Session 2.4 Information Review and Site Inspection

Conducting Road Safety Audits & Appraisals

Presented by: RTS & AGTT

January 2022

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

CONTENT

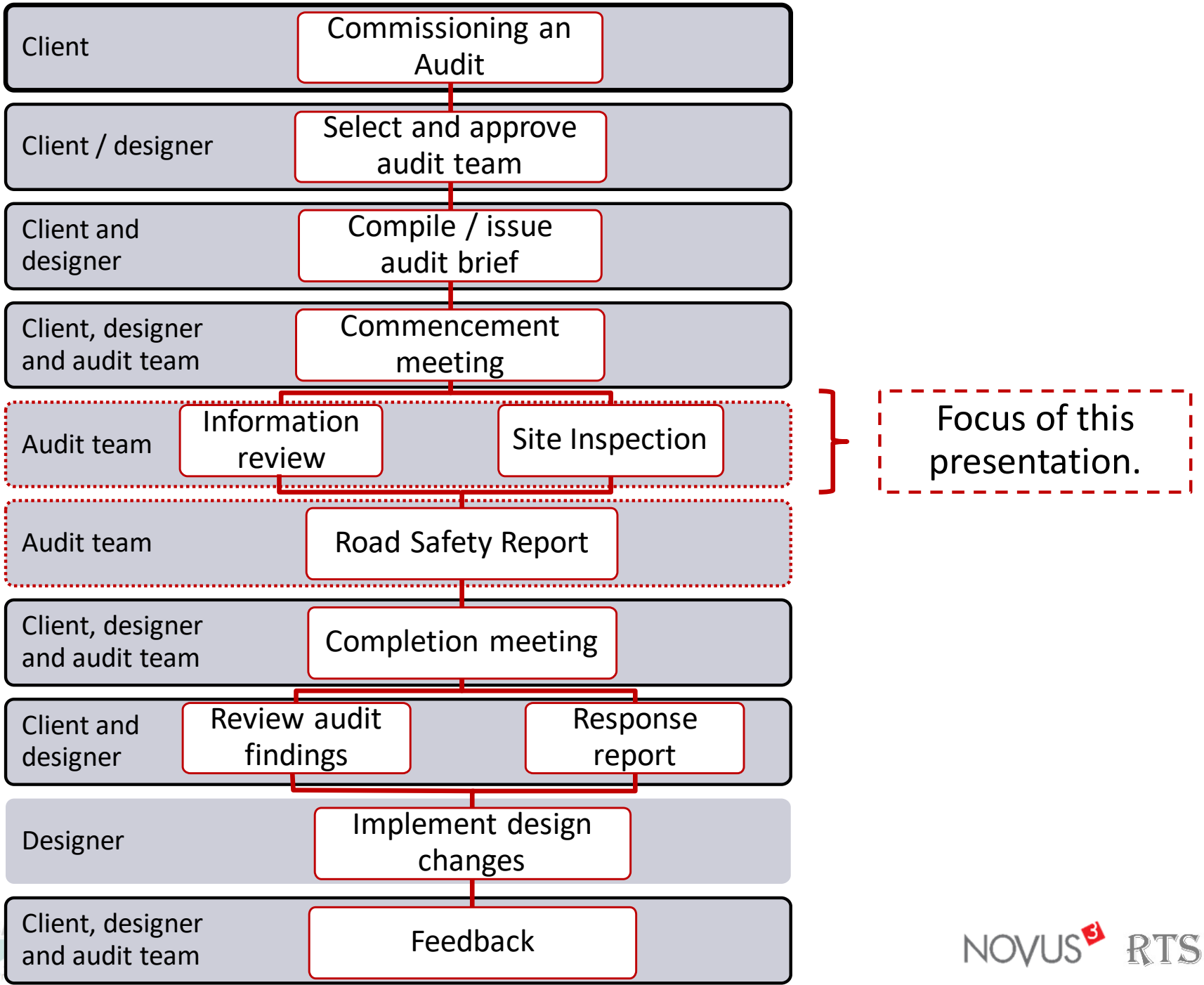
Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Content

1. Information Review
2. Relevant data
3. Relevant data - Traffic surveys
4. Relevant data – Crash Data
5. Relevant Data – Road Infrastructure & Environment
6. Site inspection
7. Conclusion

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Focus of this presentation



Copyright Novus³(Pty)Ltd

Information Review

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Information Review

Information review

To review the designs and background information and identify potential safety problems and determine the safety status of the project.

- Obtain insight into road user/road environment interaction.
- Review design info to identify issues to investigation on site.
- Review all info which might highlight potential safety risks.
- May ignore crash data - possibly only relevant if scheme is completely different.
- Guard against mitigating only risks which materialised in the past.
- Information must be reviewed again on completion of site visit.

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant Data

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant Data

Apart from design drawings, why is other data relevant?

To gather sufficient information on the:

- Road environment
- Road users (vehicles and humans)
- Road infrastructure
- Road crashes

To be able to contextualise and understand the road safety risks.

I.e. collection sufficient data to understand what the road safety risks are.

The extent and type of data will depend on the phase of the audit.
For safety appraisals, limited data is likely to be available – extensive data will have to be collected on site.

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

RELEVANT DATA - TRAFFIC SURVEYS

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Traffic surveys

Traffic surveys might be required to quantify the current vehicle and NMT volumes

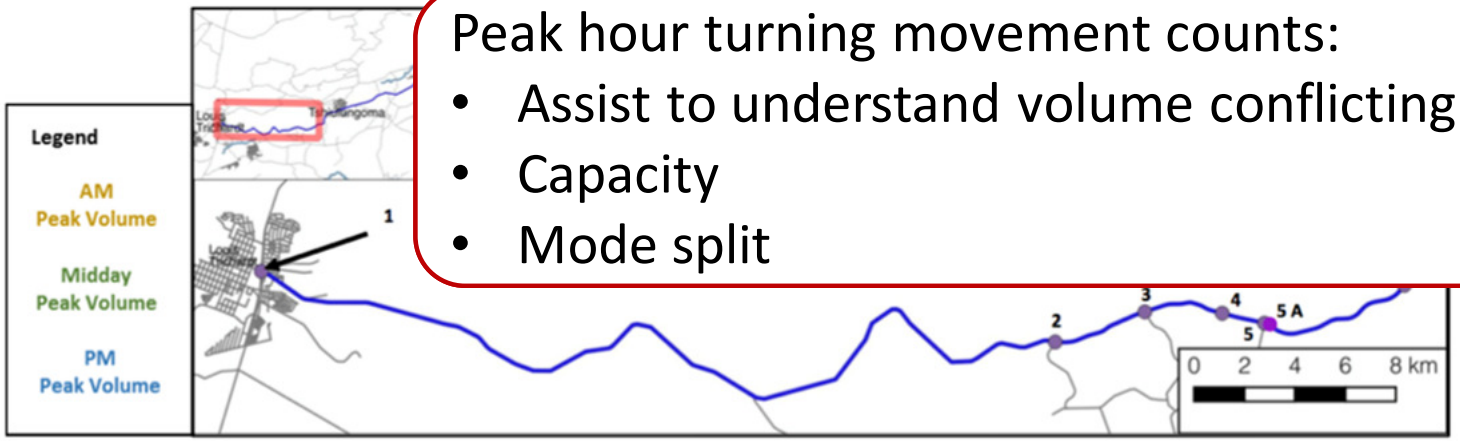
Typical traffic surveys	○ Classified vehicle counts ○ NMT counts ○ Speed surveys
Other surveys	○ Conflict studies ○ Infrastructure condition surveys

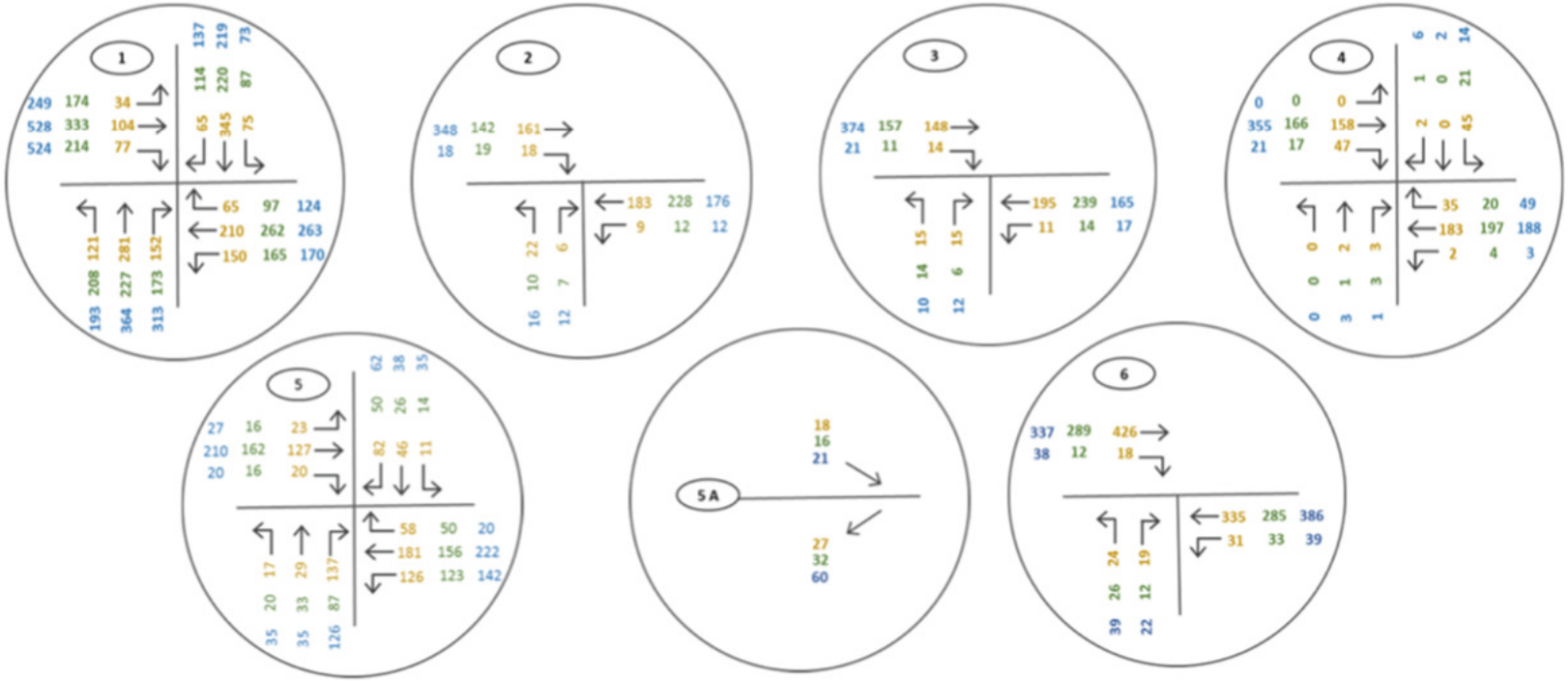
Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Traffic counts (turning movements)

Peak hour turning movement counts:

- Assist to understand volume conflicting movements.
- Capacity
- Mode split

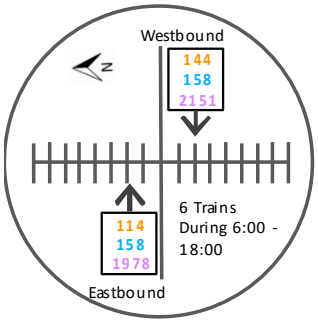




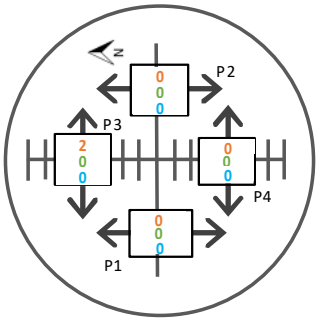
Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Traffic counts (7 day counts)

