

Attachment A15

**Footpath Analysis, Pedestrian Activity,
Comfort Assessment**

Mirvac

55 Pitt Street

55 Pitt Street Footpath Analysis

Report Ref

Issue 3 | 13 December 2019

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Introduction

Mirvac plans to develop a new commercial tower in Sydney's Circular Quay. The tower, located at 55 Pitt Street, will consist of commercial office spaces with retail frontages at the lower levels. The City of Sydney Guidelines for Site Specific Planning Proposals in Central Sydney require that a Pedestrian Comfort Levels (PCL) assessment following the Transport for London (TfL) Pedestrian Comfort Guidance document be undertaken for new developments in the Sydney CBD.

Arup have been appointed by Mirvac to undertake the pedestrian activity and comfort assessment of the footpaths adjacent to the new development at 55 Pitt Street, as outlined in Transport for London's PCL assessment tool. The objective of the assessment is to understand existing and future pedestrian flows and behaviour on the footpaths adjacent to the proposed development. TfL's PCL tool requires that pedestrian activity and movement on footpaths and formal crossings be assessed under existing conditions. No mention is made of assessment of future year scenarios. Given that the aim of the assessment is to understand the impact of the development on the footpaths, the performance of the footpaths has been evaluated for the future year of 2025, before and after the development is open. The following three scenarios have therefore been assessed, for both the AM and PM commuter peaks:

1. **2019 Existing:** Existing conditions based on recorded observations and 2019 surveyed flows
2. **2025 No Development:** Future 2025 performance including background growth due to employment
3. **2025 With Development:** Future 2025 performance including background growth due to employment and the net impact of the development at 55 Pitt Street

The PCL guide requires that only formal signalised crossing be assessed. As there are no formal crossings located in the study area, pedestrian crossings have not been evaluated as part of the assessment.

The assessment has involved undertaking qualitative observations of pedestrian flows and behaviours on footpaths, as well as pedestrian count surveys on footpaths fronting the block and adjacent, including Pitt Street, Underwood Street, Underwood Lane and Dalley Street. These observations and counts support an understanding of the different activities that typically occur on these footpaths and the impact of these activities to movements along the footpath.

The observations, combined with survey data that has recorded the volume of pedestrian movements in both directions along the footpaths have informed the recommendations of the study.

2 Study Area

The study area, situated near Circular Quay, is outlined in Figure 1. 55 Pitt Street is part of a larger office/commercial block and is highlighted in blue. The footpaths assessed as part of this study are shown in pink. Given that the surrounding land use in the area is primarily commercial, the site has been classified as “Office and Retail” under the PCL area categories.



Figure 1: Study Area

2.1 Proposed Development

The indicative street level plan for the proposed development is shown in Figure 2. The proposal includes a new through-site link between Dalley Street and Underwood Street. The colonnade feature on Pitt Street of the existing building is not replicated in the proposed building. However, the through-site link will be fronted with some ground floor retail and areas for pedestrians to sit and congregate, similar to that currently being provided by the colonnade area on Pitt Street. A colonnade feature is proposed on Underwood Street, with seating as per the indicative plan. No seating is proposed along Pitt Street.



Figure 2: Indicative plans for the proposed lobby level

3 Existing Pedestrian Movements

To quantify and understand the different activities occurring in this space at different times of the day, data on the activities occurring on the footpath has been collected in two ways:

1. Pedestrian surveys counting the number of people moving along the footpaths adjacent to the site; and
2. Observations of pedestrian behaviour on the footpaths adjacent to the site.

As the area surrounding 55 Pitt Street is predominantly office/commercial with small amounts of retail (service industry), TfL's "office and retail" categorisation was used to determine the survey hours for the study. Survey data was therefore gathered for the AM peak (8am – 10am) and PM peak (4pm – 7pm) on Thursday 25 July 2019.

3.1 Survey Data

Survey data was collected for the footpaths shown in Figure 3.

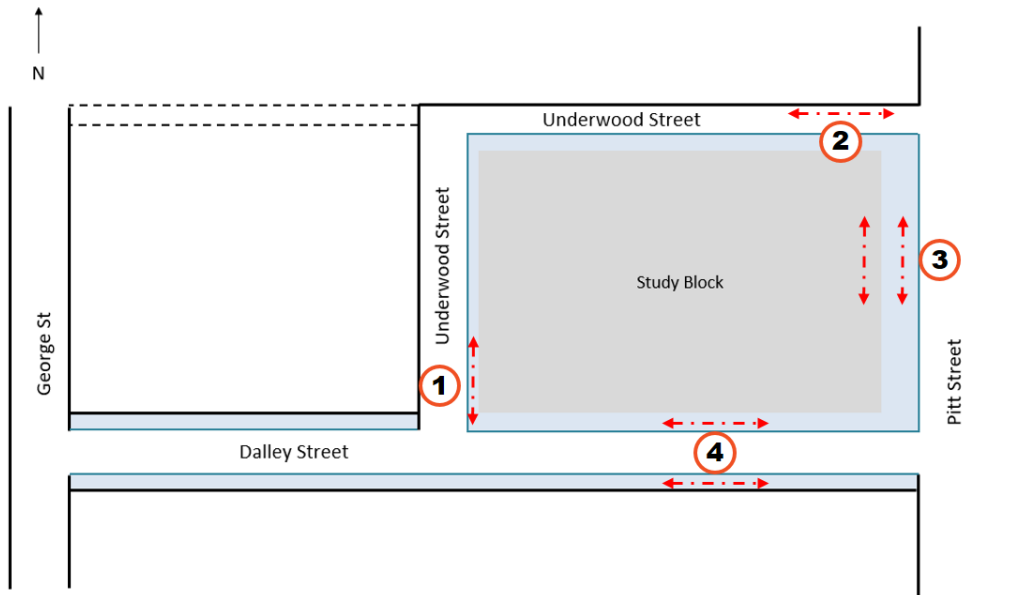


Figure 3: Pedestrian movement surveyed locations

The graph in Figure 4 shows the total counted movements during the 2-hour survey in the AM peak. Figure 5 shows the total counted movements for the 3-hour PM peak survey. Both graphs indicate that Pitt Street was found to be the busiest street out of all the surveyed streets.

