

Our Ref: 21118

28 November 2022

Think Planners
PO Box W287
PARRAMATTA 2150 NSW

Attention: Mr Jonathon Wood

Dear Jonathon,

**RE: 10-16 SEVEN HILLS ROAD, BAULKHAM HILLS
ADDENDUM TRAFFIC ASSESSMENT**

As requested, please find herein The Transport Planning Partnership (TPPP)'s response to Council's request for further information on the proposed development at 10-16 Seven Hills Road, Baulkham Hills.

1. Background

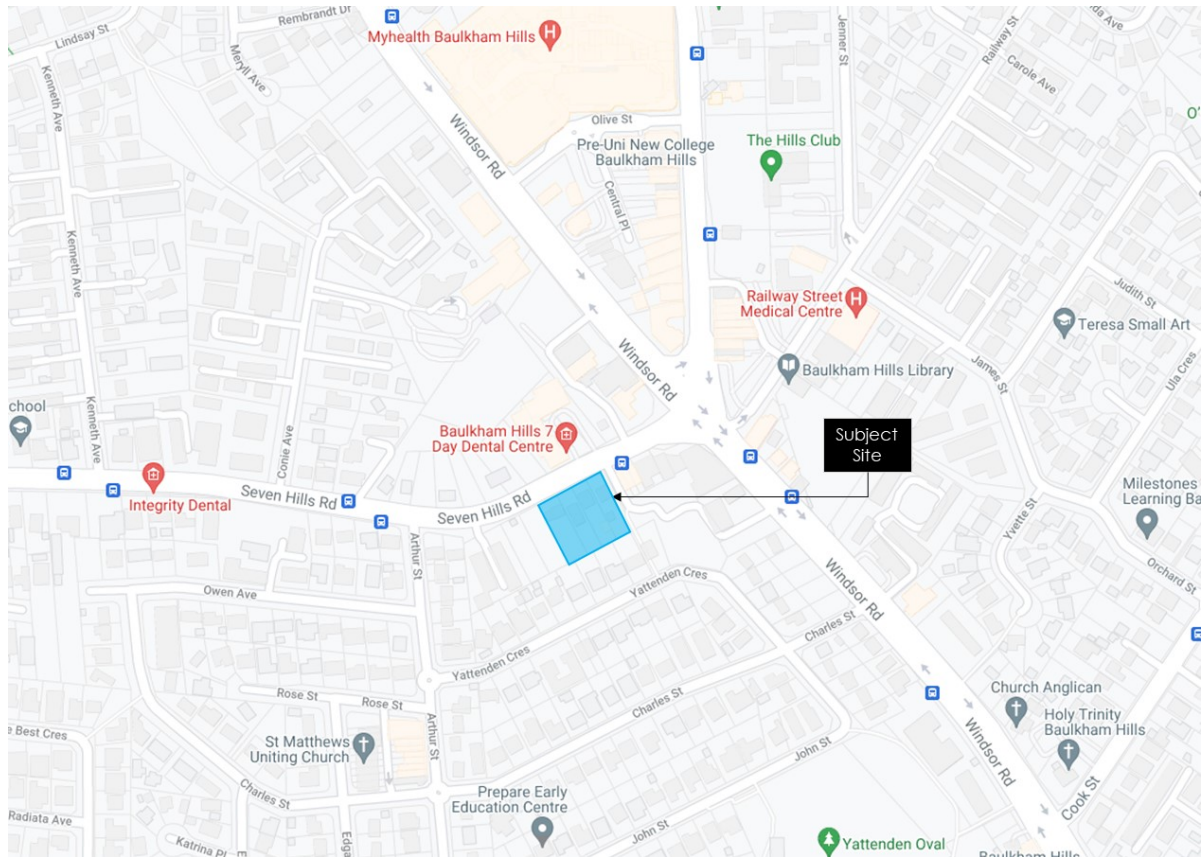
This traffic assessment is an addendum to the traffic statement prepared by TPPP (21118-L01V03-211007-Traffic Statement) associated with the proposed high density residential development at 10-16 Seven Hills Road, Baulkham Hills. The locality of the subject site is shown in Figure 1.

The Planning Proposal seeks an uplift from The Hills Shire Council's planning controls for the maximum allowable floor space area and gross floor area. This would result in an increase from 50 residential units to 66 residential units in the buildings. The development is located in Zone R4 where high density residential developments are permitted, but outside the boundary of Baulkham Hills town centre.