N14 - Section 12 (Bodenstein)



Summary of Weekday Vehicle Movements



Summary of Weekday Pedestrian Movements

Legend

AM Peak Hour Volume

Midday Peak Hour Volume

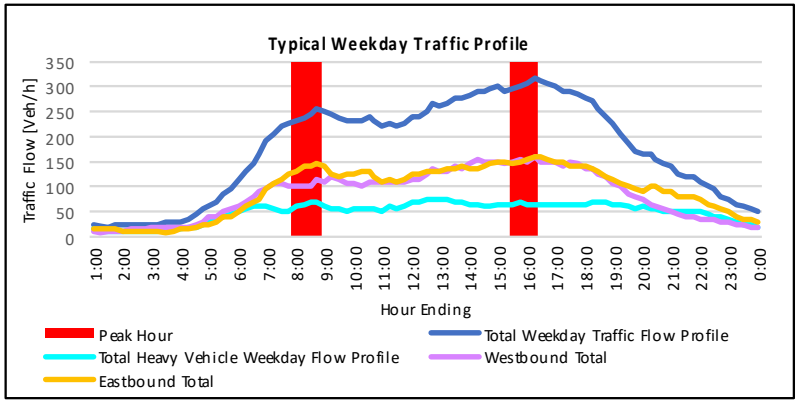
PM Peak Hour Volume

ADT

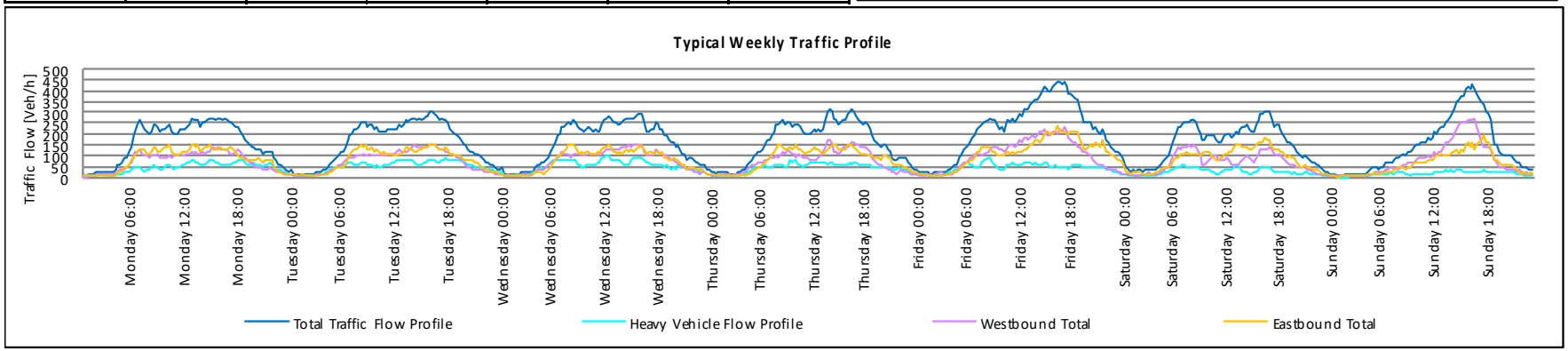
Daily/weekly flows – could determine day and time of site visit.

Survey Period: Electronic Counts: Monday, 6 June 2016 (16:15) - Wednesday, 22 June 2016 (11:15)

Manual Counts (Classified Vehicles and Pedestrian): Tuesday, 14 June 2016 (06:00 - 18:00)



	Peak hour Volume [Veh/h]		Peak Period		Peak Hourly Factor (PHF)	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
AM Peak	258	179	07:45 - 08:45	11:00 - 12:00	0.96	0.73
PM Peak	317	375	15:15 - 16:15	15:45 - 16:45	0.96	0.96



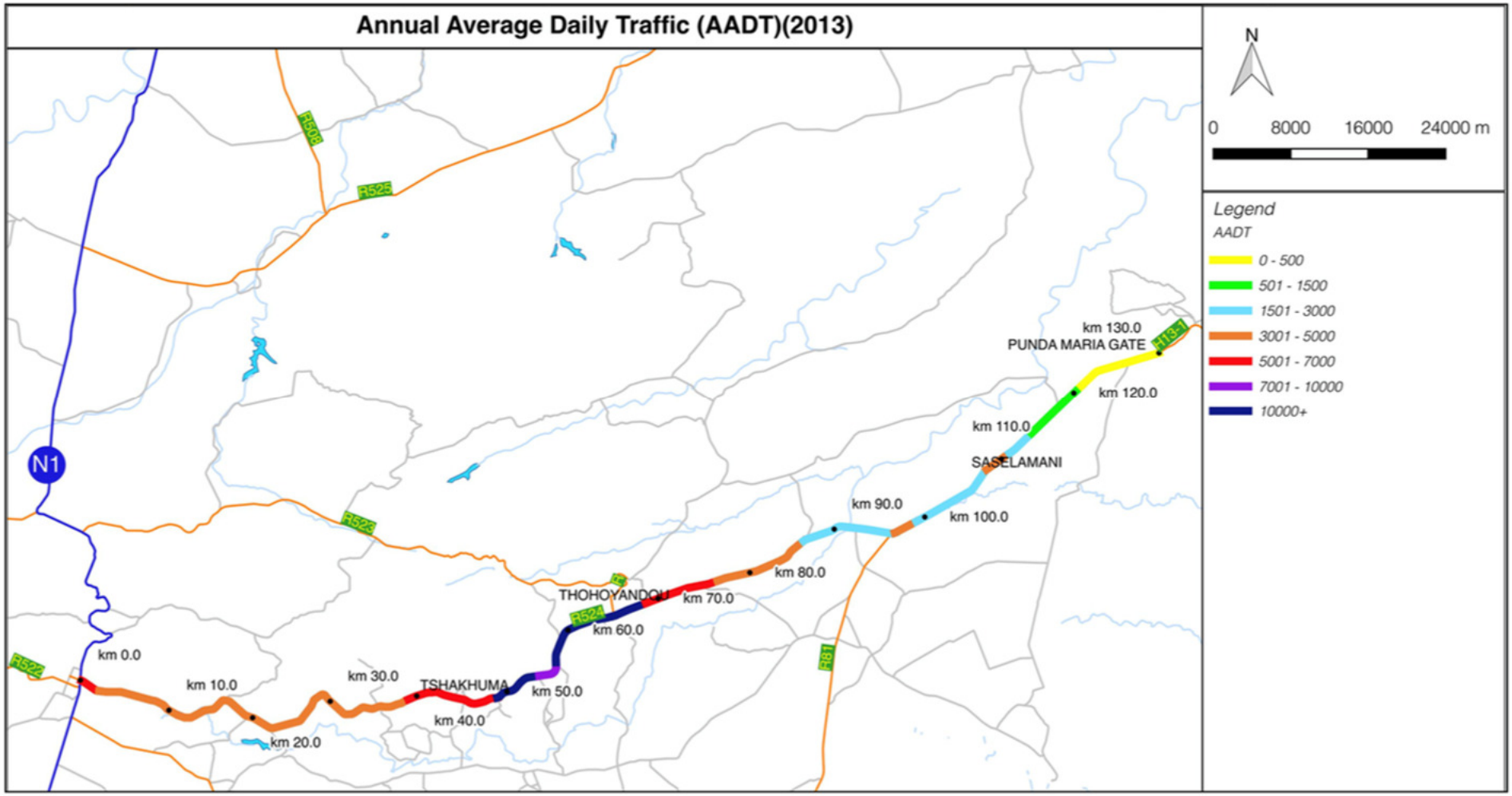
Peak Hour Modal Split [%]	
Light Vehicles	69%
Heavy Vehicles	29%
Minibus Taxi	1%
Bus	1%

Week Period	Average Daily Traffic (ADT) [veh/day]			Average Daily Truck Traffic (ADTT) [veh/day]			Heavy Vehicle Proportion [%]		
	Eastbound	Westbound	Total	Westbound	Eastbound	Total	Westbound	Eastbound	Total
Weekday	1978	2151	4129	506	653	1159	26%	30%	28%
Weekend	1816	1807	3623	233	368	601	13%	20%	17%

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Traffic counts (graphical representation)

Mapping info often gives a different perspective.



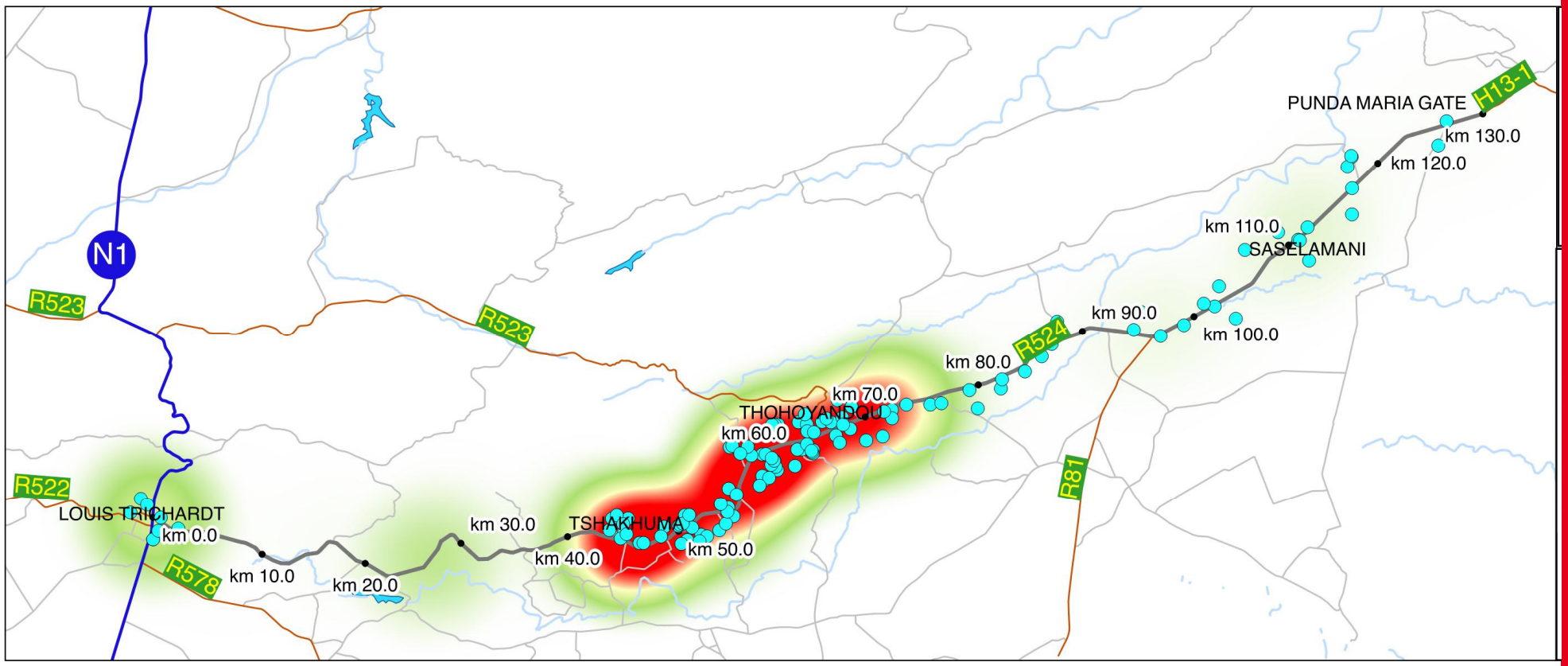
INFORMATION REVIEW AND SITE INSPECTION

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Traffic counts(graphical representation)