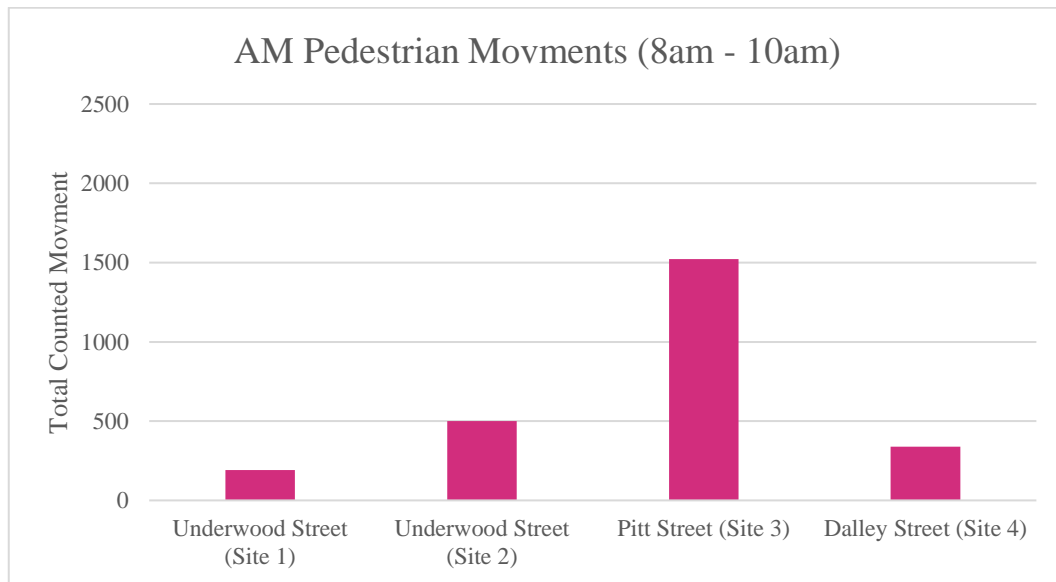


Figure 4 Total pedestrian movements, AM peak

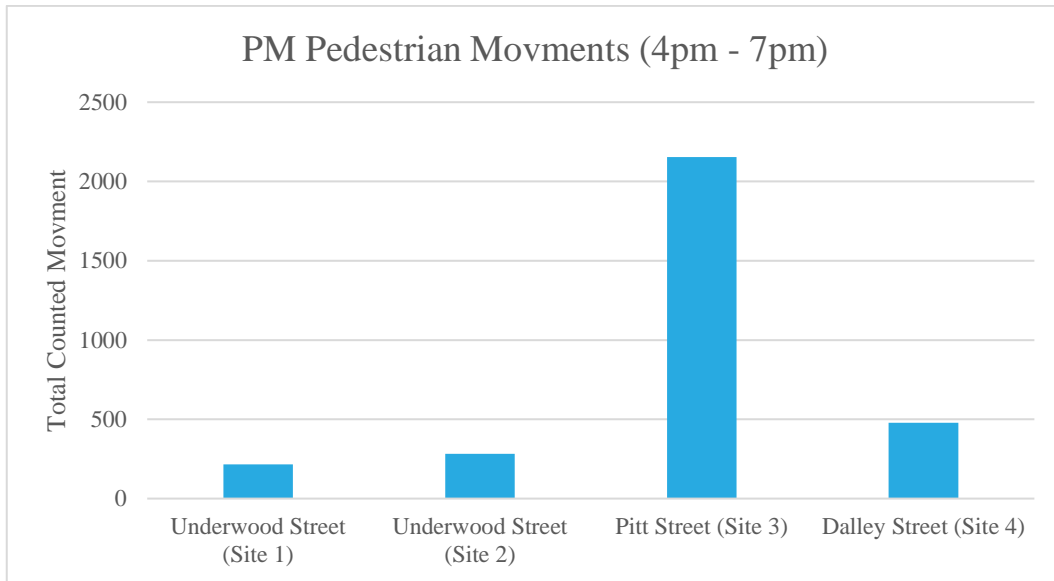


Figure 5: Total pedestrian movements, PM peak

Figure 6 shows the AM peak survey data split into 5-minute segments. The profile indicates that the 08:25 – 08:30 time period is busiest for pedestrian movement along the Pitt Street footpath. Figure 7 shows the profile for the PM peak, which shows that 17:15 – 17:20 is the busiest time period for the PM peak.

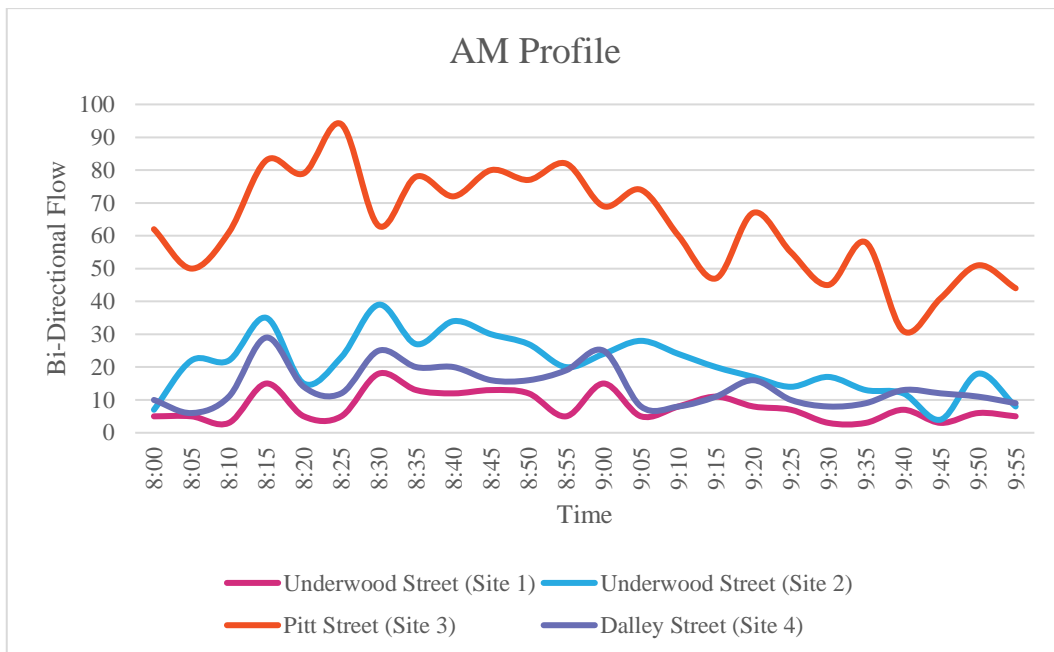


Figure 6: AM peak profile (8am – 10am)

