27 October 2023

Rick Graf
Billbergia
Locked Bag 1400
Meadowbank NSW 2114

Dear Rick,

RE: Rhodes Precinct Transport Capacity High Level Review – Scoping Report

Introduction

This high-level transport capacity review has been prepared on behalf of Billbergia in support of proposed mixed use residential developments, including affordable housing of at least 15% of the residential GFA at the following site locations:

- 9 Blaxland Road, Rhodes
- 25-27 Leeds Street, Rhodes
- Llewelyn Street, Rhodes (comprising 43B – 57 Blaxland Road, Rhodes, 2A, 2B and 2D Cavell Avenue, Rhodes 448-458 Concord Road, Rhodes and 2A Lewellyn Street, Rhodes
- 23-29 Marquet Street, Rhodes.

This letter comprises a summary of the future capacity of the transport network for the Rhodes Precinct and the T9 Northern Line services to accommodate further increases in demand as a result of the proposed mixed use developments, including further increases in potential transport demand as a result affordable housing. The outcomes were reported in several deliverables presented to Transport for NSW and Department of Planning & Environment (DPE) as shown below:

- *Rhodes Station Rail Demand Report – Dr Neil Prosser (September 2018)*
- *Wentworth Point Block H Transport Study – PwC (February 2022)*
- *Rhodes Precinct Rhodes West Trip Generation and Capacity Assessment – PwC (December 2022)*
- *Hannover Review of Rail Capacity Assessment of T9 Northern Line – Hannover (October 2023)*

The high-level review relies on the interpretation and extraction of survey and modelling outcomes from the above sources as a core component of this review. The high-level transport capacity review will assist to inform the issuance of Secretary's Environmental Assessment Requirements (SEARs) which will require more detailed traffic and transport assessments to be undertaken for each of the subject development sites.

This high-level review has relied upon, and presumed accurate information (i.e. assumptions, methodology, calculations and survey outputs etc) prepared by PwC, Hannover Consulting and Dr Neil Prosser. Except as otherwise stated in the letter, Pentelic has not attempted to verify the accuracy or completeness of any such information or undertake any additional assessments as part of this high-level review. If the information is subsequently determined to be false, inaccurate incomplete then it is possible that our observations and conclusions as expressed in this letter may change.

Surveyed trip generation rates for Rhodes Precinct

The trip generation rates for the Rhodes Precinct are a critical aspect to be considered in determining the future requirements of the transport network and overall development yields (including affordable housing) throughout the precinct. To examine the appropriate trip generation rates to be applied for the Rhodes Precinct, PwC and Matrix were engaged by Billbergia to undertake high density residential land use trip generation surveys in August 2022 and November 2022 within Rhodes West. The four sites were the same candidate sites as agreed with Transport for NSW back in late 2018 as part of the update to the *Rhodes Precinct Traffic and Transport Report* (by Jacobs). The candidate sites are shown in Figure 1 below and are all within a 400-600m walking catchment to Rhodes Station.

Site Names

Site 1. *Vantage South Meriton.*

Site 2. *Village Quay.*

Site 3. *Walker St (Stage 2A and 3A) Developments.*

Site 4. *Rhodes Central Stage 1 & 2.*

On-street Parking Survey Locations

1. *Shoreline Dr*

2. *Gauthorpe St*

3. *Marquet St*

4. *Walker St*

5. *Nina Gray Ave*

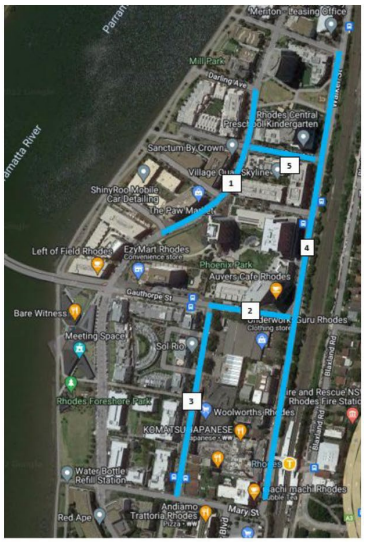


Figure 1 - Rhodes West Trip Generation Survey Location Sites for 2022 (Source: PwC)

