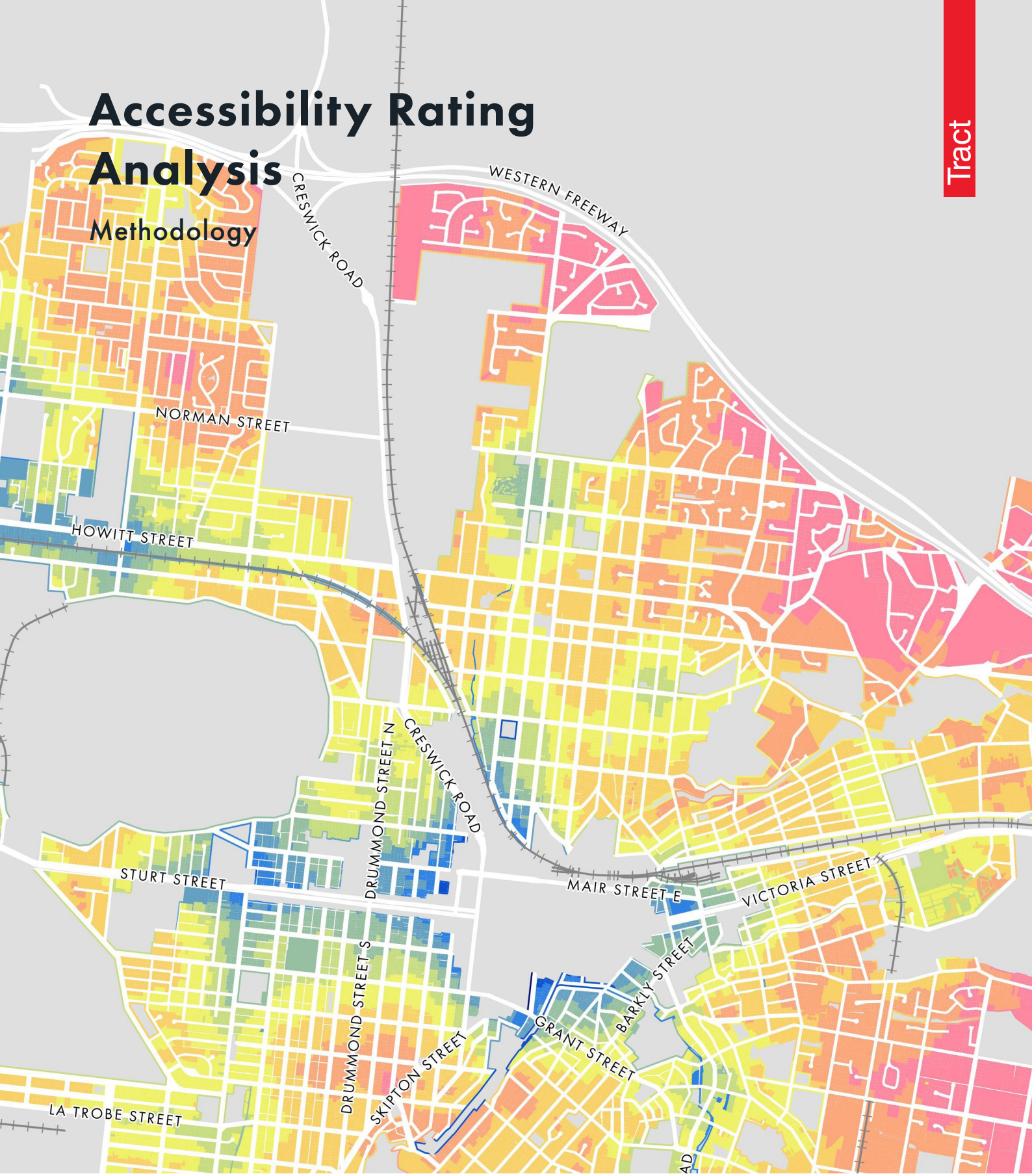
Accessibility Rating Analysis

Methodology



For the City of Ballarat

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Issued
01 May 2024

Methodology

The Ballarat Accessibility Rating Analysis assesses the proximity to amenities for residential zoned areas within City of Ballarat based on the current planning zone controls. The methodology to undertake this analysis has been detailed below. A summary of the methodology is outlined in Figure 1.

STEP1: EXTRACT RESIDENTIAL ZONED LAND

LDRZ, MUZ, TZ, RGZ, GRZ, R1Z, R2Z, R3Z, NRZ

STEP 2: IDENTIFYING DESTINATIONS

Train Stations, Bus Stops, Retail, Supermarkets, Schools, Open Space, Tertiary Education, Community Facilities, Health facilities

STEP 3: NOMINATE CATCHMENTS AND WEIGHTINGS

- Maximum catchment indicates the maximum distance people are willing to walk
- Weighting is used to measure the importance of the destination

STEP 4: CALCULATION

- Generate Isochrone maps for each destination
- Embed each property with a minimum distance to destinations
- Calculate each destination's rating based on maximum catchment and weighting
- Consolidate all destination ratings and generate an overall accessibility rating

ACCESSIBILITY RATING HEAT MAP

Figure 1. Summary of Methodology

Step1: Extract Residential Zoned Land

The first step in undertaking the Accessibility Rating Analysis was to identify all the residential land by filtering properties within the applicable residential zones. The zones include:

- Low Density Residential Zone (LDRZ)
- Mixed Use Zone (MUZ)
- Township Zone (TZ)
- Residential Growth Zone (RGZ)
- General Residential Zone (GRZ, R1Z, R2Z, R3Z)
- Neighbourhood Residential Zone (NRZ)

Step 2: Identifying Destinations

The next step was to identify all the common amenities as destinations. The list broadly covers public transport, shopping, education, recreation and health. The identified destinations and their details are listed below:

Destinations	Inclusion/Exclusion
Train Stations	Train Stations serviced by V/Line, including Ballarat Station and Wendouree Station. Data provided by VICMAP
Bus Stops	Only bus stops with services provided on weekdays were included.Bus stops with services provided over the weekends (lower frequencies) were excluded.
Retail	Commercial 1 Zone land and some manual additions, data provided by Onemap/ Department of Energy, Environment and Climate Action.
Supermarkets	Woolworths, Coles, Supa IGA, Aldi, Derived from Woolworths, Coles, IGA, Aldi, LeMax Group, Thomas Dux & About Life Data
Schools	Primary schools and secondary schools (both government and non-government). Data provided by Department of Energy, Environment and Climate Action
Open Space	Typically PPRZ and PCRZ land. Data provided Department of Energy, Environment and Climate Action
Tertiary Education	Australian Catholic University, Federation University, TAFE. Data provided by OPENSTREETMAP
Community Facilities	Early years, Libraries & outreach services, Community meeting spaces, recreation. Data provided by City of Ballarat
Health facilities	Hospitals, clinics, medical centres, pharmacies. Data provided by OPENSTREETMAP
Essential Services	Police Station, Service Australia, City Council. Data provided by City of Ballarat

Table 1. Destinations

Step 3: Nominate Catchment and Weighting

Each destination was then given a maximum catchment and a weighting. The maximum catchment indicates the maximum distance people are likely to access the destination on foot. Generally, 400m is a 5-minute walk, while 1000m can take about 10 to 12 minutes for most people. The catchments were determined through learnings on similar projects and discussions with Council officers.

A weighting to each of the destination types was applied to reflect different levels of frenquency of usage, importance and attendance.

As a regional hub, Ballarat provides relevant conncetion to broader Victoria by V/Line, so train station is one of the most important destination. Considering above, the weighting for train stations is 100%. Essential Services received 100% weighting as well, as they provide spaces to manage and support local infrastructure.

Retail, supermarkets, schools, open space, tertinary education and health facilities provide services that meet the day-to-day needs of local community, and are visited regularly . The weighting (66%) of them represents a medium level of frequency of attendance and usage.

The bus connectivity within Ballarat is generally low, and not a preferred mode of movement for Ballarat residents, bus stops received a weighting of 33%.

Community facilitities provides spaces for community events, recreation or daycare. They are destinations with a lower frequency of usage and attendace, so the weighting of community facilities is 33%.

Destinations	Maximum Catchment	Weighting
Train Stations	1000m	100%
Bus Stops	400m	33%
Retail	1000m	66%
Supermarkets	1000m	66%
Schools	1000m	66%
Open Space	1000m	66%
Tertiary Education	1500m	66%
Community Facilities	1000m	33%
Health facilities	1000m	66%
Essential Services	1000m	100%

Table 2. Destinations' maximum catchment and weighting

Step 4: Calculation

Based on the existing road network, isochrone maps were generated for each destination (see figure 2) to literal walking distances, calculated based on road network data from VICMAP, existing footpath data. The residential properties were intersected with the iscochrones and a corresponding distance attribute was assigned to each residential property.

Figure 2. A zoom-in example of an isochrone map generated for Essential services, with 1000m as maximum catchment and 10m interval lines.

Based on the distance-decay relationship, likelyhood of people accessing the destination on foot decreases as the distance increases. With the property dataset enriched with distance to destinations, the accessibility rating can be calculated. If the distance to a destination is under the maximum catchment, the difference between the two values was multiplied by their weighting, resulting in a rating. The closer to the destination, the greater the difference, therefore resulting in a higher rating figure. If the distance to the destination is greater than the maximum catchment, it receives 0 for its rating. For each destination, the calculation can be simply put as below:

if (destination distance ≤ maximum catchment)

Then rating = (maximum catchment - distance) / maximum catchment x weighting;

if (destination distance > maximum catchment)

Then rating = 0.

The ratings for each destination were then added together. This provides a Rating Sum for each site:

Rating Sum = Train Stations rating + Bus Stops rating + ...+ Health Facilities rating

In order to create a percentage rating, the sum of the ratings for each site is divided into the sum of the highest rated site in the study area:

*Percentage Rating = (Rating Sum / Rating Sum of the Highest Rated Site)*100%*

Finally, utilising the percentage value calculated above, an Accessibility Rating heat map (figure 3) was generated to reveal the overall accessibility conditions in the municipality and highlight hotspots where residential lots are well-serviced by all types of amenities.

Limitation:

Due to lack of complete footpath data, the walking distance is calculated based on road network data from VICMAP. We are mindful that this work does not reflect the true pedestrian network.

At current stage, the maps don't take the accessibility needs of those with disabilities into account due to lack of data, so there is a potential weakeness with the analysis which requires further work.

Example

Example using a residential property on Howitt Street

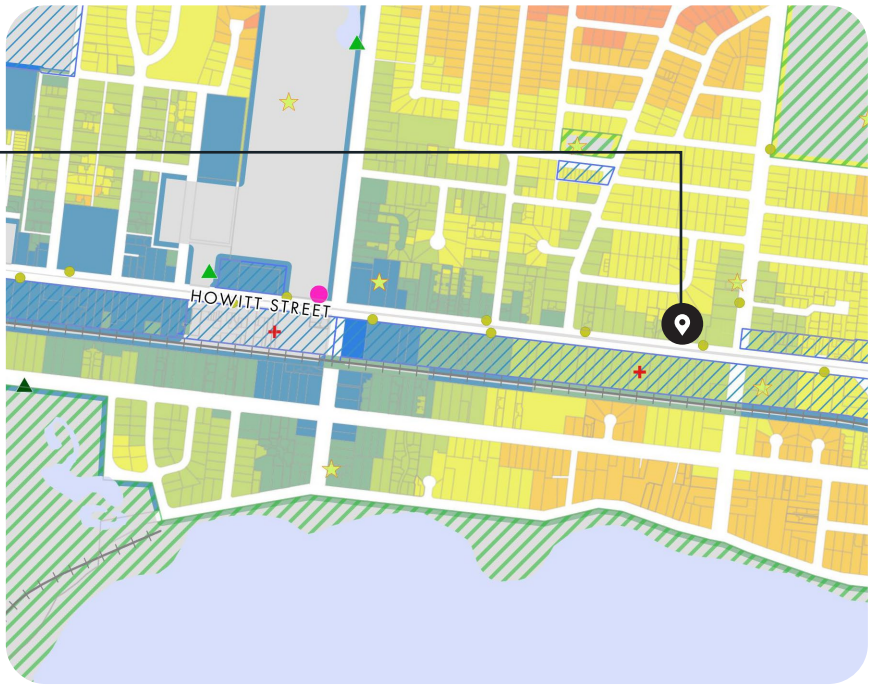
Accessibility Rating

41.7%

- Bus Stops
- Schools
- Tertiary Institutions
- Supermarkets
- Community Facilities
- Health Facilities
- Retail
- Open Space

Accessibility Rating

- 10%-20%
- 20%-30%
- 30%-40%
- 40%-50%
- 50%-60%
- 60%-70%
- 70%-80%



Train Stations Rating:

Distance to nearest Train Station: 1770m > Maximum catchment (1000m)

Rating =0%

Bus Stops Rating:

Distance to nearest Bus Stop: 60m < Maximum catchment (1000m)

Rating =(1000-60) /1000 x 66% = 28.1%

Repeat for all destinations

Destinations	Maximum Catchment	Distance to nearest	Weighting	Rating
Train Stations	1000m	1770m	100%	0%
Bus Stops	400m	60m	33%	28.05%
Retail	1000m	130m	66%	57.42%
Supermarkets	1000m	730m	66%	17.82%
Schools	1000m	990m	66%	0.66%
Open Space	1000m	490m	66%	33.66%
Tertiary Education	1500m	1470m	66%	1.32%
Community Facilities	1000m	230m	33%	25.41%
Health facilities	1000m	350m	66%	42.90%
Essential Services	1000m	1001m	100%	0%

Table 3. Distance and rating of a residential lot on Howitt Street

Then

Rating Sum = Train Station Rating +Bus Stops Rating+.....+ Health Facilities Rating