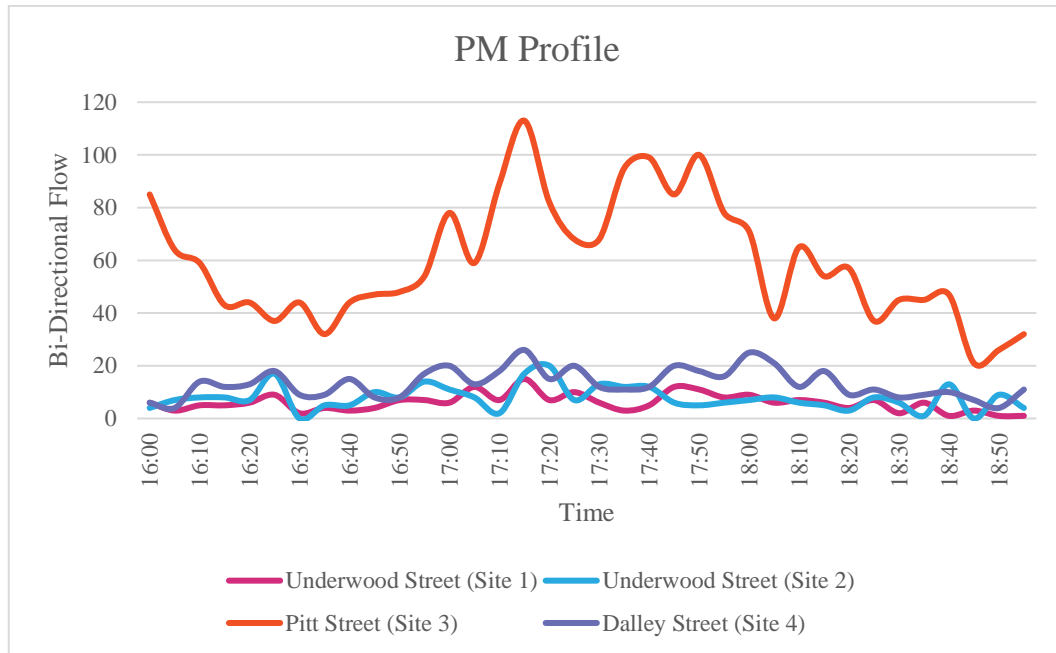


Figure 7: PM peak profile (4pm – 7pm)

3.2 Site Observations

Observations of pedestrian movements and behaviour for the footpaths and streets within the study area were also undertaken for the AM and PM commuter peak periods. The key findings of the observations are summarised in this section.

3.2.1 Pitt Street

Pitt Street, which is a main north-south thoroughfare connecting Circular Quay to the CBD, saw the most pedestrian activity out of the surveyed streets. The presence of the Underwood lane café on the corner of Pitt Street and Underwood Street drew some stationary activity. Activity in the morning was primarily people standing in line/waiting for takeaway coffee and food, and then subsequently walking away. The tables and seating provided along the café front, were not observed to be occupied, as demonstrated by the photo in Figure 8.



Figure 8: Corner Underwood lane Café in the morning

It is important to note the existing 37 Pitt Street building has a colonnade parallel to the footpath. The colonnade is on private land, next to the public footpath. Most people were observed to use the outside public footpath for commuting whereas the colonnade was used by people for building access and to engage in retail activity.

Stationary activity was observed to generally occur within the private colonnade area with people primarily queuing and waiting for grab and go services. Figure 9 shows these two areas and how stationary and movement activities seemed to naturally segregate themselves into these areas.



Figure 9: Colonnade area and open walkway

While the activity from the café could potentially spill over to the open walkway and cause interference with pedestrian movement on the public footpath, it was observed on the day that most of the stationary activities kept to the private colonnade area (shown in green in Figure 9). Therefore, stationary pedestrian activity on Pitt Street was not observed to impact northbound and southbound movements along the main public footpath. Site observations therefore indicate that the footpath and colonnade are functioning as expected, with the footpath being used for northbound/southbound pedestrian movements and the colonnade being used for retail activity and building access.

Street furniture along the Pitt Street footpath was generally towards the kerb edge and consisted of trees, street poles, parked bicycles, utility boxes and parking metres, sometimes reducing the effective footpath width.

It was observed that occasionally people walked in groups/formed groups taking up additional width on the footpath, this was more apparent in the evening where people were likely engaging in after-work events as groups.

Stationary activity associated with the café was not present during the PM peak as the café closes by 4pm and tables and chairs were moved off the sidewalk. Small numbers of people were observed to use both sides of Pitt Street for pick-up/drop-off activities (rideshare in particular). Overall, the evening peak was observed to be much less busy than the morning peak.

In both peak periods people were seen to informally cross both sides of Pitt St street, this activity being more noticeable during the PM peak. Most people were observed to cross the street at the Pitt/Underwood Street intersection.

3.2.2 Underwood Street

Underwood Street is a one-way westbound street with its entrance via Pitt Street. Currently the 33 Pitt Street building is under construction and walled off so that the only footpath is the continuation of the undercover colonnade from 35 Pitt Street, as photographed in Figure 10.



Figure 10: Entrance of Underwood Street (viewed via Pitt Street)

Towards the west end of Underwood street is the basement entry for 200 George Street which facilitates access to the car park, deliveries and bicycle parking.

Pedestrians walking along Pitt Street who informally cross Underwood Street were seen to do so without much hinderance as there was usually a continuous flow of people crossing Underwood Street and low volumes of traffic entering Underwood Street during both the morning and evening peaks.

Underwood Lane has café seating within the colonnade that continues along Underwood Street (see Figure 11). Further along there are more retail businesses which display advertising sandwich board signs on the footpath (Figure 12). It was observed with the low levels of vehicle traffic, pedestrians on Underwood Street often chose to walk freely on the road carriage itself, as shown in Figure 12. In other words, Underwood Street largely functions as a laneway providing access to local buildings. As such, Underwood Street could be considered a pedestrian priority zone. During the PM period, fewer cars were observed to use Underwood Street.



Figure 11: Underwood Street colonnade



Figure 12: Advertising signs along Underwood Street colonnade

Underwood Street continues westwards to reach a set of stairs that provide thoroughfare to George Street. After this point, Underwood Street turns south and terminates at Dalley Street. Most people going to/coming from Pitt Street were observed to use the stair connection to access George Street, with some pedestrians observed to continue the length of Underwood Street onto Dalley Street.



Figure 13: Stair connection to George Street from Underwood Street

3.2.3 Dalley Street

Dalley Street is a two-way street connecting Pitt Street with George Street. There are footpaths on both sides however they are quite narrow (1m – 1.3m in width) and frequently have obstructions along them, such as garbage bins, signs, parking meters etc.

The footpath on the north side of Dalley St towards George Street ends abruptly because of the new building being constructed on the site of 2 Dalley Street.

Dalley Street was not observed to be very busy in the morning survey period in comparison to Underwood Street, with people infrequently using this connection. The evening survey period saw that Dalley Street become more active than in the morning, with higher volumes of people using this connection than Underwood Street in the evening.

People were observed to occasionally walk on the road carriageway on Dalley Street because of the obstructions on the footpath, narrow footpath widths and low traffic volumes.



Figure 14: Dalley Street facing towards George Street

3.3 Existing Footpath Dimensions

Footpath widths were measured during site observation which occurred on the same day as the pedestrian count survey, Thursday 25 July 2019. The diagram in Figure 15 shows the approximate locations where the footpaths were measured.