On average, the trip generation surveys showed **0.15 vehicle trips per apartment in the AM peak hour** and **0.14 vehicle trips per apartment in the PM peak hour** for the Rhodes Precinct based on the November 2022 surveys. These survey results align with the trip rates applied to Chatswood (i.e. 0.14 and 0.12 trips per apartment during the AM and PM peak respectively) which was used as a benchmark for the *Rhodes Precinct Traffic and Transport Report (2021)* prepared by Jacobs on behalf of DPE and Transport for NSW (refer to Table 1). A summary of the key findings is provided below:

- The observed surveys revealed a significant reduction (i.e. 32% and 36% lower during the AM and PM peak hour respectively) from the most recent *Rhodes Precinct Traffic and Transport Report (2021)* of 0.22 vehicle trips per apartment for both the AM and PM peak hour.
- The observed surveys revealed a lower AM peak hour rate then the *TfNSW Technical Direction - 2013 Sydney Average*: of 0.19 vehicle trips per apartment for the AM peak hour, and a slightly higher rate than the 0.15 vehicle trips per apartment for the PM peak hour respectively.
- The recent trip generation rates (2022) reflect patterns observed at other transit-oriented development sites within higher order centres, such as Chatswood which was used as a benchmark centre for the *Rhodes Precinct Traffic and Transport Report (2021)* prepared by Jacobs. Based on the recent surveys, the observed trip generation rates are significantly lower than the 0.22 trips per apartment currently adopted within the *Rhodes Precinct Plan*.

Benchmarks	Vehicle Trip Generation Rate (per dwelling)	
	Peak AM Hour	Peak PM Hour
2018 Rhodes Traffic Generation Survey	0.12	0.14
TfNSW Guide to Traffic Generating Developments - Chatswood only	0.14	0.12
2022 Rhodes Travel Surveys (this analysis – July-August 2022)	0.13	0.16
2022 Rhodes Travel Surveys (this analysis – November 2022)	0.15	0.14
2021 Camellia-Rosehill Place Strategy	0.16	
TfNSW Guide to Traffic Generating Developments - Sydney avg	0.19	0.15
2021 Rhodes Precinct Traffic and Transport Report	0.22	0.22
2017 Rhodes East Precinct Study	0.24	0.24

Table 1 - Rhodes West trip generation survey results August and November 2022 (Source: PwC analysis)

Traffic and development capacity for Rhodes Precinct

The PwC report (December 2022) showed that the *Rhodes Precinct Traffic and Transport Study (2021)* by Jacobs relied upon applying a generation rate of 0.22 vehicle trip rate per dwelling for the AM and PM peak period to determine the overall development yield of an additional 4,200 residential dwellings for the Rhodes Precinct, including the 3,000 dwelling residential cap for Rhodes East. The PwC report demonstrated that the adoption of this higher trip generation rate used for the *Rhodes Precinct Plan* of 0.22 vehicle trips per dwelling lends itself to potentially overestimating the traffic generation potential, which in turn is likely to reduce the overall development capacity for the Rhodes Precinct based on the road network initiatives identified in the *Rhodes Precinct Traffic and Transport Study (2021)* (refer to Figure 2).