=207.24%

*Percentage Rating = (Rating Sum / Rating Sum of the Highest Rated Site)*100%*

=41.7%

Destination Catchments

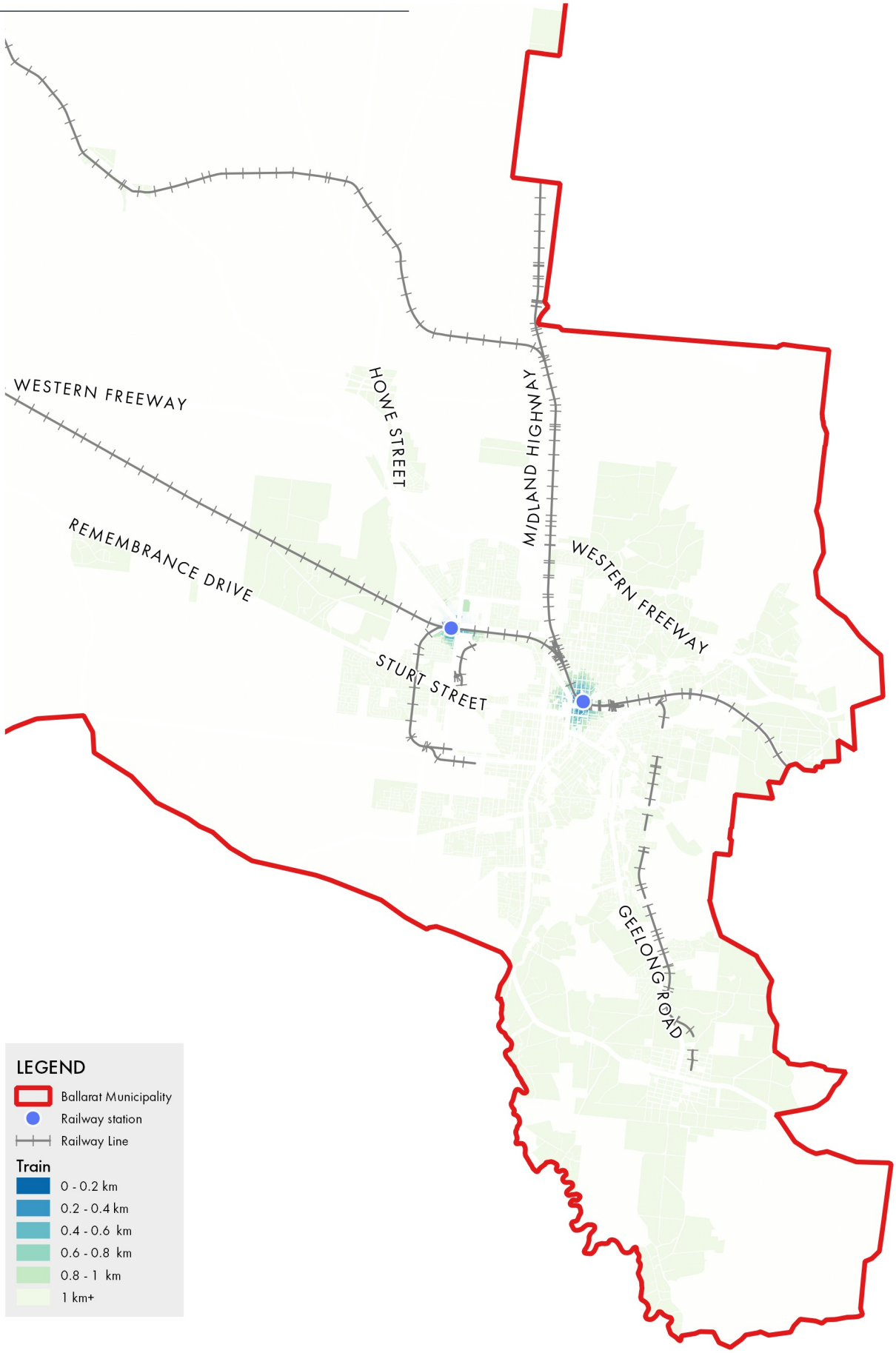
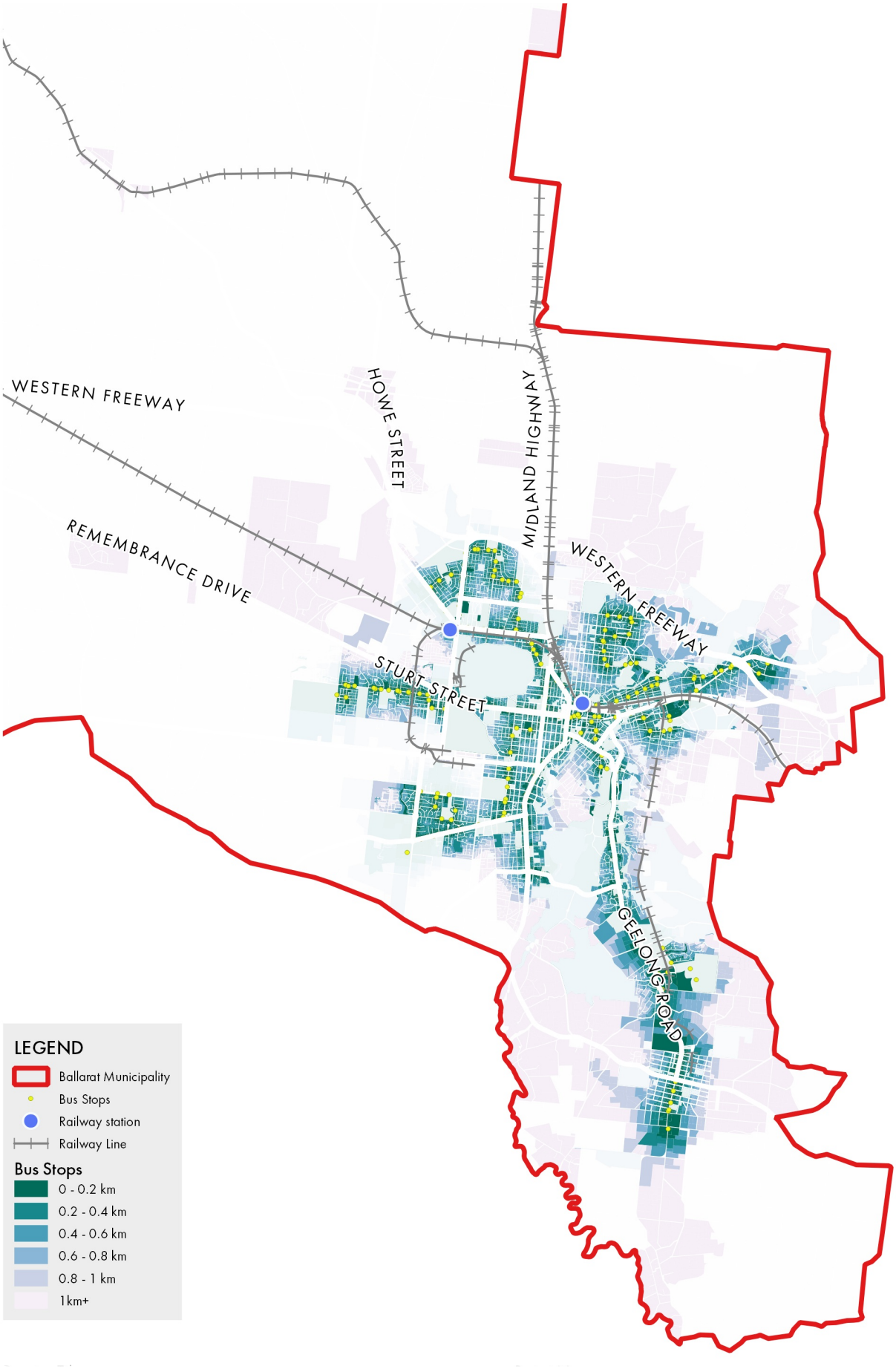
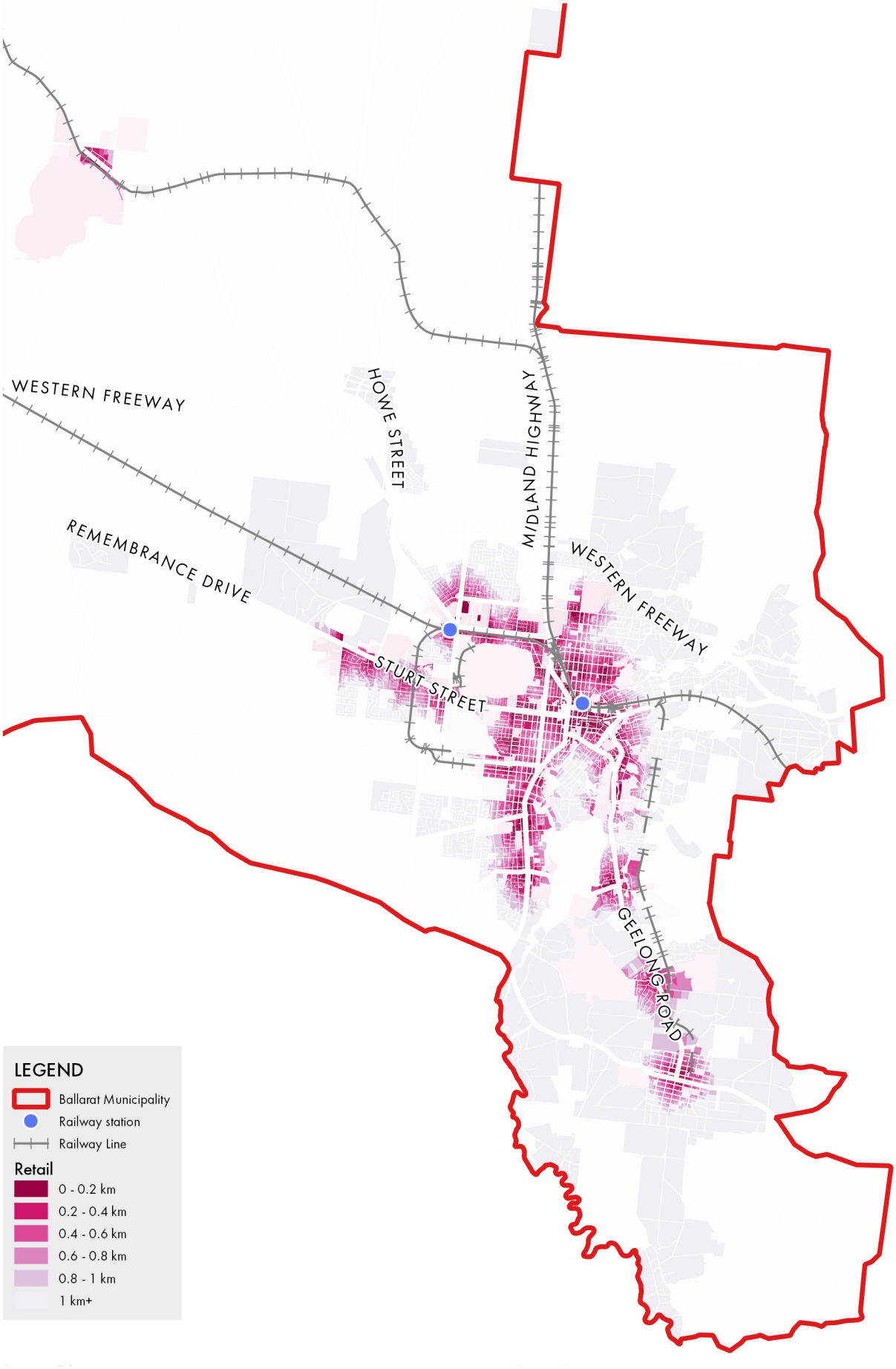
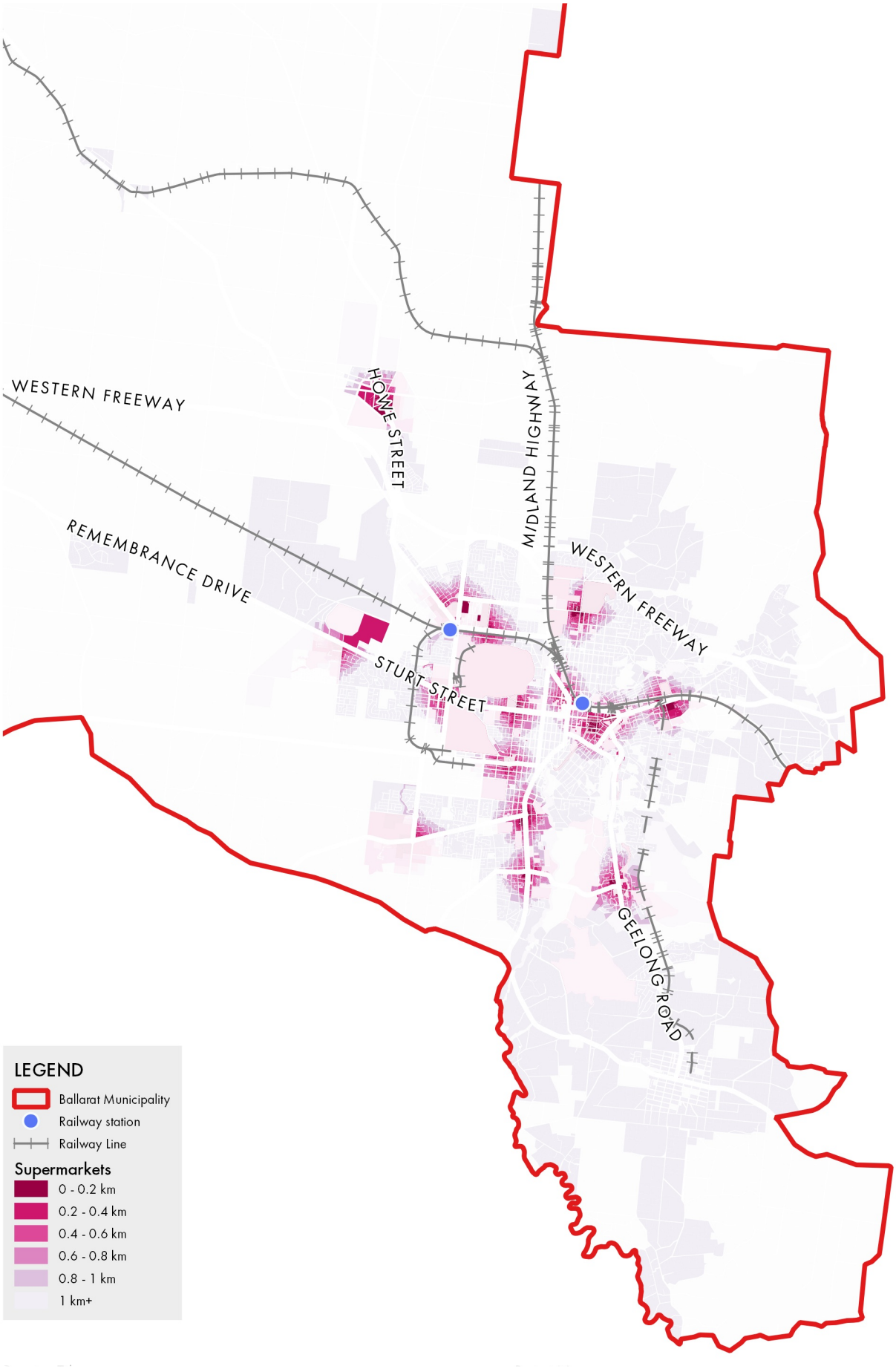
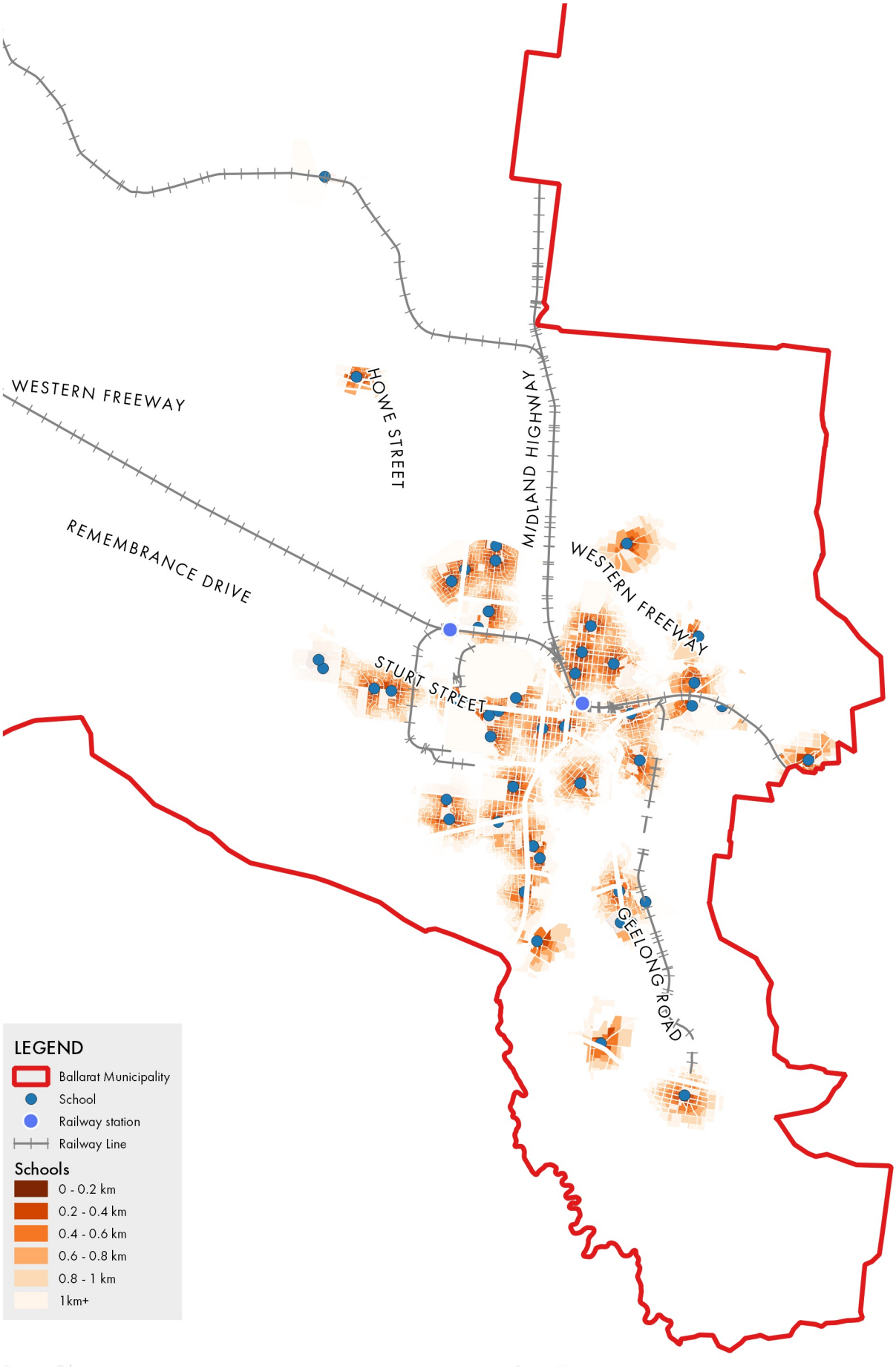


