Transport Oriented Development Atlas

UNSW
SYDNEY

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Transit Oriented Development

Transit Oriented Development (TOD) is a dense development model where mixed communities are built around transit nodes to reduce dependence on private vehicles and to increase the use of sustainable transport modes by providing walking and cycling-friendly built environments.

The concept of TOD was codified by an American architect Peter Calthorpe, one of the advocates of New Urbanism, in his book The Next American Metropolis published in 1993. Calthorpe defined TOD as "a mixed-use community within an average 800 metre (or 10-minute) walking distance of a transit stop and core commercial area". Since then, TOD has emerged as a widely accepted land use planning approach over the past two decades, which has been credited with generating diverse environmental, social, health, and economic benefits.

A Tale of Two Cities

Vancouver, British Columbia, is among Canada's densest and diverse cities. It is Canada's third-largest metropolitan area. Heralded as one of the most walkable cities in the world, Vancouver has consistently ranked one of the most liveable cities in the world, currently sitting one place behind Sydney, at number five, according to the Economist Intelligence Unit's Global Liveability Index.

The Metro Vancouver area is 2,883km^2 and is home to 2.65 million people, with an average density of 917 people per square kilometre. Comparatively, the Greater Sydney metropolitan area covers an area of 12,368km^2, including national parks. The total population is 5.31 million with a population density of about 442 people per square kilometre.

Like Sydney, Vancouver has a reputation for being an expensive city and has faced significant cost of living and housing affordability issues. In recent years, efforts have been made to address affordability through policies like increased housing density and taxes on vacant properties. The Empty Home Tax, introduced in 2017, saw a 36% drop in vacant properties over a five-year period.

In both cities, a key challenge has been balancing the need for increased housing supply whilst maintaining neighbourhood character and green spaces.

However, development in Vancouver has emphasized densification and mixed-use zoning, encouraging the construction of secondary dwellings to utilise existing urban space more efficiently.

Vancouver is an international example of best practice in TOD. Over the last ten years, construction and planning has begun on three new major, mixed-use TOD sites (Brentwood, Lougheed and Richmond) and has been so successful that five more mixed use centres are being developed in other Canadian cities.

These TODs will bring together residential and commercial centres with mixed use green spaces and transit systems.

Sydney and Vancouver share many similarities, but there are a few notable differences in the public transport systems. Sydney Trains reportedly carries about 135.5 million passengers annually (2021-22), slightly exceeding the annual ridership of Vancouver's SkyTrain, which is about 116.6 million in 2022.

However, Sydney trains encompasses a significantly broader area than the SkyTrain. The overall network length of Sydney Trains is about 4.5 times longer (369km vs 80km), and they also serve 3.2 times as many train stations than SkyTrain (170 stations vs 53 stations).

Brentwood Town Centre, Vancouver

Brentwood Park was developed in the early 1950s with 572 homes, then later a shopping centre. In 2014 "The Amazing Brentwood" redevelopment plan commenced which plans to turn this area into a mixed-use space that connects retail, commercial and residential units integrated with a SkyTrain system. The master plan for the 11.3 hectare site features six towers up to 60 storeys high, comprising approximately 2,000 market rental and 450 below-market rental homes. The TOD also includes as approximately 88,500m^2 of commercial space and 900 additional apartments for sale. There are another five towers planned for this TOD.

The project is proposed to be entirely pedestrian, with cars accessing the site's underground circulation system from the bounding streets. The master plan also envisions over half of the 32,000m^2 site as open space, including landscaped plazas and courtyards for both residents and the general public. In addition to a gym and fitness centre, the facility would include multi-purpose rooms, creative spaces for arts, crafts and music, child care space, an indoor running track and a rooftop play area.
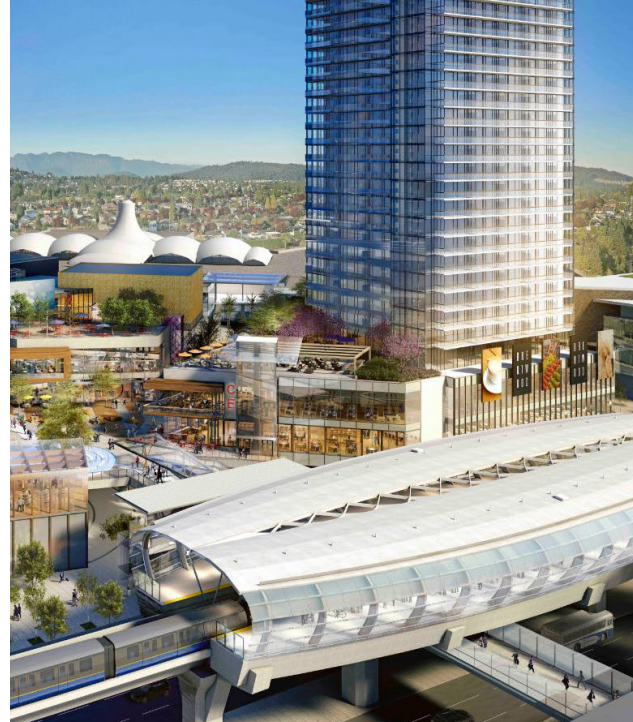
City of Lougheed, Vancouver

The City of Lougheed, formerly known as Lougheed Mall, is the second-largest shopping centre in Burnaby, a municipality within Greater Vancouver. A redevelopment master plan was designed and then adopted by the Burnaby City Council in 2016. Redevelopment of the 29 hectare site has commenced, for 30 new high-rise residential towers, with over 10,000 units of housing within nearly 1.2 million m^2 of residential space and 114,000 m^2 of new retail. This is Canada's largest new master planned community, and second to only the Hudson Yards redevelopment in New York City.

The City of Lougheed is served by two skytrain lines and a number of bus services as well as the Lougheed Highway. Significant public spaces will provide balance to the density coming to the area, including a large central open space that serves as both a civic park and urban plaza. It can host up to 10,000 people for community events, concerts, and festivals. The entire development and its public spaces will be connected by a network of pedestrian-only and cycling pathways and pocket open spaces.

As for the current first phase, the redevelopment's first four towers will contain 1,350 market ownership homes and 230 market rental homes. The first phase is due to be completed in 2023 with the first tower already selling.

Wolli Creek, Sydney

Wolli Creek showcases a highly successful strategy in TOD planning. It is located on a 78-hectare expanse along the Cooks River, 10 kilometres southwest of Sydney CBD. The area previously served as an industrial zone, jointed owned by Qantas and RailCorp. The project included a redevelopment of nearly 200,000 square metres of mix-used developments, accompanied by a 2.3 hectare of parkland.

The project become feasible due to the decision to build a railway from the CBD to the airport as part of infrastructure upgrades in preparation for the 2000 Olympic Games. Wolli Creek is a transit hub, which connects to both the Illawarra line and Airport & South Line on the Sydney Trains network. The 348 and 422 bus routes operate from the Wolli Creek station connecting to the Prince of Wales Hospital, the University of New South Wales and Railway Square.

The success of the Wolli Creek TOD is evident through the population increase, which quadrupled since the 2006 census 2,651 to approximately 10,654 residents as reported in the 2021 census. The transit mode share in Wolli Creek is among the highest in Sydney, with over 60% of commuters utilising public transport.

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Understanding TOD Potential in Sydney

As Sydney's population grows, the demand for infill development is growing as people desire to live closer to work, to have access to public and active transport, and to live in dense and walkable neighbourhoods. However, such developments must consider infrastructure, planning regulations and market conditions. In keeping with the vision of A Metropolis of Three Cities, Sydney has many centres that could offer opportunities for mixed use development, to connect residents to employment, education, and recreational activities.