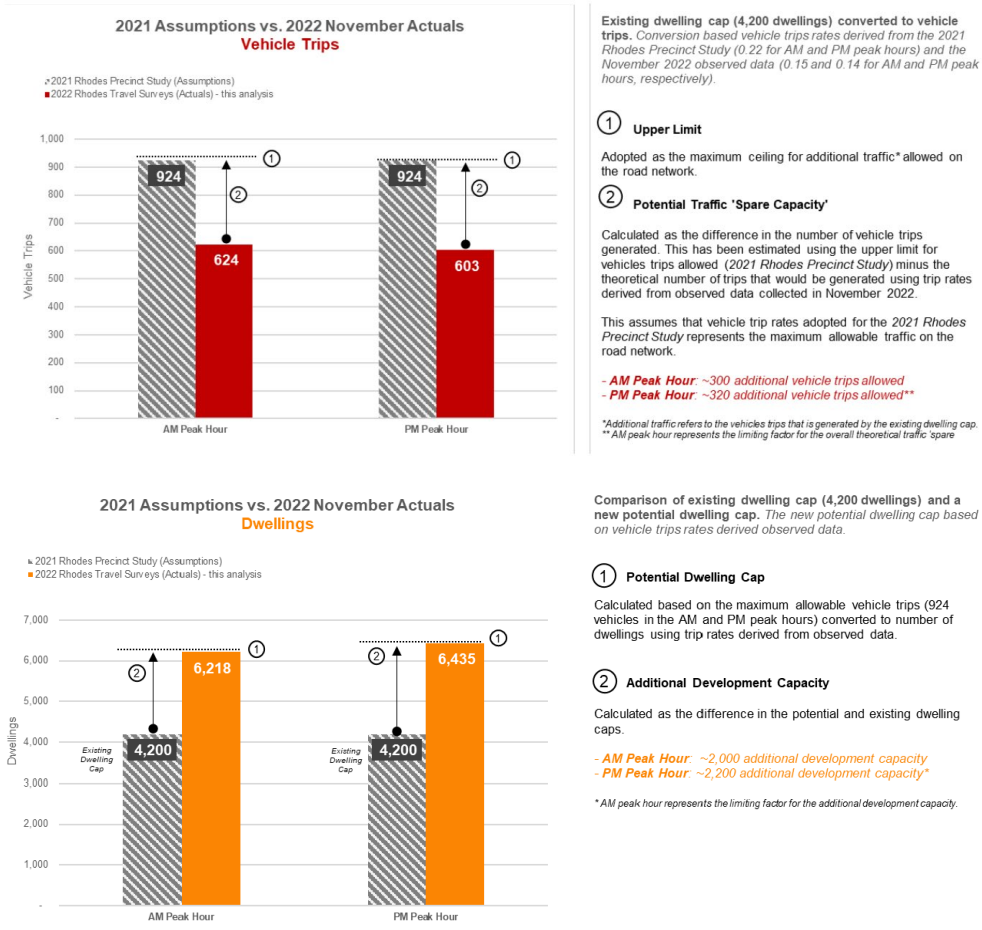


Figure 2 – Spare traffic capacity and additional development capacity (Source: PwC analysis)

The application of recently observed Rhodes Precinct trip generation surveys conducted in November 2022 revealed trip rates in the order of **0.15 vehicle trips per apartment in the AM peak hour** and **0.14 vehicle trips per apartment in the PM peak hour** which resulted in a net increase of spare traffic capacity for the critical AM peak hour of 300 vehicles trips per hour, equating to an **additional 2,000 dwellings** (refer to Table 2)**.** This is likely to result in a revised overall residential cap of 6,200 dwellings for the Rhodes Precinct (including East and West Precincts) based on the same road network initiatives already identified in the *Rhodes Precinct Traffic and Transport Study (2021).*

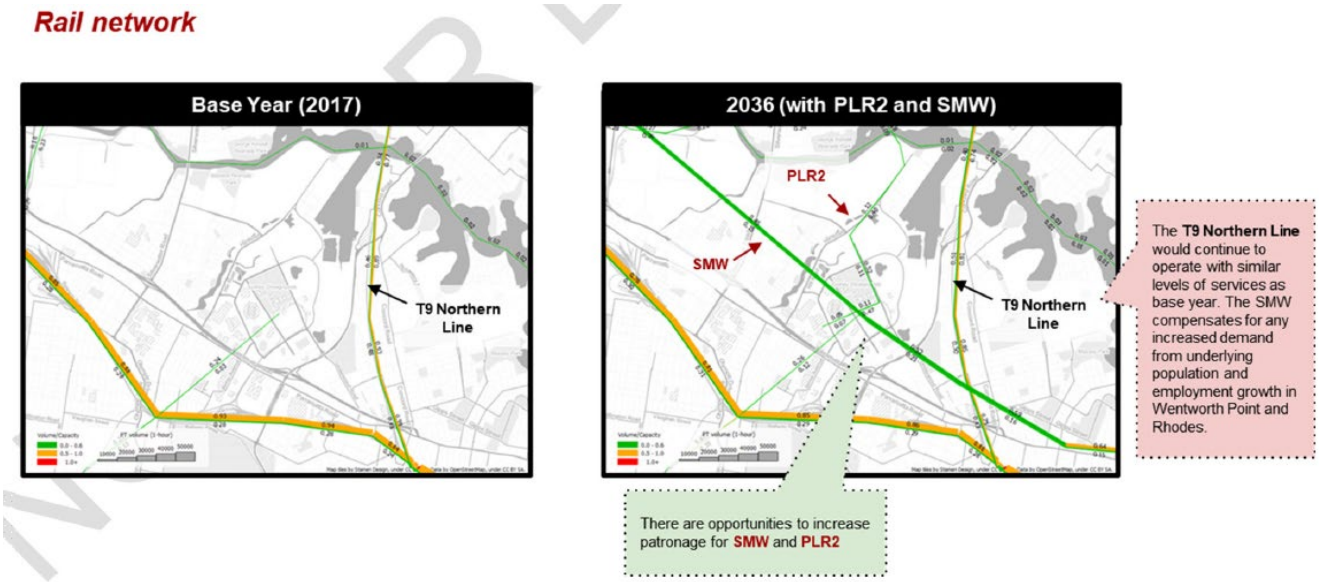
Existing Dwelling Cap	2021 Rhodes East Precinct Study			November 2022 Rhodes Surveys (Billbergia)		
	Time Period	Trip Generation Rates	No. Vehicle Trips Generated	Observed Trip Rates	No. Dwellings based on Observed Trip Rates	Additional Development Capacity
4,200	AM peak hour	0.22	924	0.15	6,218	2,018
4,200	PM peak hour	0.22	924	0.14	6,435	2,235