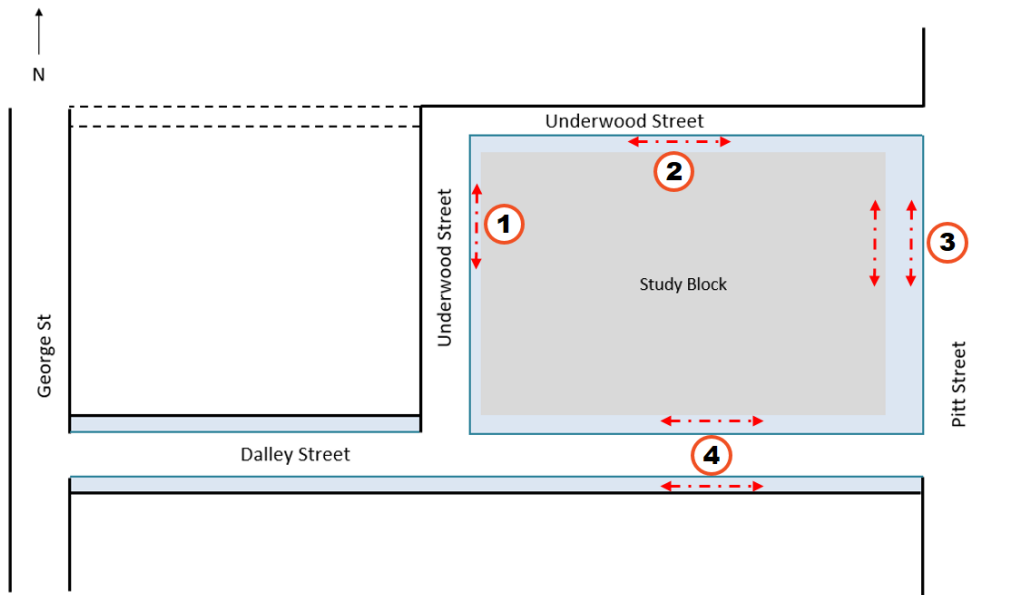


Figure 15: Approximate locations of measured footpath widths

The footpaths in the study are a mix of public footpaths and footpaths on private land. The footpaths on Underwood Street North and Pitt Street within the colonnades are on private land while the remainder of the footpaths as part of this assessment are on public land.

Table 1 provides a summary of measurements. The edge to edge width was measured to be the minimum unobstructed footpath width for each street section (this could be building to column or to street tree for example). It is worth noting that the PCL guidance recommends that a minimum footpath provision of 1.5m be provided. Given this recommendation, the recorded widths in Table 1 would show that footpath provision for Dalley Street is insufficient in so far as the PCL guidance is concerned.

Site	Location	Edge to Edge Width (m)
1	Underwood West / Public	3.0
2	Underwood North / Private	2.0
3	Pitt (West footpath) / Public	2.5
3	Pitt (undercover colonnade) / Private	3.0
4	Dalley (South footpath) / Public	1.3
4	Dalley (North footpath) / Public	1.0

Table 1: Summary of recorded footpath widths

Appendix A1 provides reference pictures of where footpath measurements made as well as detailing the context of those measurements.

4 Assessment Approach, Assumptions & Methodology

A spreadsheet-based assessment has been undertaken to evaluate the performance of the footpaths based on a combination of the surveyed flows and recorded observations. Three scenarios have been assessed:

1. **2019 Existing:** Existing conditions based on recorded observations and 2019 surveyed flows
2. **2025 No Development:** Future 2025 performance including background growth due to employment
3. **2025 With Development:** Future 2025 performance including background growth due to employment and the net impact of the development at 55 Pitt Street

The three scenarios detailed above have been assessed for both the AM and PM peak periods.

4.1 Analysis Methods

To assess the suitability of the footpaths in accommodating current and future pedestrian flows, two forms of static analysis have been undertaken based on:

1. Fruin Level of Service thresholds and;
2. Transport for London’s “Pedestrian Comfort Guidance for London”.

These two approaches have been adopted to ensure the recommendations developed are robust and so that all available analysis methods have been fully considered by the assessment.

The Fruin approach have adopted the following key assumptions which were used in calculating clear footpath widths;

- Standard edge effects of 300 mm
- Friction Effect 150mm

The TfL Pedestrian Comfort Guidance for London document assumes there is

- Buffer/Edge effects of 200 mm applied to kerb, building edges and furniture edges

4.1.1 Method 1: Fruin Level of Service

The concept of Fruin Level of Service (LoS) was developed by John J Fruin in the late 1970s. Fruin is the recognised international standard for measuring the performance of pedestrian movement in urban areas and is widely used today in pedestrian planning analysis and design. Fruin devised six different Level of service bands ranging from LoS A to LoS F. These are summarised in Figure 16.

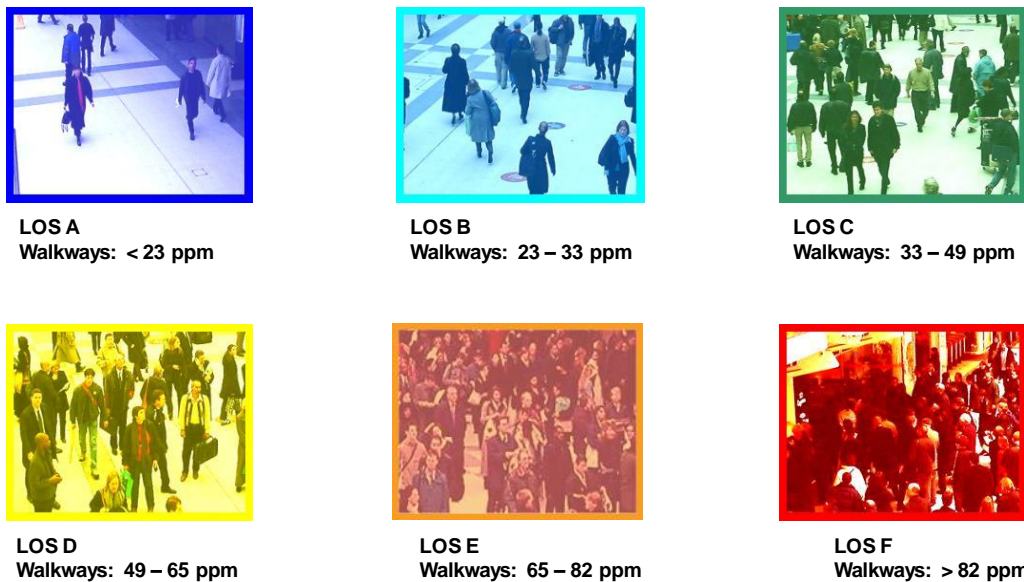


Figure 16: Fruin Level of Service

LoS A represents free flow movement conditions with LoS F representing a complete breakdown of pedestrian flow. For an urban commercial area like the

Pitt Street footpath, some busyness is to be expected and a flow rate of 41 people/minute/metre (midpoint of LoS C) has been adopted as the target metric.