While the population density of City of Sydney is high, the overall population density of Greater Sydney remains comparatively lower than several other globally comparable cities, such as Metro Vancouver. Moreover, the well-established train network of Greater Sydney provides ample opportunities for TODs based on the existing rail infrastructure or through modest expansions. TOD also provides opportunities for community consultation and stakeholder engagement to create spaces that meet community needs.

Data analytics to support TOD projects

To illustrate how data analysis can be used to support planning for future TOD opportunities within Sydney's context, we have produced a series of maps showing some of the indicators which can be considered in evaluating the suitability of stations in the heavy rail network.

The following pages of this document contain these maps, which are based on open data sources[1] and provide some data-driven contextual information on the existing train lines to help better understand current capacity, constraints and opportunities for future development.

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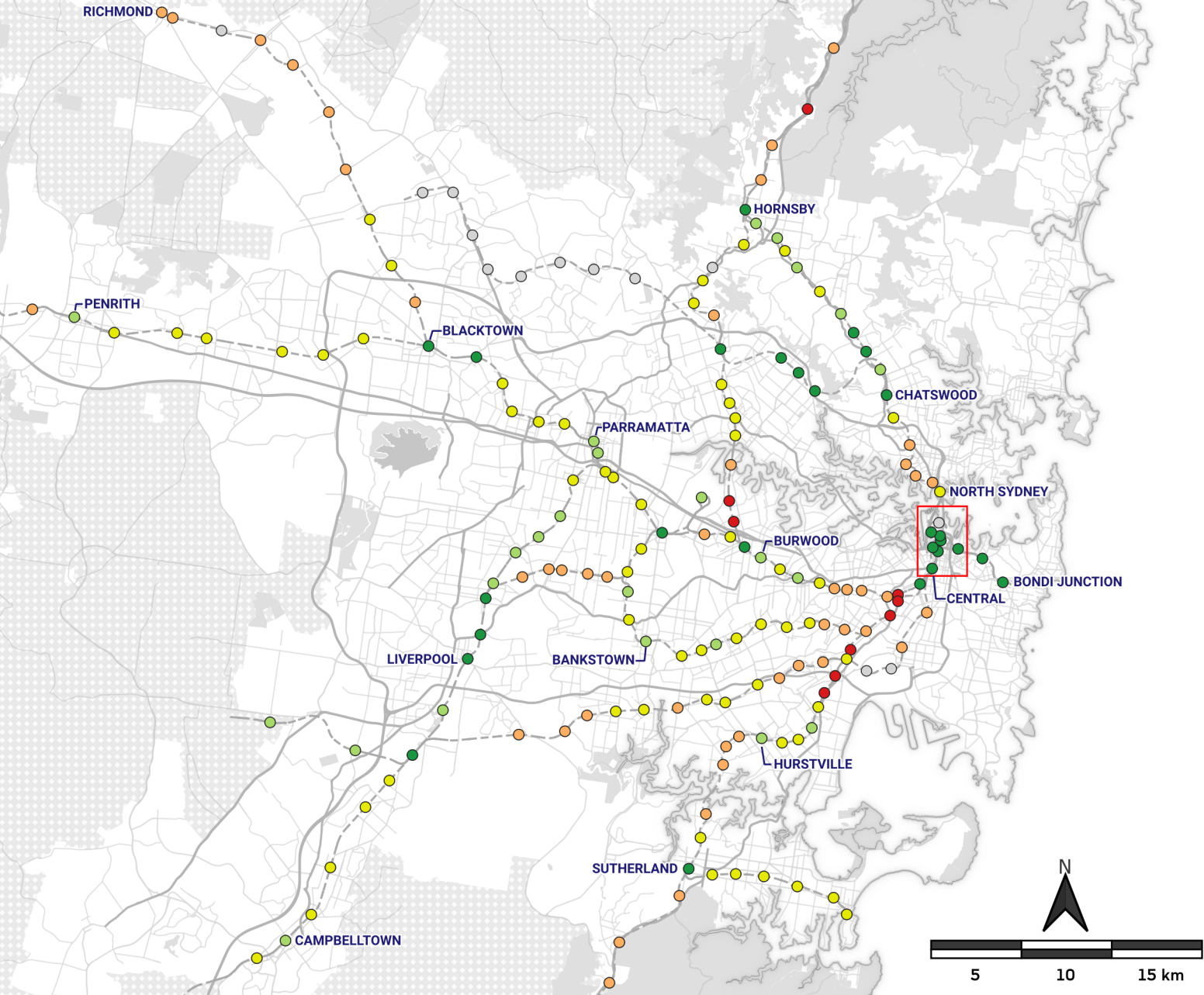
Chance of getting a seat (inbound)

Inbound AM Peak Services (2016 Data)

Key takeaways:

— Seating capacity on services is lower in locations closer to the CBD.

— Some stations which are serviced by intercity or limited stops services have lower seat availability despite being further from the CBD.

— While stations further from the CBD may have more seats available, the same service will typically approach capacity as the train moves nearer to the city.
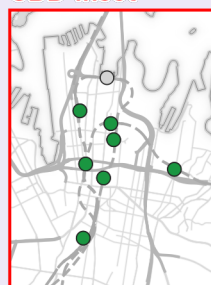
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Legend

Chance of getting a seat

- 🔴 0% - 20%
- 🟠 20% - 40%
- 🟡 40% - 60%
- 🟢 60% - 80%
- 🟢 80% - 100%
- ⚪ No Data

CBD Inset

- - - - Heavy Rail Network
——— Major Roads
——— Other Roads
▨ Nat. Parks & Forest
▦ Rural Areas

Chance of getting a seat (outbound)

Outbound AM Peak Services (2016 Data)

Map labels: RICHMOND, PENRITH, BLACKTOWN, PARRAMATTA, HORNSBY, CHATSWOOD, NORTH SYDNEY, BURWOOD, BONDI JUNCTION, CENTRAL, LIVERPOOL, BANKSTOWN, HURSTVILLE, SUTHERLAND, CAMPBELLTOWN

N

5   10   15 km

Key takeaways:

— Outbound services generally display a higher level of seat availability than inbound services.