NMT Demand vs school location heat map

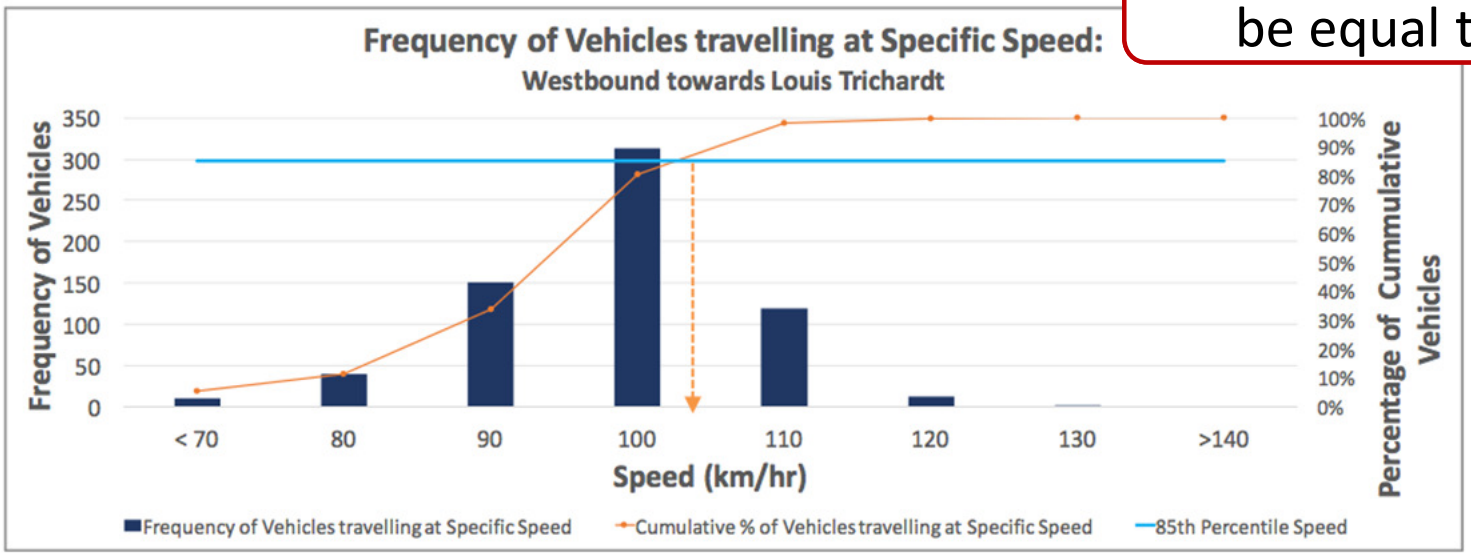
Mapping info often gives a different perspective.

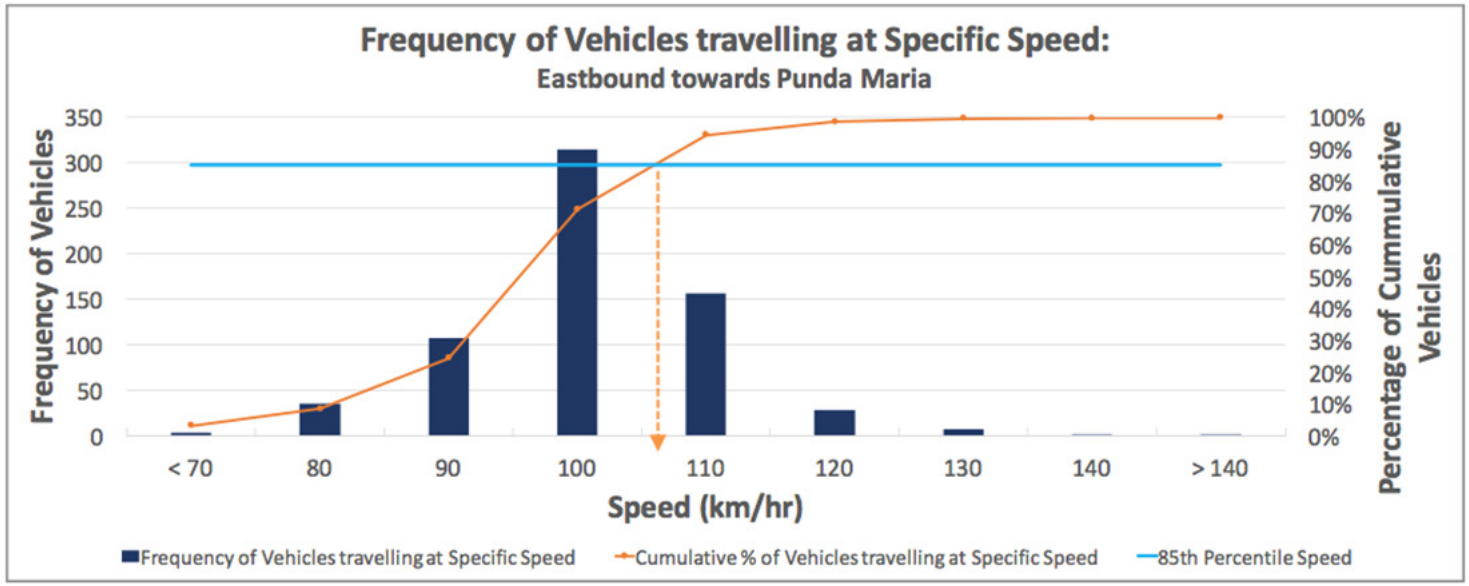


Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Speed Surveys

85th percentile speed should be equal to speed limit.





Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Crash Data

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data - Crash Data

Collision/crash data and information:

Unfortunately good quality crash data is hard to come by.

Source data from:

- Road authority's incident management system
- Local/provincial traffic police's accident database
- Local police station's Vehicle Accident Report Book
- Road authority's route manager/incident response teams

Anecdotal information regarding crashes can be obtained from:

- Local business owners
- Councillors or community leaders
- Officials from the local authority

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Accident Report Form

Obtain copies of completed accident report forms

Police station area where accident occurred (* COMPLETE IF APPLICABLE)

AR no.

CAS / /

Accident Report (AR) Form

Serial number

Capturing number

Accident date (DD/MM YYYY) / /

Day of week: Su M Tu W Th F Sa

Number of vehicles involved

Time of accident (24h) :

LOCATION

Built-up area: 1. Yes 2. No

Speed limit on road: km/h

Province 1. EC 2. FS 3. GP 4. KZN 5. MP 6. NW 7. NC 8. LIM 9. WC

Street/road name/road number

TOWN / CITY

*At intersection with (street/road name/road no.)

*Or between (street/road name/road no.)

and (street/road name/road no.)

*Suburb (if in city/town)

*City/town name

FREEWAY/RURAL

*At intersection with (road number/name)

*Or approximately km measured in compass direction N S E W

from

(Describe the distance (bridge, culvert, intersecting road or road, or distance at interchange, name of building, house, pole number, etc.)

*Information on kilometre marker: road no./section km

*Between (city/town) and (next city/town)

ROAD TYPE:

1. Freeway 5. Driveway
2. Dual/Ramp 6. Other (specify)
3. Dual carriageway 8. Cul-de-sac/parking/park
4. Single carriageway (two way) 10. Off-road parking/park

JUNCTION TYPE:

1. Cross roads 7. Metal junction or crossing
2. T-junction 9. On ramp (freeway)
3. Staggered junction 11. Off ramp (freeway)
4. Y-junction 11. Pedestrian Crossing
5. Circle 12. Access/driveway access
6. Level Crossing 2. Other (specify)

*GPS reading: X co-ordinate Y co-ordinate

PARTICULARS OF DRIVER A OR	DRIVERS/CYCLISTS	PARTICULARS OF DRIVER B OR
/ /	ID type/ ID number/ age	/ /
	Country of origin of ID	
	Surname	
/	Full name/ initials other names	/
	Residential/home address	
( ) H W	Telephone number	( ) H W
	Work/contact address	
( ) H W	Cellphone/other number	( ) H W
1. Asian 2. Black 3. Coloured 4. White 98. Other 00. Unknown	How would you describe the driver?	1. Asian 2. Black 3. Coloured 4. White 98. Other 00. Unknown
1. Male 2. Female 0. Unknown	Gender	1. Male 2. Female 0. Unknown
1. DL 2. LL 9. None / /	Driving/Learner Licence number & date of issue (DD/MM/YYYY)	1. DL 2. LL 9. None / /
A1 A B C1 C EB FC1 FC Other (specify)	Driving/Learner Licence code	A1 A B C1 C EB FC1 FC Other (specify)
1. Killed 2. Serious 3. Slight 4. No injury	Severity of injury	1. Killed 2. Serious 3. Slight 4. No injury
	Ambulance service, driver, case reference number & hospital	
1. Yes 2. No 0. Unknown	Seatbelt fitted/helmet present	1. Yes 2. No 0. Unknown
1. Yes 2. No 0. Unknown	Seatbelt/helmet **definitely** used	1. Yes 2. No 0. Unknown
1. Yes 2. No	Liquor/drug use **suspected**	1. Yes 2. No
1. Yes 2. No	Liquor/drug use: **evidentiary tested**	1. Yes 2. No
No Yes (Write particulars on page 3)	Any passengers/pedestrians?	No Yes (Write particulars on page 3)

DETAILS OF VEHICLE A OR	VEHICLES	DETAILS OF VEHICLE B OR
N S E W	Travel towards direction	N S E W
Check if front and back number-plate correspond with licence disc and expiry date of disc	Number plate number	Check if front and back number-plate correspond with licence disc and expiry date of disc
	Licence disc number	
	Colour	
	Make	
	Model (e.g. 280SE, ASTRA)	
&	*Trailer number plate number	&
1. Yes 2. No 0. Unknown	Carried passengers for reward? (e.g. bus or taxi)	1. Yes 2. No 0. Unknown
	Breakdown company, telephone number & driver name	

PAGE 1

Passenger vehicles: Write the vehicle reference letter (A, B, C, etc.) in the blocks.

31. Minibus or station wagon
32. Combi/mini bus
33. Midibus
34. Bus
35. Bus train

Goods vehicles: Write the vehicle reference letter (A, B, C, etc.) in the blocks.

36. Light delivery vehicle
37. Rigid truck
38. GVM>3500kg (greater than)
39. Truck and trailer
40. Truck articulated multiple

Motor cycles: Write the vehicle reference letter (A, B, C, etc.) in the blocks.

41. 125cc and under
42. Above 125cc
43. Tricycle
44. Quad-cycle

Other vehicles: Write the vehicle reference letter (A, B, C, etc.) in the blocks.

