Queanbeyan-Palerang Regional Future Do-minimum Network Deficiency Analysis

PREPARED FOR Queanbeyan-Palerang Regional Council | July 2023

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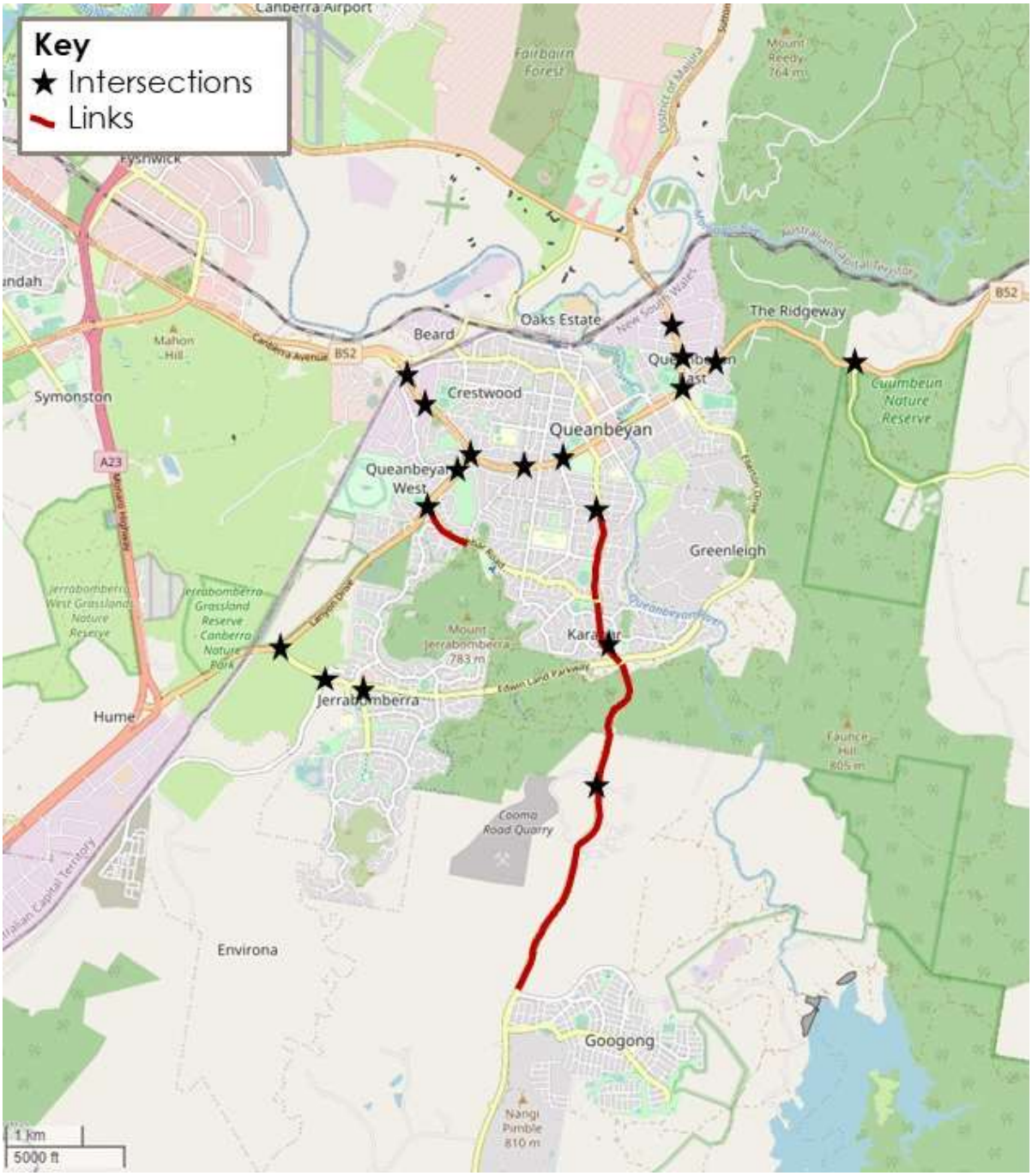
Executive summary

Stantec was asked to assess the future Queanbeyan-Palerang Regional Council (QPRC) network deficiencies that are expected to arise as a result of changing land use and demographics throughout both the QPRC and ACT areas. As part of that assessment, it was necessary to firstly apply the expected future demographic changes to the do-minimum future networks to show where the QPRC road network, if left in its do-minimum state, would come under Level of Service (LOS) stresses in excess of the desired LOS D state. Having determined those stressed locations, a following assessment will be undertaken to progressively implement network upgrades to return the future network to a LOS D or better state.

This report discusses locations, shown in the following figure, within the QPRC do-minimum network that over time drop below the desired LOS D state. The progression of these deficiencies is shown in the following summary table.

Location	DO MINIMUM MODELS														
	AM								PM						
	2021	2024	2027	2031	2036	2041	2046		2021	2024	2027	2031	2036	2041	2046
Intersections															
Lanyon / Southbar	F	E	F	F	F	F	F		C	D	E	E	E	E	D
Yass / Ellerton / Bungendore	F	F	F	F	F	F	F		E	F	F	F	F	F	F
Bungendore / Thurralilly	E	D	D	C	C	C	C		E	F	F	F	F	F	F
Canberra / Kealman	C	C	C	C	C	C	D		F	F	F	F	F	F	F
Lanyon / McCrae	C	C	D	D	D	D	D		D	D	E	E	E	E	F
Lanyon / Gilmore	C	D	D	C	C	C	C		E	E	E	E	E	E	E
Lanyon / Canberra	C	D	D	D	D	D	D		F	F	F	F	F	F	F
Jerrabomberra Circle	C	C	E	E	D	D	E				C	C	C	C	C
Canberra / Cameron / Campbell	E	E	E	F	F	F	E		D	E	E	E	E	E	E
Old Cooma / Wickerslack	E	F	F	F	F	F	F		D	F	F	F	F	F	F
Tompsitt / Environa	C	C	D	D	D	D	E		C	C	D	E	D	D	D
Cooma / Fergus	C	C	C	C	C	C	C		C	C	D	D	E	E	F
Canberra / Kendall / Gilmore	D	D	D	D	D	D	E		D	D	D	D	E	E	E
Canberra / Tharwa	F	C	C	D	D	C	D		C	C	C	C	C	C	D
Yass / Silva	C	D	D	D	D	E	E		C	D	D	D	D	D	D
Yass / Hincksman	D	D	D	D	D	E	E		C	C	C	C	C	D	D
Kings Hwy / Captains Flat				C	E	F	F								
Cooma / Candelbark	C	C	D	D	E	E	E		C	D	D	D	E	E	E
Links															
Cooma (Southbar to Ellerton)	E	E	E	E	E	E	E		C	D	E	E	E	E	E
Cooma (Thorpe to Southbar)	C	D	D	D	E	D	E		C	D	D	D	D	D	E
Old Cooma (Ellerton to Googong)		C	D	D	E	E	E			C	C	D	D	E	E
Southbar (Lanyon to Tharwa)	E	E	E	E	E	E	E		C	D	D	E	E	E	E

The locations of the above list of assessed intersections and links are shown on the map below.


Key
Intersections
Links
Canberra Airport
Fairbairn Forest
Mount Reedy 764 m
Fyshwick
Mahon Hill
Canberra Avenue
B52
Beard
Oaks Estate
The Ridgeway
Crestwood
Queanbeyan
Queanbeyan East
Queanbeyan West
Symonston
A23
Monaro Highway
Greenleigh
Jerrabomberra West Grassland Nature Reserve
Jerrabomberra Grassland Reserve Canberra Nature Park
Mount Jerrabomberra 783 m
Karabar
Jerrabomberra
Hume
Tarcutta Hill 805 m
Cooma Road Quarry
Environa
Googong
Nangi Pimble 810 m
1 km
5000 ft

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1 Introduction

The purpose of this report is to be a precursor to identifying the improvements needed to the future 2046 Queanbeyan-Palerang Regional Council (QPRC) network to return it to a similar Level of Service as that currently provided in the 2016 network. This report updates a previous report based on the 2016 Census with results of modelling undertaken using the 2021 Census as a replacement for the previously projected 2021 land use and producing later future year land uses based on the updated 2021 Census data as a base.

One of the main objectives of the Queanbeyan and Bungendore Traffic Study Update was to identify when and where transport network improvements should occur in the Queanbeyan transport network between 2016 and 2046. To assist with this, it was necessary to analyse the state of the “do-minimum” network at each future year and identify the deficiencies that would exist if no network improvements were undertaken. This do-minimum network included all funded network improvements within the QPRC area intended for each modelled future year and improvements proposed by the ACT for their road network.

2 Background

2.1 Summary of the Model

Section 2 of the **Queanbeyan-Palerang Regional 2016 Transportation Model Update Report August 2022** contains a detailed account of the model structure for the 2016 base year and future year road networks and land use information.

The land use for the future years were generated by using development projections within the QPRC area as provided by Council and interpolating development projections within each of the ACT districts as provided by ACT planning staff. The ACT district projections are the same as those used in the current 2021 Canberra Strategic Transport Model but converted into the QPRC model zone structure.

Table 2-1 shows the breakdown of Total Households and Total Jobs for each future year period for each of the following regions: ACT, Googong, South Jerrabomberra, South Googong, Jumping Creek development areas, the Fernleigh/Burra/Royalla infill areas, Bungendore infill and the various Bungendore development areas.

Table 2-1: Total Households and Total Jobs for each future year period

Land Use								
Year	**Googong**	**South Jerrabomberra**	**Misc Infill**	**Jumping Creek**	**Bungendore**	**Rest of QPRC**	**ACT**	**Total**
Occupied Private Dwellings								
2016	462	-	799	-	1,116	15,550	142,244	160,171
2021	1,988	30	827	-	1,368	16,579	168,121	188,913
2024	3,015	480	857	65	1,850	16,940	176,069	199,276
2027	3,840	930	887	131	2,031	17,269	184,128	209,216
2031	4,680	1,500	927	218	2,357	17,709	195,171	222,562
2036	6,030	1,500	977	218	2,767	18,254	208,322	235,068
2041	6,200	1,500	1,027	218	3,038	18,779	221,473	252,235
2046	6,200	1,500	1,027	218	3,237	19,279	228,662	260,123
Employment								
2016	412	3	79	-	1,173	12,062	220,654	234,385
2021	576	219	96	-	1,653	13,591	265,949	282,084
2024	1,645	572	96	-	1,653	13,596	283,161	300,723
2027	2,033	1,019	96	-	1,653	13,596	300,585	318,982
2031	2,789	1,354	96	-	1,653	13,596	324,386	343,874
2036	3,410	1,354	96	-	1,653	13,596	343,730	363,838
2041	3,410	1,354	96	-	1,653	13,596	363,074	383,182
2046	3,410	1,354	96	-	1,653	13,596	382,418	402,526

2.2 Future Years Land Use

The background future year land use for this analysis was based on the established 2016, 2021, 2024, 2027, 2031, 2036, 2041 and 2046 land use information provided by QPRC and ACT. The ACT land use was provided for 2016, 2021, 2026, 2031 and 2041 only and therefore the intermediate future years of 2024, 2027, 2036 and 2046 were generated by interpolation of the primary ACT land use information and assuming that development occurred at a uniform rate between years.

This analysis also includes specific development information for the proposed South Jerrabomberra, Googong, South Googong, Jumping Creek development areas, the Fernleigh/Burra/Royalla infill areas, Bungendore infill and the various Bungendore development areas. The following details the assumed sequence of these developments:

- South Jerrabomberra
  - Years of Development: 2016-2031
  - Dwellings: 1,500
  - Population: 4,275
  - Employment: 1,204 jobs
  - School: 1,500 pupils, 150 jobs
- Googong
  - Years of Development: 2016-2036
  - Dwellings: 6,200
  - Population: 19,840
  - Employment: 3,653 jobs
  - Schools: 3,250 pupils, 329 jobs
- Jumping Creek
  - Years of Development: 2024-2031
  - Dwellings: 218
  - Population: 698
  - Employment: -
  - Primary School: -
- Fernleigh/Burra/Royalla Infill
  - Years of Development: 2024-2041
  - Dwellings: 200
  - Population: 640
  - Employment: -
  - Primary School: -
- Bungendore Infill
  - Years of Development: 2021-2048
  - Dwellings: 460
  - Population: 1,380
  - Employment: -
  - Primary School: -
- North Elmslea
  - Years of Development: 2021-2024
  - Dwellings: 351
  - Population: 1,053

  - Employment: -
  - Primary School: -

- Bungendore East
  - Years of Development: 2023-2038
  - Dwellings: 592
  - Population: 1,776
  - Employment: -
  - Primary School: -

- Ashby
  - Years of Development: 2025-2035
  - Dwellings: 250
  - Population: 750
  - Employment: -
  - Primary School: -

- North of North Elmslea
  - Years of Development: 2035-2048
  - Dwellings: 300
  - Population: 900
  - Employment: -
  - Primary School: -

2.2.1 Vehicles per household

A global ACT/Queanbeyan future projection rate for car availability was calculated using a vehicle availability projection model developed by Smith and Milthorpe for the Sydney Transport Model Recalibration in April 1995. This model is based on vehicles per 1000 population that are then converted into vehicles per household for use in the model.

The standard projection model assumes there would be an increase in global vehicles per 1000 population for the foreseeable future. The 2016 Census rate was recorded for the ACT/Queanbeyan area at 687 vehicles per 1000 Private Occupied Dwelling Population.

However, the determination of the level of future household car availability is dependent on many factors:

- Price of vehicles
- Price of fuel
- Use of hybrid vehicles
- Use of alternative fuels
- More fuel efficiency
- The change in ownership from large fuel inefficient vehicles to smaller fuel-efficient vehicles.
- Availability of alternative means of transport

Rather than assume a simple linear growth in car availability, an analysis was undertaken of the historic change in car availability in the ACT/Queanbeyan area. Figure 2-1 shows the historic change in vehicle availability of the ACT/Queanbeyan area and the projected future change in vehicle availability based on a reducing rate of increasing car ownership. The plot expresses availability in the form of vehicles per 1000 population and is asymptotic to 710 vehicles per 1000 Private Occupied Dwelling Population.

The corresponding number of vehicles per household has been calculated based on household and population projections for 2016 and 2046 and are shown in Table 2-2.

Table 2-2: ACT/Queanbeyan Projections of Vehicle/ People Ratios

ACT/Queanbeyan Projections of Vehicle/People Ratios		
	2016	**2046**
Population	408,242	645,719
Households	160,175	260,723
Vehicles	280,498	457,815
Vehs/1000 Pop	687	709
Vehs/HH	1.751	1.756

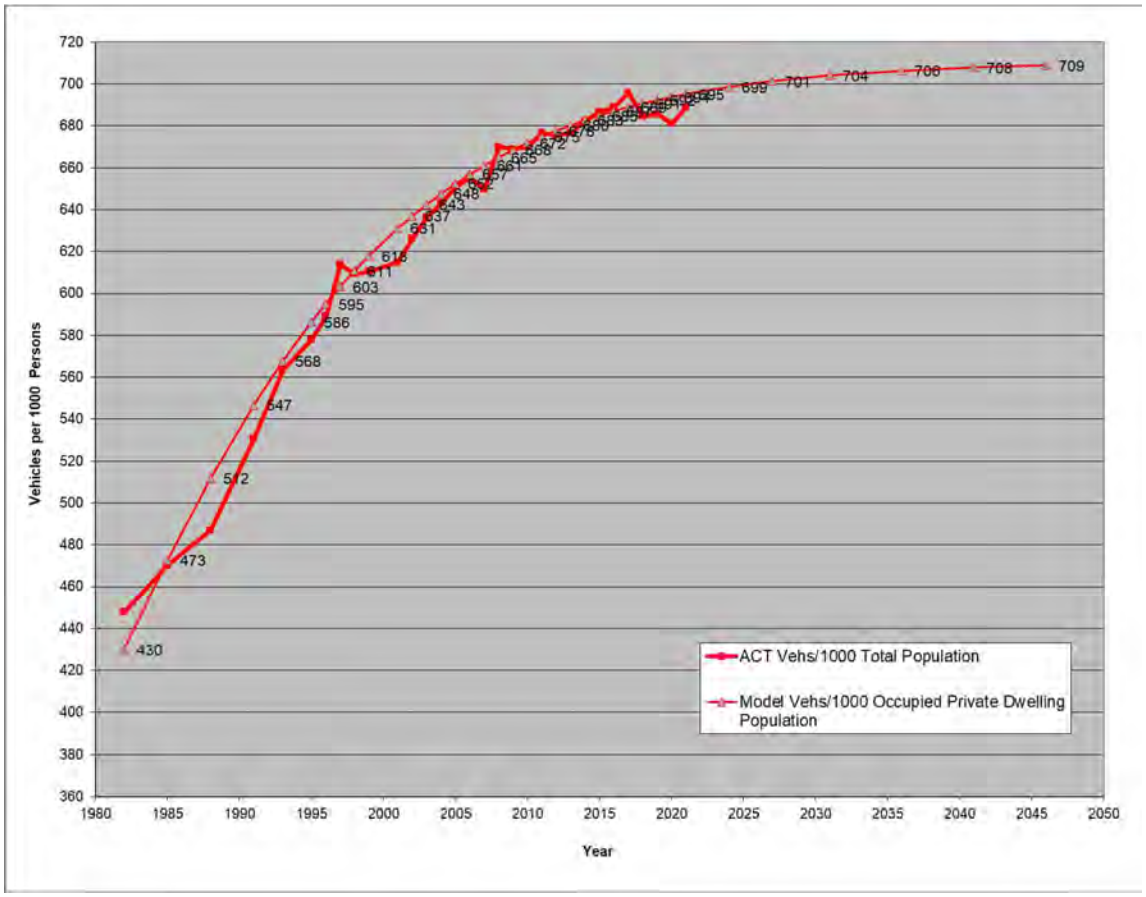


Figure 2-1: Change in Vehicle Availability

2.2.2 Externals

External flow relates to activity both inside and outside the model area. External traffic is made up of flow through the area and flow to and from land use inside the area. As households and jobs in the model area increase over time, the level of flow to and from areas outside the model increases correspondingly.

Growth in externals from 1996 to 2016 has historically varied within the area of each of the externals by 1%-4%. It is unlikely that the higher levels of growth would continue over the next 25 years and so some method of approximating external flow change needed to be determined.

The previous model update looked at the change in rate of external-bound trips per 1000 population but found that the ratio of external flow to population was actually increasing at a slower rate than expected and needed adjustment after the initial calculations. This update related the growth to rate of increase in the number of privately occupied households over time.

Table 2-3 and Table 2-4 show the modelled natural growth changes in external traffic flows.

Table 2-3: AM Peak External Traffic Flows – 2 Hour

Zone	Description	Inbound 2hr Flow		Outbound 2hr Flow	
		2016	2046	2016	2046
1793	Airport	1,040	1,693	1,500	2,442
1794	Mulligans Flat Road	955	1,554	290	472
1795	Barton Highway	1,789	2,912	532	866
1796	Tharwa Drive	43	70	25	41
1797	Monaro Highway	248	404	197	321
1798	Kings Highway	366	596	214	348
1799	Tarago Road	160	260	54	88
1800	Federal Highway	799	1,301	672	1,094
ALL EXTERNAL STATIONS		5,400	8,790	3,484	5,671

Table 2-4: PM Peak External Traffic Flows – 2 Hour

Zone	Description	Inbound 2hr Flow		Outbound 2hr Flow	
		2016	2046	2016	2046
1793	Airport	1,700	2,767	970	1,579
1794	Mulligans Flat Road	402	654	666	1,084
1795	Barton Highway	639	1,040	1,639	2,668
1796	Tharwa Drive	50	81	70	114
1797	Monaro Highway	298	485	383	623
1798	Kings Highway	302	492	507	825
1799	Tarago Road	78	127	165	269
1800	Federal Highway	1,037	1,688	1,429	2,326
ALL EXTERNAL STATIONS		4,506	7,335	5,829	9,488

2.3 Future Years Networks

A number of network improvements were included in the future models at various years to ensure that proposed infrastructure upgrades, by ACT in particular, were included. These infrastructure upgrades could have large impacts on both trip distribution throughout the network and the routes traffic takes between areas.

It was agreed with QPRC that the only infrastructure upgrades within Queanbeyan to be included in the future year models would be the local development infrastructure and projects that have been committed for construction up to 2022. These included the following:

- Old Cooma Rd / Googong Rd – traffic signals
- Old Cooma Rd / Wellsvale Dr – traffic signals
- Tompsitt Dr / Lanyon Rd – traffic signals
- Uriarra Rd / Ross Rd – traffic signals
- Uriarra Rd / Stornaway Rd – right turn ban
- Kings Hwy / Molongola St – roundabout
- Crawford St / Anthill St – traffic signals
- Crawford St / Campbell St – right turn ban

ACT provided a list of infrastructure improvements that are expected to occur within the region at each 5-year interval from 2021-2051 for inclusion in the future models. Those improvements are detailed in Table 2-5 to Table 2-9 and shown in Figure 2-2 to Figure 2-7.

