Construction Traffic Management Plan;

Mosman High School

For SINSW

3 December 2021

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civil design;
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ptc.

Document Control

Mosman High School, Construction Traffic Management Plan

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1. Introduction

1.1 Project description

School Infrastructure New South Wales (SINSW) is proposing an expansion of Mosman High School (MHS) which involves the uplift of the current capacity of 1,116 Year 7 – 12 students to 1,200 students by 2031. The increased capacity will be achieved through the construction of a new school building including associated core infrastructure, new outdoor play areas, roof top play areas and associated landscaping works.

Mosman High School is located at 745 Military Road, Mosman NSW 2088 (see Figure 1). The school lies within the Mosman Local Government Area (LGA) and is bounded by Belmont Road to the north, Military Road to the east, Avenue Road to the west and Gladstone Avenue to the west. There are several pedestrian access gates along each frontage and the existing car park access is located on Gladstone Avenue.

Figure 1 – Site location (Source: HERE WeGo Maps)

1.2 Purpose of this report

The Construction Traffic Management Plan (CTMP) addresses the construction activity associated with the construction of the development, including:

- Location of any proposed Work Zone, Site Boundary, and any site office, crane locations, material and waste storage area and other components as necessary;
- Haulage routes;
- Construction vehicle access arrangements;
- A heavy vehicle swept path assessment, demonstrating feasibility of any site access, in addition to haulage routes if required;
- Estimated construction hours;
- Estimated number of construction vehicle movements;
- Estimated construction program;
- Mitigation of any potential impacts to general traffic, cyclists, pedestrians and bus services within the vicinity of the site from construction vehicles during the construction of the proposed works;
- Development of a traffic management plan (TMP), outlining the construction access to the development and a description of likely traffic control measures required.

1.3 Structure of this Report

This report has been prepared to present the traffic and pedestrian management arrangements (including Traffic Guidance Schemes) associated with the redevelopment of the Mosman High School.

This report presents the following considerations in relation to the CTMP:

Section 2	Background;
Section 3	A description of the project;
Section 4	A description of the road network and transport facilities serving the development site;
Section 5	Management of construction vehicles and non-site traffic; and
Section 6	Summary

2. Background

Mosman high school is located within a SP2 Infrastructure Zone, as shown in Figure 2. Key features surrounding the site include:

- Mosman Public School situated to the north-west of MHS;
- A Local Centre (B2) Zone located along Military Road which comprises of a variety of local businesses, restaurants and cafes;
- A Public Recreation (RE1) Zone to the north-west comprising Mosman Park and Allan Border Oval; and
- The greater residential area of Mosman comprising of a mix of Low Density Residential (R2) and Medium Density Residential (R3) Zones.

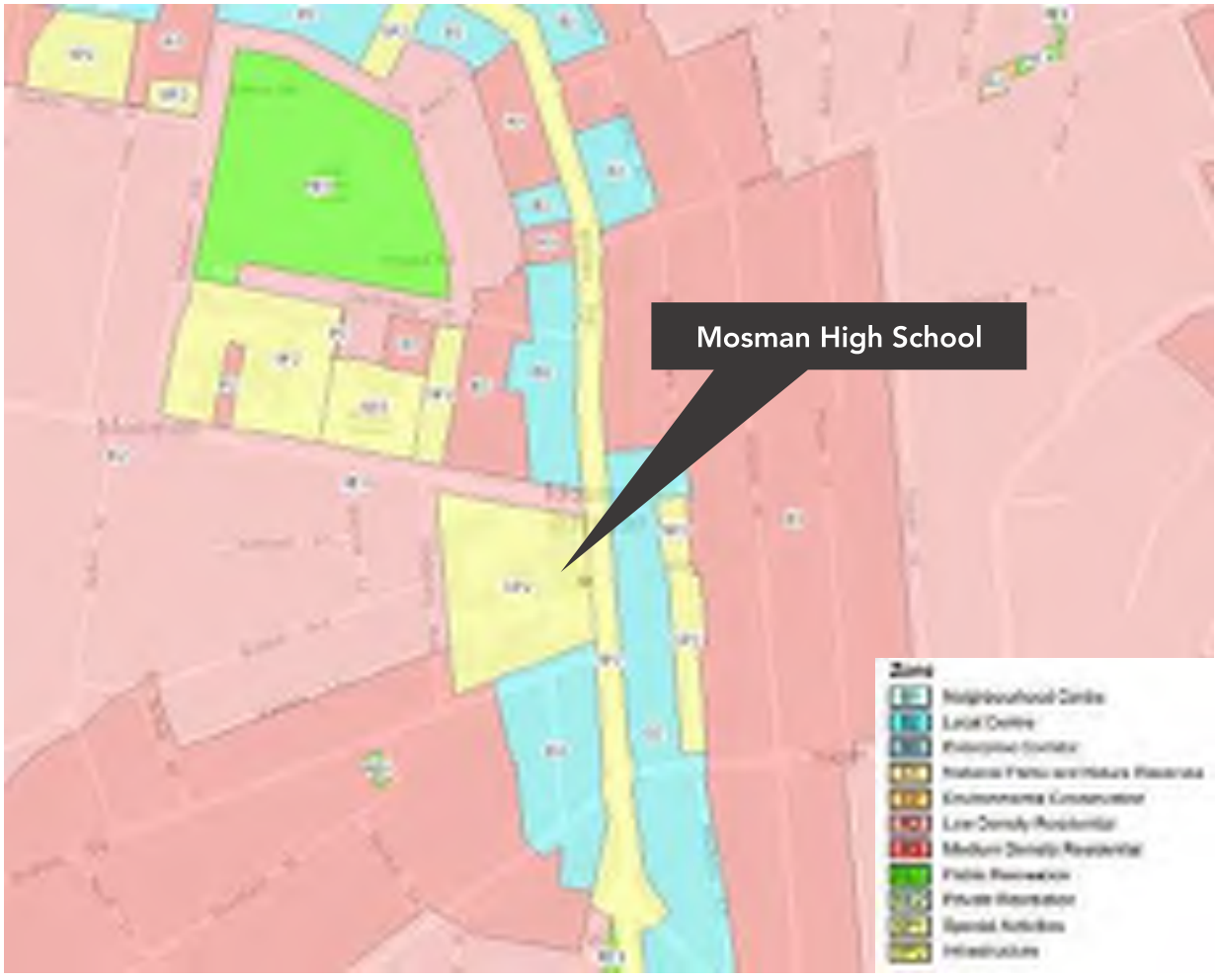

Figure 2 – Local land use map (Source: NSW Planning Viewer)

3. Development proposal

The development proposal for the Mosman High School involves the expansion of the School to accommodate an increased capacity of 84 students (from the current 1,116 student capacity to 1,200 students) by 2031.

It is also anticipated that the current catchment area for students will be more enforced in the future, meaning that students from outside the official area will not be accepted at MHS.

The following CTMP will cover the scope of the SSDA (Construction Stage 2 – Main Works), which includes:

- Demolition of Building B, Building C and part Building E;
- Removal of existing sports court and surrounding retaining walls and nominated trees;
- Construction of a new part 3/ part 4 storey building plus lift overrun and net enclosure to rooftop multi-court (Building G) on the corner of Military Road and Belmont Road providing:
    - administration and staff facilities;
    - multipurpose gym/hall;
    - library;
    - canteen facilities;
    - general and senior learning units;
    - science learning unit;
    - health / PE and performing arts unit; and
    - learning and admin support unit.
- Associated landscaping works including new outdoor play areas, a rooftop play space and rooftop multi-purpose court; and
- Relocation of the main pedestrian entrance from Military Road to Belmont Road.

The proposed site layout plan for the SSDA phase of MHS is illustrated in Figure 3.