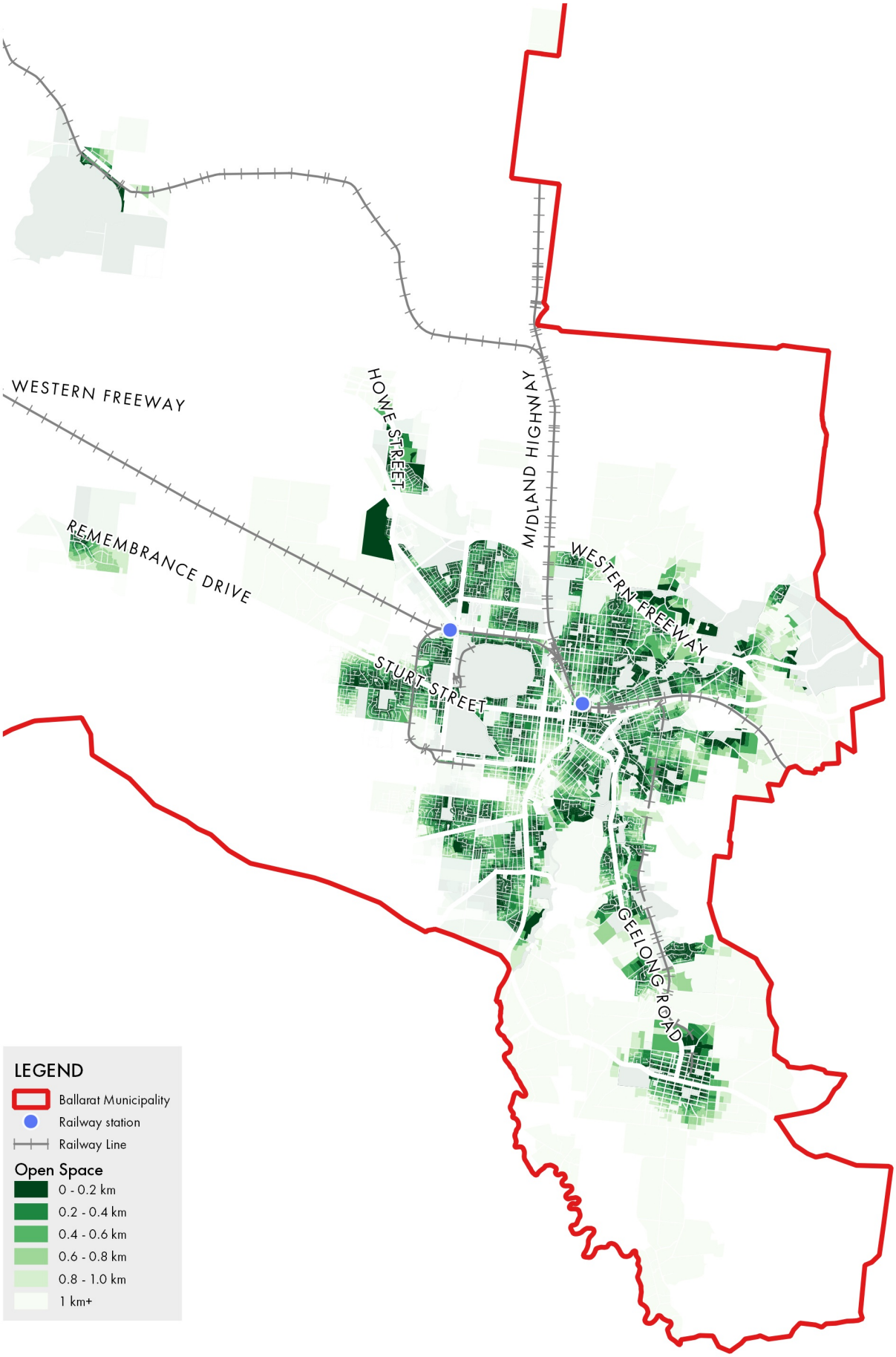
Figure 3. Isochrone Maps for each destination

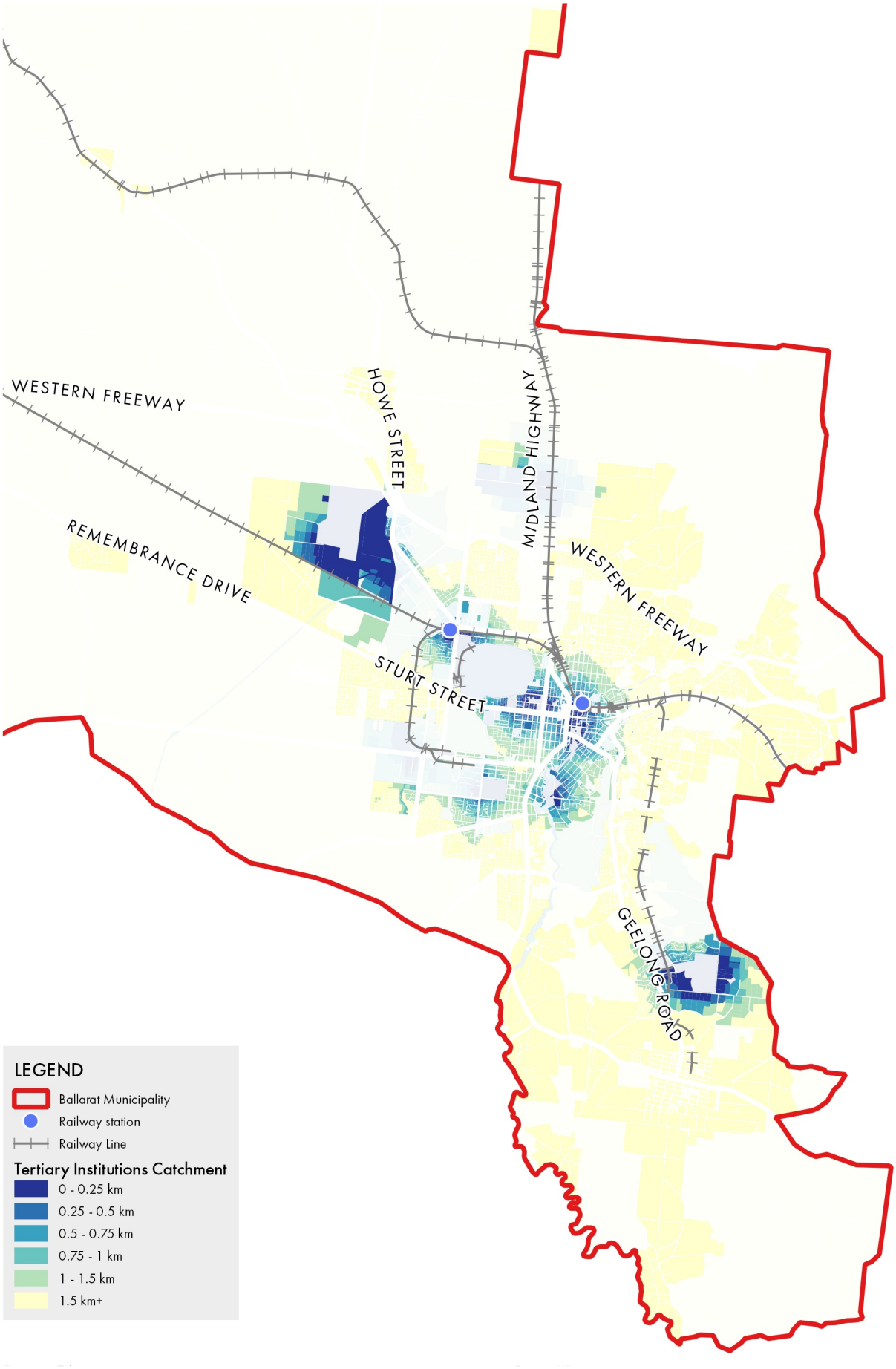

WESTERN FREEWAY
REMEMBRANCE DRIVE
HOWE STREET
MIDLAND HIGHWAY
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Bus Stops
Railway station
Railway Line
Bus Stops
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1km+