The proposed development includes a two-level basement car park with a vehicular access located on the south side of Seven Hills Road.

The traffic impact associated with the proposed development has been assessed in this addendum traffic assessment.

Figure 1: Locality Map



2. Objective

Council requested additional information to be provided (ref. letter dated 15 June 2022), that is traffic modelling at key intersections near the site with consideration given to nearby approved developments. The details from Council are provided in Figure 2.

Figure 2: Council's Request for Information

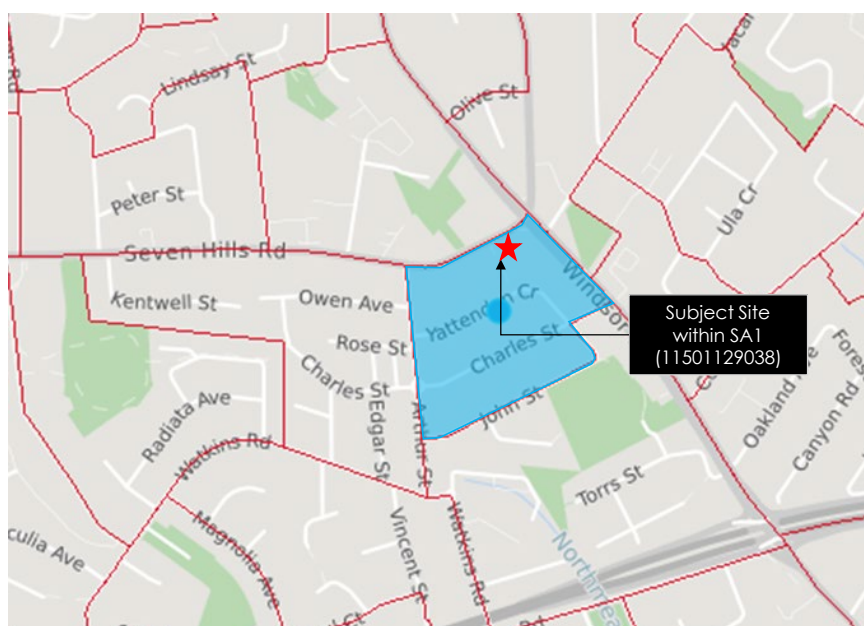
b) Traffic Modelling

The planning proposal is accompanied by a Traffic Report prepared by The Transport Planning Partnership. Further information should be provided detailing the impact of the proposed development on the Level of Service for nearby key intersections. This includes the signalized intersection of Arthur Street and Seven Hills Road, the roundabout at the intersection of Arthur Street and Yattenden Crescent and the key junction of Seven Hills Road, Windsor Road and Old Northern Road. Modelling should also consider the neighboring Moderna Apartments on the corner of Seven Hills Road and Windsor Road and the resultant traffic once this development is completed and occupied.

3. Existing Travel Patterns

Journey to Work (JTW) data from the Bureau of Transport Statistics (BTS), derived from the 2016 Census, has been obtained to understand existing transportation modes to and from the subject site located within SA1 (11501129038) as shown in Figure 3. It is noted that 2021 Census data is not available for mode of transport at this stage.

Figure 3: SA1 Usual Residence



A summary of the top destinations for employed residents from this SA1 is presented in Table 1.

Table 1: Top Work Destinations

Top Destinations for Workplace	Percentage
Baulkham Hills	29%
Parramatta	15%
Chatswood – Lane Cove	14%
Strathfield – Burwood – Ashfield	11%
Auburn	9%
Merrylands – Guildford	6%
Blacktown	6%
Fairfield	5%
Sydney Inner City	5%
Total	100%

Reference: Census 2016

A summary of the existing mode splits of transportation is presented in Table 2 for the associated SA1 and compared with those across Baulkham Hills referenced from with Profile.ID.

Table 2: Mode Share

Transport Mode	Mode Share at the Associated SA1	Mode Share Across Baulkham Hills
Train	0%	5%
Bus	36%	19%
Car (as driver or passenger)	61%	74%
Truck	0%	1%
Motorbike	0%	0%
Bicycle	0%	0%
Walk Only	3%	1%
Total	100%	100%

Reference: Census 2016 and Profile ID (<https://profile.id.com.au/the-hills/travel-to-work?WebID=110>)

Table 2 indicates 36% of the employed residents surrounding the subject site would take public transport to work while 61% would travel by cars. The uptake of public transport (36%) is considered high as it is located away from train stations, and it is also much higher than the figure across Baulkham Hills (24%).