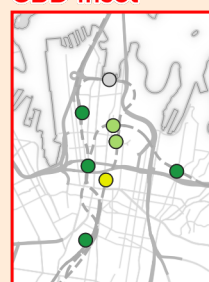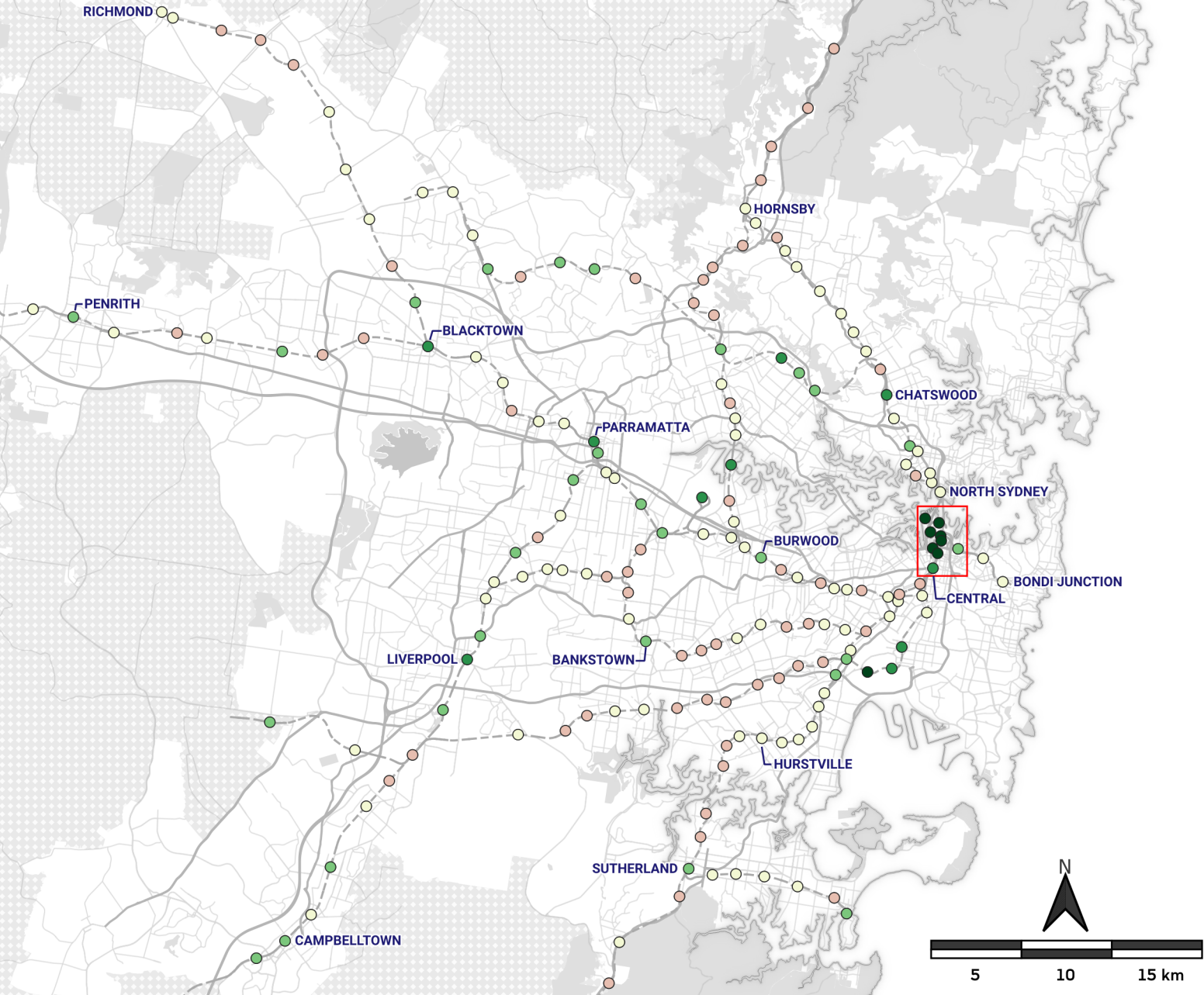— Areas which display lower seat availability are located around subregional centres on each line.

CBD Inset

Legend

Chance of getting a seat

- ● 0% - 20%
- ● 20% - 40%
- ● 40% - 60%
- ● 60% - 80%
- ● 80% - 100%
- ● No Data

- - - Heavy Rail Network
—— Major Roads
—— Other Roads
▓ Nat. Parks & Forest
▒ Rural Areas

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Maximum Building Heights

Average height control within 800m of stations, ignores areas with no control

Key takeaways:

— Outside of the CBD, areas with significant maximum height limits are largely concentrated in subregional centres (e.g. Parramatta, Blacktown, Liverpool).

— Some inner and middle ring suburbs have notably low maximum height limits, substantially lower than some areas further from the CBD.
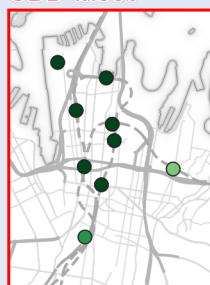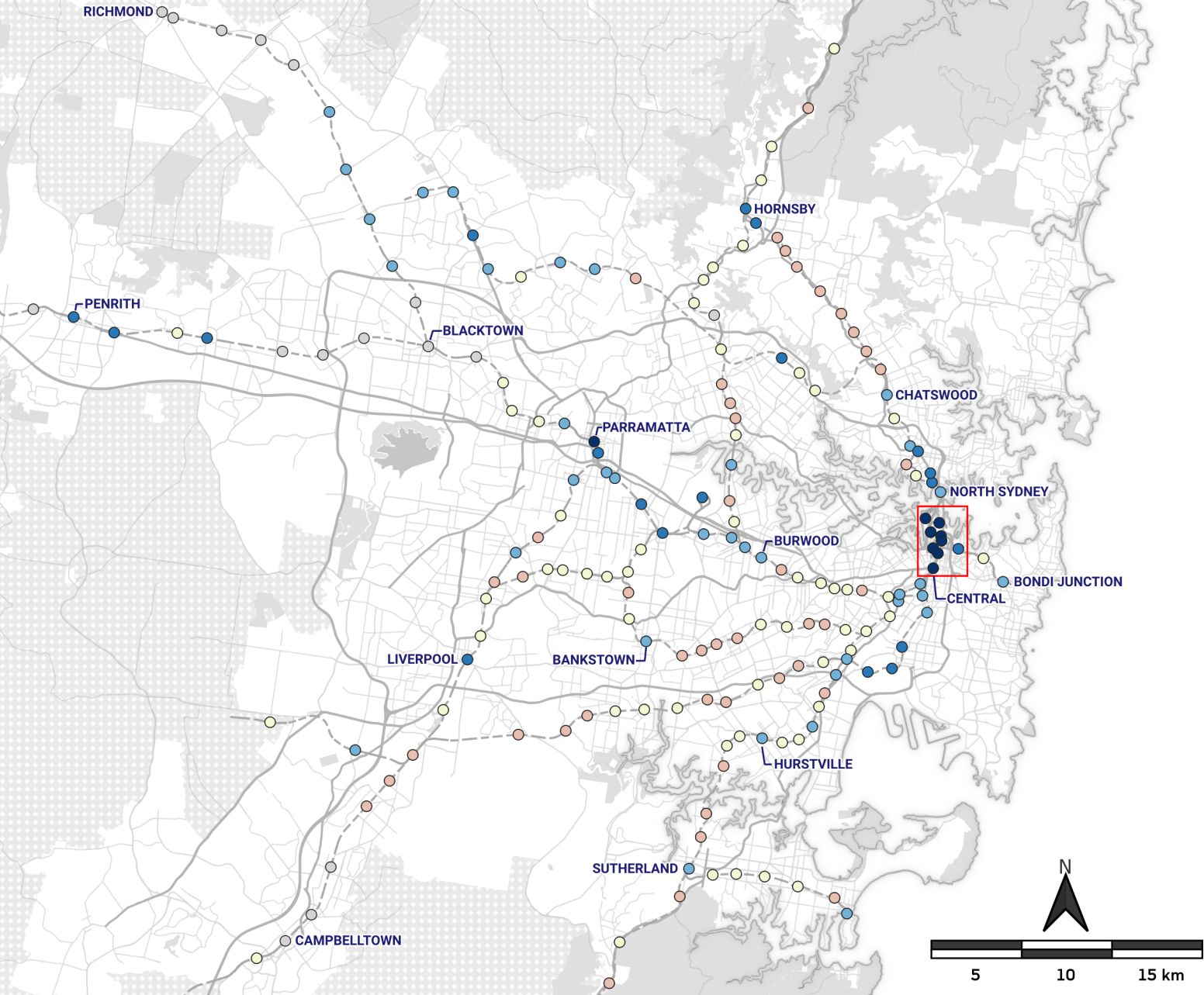
10

Legend

Average Height

- 5m - 10m
- 10m - 15m
- 15m - 24m
- 24m - 45m
- 45m - 105m
- No Data

CBD Inset

- - - Heavy Rail Network
— Major Roads
— Other Roads
Nat. Parks & Forest
Rural Areas

Maximum Floor Space Ratios (FSR)

Average FSR control within 800m of stations, ignores areas with no FSR control

Key takeaways:

— The average maximum floor space ratios around stations follows a similar distribution to height limits.