4.1.2 Method 2: Passenger Comfort Level (Transport for London)

The “Pedestrian Comfort Guidance for London” has been developed by Transport for London (TfL) to assist those planning London’s streets in helping to provide an attractive and comfortable experience for pedestrians on footpaths. The guide identifies five different types of street categories: High Street, Office and Retail, Residential, Tourist Attraction and Transport Interchange. The footpaths analysed as part of this work has been categorised as Office and Retail given the area is dominated by commercial office buildings.

Figure 17 and Figure 18 show the different PCLs identified in the guidance document. The guidance states that PCL C+ is the maximum flow that would be categorised as “acceptable” for footpaths in an Office and Retail area, with PCL C– being categorised as “at risk”. PCL C+ is equivalent to a maximum flow rate of 20 people/minute/metre (see Figure 17). The guidance is silent on the categorisation of the PCL C rating, which is equivalent to a maximum flow rate of 23 people/minute/metre. A PCL C rating could therefore be deemed to be “borderline acceptable”.

The PCL guidance recommends that all footpaths be a minimum of 1.5m in width, regardless of the level of pedestrian activity. Where footpath provision of less than 1.5m is provided, the PCL tool automatically assigns a performance level of PCL E to the footpath, and that the footpath provision is inadequate, even if a static assessment shows flows on the footpath to be within the recommended PCL range. Given that surveyed flows show Dalley Street to have low volumes of pedestrian flow, the static analysis has for the moment disregarded the minimum footpath requirement. The approach of disregarding the minimum width requirement has been adopted so that the performance of the footpath based on recorded pedestrian activity can be estimated and understood.



Figure 17: Pedestrian Comfort Levels on Footways (Transport for London)

	HIGH STREET		OFFICE AND RETAIL		RESIDENTIAL		TOURIST ATTRACTION		TRANSPORT INTERCHANGE	
	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max
A	COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE	
B+	COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE	
B	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	
B-	AT RISK		ACCEPTABLE		ACCEPTABLE		AT RISK		ACCEPTABLE	
C+	UNACCEPTABLE/ UNCOMFORTABLE		ACCEPTABLE		AT RISK	AT RISK	UNACCEPTABLE/ UNCOMFORTABLE		ACCEPTABLE	
C-	UNACCEPTABLE/ UNCOMFORTABLE		AT RISK	AT RISK	UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		AT RISK	AT RISK
D	UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE	
E	UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE		UNACCEPTABLE/ UNCOMFORTABLE	
	Peak and Average of Maximum Activity levels have similar guidance as people visiting retail areas stated they were particularly sensitive to crowding.		The "at risk" level is set at a lower PCL during the Average of Maximum Activity than peak flows. This is because of the greater number of single travellers and the short duration of maximum activity.		The "at risk" level is set at a lower PCL than peak flows in Residential Areas to reflect the short time this is likely to occur. A site visit to Residential sites is particularly important to check if there is school activity or a bus stand in the area.		Peak and Average of Maximum Activity levels have similar guidance as people visiting tourist areas are likely to be particularly sensitive to crowding		The "at risk" level is set at a lower PCL during the Average of Maximum Activity than peak flows. This is because of the greater number of single travellers and the short duration of maximum activity.	

Figure 18: Guidance for different area types (Transport for London)

4.2 Analysis Assumptions

The following assumptions have been adopted in both analysis methods:

- Peak 5-minute flows have been used in the assessment. The peak minute flow has been calculated by dividing the peak 5-minute flow by 5 i.e. a flat profile has been assumed within the peak 5 minutes.
- A growth rate of 1.4% per annum has been assumed to estimate flows on the footpaths in 2025. The 1.4% per annum growth rate has been estimated based on projected employment figures from Transport for NSW’s Travel Zone Projection 2016, version 1.51 for the travel zone within which 55 Pitt Street is located.
- A building occupancy rate of 85% was assumed to represent the proportion of office workers who would commute to the office on an average day. Adopting an 85% occupancy rate will account for the fact that due to flexible working hours, work from home arrangements, out of client meetings etc. a building is typically expected to be only part occupied on average workday, meaning resulting commuting work trips in both AM and PM peaks will follow this pattern.

- The uplift in population as a result of the proposed development was applied to the recorded profile of movements for the AM (8am-10am) and PM (4pm-7pm) peaks respectively.

5 Analysis & Results

5.1 2019 Existing

Table 2 presents the results of the AM assessment and Table 3 presents the results of the PM assessment. The results show that during both peaks, both the PCL and Fruin LoS are within acceptable levels, with all assessed footpaths performing at Fruin LoS A or PCL B+ or better. Given that non-commuting static pedestrian activity (i.e. retail transactions, waiting, etc.) was noted to primarily occur on Pitt Street, and that this activity primarily happened under the covered colonnade, the current footpath provision seems to be adequate to cater to the pedestrian flows in the area.

Location	AM Peak 5-minute flow (ppl/5-min)	AM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	18	3.6	2.2	A+	2.25	A
Underwood Street North	39	7.8	1.6	A	1.25	A
Pitt Street (outer footpath)	65	13	2.1	A-	1.75	A
Pitt Street (undercover colonnade)	33	6.6	2.6	A+	2.25	A
Dalley Street (Southern Footpath)	8	1.6	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	21	4.2	0.8	A-	0.25	A

Table 2: 2019 Existing, AM Analysis Results

Location	PM Peak 5-minute flow (ppl/5-min)	PM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	15	3	2.2	A+	2.25	A
Underwood Street North	20	4	1.6	A+	1.25	A
Pitt Street (outer footpath)	86	17.2	2.1	B+	1.75	A
Pitt Street (undercover colonnade)	29	5.8	2.6	A+	2.25	A
Dalley Street (Southern Footpath)	12	2.4	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	14	2.8	0.8	A	0.25	A

Table 3: 2019 Existing, PM Analysis Results

5.2 2025 No Development

Flows on the footpaths for the 2025 No Development scenario were estimated by applying a 1.4% per annum growth to the flows recorded in the 2019 survey. Table 4 presents the results of the AM assessment and Table 5 presents the results of the PM assessment. The results show that during both peaks, both the PCL and Fruin LoS are within acceptable levels, with all assessed footpaths performing at Fruin LoS A or PCL B+ or better. Therefore, footpath provision in the future year 2025 No Development scenario is adequate for the estimated flows.

Location	AM Peak 5-minute flow (ppl/5-min)	AM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	20	4	2.2	A+	2.25	A
Underwood Street North	42	8	1.6	A-	1.25	A
Pitt Street (outer footpath)	71	14	2.1	A-	1.75	A
Pitt Street (undercover colonnade)	36	7	2.6	A+	2.25	A
Dalley Street (Southern Footpath)	9	2	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	23	5	0.8	A-	0.25	A

Table 4: 2025 No Development, AM Analysis Results

Location	PM Peak 5-minute flow (ppl/5-min)	PM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	16	3	2.2	A+	2.25	A
Underwood Street North	22	4	1.6	A+	1.25	A
Pitt Street (outer footpath)	93	19	2.1	B+	1.75	A
Pitt Street (undercover colonnade)	32	6	2.6	A+	2.25	A
Dalley Street (Southern Footpath)	13	3	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	15	3	0.8	A	0.25	A

Table 5: 2025 No Development, PM Analysis Results

5.3 2025 With Development

To understand the impact of the proposed development to flows on the adjacent footpaths, the total number of additional trips to the building must be estimated. To do so, the additional population of the tower was calculated, based on the estimated NLA's and density occupancies of the existing and proposed developments, as outlined in Table 6. The table shows, that the proposed development caters to 4,393 additional employees compared to the existing building.

