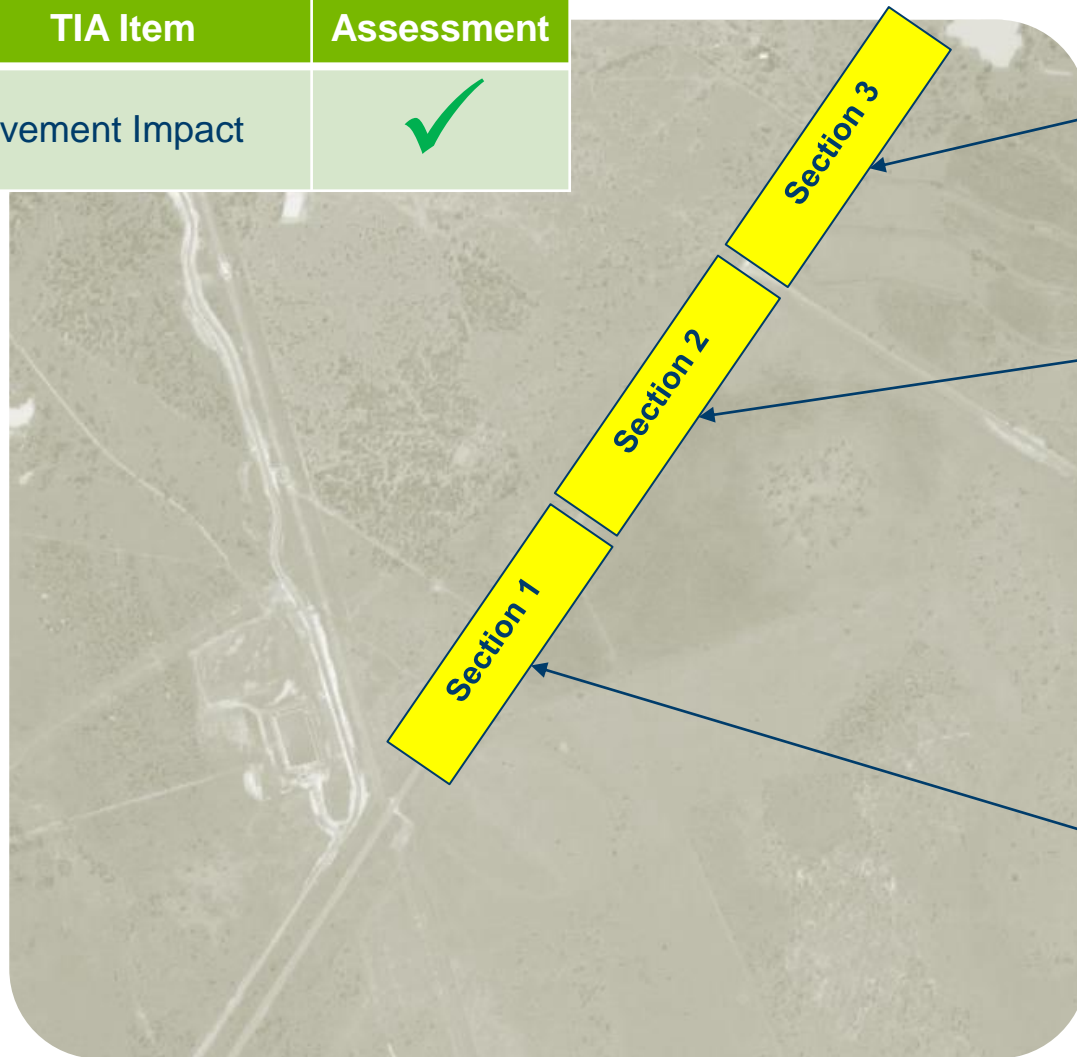
Development Type	Road Environment Safety Rating		
	Low	Medium	High
Major Development	Road Safety Assessment	Road Safety Audit	Road Safety Audit
Planning Act Development	Road Safety Assessment	Road Safety Assessment	Road Safety Audit

A Road Safety Audit is required to be undertaken for the proposed overtaking lanes

TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	✓

Step 5: Impact assessment and mitigation

TIA Item	Assessment
Pavement Impact	✓



2022 SARs with development = **4% increase**

2022 SARs with development = **9% increase**

2022 SARs with development = **20% increase**

Not triggered for further assessment

Remaining SAR capacity will not be consumed during mitigation period

FAMLIT

Contribution rate per SAR-km

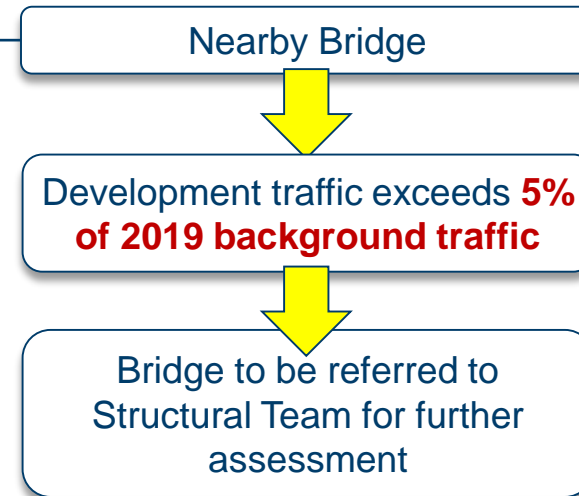
Development consumes remaining pavement SAR capacity during impact mitigation period

Pavement design required

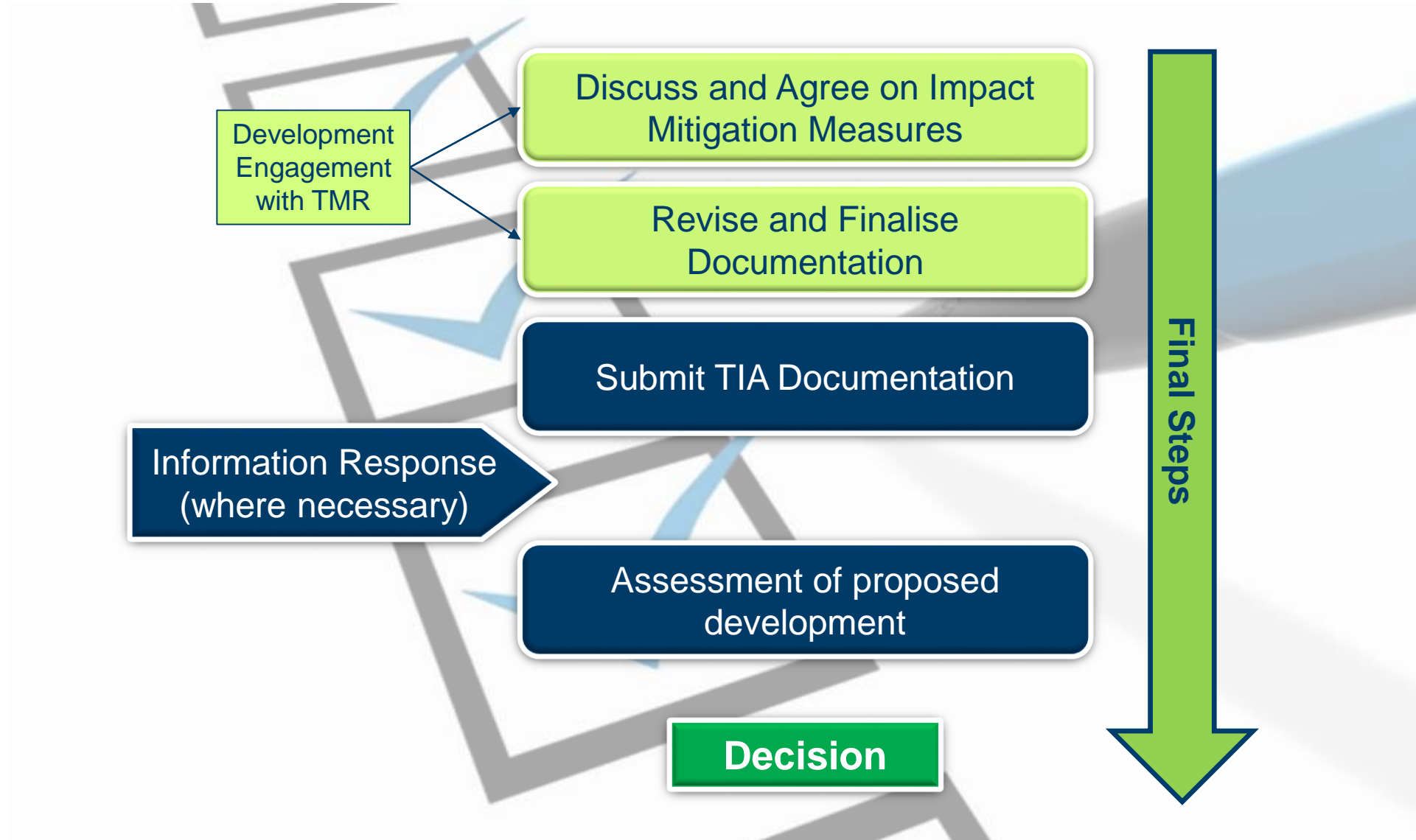
Step 5: Impact assessment and mitigation