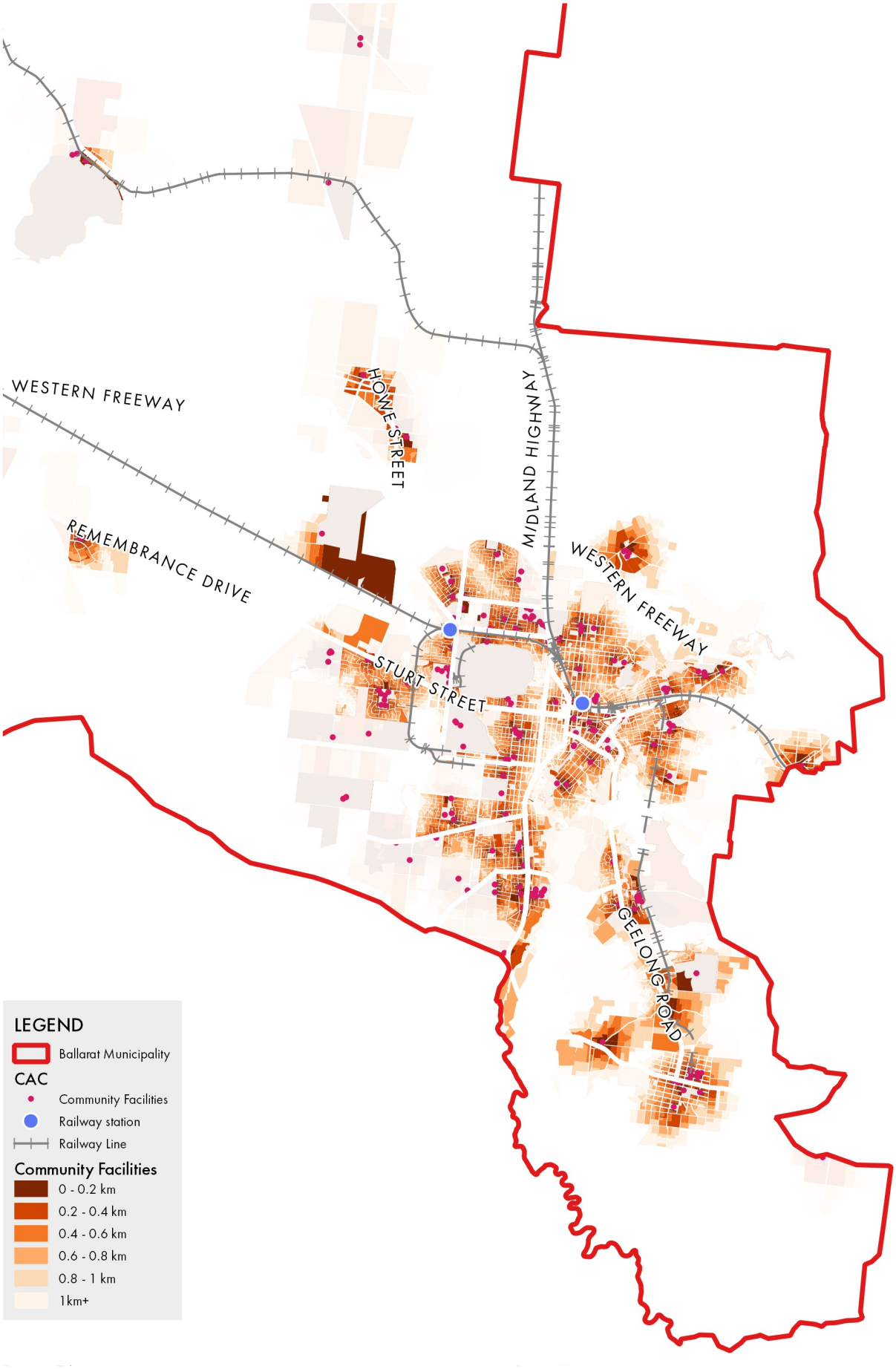

WESTERN FREEWAY
HOWE STREET
MIDLAND HIGHWAY
REMEMBRANCE DRIVE
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Railway station
Railway Line
Retail
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1 km+

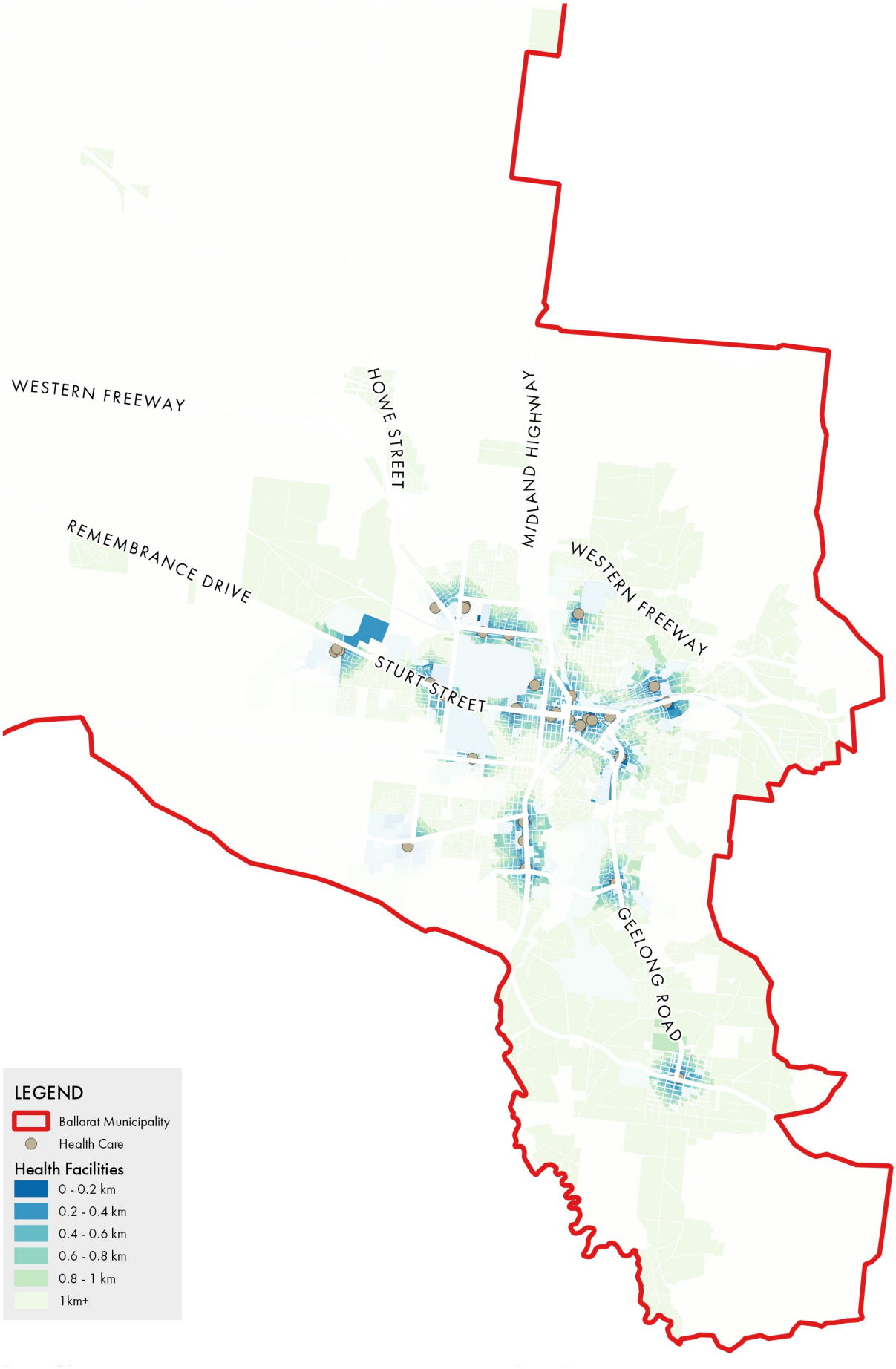

WESTERN FREEWAY
HOWE STREET
MIDLAND HIGHWAY
REMEMBRANCE DRIVE
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Railway station
Railway Line
Supermarkets
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1 km+

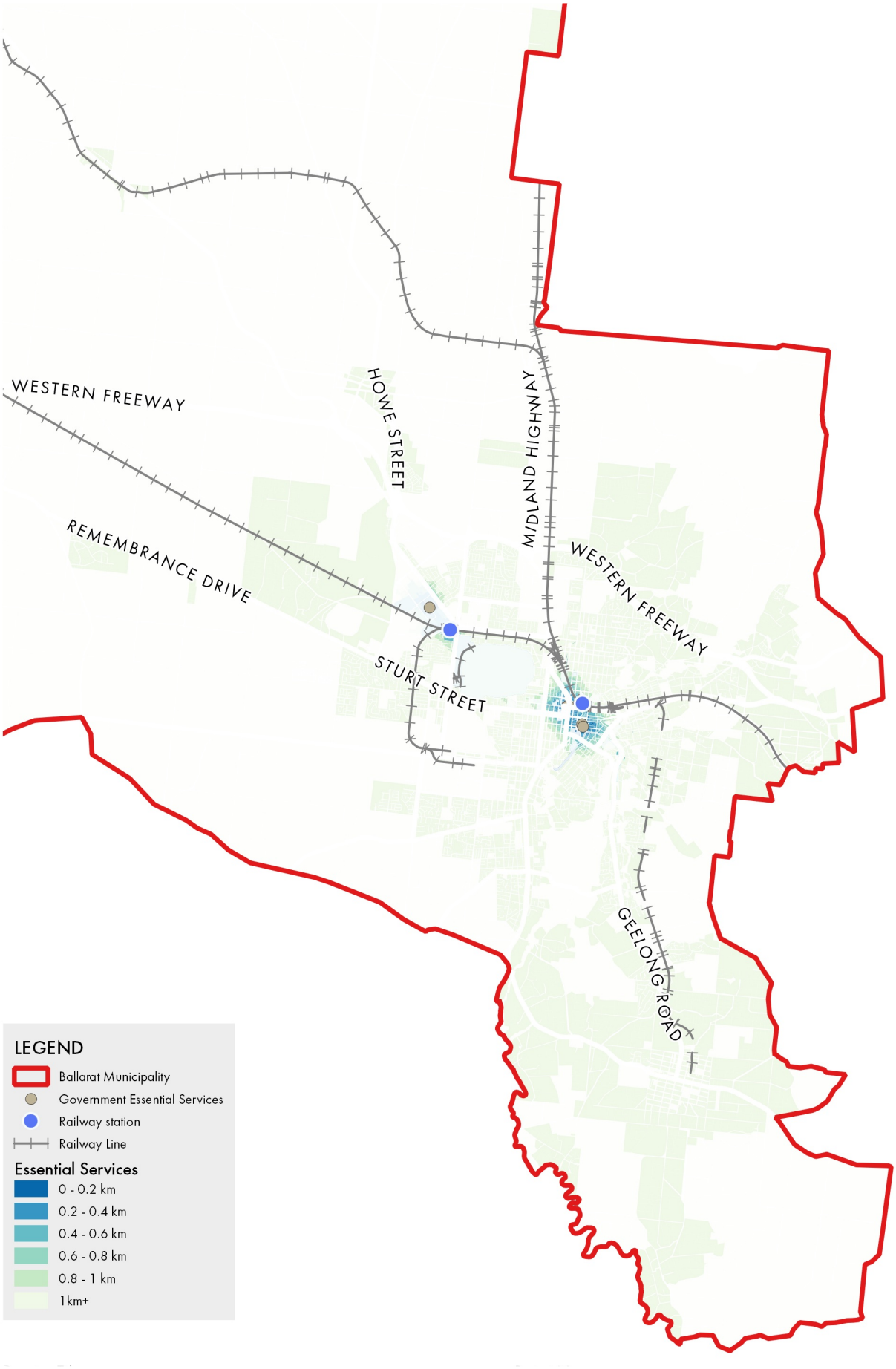

WESTERN FREEWAY
REMEMBRANCE DRIVE
HOWE STREET
MIDLAND HIGHWAY
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
School
Railway station
Railway Line
Schools
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1km+


WESTERN FREEWAY
HOWE STREET
MIDLAND HIGHWAY
REMEMBRANCE DRIVE
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Railway station
Railway Line
Open Space
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1.0 km
1 km+