— Again, a range of inner and middle ring suburbs display lower maximum FSRs than other areas further from the CBD.
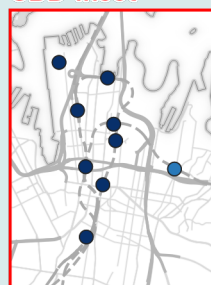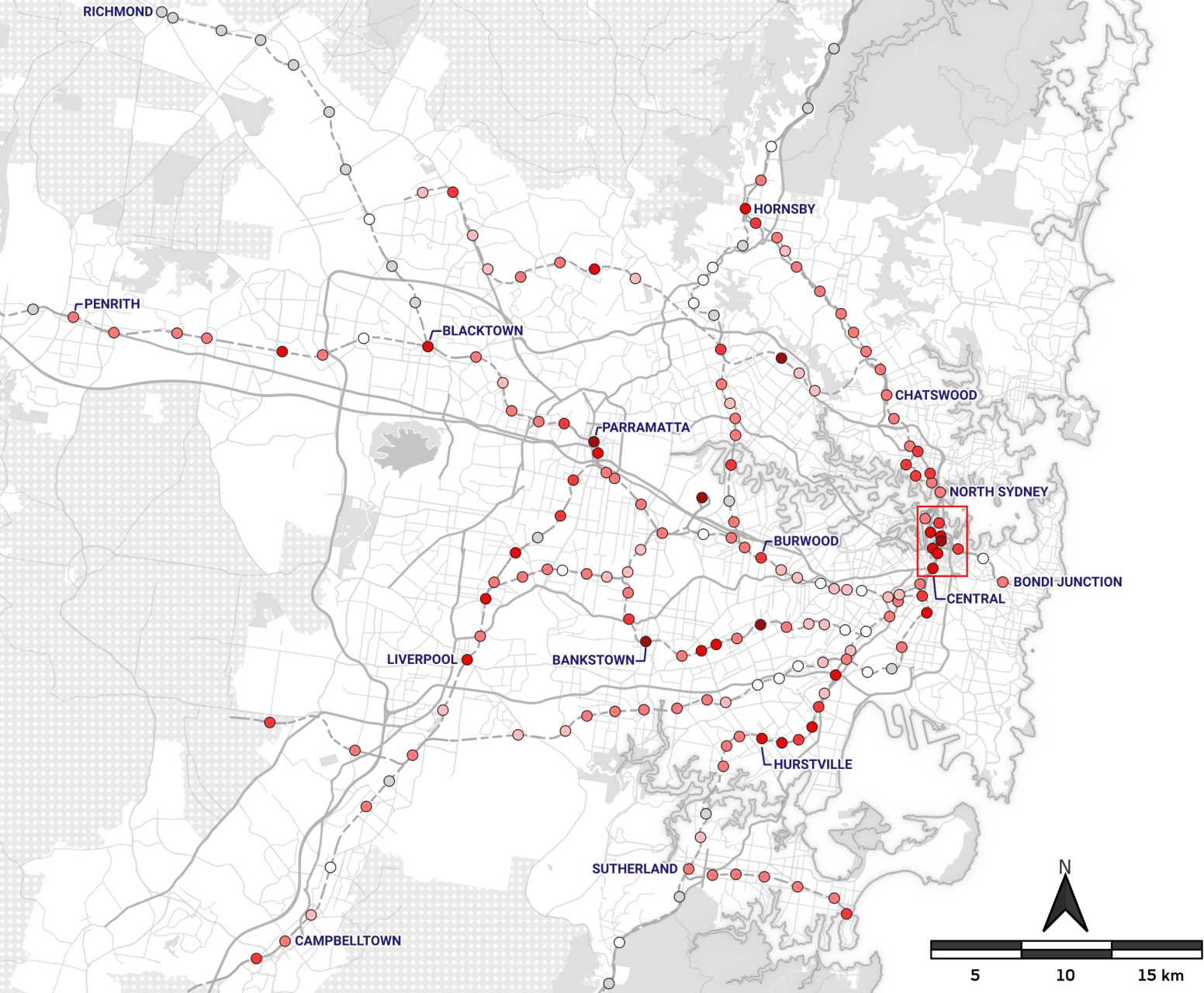
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Legend

Average FSR (n:1)

- 0.2 - 0.7
- 0.7 - 1.2
- 1.2 - 2
- 2 - 3.5
- 3.5 - 7.8
- No Data

CBD Inset

- - - Heavy Rail Network
— Major Roads
— Other Roads
Nat. Parks & Forest
Rural Areas

High Density Residential Zones

R4, MU1, SP5, & B4 land within 800m of stations

Key takeaways:

— High density zones feature around most rail stations across the metropolitan area, albeit to a varying amount.

— Some commercial zones permit residential development, which will not be reflected in the map above.

— Some areas may have zones which permit high density development, but FSR and height controls which could restrict the achievable densities.
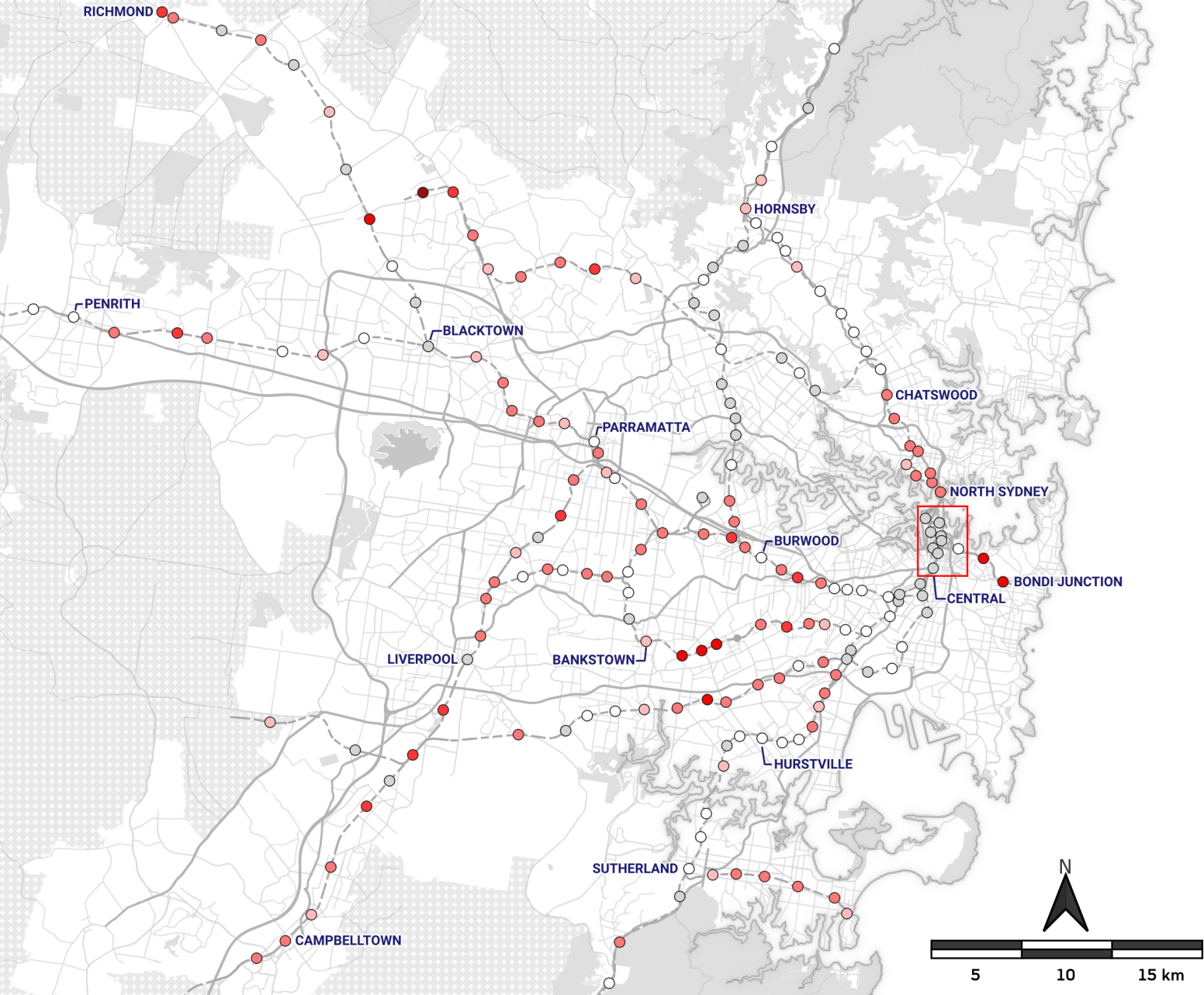
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Legend