TIA Item	Assessment
Transport Infrastructure	✓



Impact mitigation measures, finalisation and submission



WORKED CASE STUDY

Case Study 4: Small residential development in under capacity road network

Step 1: Introduction

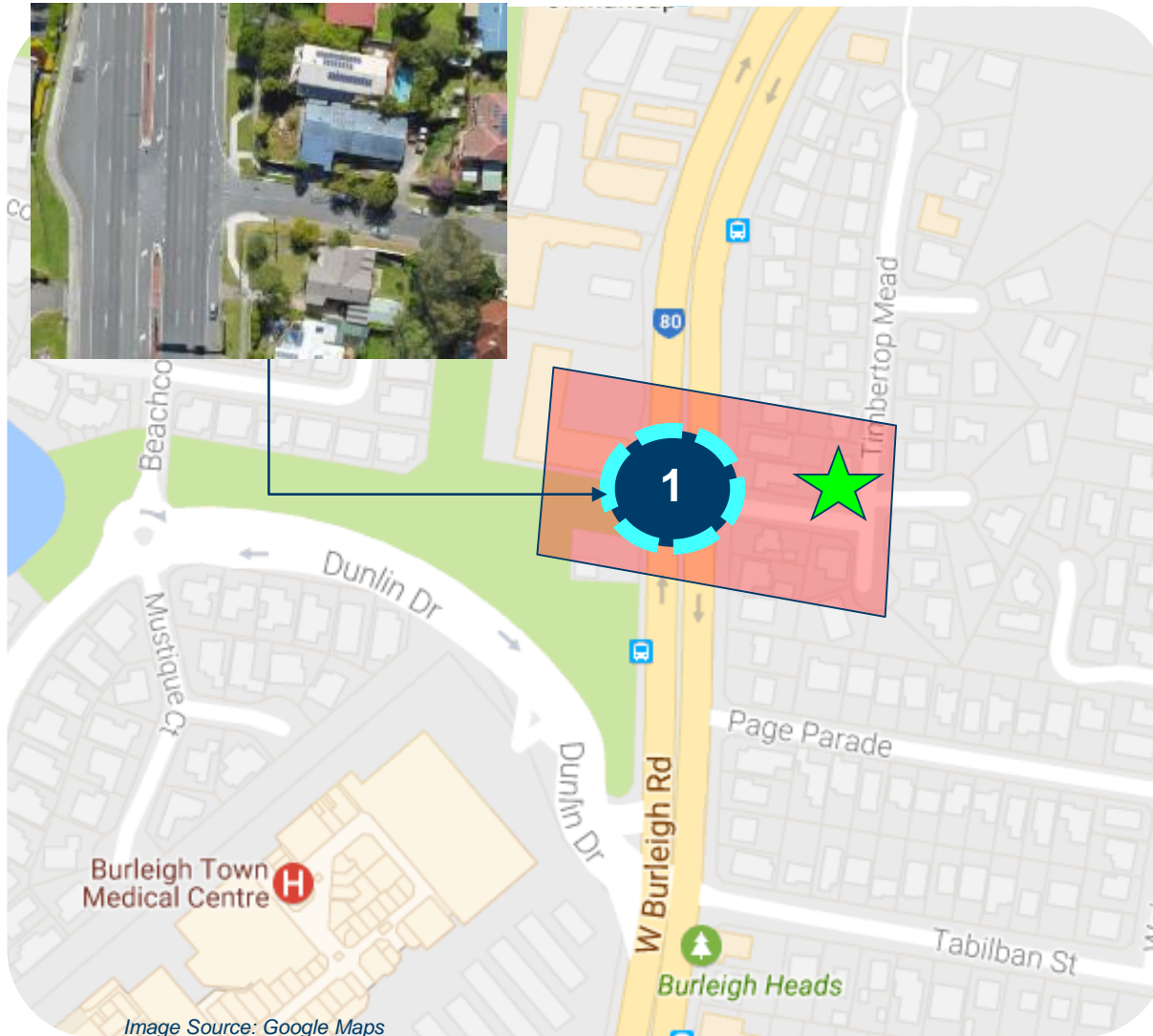