Table 2-5: 2016-2021 ACT Infrastructure Improvements Included in the QPRC Transportation Model

2016-2021 ACT INFRASTRUCTURE IMPROVEMENTS	
Item	**Description**
Taylor Local Roads	Added
Horse Park Drive Duplication	Duplication of Horse Park Drive between Federal Highway and Roden Cutler Drive- for 2018 completion. Anthony Rolfe Avenue to Well Station Drive
Hibberson Street pedestrian and light rail zone	Pedestrian and light rail only zone between Kate Crace Street and Gungahlin Place
Hibberson Street one-way shared zone	Shared zone between pedestrians and vehicles on Hibberson Street between Gungahlin Place and Gozzard Street
Manning Clark Crescent Extension	New road connecting Flemington Road to Anthony Rolfe Avenue
Ernest Cavanagh Street Extension	Extension of Ernest Cavanagh Street from Hinder Street to Manning Clark Crescent
The Valley Avenue Extension and Manning Clark Crescent Extension	Extension of The Valley Avenue from Kate Crace Street to Manning Clark Crescent and the extension of Manning Clark Cres from Flemington Rd to Anthony Rolfe Avenue
New road to the south of The Valley Avenue	Following up SLA (Darren Benson) for details where it connects to including extension of Gungahlin Place and 4th leg of Valley Avenue/Kate Crace St intersection (both intersections now signalised
Flemington Road changes due to Light Rail Stage 1	Lane configuration changes between Well Station Drive and Federal Highway
Throsby Local Roads	Added
Gundaroo Drive Duplication Stage 1	Duplication between Gungahlin Drive and Mirrabei Drive/Anthony Rolfe Avenue
Gundaroo Drive Duplication Stage 2	Duplication between Gungahlin Drive and Barton Highway Roundabout.
Kuringa Drive/Owen Dixon Drive Signalisation	Intersection signalisation
Lawson Local Roads	Added
University of Canberra Hospital Access Road off Aikman Drive	A new road and associated intersection works to provide access to the hospital
Aikman Drive Duplication	Duplication between Ginninderra Drive and Emu Bank
Southern Cross Drive/Starke Street Signalisation	Intersection signalisation
Dickson Group Centre intersection upgrade	Antill Street/Cowper Street and Cowper Street/Dickson shops access road works, plus signalisation of Antill St/Badham St
Cape Street Extension	Extension of Cape Street from Challis Street to Northbourne Avenue - (Bus Access Only)
Parkes Way to Allara Street Exit	Added
West Belconnen Stage 1	New arterial road (Road 100) northwest of Stockdill Drive including multiple intersections located along the new arterial road. Also include other works proposed along Drake Brockmann Drive and Stockdill Drive
John Gorton Drive Stage 3	"New roadworks providing access to Whitlam including signalisation of John Gorton Drive/William Hovell Drive/Coulter Drive intersection.
Molonglo Roads Stage 2	New roadways providing access to residential development
Weston Creek Group Centre	Brierly Street and Trenerry Square upgrade
Launceston Street / Irving Street Signalisation	Intersection signalisation
Cotter Road Duplication	Duplication from Tuggeranong Parkway to Yarralumla Creek
Dudley Street upgrade	Dudley St upgrade and Canberra Brickworks precinct access road from Dudley Street via a roundabout to boundary of new estate development
IKEA Northern Access Road	Mustang Avenue extension to north of IKEA called 'Dharaban Road'
Majura link road (Spitfire Avenue)	Link road between Majura Road and Majura Parkway Construction called 'Meddhung Road'
Tompsitt Drive Extension	Connect Tompsitt Drive to Yass Road (Ellerton Drive) in Queanbeyan
Hindmarsh Drive intersection upgrades	Signalisation at intersection with Launceston Street and Eggleston Crescent
Ashley Drive Duplication	Duplication of Ashley Drive from Erindale Drive to Johnson Drive
Anketell Street Upgrade	

Googong/Tralee Link	Connect Googong/Tralee area to Lanyon Drive West of Tompsitt Street
Horse Park Drive Duplication	From Mulligans Flat Road to Roden Cutler Drive
Edinburgh Avenue extensions to Vernon Circle	"Part of City to the Lake, Parkes Way upgrade and associated new roads.
Alinga Street bus station	Alinga St changed to bus only from Moore St to Mort St.
Barry Drive / Kingsley Street bus layover	"Changes to intersection configuration and signal phasing of Barry Drive / Kingsley Street intersection

Table 2-6: 2021-2026 ACT Infrastructure Improvements Included in the QPRC Transportation Model

2021-2026 ACT INFRASTRUCTURE IMPROVEMENTS	
Item	**Description**
Mirrabei Drive Duplication (parts)	"From Paul Coe Crescent to Yamma Way (Mirrabei Drive corridor upgrade (including Shoalhaven intersection signalisation)"
Old Well Station Road Upgrade	Old Well Station Road Upgrade between Federal Highway and Morisset Road (including signalising Morisset Road and Old Well Station Road)
Nudurr Drive Extension	Connect Nudurr Drive from Grampians Street to Gungahlin Drive
Mouat Street, Lyneham	"Additional lane for public transport including queue jump lane. (Mouat Street duplication (between Challis Street &Ginninderra Drive))"
Gundaroo Drive (William Slim Drive) Upgrade	Duplication from Barton Highway to Ginninderra Drive
Belconnen Way/ Springvale Drive Signalisation	Intersection signalisation
William Hovell Drive augmentation	"New roadworks duplicating William Hovell Drive from John Gorton Drive to Drake Brockman Drive (William Hovell Drive northbound widening (Drake-Brockman Dr to Coppins Crossing Road)) "
John Gorton Drive Extension and Molonglo River Bridge	John Gorton Drive Arterial Road Approaches and Bridge Crossing of the Molonglo River
Athllon Drive Duplication (southern portion)	Athllon Drive Duplication between Sulwood Drive and Drakeford Drive
Drake Brockman Drive Upgrade - Stage 2	"Partial upgrades as part of Stage 2 works: - Provision of left turn and right turn slip lanes on Drake Brockman Dr at Britten Jones Dr intersection, Spofforth St intersection, Trickett St intersection & Macnaughton St intersection - Duplication (two through lanes eastbound and westbound) of Drake Brockman Dr at Macnaughton Dr intersection - Signalisation of three intersections with Drake Brockman Drive – Spofforth Street, Trickett Street and Macnaughton Street"
New at-grade intersection between Commonwealth Avenue and London Circuit	For lane configuration of intersection
Removal of the Commonwealth Avenue to London Circuit loop ramps	"Includes removal of: - Commonwealth Ave northbond to London Cct westbound ramp - Commonwealth Ave northbound to London Cct eastbound ramp - London Cct westbound to Commonwealth Ave southbound ramp"
Athllon Drive Duplication (northern portion)	Athllon Drive Duplication between Hindmarsh Dr and Melrose Dr. This includes bus only lane on northbound carriageway from Melrose Dr intersection to Hindmarsh Dr intersection.
Monaro Highway / Lanyon Drive Interchange	Grade separate interchange at Lanyon Dr / Monaro Hwy comprising new southbound overpass, extension of David Warren Road to connect to the existing Lanyon Drive/Shepard Street intersection (making this a 4 way signalised intersection), removal of the traffic lights and removal of the right turns into and out of David Warren Road at Monaro Highway / David Warren Road intersection.
Streeton Drive / Namatjira Drive intersection signalisation	Signalisation of the Streeton Drive / Namatjira Drive intersection

Streeton Drive / Heysen Drive intersection signalisation	Signalisation of the Streeton Drive / Heysen Drive intersection
Tharwa Drive / Lawrence Wackett Crescent	Signalisation of intersection.
Kent Street / Novar Street Upgrades	Upgrade of Kent St / Novar St interchange over Yarra Glen.
Pedestrian crossing at Edinburgh Ave / Vernon Circle intersection	Inclusion of an east/west pedestrian crossing of the southern leg at Edinburgh Ave / Vernon Circle intersection.
Woden Bus Interchange	Callam St closed to general traffic (bus only) from Bradley St to Matilda St.
Erindale Dr (Rectify error in CSTM)	Rectify error in CSTM. Erindale Dr from Ashley Dr to Sternberg Cr to be changed to 2 lanes eastbound & westbound for 2021, 2031, 2041 and 2051.

Table 2-7: 2026-2031 ACT Infrastructure Improvements Included in the QPRC Transportation Model

2026-2031 ACT INFRASTRUCTURE IMPROVEMENTS	
Item	**Description**
Sandford/Morisset Road Extension	Extension of Morisset Road to Federal Highway (Watson roundabout)
Pialligo Avenue Duplication (short term / high priority)	Short term proposed upgrades for Pialligo Ave: - Duplication from Brindabella Circuit to Molonglo Drive (package A) - Signalisation of Pialligo Ave / Sutton Rd intersection (part of package D)
Horse Park Drive Duplication	From Roden Cutler Drive to Clarrie Hermes Drive
CSIRO Access Roads	Access roads to CSIRO development; no access via Barton Highway
Gungahlin Drive Duplication	From Gundaroo Drive to Horse Park drive (Gungahlin Drive augmentation (Horse Pak Drive to The Valley Avenue))
Clarrie Hermes Drive Duplication	From Horse Park Drive to the Barton Highway (Clarrie Hermes Drive Duplication (Gunghalin Drive to Barton Highway))
Barton Highway Interchange	Grade separation of Barton Highway and Gundaroo Drive
Lawson West Road Network	Road network in Lawson West, linking Lawson to the Ginninderra Drive - Aikman Drive intersection
Bindubi Street Extension	New roadworks linking John Gorton Drive and Bindubi Street
Kuringa Drive Duplication	Kuringa Drive Duplication between Kingsford Smith and Barton Highway
West Belconnen Stage 2	Roads to service West Belconnen Stage 2; link to Parkwood Drive (Duplication of part of Parkwood Road and Southern Cross Drive up to Florey Drive)
Southern Cross Drive Duplication	Duplication from Moyes Cr to Macfarlane Burnet Ave
Molonglo Stage 3 Collector Roads - completion by 2031	New roads providing access to the suburbs of Molonglo Stage 3 to be constructed by SLA from say 2024 to 2036 starting from W side moving E then S to EWA. M3E Collector Roads in the northern region to be constructed prior to 2031
Light Rail Stage 2A	Light rail from City to Comonwealth Park
Commonwealth Avenue / Albert Street Signalisation	Constructed as part of LRS2A as a signalised Left in Left out intersection with a single pedestrian crossing of Commonwealth Ave. Ultimate intersection arrangement post Acton Waterfront development is shown to the right of the screen.
Commonwealth Avenue / Corkhill Street Signalisation	Signalised Left in / left out with no pedestrian crossing of Commonwealth Ave.
New west facing ramps at the Parkes Way/Clunies Ross Street interchange	Part of City to the Lake, Parkes Way upgrade and associated new roads
Clunies Ross Street Upgrade	Duplication of Clunies Ross Street between Barry Drive and Parkes Way
Sturt Avenue/MacMillan Crescent Signalisation	Intersection signalisation
East Lake Internal Roads	Primary transport access connections from Wentworth Avenue and Canberra Avenue Access/egress: extension of Dawes Street/Sandalwood Street, Cunningham Street, Burke Crescent and extension of the Causeway to a connection at Mildura Street

Airport Northern Access Road	Connect Glenora Drive to Majura Road (Northern Access to RAAF Fairbairn
Acton Waterfront Access roads (2031 - partial development)	Access roads for Acton Waterfront to be in place at 2031: - Corkhill St access (Left in Left out) - Albert St access (left in, left out, Right turn in, right turn out) - Western access (at Lawson Cr or at Edinburgh Ave interchange - to be confirmed)
Parkwood Road Upgrade	Road improvements along Parkwood Road to West Belconnen (west of Macfarlane Burnet Ave)
LRS2A road network changes to London Cct	
Monaro Highway Interchange at Hume	Partial interchange with an overpass connecting Mugga Lane and Tralee Street. Closure of right turns into and out of Shepard Street at Monaro Hwy/Shepard St intersection.
Hume Circle	Upgrade of the Wentworth Ave / Canberra Ave / Sturt Ave roundabout. Scope of project is not yet confirmed. Not to be upgraded to grade separated intersection. Likely to be some form of part time or full time signalisation.
Monaro Highway / Newcastle Street / Dairy Road intersection upgrade	Change to lane configuration on Monaro Highway on/off ramps, Dairy Road and on Newcastle Street.
Monaro Rock Quarry Project	Unsignalised seagull intersection located 2.5km north of Old Cooma Road to provide access to a new proposed rock quarry.
North Curtin Diplomatic Estate	Access roads into new development site bounded by Yarra Glen, Cotter Rd, McCulloch St & Yarralumla Creek. Access into main development site provided at 4-way signalised intersection at: - Cotter Rd / Lady Denman Dr intersection - Cotter Rd / Dudley St intersection Access into additional smaller development site west of McCulloch St, provided at a new unsignalised intersection on McCulloch St 200m south of Cotter Rd.
Well Station Drive Duplication	Duplication of of Well Station Drive from Flemington Road to Horse Park Drive to facilitate increased traffic demand as a result of development of Kenny.

Table 2-8: 2031-2041 ACT Infrastructure Improvements Included in the QPRC Transportation Model

2031-2041 ACT INFRASTRUCTURE IMPROVEMENTS	
Item	**Description**
Fairbairn Avenue - additional westbound lane	Additional westbound lane from Pialligo Avenue to Majura Parkway
Fairbairn Avenue – additional eastbound lane	Additional eastbound lane from Majura Parkway to Pialligo Avenue
Fairbairn Avenue Duplication	Duplication from Treloar Crescent to Majura Parkway
Pialligo Avenue Grade Separation	Grade separation of Pialligo Ave / Fairbairn Ave intersection
Bindubi St / William Hovell Dr interchange	Grade separated interchange at Bindubi St / William Hovell Dr intersection
Monaro Highway / Isabella Drive Interchange	Grade separated interchange at Monaro Hwy / Isabella Dr.
LRS2B & Mawson Extension expected road network changes	Changes to road network as a result of LRS2B (Commonwealth Park to Woden Town Centre): - LR crossover from median to eastern verge at Commonwealth Ave / Coronation Dr intersection - Removal of ramp from Commonwealth Ave southbound onto State Circle eastbound - Addition of signalised LR crossing of State Circle east of Commonwealth Ave - New link road connecting Capital Circle and Brisbane Ave / State Circle intersection - Signalised LR crossing of Capital Circle between Melbourne Ave and Adelaide Ave - Yarra Glen / Yamba Dr / Melrose Dr roundabout converted to a signalised intersection with movement from northbound Yamba Dr to southbound Melrose Dr proposed to be banned. - Removal of northbound T2 Transit Lane on Yarra Glen (from Yarra Glen roundabout to Cotter Rd) - Retainment of existing T2 Transit Lanes north of Cotter Rd Mawson Extension road network changes:

	- LR crossing of Callam St / Naptune St intersection, Corinna St / Callam St intersection, Athllon Drive / Hindmarsh Drive intersection and Mawson Drive / Athllon Drive intersection - LR crossing from median to eastern verge ~200m north of Shea St intersection
Pialligo Avenue Duplication (long term / low priority)	Long term proposed upgrades for Pialligo Ave: - Duplication of Pialligo Ave from Molonglo Drive to Shropshire St
Cotter Road - Stage 3 (and Mint Interchange)	Duplication of Cotter Rd from Dunrossil Dr to Adelaide Avenue (not including the Mint Interchange)
Tuggeranong Parkway - additional northbound lane	From Cotter Road to the Glenloch Interchange
Drake Brockman Drive Upgrade - Stage 3 (ultimate)	Duplication of Drake Brockman Drive from Lionel Rose Street intersection to Kingsford Smith Dr / William Hovell Dr intersection.
Molonglo Stage 3 Collector Roads - completion by 2036	New roads providing access to the suburbs of Molonglo Stage 3 to be constructed by SLA from say 2024 to 2036 starting from W side moving E then S to EWA. M3E Collector Roads in the southern region and Arboretum Access Road to be constructed between 2031 and 2036
Light Rail Stage 2B including Mawson Extension	Light Rail from Commonwealth Park to Woden Town Centre including extension to Mawson Group Centre.
Acton Waterfront Access roads (2041 - ultimate development)	Access roads for Acton Waterfront to be in place at 2041: - Future West Rd access from London Cct (bridge over Parkes Way)
West Belconnen Ultimate Development	Complete West Belconnen road network at buildout
Molonglo East-West Arterial	Connecting John Gorton Drive and Tuggeranong Parkway; full access interchange at Tuggeranong Parkway
Dunn's Creek Road	Connection from Old Cooma Road to Monaro Highway
Northbourne Avenue Lane Reduction	Reduction from 3 lanes to 2 lanes northbound and southbound on Northbourne Ave from MacArthur Ave intersection to London Cct intersection.
Erindale Dr	Erindale Dr from Ashley Dr to Sternberg Cr to be changed to 2 lanes eastbound & westbound for 2021, 2031, 2041 and 2051.

Table 2-9: 2041-2051 ACT Infrastructure Improvements Included in the QPRC Transportation Model

2041-2051 ACT INFRASTRUCTURE IMPROVEMENTS	
Item	**Description**
Pro Hart Avenue Duplication	Duplication of Pro Hart Avenue from Lionel Rose Street intersection to Asimus Avenue intersection.
Removal of south east cloverleaf	Removal of south east cloverleaf to facilitate development of this area.
Erindale Dr	Erindale Dr from Ashley Dr to Sternberg Cr to be changed to 2 lanes eastbound & westbound for 2021, 2031, 2041 and 2051.