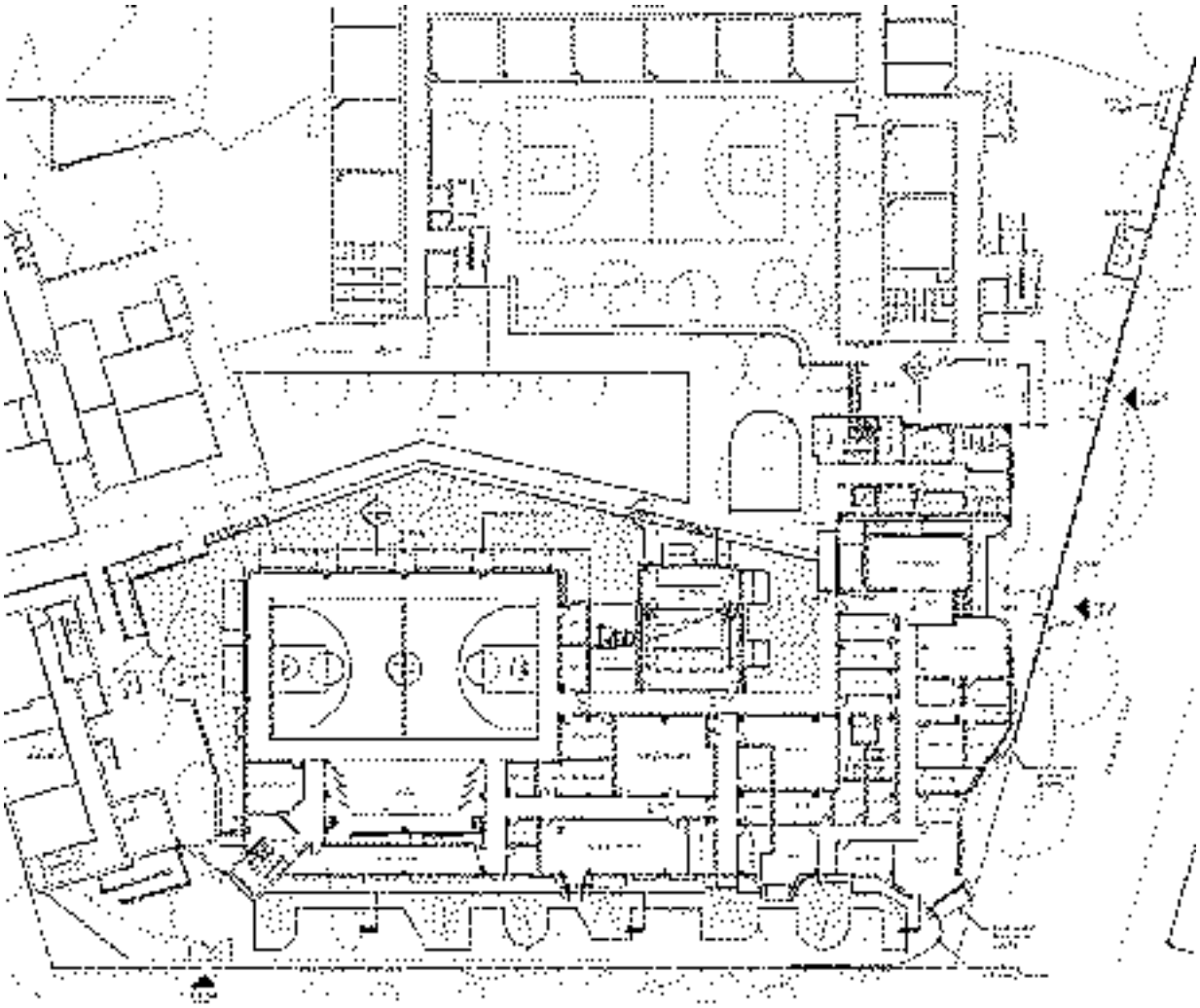

Figure 3 – Proposed SSDA site layout (Source: Multiplex)

4. Existing Transport Facilities

4.1 Road hierarchy

MHS is served primarily by Military Road on the eastern frontage which is a Regional Road between Spit Road and the Taronga Zoo Wharf, but transitions into a State Road at the intersection of Military Road/Spit Road. Military Road provides the main connection between Mosman and the Sydney CBD and the northern beaches. A network of Council-managed Local Roads provide access to the school and the greater suburb of Mosman. The surrounding road network is illustrated in Figure 4.

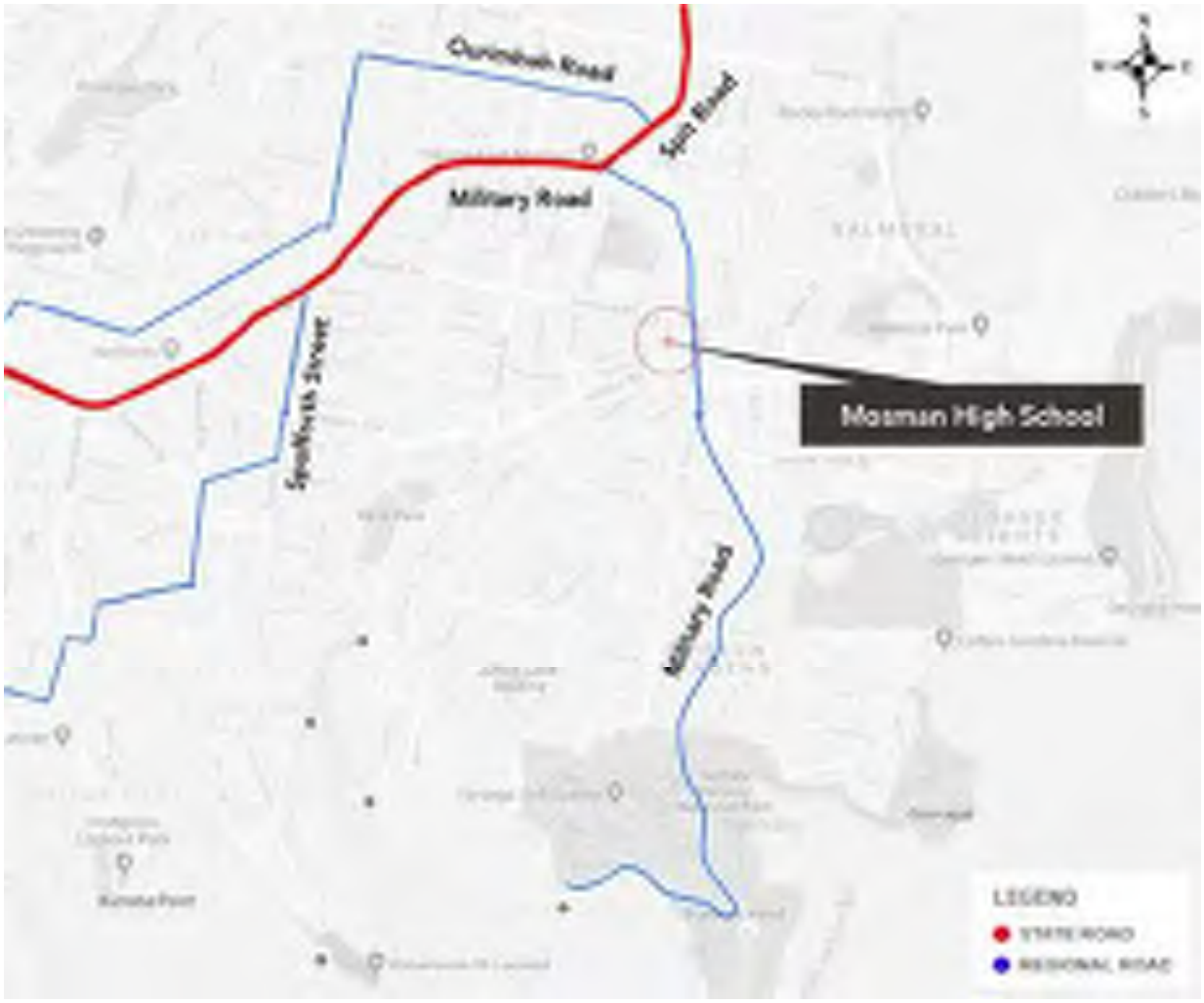

Figure 4 – Road Hierarchy (Source: TfNSW Road Hierarchy Review)

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

State Roads	- Freeways and Primary Arterials (TfNSW managed)
Regional Roads	- Secondary or Sub Arterials (Council managed, partly funded by the State)
Local Roads	- Collector and Local Access Roads (Council managed)