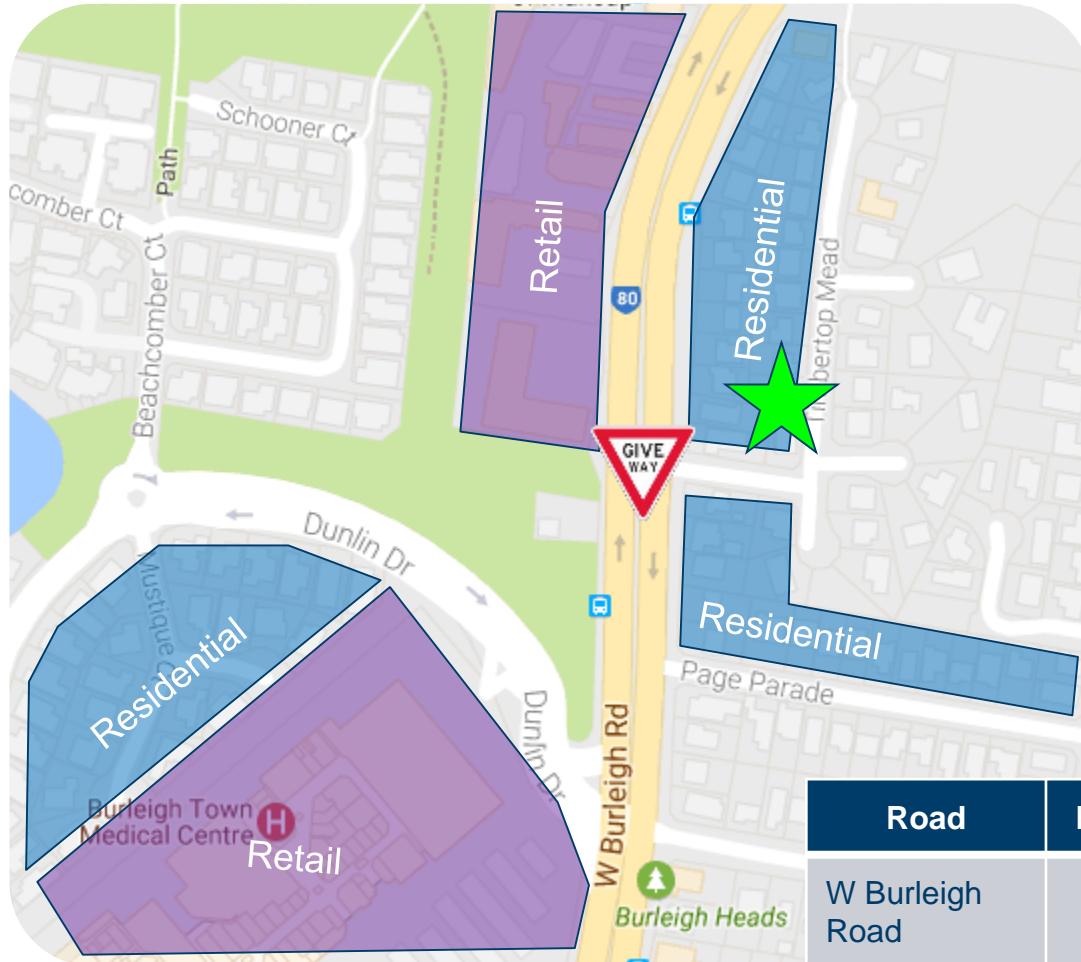
Image Source: Google Maps

TIA Item	Assessment
Background Info	✓
Scope and Study Area	✓
Pre-lodgement Meeting Notes: - site is 20m from a state-controlled road - no major transport impacts expected	