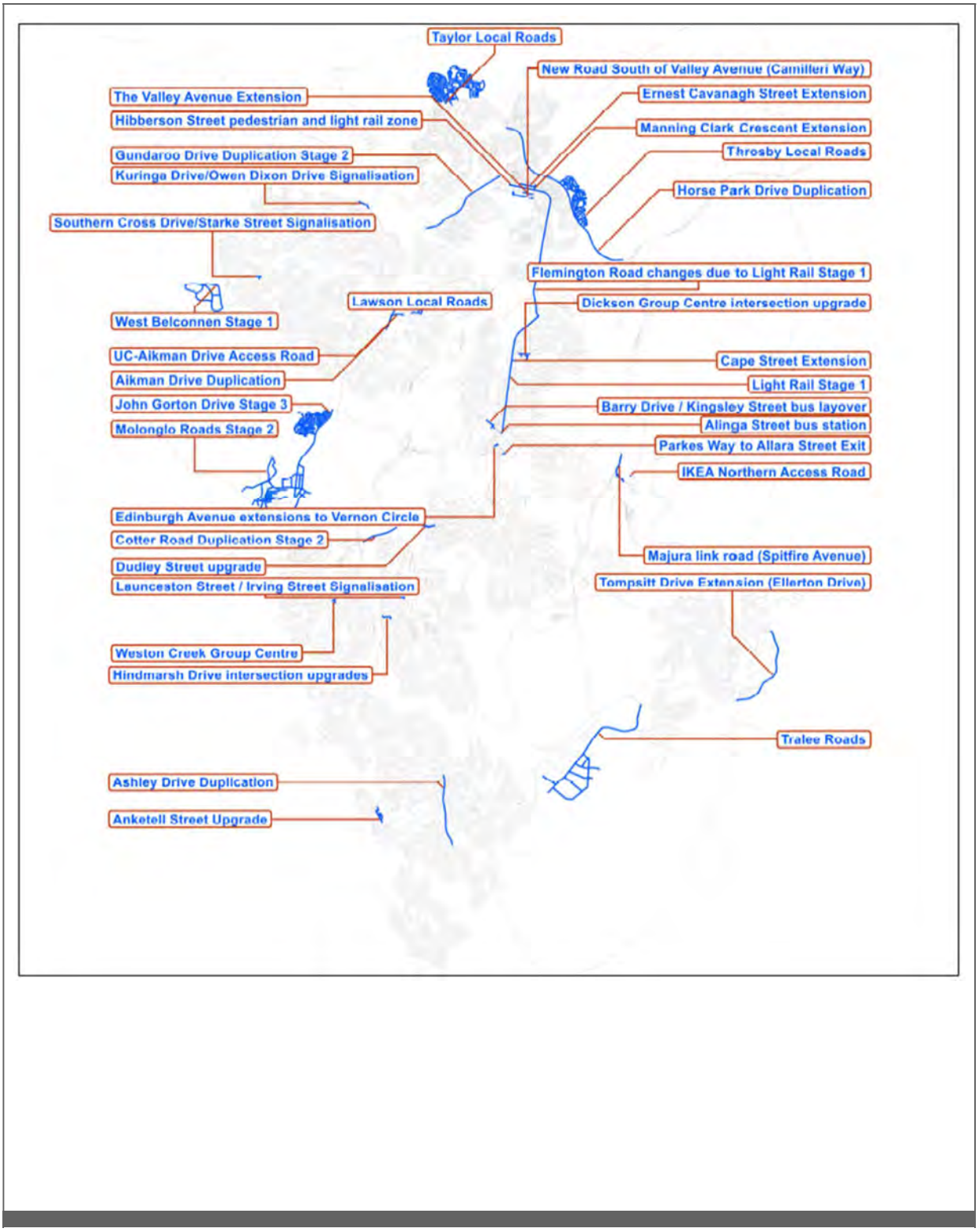


Figure 2-2: 2016-2021 ACT Infrastructure Improvements

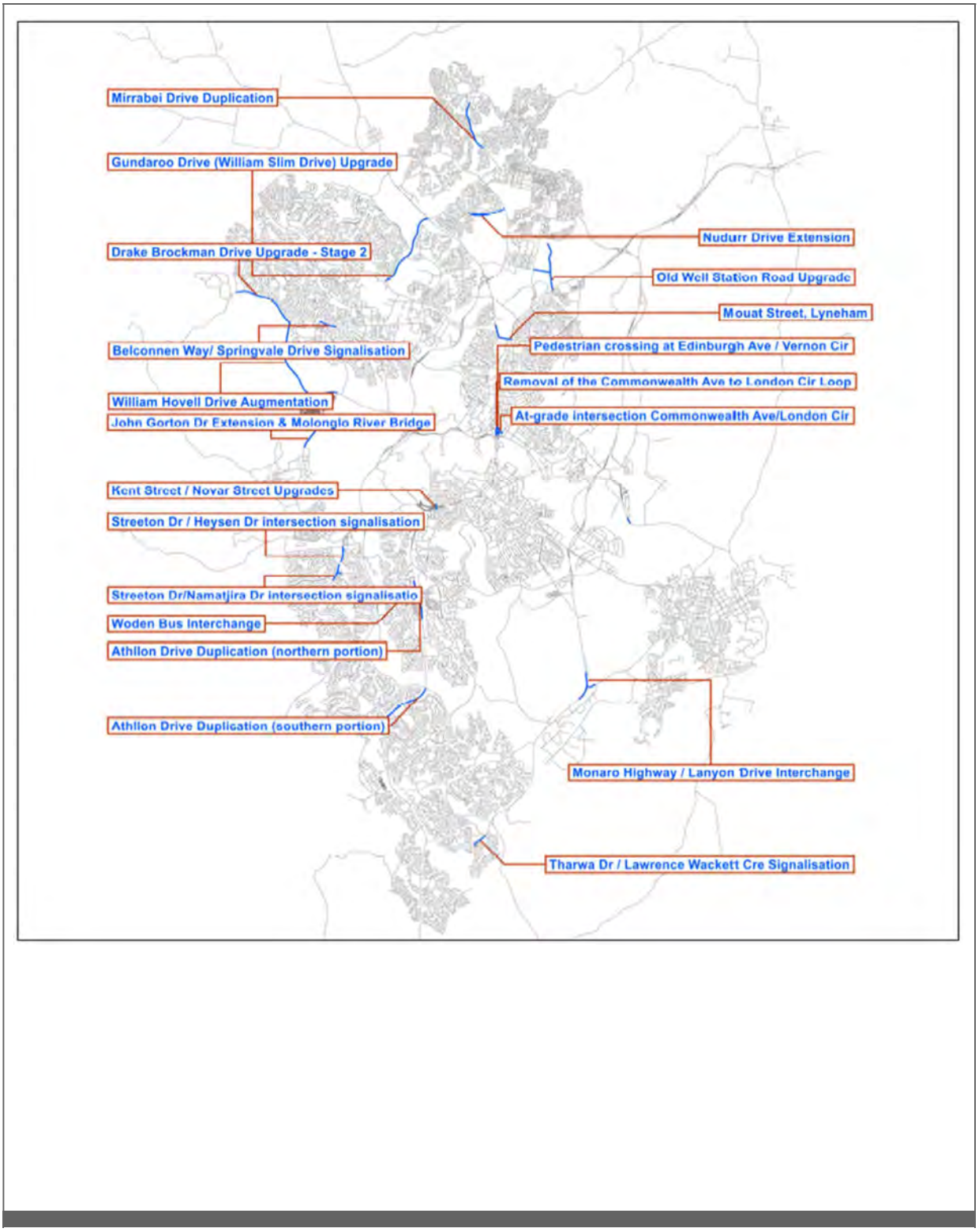


Figure 2-3: 2021-2026 ACT Infrastructure Improvements

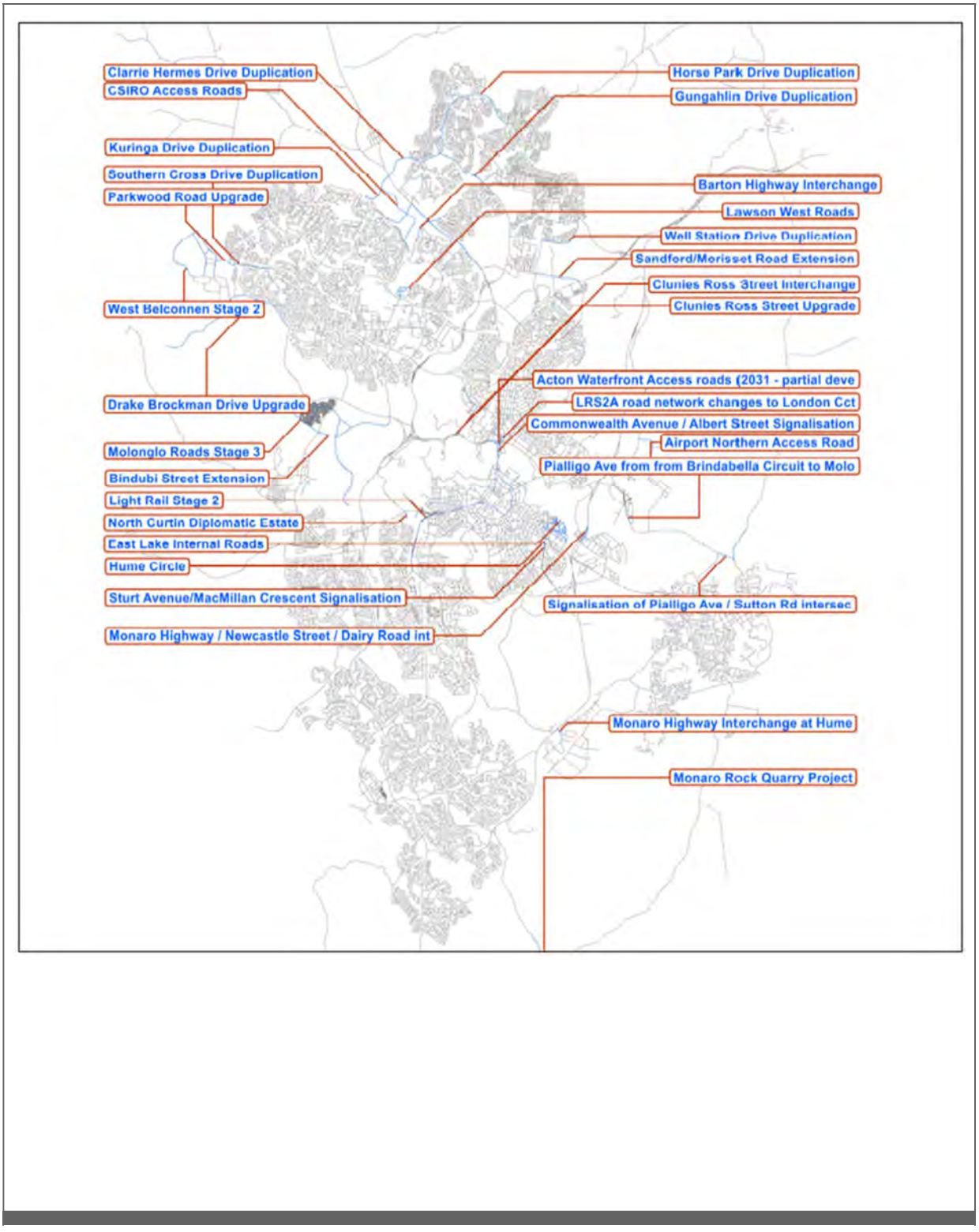


Figure 2-4: 2026-2031 ACT Infrastructure Improvements

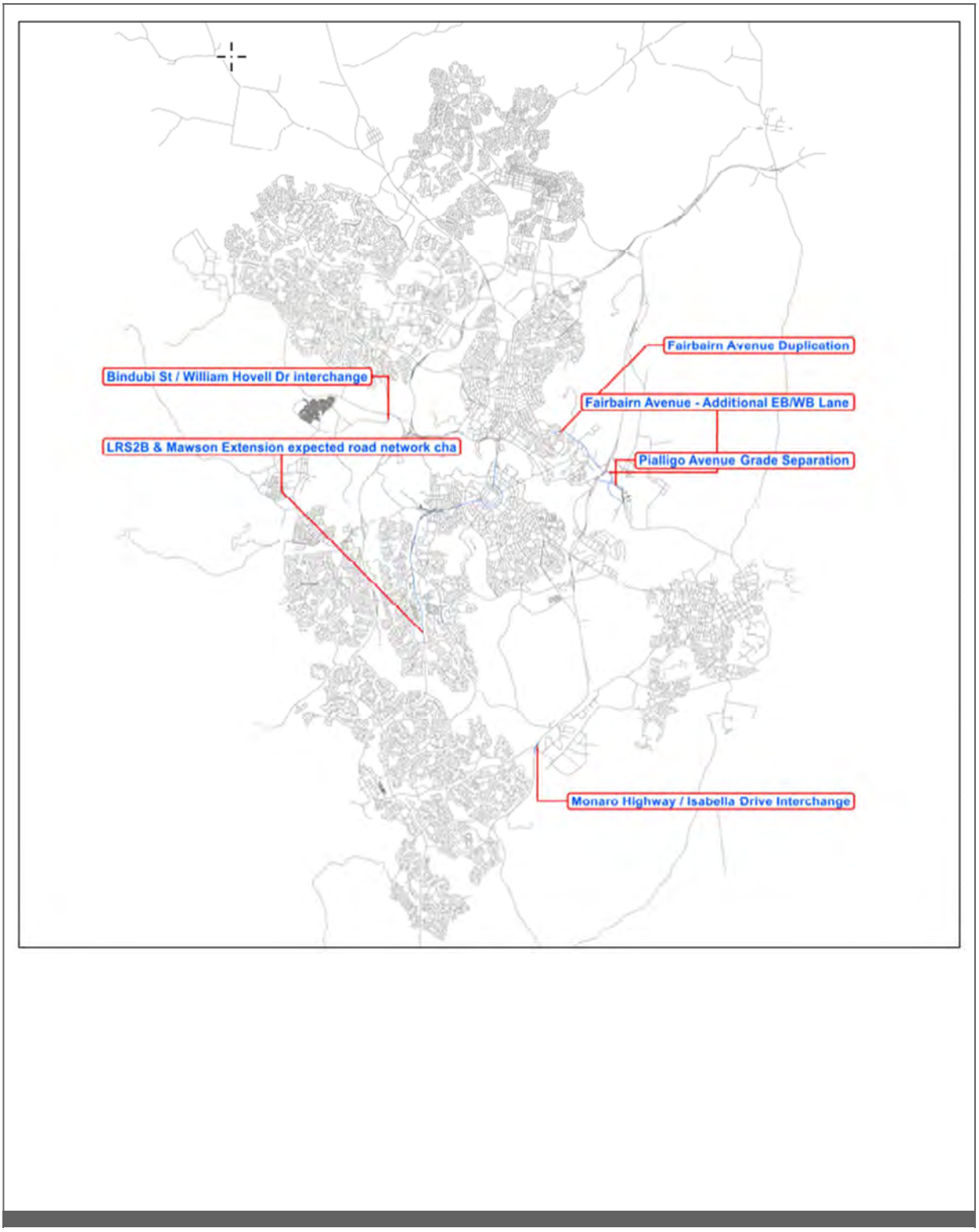


Figure 2-5: 2031-2036 ACT Infrastructure Improvements

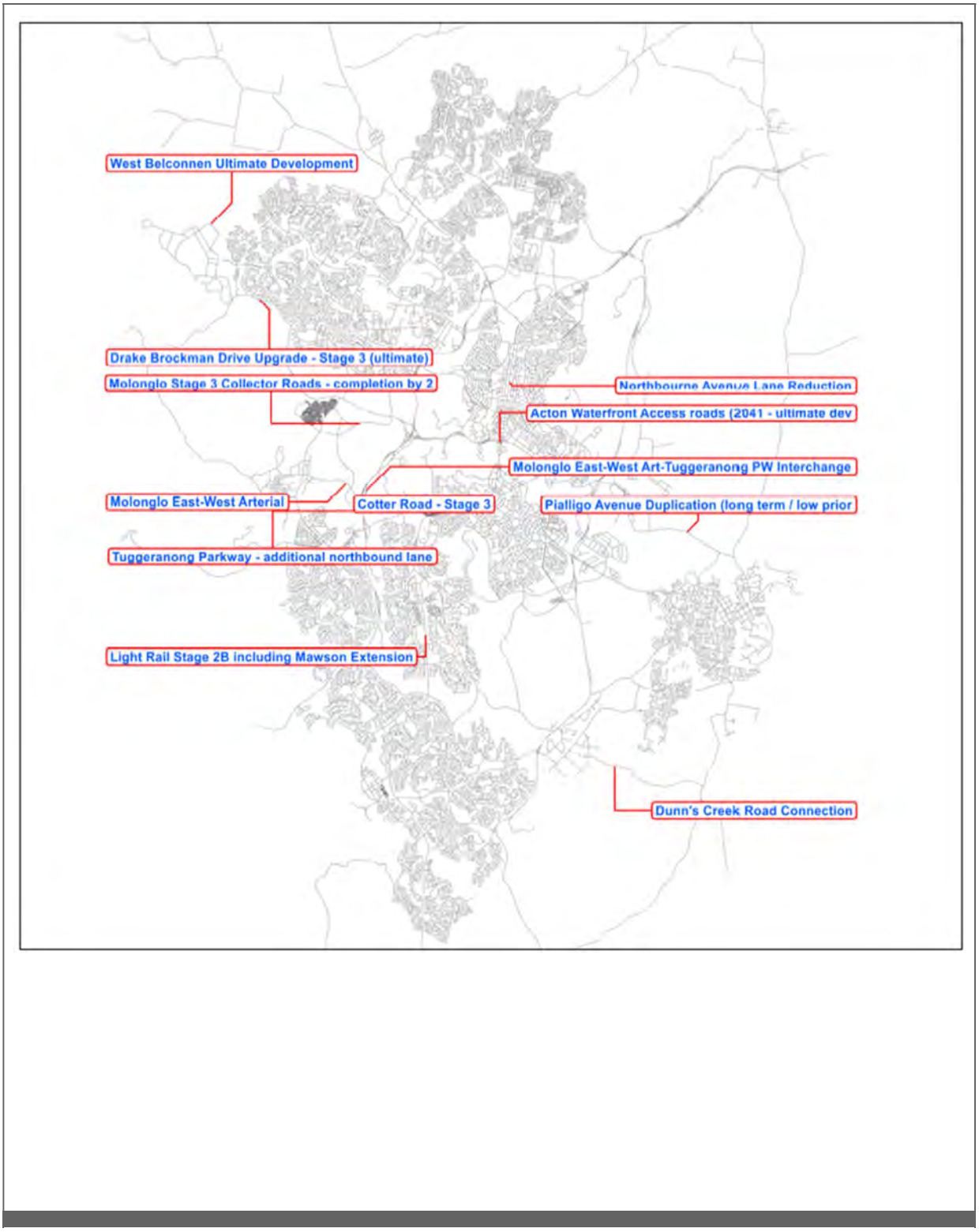


Figure 2-6: 2036-2041 ACT Infrastructure Improvements

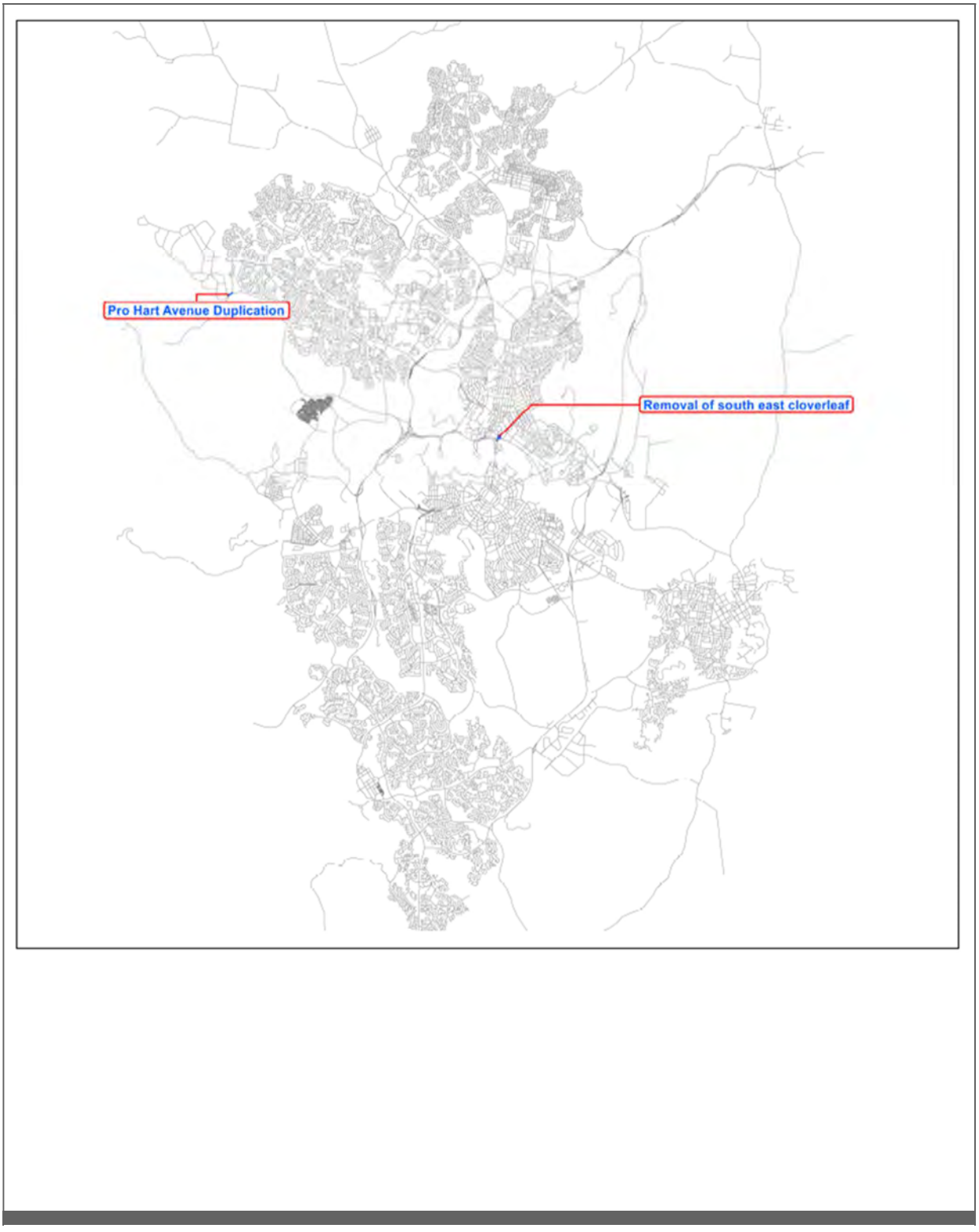


Figure 2-7: 2041-2051 ACT Infrastructure Improvements

3 NETWORK DEFICIENCIES

The level of traffic used in the vehicle network modelling is calculated from land use data which focuses on the QPRC and ACT areas and includes the number of dwellings, vehicles, school rolls, employment and job distribution. This data has been based on 2016 census data and projected for each future year by QPRC and ACT planners. A model of the QPRC area has been created and, tested (validated) against traffic counts

The 2016 and future year land uses cover both the QPRC and ACT Land Government Acts so that the interaction between the two areas can be correctly considered. The Queanbeyan study area however is bordered on the west and south by the ACT-NSW border and in the east as far as Bungendore. The QPRC study area of the model is divided into sub areas to form a zone system. The QPRC study area consists of 599 zones, but the total model consists of 1800 zones representing QPRC and the ACT.

Road network deficiencies for each future year period have been identified assuming that the base 2016 network has only been upgraded with the improvements identified in Section 2 and therefore represents the assumed do-minimum future network. These do-minimum network deficiencies are used as the starting point to determine additional QPRC network improvements needed to return each future network to a Level of Service (LOS) D or better. These additional network improvements are reported in a subsequent report.

4 LEVEL OF SERVICE

LOS is a subjective measure of the way in which a network is operating, given the traffic demands that are placed on it. It is a concept developed by American engineers and has been generally internationally adopted. It is being used in this study to measure the performance of both roads and intersections.

This section begins with a description of the LOS criteria used and follows with Level of Service results. The LOS for each network component is both tabulated and illustrated to show where and when LOS issues are likely to arise.

The LOS is reported as that which occurs on average over the entire peak hour and may therefore be less than the absolute peak LOS that occurs for short periods during the hour.

4.1 LOS Descriptions

Because it is subjective, individual regions have a local perception of how individual roads and intersections are operating and that affects the local interpretation of the LOS values. It is important to note that level of service tends to be much worse during the morning and evening peaks.

In this study the boundaries adopted were those used in previous QPRC deficiency investigations and are also used currently in Wollongong, Shoalhaven, Camden, Wingecarribee and Wollondilly studies. They reflect network operation that is consistent with the US Highway Capacity Manual (HCM) level of service criteria.

This study focuses on LOS F, E, D and C with particular attention paid to LOS F and E. The final LOS boundaries, approved by representatives of the relevant stake holders, are described in Table 4-1, which provides a description of:

- LOS definitions describing the type of conditions a driver faces under each level
- Link LOS boundaries that describe the performance of traffic moving along a section of road and a function of traffic volume and link free flow speed.
- Intersection LOS boundaries, which are based on two different criteria: Worst approach delay for priority-controlled intersections; and weighted average delay across all approaches for signalised intersections and roundabouts.

Figure 4-1 shows how Link LOS varies depending on link type. It shows that the higher the vehicle volume and the lower the free speed the worse the LOS becomes. Link types are defined as follows:

- Link type 1 equates to road speeds of 10km/hr
- Link type 2 and 12 equate to road speeds of 20km/hr and 25km/hr
- Link type 3 and 13 equate to road speeds of 30km/hr and 35km/hr
- Link type 4 and 14 equate to road speeds of 40km/hr and 45km/hr
- Link type 5 and 15 equate to road speeds of 50km/hr and 55km/hr
- Link type 6 and 16 equate to road speeds of 60km/hr and 65km/hr
- Link type 7 and 17 equate to road speeds of 70km/hr and 75km/hr
- Link type 8 and 18 equate to road speeds of 80km/hr and 85km/hr
- Link type 9 and 19 equate to road speeds of 90km/hr and 95km/hr

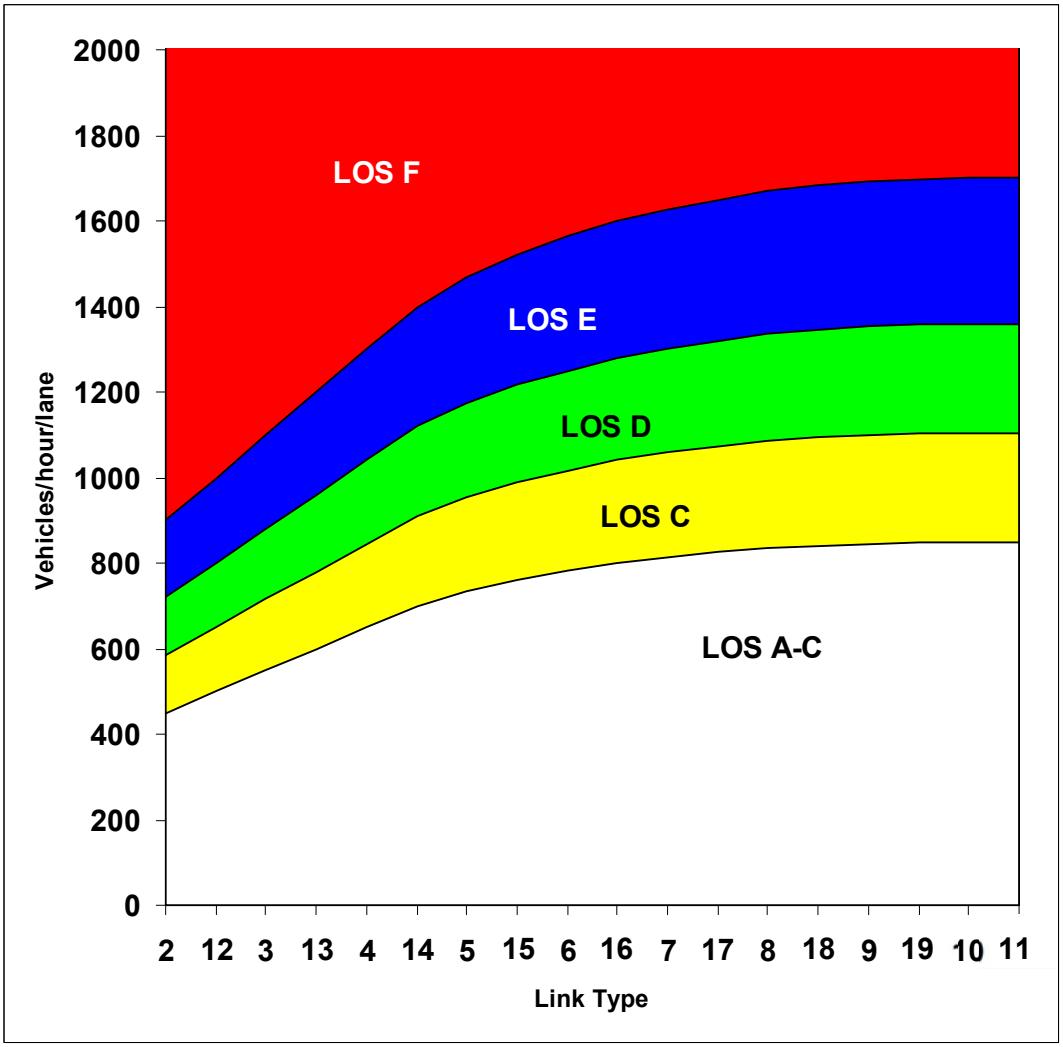
- Link type 10 and 11 equate to road speeds of 100km/hr and 110km/hr
- Link type 20 equates to road speeds of 105km/hr

This present-day Level of Service provides a measure by which future network performance and deficiencies can be assessed given knowledge and experience of current conditions.

Table 4-1: Definitions Of LOS

LOS	AustRoads Description	HCM LOS criteria		
		Link (vehicles per hour)	Intersection (average delay/veh)	
			Priority	Signal/Rotary
LOS F	Forced flow. The amount of traffic approaching a point exceeds that which can pass it. Flow breakdowns occur, and queuing and delays occur.	In excess of **900-1700** depending on link type	50 sec	80 sec
LOS E	Traffic volumes are at or close to *capacity and there is virtually no freedom* to select desired speed and to manoeuvre within the traffic stream. Flow is unstable and *minor disturbances within the traffic stream will cause breakdowns in operation*.	Between **720-1360** depending on link type	35 sec	55 sec
LOS D	Approaching unstable flow where *all drivers are severely restricted* in their freedom to select desired speed and to manoeuvre within the traffic stream. The general level of *comfort and convenience is poor* and small increases in traffic flow will cause operational problems.	Between **585-1105** depending on link type	25 sec	35 sec
LOS C	Stable flow but most drivers *are restricted to some extent* in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of *comfort and convenience has declined noticeably*.	Between **450-850** depending on link type	15 sec	20 sec
LOS B	Stable flow where drivers still *have reasonable freedom* to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is less than LOS A.	Not Applicable	Not Applicable	
LOS A	Free flow in which drivers are *virtually unaffected* by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high and the general level of *comfort and convenience is excellent*.			

NB The LOS for priority intersections is dictated by the delay on the worst approach and the LOS for roundabouts and signalised intersections is calculated based on the weighted average delay across all approaches.



Free Flow Speed (km / hr)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110

	LINK TYPE																	
LOS BAND (Veh/Lane/Hour	2	12	3	13	4	14	5	15	6	16	7	17	8	18	9	19	10	11
LOS C	450	500	550	600	650	700	734	760	782	760	814	825	835	841	846	849	850	850
LOS D	585	650	715	780	845	910	954	988	1016	988	1058	1073	1085	1093	1100	1104	1105	1105
LOS E	720	800	880	960	1040	1120	1175	1216	1250	1216	1302	1320	1335	1346	1354	1358	1360	1360
LOS F	900	1000	1100	1200	1300	1400	1467	1520	1563	1520	1627	1650	1669	1682	1692	1698	1700	1700

Figure 4-1: HCM Link LOS Criteria Used for This Study

4.2 2021 Do-minimum Model

Modelling the existing 2021 network with 2021 Land Use identified the following deficiencies in the QPRC area as arising if no further works are implemented before 2021:

Table 4-2: 2021 Do-minimum Deficiencies

Location	Period	LOS	Issue
Lanyon / Southbar (Sth)	AM	F	Int LOS F - (750v) on south approach
Canberra Ave / Tharwa Rd	AM	F	Int LOS F – Left turn
Yass / Ellerton / Bungendore (Sth)	AM	F	Int LOS F - (600v) on south approach
Bungendore / Thurralilly (Nth)	AM	E	Int LOS E - (10v) on north app turning right
Canberra Ave / Cameron Rd	AM	E	Int LOS E - (250v) on South approach
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on sw app turning right
Lanyon / Canberra (NE)	PM	F	Int LOS E - (300v) on merge of nth to east slip lane
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (Nth)	PM	E	Int LOS E - (900v) on nth app
Cooma Rd (Southbar to Ellerton)	AM	E	Link LOS E NB on this stretch

LOS plots highlighting these deficiencies are shown in Figure 4-2 and Figure 4-3 below and AM and PM peak hour traffic volumes are plotted in Figure 4-4 and Figure 4-5.