Military Road	
Road Classification	Regional Road (within vicinity of MHS); Military Road becomes a State Road at intersection of Spit Road/Military Road
Alignment	North - South (within the vicinity of MHS)
Number of Lanes	1 lane in each direction with parking lanes on either side of the carriageway
Carriageway Type	Undivided
Carriageway Width	13 metres
Speed Limit	50 km/h
School Zone	Yes
Parking Controls	Time-restricted parking on both sides of the carriageway
Forms Site Frontage	Yes

Figure 5 – Military Road (Southbound towards Raglan Street)

Belmont Road	
Road Classification	Local Road
Alignment	East - West
Number of Lanes	1 lane in each direction with parking lanes on either side of the carriageway
Carriageway Type	Undivided
Carriageway Width	12.5 metres
Speed Limit	50 km/h
School Zone	Yes
Parking Controls	Time-restricted parking on both sides of the carriageway
Forms Site Frontage	Yes

Figure 6 – Belmount Road (Westbound towards Gladstone Avenue)

Gladstone Avenue	
Road Classification	Local Road
Alignment	North - South
Number of Lanes	1 lane in each direction with parking lanes on either side of the carriageway
Carriageway Type	Undivided
Carriageway Width	12.5m
Speed Limit	50 km/h
School Zone	Yes
Parking Controls	'No Parking, 8:00am – 9:30am & 2:30pm-4:00pm School Days Only' and Bus Zone on the eastern side; unrestricted parking towards the northern end of Gladstone Avenue
Forms Site Frontage	Yes

Figure 7 – Gladstone Avenue (Northbound towards Belmont Road)

Avenue Road	
Road Classification	Local Road
Alignment	East - West
Number of Lanes	1 lane in each direction with parking lanes on either side of the carriageway
Carriageway Type	Undivided
Carriageway Width	12.5m
Speed Limit	50 km/h
School Zone	Yes
Parking Controls	Time-restricted parking on both sides of the carriageway
Forms Site Frontage	Yes

Figure 8 – Avenue Road (Eastbound towards Military Road)

4.2 Key intersections

The key intersections in the vicinity of the site and their characteristics are listed below and shown in Figure 9:

- Military Road / Belmont Road (East): signalised 3-arm intersection;
- Military Road / Belmont Road (West): signalised 3-arm intersection;
- Belmont Road / Gladstone Avenue: non-signalised T section intersection;
- Avenue Road / Gladstone Avenue: non-signalised T section intersection;
- Military Road / Avenue Road: non-signalised T section intersection;
- Military Road / Spit Road: signalised 3-arm intersection;
- Military Road / Middle Head Road / Bradleys Head Road / Prince Albert Street Roundabout Intersection.

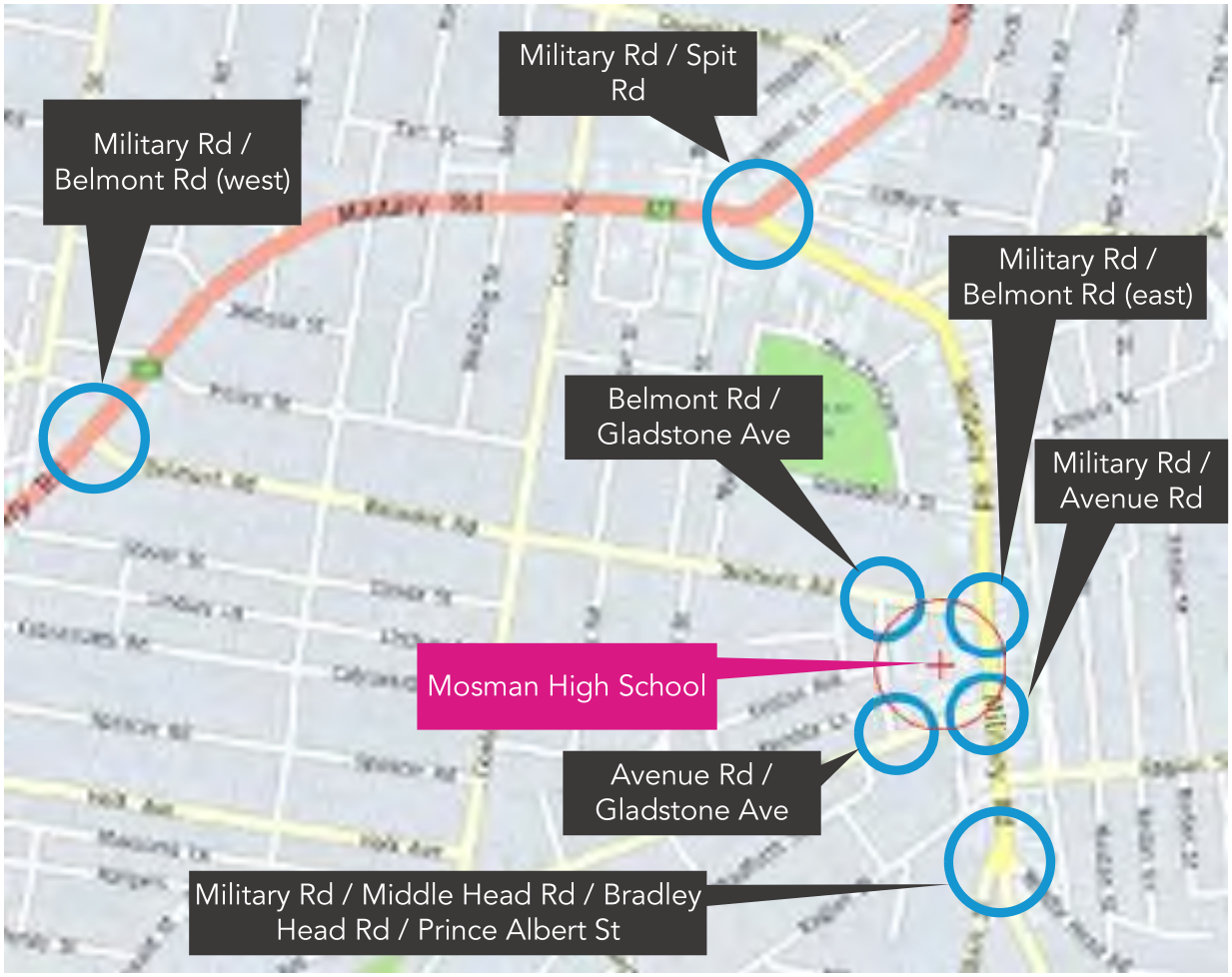

Figure 9 – Key Intersections

4.3 Public Transport

A review of the public transport network within the vicinity of MHS has been undertaken to determine accessibility via public transport modes.

Within the radius of 400m walking distance from the school, there are many local bus services operating along Military Road. They provide connectivity within the suburb of Mosman and to the Sydney CBD and the northern beaches.

The available public transport options such as buses and trains within comfortable walking distance are shown in Figure 10.

Figure 10 – Public Transport Accessibility Map

The review indicates that the public transport mode which is most easily accessible is via bus, with numerous services operating along Military Road providing connectivity to the Sydney CBD and the northern beaches. The closest public bus stop is located immediately adjacent to the school on Military Road.

4.3.1 STA Bus Services

The review indicates that the most easily available public transport mode is via bus, with numerous services operating along Military Road providing connectivity to the Sydney CBD and the northern beaches. The closest public bus stop is located immediately adjacent to the school on Military Road.

A map of the existing bus network is illustrated in Figure 11.