Table 2 –Additional dwelling capacity of Rhodes Precinct based on observed trip surveys (Source: PwC analysis)

Public transport network capacity for Rhodes Precinct

The most up to date information on issues relating to public transport network capacity for three modes (road, rail and bus) within the Rhodes Precinct for 2017 and 2036 was undertaken by PwC within their report titled '*Wentworth Point Block H Transport Study'(February 2022).* This information is illustrated in Figure 3 and sourced from the Public Transport Project Model (PTPM) as a cordon for the study area which included the Rhodes Precinct. The PTPM volume-to-capacity outputs indicate that the combined network capacity serving both the Rhodes Precinct has spare theoretical capacity in 2017 (base year).

For 2036, a surplus capacity is clearly evident along the T9 Northern Line when Sydney Metro West, Sydney Metro CBD and Southwest and Parramatta Light Rail Stage 2 come on-line. The future demand in passenger trips at Rhodes Station is likely to be at similar levels to the 2017 base year as Sydney Metro network extends across the Sydney Metropolitan Area to the north and south of Rhodes Station. These results indicate that the entire Rhodes Precinct will have surplus capacity on both the T9 Northern Line and surrounding bus network to accommodate future population and employment demands in 2036 and beyond.



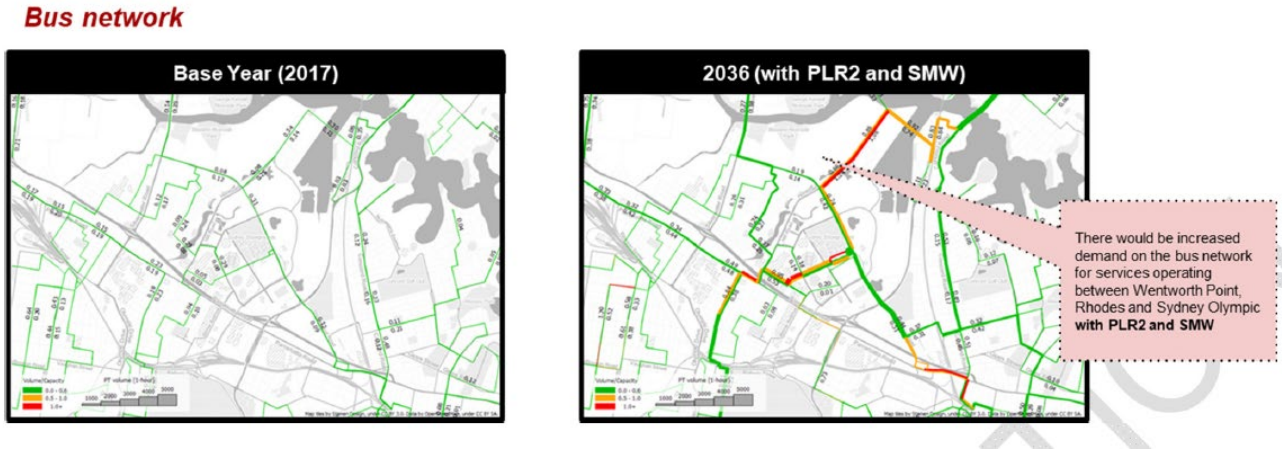


Figure 3 – Public transport network capacity (AM peak) within the Rhodes Precinct (Source: PwC analysis)

Review of T9 Northern Line rail capacity

A high-level review was also undertaken of the T9 Northern Line rail capacity by Hannover Consulting to examine recent data sets (i.e. population and employment projections and patronage data), observed train loading data and changes to travel patterns post COVID on train usage for both Rhodes Station and Strathfield Station.