Legend

- ★ Site Location
- Study Area
- ⦿ Key Intersections

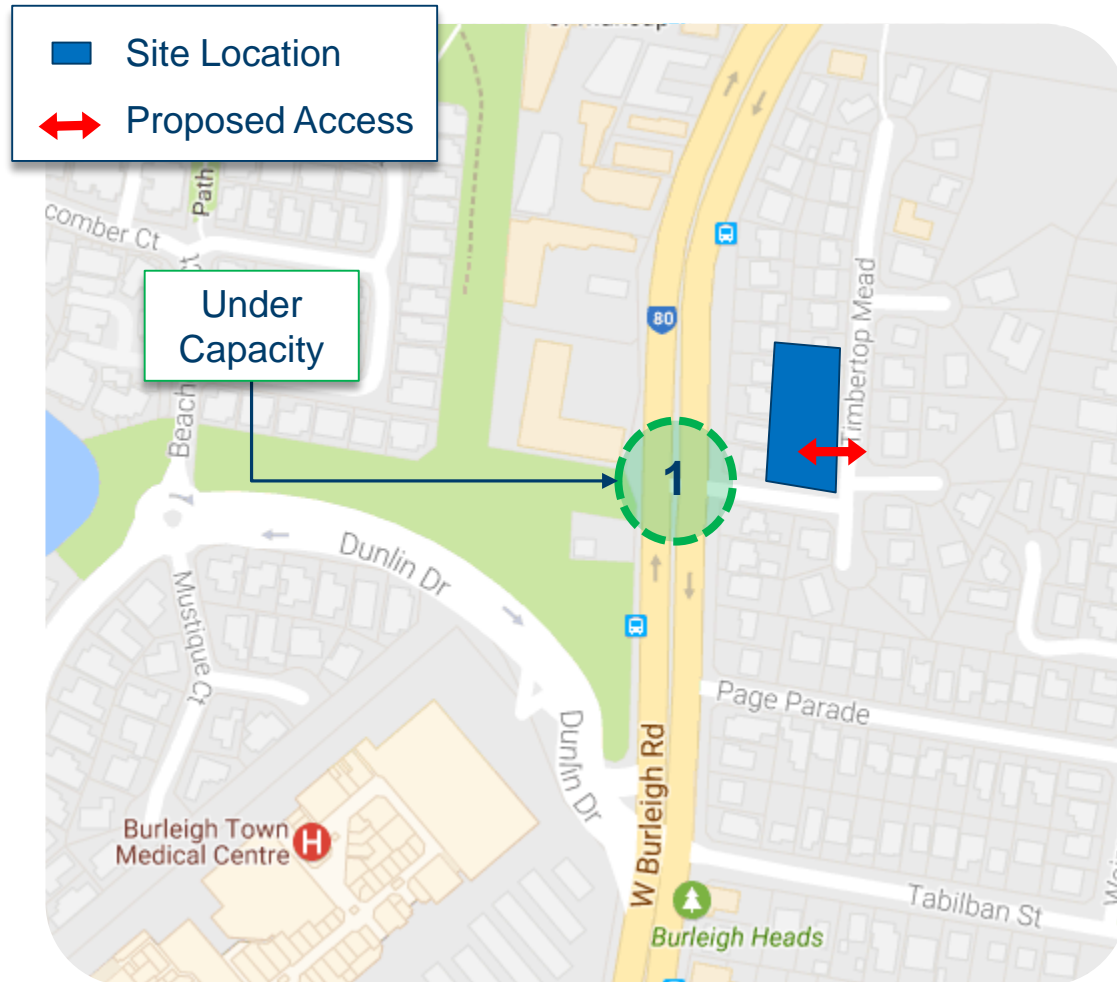
Step 2: Existing conditions



TIA Item	Assessment
Land use and Zoning	✓
Adjacent Land Uses/Approvals	✓
Surrounding Road Details	✓

Road	Lanes	Jurisdiction	Divided	Speed	Comment
W Burleigh Road	6	TMR	Yes	70kph	Major Arterial
Timbertop Mead	2	Council	No	50kph	Local

Step 2: Existing conditions



TIA Item	Assessment
Traffic Volumes	✓
Intersection and Network Performance	✓
Road Safety Issues	✓
Site Access	✓

Notes:

- No current road safety issues;
- Recent traffic survey data used.