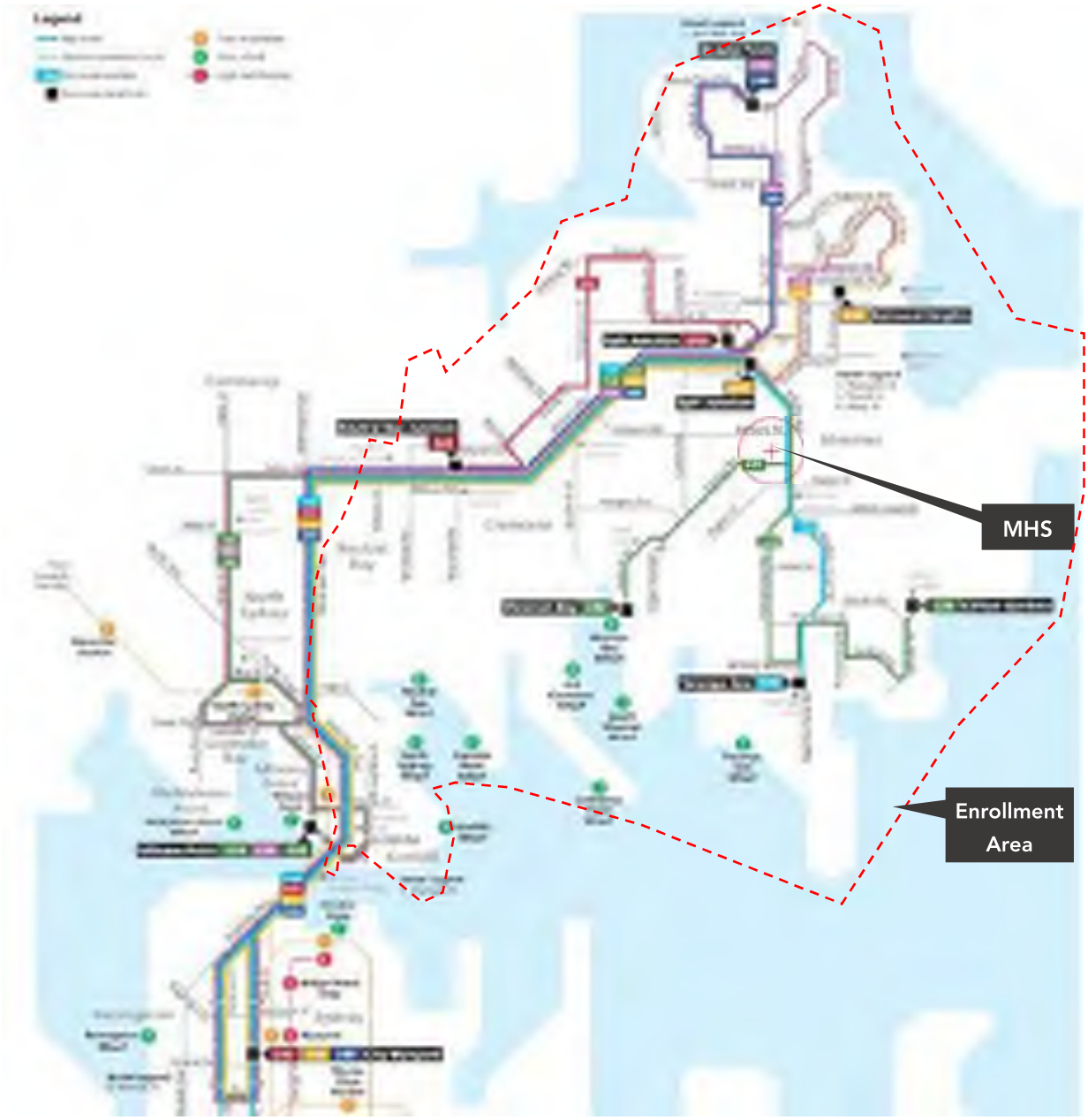

Figure 11 - Bus Network Map (Source: Transport for NSW, 2018)

A summary of the existing public bus frequencies and services operating from the bus stop adjacent to MHS offering the 1-seat trip is outlined in Table 1.

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Table 1 - Summary of Public Bus Services

Route No.	Frequency (approximate)	Coverage	Bus Stop	Walking Distance to Bus Stop
114	Once a day	Balmoral to Royal North Shore Hospital	Stop ID: Gladstone Avenue near Mosman High, Mosman - 208867	25m
	Services every 2-30 min from 5:51am to 12:33am on weekdays	Royal North Shore Hospital to Balmoral	Stop ID: Mosman High School, Military Road - 208864	45m
		Balmoral to Royal North Shore Hospital	Stop ID: Military Road opposite Mosman High School - 208847	110m
230	Services every 2-30 min from 5:22am to 12:42am on weekdays	Mosman Wharf to Milsons Point via North Sydney	Stop ID: Mosman High School, Military Road - 208864	45m
		Milsons Point to Mosman Wharf via North Sydney	Stop ID: Avenue Road at Carney Lane - 2088162	60m
111	Once a day	Chowder Bay to South Mosman Wharf	Stop ID: Gladstone Avenue near Mosman High, Mosman - 208867	25m
	Services every 12-60 min from 5:22am to 8:27pm on weekdays	Chowder Bay to South Mosman Wharf	Stop ID: Military Road at Raglan Street - 208863	176m
		South Mosman Wharf to Chowder Bay	Stop ID: Military Road at Raglan Street -208863	176m
100	Services every 4-20 min from 5:06am to 12:54am on weekdays	Taronga Zoo to City QVB	Stop ID: Mosman High School, Military Road - 208864	45m
		City QVB to Taronga Zoo	Stop ID: Military Road opp Mosman High School -208848	110m
228	Limited to 5-7 services per day	Clifton Gardens to Milsons Point	Stop ID: Military Road at Raglan Street - 208863	45m
		Milsons Point to Clifton Gardens	Stop ID: Military Road near Belmont Rd (opposite Mosman High School – 208847)	110m

Based on the frequency of services and the number of routes operating within the vicinity of MHS, the school is considered to be well connected via bus.

4.3.2 Ferry Services

It is noted that ferry services also operate in the locality with the nearest ferry wharf being the Mosman Bay Wharf. The wharf is located approximately 1.6km walking distance from MHS. Although this is outside of the comfortable walking catchment of 800m, it is anticipated that some staff may utilise this as a method of

travel to and from the school, particularly in combination with a bicycle, or bus services connecting the wharf and the school.

Table 2 - Ferry Services

Route No.	Frequency (approximate)	Coverage
F6	Services every 30 min during weekdays and every 1 hour during weekends and public holidays	Circular Quay to Mosman Bay

4.4 Active Transport

The vicinity of the School has been assessed for the potential for attractive walking and cycling opportunities for students and staff. When defining accessibility, the NSW Planning Guidelines for Walking and Cycling (2004) suggests that a 400m – 800m catchment represents a comfortable walking distance to public transport or local amenity access.

Figure 12 – Mosman High School walking catchment 400 m – 800 m

4.4.1 Walking

The pedestrian network in the locality of the School has been assessed to provide a reasonably high level of amenity within the vicinity of the school with raised pedestrian crossings adjacent to the intersections of Military Road/Avenue Road and Belmont Road/Gladstone Avenue. Signalised pedestrian crossings are provided on each of the approach arms of the Military Road/Belmont Road intersection, which facilitates pedestrian movement across Military Road.