45. Bicycle
46. Mobile equipment (driver)
47. Animal-drawn vehicle
48. Other (specify)

LIGHT CONDITION: (Mark ONE only)

1. Daylight 3. Night: unlit 5. Other (specify)
2. Night: lit by street light 4. Dawn/dusk

WEATHER CONDITIONS AND VISIBILITY: (Mark one box only)

1. Clear 4. Misting 7. Hail/sleet
2. Overcast 5. Hail/Snow 8. Severe wind
3. Rain 6. Dust 0. Unknown

ROAD SURFACE TYPE: (Mark ONE only)

1. Concrete 3. Gravel 8. Other (specify)
2. Tarmac 4. Clay

QUALITY OF ROAD SURFACE: (Mark ONE only)

1. Good 4. Cracks
2. Dumpy 5. Corrugated
3. Potholes 8. Other (specify)

ROAD SURFACE: (Mark ONE only)

1. Dry 5. Snow 9. Water standing/flowing
2. Wet 6. Loose gravel or sand
3. Wet/Heavy rain 7. Slippery
4. Ice 8. Other (specify)

ROAD MARKING VISIBILITY: (Mark ONE only)

0. Unknown 4. Not applicable (specify)
1. Good 7. N/A

OBSTRUCTIONS:

1. Accident site 3. Roadblock 9. None
2. Roadworks 8. Other (specify)

OVERTAKING CONTROL: (Mark ONE only)

1. Barrier line 2. Road sign 7. N/A
9. None

1. Robot
2. Stop sign
3. Yield sign
4. Other
5. Other vehicle
6. Uncontrolled junction
7. Non-automatic crossing
8. Non-automatic crossing with barrier line
9. All robots out of order
10. Some robots out of order (specify)
11. Flashing robots (red/yellow)
12. None
13. Pedestrian crossing
14. Barrier line

ROAD SIGNS CLEARLY VISIBLE:

1. Yes 2. No 7. N/A

CONDITION OF ROAD SIGNS:

1. Good 2. Not good 3. Damaged or missing
7. N/A (specify)

DIRECTION OF ROAD: (Mark ONE only)

1. Straight 2. Curving 3. Sharp curve 90 degrees or more

FLAT OR SLOPED: (Write vehicle reference letter (A, B, C, etc.) in the blocks)

1. Flat 2. Uphill 3. Downhill 4. Steep uphill 5. Steep downhill

POSITION OF VEHICLE BEFORE ACCIDENT:

Write the vehicle reference letter (A, B, C, etc.) in the blocks.

1. Correct road lane
2. Wrong road lane (straight ahead only)
3. Wrong side of road
4. Road shoulder
5. Off road parking bay
6. Off road parking bay

VEHICLE MANOEUVRE/ WHAT DRIVER WAS DOING:

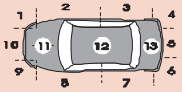
Write the vehicle reference letter (A, B, C, etc.) in the blocks.

01. Turning right
02. Turning left
03. U-turn
04. Entering traffic flow
05. Merging
06. Changing lane
07. Overtaking (see-saw)
08. Overtaking (passing off)
09. Travelling straight
10. Reversing
11. Building start
12. Stationary vehicle
13. Changing lane
14. Swerving
15. Stopping (driver)
16. Avoiding object
17. Stationary (specify)
18. Parking (specify)
98. Other

VEHICLE DAMAGE: (Write the City of Johannesburg Motor Vehicle Accident Report vehicle damage codes)

Write the vehicle reference letter (A, B, C, etc.) in the blocks.

C1. Right front
C2. Right mid front
C3. Right mid back
C4. Back right
C5. Back centre
C6. Back left
C7. Left mid back
C8. Left mid front
C9. Left front
C10. Front centre
C11. Bonnet
C12. Roof
C13. Boot
C14. Multiple
C15. Caught fire
C16. Rolled
C17. Damage underneath
C18. Damage wheel
C19. No damage
C20. Windscreen/ windows



1. Head-rear end
2. Head on
3. Sideswipe: opposite directions
4. Sideswipe: same direction
5. Approach at angle - both travelling straight
6. Single vehicle: off the road
11. Single vehicle: overturned
12. Accident with pedestrian
13. Accident with animal (specify)
14. Accident with train
15. Accident with tree/ other object (specify)

Was this a Hit & Run accident? 1. Yes 2. No

ACCIDENT SKETCH:

Show direction North with arrow. Show direction, position and reference number of each vehicle, pedestrian, impact point of impact, lamp posts, fixed point(s), and other object(s) involved. Measurements also confirm!

BRIEF DESCRIPTION OF THE ACCIDENT:

PAGE 2

INFORMATION REVIEW AND SITE INSPECTION

SARF better roads SANRAL NOVUS³ RTS

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Summarised crash data from Metro Police

Only summarised information is often available

GEN-DAST

NUMBER OF ACCIDENTS AND CASUALTIES PER DAY

Authority : TSHWANE METRO POLICE (4046)
Section : HANS STRIJDOM-RYLAAN (1)
From date : 01/01/2003

Road : HANS STRIJDOM-RYLAAN (H0205)
Node : GARSFONTEIN x HANS STRIJDOM
To date : 20/11/2006

	Accidents/Persons							
Date	Fatal accidents	Injury accidents	Damage	Total accidents	Persons killed	Persons serious	Persons slight	Total persons
08/01/2003	0	1	0	1	0	0	1	1
10/01/2003	0	1	0	1	0	0	2	2
13/01/2003	0	0	1	1	0	0	0	0
16/01/2003	0	0	1	1	0	0	0	0
29/01/2003	0	0	1	1	0	0	0	0
04/02/2003	0	1	0	1	0	0	1	1
06/02/2003	1	0	2	3	2	2	1	5
14/02/2003	0	0	1	1	0	0	0	0
17/02/2003	0	0	1	1	0	0	0	0
22/02/2003	0	1	0	1	0	0	1	1
11/03/2003	0	0	1	1	0	0	0	0
22/03/2003	0	1	0	1	0	0	1	1
28/03/2003	0	0	1	1	0	0	0	0
01/04/2003	0	0	2	2	0	0	0	0
15/04/2003	0	0	1	1	0	0	0	0
23/04/2003	0	0	1	1	0	0	0	0
29/04/2003	0	0	1	1	0	0	0	0
03/05/2003	0	0	1	1	0	0	0	0
14/05/2003	0	0	1	1	0	0	0	0
26/05/2003	0	0	1	1	0	0	0	0
30/05/2003	0	0	1	1	0	0	0	0
31/05/2003	0	1	1	2	0	1	1	2
05/06/2003	0	0	1	1	0	0	0	0
06/06/2003	0	0	1	1	0	0	0	0
11/06/2003	0	0	2	2	0	0	0	0
27/06/2003	0	1	1	2	0	0	1	1
26/07/2003	0	1	1	2	0	0	1	1
29/07/2003	0	0	1	1	0	0	0	0
30/07/2003	0	0	1	1	0	0	0	0
05/08/2003	0	1	1	2	0	0	1	1
08/08/2003	0	1	0	1	0	0	2	2
15/08/2003	0	1	2	3	0	0	1	1
25/08/2003	0	0	1	1	0	0	0	0
27/08/2003	0	0	1	1	0	0	0	0
30/08/2003	0	0	1	1	0	0	0	0
03/09/2003	0	0	1	1	0	0	0	0
05/09/2003	0	0	1	1	0	0	0	0
07/09/2003	0	0	1	1	0	0	0	0

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Summarised crash data from Metro Police

Only summarised information is often available

Includes accidents on intersecting roads

ACCIDENTS PER VEHICLE TYPE

Authority : TSHWANE METRO POLICE(4046)

Road : HANS STRIJDOM-RYLAAN (H0205)

Period : 01/01/2003 - 20/11/2006

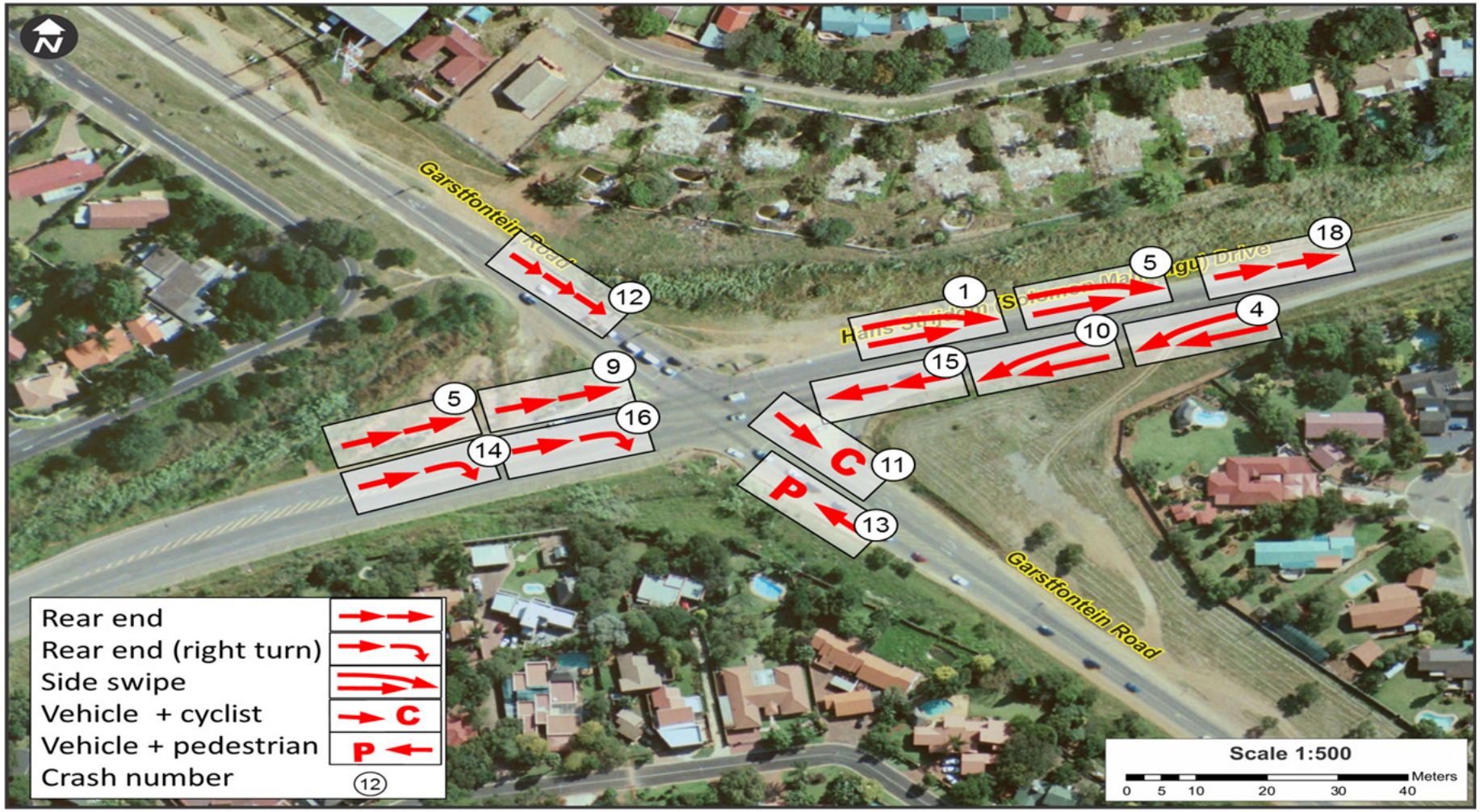
Section : HANS STRIJDOM-RYLAAN (1)

Node : GARSFONTEIN x HANS STRIJDOM-RYLAAN (110)