Intersection	Recent Data Available?
1	Yes (2015 Data)

Step 2: Existing conditions



TIA Item	Assessment
Public Transport	✓
Active Transport	✓
Parking	✓
Pavement	NA
Transport Infrastructure	NA






Step 3: Proposed development details

- ❖ **2019 Year of Opening**
- ❖ **20 Residential Townhouses**
- ❖ **13 Peak Vehicle Trips**
- ❖ **30 Parking Spaces**
- ❖ **Access on minor road**



TIA Item	Assessment
Development Site Plan	✓
Operational Details	✓
Proposed Access and Parking	✓

Step 4: Development traffic

Item	Result	
Trip Generation Rate	0.65 trips per dwelling	
Peak Hour Trips	0.65 x 20 dwellings = 13 peak hour trips	
IN/OUT Split 	AM	PM
	 	 

TIA Item	Assessment
Trip Generation	✓
Trip Distribution	✓

Sourced from RMS
Technical Note

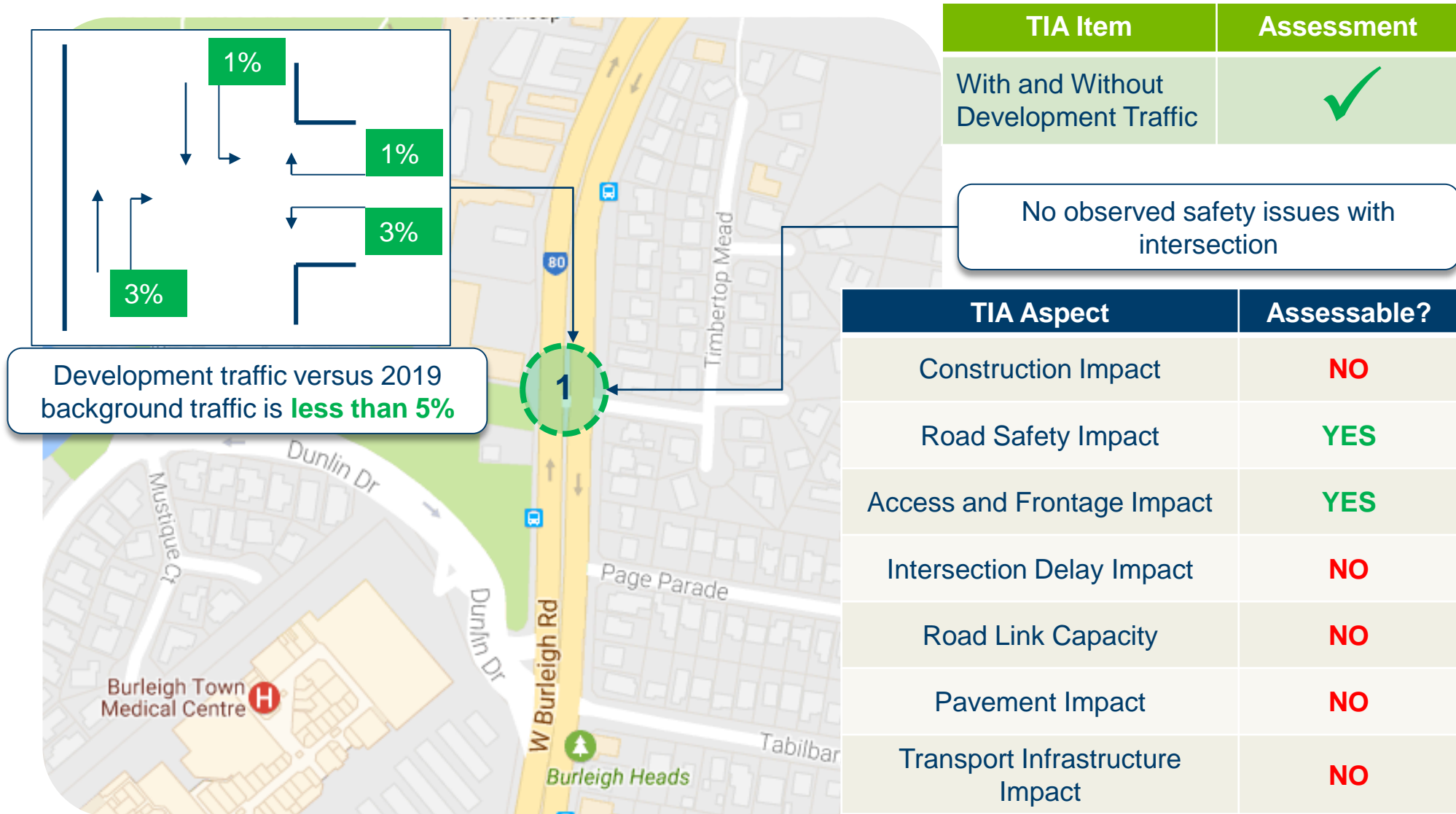
Image Source: huffingtonpost.com

Step 4: Development traffic



TIA Item	Assessment
Development Traffic Volumes on Network	✓
Notes: Distribution is based on:	
❖ Traffic Survey Data	
❖ Local Knowledge	