Notwithstanding the above, the uptake of public transport is expected to have increased since 2016 with the operation of the Sydney Metro North West Line which provides frequent services between Tallawong and Chatswood, and direct connection at Epping and Chatswood stations to other train lines. Bus Routes 600 and 610X provide services between Old Northern Road (4 minute walk from the site) and Castle Hills Metro Station.

4. Existing Traffic Volumes

TTPP commissioned traffic movement counts at key intersections in the vicinity of the site on Tuesday, 21 June 2022 between 7:00am-9:00am and between 4:00pm-6:00pm.

The key intersections are:

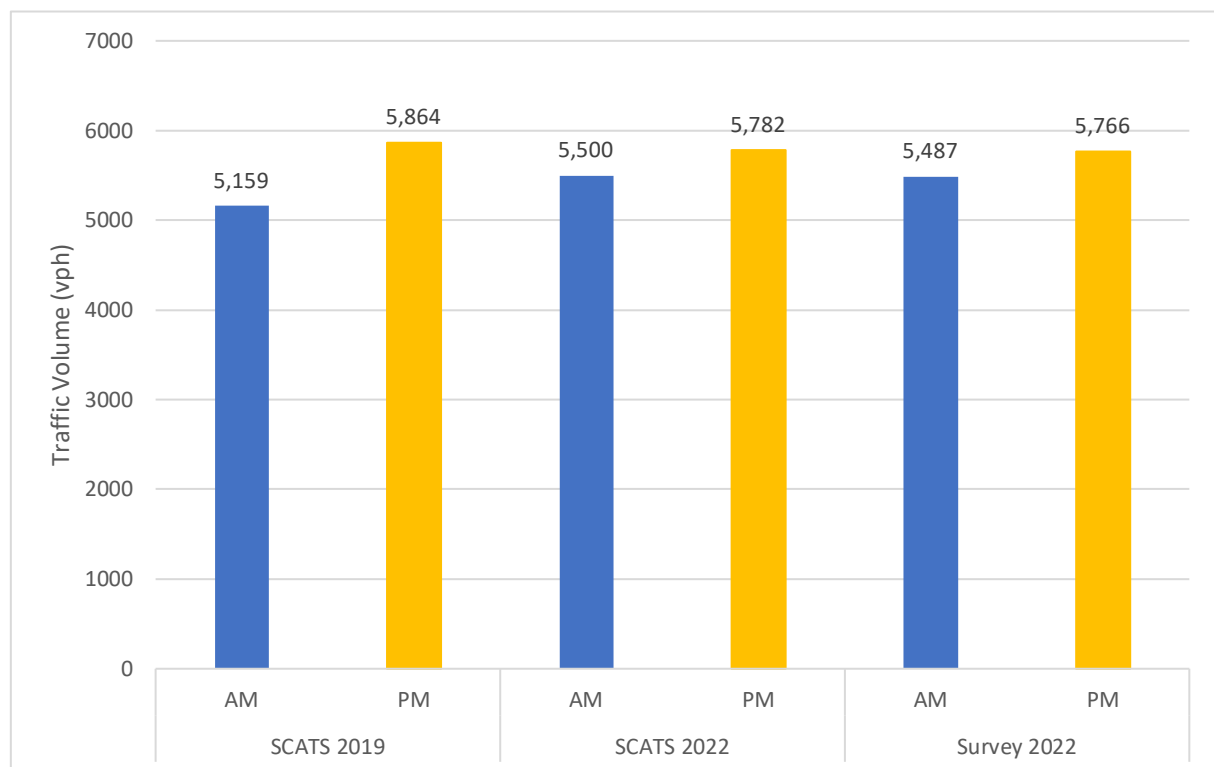
- Windsor Road – Seven Hills Road – Old Northern Road (traffic signals)
- Seven Hills Road – Arthur Street (traffic signals)
- Arthur Street – Yattenden Crescent (roundabout)

The weekday AM peak and PM peak hours are 8:00am to 9:00am and 4:45pm to 5:45pm respectively.

To confirm whether the surveyed traffic volumes collected in June 2022 have resumed to pre-covid conditions, TTPP has reviewed historical 2019 (pre-covid) SCATS count data to quantify the traffic fluctuation. SCATS traffic count data at the Windsor Road-Seven Hills Road-Old Northern Road intersection was obtained from TfNSW for a typical Tuesday in June 2019 and the same survey day on 21 June 2022.