Vehicle type		ACCIDENTS					Graphical representation
Code	Vehicle type	Fatal	Serious	Slight	No inj	Total	0 60 120 181 241 301
1	Motor car/station wagon	8	18	45	230	301	
6	Light delivery vehicle	4	4	18	65	91	
0	Unknown	0	1	1	28	30	
	Unknown	1	0	11	17	29	
8	GVM>3500Kg: (greater than)	1	0	6	6	13	
9	Truck: Articulated	2	2	0	8	12	
2	Combi/minibus	0	0	0	11	11	
12	M.cycl: Above 125cc	0	1	3	0	4	
4	Bus	0	0	1	1	2	
7	Panelvan	0	1	1	0	2	
98	Other vehicle	1	0	0	1	2	
10	Truck : Articulated multiple	0	0	0	1	1	
11	M.cycl: 125cc and under	0	0	0	1	1	
15	Bicycle	0	0	0	1	1	
20	Taxi	0	0	0	1	1	
Grand Total:		17	27	86	371	501	

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Crash data analysis

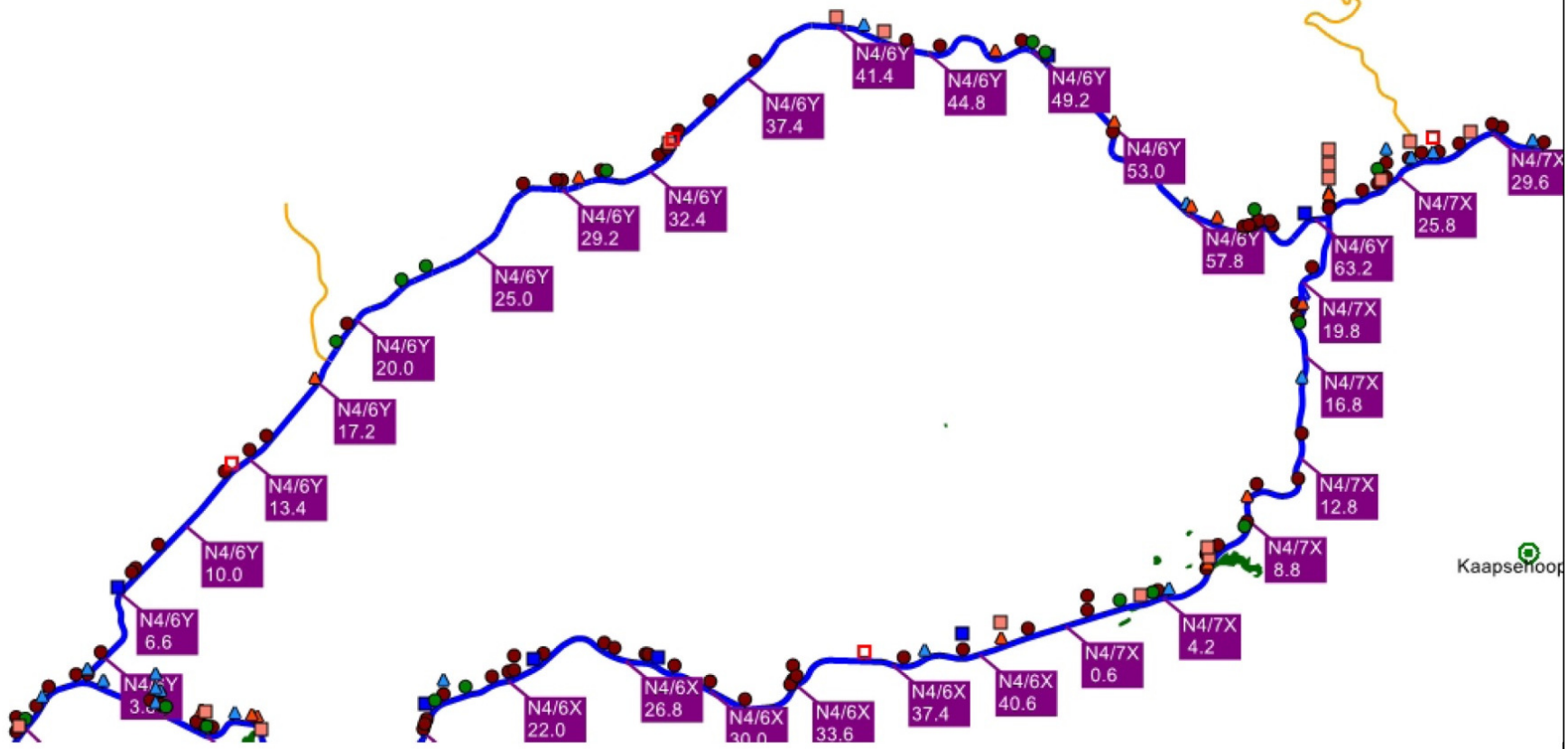


Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Summarised crash data from incident management system

Obtain data from road authority's incident management system.

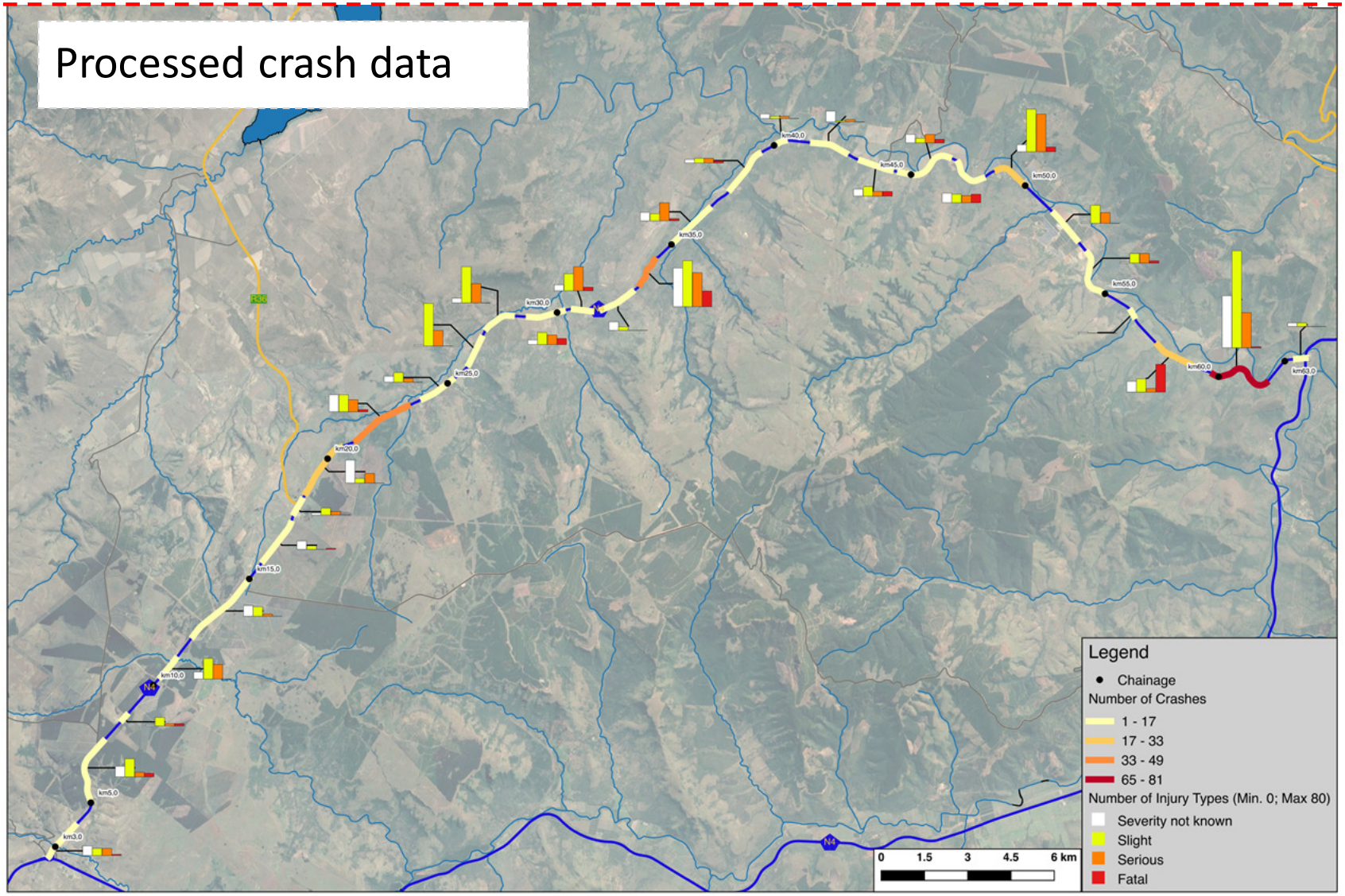
Example: Good quality crash data from IMS



Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

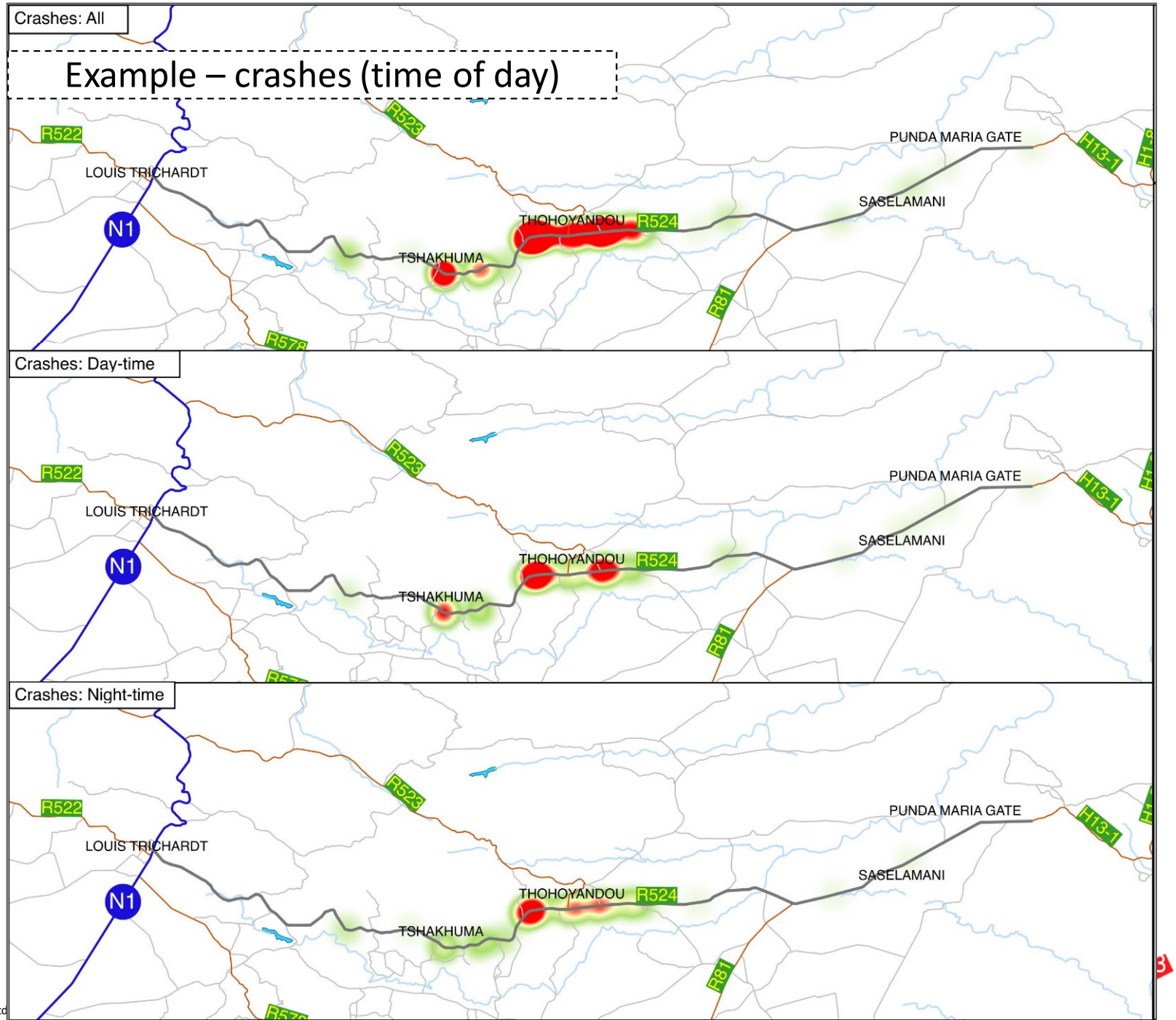
Relevant data – Summarised crash data from incident management

Obtain data from road authority's incident management system.



Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant data – Crash data analysis - spatial analysis



Copyright Novus³(Pty)Ltd

Relevant Data – Road Infrastructure & Environment

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

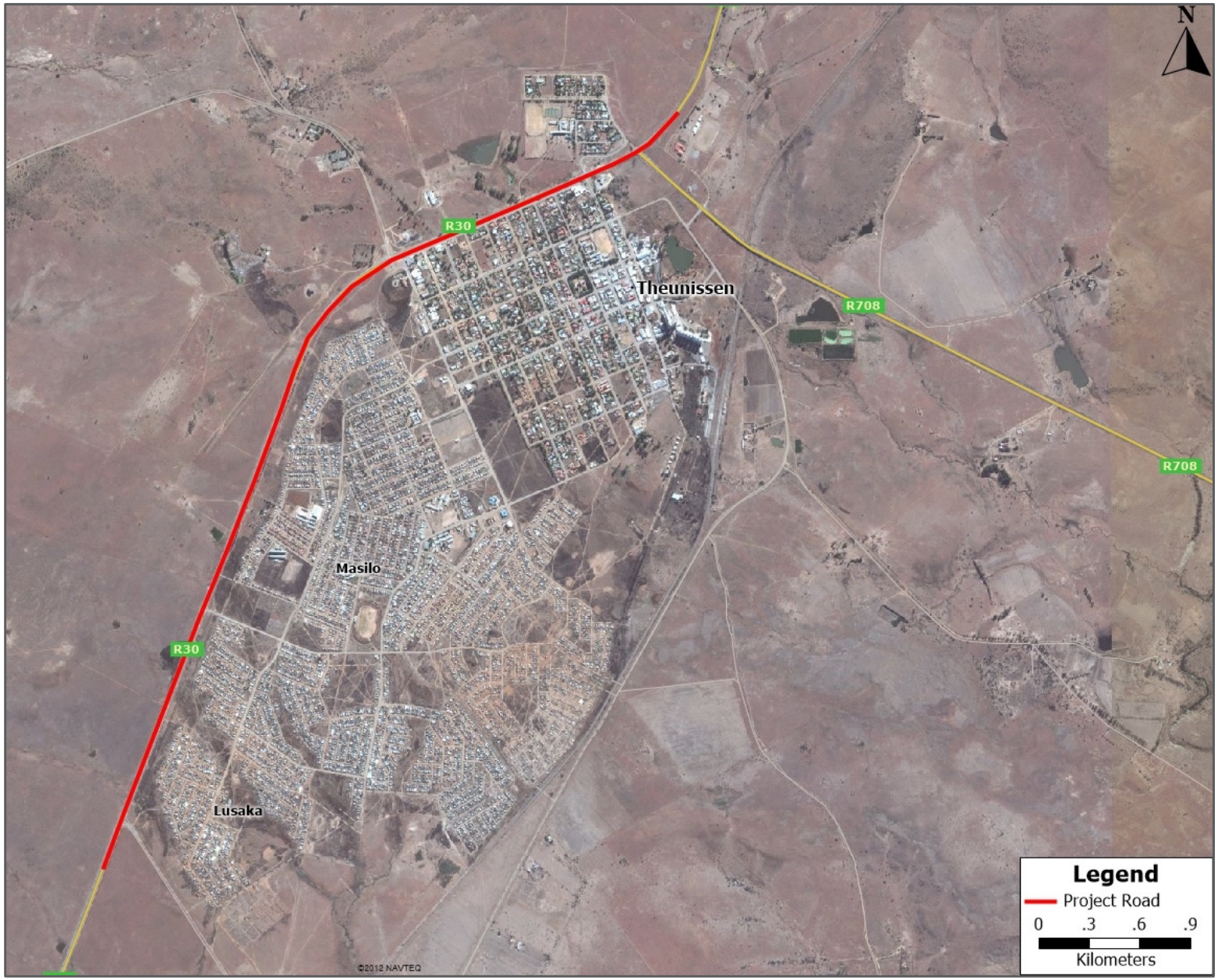
Relevant Data – Road Infrastructure & Environment

Analysis of road environment assist in identifying road safety risks

- Lane configuration
- Road markings & signs
- Intersection control
- Accesses
- Public transport facilities
- NMT facilities
- Traffic calming measures
- Road side furniture
- Street lighting
- Barriers/ guard rails
- Bridges/ culverts
- Land use
- Tourist attractions/ facilities

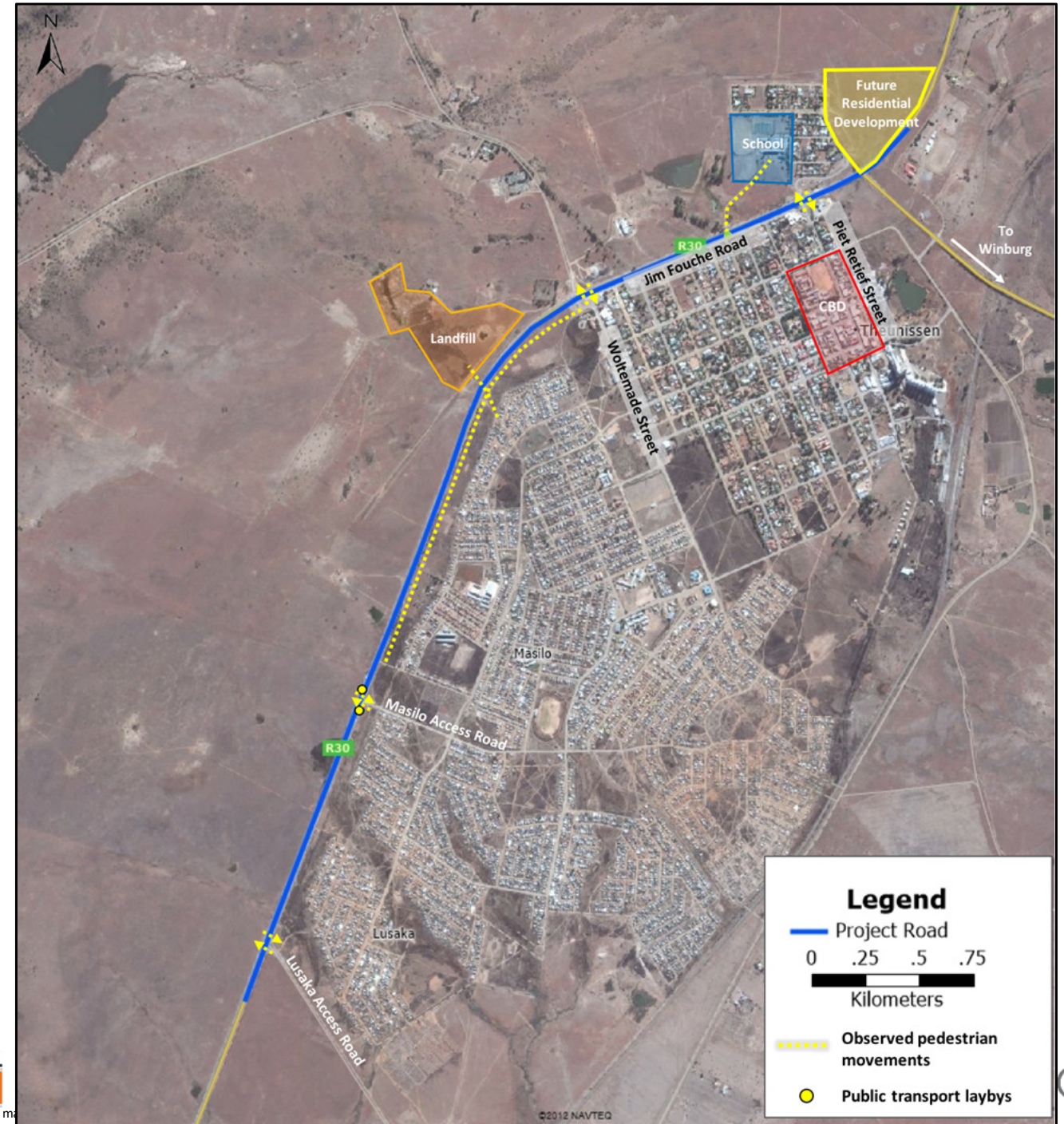
Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant Data – Project extent



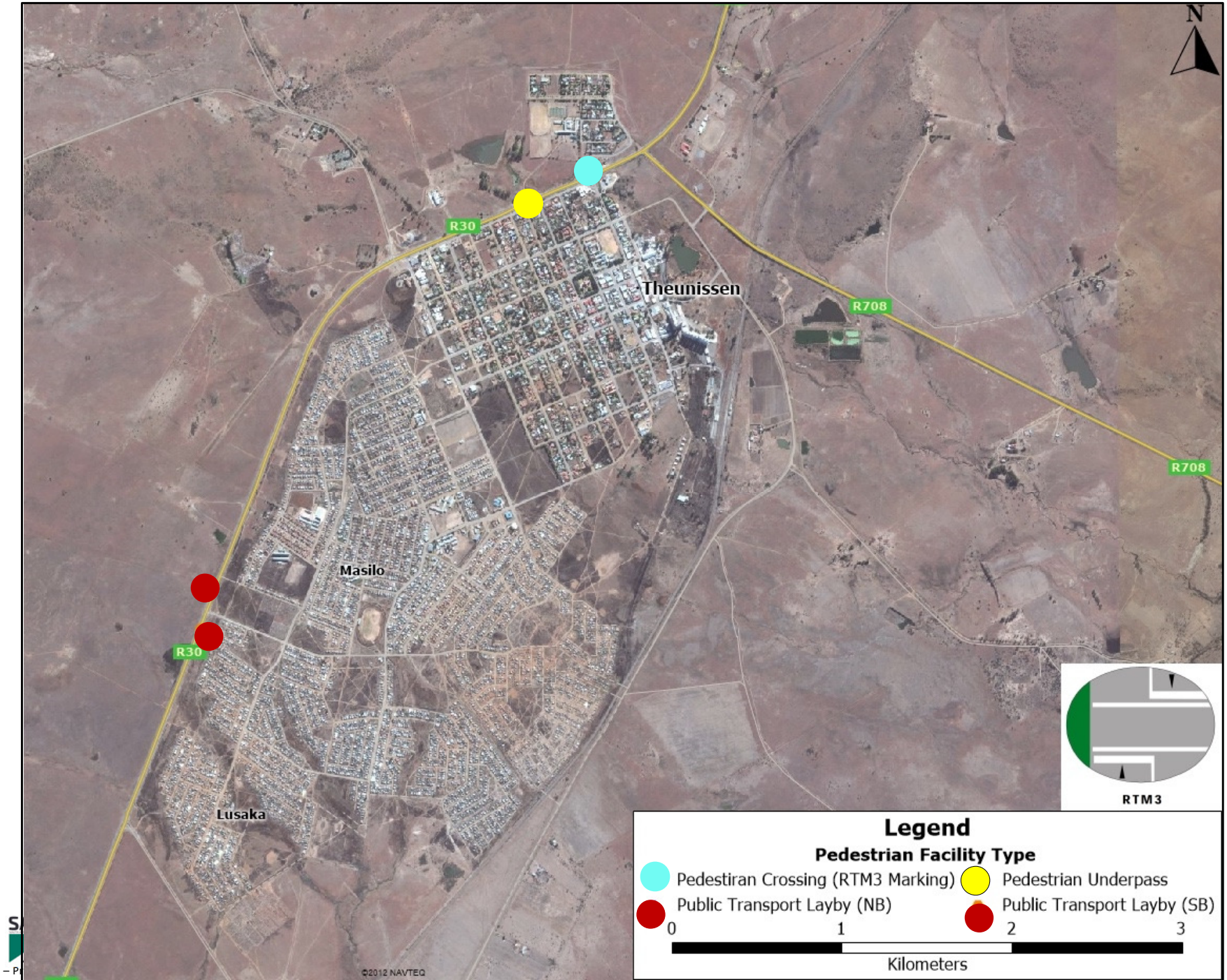
Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Relevant Data – Land Use & Pedestrians



