MTR Corporation Limited

TUEN MUN SOUTH EXTENSION

(No. EP-615/2022)

Rail Noise Mitigation Plan

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Date	:	19 April 2024

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Position	:	Independent Environmental Checker
Date	:	19 April 2024

MTR Corporation Limited

Consultancy Agreement No. C1502

Tuen Mun South Extension

Rail Noise Mitigation Plan

April 2024

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Version: 6	Date: 18 April 2024

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1 INTRODUCTION

1.1 Background

1.1.1 The Tuen Mun South Extension (TME) (hereinafter referred to as "the Project") is one of the seven recommended railway schemes in the Railway Development Strategy 2014 ("RDS-2014"). The Project will extend the Tuen Ma Line (TML), from Tuen Mun (TUM) Station southwards by about 2.4 km, terminating at a new station near Tuen Mun Ferry Pier (i.e. Tuen Mun South (TMS) Station) with an intermediate station at Tuen Mun Area 16 (i.e. A16 Station).

1.1.2 An Environmental Impact Assessment (EIA) study for the Project was conducted in accordance with EIA Study Brief No. ESB-332/2020. The EIA Report (Register No.: AEIAR-236/2022) were approved under the Environmental Impact Assessment Ordinance (EIAO), with an Environmental Permit (EP) granted on 18 August 2022 (EP No: EP-615/2022).

1.1.3 According to the EIA Report (Register No.: AEIAR-236/2022) (hereinafter referred to as "the approved EIA Report"), rail noise mitigation measures in the form of vertical noise barrier, semi-noise enclosure and noise enclosure were proposed to mitigate the potential noise exceedances at the NSRs located to the north of TMS Station (i.e. Tuen Mun Wu Hong Police Quarters), north and south of A16 Station (i.e. the planned A16 property development, Oi Tak House and Oi Lai House).

1.1.4 The construction works of the Project are tentatively scheduled to commence in Q4 2023. Pursuant to Conditions 2.15 of EP-615/2022, a Rail Noise Mitigation Plan (RNMP) shall be certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC) as conforming to the findings and recommendations of the EIA Report, and shall be submitted to the Director of Environmental Protection (DEP) for approval no later than 2 months before commencement of construction works of the Project. If there is any change to the rail noise mitigation measures in the approved RNMP, an updated RNMP shall be deposited with the DEP, no later than 1 month before the implementation of such change. The RNMP shall include the following details:

- A review of the noise mitigation measures and demonstration of the rail noise performance requirements set out in the approved EIA Report will be met with the mitigation measures; and
- Implementation schedule in table form to clearly list out the mitigation measures to be implemented, and the implementation party, location, timing, and environmental performance required for implementation of the mitigation measures.

1.2 Purpose of this Plan

1.2.1 This RNMP presents the review findings of noise mitigation measures as recommended in the approved EIA Report and the implementation schedule with location of the rail noise mitigation measures.

1.2.2 In case of any change due to the rail operation and/or the design of the rail noise mitigation measures as well as any change to the assumptions/parameters that may affect the noise performance of the TME, the RNMP should be updated accordingly to demonstrate the compliance of noise requirement with updated implementation schedule of the proposed noise mitigation measures.

2 REVIEW OF RAIL NOISE MITIGATION MEASURES

2.1 Rail Noise Attenuation System

2.1.1 To minimize the potential rail noise from the Project, a multi-plenum noise attenuation system of Twin Track and Single Track (Diagram 2.1A and 2.1B refer), as proposed in the approved EIA Report, will be adopted for the Project. Detailed design of such attenuation system is described as follows.

- Use of resilient rail base-plates for mounting tracks on viaduct to reduce vibration transmission to the viaduct structure, thereby reduce re-radiated noise from the viaduct structure;
- Mounting of track on a floating slab system to further reduce vibration transmission to the viaduct structure;
- Use of train skirts and floor with absorptive lining to create a noise-absorbing plenum beneath the train car. The train skirts would be extended to approximately 250mm above the derailment containment upstand on the floating slab in normal running;
- Use of edge wall of about 1.2m above walkway with sound absorption to form an additional barrier for sensitive receivers at lower floor levels; and
- Use of central plenum and trackside walkways (<=1.3m width) to create noise-absorbing plena on both sides of the train car.