Figure 4 shows the difference in the total traffic movement volumes at the Windsor Road-Seven Hills Road-Old Northern Road intersection between Year 2019 and Year 2022 for the weekday AM and PM peak hours.

Figure 4: Comparison of Total Traffic Volumes at the Windsor Road-Seven Hills Road-Old Northern Road Intersection in 2019 and 2022



From Figure 4, the SCATS 2019 data shows that there was a total traffic volume of 5,159 vehicles per hour (vph) in the AM peak and 5,864 vph in the PM peak at the Windsor Road-Seven Hills Road-Old Northern Road intersection.

The 2019 and 2022 SCATS data shows an increase of 341 vph during the AM peak and a decrease of 82 vph during the PM peak, indicating the traffic volume in the PM peak has not fully recovered to the year 2019 level. For consistency purposes, the SCATS 2019 and 2022 data was used to derive adjustment factors for each approach at each intersection respectively for the AM and PM peak hours.

Based on the above, the adjusted 2022 traffic volumes are shown in Figure 5 and Figure 6.

Figure 5: Adjusted Existing AM Traffic Volumes

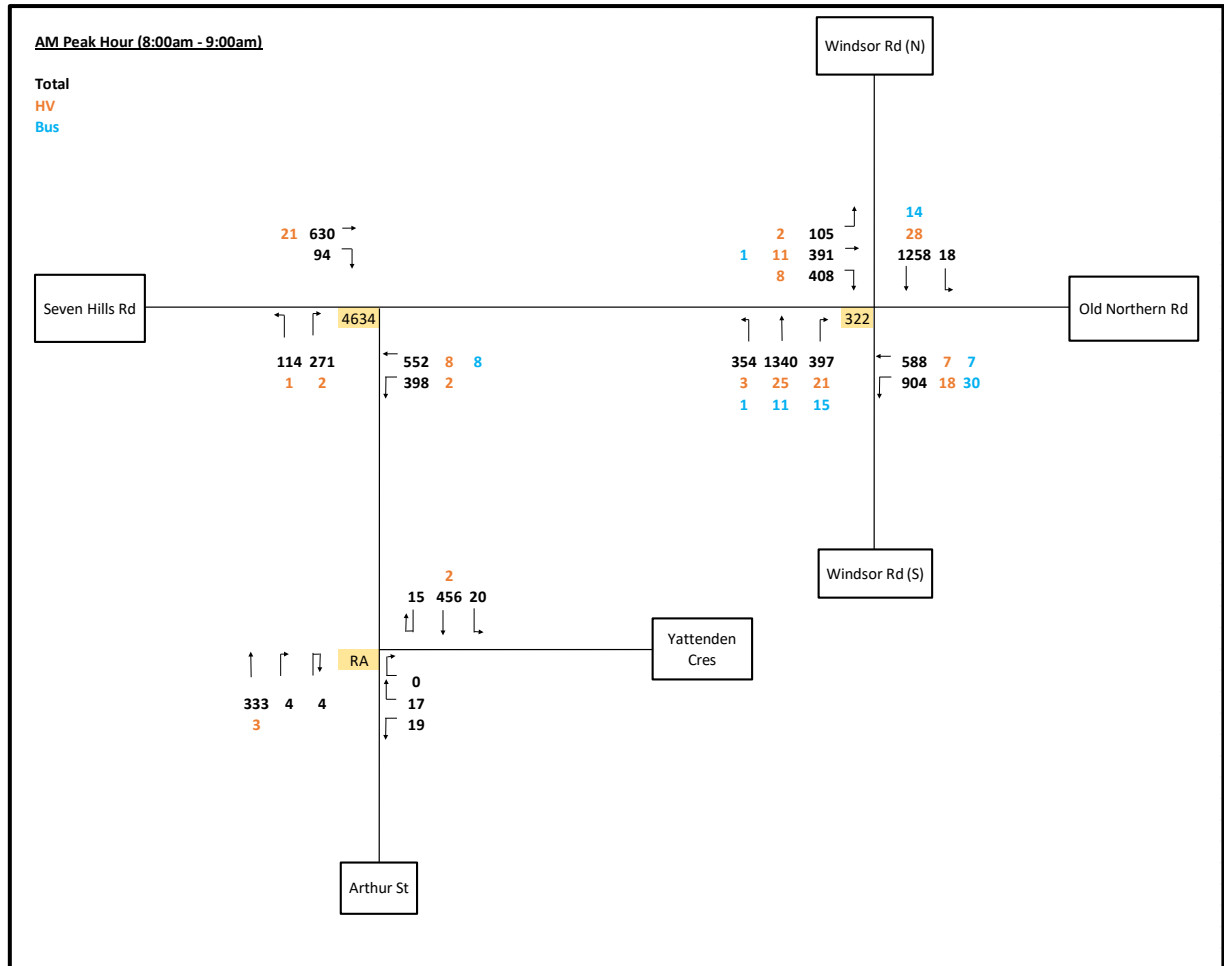
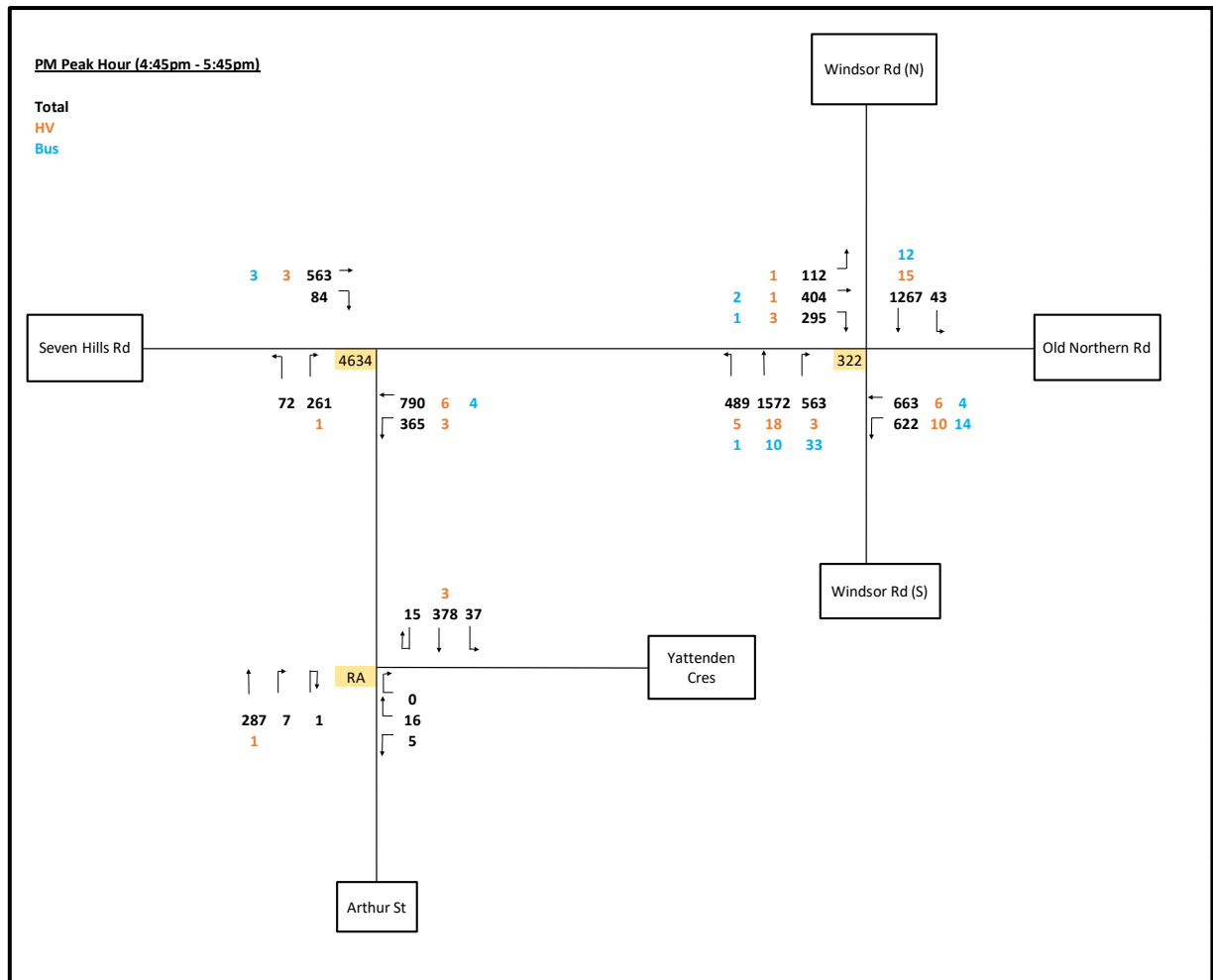


Figure 6: Adjusted Existing PM Traffic Volumes



5. Surrounding Approved Developments

A review of approved developments near the site was carried out as shown in Table 3. These developments are likely to share common vehicular routes with the subject DA, and thus, a cumulative traffic assessment was undertaken.