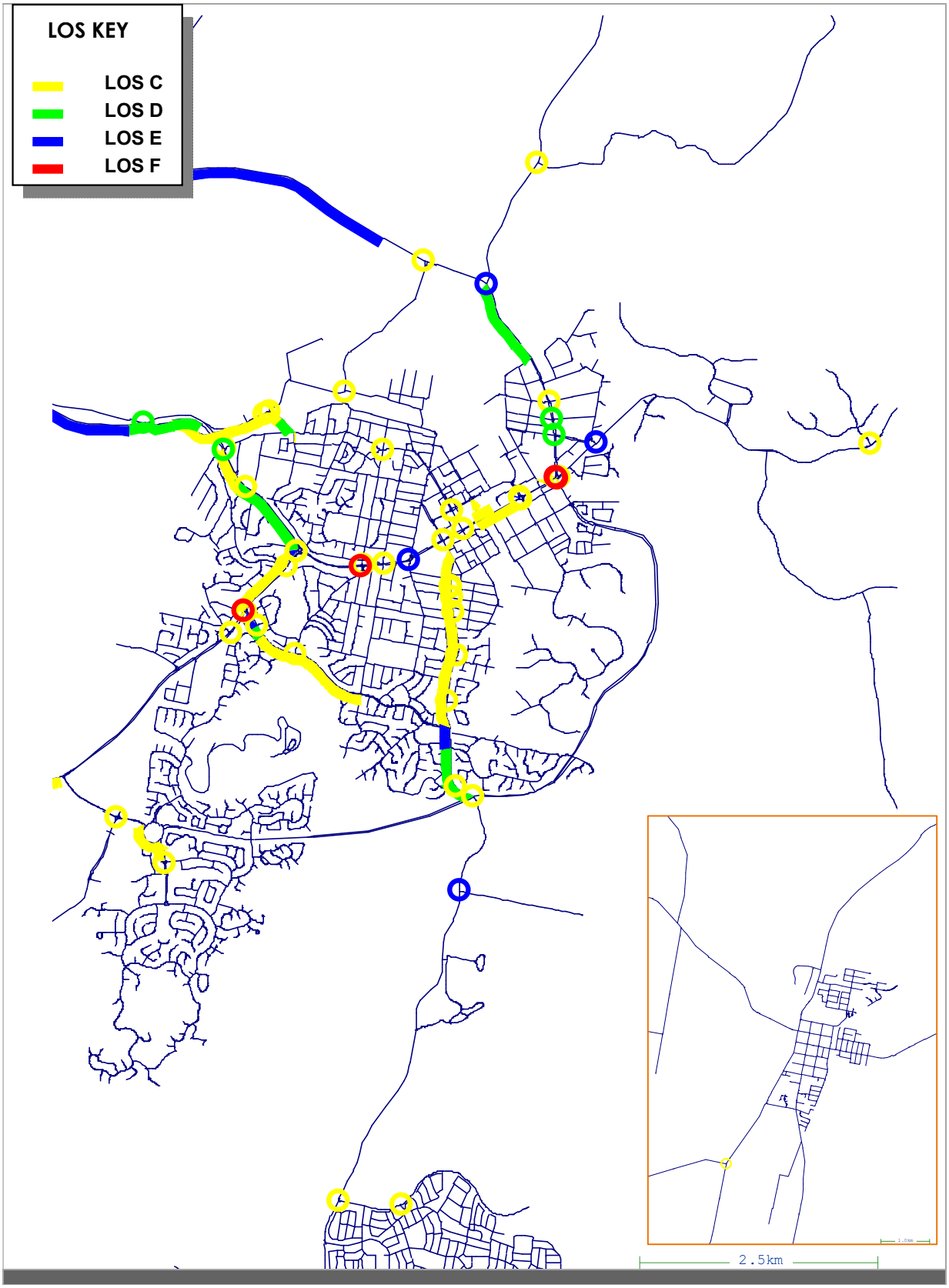


Figure 4-2: 2021 Base Network Levels of Service Plot AM Peak

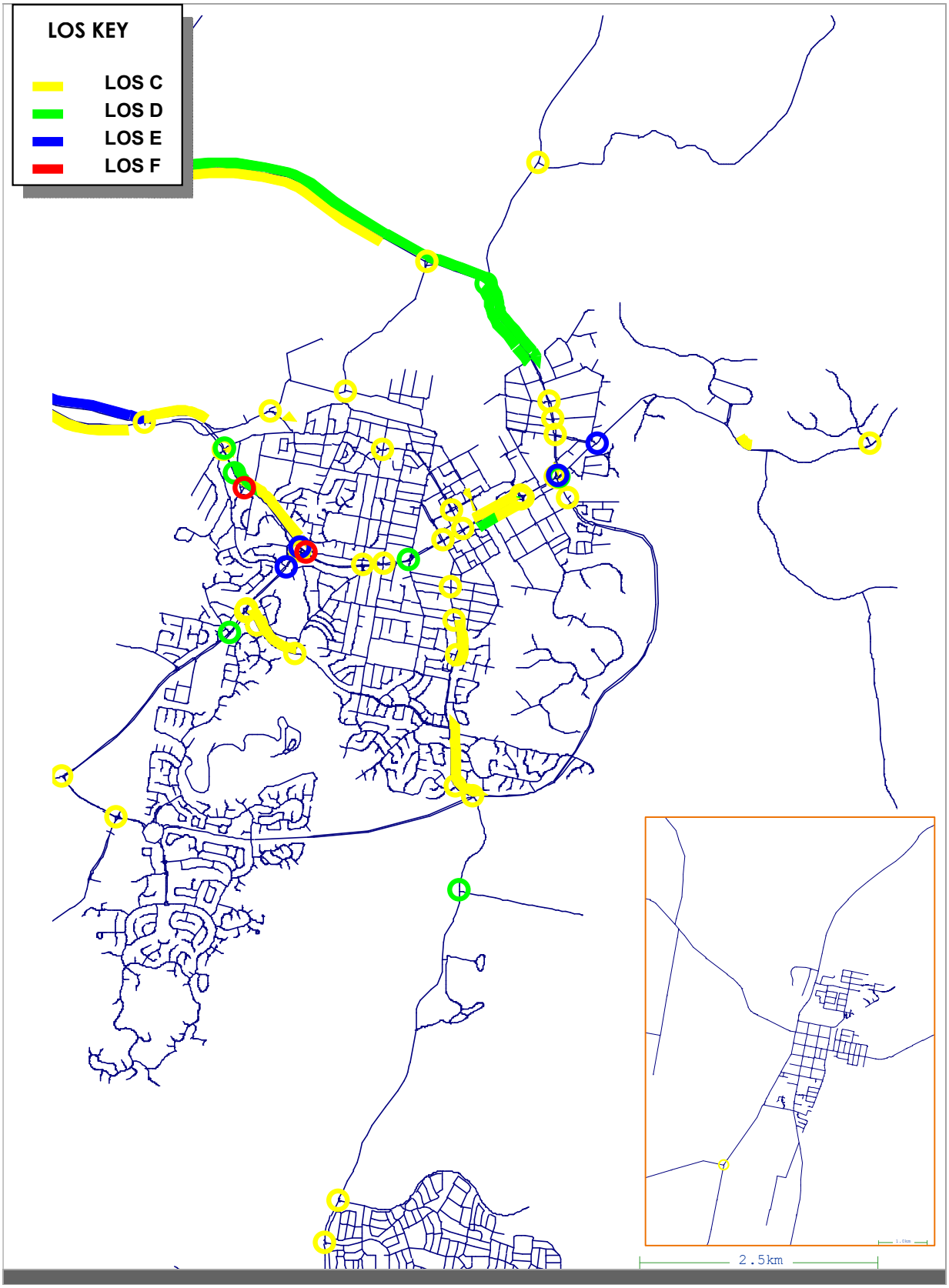


Figure 4-3: 2021 Base Network Levels of Service Plot PM Peak

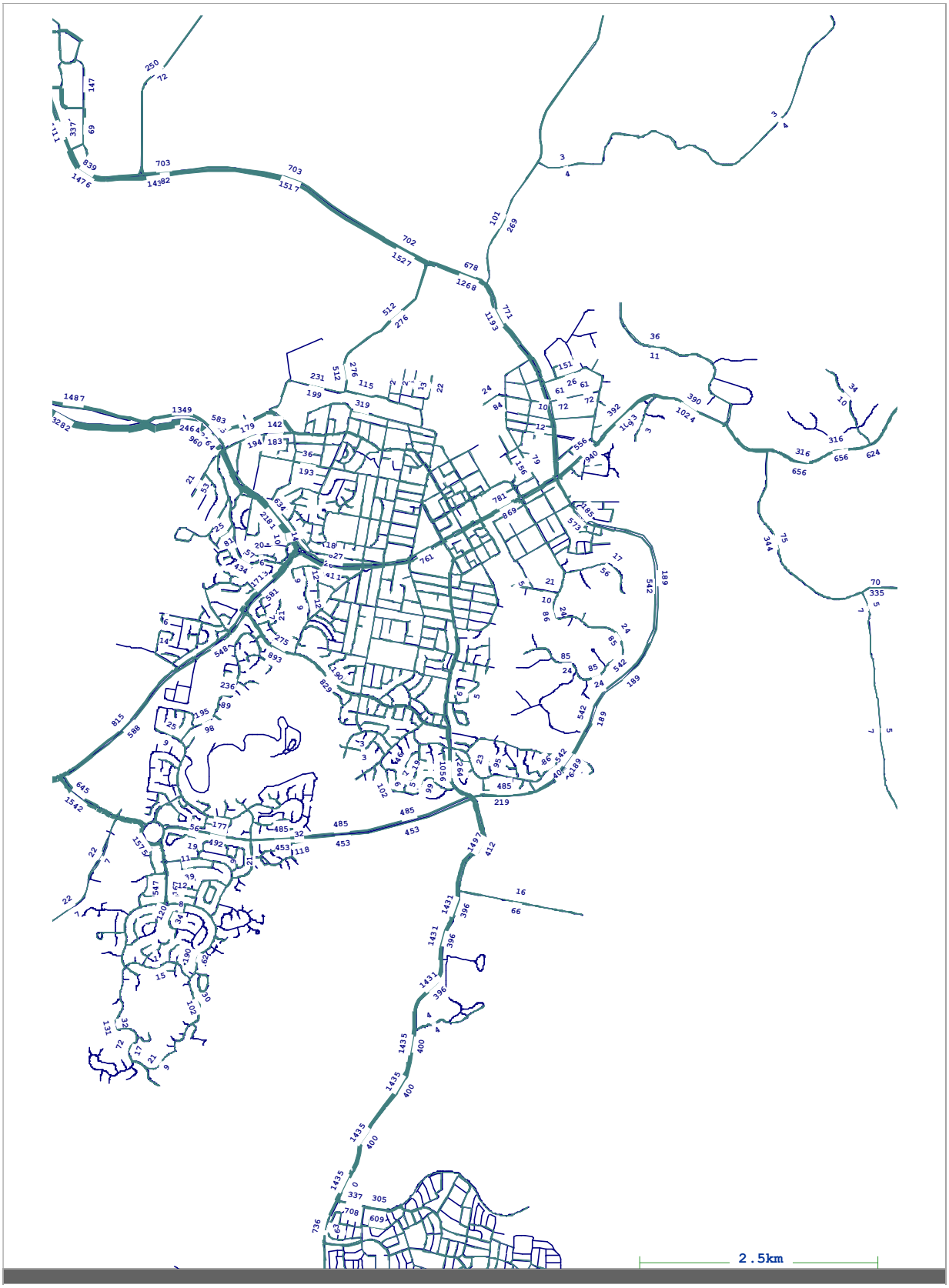


Figure 4-4: 2021 Base Network Traffic Volume Plot AM Peak

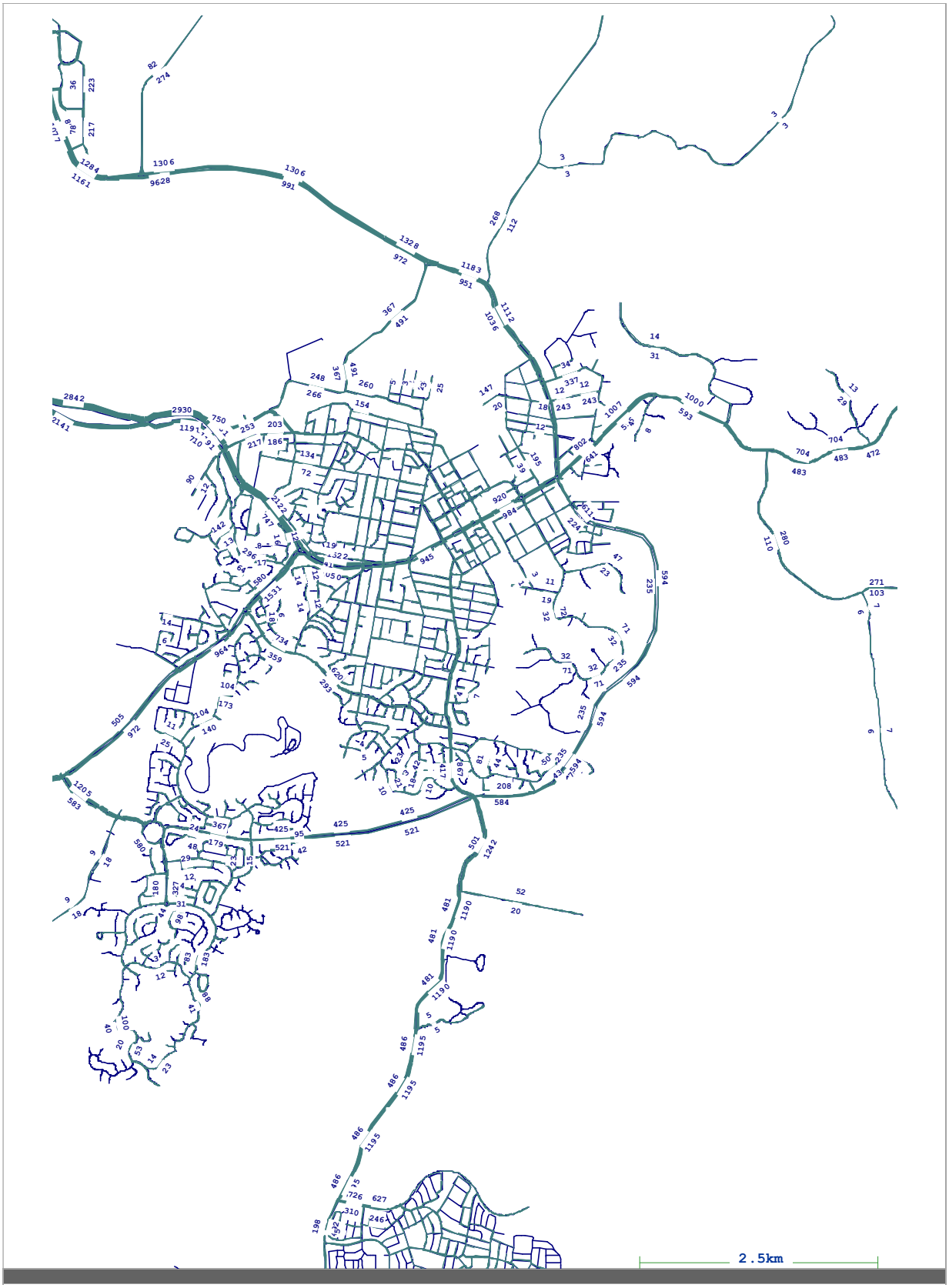


Figure 4-5: 2021 Base Network Traffic Volume Plot PM Peak

4.3 2024 Do-minimum Model

The 2024 base network was built from the 2021 base network with the addition of the improvements identified in Section 2 at or before 2024. The 2024 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2024:

Table 4-3: 2024 Do-minimum Deficiencies

Location	Period	LOS	Issue
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Lanyon / Southbar (Sth)	AM	E	Int LOS E - (750v) on south approach
Yass / Ellerton / Bungendore (Sth)	AM	E	Int LOS E - (600v) on south approach
Canberra / Cameron (Sth)	AM & PM	E	Int LOS E - south app turning right (35v)
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (10v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (NE)	PM	F	Int LOS F - (300v) on merge of north to east slip lane
Cooma Rd (Southbar to Ellerton)	AM	E	Link LOS E NB on this stretch
Southbar Rd (Lanyon to Nth Terrace)	AM	E	Link LOS E NB

Note: The Wickerslack Ln approach to the Old Cooma Rd / Wickerslack Ln is expected to experience LOS F during the AM and PM periods. Due to the low volumes involved it has not been highlighted but this may become a greater issue if additional development occurs in the area or if Old Cooma Rd is 6-laned. This similarly applies to Old Cooma rd / Heights Rd intersection, where volumes are equally low.

LOS plots highlighting these deficiencies are shown in Figure 4-6 and Figure 4-7 below and AM and PM peak hour traffic volumes are plotted in Figure 4-8 and Figure 4-9.