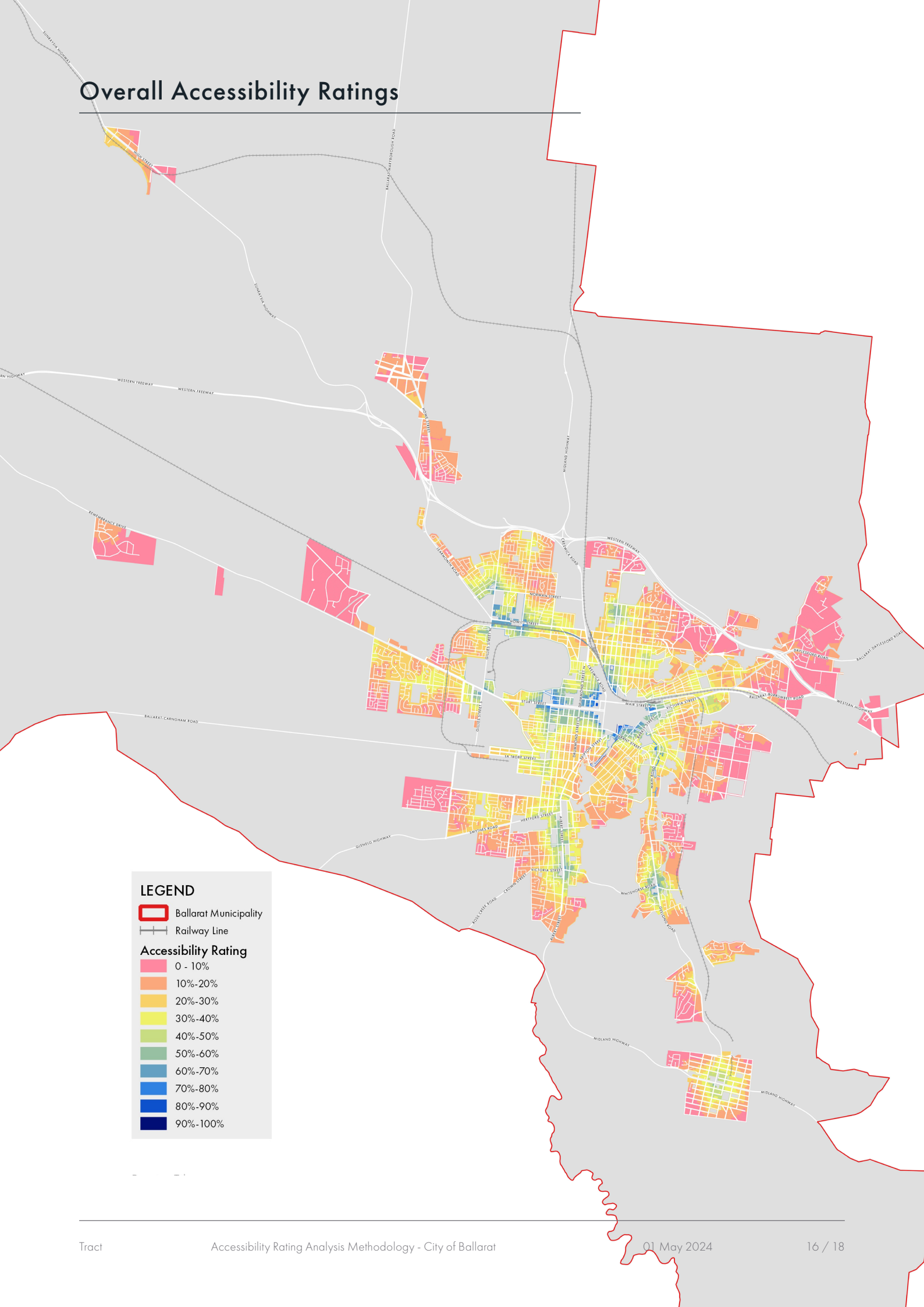

WESTERN FREEWAY
REMEMBRANCE DRIVE
HOWE STREET
MIDLAND HIGHWAY
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Railway station
Railway Line
Tertiary Institutions Catchment
0 - 0.25 km
0.25 - 0.5 km
0.5 - 0.75 km
0.75 - 1 km
1 - 1.5 km
1.5 km+


WESTERN FREEWAY
REMEMBRANCE DRIVE
HOWE STREET
MIDLAND HIGHWAY
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
CAC
Community Facilities
Railway station
Railway Line
Community Facilities
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1km+


WESTERN FREEWAY
HOWE STREET
MIDLAND HIGHWAY
REMEMBRANCE DRIVE
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Health Care
Health Facilities
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1km+


WESTERN FREEWAY
HOWE STREET
MIDLAND HIGHWAY
REMEMBRANCE DRIVE
WESTERN FREEWAY
STURT STREET
GEELONG ROAD
LEGEND
Ballarat Municipality
Government Essential Services
Railway station
Railway Line
Essential Services
0 - 0.2 km
0.2 - 0.4 km
0.4 - 0.6 km
0.6 - 0.8 km
0.8 - 1 km
1km+

Overall Accessibility Ratings



Data Sources

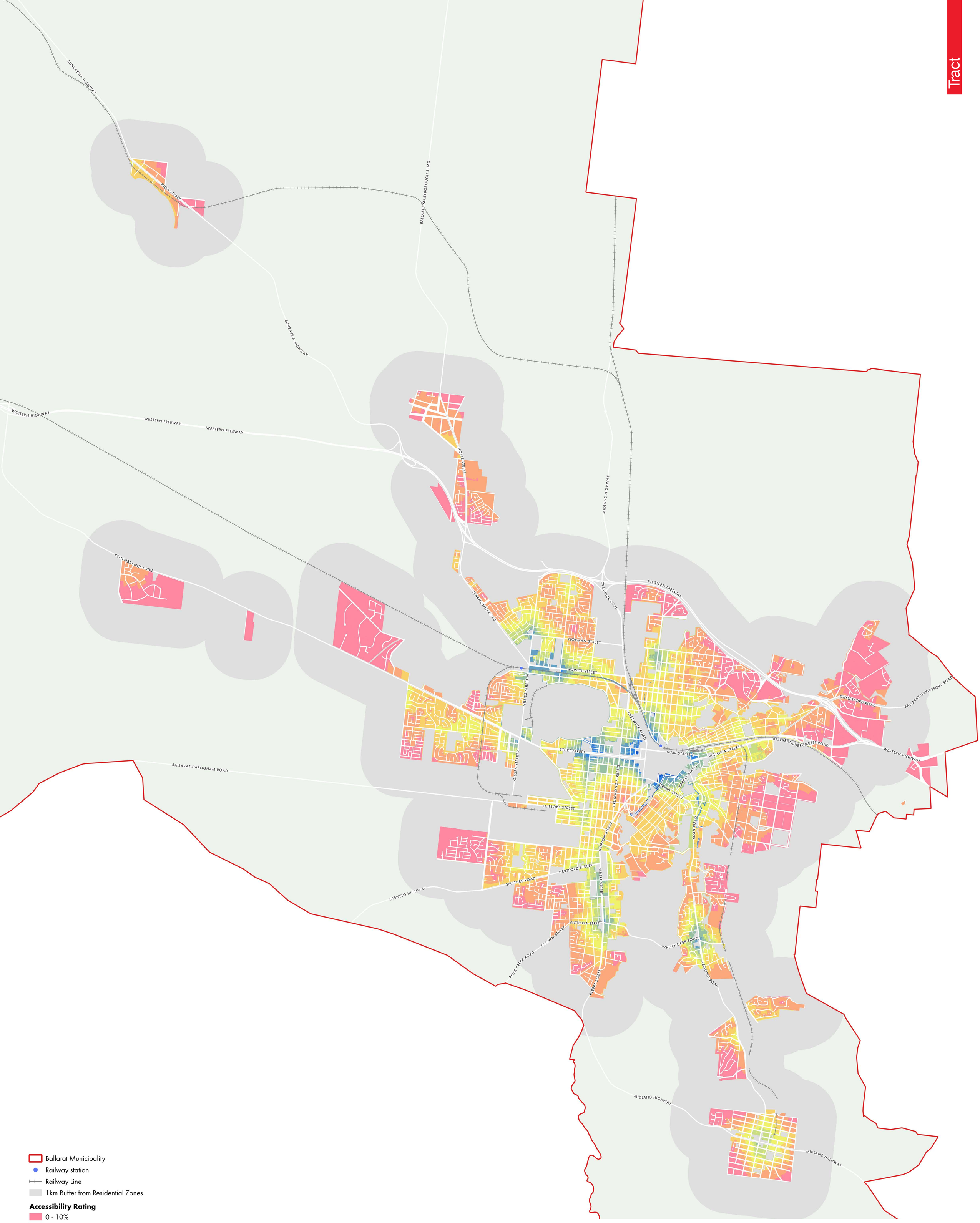
A number of datasets have been relied on to undertake the analysis. These datasets are outlined in Table 3.

Data Source	Description	Provider
Properties	Consists of polygons representing Victoria's properties	Department of Energy, Environment and Climate Action
Planning Zones	Contains polygon features representing land use zones, it is used to extract residential land use, retail land use and open space.	Department of Energy, Environment and Climate Action
Road Network	An extensive digital road network - line features delineating state wide road network	Department of Energy, Environment and Climate Action
Public Transport	Train Stations, Bus Routes, Bus Stops	Department of Energy, Environment and Climate Action
Supermarkets	Woolworths, Coles, Supa IGA, Aldi, Leo's Fine Food & Wine, and Maxi Foods stores	Derived from Woolworths, Coles, IGA, Aldi, LeMax Group, Thomas Dux & About Life Data
Schools	Primary schools and secondary schools (both government and non-government)	Department of Energy, Environment and Climate Action
Tertiary Education	Universities, TAFE, Polytechnics	OpenStreetMap
Community and Social Infrastructure Model (CASIMO)	Early years, Libraries & outreach services, Community meeting spaces, recreation.	City of Ballarat
Health Facilities	Hospitals, clinics, medical centres, pharmacies.	OpenStreetMap
Essential Services	Police Station, Service Australia, City Council.	City of Ballarat

Table 4. Datasets utilised for the Accessibility Rating Analysis

Tract

Melbourne
Level 6, 6 Riverside Quay, Southbank
VIC, Australia 3006
(03) 9429 6133
melbourne@tract.net.au



Ballarat Municipality
Railway station
Railway Line
1km Buffer from Residential Zones

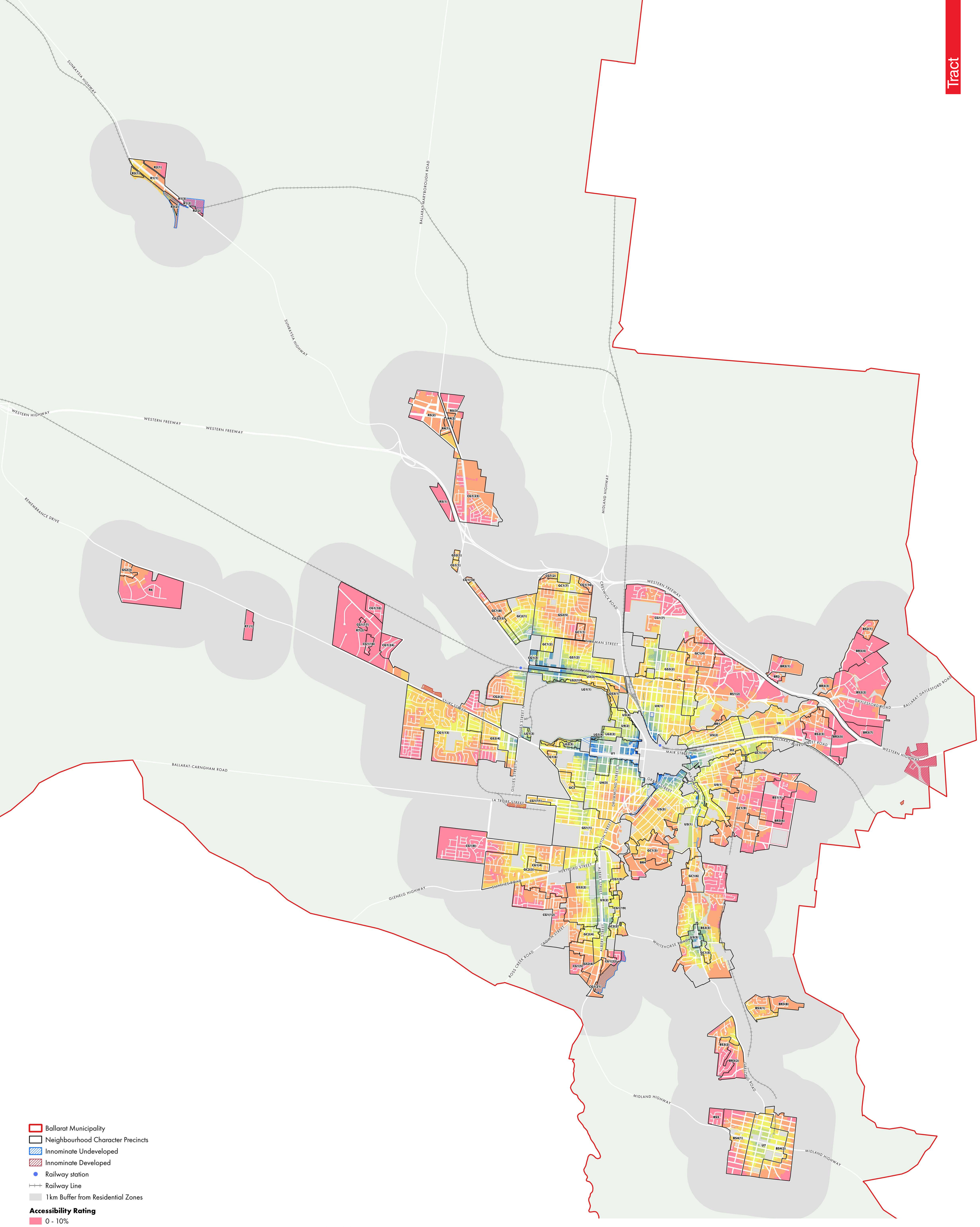
Accessibility Rating

- 0 - 10%
- 10%-20%
- 20%-30%
- 30%-40%
- 40%-50%
- 50%-60%
- 60%-70%
- 70%-80%
- 80%-90%
- 90%-100%

Destinations	Maximum Catchment (m)	Weighting (%)
Train Stations	1000	100%
Bus Stops	400	33%
Retail	1000	66%
Supermarkets	1000	66%
Schools	1000	66%
Open Space	1000	66%
Tertiary Education	1500	66%
Community Facilities (consolidated)	1000	33%
Health facilities	1000	66%
Essential Services	1000	100%

Accessibility Rating is calculated based on a property's distance to the nearest destinations and their respective importance (weighting). Overall rating is then adjusted too 100% based on the highest rating within the Study Area.