Table 3: Approved Developments

Development	Yield
2-4 Seven Hills Road, Baulkham Hills (Modena Apartments)	233 residential apartment units and 4,263m ² retail area
2-4 Old Northern Road, Baulkham Hills	44 residential apartment units, 591.5m ² retail area, 452m ² of commercial area

6. Traffic Impact Assessment

6.1 Existing Traffic Generation

The RMS Technical Direction TDT2013/04a has been the source for determining the traffic generation associated with the existing site.

There are currently four single dwelling houses at the subject site. Based on the RMS trip rates for low-density dwellings in urban areas, which is 0.95 trips per dwelling in the AM peak and 0.99 trips per dwelling in the PM peak, the existing dwellings are estimated to generate approximately four trips in each peak period.

6.2 Potential Traffic Generation of the Surrounding Approved Developments

The vehicle trips to be generated from the approved developments at 2-4 Seven Hills Road, Baulkham Hills (Modena Apartments) and 2-4 Old Northern Road, Baulkham Hills have been considered in the future base case in a cumulative traffic assessment.

The trip rates for 2-4 Old Northern Road, Baulkham Hills were obtained from the Varga Traffic Planning Traffic and Parking Assessment Report.

The DA traffic report for 2-4 Seven Hills Road, Baulkham Hills could not be obtained. Therefore, the trip generation has been estimated for the residential and retail components.

The high-density residential development is located at a distance greater than 800m from the closest train station or metro station. Typical traffic generation estimates for the approved high density residential development have been sourced from the RMS (now TfNSW) Guide to Traffic Generating Developments (2002), as follows:

- AM peak hour vehicle trips = 0.29 trips/ unit
- PM peak hour vehicle trips = 0.29 trips/ unit.

Based on site observations and driveway counts undertaken at the Modena Apartment on the same survey day (21 June 2022), it is understood that apartments are starting to be occupied. Based on the driveway counts, it is expected that the existing traffic volumes possibly involving residents, fitout workers and deliveries etc. recorded at the Yattenden Crescent driveway which is 10% of total potential traffic generation. This level of traffic generation is equivalent to 23 units out of 233 units for analytical purposes.

Trip generation rates for the retail component have been sourced from TfNSW's *Trip Generation Surveys – NSW Small Suburban Shopping Centres* report (November 2018). The following rates have been used based on the conversion of exponential models with the GLFA of the survey sites ranging from 1,000m² to 6,000m² for the AM and PM peak periods on Wednesday/ Thursday:

- AM peak hour: $0.066\text{GLFA} + 126$ during the morning peak hour
- PM peak hour: $0.089\text{GLFA} + 170$ during the afternoon peak hour.

Notwithstanding this, a 15% factor for the linked trips has been applied to retail traffic to account for those who live in the apartments above and are able to walk to the shops, and hence would not generate vehicular traffic.

The peak hourly trip generation associated with each of these developments has been summarised in Table 4.

Table 4: Potential Trip Generation of the Surrounding Approved Developments

Development	Land Use	Yield	Trip Rate		Trip Generation	
			AM Peak	PM Peak	AM Peak	PM Peak
2-4 Seven Hills Road, Baulkham Hills (Modena Apartments)	Residential	Approximately 210 unoccupied apartment units *	0.29 trips per unit	0.29 trips per unit	61 trips	61 trips
	Retail	4,263m ² (3,197.3m ² GLFA) **	$0.066\text{GLFA} + 126$ (with a 15% discount for linked trips)	$0.089\text{GLFA} + 170$ (with a 15% discount for linked trips)	286 trips	386 trips
2-4 Old Northern Road, Baulkham Hills	Residential	44 apartment units	0.19 trips per unit	0.15 trips per unit	8 trips	7 trips
	Retail	591.5m ²	1.6 trips per 100m ² GFA	1.2 trips per 100m ² GFA	10 trips	7 trips
	Commercial	452m ²			7 trips	5 trips

* Potential trip generation calculated for unoccupied units, estimated to be approximately 90% of total yield (i.e. 210 apartments)

** GLFA is 75% of GFA in accordance with the TfNSW Guide 2002

The surrounding developments are expected to generate a total of 372 trips in the AM peak hour and 466 trips in the PM peak hour.