The review focused on a report prepared by Dr Neil Prosser titled '*Rhodes Station Rail Demand Assessment Demand Forecasting' (2018)* which was prepared to understand the impact on the T9 Northern Line as a result of additional development yield of ~5,500 residential dwellings and 6,000 additional jobs above the TZP16 population and employment forecasts for both the Rhodes Precinct and Rhodes Corporate Business Park respectively.

The review identified that current land use forecasts (based on TZP22) for the Rhodes Precinct are substantially lower than what was assumed in the 2018 rail demand assessment. The growth assumptions used for Rhodes Precinct to examine 2036 train loadings are conservatively higher than the updated TZP22 forecasts with the T9 Northern Line still maintaining acceptable levels of train crowding with continued development growth (refer to Figure 4).

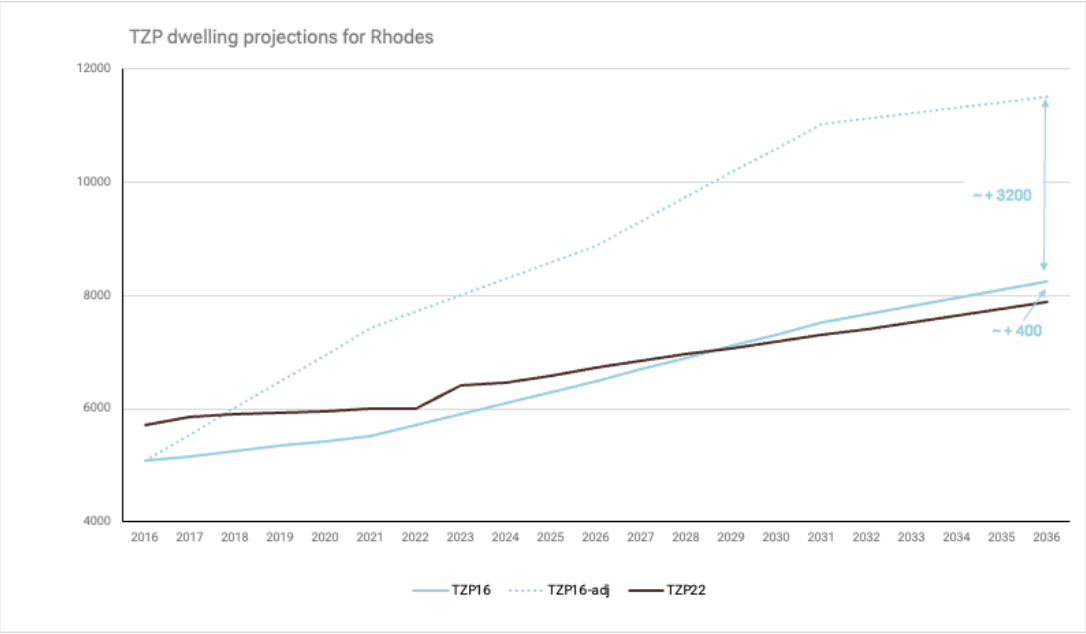


Figure 4 –Dwelling forecast comparisons (Source: Hannover analysis)

The review identified that the post-COVID-19 era will continue to pose a substantial challenge to accurately predicting future travel patterns for the T9 Northern Line and the wider network. Patronage and train usage reduced by nearly 27% at Rhodes Station when compared to 2018 (refer to Figure 5). The current OPAL patronage data showed a clear reduction in rail patronage demand at Rhodes Station due to residents working from home, which further relieves passenger demand on Rhodes Station and T9 Northern Line.