Zoned area (ha)

- ○ 0
- ○ 1 - 5
- ○ 5 - 10
- ○ 10 - 35
- ● 35 - 50
- ● 50 - 80
- ● 80 - 152

CBD Inset

- - - Heavy Rail Network
- —— Major Roads
- —— Other Roads
- ▨ Nat. Parks & Forest
- ▨ Rural Areas

Medium Density Residential Zones

R3 land within 800m of stations

Key takeaways:

— Medium density zoning is less prevalent within 800m of rail stations across the metropolitan area.

— A substantial number of stations do not contain any instances of this zone in an 800m catchment.
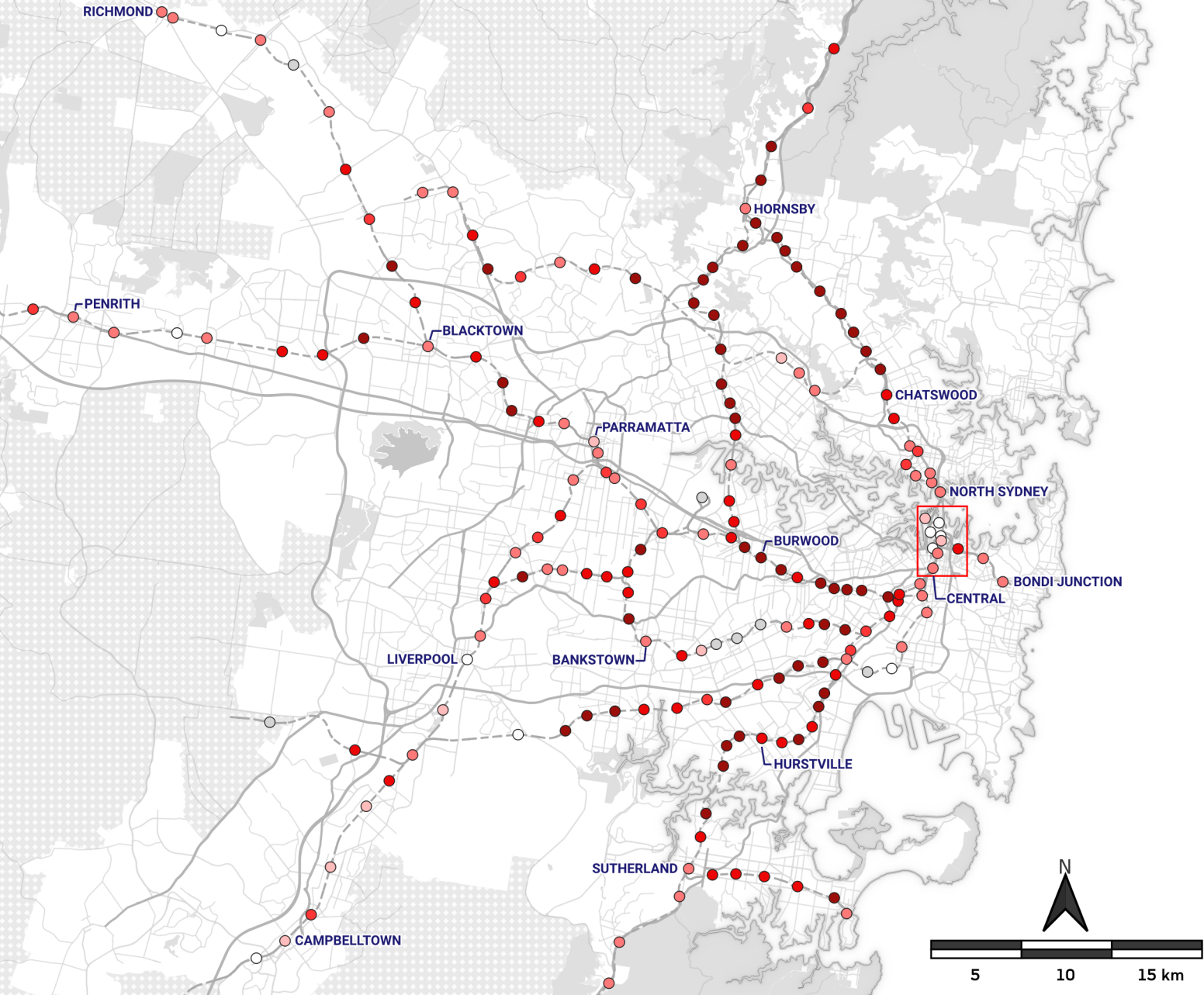
Legend

Zoned area (ha)

- ● 0
- ○ 1 - 5
- ● 5 - 10
- ● 10 - 35
- ● 35 - 50
- ● 50 - 80
- ● 80 - 97

- --- Heavy Rail Network
- —— Major Roads
- —— Other Roads
- Nat. Parks & Forest
- Rural Areas

CBD Inset

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Low Density Residential Zones

R1 & R2 land within 800m of stations

Key takeaways:

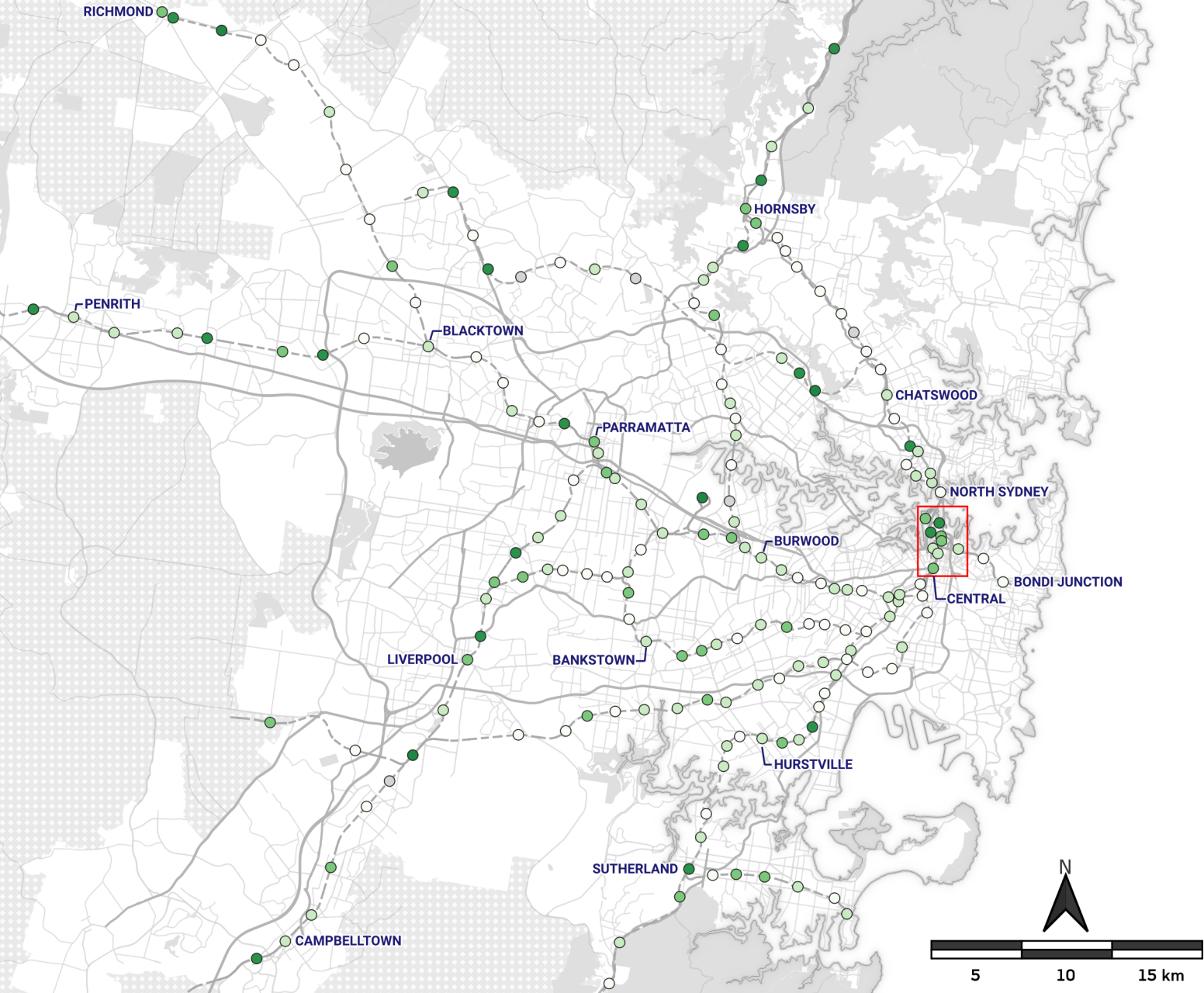— Low density zones feature strongly around most stations in the metropolitan area.

Legend

Zoned area (ha)

- ○ 0
- ○ 1 - 5
- ○ 5 - 10
- ● 10 - 35
- ● 35 - 50
- ● 50 - 80
- ● 80 - 144

- - - Heavy Rail Network
— Major Roads
— Other Roads
▨ Nat. Parks & Forest
▨ Rural Areas

CBD Inset

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NSW Government Land Holdings

Government land within 800m of stations; excludes C1-4, W1-3 and RE1 zones

Key takeaways:

— Most stations do not have a substantial amount of government land within 800m.

— Conservation, waterway, and public recreation zones were omitted from the totals since they are not likely to accommodate significant development, while making up a substantial proportion of government land in some locations.
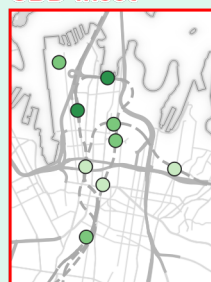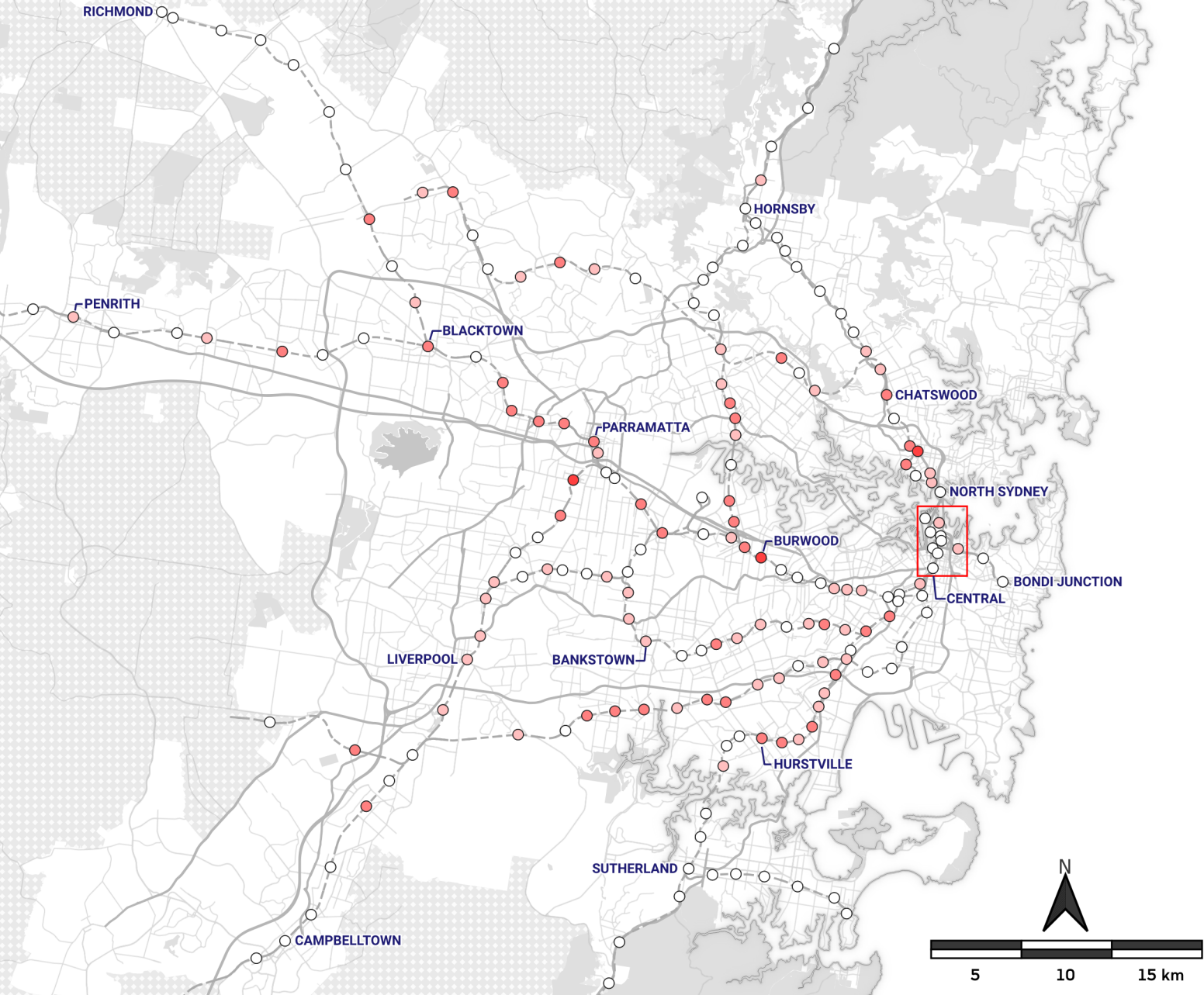
Legend

NSW Government Land (ha)

- ○ 0
- ○ 1 - 5
- ○ 6 - 15
- ● 15 - 25
- ● 25 - 50
- ● 50 - 284

CBD Inset

- - - Heavy Rail Network
—— Major Roads
—— Other Roads
▓ Nat. Parks & Forest
░ Rural Areas

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DAs - multi-unit and subdivisions

DAs for multiple residential units or involving subdivision; 2020-2023

Key takeaways:

— Middle ring suburbs display the most substantial development activity in this classification.