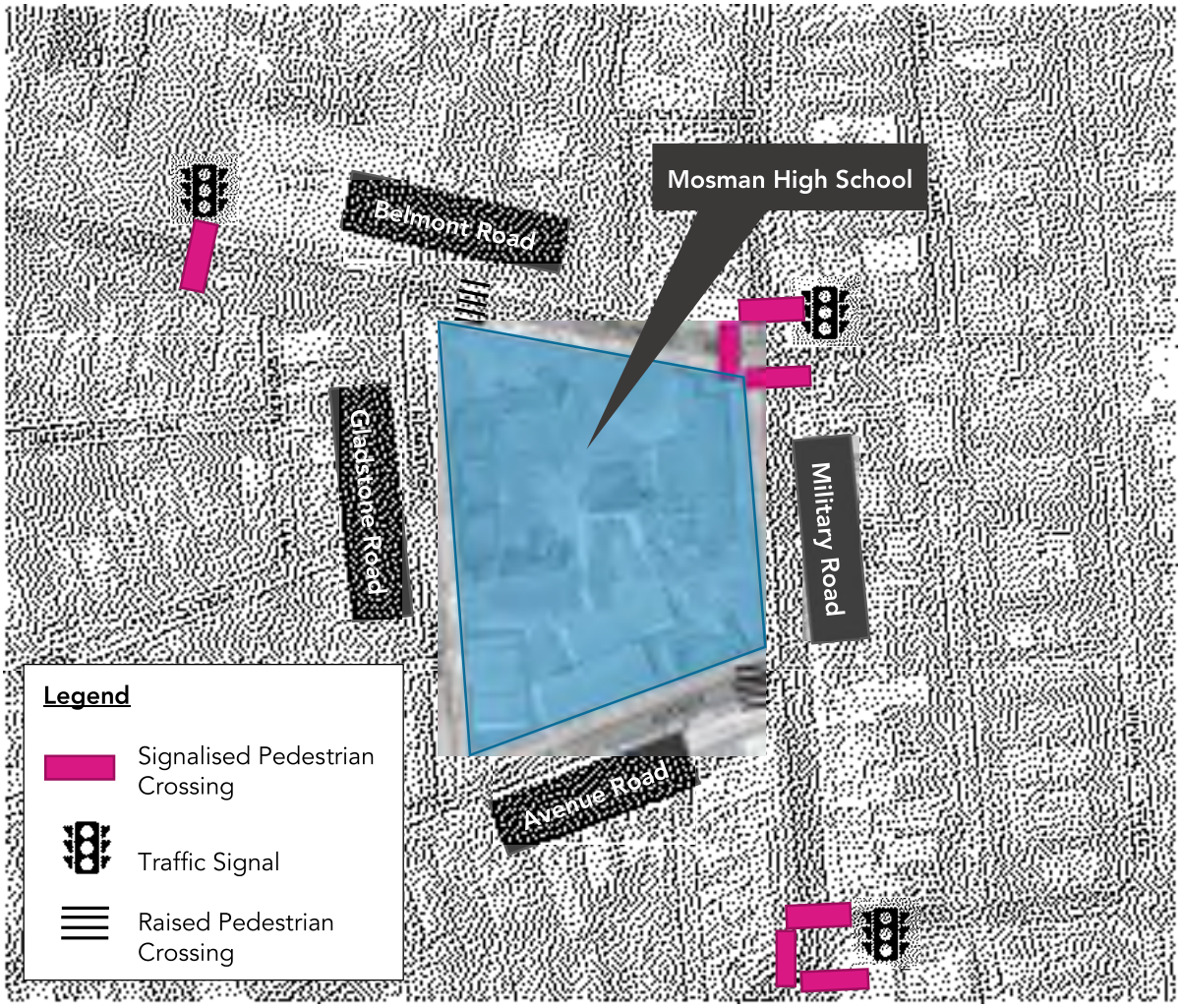

Figure 13 – Surrounding pedestrian infrastructure

4.4.2 Cycling

The surrounding locality within the vicinity of MHS comprises predominantly of on-road marked cycle routes as shown in Figure 14. The on-road cycle paths extend across the Mosman LGA, providing connection to Spit Junction, Clifton Gardens, Balmoral and Georges Heights.

It is acknowledged, however, that Military Road extends along a downward slope towards the Taronga Zoo Wharf, which may mean that cycling as a mode of transport would be influenced by the residential location of students and staff and their ability to ride across steep terrain in some areas. Nonetheless, the cycling connections provided makes this a feasible mode of transport to and from the school.

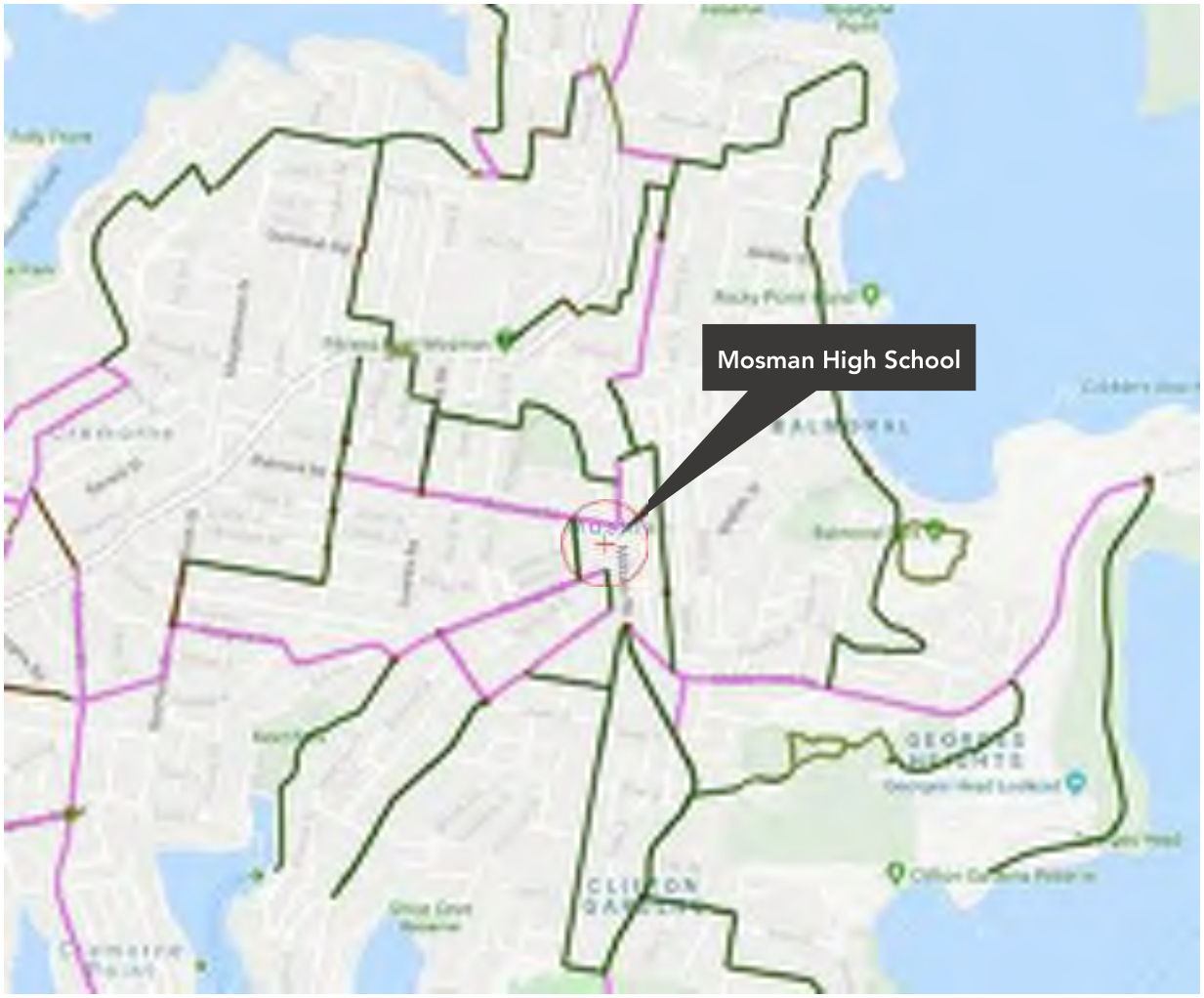

Figure 14 – Cycling Infrastructure within Mosman (Source: TfNSW Cycleway Finder, 2019)

5. Construction Traffic Management Plan (CTMP)

5.1 Traffic Management Planning Process

Temporary Traffic Management (TTM) for the project has been planned in accordance with Transport for NSW, *Traffic control at work sites – Technical Manual, Issue No.6.0,* 14 September 2020 (TCAWS). The process is shown in Figure 15.

Figure 15: Construction Vehicle Ingress Route

An iterative process is being adopted in collaboration with relevant stakeholders to adopt the most appropriate traffic management approach and develop the associated documents for the work.

5.2 Traffic Management Strategy

A traffic management strategy has been chosen to support the appropriate allocation of time, funds and resources for the project, and allow for consultation in determining the safest and most efficient way for road users to interact with the work site.

The traffic management strategy included consistent engagement with TfNSW through the development and submission of an initial Concept Construction Traffic Management Plan (CCTMP). The CCTMP process highlighted the initial data collection and options assessment to ensure the lowest net risk for all stakeholders were considered. The following have been considered in determining the TTM method:

Detour options
No detours are necessary or proposed by the client and therefore, disproportionate amount of disruption to the road users will NOT be introduced.

Site location
The site of the works is primarily flat between the Belmont Road and the worksite, however there are existing signage and infrastructure that may obstruct signs and devices needed for certain strategies.