6.3 Potential Traffic Generation of the Subject Development

The subject high density residential development is located at a distance greater than 800m from the closest train station or metro station. Typical traffic generation estimates for the proposed high density residential development have been sourced from the RMS (now TfNSW) Guide to Traffic Generating Developments (2002), as follows:

- AM peak hour vehicle trips = 0.29 trips/ unit
- PM peak hour vehicle trips = 0.29 trips/ unit.

A summary of the traffic generation estimate is shown in Table 5 for the proposed development. For the trips generated from the residential area, it has been assumed 20% of trips are inbound and 80% of trips are outbound in the AM peak hour, and these have been reversed in the PM peak hour.

Table 5: Traffic Generation Estimates and Net Increase

Design	Land Use	Yield	TfNSW Trip Rate		AM Traffic Generation		PM Traffic Generation	
			AM Peak	PM Peak	Inbound	Outbound	Inbound	Outbound
Existing	Low Density Residential	4 dwellings	0.95 trips per dwelling	0.99 trips per dwelling	1	3	3	1
Based on Council Planning Control	High Density Residential	50 units	0.29 trips per unit	0.29 trips per unit	3	12	12	3
Net Increase from existing traffic generation	-	-	-	-	2	9	9	2
Proposed Uplift	High Density Residential	+ 16 units	0.29 trips per unit	0.29 trips per unit	1	4	4	1
Net Increase from Planning Proposal	-	-	-	-	1	4	4	1
Total Development	High Density Residential	66 units	0.29 trips per unit	0.29 trips per unit	4	15	15	4
Net Increase from existing traffic generation					3	13	13	3

The development with a complying yield of 50 units is estimated to generate 15 trips in the AM and PM peak hours. This is a net increase of 11 trips in the AM and PM peak hours from the existing use of the site.

The proposed uplift with an increase of 16 units is estimated to generation an additional of 5 trips in the AM and PM peak hours from the complying yield of 50 units.

Overall, the proposed development of 66 units is estimated to generate 19 trips in the AM and PM peak hours, with a net increase of 16 vehicle trips in both AM peak and PM peak hours from the existing use of the site. This addendum assessed the traffic impact arising from 19 trips associated with the total traffic generation of the proposed development.

6.4 Traffic Distribution

Review of the Journey to Work data indicates the directional distributions of trips to/from the associated SA1 are shown in Table 6. It has been assumed a 10% shift of driving to the north to Castle Hill Metro Station for analytical purposes.

Table 6: Traffic Distribution

Route	Directional Split (Based on Census 2016)	Directional Split (with 10% Shift to Metro Station Located North of the Subject Site)
To/from north via Windsor Road	15%	15%
To/from north via Old Northern Road	15%	25%
To/from south via Windsor Road	48%	48%
To/from east via the M2 motorway	18%	8%
To/from west via the M2 motorway	2%	2%
To/from west via Seven Hills Road	2%	2%
Total	100%	100%

Reference: Census 2016

The traffic median on Seven Hills Road prevents right turn movements to/from the proposed car park access, and therefore a left-in left-out arrangement will be required at the car park access.

For vehicles accessing the site, eastbound vehicles are expected to travel via Seven Hills Road, turn right onto Arthur Street, turn left onto Yattenden Crescent, turn left onto Charles Street, turn left onto Windsor Road, turn left onto Seven Hills Road, and subsequently left turn towards the site. Vehicles coming from Windsor Road and Old Northern Road would directly turn left from Seven Hills Road towards the site.

All vehicles exiting the site would turn left onto Seven Hills Road. For those wishing to reach Windsor Road and Old Northern Road, they are expected to turn left onto Arthur Street, make a U-turn movement at the roundabout at the Yattenden Crescent intersection, turn right onto Seven Hills Road, and subsequently disperse to other roads at the Windsor Road intersection.

Figure 7 depicts distribution of the site traffic based on the above descriptions for the proposed development.

Figure 7: Traffic Distribution



6.5 STFM Traffic Growth

The Sydney's Strategic Travel Forecast Model (STFM) provided by TfNSW is a strategic transport planning model that considers population and employment growths and is used for high level of assessment of major infrastructure proposals, transport strategies and policy decision making.