— Areas of southern and northern Sydney display very limited development activity in this classification.
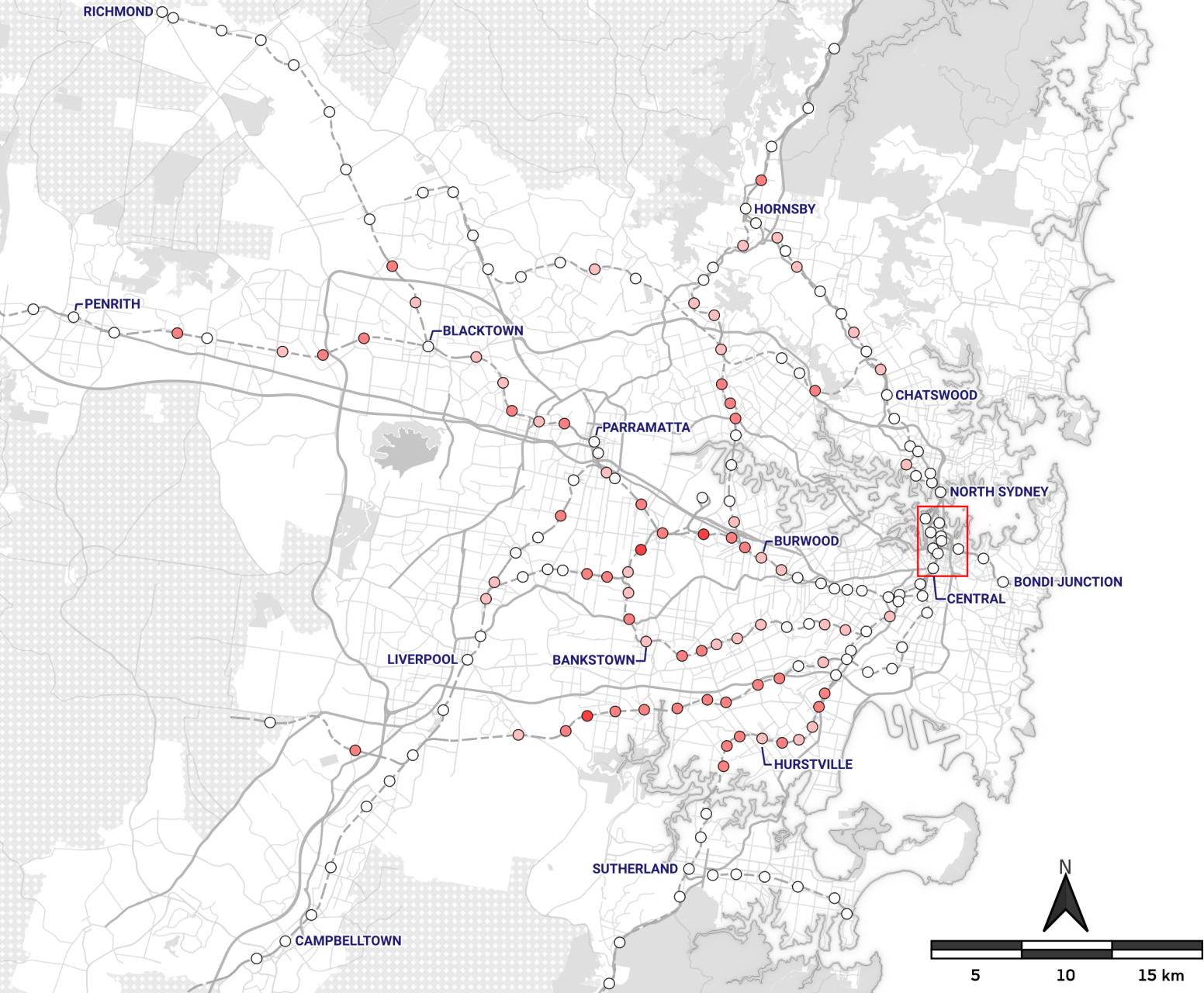
Legend

Number of DAs

- ○ 0 - 5
- ○ 5 - 10
- ● 10 - 25
- ● 25 - 42

CBD Inset

- - - - Heavy Rail Network
- —— Major Roads
- —— Other Roads
- Nat. Parks & Forest
- Rural Areas

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DAs - detached/secondary dwellings

DAs for detached dwellings, secondary dwellings; 2020-2023

Key takeaways:

— Middle ring suburbs display the most substantial concentrations of development activity in this classification, with limited areas of higher activity in the outer west and north.

— Inner city areas, and outer south and south-western areas display very limited development activity in this classification.
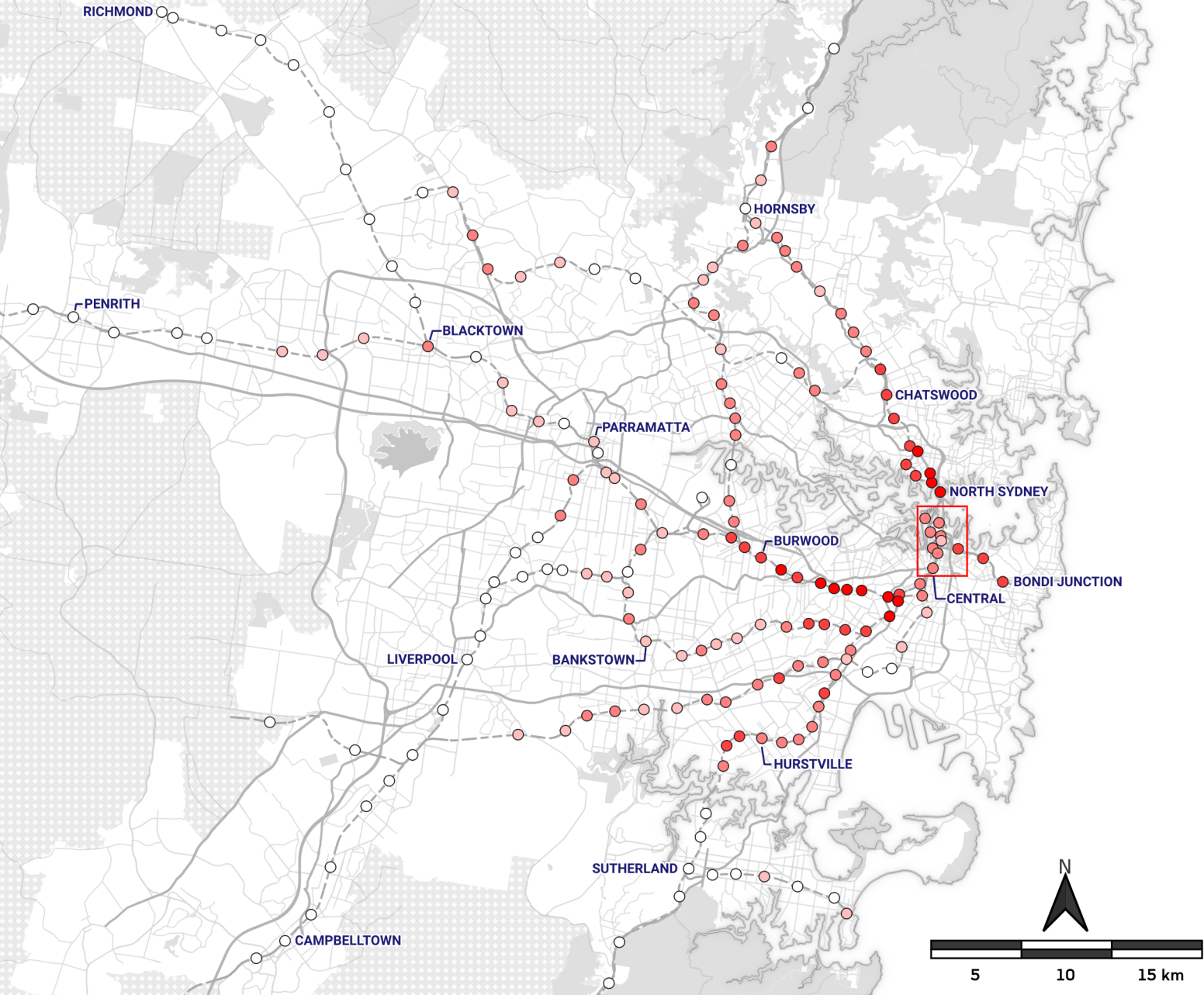
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Legend