Work area
The area needed to safely perform the work does not require any road closure, however it will require the relocation of street parking and taxi loading zones.

Vulnerable road users
Desire lines of pedestrians, cyclists, motorcyclists and users of scooters do not impact on works or create undesired interaction between these road users and traffic

Community facilities and needs
The presence of the surrounding bus stops on Military Road and Gladstone Avenue and the pedestrian crossings on Belmont Road and Avenue Road in the vicinity of the site does not create conflict with the work.

5.3 Decision of TTM Method

After considering the factors in Section 5.2 and the recommendation of the client, the TTM method chosen is "Around (elimination)" as traffic can and will be completely separated from the work area. This method will provide the lowest overall net risk option.

5.4 Objective

The traffic management plan associated with the construction activity aims to ensure the safety of all workers and road users within the vicinity of the construction site and following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network;
- To ensure continuous, safe and efficient movement of traffic for both the general public and construction workers;
- Installation of appropriate advance warning signs to inform users of the changed traffic conditions;
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site;
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site; and
- Establishment of a safe pedestrian environment in the vicinity of the site.

5.5 Hours of work

All works associated with the project will be restricted to the time periods by the Conditions of Consent. At this stage these hours are not known and therefore we have assumed the following working hours associated with the construction activity:

• Monday to Friday	7:00am to 6:00pm; and
	6:00pm to 7:00pm, provided noise levels do not exceed the existing background noise level plus 5dB; and
• Saturday	7:30am to 3:30pm; and
	3:30pm to 4pm, provided noise levels do not exceed the existing background noise level plus 5dB; and
• Sunday, Public Holidays	No works to be undertaken without prior approval.

5.6 General requirements

In accordance with Transport for NSW (TfNSW) requirements, all vehicles transporting loose materials will have to be entirely load covered and / or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during the travel to and from the site. All subcontractors must be inducted by the lead contractor to ensure that the procedures are met for all vehicles entering and exiting the construction site. The lead contractors will monitor the roads leading to and from the site and take all necessary steps rectify any road deposits caused by site vehicles.

Vehicles operating to, from and within the site shall do so in a manner, which does not create unreasonable or unnecessary noise or vibration. No tracked vehicles will be permitted or required on any paved roads.

Public roads and access points will not be obstructed by any materials, refuse skips or the like, under any circumstances. No construction vehicles are permitted to double park, or park on the public road.

Spoil shall be exported from site as progressively as the works occur. Spoil shall not be stockpiled and exported from the site in bulk.

The applicant / contractor is required to follow and abide by the specific standard requirements for construction management as set out by Mosman Municipal Council.

5.7 Construction staging

The overall project is proposed to be split into two stages, Stage 1 – Early Works and Stage 2 – Main Works.

The Early Works are expected to take approximately 5 months and will consist of enabling works in order to maintain school operations upon the commencement of the Main Works. Early works were recently approved under Part 5 of the EP&A Act by School Infrastructure NSW as 'development without consent' under ISEPP. Other works are proposed as 'Exempt Development' under ISEPP.

This CTMP covers work of Stage 2 only.

An indicative construction program received from Multiplex sets a timeframe of 12.5 months for Stage 2 – Main Works, with the overall anticipated construction works being approximately 17.5 months. The construction works will begin on the 17th December 2021 and end on the 28th April 2023. An excerpt from the construction program is shown in Figure 16, whereas the entire construction program is presented in Attachment 2.

Figure 16 – Construction Program (Source: Multiplex)

The program shows that different vehicles are required during different construction phases, with white stages representing the requirement for rigid vehicles and orange stages representing the requirement for articulated vehicles (semies). The vehicle numbers have been summarised to determine the maximum truck movements per day differentiated by the types/size of vehicles required. A maximum of 3 semis and 8 rigid trucks (Heavy Rigid Vehicle or a smaller agitator truck) per day is anticipated. This represents one to two trucks per hour.

As discussed in Section 3, the SSDA phase (Stage 2 – Main Works) will include the following:

- Demolition of Building B, Building C and part Building E;
- Removal of existing sports court and surrounding retaining walls and nominated trees;
- Construction of a new part 3/ part 4 storey building plus lift overrun and net enclosure to rooftop multi-court (Building G) on the corner of Military Road and Belmont Road providing:
    - administration and staff facilities;
    - multipurpose gym/hall;
    - library;
    - canteen facilities;
    - general and senior learning units;
    - science learning unit;
    - health / PE and performing arts unit; and
    - learning and admin support unit.
- Associated landscaping works including new outdoor play areas, a rooftop play space and rooftop multi-purpose court; and
- Relocation of the main pedestrian entrance from Military Road to Belmont Road.

5.7.1 Phasing of Stage 2

The abovementioned construction works are to be completed within two phases.

Phase 1: Demolition (Week 1 – 8)

Phase 2: Structure (Week 9 – 28)

Phase 3: Façade, Fitout & Landscape (Week 29 - 50)

The plans for the proposed phases are shown in Figure 17 and Figure 18 respectively.

Figure 17 – Phase 1 Plan

Figure 18 – Phase 2 & 3 Plan

5.8 Construction Vehicle Types

The construction during the SSDA stage will involve Articulated Vehicles (AV) and Heavy Rigid Vehicles (HRV) with the vehicles size limited up to a 19m AV for all phases. Larger vehicles will be dealt with separately, with the submission of required permits to and subsequent approval by Mosman Municipal Council.

5.9 Construction Vehicles Routes

The site is located in Mosman and the proposed construction vehicle routes have regard for the surrounding traffic arrangements in the vicinity of the site. No queuing or marshalling of trucks is permitted on any public road and all loading and unloading of materials will be undertaken within the site or a work zone.

The work zone for the construction is proposed to be located along Belmont Road, details of which are described in Section 5.9.4.

All vehicle routes to and from site are constrained to existing public roads that have the physical geometry to accommodate the turning movements. A swept path assessment has been undertaken using both a 12.5m Heavy Rigid Vehicle (HRV) and 19.0m Articulated Vehicle (AV). The assessment indicates that the turning manoeuvres from Belmont Road into Military Road require the use of multi-lanes. However, as per the *Road Rules 2014 – NSW Legislation Regulation 28* such manoeuvring is permissible. Therefore, the

assessment indicates that the existing public roadways are able to accommodate the turning manoeuvres of the construction vehicles.

It is noted that a 3t weight limit is posted along Belmont Road; However, this limit exists as part of the Local Area Traffic Management to stop trucks from cutting through the local area instead of using the Spit Junction. Belmont Road and all intersection treatments along this road have been designed to accommodate large vehicles, as shown later by swept paths. It is also noted that Belmont Road is utilised by regular public buses.

5.9.1 Road Rules 2014 – NSW Legislation Regulation 28

The following has been extracted from the road rules which allows for the use of multi-lanes to perform a left turn manoeuvre for the proposed heavy vehicles.

A driver may approach and enter the intersection from the marked lane next to the left lane as well, or instead of, the left lane if:

(a) the driver's vehicle, together with any load or projection, is 7.5 metres long, or longer, and

(b) the vehicle displays a do not overtake turning vehicle sign, and

(c) any part of the vehicle is within 50 metres of the nearest point of the intersection, and

(d) it is not practicable for the driver to turn left from within the left lane, and

(e) the driver can safely occupy the next marked lane and can safely turn left at the intersection by occupying the next marked lane, or both lanes.

The construction vehicles that require the use of multi-lanes all exceed 7.5m in length and also meet all other requirements stipulated in the regulation. Therefore, the swept path assessment has been undertaken utilising multi-lanes to perform turning manoeuvres when necessary.

In order to reach the proposed work zone, different routes are proposed for AVs and HRVs as ae described in the following sub-sections.

5.9.2 AV

All AVs will arrive via Military Road, turn right at Spit Junction and turn right at Belmont Road. While exiting the site, the AVs will leave via Belmont Road, Gladstone Avenue, Avenue Road and back onto Military Road.

The AV route is shown in Figure 19.

When entering and exiting the site, the vehicles need to use the surrounding road network and intersections. For this reason, a swept path assessment has been undertaken to confirm that all required vehicle movements are possible and what management measures may be required.