Development	Approximate NLA (m ²)	Density	Population
Existing	22,500	1:14	1,607
Proposed	60,000	1:10	6,000
Difference			4,393

Table 6: Estimated populations of the existing and proposed developments

Plans of the proposed office lobby (see Figure 19) indicate that there are two entrances to the lobby: one on the corner of Pitt and Underwood streets and one on Pitt Street. Given that the lobby will have two entry points, the direction of approach of people arriving to the building lobby will need to be estimated so that pedestrians can be apportioned to the adjacent footpaths.



Figure 19: Indicative plans for the proposed building and entrances

5.3.1 Mode Share & Approach

Transport mode share for the site was calculated based on analysis of Census Journey to Work 2016 dataset for destination zones (DZN) 113371025 and 113371026.

Incoming work trips to these zones were analysed and the resulting mode share is summarised in Table 7. It is evident that public transport accounts for most trips made to the study area.

Mode	Percent of work trips made to study area
Train	53.1%
Bus	21.3%
Vehicle driver	11.1%
Ferry	6.2%
Walked only	4.9%
Other	3.4%

Table 7: Journey to Work mode share for study area

A high-level public transport route assessment was applied to approximate the different approaches public transport users would typically take towards the study area. 55 Pitt Street is approximately located between Wynyard Station and Circular Quay Station both of which are approximately 5 minutes' walk away. There are also several bus stops surrounding the area as shown in Figure 20.

Annual station Opal data counts were used to approximate what proportional split of commuters from the site would walk to/from either Circular Quay or Wynyard Station (represented by north and south Pitt Street approach).

Other modes were also given rough approximate directionality, such as Ferry (100% north) and Bus and walking (50/50 split). In summary of all public transport modes, it was found the split between commuters to the study area from the North and South approach is expected to be 37% and 63% respectively. These directional factors were used to split the total increased pedestrian flows originating from the new development, meaning people 37% of new trips associated with the development would connect with the study area from the north and 63% from the south. These approaches to the building entrances are illustrated in Figure 21 along with their associated percentage splits.

It is worth noting that the assumption of all those who approach from the south accessing the development through Pitt Street south is conservative, as retail attractors in the through-site link will likely draw commuters to use the through site link in the morning, as they pick up breakfast or a coffee on their way into the office. Those that choose to divert via the through site link to visit the retail will then enter the building from the north end of the site. However, to represent a worst-case scenario on Pitt Street, the analysis has assumed that all those approaching from the south do so via Pitt Street South.

Given the access streets to the proposed development, it is likely that those coming from the north will use the northern half of Pitt Street to access the development via the revolving door on the corner of Underwood Street/Pitt Street. Those approaching from the south are most likely to approach from Pitt Street South, as indicated in Figure 20 and Figure 21. Given these approach directions, the development is not expected to have any impact to the flows on Underwood Street and Dalley Street.

The introduction of Sydney Light Rail along George Street and Sydney Metro at Barangaroo and Martin Place has been considered in the absence of any publicly available data or documentation to understand the impact of existing travel to the

site. Should existing bus trips from the north and south switch to Metro via Barangaroo or Martin Place Station, commuters will have the same approach from the south. Existing Sydney Train customers who may switch to Metro may switch from Wynyard to Barangaroo or Martin Place Station which may shift additional demand from south of the site along the Pitt Street footpath. A sensitivity test was considered assuming all train users shift to Metro and approach from the south, resulting in a 23% north and 77% south split.

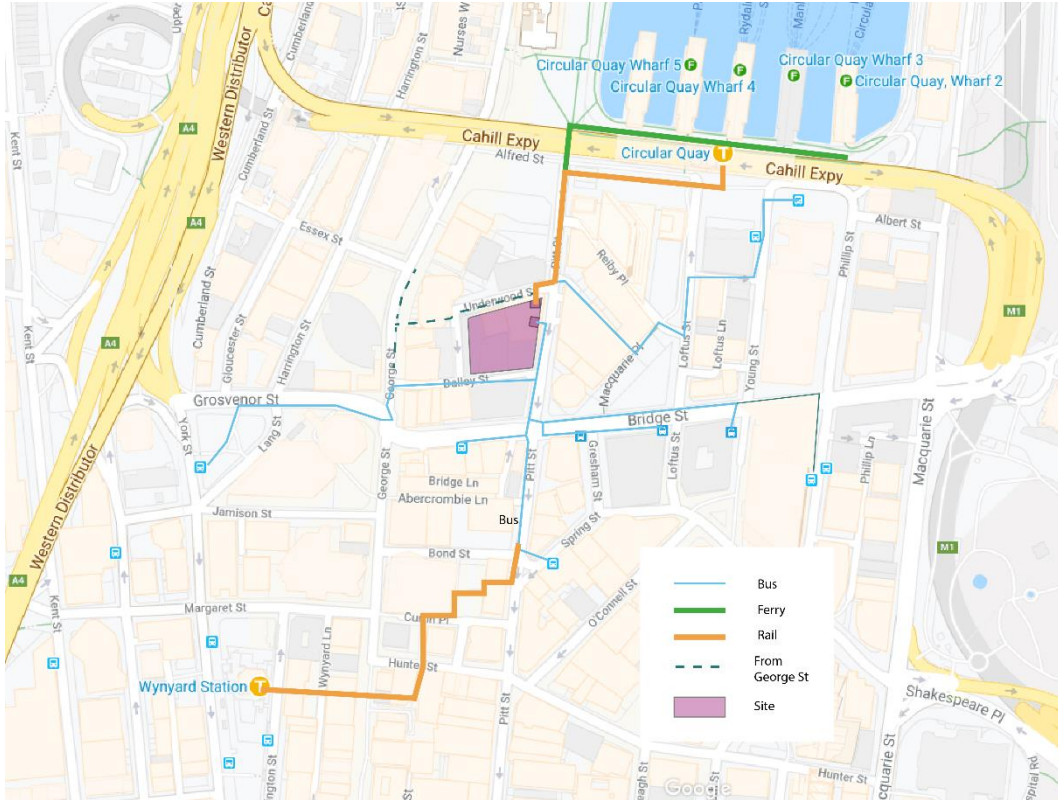


Figure 20: Context and public transport walking paths to the proposed development