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Residential Properties Accessibility Rating	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	03	01.05.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km



- Ballarat Municipality
- Neighbourhood Character Precincts
- Innominate Undeveloped
- Innominate Developed
- Railway station
- Railway Line
- 1km Buffer from Residential Zones

Accessibility Rating

- 0 - 10%
- 10%-20%
- 20%-30%
- 30%-40%
- 40%-50%
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- 60%-70%
- 70%-80%
- 80%-90%
- 90%-100%

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Health facilities	1000	66%
Essential Services	1000	100%

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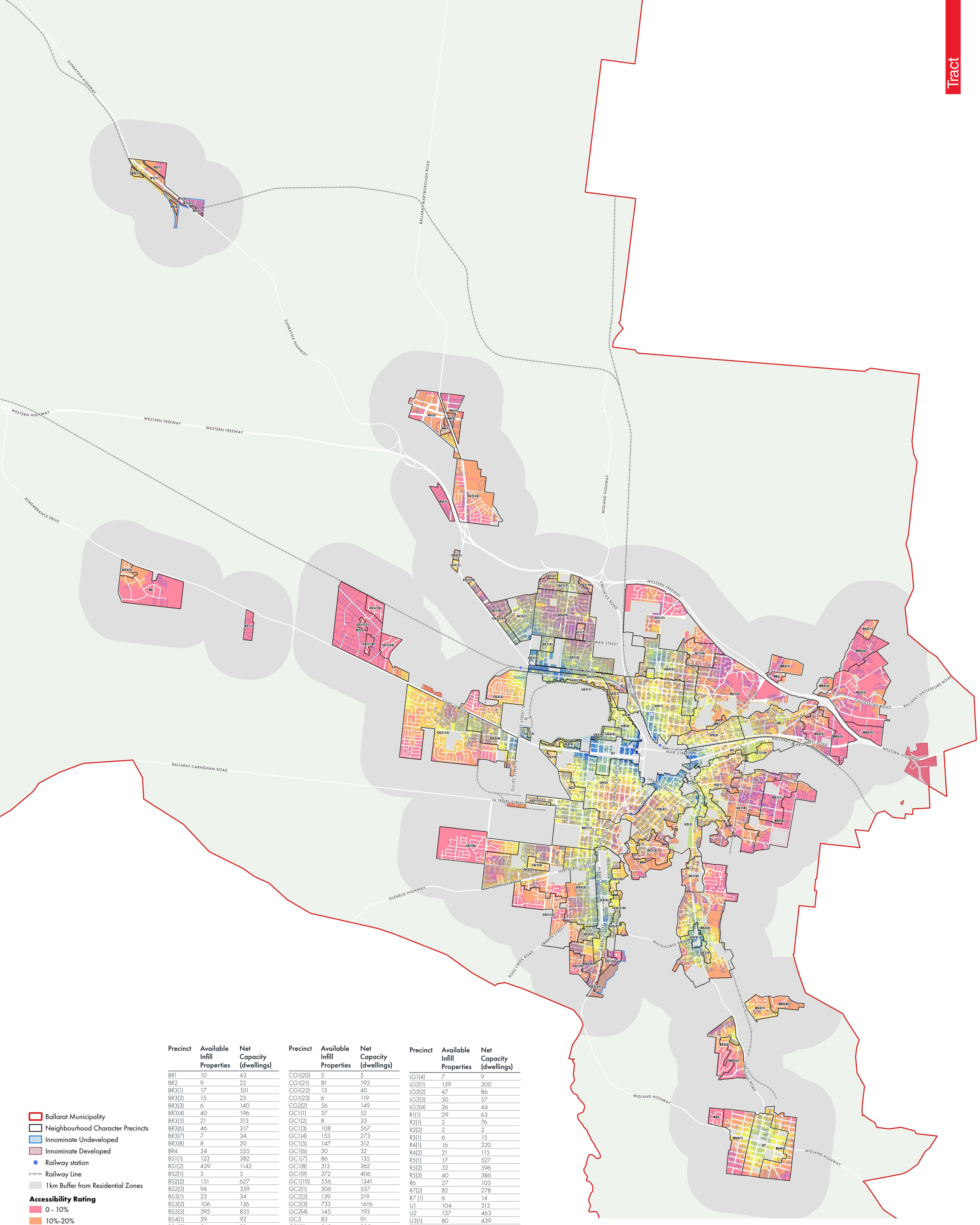
Residential Properties Accessibility Rating	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	03	01.05.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km



Precinct	Available Infill Properties	Net Capacity (dwellings)
BR1	10	43
BR2	9	22
BR3(1)	17	101
BR3(2)	15	23
BR3(3)	6	140
BR3(4)	40	196
BR3(5)	21	313
BR3(6)	46	317
BR3(7)	7	34
BR3(8)	8	20
BR4	34	555
BS1(1)	123	382
BS1(2)	439	1142
BS2(1)	5	5
BS2(2)	151	627
BS2(3)	94	359
BS3(1)	23	34
BS3(2)	106	136
BS3(3)	395	835
BS4(1)	39	92
BS4(2)	54	93
BS5	2	3
CG1(1)	1	10
CG1(2)	41	329
CG1(5)	31	105
CG1(6)	439	687
CG1(7)	12	12
CG1(8)	3	4
CG1(9)	10	72
CG1(11)	2	8
CG1(12)	13	88
CG1(13)	49	237
CG1(16)	35	75

Precinct	Available Infill Properties	Net Capacity (dwellings)
CG1(20)	5	5
CG1(21)	81	192
CG1(22)	13	40
CG1(23)	6	119
CG2(2)	56	149
GC1(1)	37	52
GC1(2)	8	33
GC1(3)	108	567
GC1(4)	153	273
GC1(5)	147	312
GC1(6)	30	32
GC1(7)	86	135
GC1(8)	313	362
GC1(9)	372	406
GC1(10)	556	1341
GC2(1)	506	557
GC2(2)	139	219
GC2(3)	733	1616
GC2(4)	145	193
GC3	83	91
GS1(1)	540	905
GS1(2)	754	1191
GS2(1)	30	48
GS2(2)	706	1141
GS2(3)	1	1
GS2(4)	408	573
GS2(5)	1603	1711
GS2(6)	282	524
GS3(1)	17	34
GS3(2)	700	1043
LG1(1)	57	138
LG1(2)	29	55
LG1(3)	7	15

Precinct	Available Infill Properties	Net Capacity (dwellings)
LG1(4)	7	9
LG2(1)	139	300
LG2(2)	47	86
LG2(3)	50	57
LG2(4)	26	44
R1(1)	29	63
R2(1)	2	76
R2(2)	2	2
R3(1)	6	15
R4(1)	16	220
R4(2)	21	115
R5(1)	17	527
R5(2)	32	596
R5(3)	40	386
R6	27	103
R7(2)	82	278
R7 (1)	6	14
U1	104	313
U2	137	463
U3(1)	80	439
U3(2)	383	760
U3(3)	129	973
U3(4)	10	12
U3(5)	18	117
U4(1)	427	616
U4(2)	50	95
U4(3)	414	572
U5(1)	298	750
U5(2)	129	211
U5(3)	512	851
U6	330	825
U7	97	190
Total	**14658**	**31250**

- Ballarat Municipality
- Neighbourhood Character Precincts
- Innominate Undeveloped
- Innominate Developed
- Railway station
- Railway Line
- 1km Buffer from Residential Zones

Accessibility Rating

- 0 - 10%
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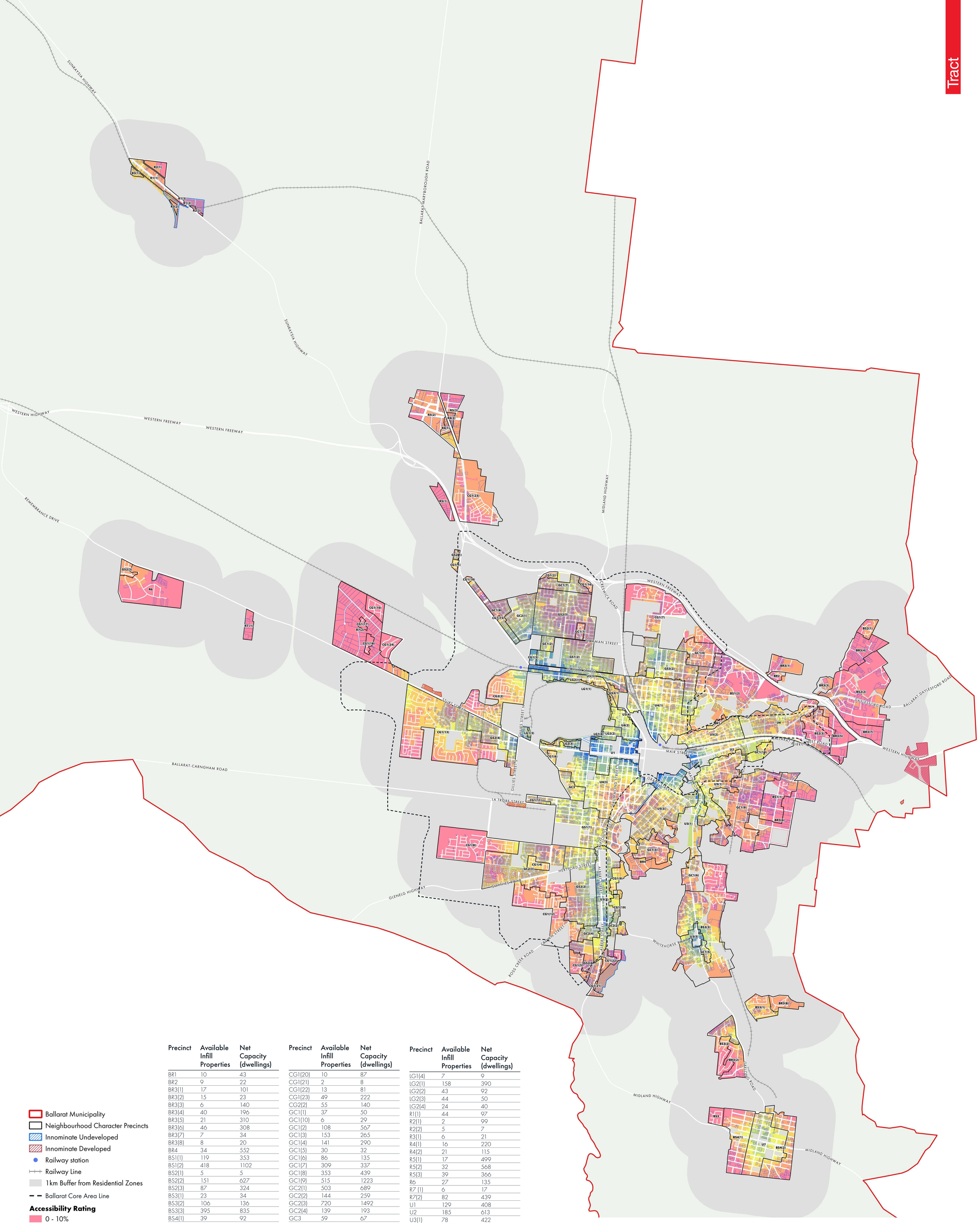
Open Space	1000	66%
Tertiary Education	1500	66%
Community Facilities (consolidated)	1000	33%
Health facilities	1000	66%
Essential Services	1000	100%

Accessibility Rating is calculated based on a property's distance to the nearest destinations and their respective importance (weighting). Overall rating is then adjusted too 100% based on the highest rating within the Study Area.

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Residential Properties Accessibility Rating	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	03	01.05.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km



Precinct	Available Infill Properties	Net Capacity (dwellings)
BR1	10	43
BR2	9	22
BR3(1)	17	101
BR3(2)	15	23
BR3(3)	6	140
BR3(4)	40	196
BR3(5)	21	310
BR3(6)	46	308
BR3(7)	7	34
BR3(8)	8	20
BR4	34	552
BS1(1)	119	353
BS1(2)	418	1102
BS2(1)	5	5
BS2(2)	151	627
BS2(3)	87	324
BS3(1)	23	34
BS3(2)	106	136
BS3(3)	395	835
BS4(1)	39	92
BS4(2)	54	93
BS5	2	3
CG1(1)	1	10
CG1(2)	3	4
CG1(5)	33	66
CG1(6)	5	5
CG1(7)	79	176
CG1(8)	13	38
CG1(9)	6	142
CG1(11)	41	265
CG1(12)	31	96
CG1(13)	436	617
CG1(16)	12	12

Precinct	Available Infill Properties	Net Capacity (dwellings)
CG1(20)	10	87
CG1(21)	2	8
CG1(22)	13	81
CG1(23)	49	222
CG2(2)	55	140
GC1(1)	37	50
GC1(10)	6	29
GC1(2)	108	567
GC1(3)	153	265
GC1(4)	141	290
GC1(5)	30	32
GC1(6)	86	135
GC1(7)	309	337
GC1(8)	353	439
GC1(9)	515	1223
GC2(1)	503	689
GC2(2)	144	259
GC2(3)	720	1492
GC2(4)	139	193
GC3	59	67
GS1(1)	478	800
GS1(2)	752	1291
GS2(1)	30	39
GS2(2)	681	1133
GS2(3)	4	5
GS2(4)	415	818
GS2(5)	1587	1841
GS2(6)	271	480
GS3(1)	16	30
GS3(2)	682	1101
LG1(1)	55	125
LG1(2)	28	49
LG1(3)	7	13