Swept paths showing a 19m long AV entry and exit routes are shown in Attachment 1.

The taxi rank on Belmont Road will need to be relocated so that an AV can access the work zone, refer to Section 5.11.1 for details.

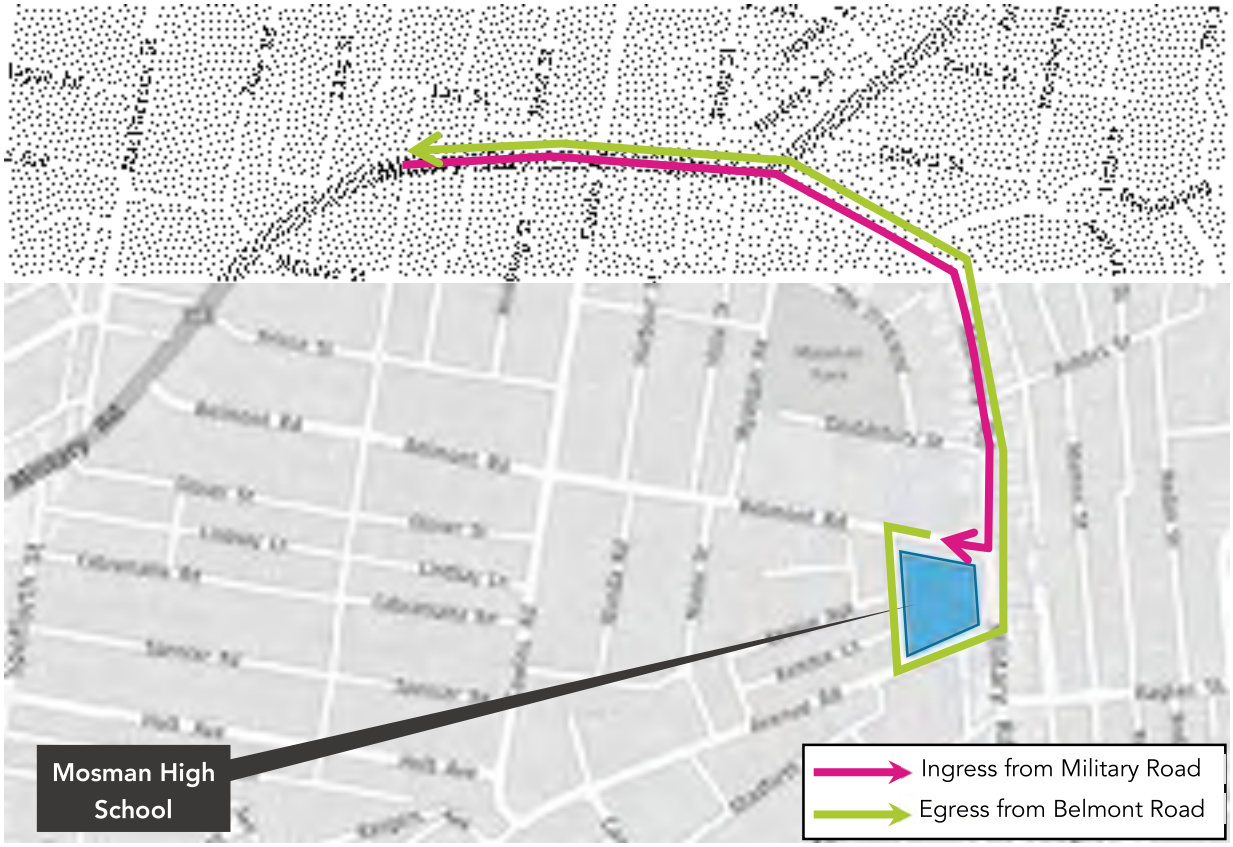

Figure 19 – AV Routes

5.9.3 HRV

Two different entry and exit routes are proposed for an HRV. The HRV movements will be distributed evenly along both routes.

- Entry Route 1: arrive via Belmont Road, loop around the school before reaching the work zone in Belmont Road.
- Entry Route 2: arrive via Military Road, turn right at the Spit Junction towards Military Road, turn right at Belmont Road and access the work zone.
- Exit Route 1: leave via Belmont Road.
- Exit Route 2: loop around the school before leaving via Military Road.

The HRV ingress and egress routes are shown in Figure 20 and Figure 21 respectively.

A swept path assessment has been undertaken to confirm that the HRV movements are possible in the nearby intersections and what management measures may be required.

The swept paths for a 12.5m long HRV for all entry and exit routes are shown in **Attachment 1**.