Step 5: Impact assessment and mitigation

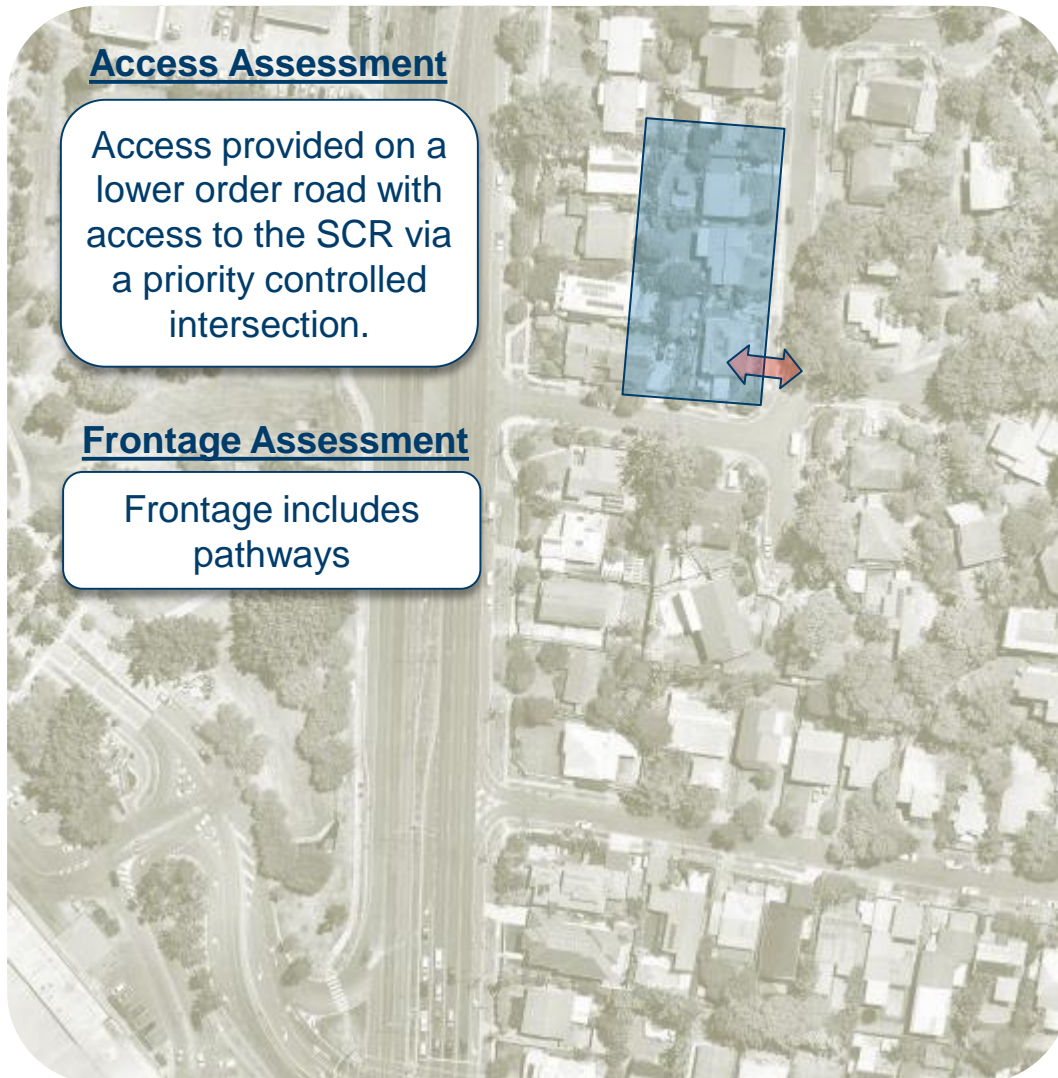


Step 5: Impact assessment and mitigation

Risk Item	Without Development			With Development		
	Likelihood	Consequence	Result	Likelihood	Consequence	Result
Development results in a small increase in northbound right-turn traffic demand at Intersection 1. Peak hour site observations indicate that queueing in this turn lane is currently low (i.e. 1-2 vehicles at any given time) and the storage length is long (approx. 70m or 10 vehicle lengths). The catchment served by this turn lane is 'closed' and has limited future development potential. Therefore, the risk profile of the northbound right-turn lane overflow into the adjacent through lane remains unchanged.	1	2	L	1	2	L