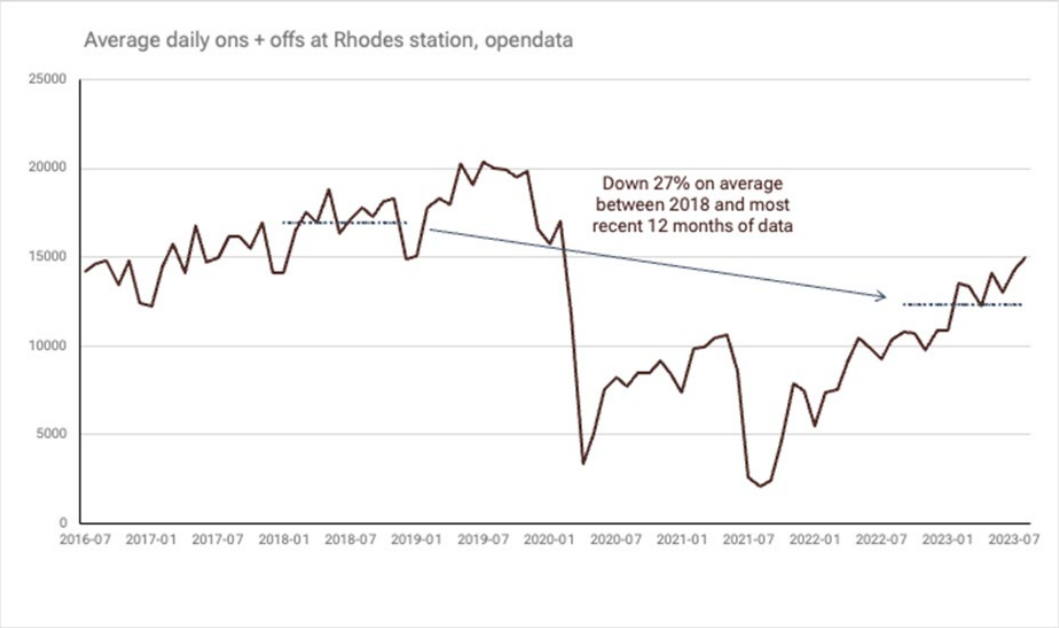


Figure 5 –Average daily tap on/offs at Rhodes Station (Source: Hannover analysis)

Hannover Consulting also undertook a site visit on 11 October 2023 to determine the average T9 Northern Line loading for trains arriving at Rhodes and Strathfield Stations during the AM peak period. The results in Figure 6 showed:

- Average train loading for Rhodes Station was estimated at 101%.
- Average train loading Strathfield Station was estimated at 136%.
- The recent observed train loadings are lower by nearly 20% compared to the 2024 scenario in the 2018 rail assessment report, which demonstrates that trains are less crowded in the post-COVID era.

The review identified that train loadings of the T9 Northern Line peak services into Strathfield Station are the key indicator in understanding whether quadruplication of the T9 Northern Line is required for additional passenger services. It was estimated that Sydney Metro City and Southwest and Sydney Metro West will reduce train loadings by nearly 30% into Strathfield Station (110% average train loading), which is well below the threshold level of 135% “Comfortable” standing load (refer to Figure 6).

Even with the conservatively higher population and employment projections assumed in the original *Rhodes Station Rail Demand Assessment (2018),* the T9 Northern Line in 2036 will have an average train loading into Strathfield Station of 135% which is still within acceptable service levels. These results indicate that there is no need for quadruplication of the T9 Northern Line based on the additional capacity provided by various Sydney Metro projects currently underway in 2036.