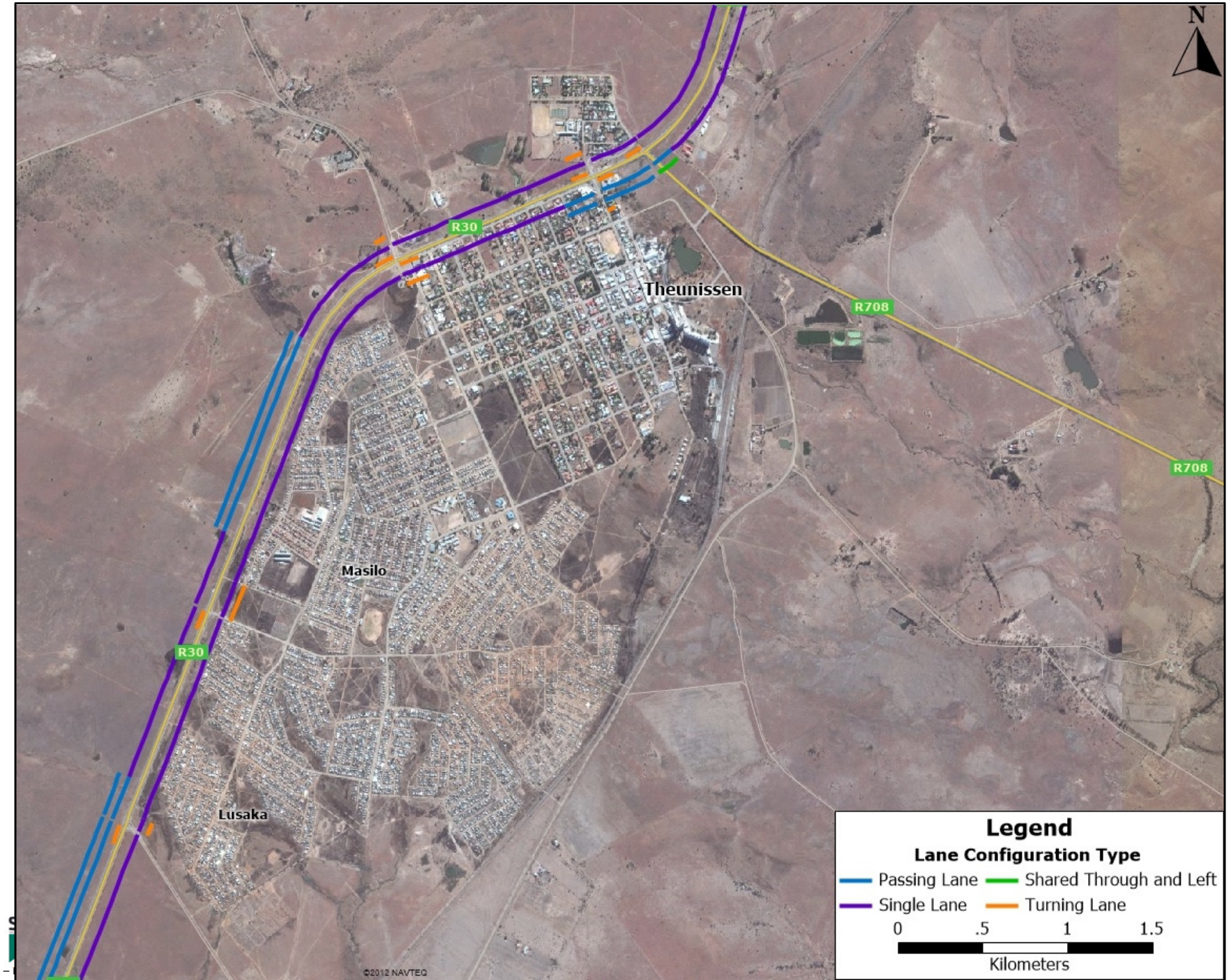
Copyright Novus³(Pty)Ltd – Presentation ma