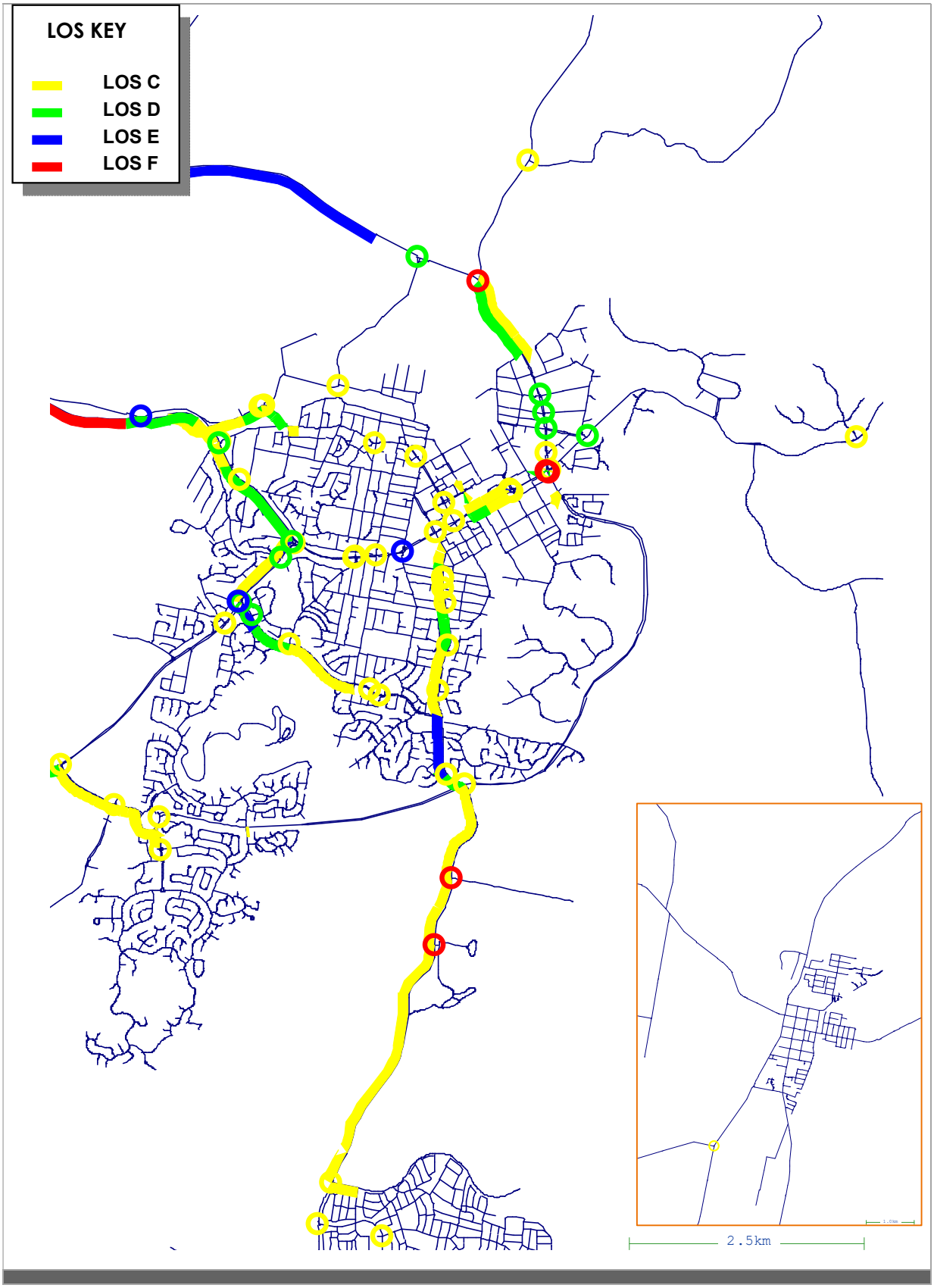


Figure 4-6: 2024 Base Network Levels of Service Plot AM Peak

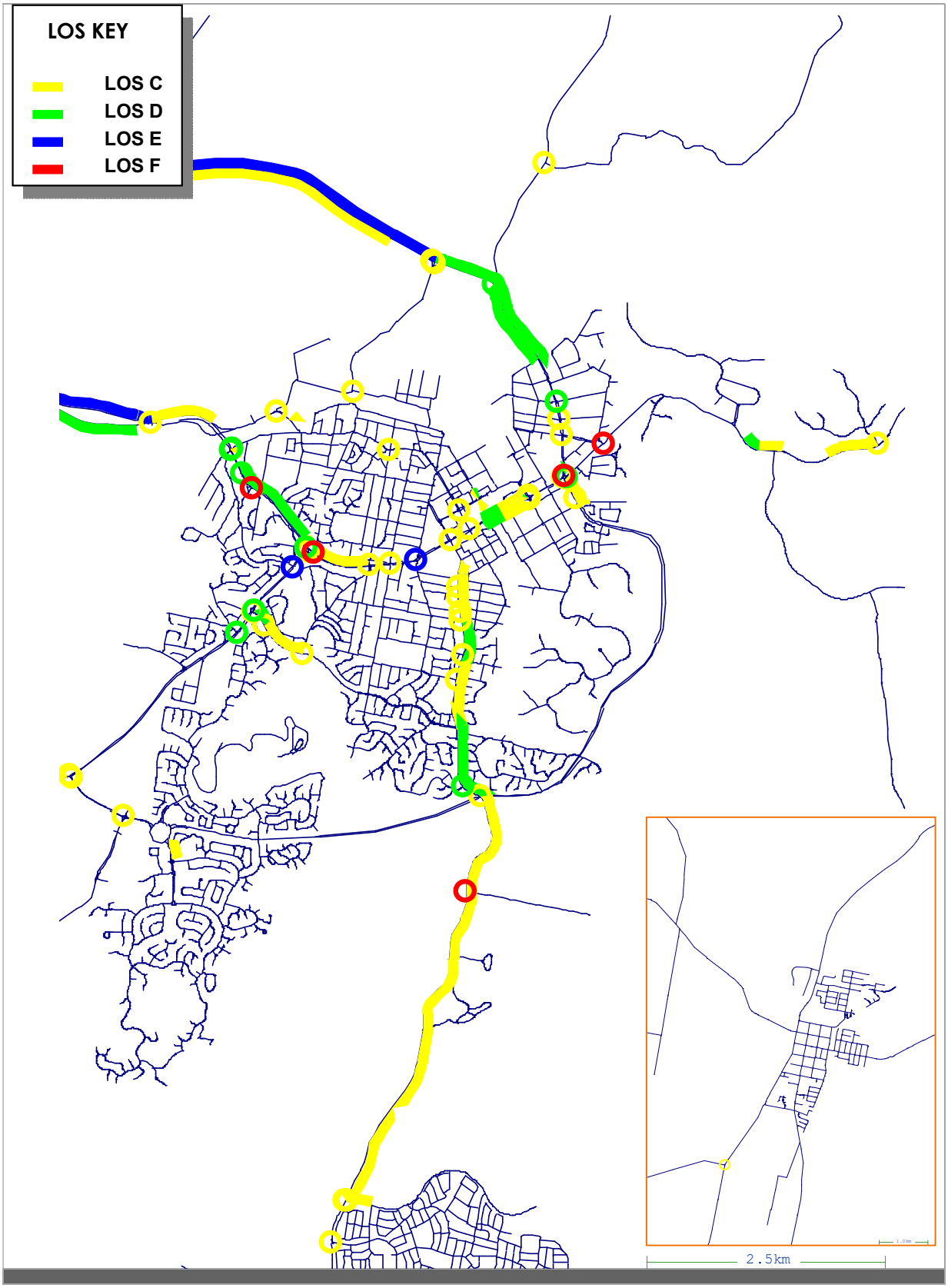


Figure 4-7: 2024 Base Network Levels of Service Plot PM Peak

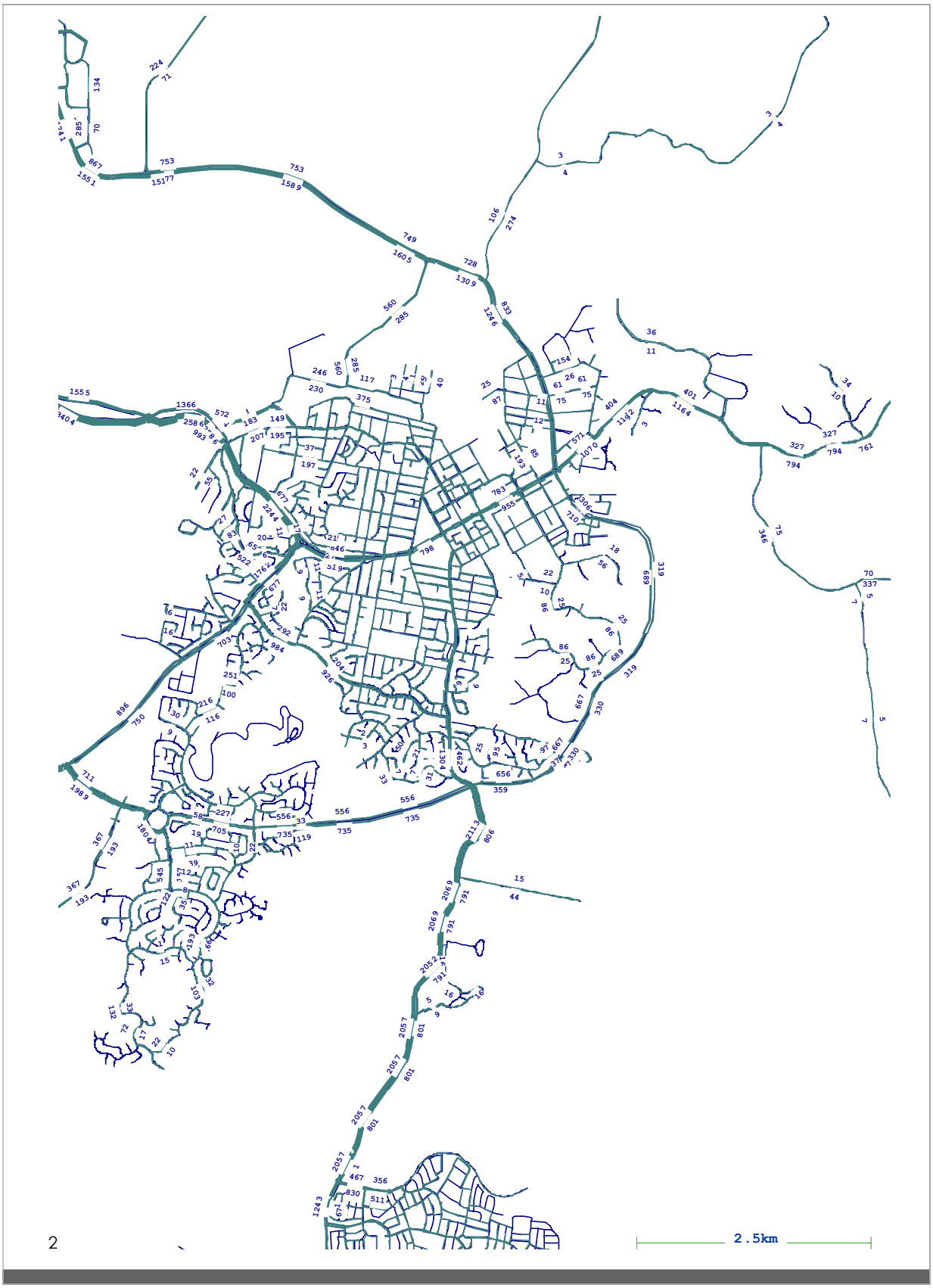


Figure 4-8: 2024 Base Network Traffic Volume Plot AM Peak

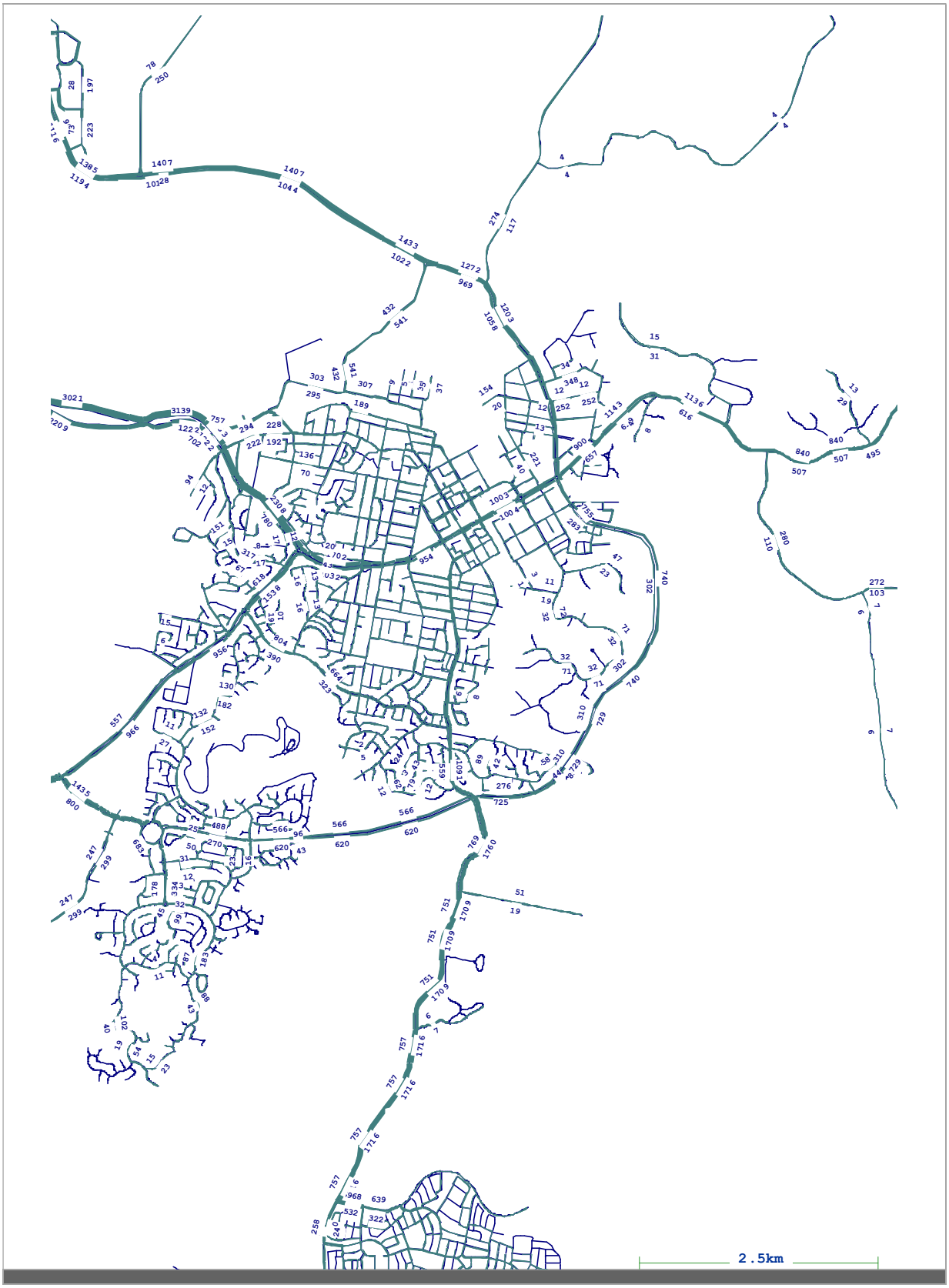


Figure 4-9: 2024 Base Network Traffic Volume Plot PM Peak

4.4 2027 Do-minimum Model

The 2027 base network was built from the 2024 base network with the addition of the improvements identified in Section 2 at or before 2027. The 2027 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2027:

Table 4-4: 2027 Do-minimum Deficiencies

Location	Period	LOS	Issue
Yass / Ellerton / Bungendore (Sth)	AM	F	Int LOS F - (700v) on south approach
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Jerrabomberra Circle	AM	E	Int LOS E on east app (Edwin Land Pkwy)
Lanyon / Southbar (Sth)	AM & PM	F-E	Int LOS F - (750v) on south approach
Canberra / Cameron (Sth)	AM & PM	E	Int LOS E - south app turning right (35v)
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (10v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / McCrae (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (Nth)	PM	E	Int LOS E - (900v) on north app
Lanyon / Canberra (NE)	PM	F	Int LOS F - (300v) on merge of north to east slip lane
Southbar Rd (Lanyon to Nth Terrace)	AM	E	Link LOS E NB
Cooma Rd (Southbar to Ellerton)	AM & PM	E	Link LOS E NB and SB

LOS plots highlighting these deficiencies are shown in Figure 4-10 and Figure 4-11 below and AM and PM peak hour traffic volumes are plotted in

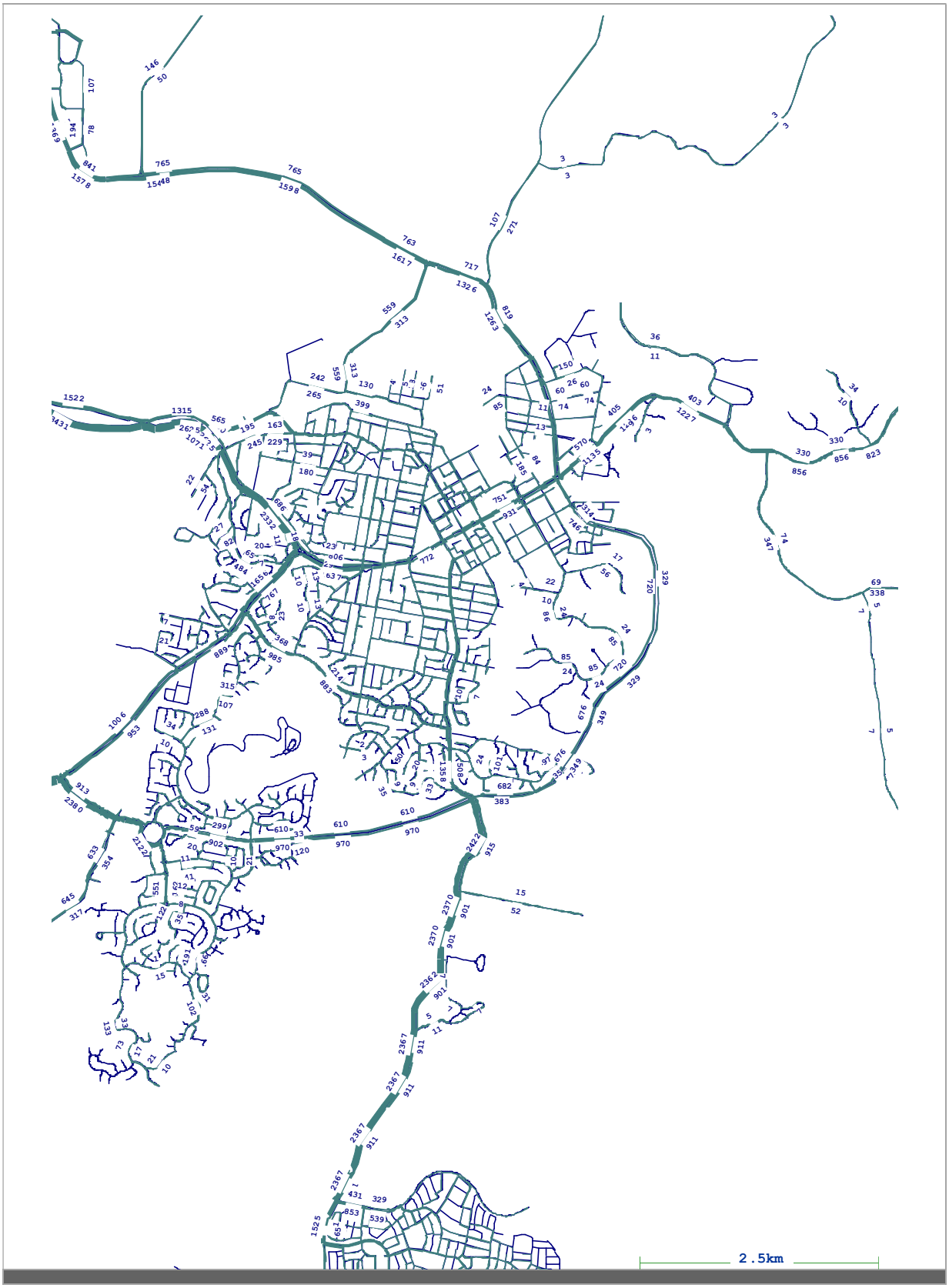


Figure 4-12 and Figure 4-13.

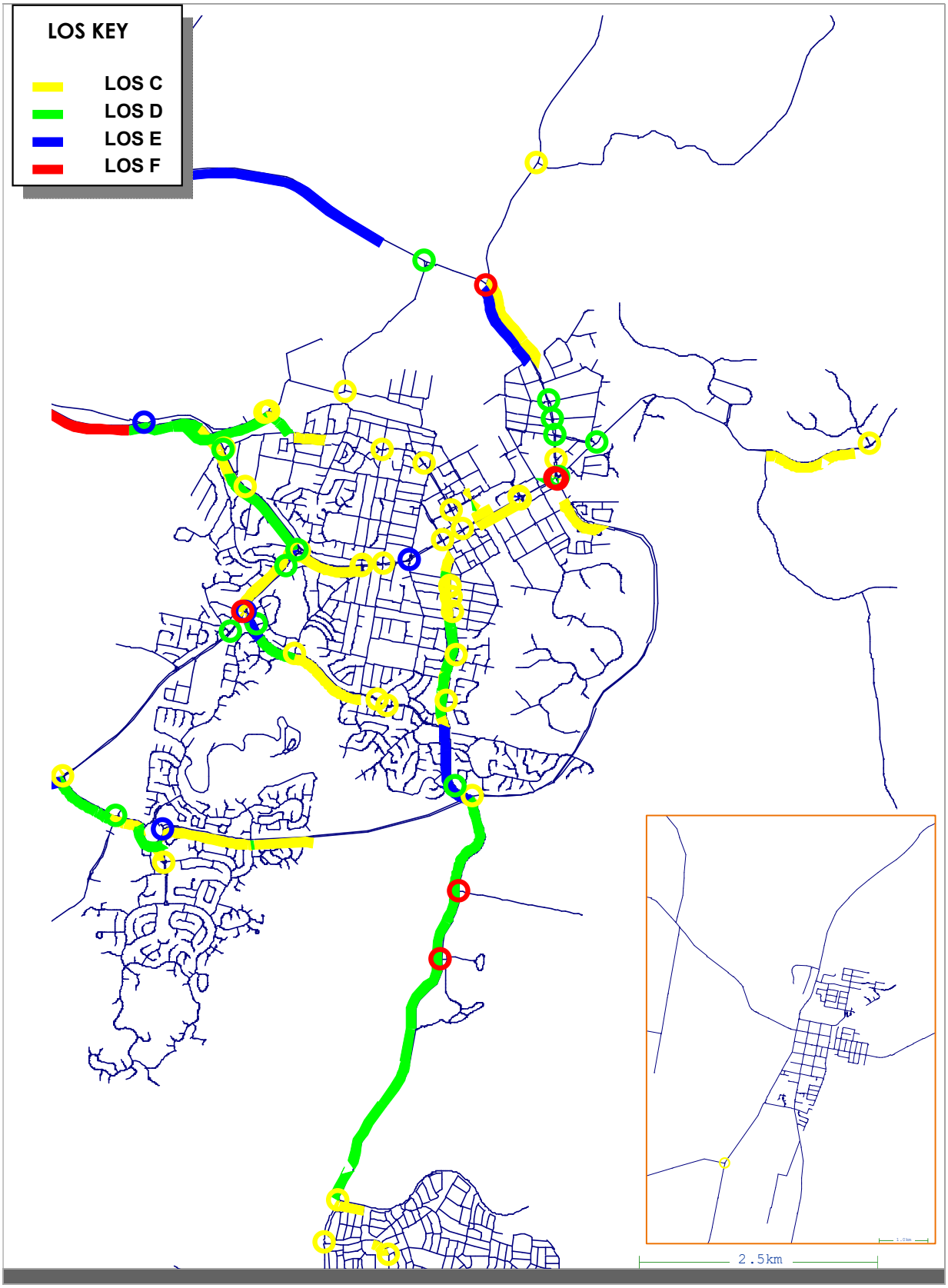


Figure 4-10: 2027 Base Network Levels of Service Plot AM Peak

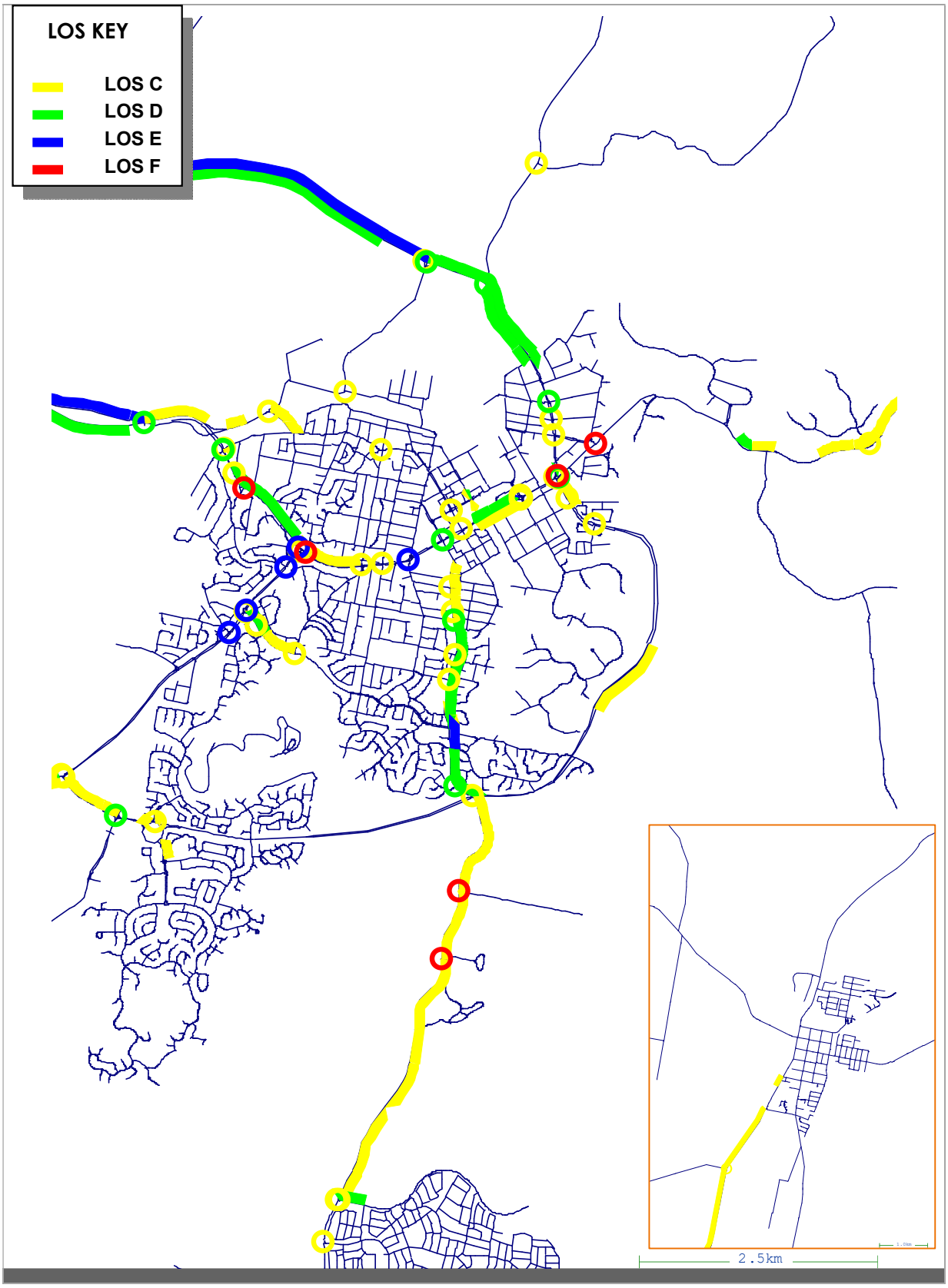


Figure 4-11: 2027 Base Network Levels of Service Plot PM Peak

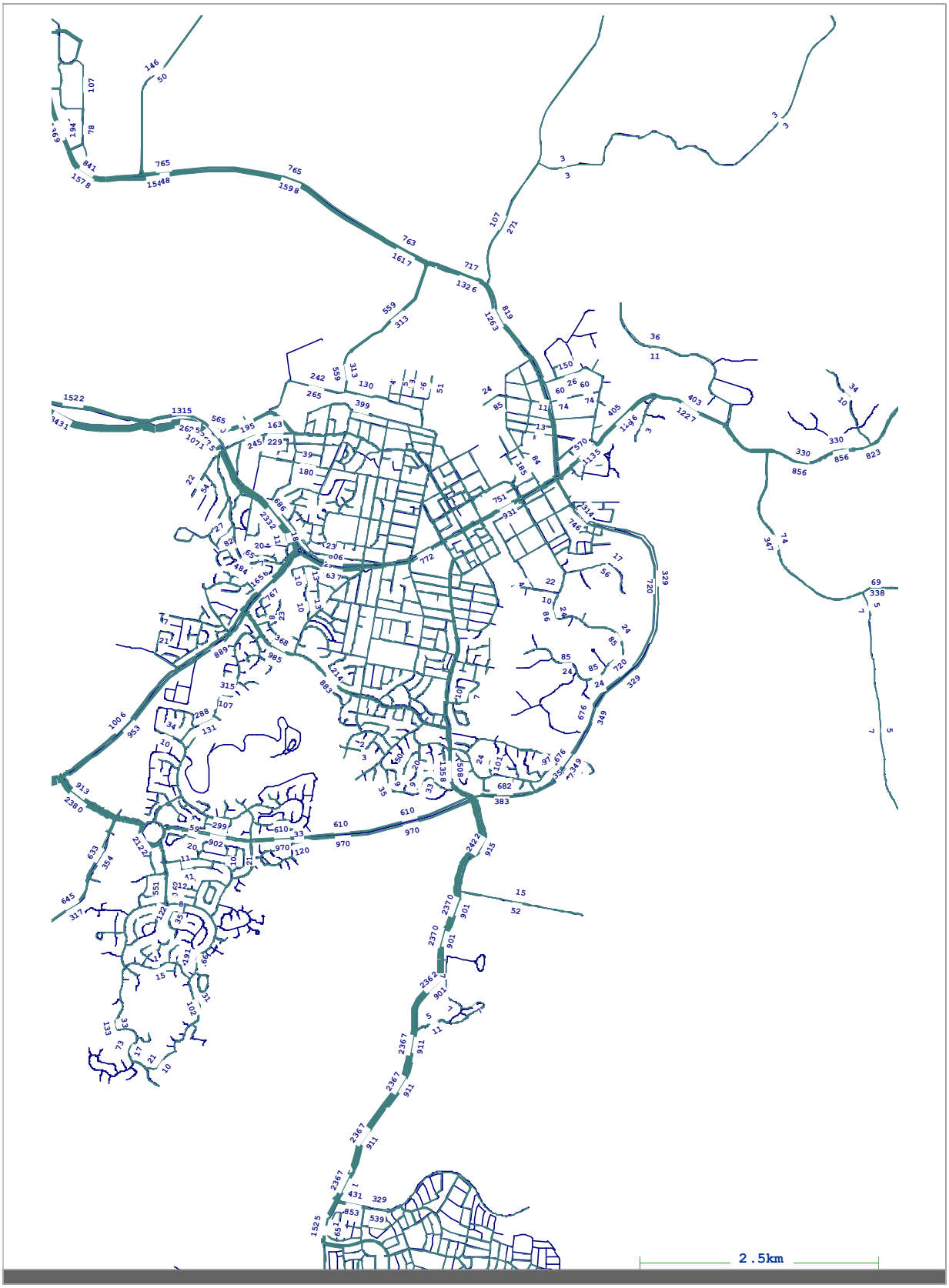


Figure 4-12: 2027 Base Network Traffic Volume Plot AM Peak



Figure 4-13: 2027 Base Network Traffic Volume Plot PM Peak

4.5 2031 Do-minimum Model

The 2031 base network was built from the 2027 base network with the addition of the improvements identified in Section 2 at or before 2031. The 2031 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2031:

Table 4-5: 2031 Do-minimum Deficiencies

Location	Period	LOS	Issue
Lanyon / Southbar (Sth)	AM & PM	F-E	Int LOS E & F at various approaches
Yass / Ellerton / Bungendore (Sth)	AM & PM	F	Int LOS F - (700v) on south approach
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Canberra / Cameron (Sth)	AM & PM	F-E	Int LOS F - south app turning right (70v)
Jerrabomberra Circle (Est)	AM	E	Int LOS E on east app (Edwin Land Pkwy)
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (10v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Tompsitt / Environa	PM	E	Int LOS E
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (50v) on west app turning right
Lanyon / McCrae (Wst)	PM	E	Int LOS E - (50v) on west app turning right
Lanyon / Canberra (Nth)	PM	E	Int LOS E - (900v) on north app
Lanyon / Canberra (NE)	PM	F	Int LOS F - (300v) on merge of north to east slip lane
Cooma Rd (Southbar to Ellerton)	AM & PM	E	Link LOS E NB and LOS E SB
Southbar Rd (Lanyon to Nth Terrace)	AM & PM	E	Link LOS E NB and SB

LOS plots highlighting these deficiencies are shown in Figure 4-14 and Figure 4-15 below and AM and PM peak hour traffic volumes are plotted in Figure 4-16 and Figure 4-17.

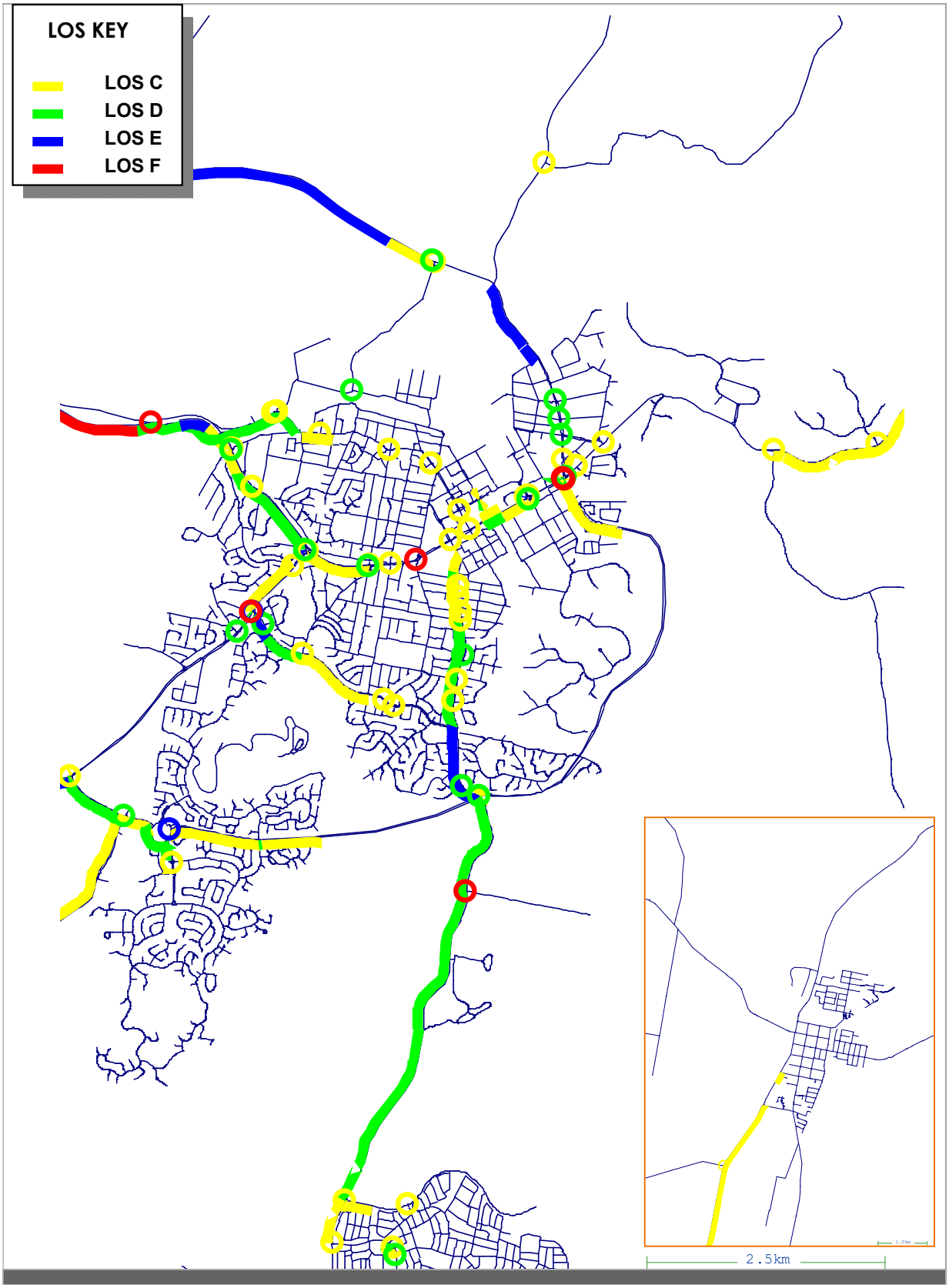


Figure 4-14: 2031 Base Network Levels of Service Plot AM Peak

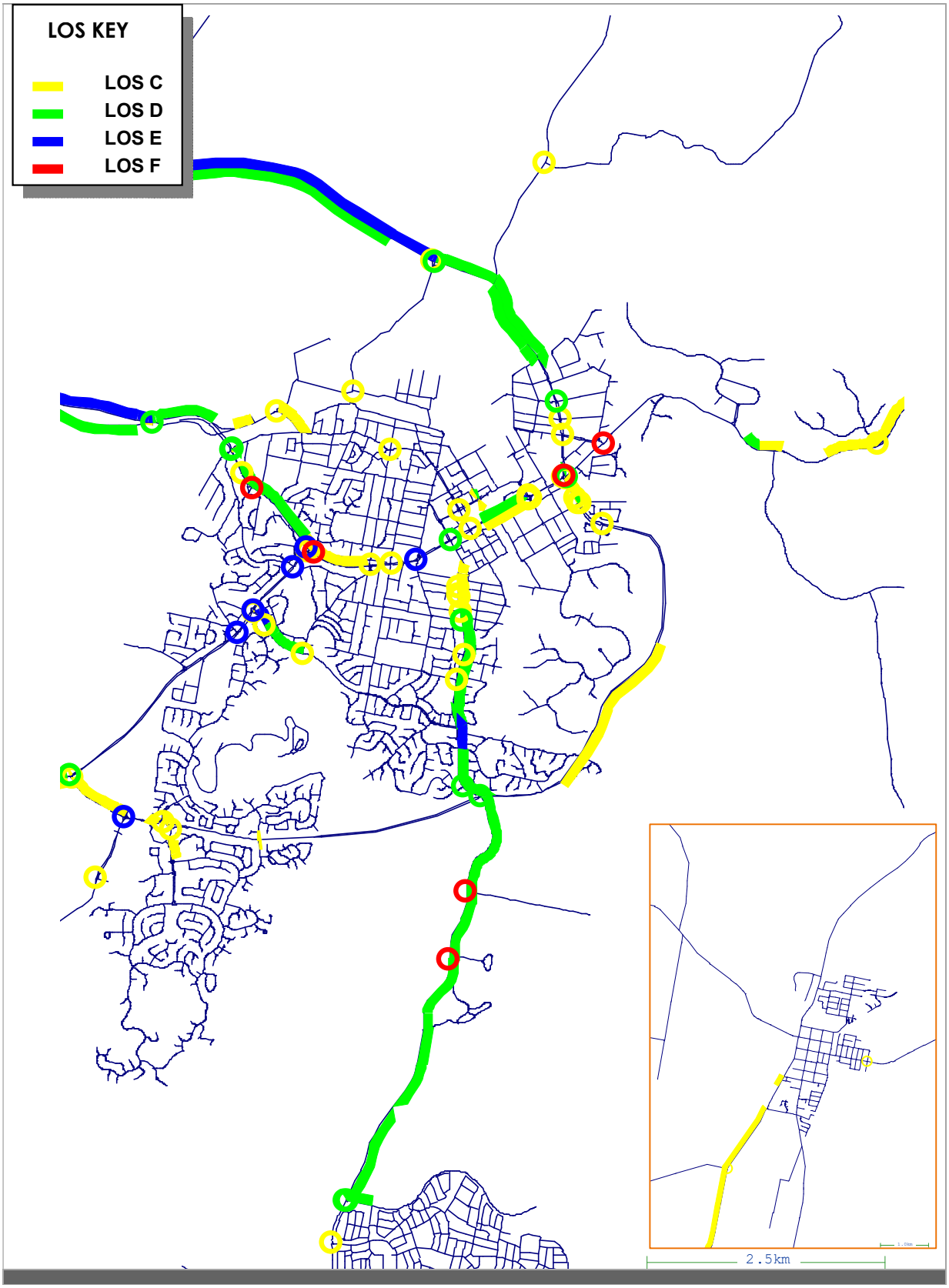


Figure 4-15: 2031 Base Network Levels of Service Plot PM Peak

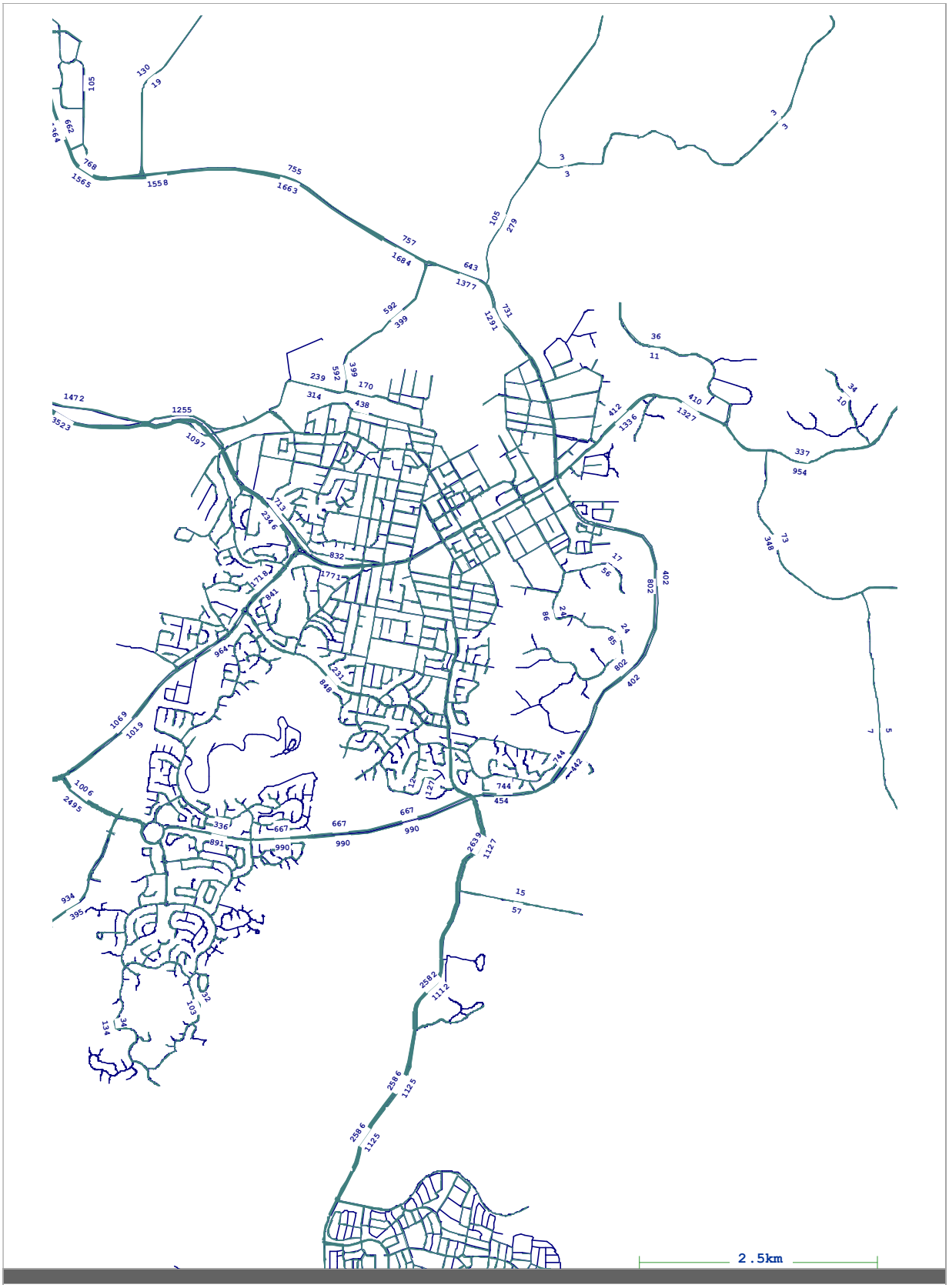


Figure 4-16: 2031 Base Network Traffic Volume Plot AM Peak

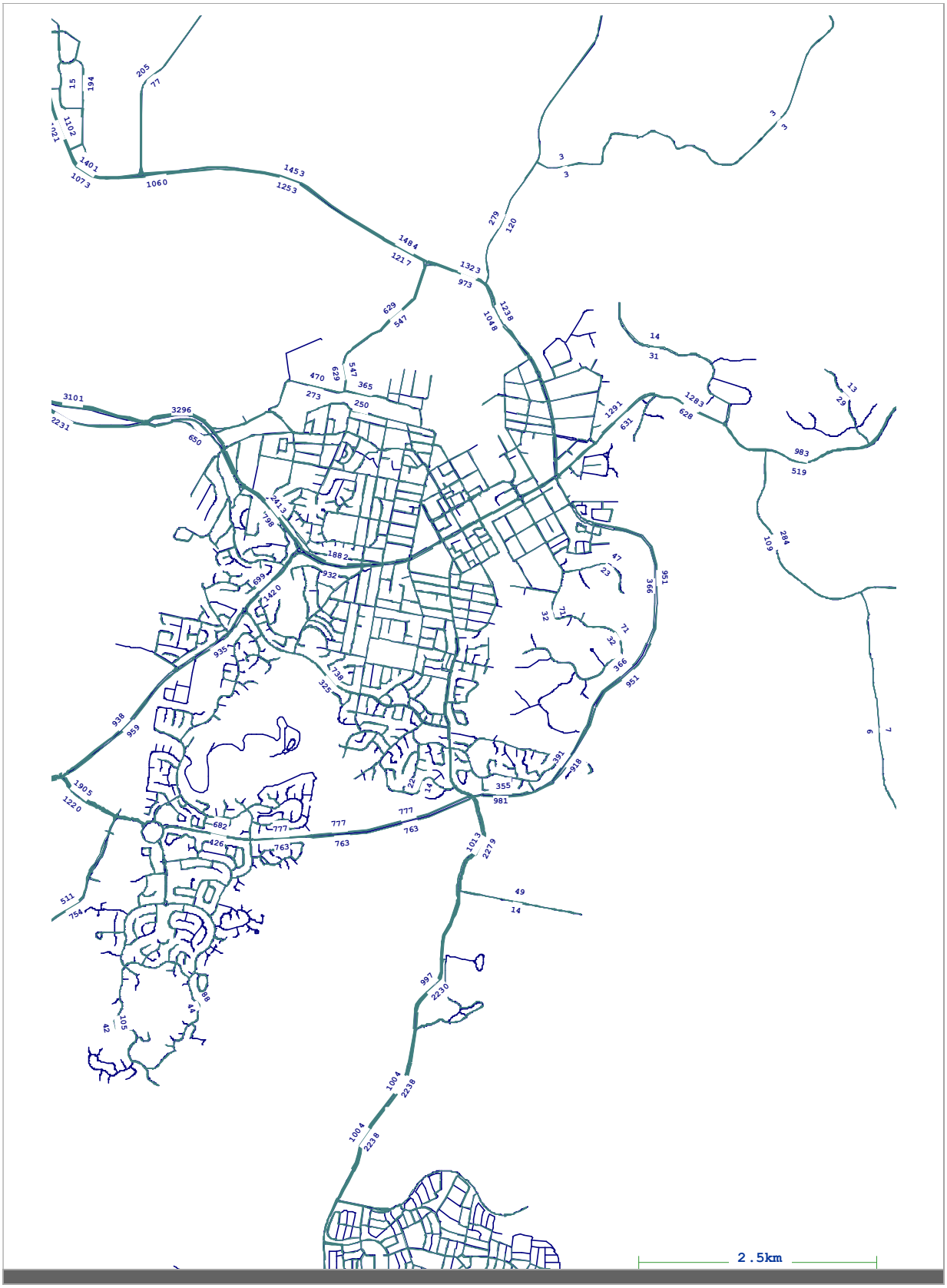


Figure 4-17: 2031 Base Network Traffic Volume Plot PM Peak

4.6 2036 Do-minimum Model

The 2036 base network was built from the 2031 base network with the addition of the improvements identified in Section 2 at or before 2036. The 2036 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2036:

Table 4-6: 2036 Do-minimum Deficiencies

Location	Period	LOS	Issue
Lanyon / Southbar (Sth)	AM & PM	E-F	Int LOS F - (860v) on south approach
Yass / Ellerton / Bungendore (Sth)	AM & PM	F	Int LOS F - (900v) on south approach
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (20v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Canberra / Cameron (Sth)	AM & PM	F-E	Int LOS F - south app turning right (50v)
Kings Hwy / Captains Flat	AM	E	Int LOS E – on east approach
Cooma / Fergus	PM	E	Int LOS E - (300v) on west app
Lanyon / McCrae (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (NE)	PM	F	Int LOS F - (400v) on merge of north to east slip lane
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Canberra / Gilmore (Sth)	PM	E	Int LOS E
Cooma / Candlebark	AM & PM	E	Int LOS E - (50v) on west approach
Cooma Rd (Southbar to Ellerton)	AM & PM	E-F	Link LOS F NB and LOS E SB
Cooma Rd (Southbar to Thorpe)	AM	E	Link LOS E NB
Southbar Rd (Lanyon to Nth Terrace)	AM & PM	E	Link LOS E NB and SB
Old Cooma Rd (Googong to Ellerton)	AM	E	Link LOS E N

LOS plots highlighting these deficiencies are shown in Figure 4-18 and Figure 4-19 below and AM and PM peak hour traffic volumes are plotted in Figure 4-20 and Figure 4-21.