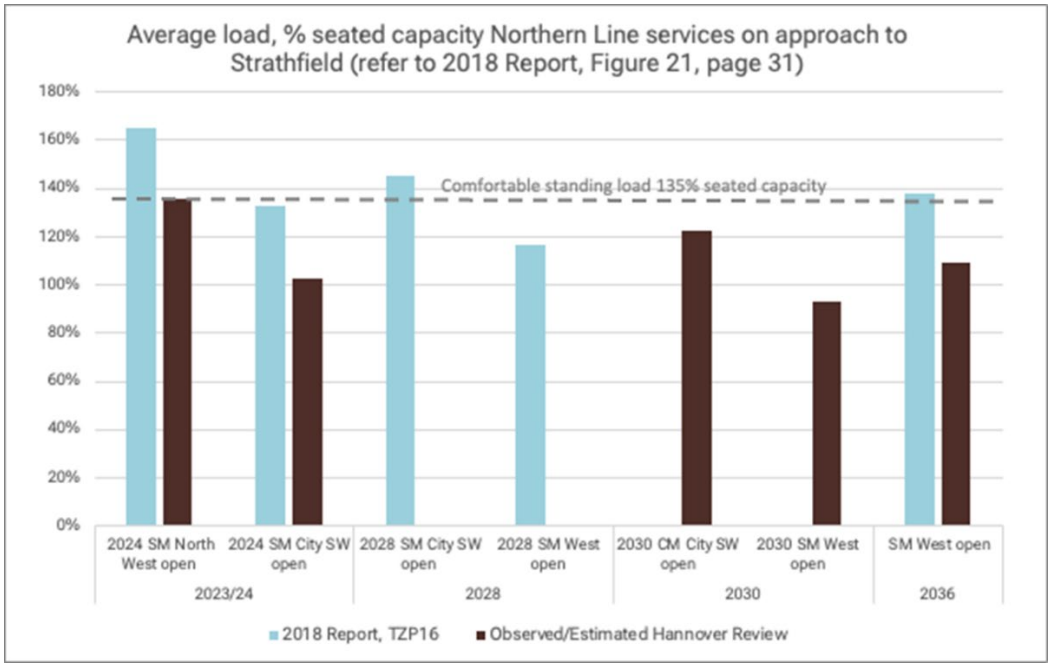


Figure 6 –Predicted train loadings into Strathfield Station (Source: Hannover analysis)

Key conclusions

The high-level transport capacity review provides sufficient evidence to support additional development (including affordable housing) within the Rhodes Precinct beyond the current development residential cap of 3,000 dwellings proposed in the Rhodes Precinct Plan. The key conclusions of the high-level review are as follows:

- The trip generation surveys in November 2022 reflect the most recent patterns observed for Rhodes Precinct high density residential development sites:
    - 0.15 vehicle trips per apartment in the AM peak hour (32% lower than the current Jacobs rate)
    - 0.14 vehicle trips per apartment in the PM peak hour (36% lower than the current Jacobs rate)
- The latest observed trip generation results align with the mode share targets when benchmarking Rhodes Strategic Centre to Chatswood (as proposed within the *Rhodes Precinct Plan*) to achieve non-car mode shares that are significantly better than the current vehicle trips rates of 0.22 vehicle trips per apartment adopted in the *Rhodes Precinct Traffic and Transport Report (2021).*
- Based on the research conducted by PwC, the report finds that there is capacity for circa ~2,000 dwellings on top of the existing development cap of 4,200 dwellings envisaged for both the Rhodes East (~3,000 dwellings) and Rhodes West (~1,200 dwellings). This is based on the reduced trip generation rate and strong evidence of sustainable travel behaviours within the Rhodes Precinct to support additional residential development including affordable housing.
- Based on strategic modelling conducted by PwC the transport network in the form of higher-order modes of public transport such as light rail and/or heavy rail/metro will have sufficient capacity to meet the future needs associated with the Rhodes Precinct and to maintain acceptable levels of service, as future development continues to grow and intensify (including affordable housing).
- The various Sydney Metro projects underway, including Sydney Metro West (SMW) and City-South West, will further reduce pressure on the T9 Northern Line. The PwC assessment showed that from 2018 to 2030 post-SMW opening, there will be nearly a 10% increase in capacity on approach to Rhodes Station based on PTPM strategic modelling without the need for quadruplication of the T9 Northern Line.

- Current NSW Government infrastructure projects underway will further encourage the use of sustainable transport within the Rhodes Precinct. This includes the Parramatta Light Rail Stage 2, which will provide a new east-west connection between Rhodes and Parramatta, unlock opportunities for Rhodes residents, and relieve future passenger demand on Rhodes Station and T9 Northern Line.
- The most recent OPAL data showed a clear reduction in rail patronage at Rhodes Station post COVID-era due to residents working from home further relieving passenger demand on Rhodes Station and the T9 Northern Line. COVID behaviours are likely to rebound to a certain extent, but some behaviours (such as work from home) are unlikely to return to pre-COVID levels.
- Average train loadings into Strathfield Station in 2036 estimated by Hannover Consulting to be in the order of 110% and considered to be within acceptable levels of train crowding (below the 135% seated capacity) on the T9 Northern Line. The surplus seating capacity into Strathfield Station in 2024, 2030 and 2036 does not trigger the need for quadruplication of the T9 Northern Line (between Epping and Strathfield).

Yours sincerely

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