Relevant Data – Pedestrian/PT infrastructure



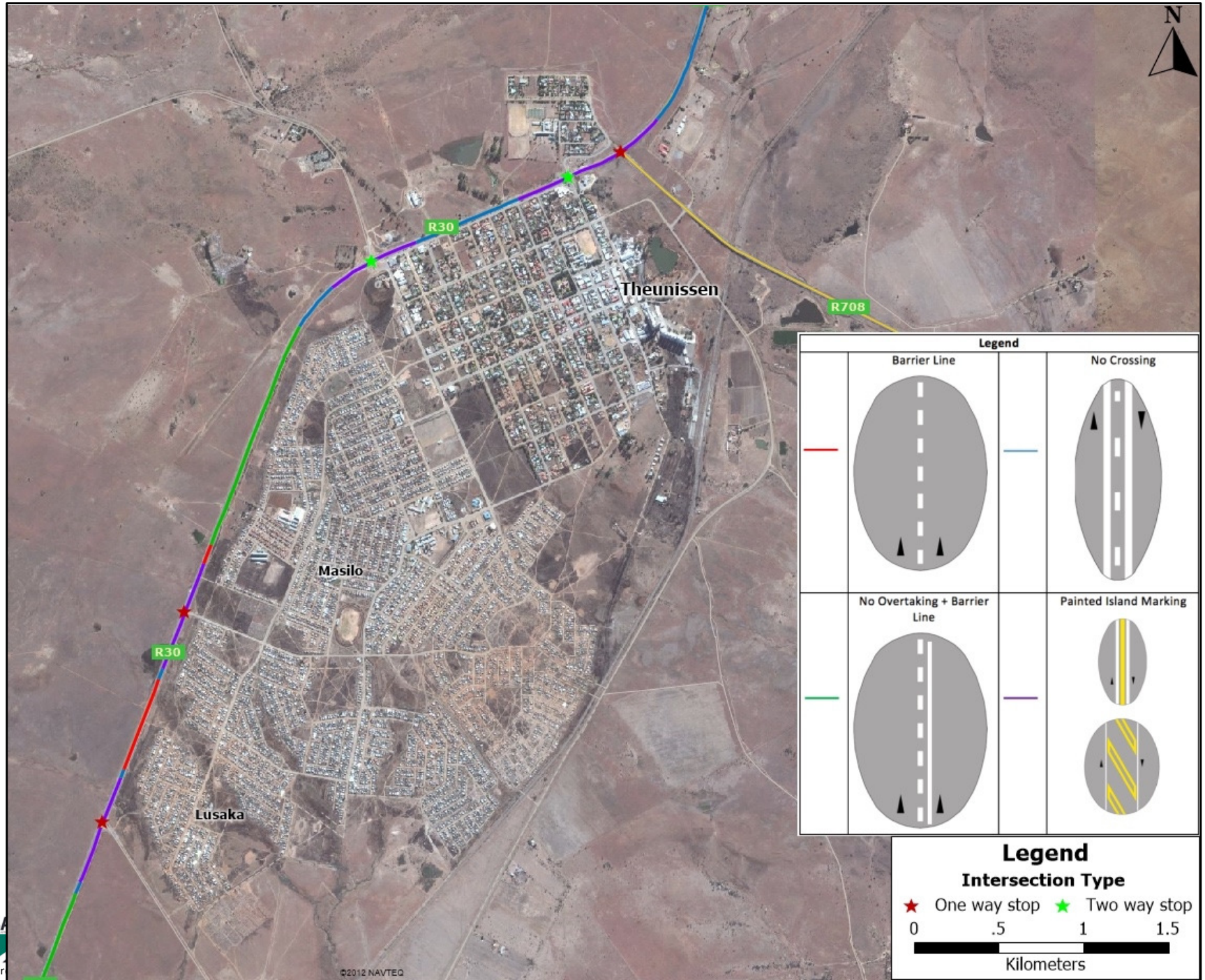
Copyright Novus³(Pty)Ltd – P

Relevant Data – Lane configuration



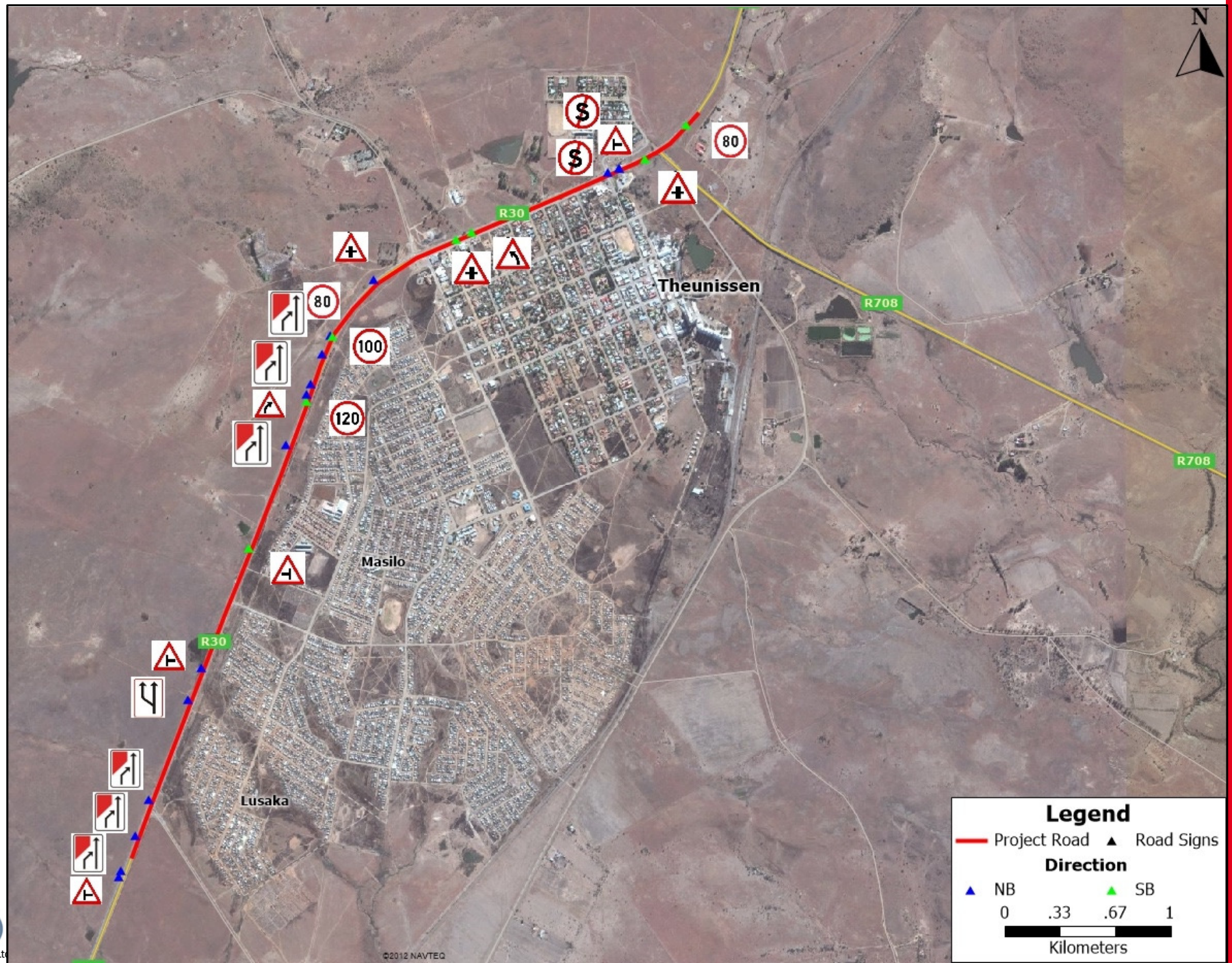
Copyright Novus³(Pty)Ltd –

Relevant Data – Road markings



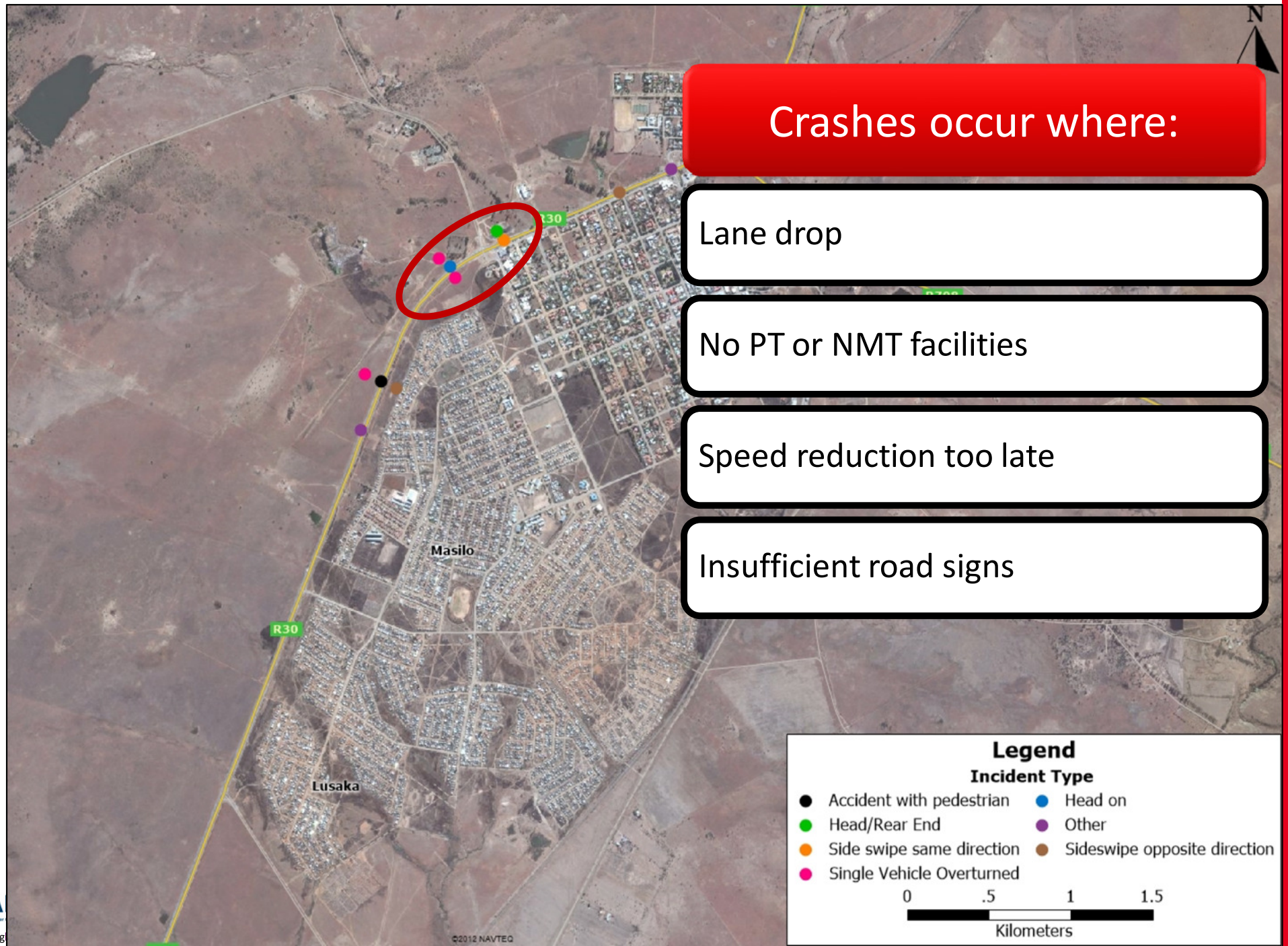
SARF
Copyright Novus³(Pty)Ltd – Pr

Relevant Data – Road signs



SARF
Copyright Novus³(Pty)Lt

Relevant Data – Crash Types

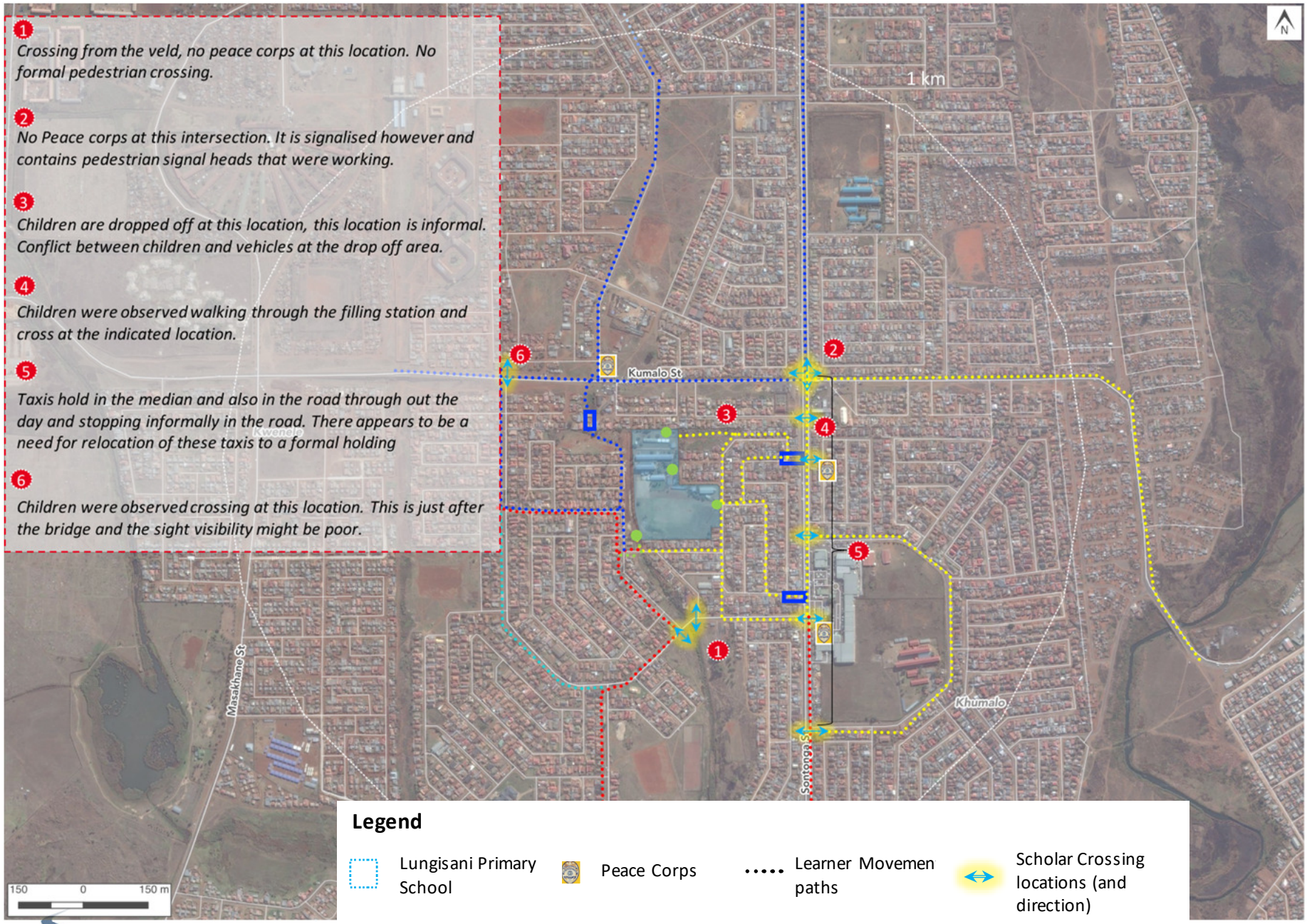


Crashes occur where:

- Lane drop
- No PT or NMT facilities
- Speed reduction too late
- Insufficient road signs

SA
Copyrig

Relevant Data – Project context and safety risk locations



1. *Crossing from the veld, no peace corps at this location. No formal pedestrian crossing.*
2. *No Peace corps at this intersection. It is signalised however and contains pedestrian signal heads that were working.*
3. *Children are dropped off at this location, this location is informal. Conflict between children and vehicles at the drop off area.*
4. *Children were observed walking through the filling station and cross at the indicated location.*
5. *Taxis hold in the median and also in the road through out the day and stopping informally in the road. There appears to be a need for relocation of these taxis to a formal holding*
6. *Children were observed crossing at this location. This is just after the bridge and the sight visibility might be poor.*

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Site Inspection

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Site inspection

Site inspection

To identify how the proposal interacts with its surroundings and nearby roads; to visualise potential obstructions and conflicts for road users.

- Observe conditions at day and night.
- Review interaction with adjacent road sections and land use.
- Establish traffic conflicts (all modes)
- Identify risks due to proposed new scheme or road upgrade.
- Need for communication with road users.

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Site Inspection

The site visit provides the opportunity to:

To meet with relevant local role players who may be able to provide context and background:

- *Existing traffic operation and road safety issues*
- *Future infrastructure and land use planning*

Traffic police

SAPS

Route manager

Community liaison officer

Local authority

- *Engineering department*
- *Land use planning*
- *Community safety*

Community leaders

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

WBS 2-2: Site Investigations

Site visit activities :

Site/route inspection	○ All relevant peak periods ▪ *AM, PM and off-peak* ▪ *Night time* ▪ *Weekends* ○ Observations on consecutive days if required.
On site observations	○ Road infrastructure - alignment, sight distance, road markings & signs, street lights ○ Public transport infrastructure ○ NMT infrastructure ○ Land use ○ Road user activity – desire lines, peak flows ○ Traffic, intersection and traffic signal operations

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

CONCLUSION

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

Conclusion

On completion of the data processing and analysis the audit team must:

Understand what the current road safety risks are.

Should be able to summarise the problem in a few sentences.

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.

END OF LECTURE

Copyright Novus³(Pty)Ltd – Presentation may only copied or distributed with permission of the authors.