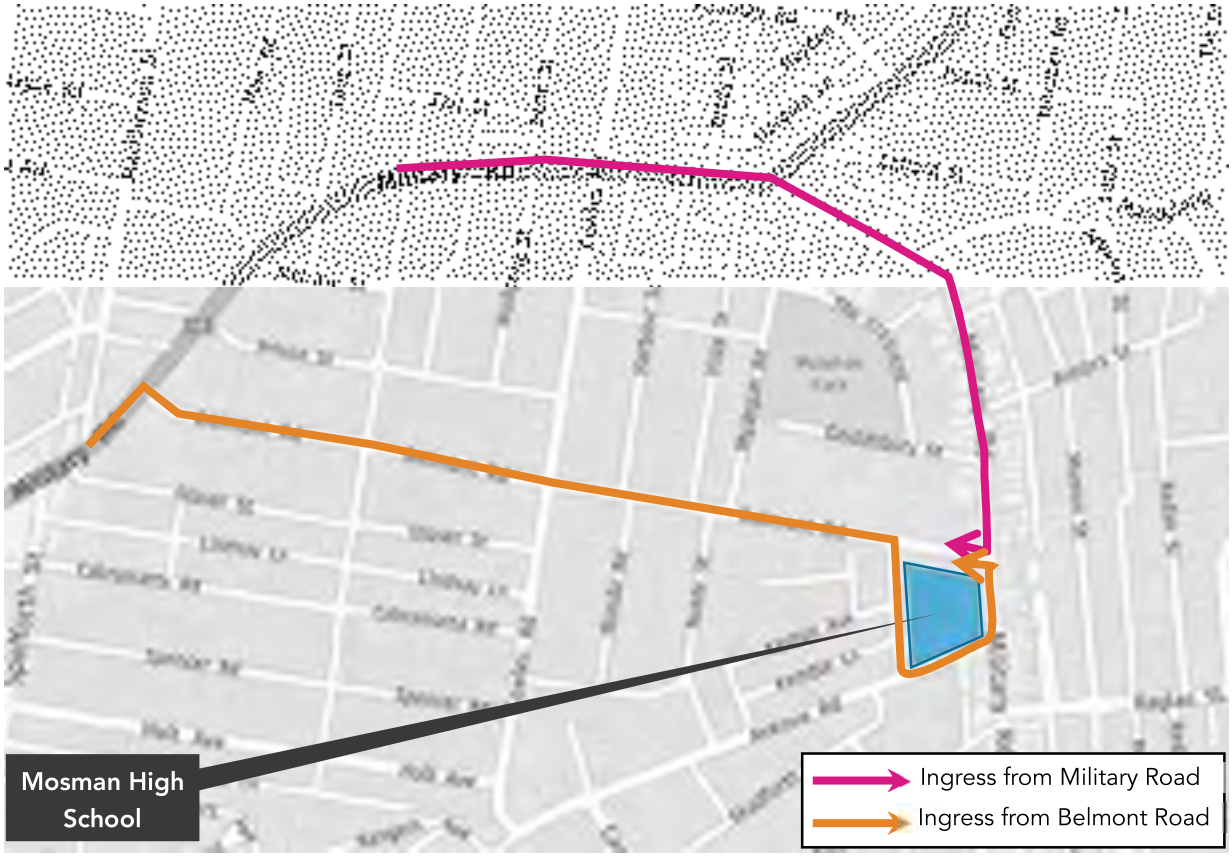

Figure 20 – HRV Ingress Routes

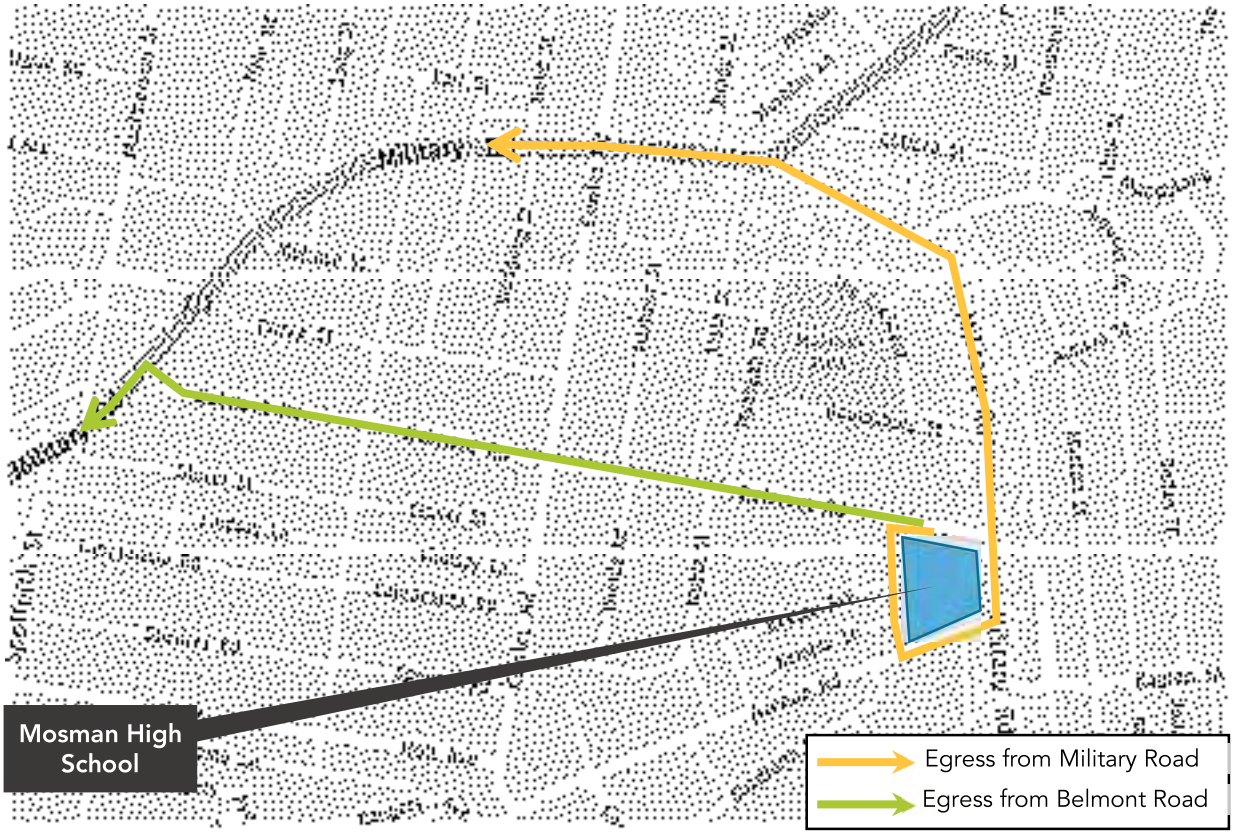

Figure 21 – HRV Egress Routes

5.9.4 Additional Movements during Demolition Phase

During the Phase 1 (Demolition), a vehicular access gate will allow for 12.5m Heavy Rigid Vehicles (HRV) to enter the site to pick up materials and earthworks. The gate will only allow one truck to enter and exit at a time due as the driveway will only allow one-way flow. The proximity of the gate to the adjacent trees, results in a HRV crossing onto the opposing traffic lane. A TfNSW certified Traffic Controller and relevant Traffic Guidance measures (further described in Section 6) will be used to ensure that the vehicle does not impact local traffic.

To ensure pedestrians are protected around the site, dynamic pedestrian barriers will be used to prevent pedestrians from walking past the driveway as a truck is entering or leaving. The barriers will only be used when there is a suitable gap in pedestrians walking along the footpath.

Figure 22 shows the gate location and an HRV performing a three-point turn manoeuvre within the existing tennis court.

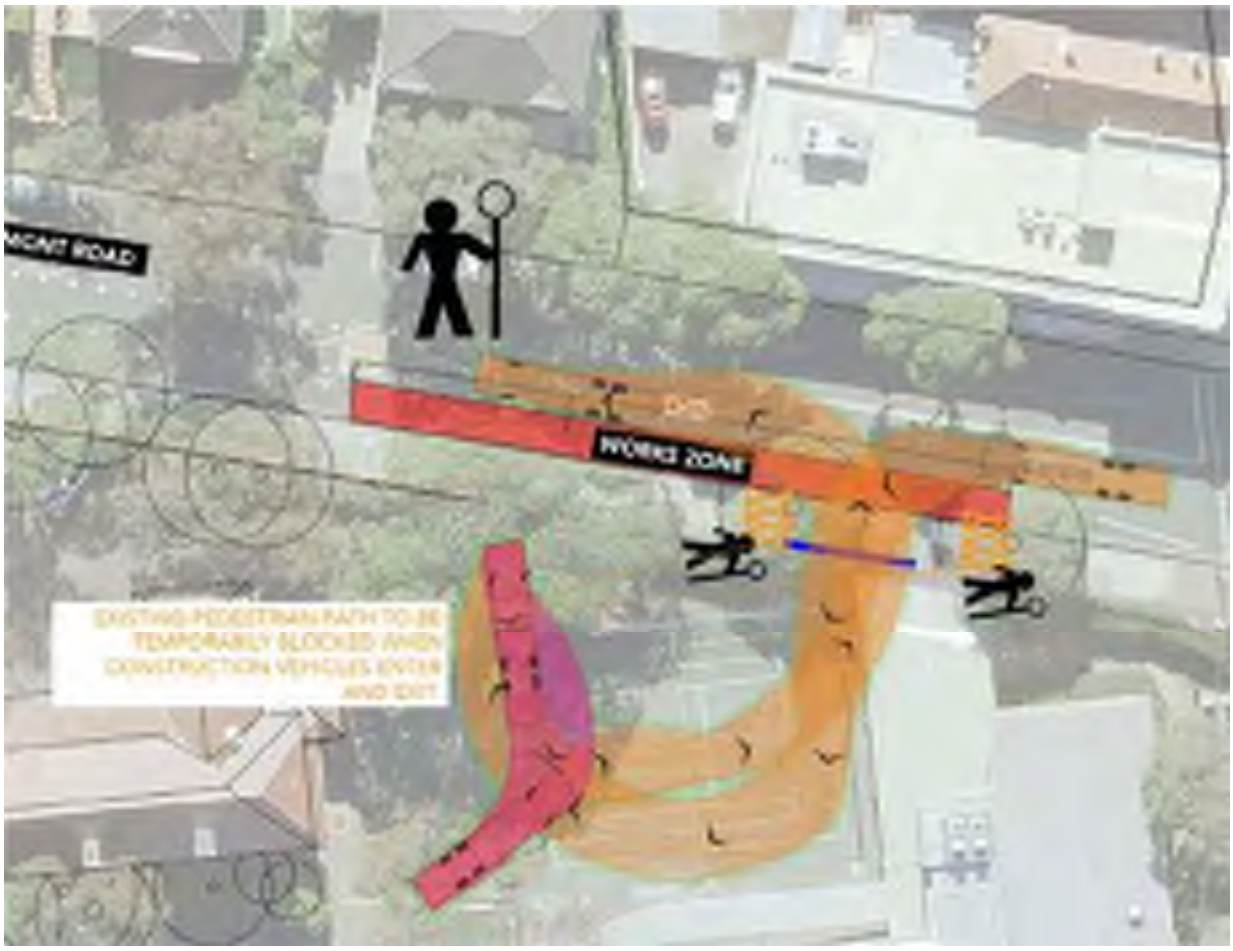

Figure 22 – Demolition Gate Access during Phase 1

5.9.5 Additional Movements during Construction Phase

During the Phase 2 and 3, the gate will be moved west to allow a maximum 12.5m HRV to enter forward in. Due to site restrictions this will require the HRV to perform a reverse manoeuvre out of the site onto Belmont Road. A TfNSW certified Traffic Controller and relevant Traffic Guidance measures (further