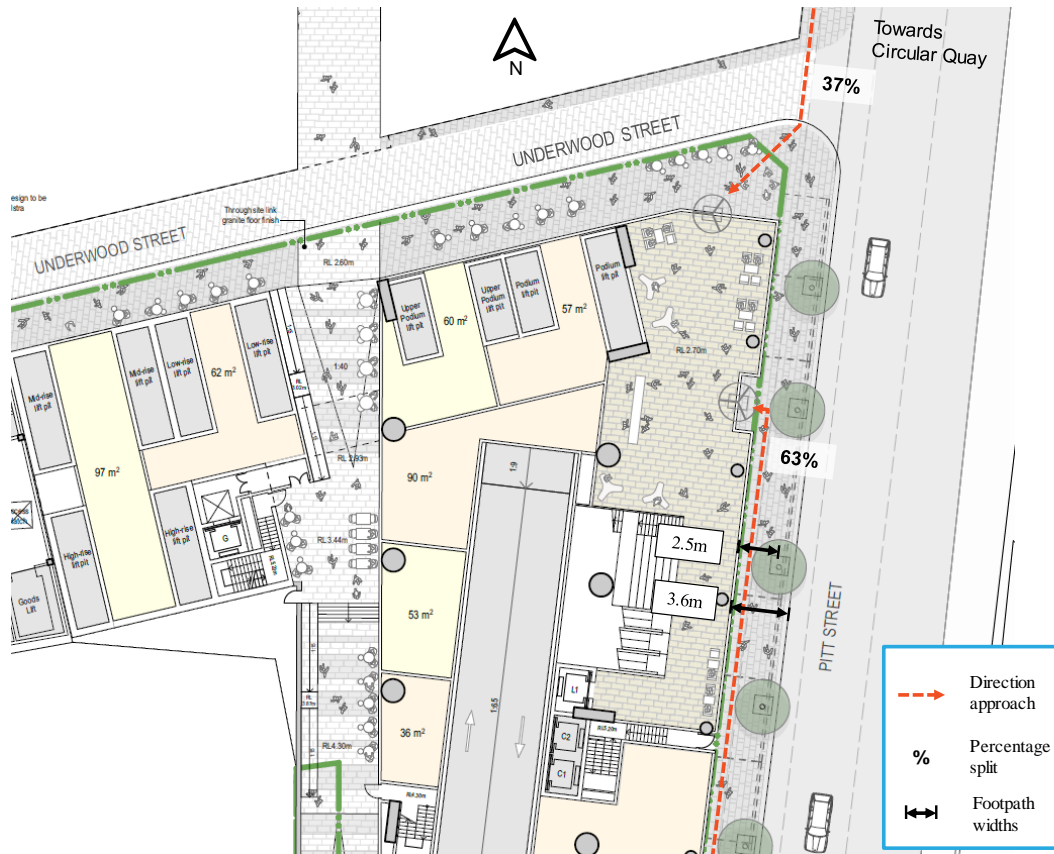


Figure 21: Indicative footpath widths for the proposed development and pedestrian approaches to development

5.3.2 Results

The proposed development shows Pitt Street to be one continuous footpath with some tree planting. The existing Pitt Street layout, which is broken up into an outdoors and undercover colonnade, is therefore no longer present in the 2025 With Development scenario. Measurements from the drawings are shown in Figure 21 and indicate that that the Pitt Street footpath is 3.6m wide in the proposed scheme, the same as that provided currently. The scheme also shows five locations with trees along the footpath, which narrows the footpath width to approximately 2.5m, which is again similar to what is currently provided along the Pitt Street footpath. Therefore, the proposed development makes no changes to the widths along the public footpath on Pitt Street. The width used for the PCL assessment is 2.1m, with 0.2m buffers on either side.

Therefore, the effective width of 2.1m has been adopted for the 2025 With Development scenario. Given that the proposed scheme shows only one footpath on Pitt Street, the future Pitt Street pedestrian flow was estimated by combining the flows of Pitt Street outdoors and colonnade sections.

The results show a PCL rating of C is achieved in the AM and PM peak for the sections of Pitt Street with tree plantings. Other areas along Pitt Street that have no trees have also been assessed and achieve a PCL rating of B- in the AM and PM peaks. The PCL guidance categorises a PCL C+ to be “acceptable” and a PCL

of C- as “at risk”. However, it is unclear as to the categorisation of PCL C. It could therefore be argued that a PCL rating of C is acceptable for an Office and Retail environment, which is expected to be bustling and busy. A width of 2.8m would be required at the locations with tree planting, to achieve a rating of PCL C+. The Fruin assessment shows all assessed footpaths to be operating within acceptable limits in the future year with development scenario.

The worst-case assessment along the Pitt Street footpath section between the building and the tree obstruction.

Location	AM Peak 5-minute flow (ppl/5-min)	AM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	20	4	2.2	A+	2.25	A
Underwood Street North	42	8	1.6	A-	1.25	A
Pitt Street (with obstruction)	252	50	2.1	C	1.75	B
Pitt Street (without obstruction)	252	50	3.2	B-	2.85	A
Dalley Street (Southern Footpath)	9	2	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	23	5	0.8	A-	0.25	A

Table 8: 2025 With Development, AM Analysis Results

Location	PM Peak 5-minute flow (ppl/5-min)	PM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Underwood Street West	16	3	2.2	A+	2.25	A
Underwood Street North	22	4	1.6	A+	1.25	A
Pitt Street (with obstruction)	248	50	2.1	C	1.75	B
Pitt Street (without obstruction)	248	50	3.2	B-	2.85	A
Dalley Street (Southern Footpath)	13	3	0.9	A+	0.55	A
Dalley Street (Northern Footpath)	15	3	0.8	A	0.25	A

Table 9: 2025 With Development, PM Analysis Results

The sensitivity test considering a higher percentage of people approaching from the south end of Pitt Street as a result of a mode shift from Sydney Trains to Metro is summarised in Table 10 and Table 11 for the AM and PM peak respectively. The Fruin rating along areas of the footpath where there are obstructions (trees) remains the same, and the PCL rating reduces from C to C-. While both Fruin and PCL rating for the sections of Pitt Street without any obstructions (trees) remains the same.