Number of DAs

○ 0 - 5
● 5 - 10
● 10 - 25
● 25 - 29

CBD Inset

-- - Heavy Rail Network
— Major Roads
— Other Roads
▨ Nat. Parks & Forest
▨ Rural Areas

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DAs - alterations and additions

DAs for alterations or renovations to existing residential dwellings; 2020-2023

Key takeaways:

— Inner city and some middle ring areas in the central-west and northern parts of Sydney display a substantial presence of development applications for renovations.

— Areas in the south, south-west, and west have a lower prevalence in this classification.
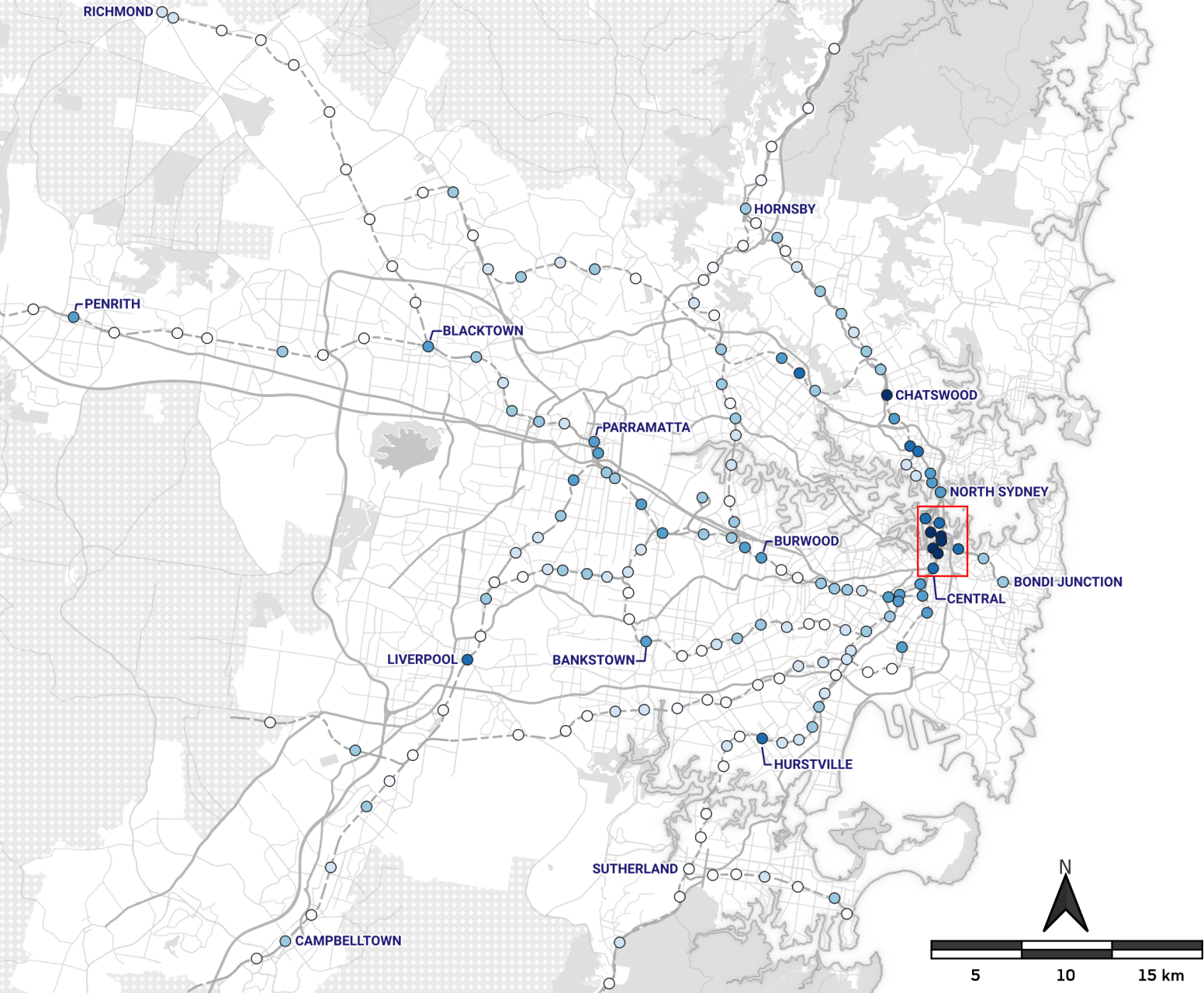
18

Legend

Number of DAs

- ○ 0 - 5
- ● 5 - 10
- ● 10 - 25
- ● 25 - 50
- ● 50 - 106

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- - - Heavy Rail Network
- —— Major Roads
- —— Other Roads
- ▨ Nat. Parks & Forest
- ▦ Rural Areas

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DAs - non-residential

Non residential DAs; 2020-2023

Key takeaways:

— Stations with significant commercial centres are strongly represented for development activity in this classification.

— Most stations display some level of development activity in this classification, indicative of the volume of applications which are required for relatively routine processes such as changing the use of a commercial premises.
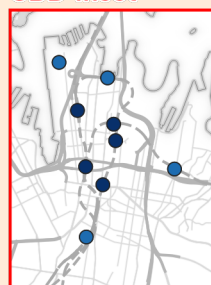
Legend

Number of DAs

- ○ 0 - 5
- ○ 5 - 10
- ○ 10 - 25
- ○ 25 - 50
- ● 50 - 100
- ● 100 - 150

- – – Heavy Rail Network
- —— Major Roads
- —— Other Roads
- Nat. Parks & Forest
- Rural Areas

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