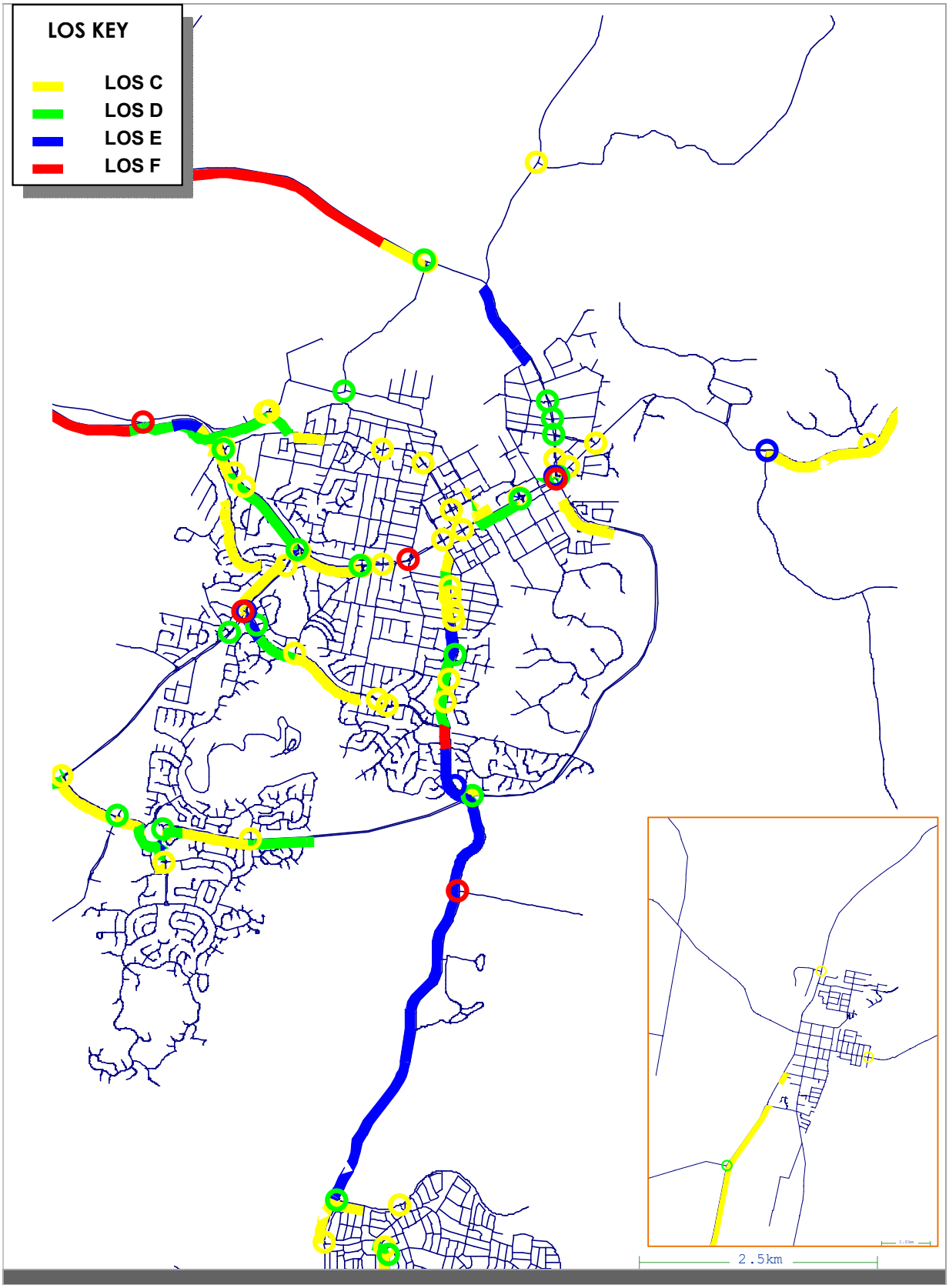


Figure 4-18: 2036 Base Network Levels of Service Plot AM Peak

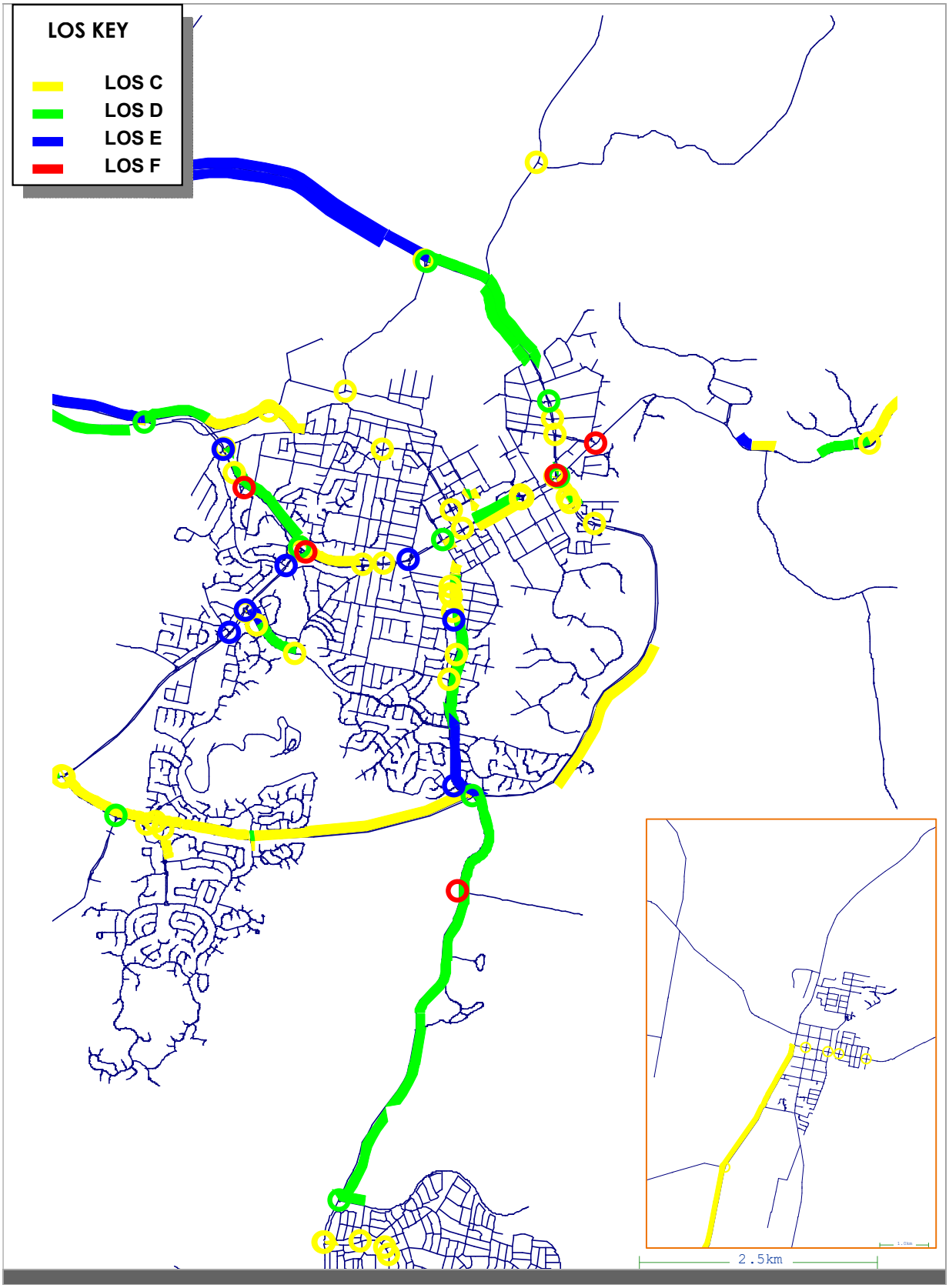


Figure 4-19: 2036 Base Network Levels of Service Plot PM Peak

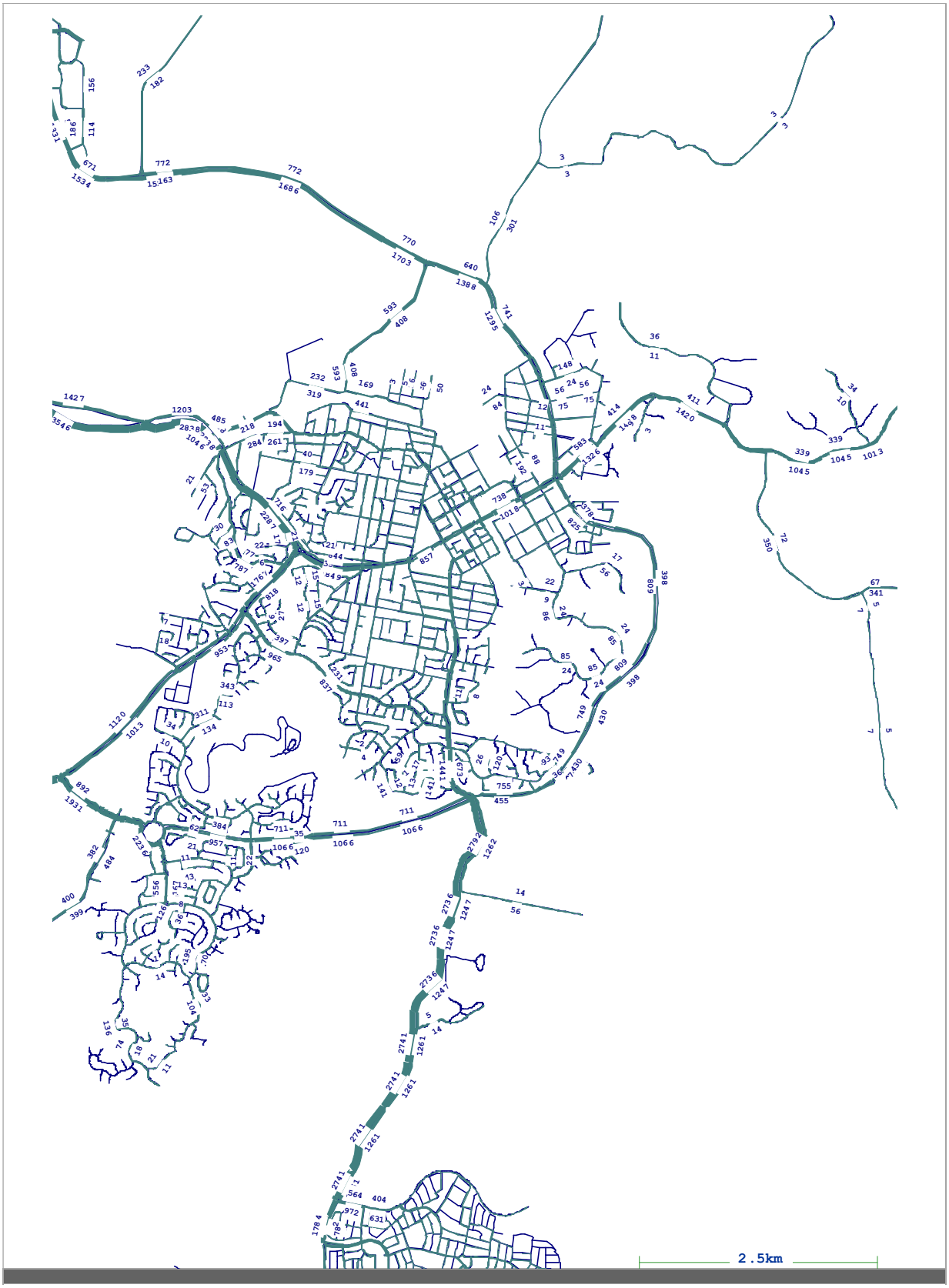


Figure 4-20: 2036 Base Network Traffic Volume Plot AM Peak

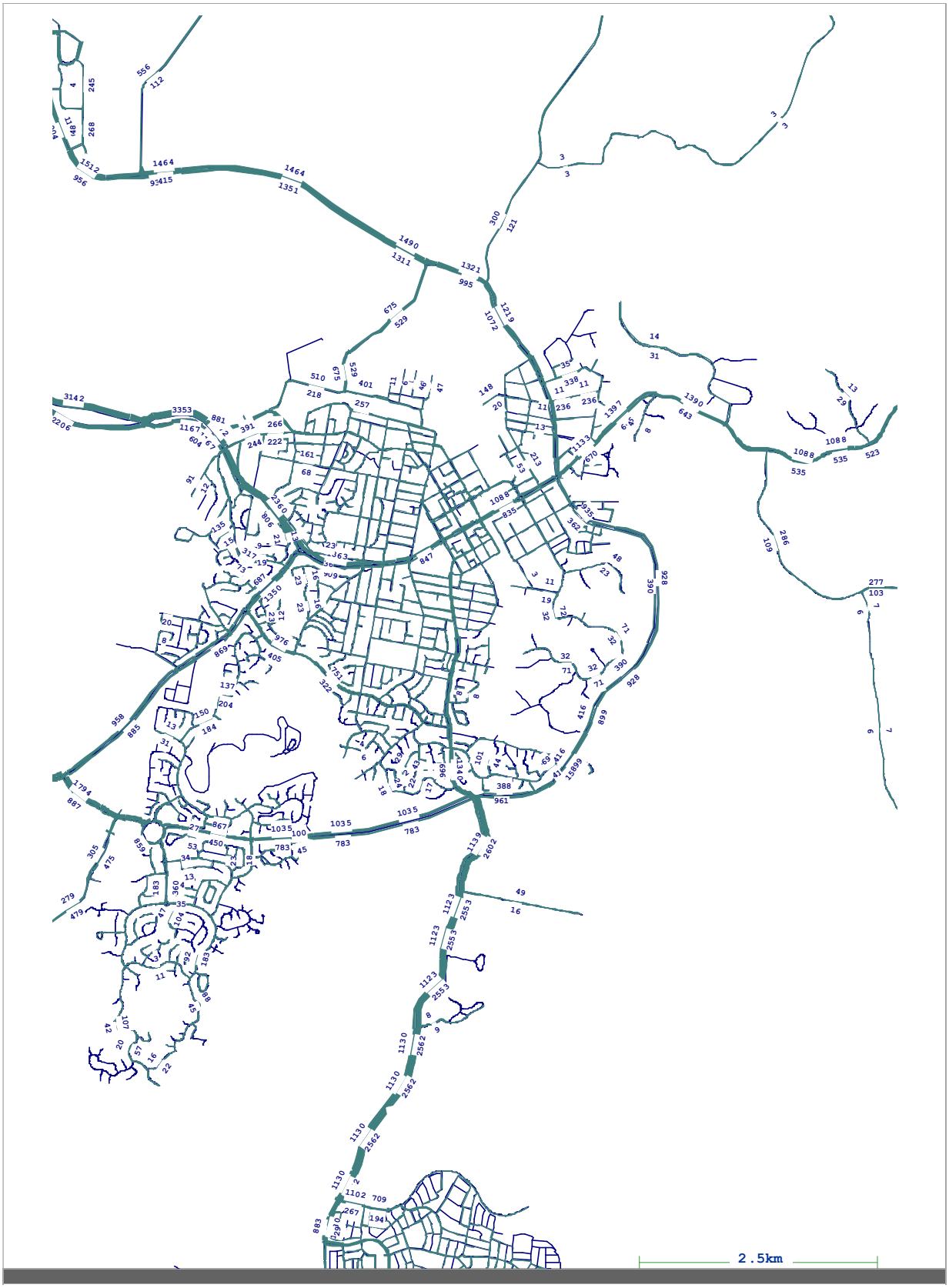


Figure 4-21: 2036 Base Network Traffic Volume Plot PM Peak

4.7 2041 Do-minimum Model

The 2041 base network was built from the 2036 base network with the addition of the improvements identified in Section 2 at or before 2041. The 2041 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2041:

Table 4-7: 2041 Do-minimum Deficiencies

Location	Period	LOS	Issue
Lanyon / Southbar (Sth)	AM & PM	F-E	Int LOS F - (860v) on south approach
Yass / Ellerton / Bungendore (Sth)	AM & PM	E-F	Int LOS F - (900v) on south approach
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Yass / Silva (Est)	AM	E	Int LOS E - (70v) on east approach
Yass / Hincksman (Est)	AM	E	Int LOS E - (70v) on east approach
Canberra / Cameron (Sth)	AM & PM	F-E	Int LOS F - south app turning right (35v)
Kings Hwy / Captains Flat	AM	F	Int LOS F – on east approach
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (10v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Cooma / Fergus	PM	E	Int LOS E - (300v) on west app
Lanyon / McCrae (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (NE)	PM	F	Int LOS F - (400v) on merge of north to east slip lane
Lanyon / Canberra (Nth)	PM	E	Int LOS E - (900v) on north app
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Canberra / Gilmore (Sth)	PM	E	Int LOS E
Cooma / Candlebark	AM & PM	E	Int LOS E - (50v) on west approach
Cooma Rd (Southbar to Ellerton)	AM & PM	E	Link LOS E NB and SB
Southbar Rd (Lanyon to Nth Terrace)	AM & PM	E	Link LOS E NB and SB
Old Cooma Rd (Googong to Ellerton)	AM & PM	E	Link LOS E NB and SB

LOS plots highlighting these deficiencies are shown in Figure 4-22 and Figure 4-23 below and AM and PM peak hour traffic volumes are plotted in Figure 4-24 and Figure 4-25.