Location	AM Peak 5-minute flow (ppl/5-min)	AM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Pitt Street (with obstruction)	284	57	2.1	C-	1.75	B
Pitt Street (without obstruction)	284	57	3.2	B-	2.85	A

Table 10: Sensitivity test for 2025 With Development, AM Analysis Results

Location	PM Peak 5-minute flow (ppl/5-min)	PM Peak minute flow (ppl/min)	PCL Effective Width (m)	PCL	Fruin Effective Width (m)	Fruin LoS
Pitt Street (with obstruction)	276	55	2.1	C-	1.75	B
Pitt Street (without obstruction)	276	55	3.2	B-	2.85	A

Table 11: Sensitivity test 2025 With Development, PM Analysis Results

6 Conclusion

Mirvac propose to develop a new commercial tower in Sydney's Circular Quay area. The potential impact of the new 50 storey development has been assessed for the following three scenarios, for the AM and PM commuter peaks:

1. **2019 Existing:** Existing conditions based on recorded observations and 2019 surveyed flows, undertaken on Thursday 25 July
2. **2025 No Development:** Future 2025 performance including background growth due to employment
3. **2025 With Development:** Future 2025 performance including background growth due to employment and the net impact of the development at 55 Pitt Street

Key findings from the pedestrian assessment include:

- The 2019 Existing Conditions assessment shows that all assessed footpaths are operating within the recommended PCL and Fruin limits. However, the assessment has highlighted that Dalley Street has locations where the footpath width is less than 1.5m. Given that the PCL considers any width to be less than 1.5m inadequate regardless of the pedestrian flow, an argument could be made that the current footpath provision on the street is inadequate according to PCL guidance.
- The 2025 No Development assessment shows that all assessed footpaths are within acceptable PCL and Fruin limits. However, unless changes are made to the footpath widths on Dalley Street, footpath provision would still be less than 1.5m, which would not be considered acceptable by the PCL guidance.
- The 2025 With Development assessment shows that all assessed footpaths are operating within acceptable Fruin LoS. All assessed footpaths are also operating within acceptable PCL limits, except at the five locations on Pitt Street adjacent to the trees, which are operating at PCL C. However, given that the categorisation of PCL C is unclear in the guidance (on the border between PCL C+ and PCL C- as shown in Figure 18), it could be argued that a PCL C rating in an Office and Retail environment is acceptable. To achieve PCL C+ on Pitt Street, an additional 300mm of clear footpath width would be

required in the five locations adjacent to trees. Other areas along Pitt Street do not have any obstructions and result in acceptable PCL ratings of between C and B-.

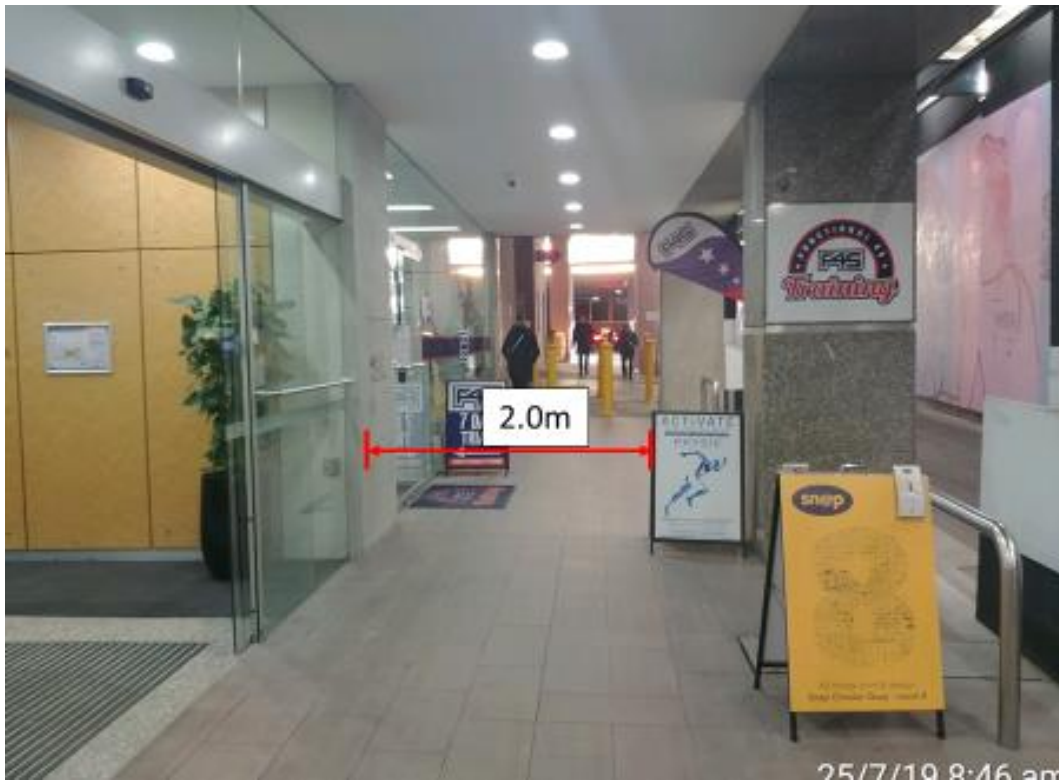
- The new development provides street level activation with the provision of a new attractive pedestrian laneway through-site link. The public footpath associated with movement along Pitt Street remains the same width though the colonnade service footpath has been eliminated. The development also provides wider footpaths on Underwood Street north for an improved pedestrian experience in the new activated area.
- Given that the crossings in the study area are informal crossings and the PCL guidance does not require informal crossings to be assessed, no formal analysis of the pedestrian crossings has been undertaken as part of this work. On-site observations have shown the crossings to be generally low activity levels with people able to walk freely across them without issues. This behaviour could be attributed to the fact that traffic volumes into Underwood Street and Dalley Street are low, allowing pedestrians to cross informally with ease.

Appendix A – Footpath Measurements

A1 Underwood Site 1 Measurement



A2 Underwood Street Site 2 Measurement

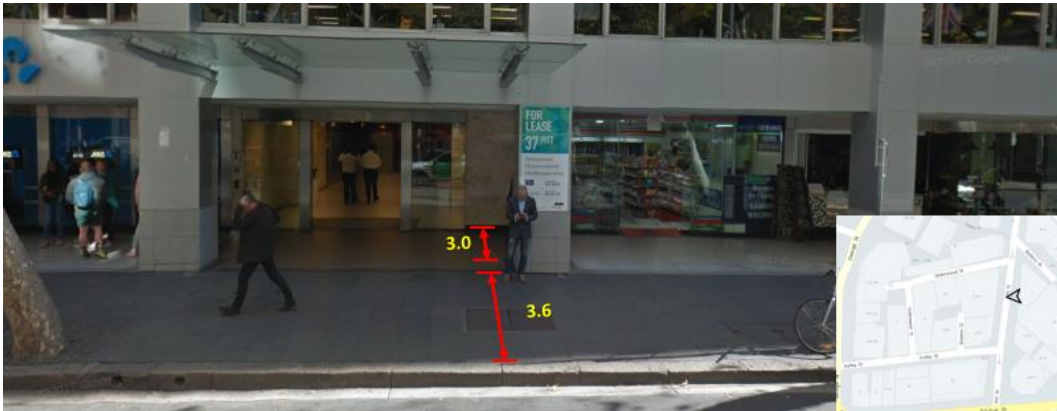


A3 Pitt Street Site 3 Measurement

Pitt Street – Corner of Underwood Street



Pitt Street



A4 Dalley Street Site 4 Measurement



Dalley Street – Northern footpath