The STFM provides future year traffic volumes to determine the relative traffic growth between baseline traffic and future year traffic conditions.

These rates have been adopted to determine the future base traffic volumes.

6.6 SIDRA Modelling

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION 9 (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 7 shows the criteria that SIDRA adopts in assessing the level of service.

Table 7: SIDRA Level of Service Criteria

Level of Service (LoS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode.
F	Greater than 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode or major treatment

Reference: TfNSW Traffic Modelling Guidelines 2013, Table 14.4

Assessed Scenarios

The following scenarios have been considered to assess the potential traffic impact of the proposed development on the surrounding road network:

- Scenario 1 (S1): 2022 Existing Base Case including the Modena development (partially occupied)
- Scenario 2 (S2): 2032 Future Base Case with background traffic growth, the Modena development (completely occupied) and 2-4 Old Northern Road development (completely occupied)
- Scenario 3 (S3): Scenario 2, plus the development traffic

Modelling Results

A summary of the traffic modelling results of the intersections in each scenario is presented in Table 8.

Table 8: SIDRA Modelling Results

Scenario	Intersection	AM Peak		PM Peak	
		Delay (s)	LoS	Delay (s)	LoS
Existing Base (S1)	Windsor Road – Seven Hills Road – Old Northern Road	50	D	67	E
	Seven Hills Rd – Arthur Street	28	B	25	B
	Arthur Street – Yattenden Crescent	11	A	10	A
Future Base (S2)	Windsor Road – Seven Hills Road – Old Northern Road	57	E	84	F
	Seven Hills Rd – Arthur Street	29	C	37	C
	Arthur Street – Yattenden Crescent	12	A	11	A
Future + Development (S3)	Windsor Road – Seven Hills Road – Old Northern Road	60	E	86	F
	Seven Hills Rd – Arthur Street	31	C	37	C
	Arthur Street – Yattenden Crescent	12	A	11	A

In Scenario 1, the Windsor Road – Seven Hills Road – Old Northern Road intersection is operating at capacity at level of service (LOS) D in the AM peak and is operating over capacity at LOS E in the PM peak. The Seven Hills Road – Arthur Street intersection and the Arthur Street – Yattenden Crescent intersection are operating satisfactorily at LOS B and A respectively in both AM and PM peaks.

In Scenario 2 for year 2032 base case, modelling results indicate that the Windsor Road – Seven Hills Road – Old Northern Road intersection would operate over capacity in Year 2032 due to the increase in background traffic of the surrounding area and when the nearby future developments are fully occupied, regardless of the proposed development. The intersection would experience an increase in delay of 7 seconds and operate from LOS D to LOS E in the AM peak, and further increases in delay in the order of 17 seconds and operate from LOS E to LOS F in the PM peak, regardless of the proposed development. Average delay at the Seven Hills Road – Arthur Street intersection is expected to increase by 1 second in the AM peak and 12 seconds in the PM peak. The performance levels of the Arthur Street – Yattenden Crescent intersection would maintain with minimal increase in delay.

In Scenario 3, the additional traffic generated from the proposed development is anticipated to slightly increase the average delay of the Windsor Road – Seven Hills Road – Old Northern Road intersection by 3 seconds in the AM peak and 2 seconds in the PM peak. The performance levels of the intersection would continue to operate at LOS E in the AM peak and LOS F in the PM peak. The Seven Hills Road – Arthur Street intersection and Arthur Street – Yattenden Crescent intersection would experience little to no change in delays and maintain the same level of service as Scenario 2.

Hence, the proposed development which would generate in the order of 20 vehicle trips (or a net increase of 9 vehicle trips from the complying yield) in both AM and PM peak hours is not anticipated to impose any adverse traffic impact on the surrounding road network.

7. Summary and Conclusion

The Transport Planning Partnership (TPPP) has prepared this traffic assessment to provide response to comments provided by The Hills Shire Council on 16 June 2022.

Traffic modelling results indicate that the Windsor Road – Seven Hills Road – Old Northern Road intersection is anticipated to operate over capacity in Year 2032 due to the increase in background traffic of the surrounding area to the site. The additional traffic generated by the proposed development is not considered to impose any adverse impact on the road network.

The traffic implications on the Seven Hills Road – Arthur Street intersection and the Arthur Street – Yattenden Crescent intersection are considered to be minimal and continue to operate at satisfactory level of service.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,



Ken Hollyoak
Director