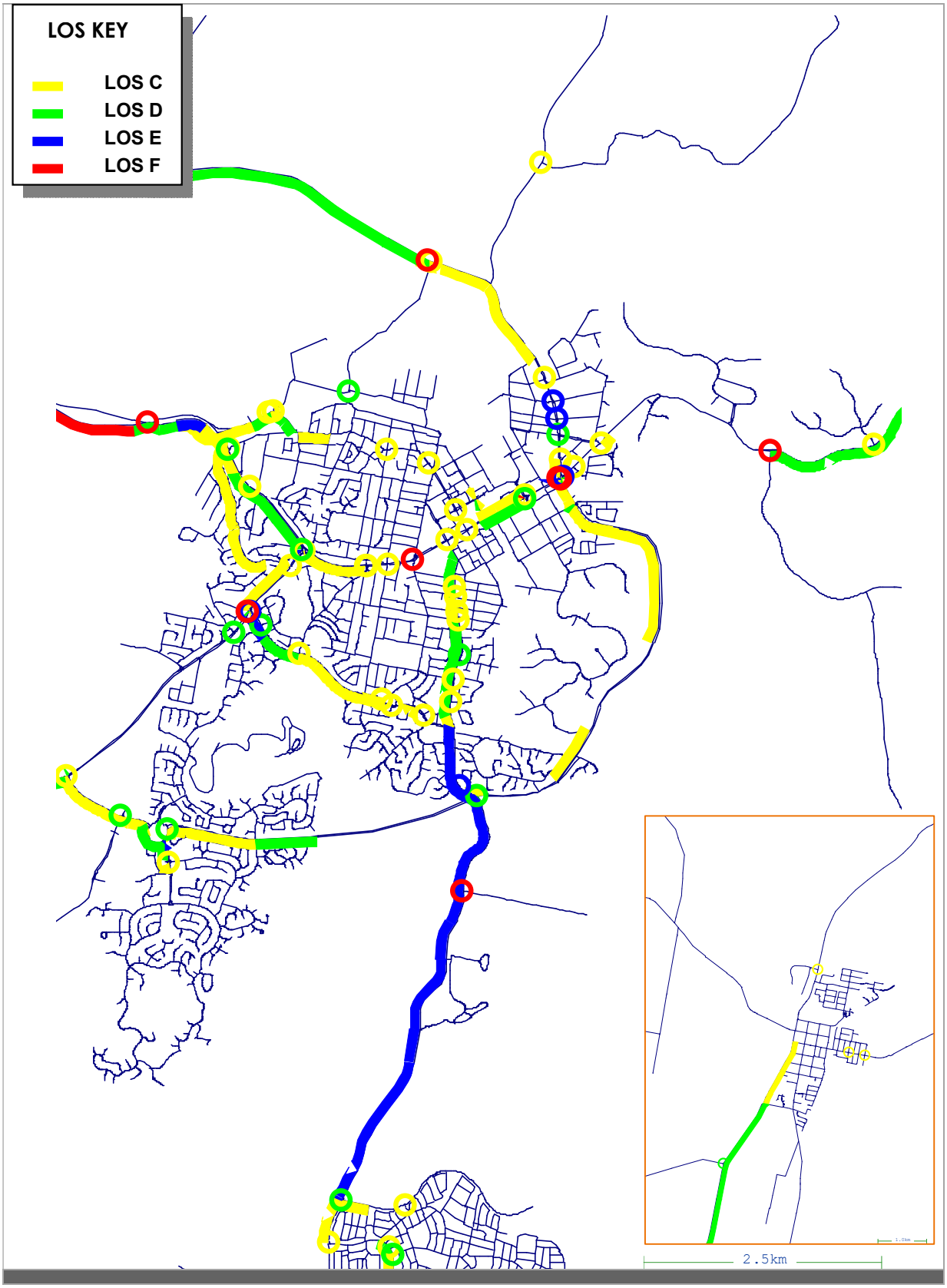


Figure 4-22: 2041 Base Network Levels of Service Plot AM Peak

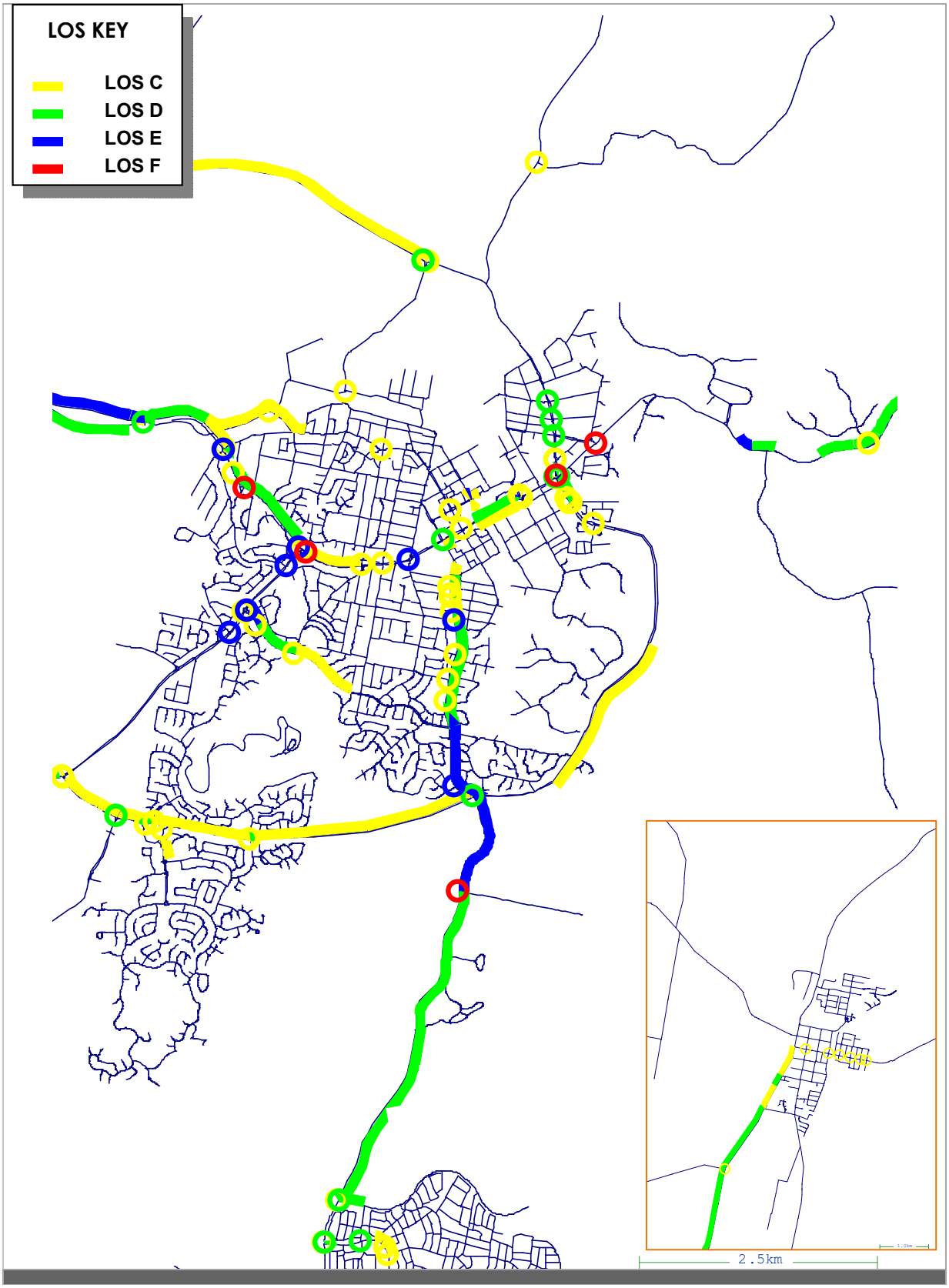


Figure 4-23: 2041 Base Network Levels of Service Plot PM Peak

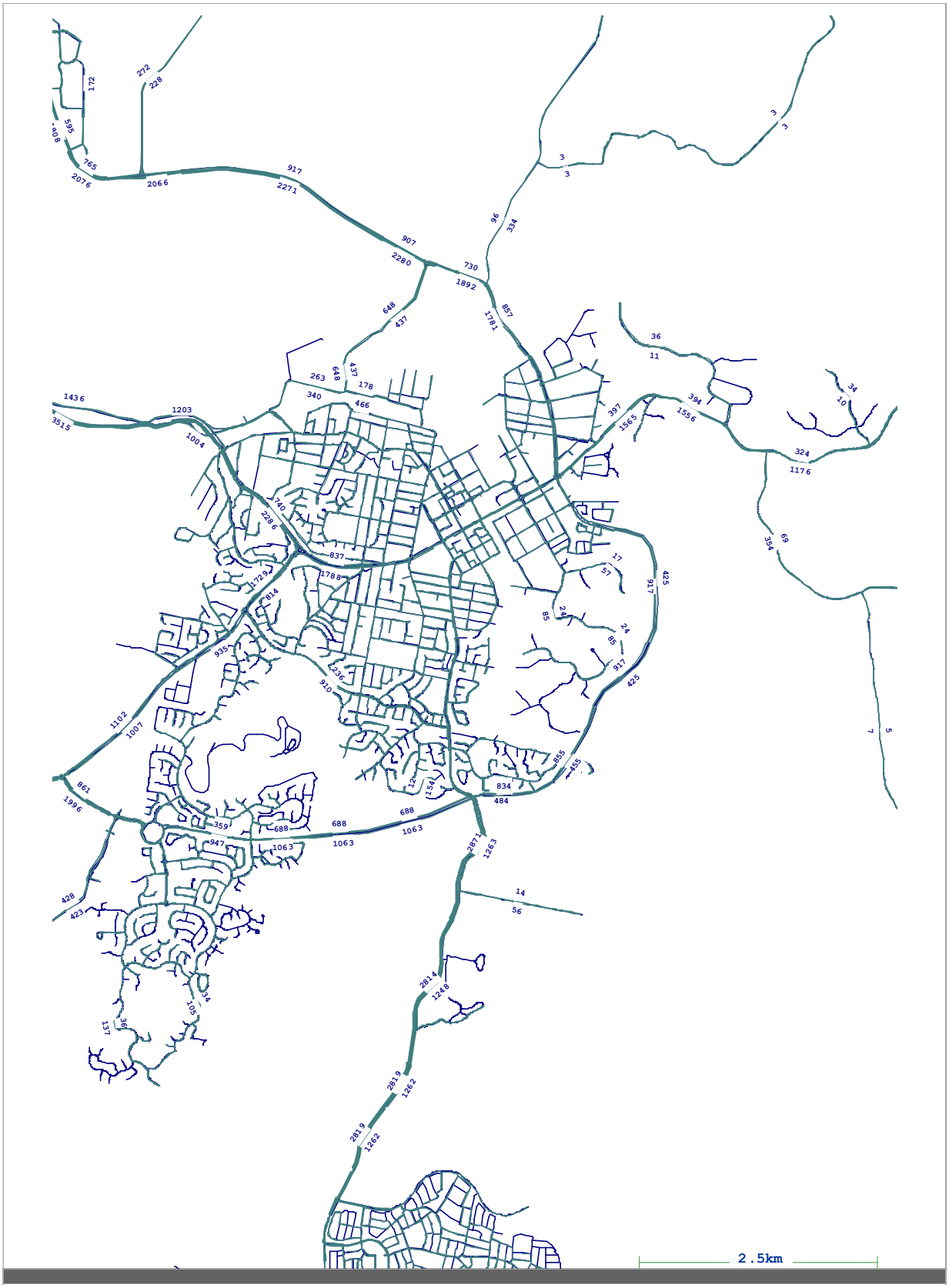


Figure 4-24: 2041 Base Network Traffic Volume Plot AM Peak

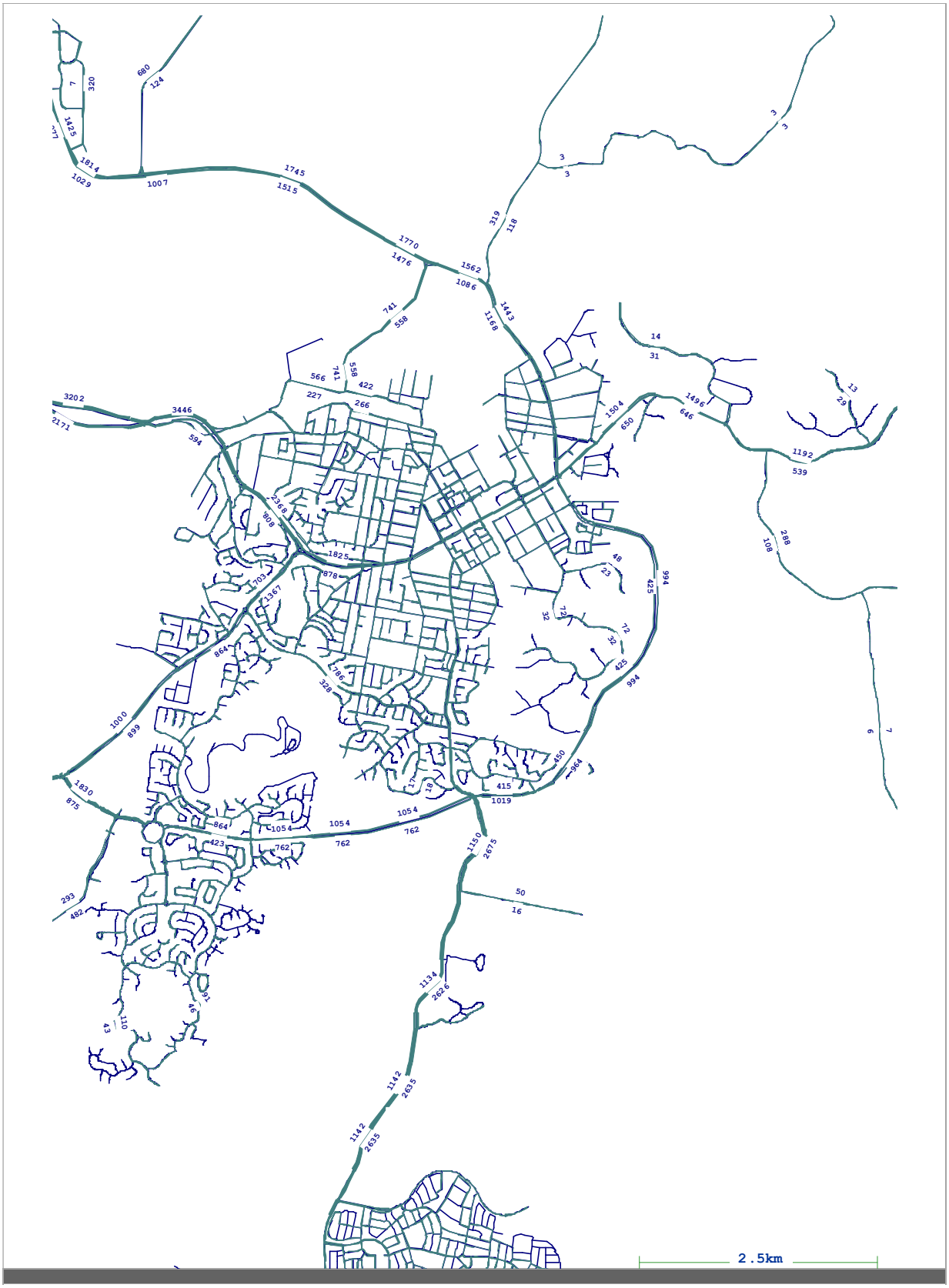


Figure 4-25: 2041 Base Network Traffic Volume Plot PM Peak

4.8 2046 Do-minimum Model

The 2046 base network was built from the 2041 base network with the addition of the improvements identified in Section 2 at or before 2046. The 2046 land use was applied to this network and the following deficiencies in the QPRC area were identified as arising if no further works are implemented before 2046:

Table 4-8: 2046 Do-minimum Deficiencies

Location	Period	LOS	Issue
Lanyon / Southbar (Sth)	AM	F	Int LOS F - (860v) on south approach
Yass / Ellerton / Bungendore (Sth)	AM & PM	F	Int LOS F - (900v) on south approach
Yass / Ellerton / Bungendore (Wst)	AM & PM	F	Int LOS F - (700v) on west approach
Yass / Silva (Est)	AM	E	Int LOS E - (70v) on east approach
Yass / Hincksman (Est)	AM	E	Int LOS E - (70v) on east approach
Kings Hwy / Captains Flat	AM	F	Int LOS F – on east approach
Jerrabomberra Circle (Est)	AM	E	Int LOS E – on east app (Edwin Land Pkwy)
Canberra / Cameron (Sth)	AM & PM	E	Int LOS E south app turning right (35v)
Bungendore / Thurralilly (Nth)	PM	F	Int LOS F - (10v) on north app turning right
Canberra / Kealman (SW)	PM	F	Int LOS F - (10v) on SW app turning right
Canberra / Gilmore	AM & PM	E	Int LOS E
Lanyon / McCrae (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Gilmore (Wst)	PM	E	Int LOS E - (100v) on west app turning right
Lanyon / Canberra (Nth)	PM	E	Int LOS E - (900v) on north app
Lanyon / Canberra (NE)	PM	F	Int LOS F - (400v) on merge of north to east slip lane
Cooma / Fergus	PM	F	Int LOS F - (250v) on west app
Cooma / Candlebark	AM & PM	E	Int LOS E - (50v) on west approach
Cooma Rd (Southbar to Ellerton)	AM & PM	E	Link LOS E NB and SB
Cooma Rd (Southbar to Thorpe)	AM & PM	E	Link LOS E NB and SB
Southbar Rd (Lanyon to Nth Terrace)	AM & PM	E	Link LOS E NB and SB
Old Cooma Rd (Googong to Ellerton)	AM & PM	E	Link LOS E NB and SB

LOS plots highlighting these deficiencies are shown in Figure 4-26 and Figure 4-27 below and AM and PM peak hour traffic volumes are plotted in Figure 4-28 and Figure 4-29.

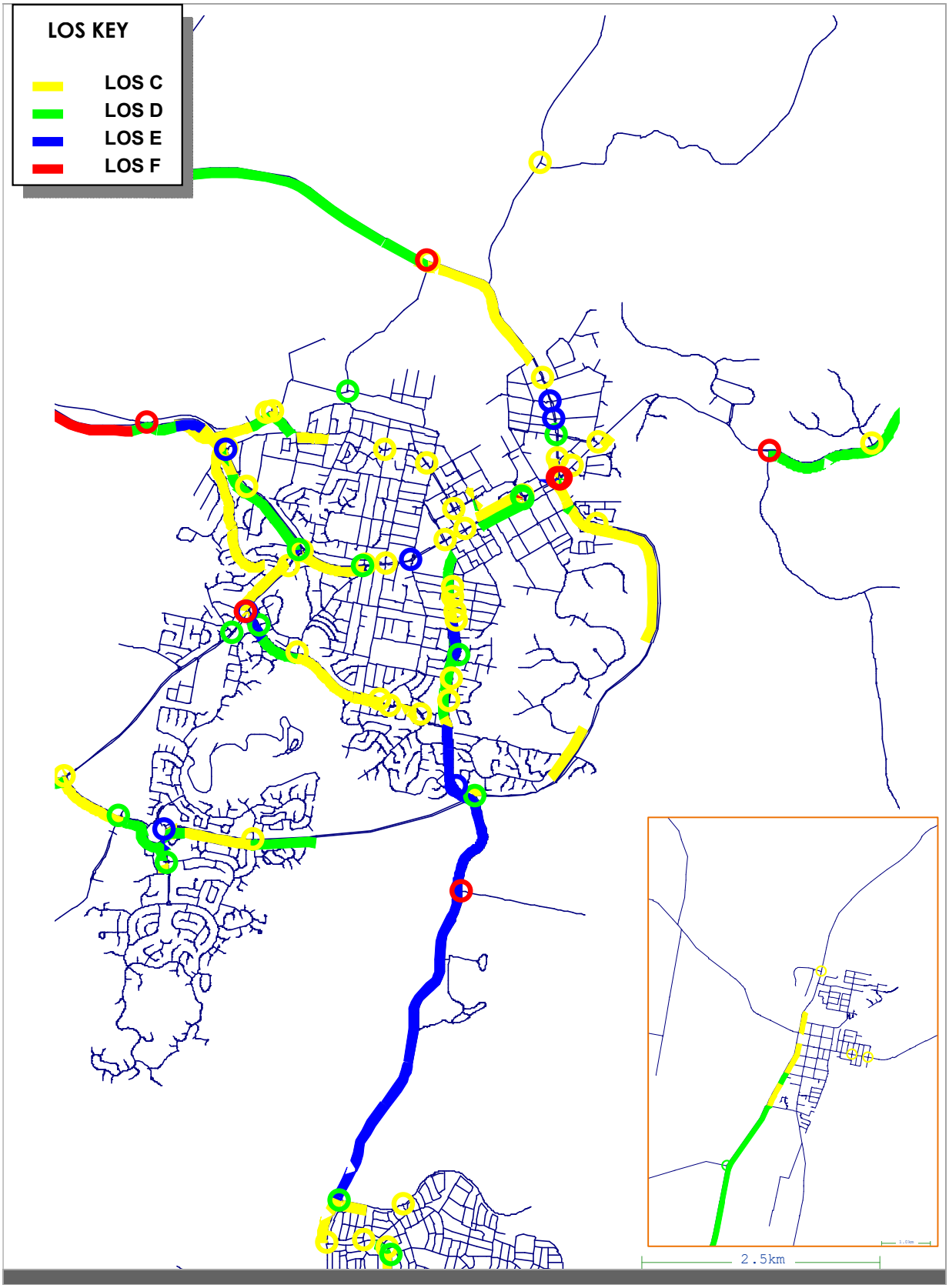


Figure 4-26: 2046 Base Network Levels of Service Plot AM Peak

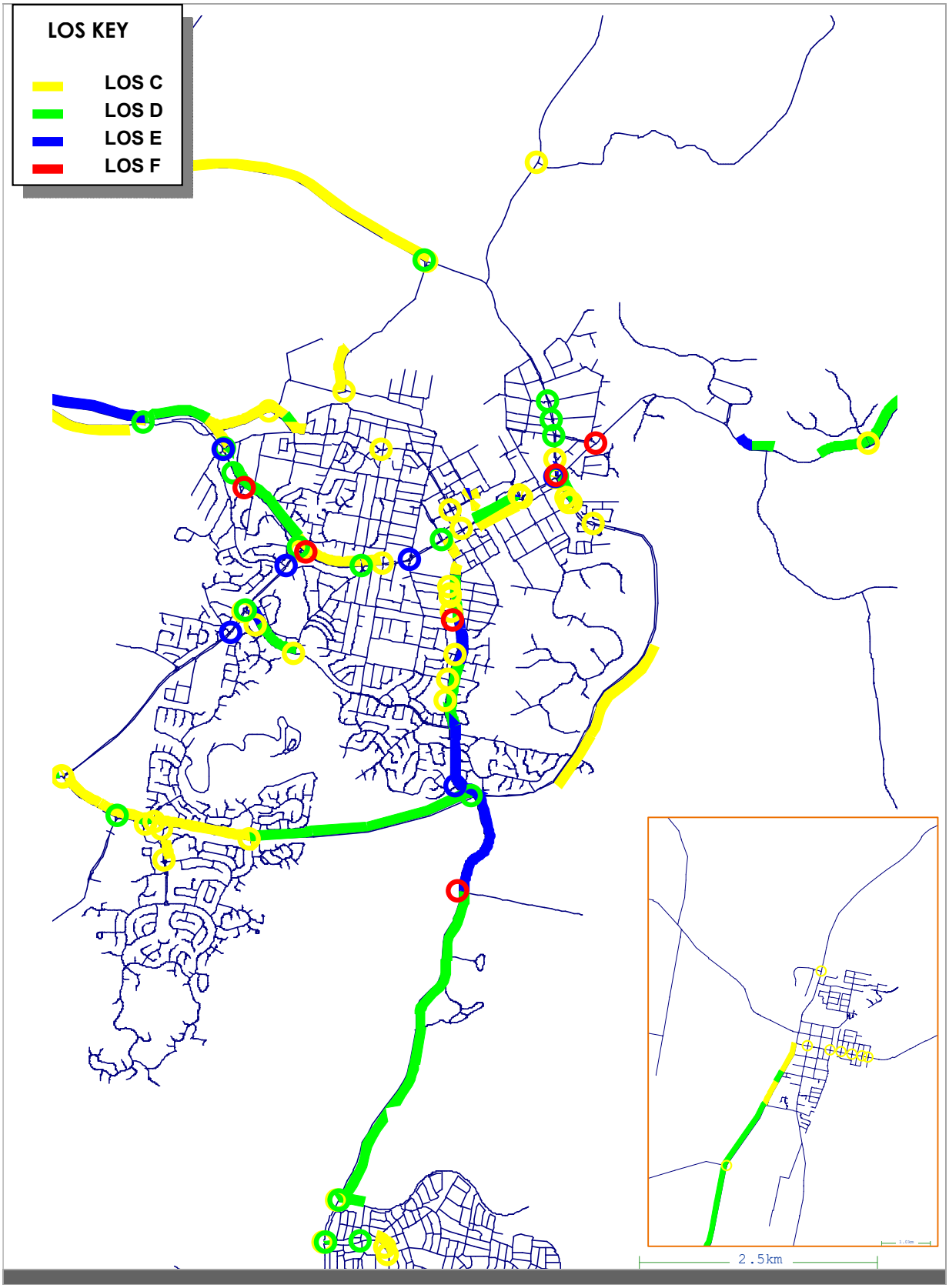


Figure 4-27: 2046 Base Network Levels of Service Plot PM Peak

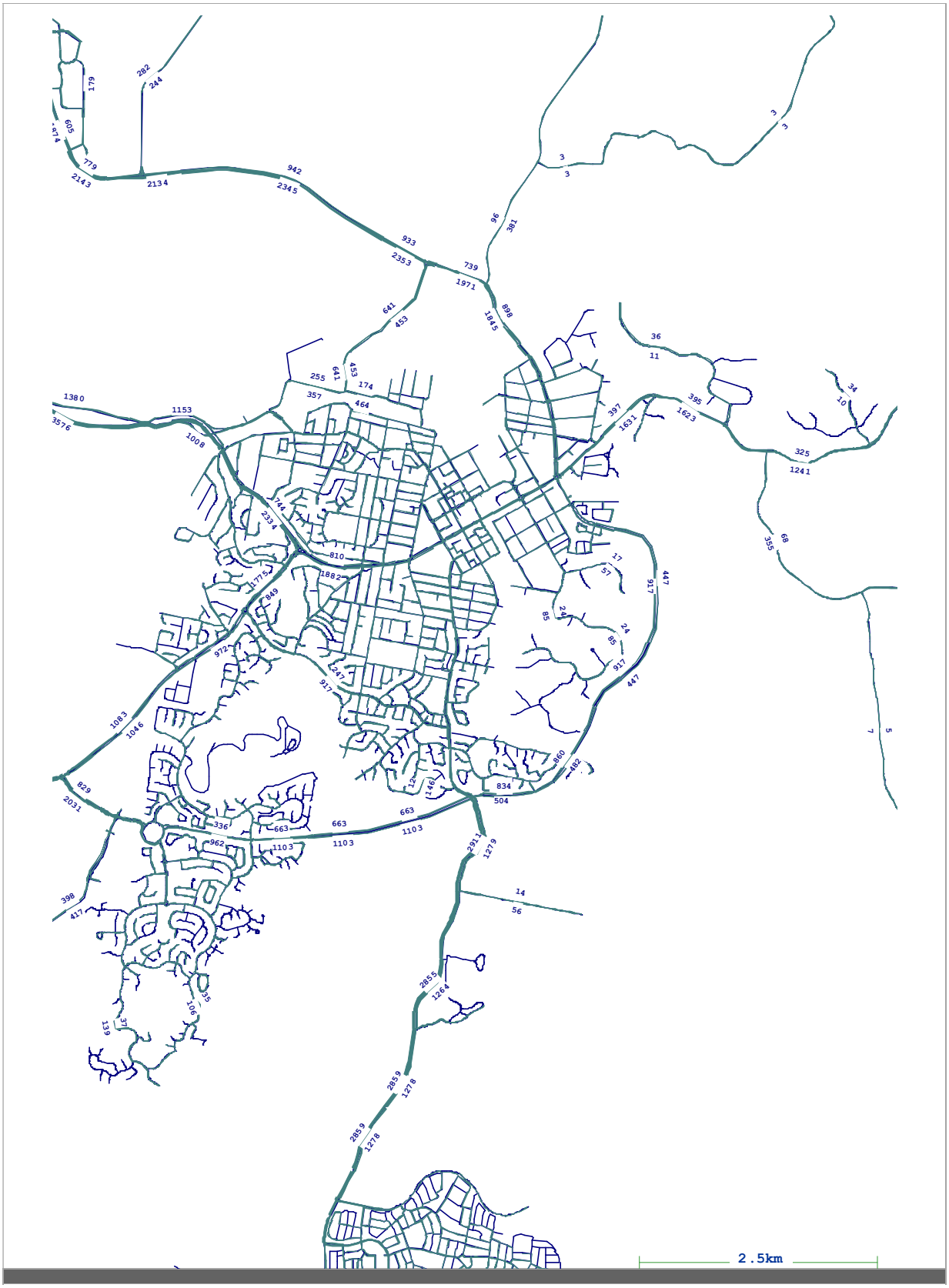


Figure 4-28: 2046 Base Network Traffic Volume Plot AM Peak

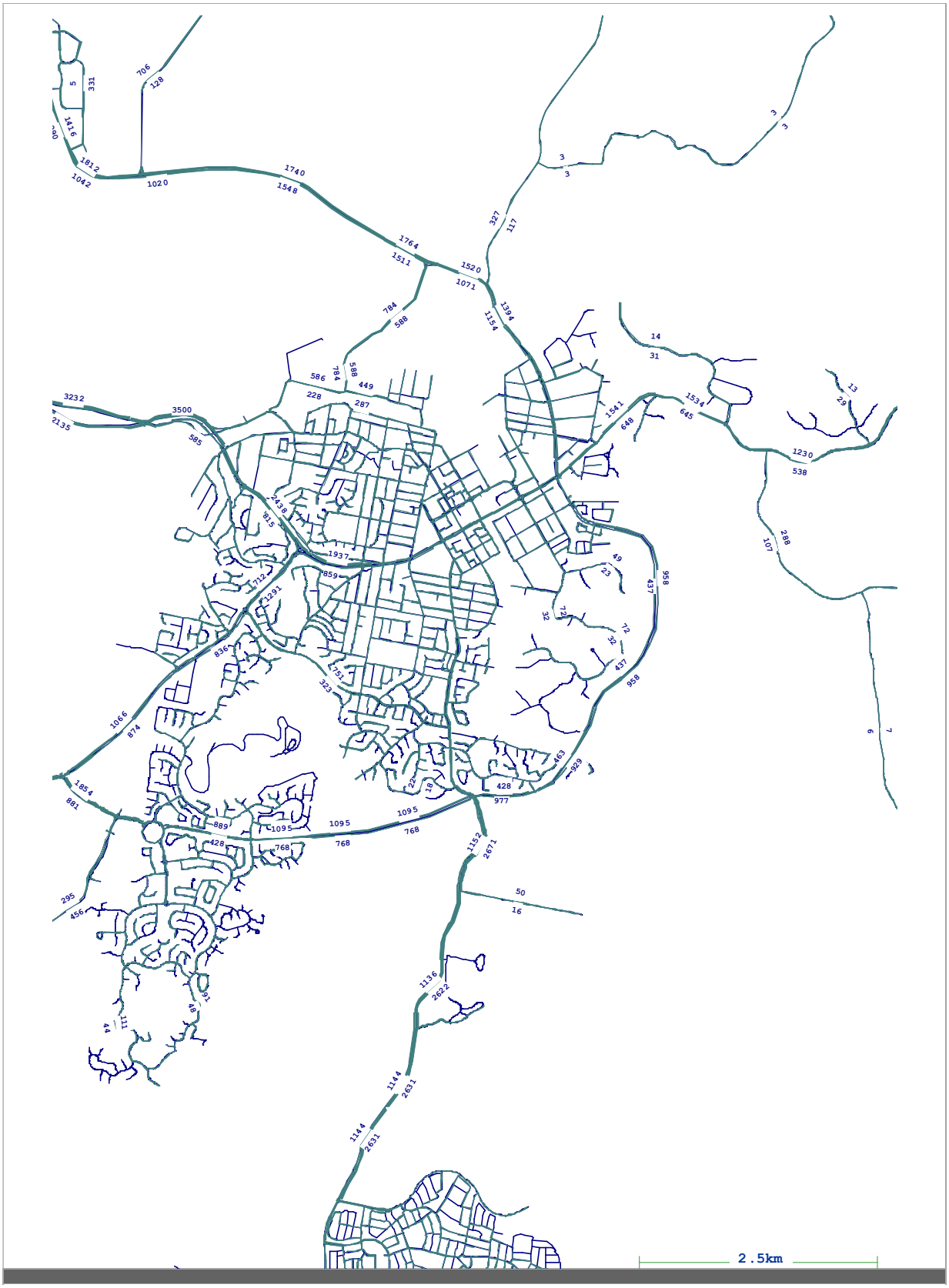


Figure 4-29: 2046 Base Network Traffic Volume Plot PM Peak

DESIGN WITH COMMUNITY IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

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