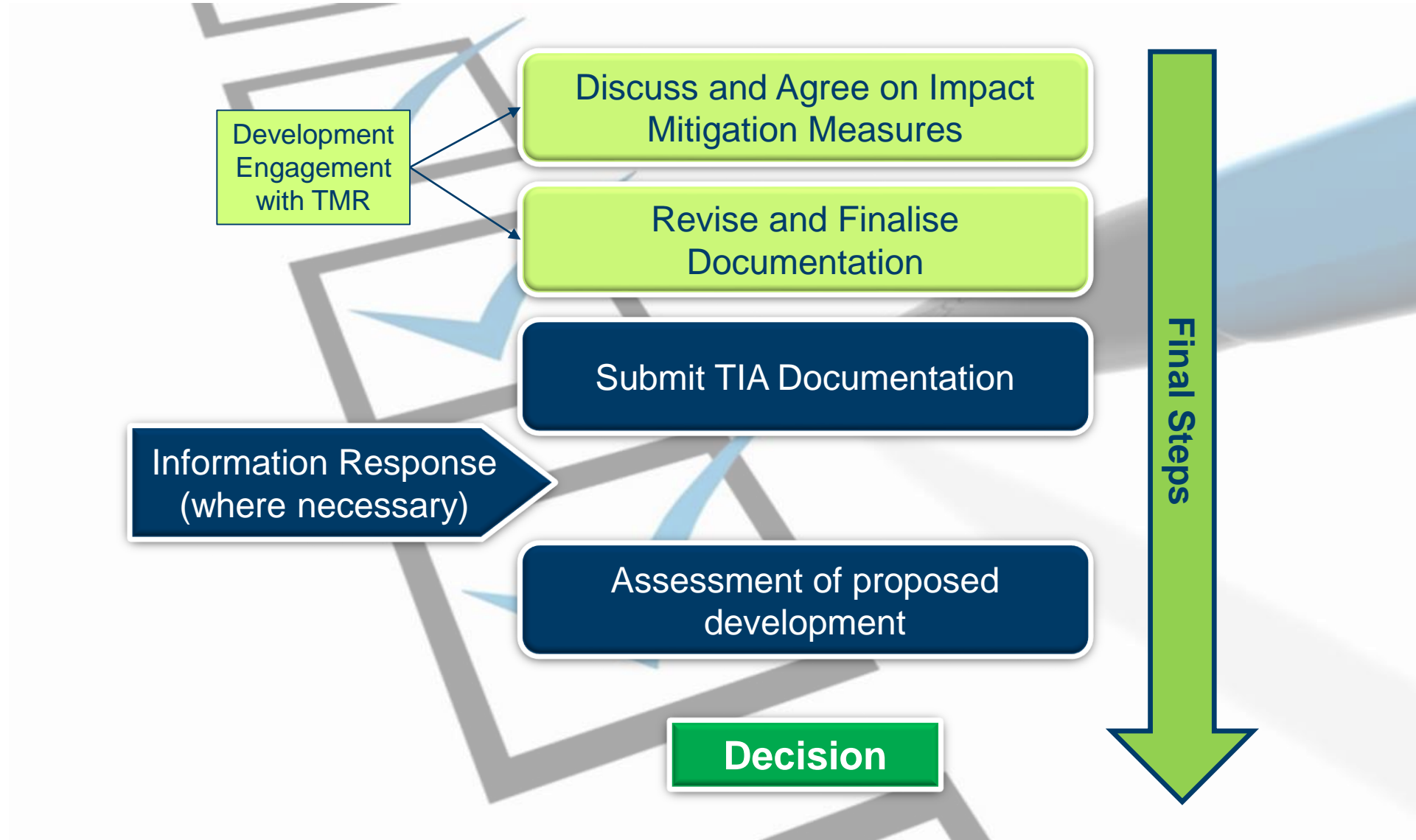
TIA Item	Assessment
Road Safety Impact Assessment and Mitigation	

Step 5: Impact assessment and mitigation



TIA Item	Assessment
Access and Frontage Impact Assessment and Mitigation	✓

Impact mitigation measures, finalisation and submission



Thank you and stay connected



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