Precinct	Available Infill Properties	Net Capacity (dwellings)
LG1(4)	7	9
LG2(1)	158	390
LG2(2)	43	92
LG2(3)	44	50
LG2(4)	24	40
R1(1)	44	97
R2(1)	2	99
R2(2)	5	7
R3(1)	6	21
R4(1)	16	220
R4(2)	21	115
R5(1)	17	499
R5(2)	32	568
R5(3)	39	366
R6	27	135
R7 (1)	6	17
R7(2)	82	439
U1	129	408
U2	185	613
U3(1)	78	422
U3(2)	415	1818
U3(3)	126	1057
U3(4)	9	11
U3(5)	18	117
U4(1)	416	587
U4(2)	42	83
U4(3)	436	615
U5(1)	264	683
U5(2)	123	204
U5(3)	488	832
U6	314	769
U7	97	190
Total	**14423**	**32687**

- Ballarat Municipality
- Neighbourhood Character Precincts
- Innominate Undeveloped
- Innominate Developed
- Railway station
- Railway Line
- 1km Buffer from Residential Zones
- Ballarat Core Area Line

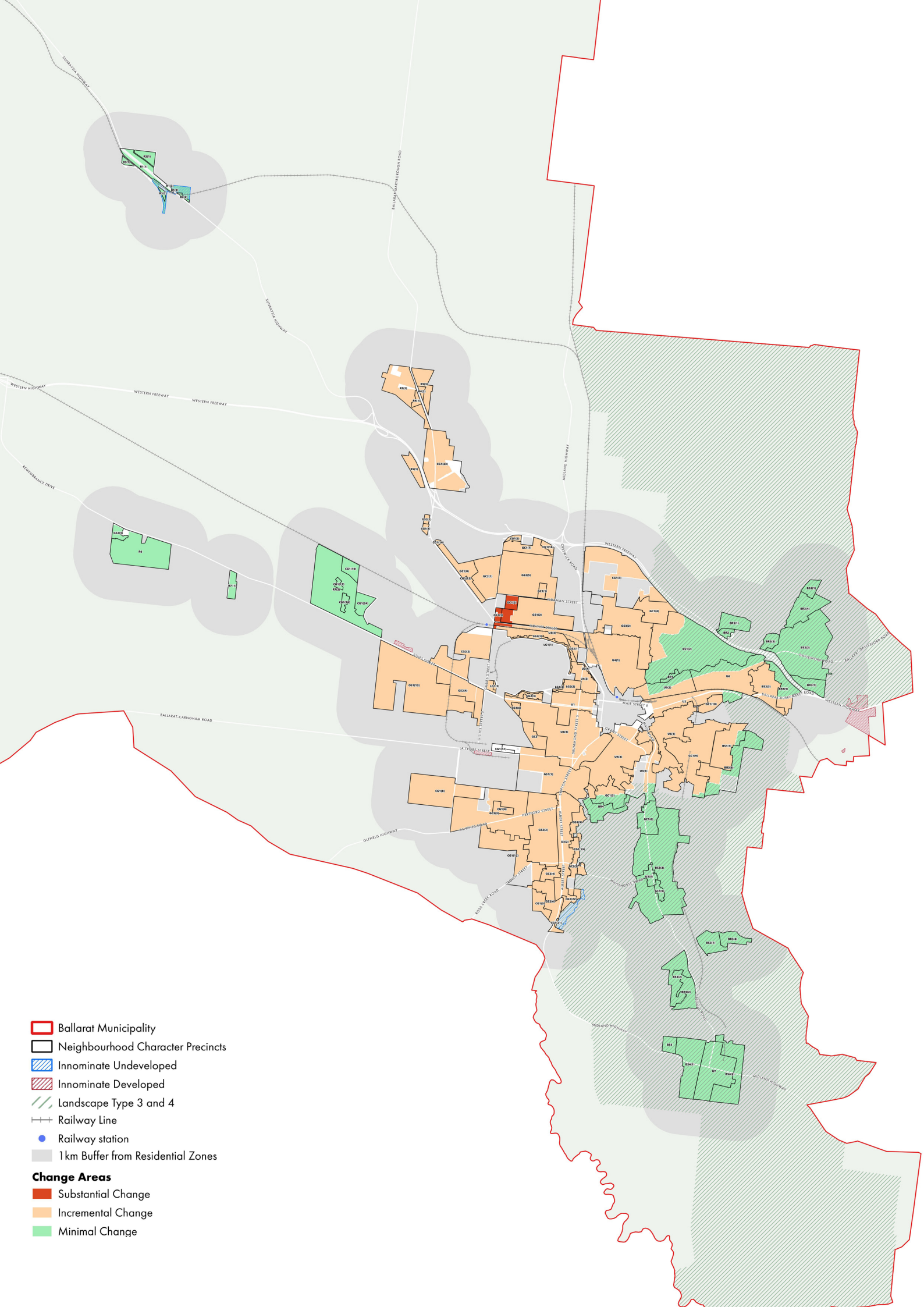
Accessibility Rating

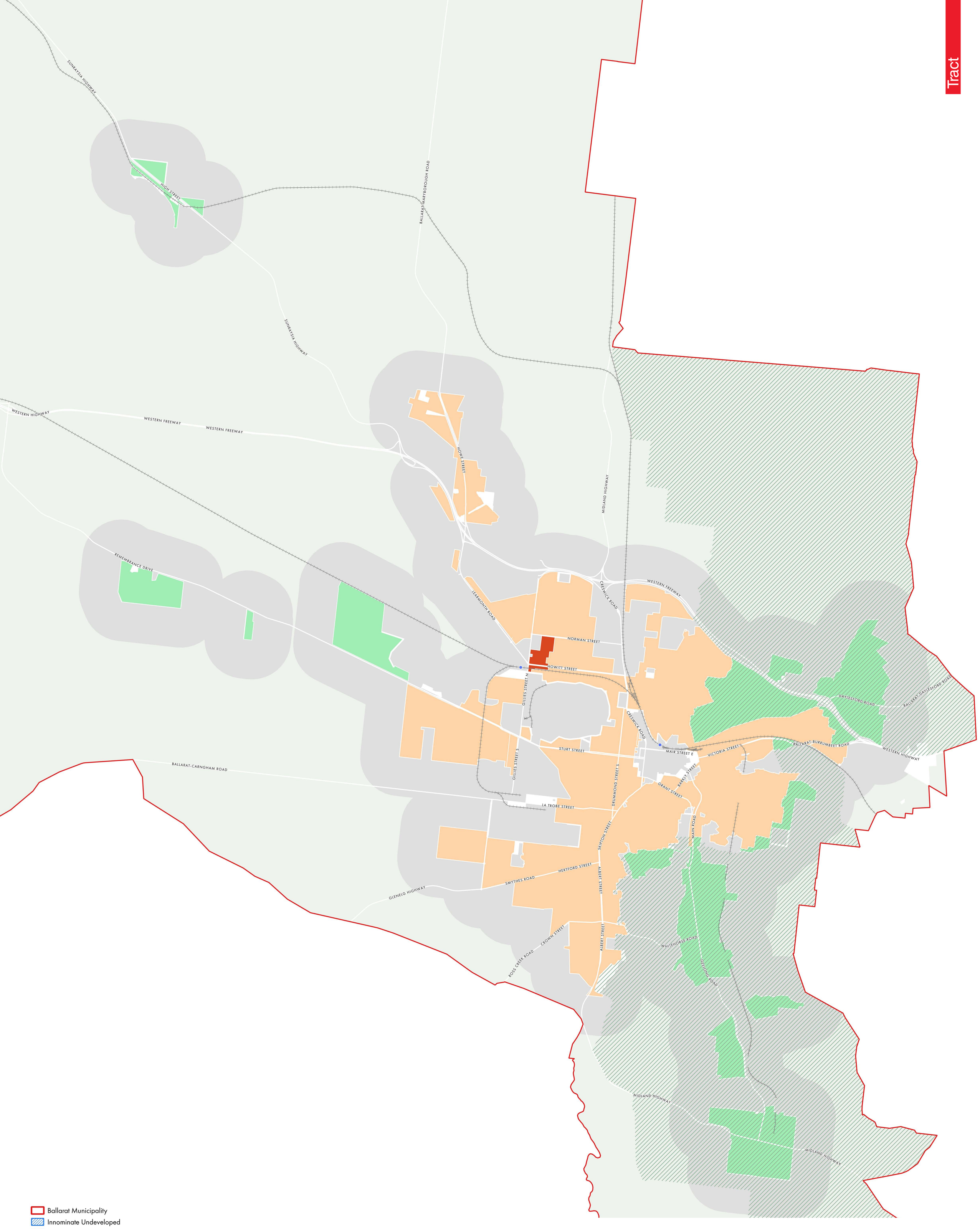
- 0 - 10%
- 10%-20%
- 20%-30%
- 30%-40%
- 40%-50%
- 50%-60%
- 60%-70%
- 70%-80%
- 80%-90%
- 90%-100%

Destinations	Maximum Catchment (m)	Weighting (%)
Train Stations	1000	33%
Bus Stops	400	33%
Retail	1000	66%
Supermarkets	1000	100%
Schools	1000	66%
Open Space	1000	66%
Tertiary Education	1500	66%
Community Facilities (consolidated)	1000	33%
Health facilities	1000	66%

Accessibility Rating is calculated based on a property's distance to the nearest destinations and their respective importance (weighting). Overall rating is then adjusted too 100% based on the highest rating within the Study Area.

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Residential Properties Accessibility Rating	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	03	01.05.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km

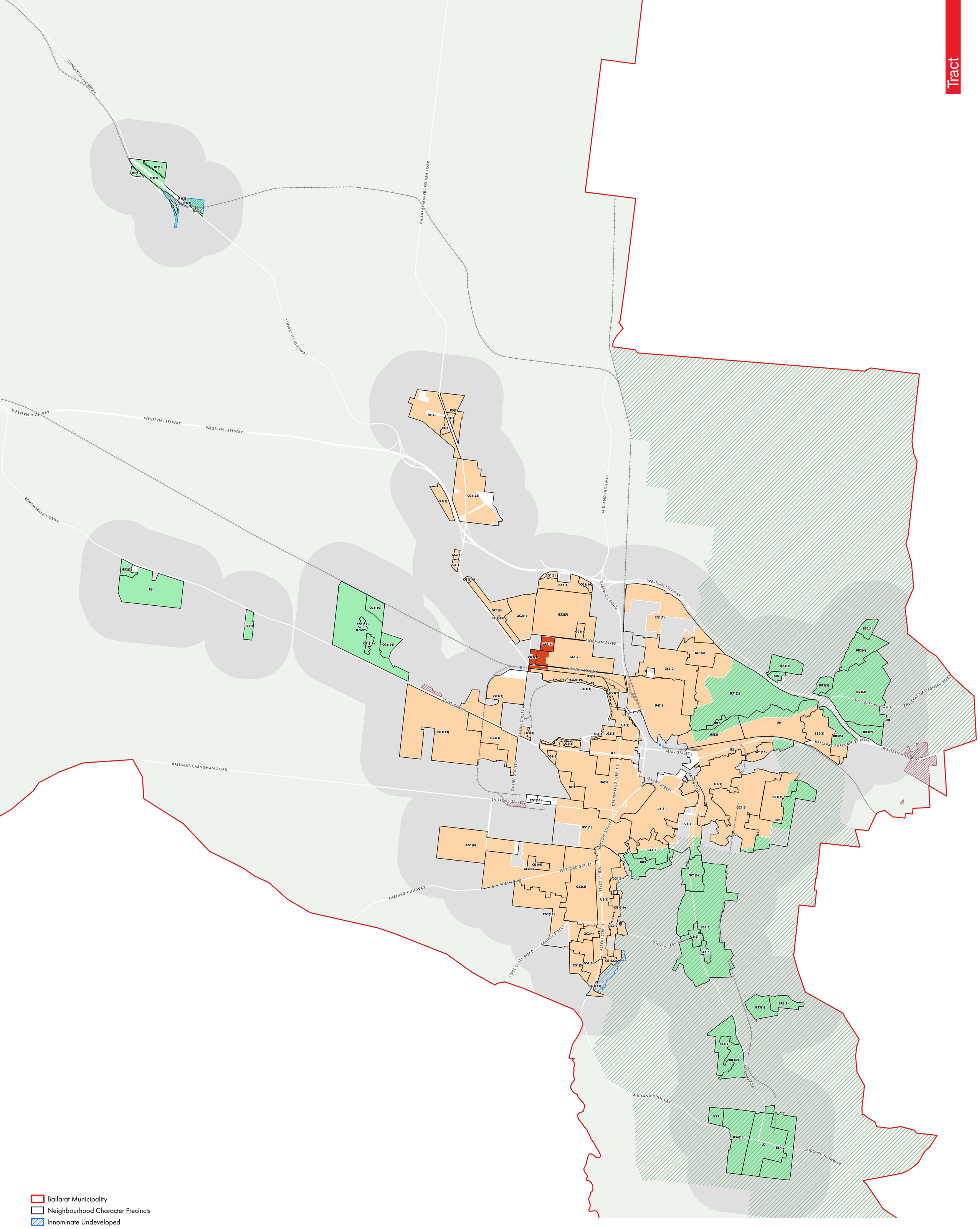

Ballarat Municipality
Neighbourhood Character Precincts
Innominate Undeveloped
Innominate Developed
Landscape Type 3 and 4
Railway Line
Railway station
1km Buffer from Residential Zones
Change Areas
Substantial Change
Incremental Change
Minimal Change



Ballarat Municipality
Innominate Undeveloped
Innominate Developed
Landscape Type 3 and 4
Railway Line
Railway station
1km Buffer from Residential Zones

Change Areas
Substantial Change
Incremental Change
Minimal Change

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Ballarat Change Areas	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	04	30.04.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km

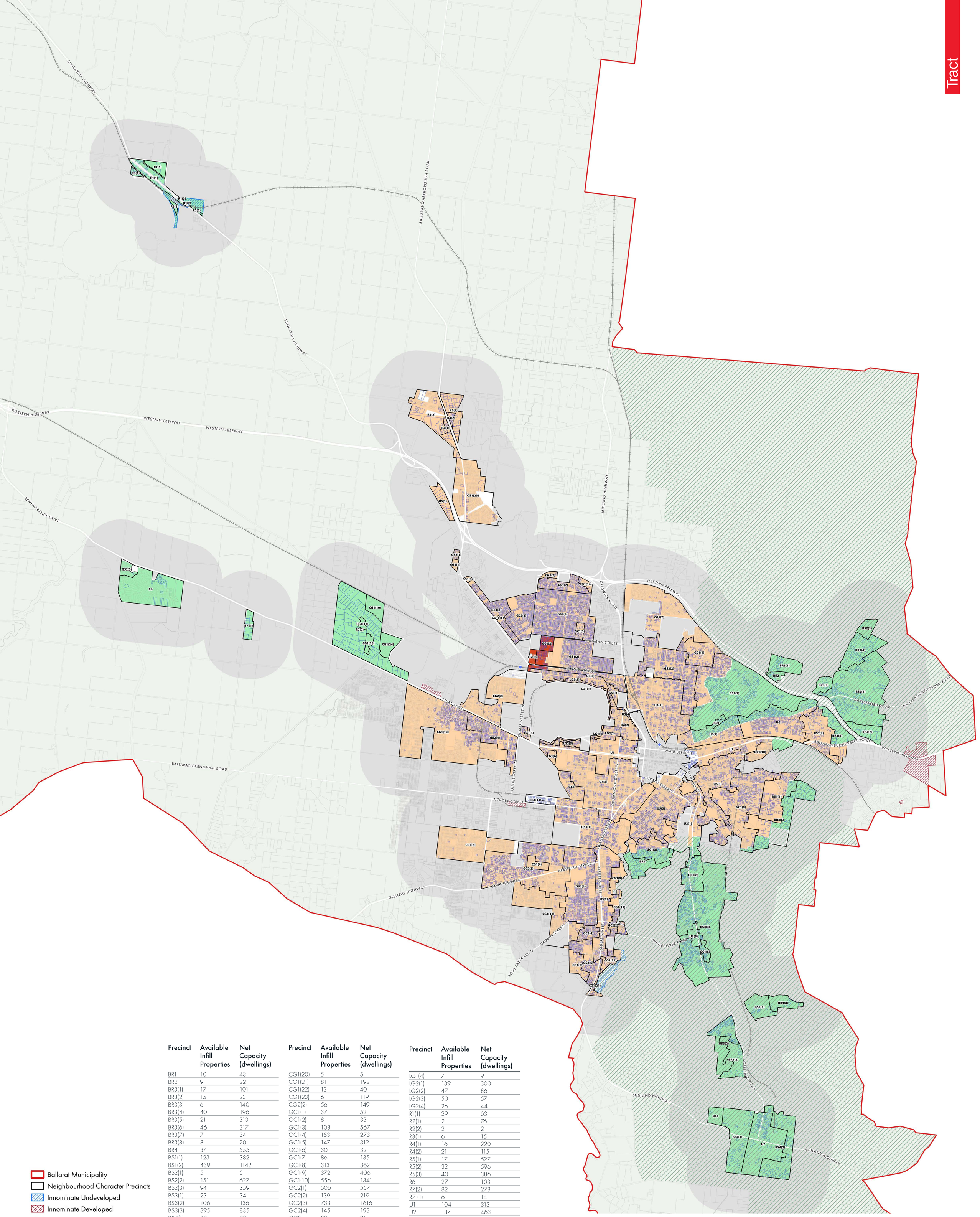


Ballarat Municipality
Neighbourhood Character Precincts
Innominate Undeveloped
Innominate Developed
Landscape Type 3 and 4
Railway Line
Railway station
1km Buffer from Residential Zones

Change Areas

Substantial Change
Incremental Change
Minimal Change

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Ballarat Change Areas and Neighbourhood Character Precincts	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR01	04	30.04.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km



Precinct	Available Infill Properties	Net Capacity (dwellings)
BR1	10	43
BR2	9	22
BR3(1)	17	101
BR3(2)	15	23
BR3(3)	6	140
BR3(4)	40	196
BR3(5)	21	313
BR3(6)	46	317
BR3(7)	7	34
BR3(8)	8	20
BR4	34	555
BS1(1)	123	382
BS1(2)	439	1142
BS2(1)	5	5
BS2(2)	151	627
BS2(3)	94	359
BS3(1)	23	34
BS3(2)	106	136
BS3(3)	395	835
BS4(1)	39	92
BS4(2)	54	93
BS5	2	3
CG1(1)	1	10
CG1(2)	41	329
CG1(5)	31	105
CG1(6)	439	687
CG1(7)	12	12
CG1(8)	3	4
CG1(9)	10	72
CG1(11)	2	8
CG1(12)	13	88
CG1(13)	49	237
CG1(16)	35	75

Precinct	Available Infill Properties	Net Capacity (dwellings)
CG1(20)	5	5
CG1(21)	81	192
CG1(22)	13	40
CG1(23)	6	119
CG2(2)	56	149
GC1(1)	37	52
GC1(2)	8	33
GC1(3)	108	567
GC1(4)	153	273
GC1(5)	147	312
GC1(6)	30	32
GC1(7)	86	135
GC1(8)	313	362
GC1(9)	372	406
GC1(10)	556	1341
GC2(1)	506	557
GC2(2)	139	219
GC2(3)	733	1616
GC2(4)	145	193
GC3	83	91
GS1(1)	540	905
GS1(2)	754	1191
GS2(1)	30	48
GS2(2)	706	1141
GS2(3)	1	1
GS2(4)	408	573
GS2(5)	1603	1711
GS2(6)	282	524
GS3(1)	17	34
GS3(2)	700	1043
LG1(1)	57	138
LG1(2)	29	55
LG1(3)	7	15

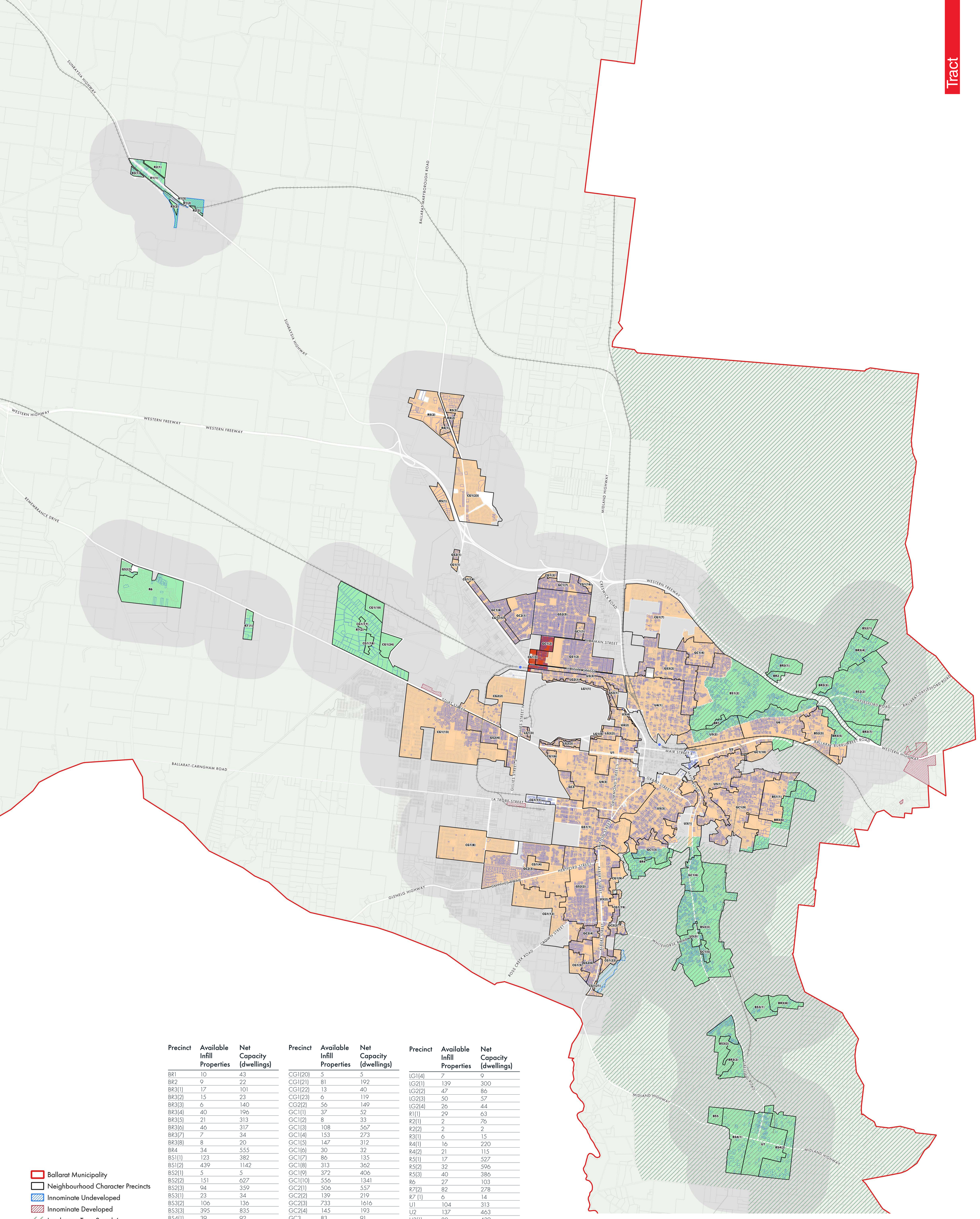
Precinct	Available Infill Properties	Net Capacity (dwellings)
LG1(4)	7	9
LG2(1)	139	300
LG2(2)	47	86
LG2(3)	50	57
LG2(4)	26	44
R1(1)	29	63
R2(1)	2	76
R2(2)	2	2
R3(1)	6	15
R4(1)	16	220
R4(2)	21	115
R5(1)	17	527
R5(2)	32	596
R5(3)	40	386
R6	27	103
R7(2)	82	278
R7 (1)	6	14
U1	104	313
U2	137	463
U3(1)	80	439
U3(2)	383	760
U3(3)	129	973
U3(4)	10	12
U3(5)	18	117
U4(1)	427	616
U4(2)	50	95
U4(3)	414	572
U5(1)	298	750
U5(2)	129	211
U5(3)	512	851
U6	330	825
U7	97	190
Total	**14658**	**31250**

- Ballarat Municipality
- Neighbourhood Character Precincts
- Innominate Undeveloped
- Innominate Developed
- Landscape Type 3 and 4
- Property Boundaries
- Available Infill Properties
- Railway Line
- Railway station
- 1km Buffer from Residential Zones

Change Areas

- Substantial Change
- Incremental Change
- Minimal Change

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Ballarat Change Areas and Residential Capacity	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR02	04	30.04.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km



Precinct	Available Infill Properties	Net Capacity (dwellings)
BR1	10	43
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BR3(6)	46	317
BR3(7)	7	34
BR3(8)	8	20
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BS1(1)	123	382
BS1(2)	439	1142
BS2(1)	5	5
BS2(2)	151	627
BS2(3)	94	359
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BS3(3)	395	835
BS4(1)	39	92
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BS5	2	3
CG1(1)	1	10
CG1(2)	41	329
CG1(5)	31	105
CG1(6)	439	687
CG1(7)	12	12
CG1(8)	3	4
CG1(9)	10	72
CG1(11)	2	8
CG1(12)	13	88
CG1(13)	49	237
CG1(16)	35	75

Precinct	Available Infill Properties	Net Capacity (dwellings)
CG1(20)	5	5
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CG1(23)	6	119
CG2(2)	56	149
GC1(1)	37	52
GC1(2)	8	33
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GC2(2)	139	219
GC2(3)	733	1616
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GS1(1)	540	905
GS1(2)	754	1191
GS2(1)	30	48
GS2(2)	706	1141
GS2(3)	1	1
GS2(4)	408	573
GS2(5)	1603	1711
GS2(6)	282	524
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GS3(2)	700	1043
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LG2(1)	139	300
LG2(2)	47	86
LG2(3)	50	57
LG2(4)	26	44
R1(1)	29	63
R2(1)	2	76
R2(2)	2	2
R3(1)	6	15
R4(1)	16	220
R4(2)	21	115
R5(1)	17	527
R5(2)	32	596
R5(3)	40	386
R6	27	103
R7(2)	82	278
R7 (1)	6	14
U1	104	313
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U3(1)	80	439
U3(2)	383	760
U3(3)	129	973
U3(4)	10	12
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- Innominate Developed
- Landscape Type 3 and 4
- Property Boundaries
- Available Infill Properties
- Railway Line
- Railway station
- 1km Buffer from Residential Zones

Change Areas

- Substantial Change
- Incremental Change
- Minimal Change

Planning Zone and Condition	Minimal Change Net Density (Dwellings/Ha)	Incremental Change Net Density (Dwellings/Ha)	Substantial Change Net Density (Dwellings/Ha)
RGZ1	100	100	100
GRZ1	30	38	100
GRZ1-Heritage	20	25	100
NRZ1, NRZ2, NRZ2-Heritage	13	16	N/A
MUZ, MUZ - Heritage	50	60	80
TZ	13	16	N/A
LDRZ-sewered	3	6	N/A
LDRZ-unsewered	2.5	3	N/A

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Ballarat Change Areas and Residential Capacity	Ballarat Housing Capacity Analysis	320.0780.00.U03.DR02	04	30.04.2024	KXS	KXS	MN	1:30,000 (A0) 0 1 2 4km