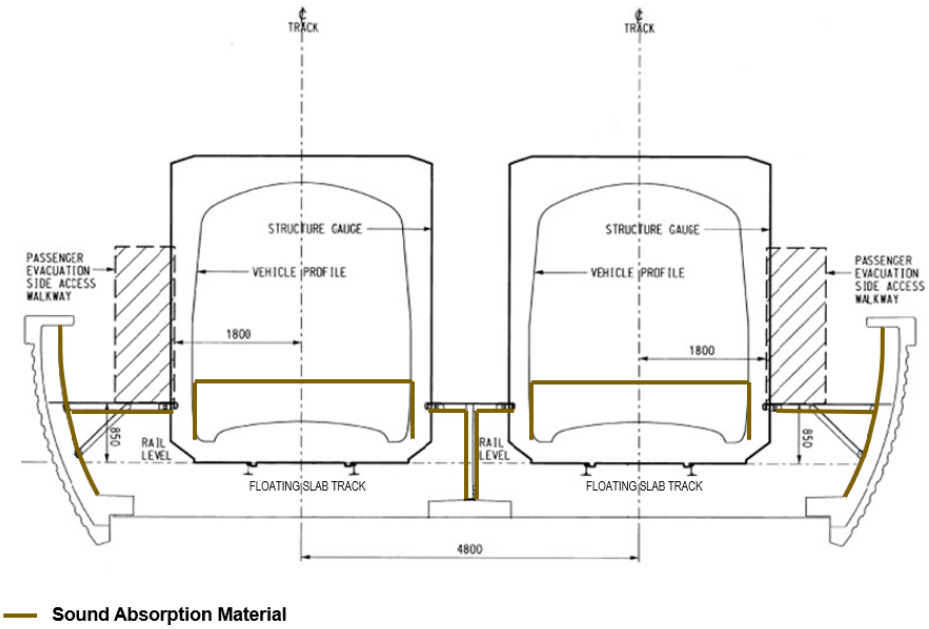


Diagram 2.1A Illustration of Multi-plenum System (Twin Track)

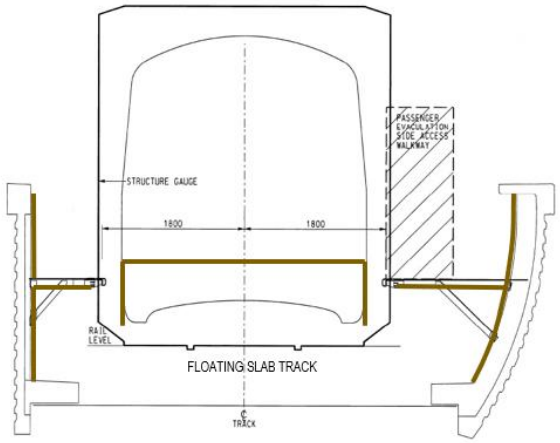


Diagram 2.1B Illustration of Multi-plenum System (Single Track)

2.2 Proposed Rail Noise Mitigation Measures

2.2.1 Based on the latest design information provided by MTR, the rail operation and the alignment of the TME remains unchanged from the EIA study, and thus the train operation parameters including the vertical profile as indicated in Appendix 2.1 of the approved EIA Report and the assumption of TME adopted in the railway noise assessment of the approved EIA Report (**Appendix A** refers) remain valid.

2.2.2 The design of TME structures including the viaduct, A16 and TMS Stations is same as those presented in the EIA study, with illustration of the design at A16 and TMS Stations is presented in **Appendix B**. In addition, same as the design adopted in the EIA stage, the rail tracks and stabling tracks at A16 Station would be fitted with floating slab track and have no structural connection with the building structure of the planned development atop A16 Station, such that vibration transmission through structural elements of building to the planned NSRs[1] atop A16 Station is not anticipated. For the TMS Station, given that the southern end is the overrun section where would not have train movement during normal operation.

2.2.3 In view of the above, it is anticipated that the railway noise impact assessment findings in the approved EIA Report remain valid. Rail noise mitigation measures in the form of semi-enclosure, enclosure with opening and vertical noise barrier as proposed in the EIA Report would still be applicable in mitigating the noise exceedances predicted at some of the NSRs during night-time period. Details of the proposed rail noise mitigation measures are provided in **Table 2.1**, with their locations depicted in the **Figure Nos. C1502/C/TME/ACM/M52/112 - 114**.

Table 2.1 Recommended Rail Noise Mitigation Measures

Track Direction(1)	Chainage	Type of Noise Mitigation Measures(2)	Length, m
Up	138+280 to 138+480	Semi-enclosure with vertical wall on East Side and open on West side. Roof shall extend up to the car body edge of Down track.	200
Up	138+520 to	Semi-enclosure with vertical wall on East side	75

[1] Design and planning parameters of A16 development, i.e. the development boundary of the planned A16 development shown in Figure C1502/C/TME/ACM/M52/113, Footnote [6], [7] and [11] of Table 4.6 of the EIA Report remain valid.

Track Direction[1]	Chainage	Type of Noise Mitigation Measures[2]	Length, m
	138+595	and open on West side. Roof shall cover both Up Track, siding and turnout.	
Up	138+595 to 138+682	Semi-enclosure with vertical wall on East side of siding track and open on West side of Up Track. Roof shall cover siding track and shall extend up to the car body edge of Up Track.	87
Up	138+981 to 139+060	Semi-enclosure start from South end of A16 Station with vertical wall on East side and open on West side. Roof shall cover whole Up Track.	79
Up	139+060 to 139+163	Semi-enclosure with vertical wall on East Side and open on West side. Roof shall cover both Up Track, Down Track, siding and turnout.	103
Up	139+582 to 139+722	Noise Enclosure with 2m wide opening at the middle of the roof	140
Down	139+585 to 139+725		140
Up	139+722 to 139+832	1m high noise barrier above exterior parapet (i.e. 3.1m above top of rail) on East side which shall extend to North end of TMS Station platform	110
Down	139+725 to 139+836	1.5m high noise barrier above exterior parapet (i.e. 3.6m above top of rail) on West side which shall extend to North end of TMS Station platform	111

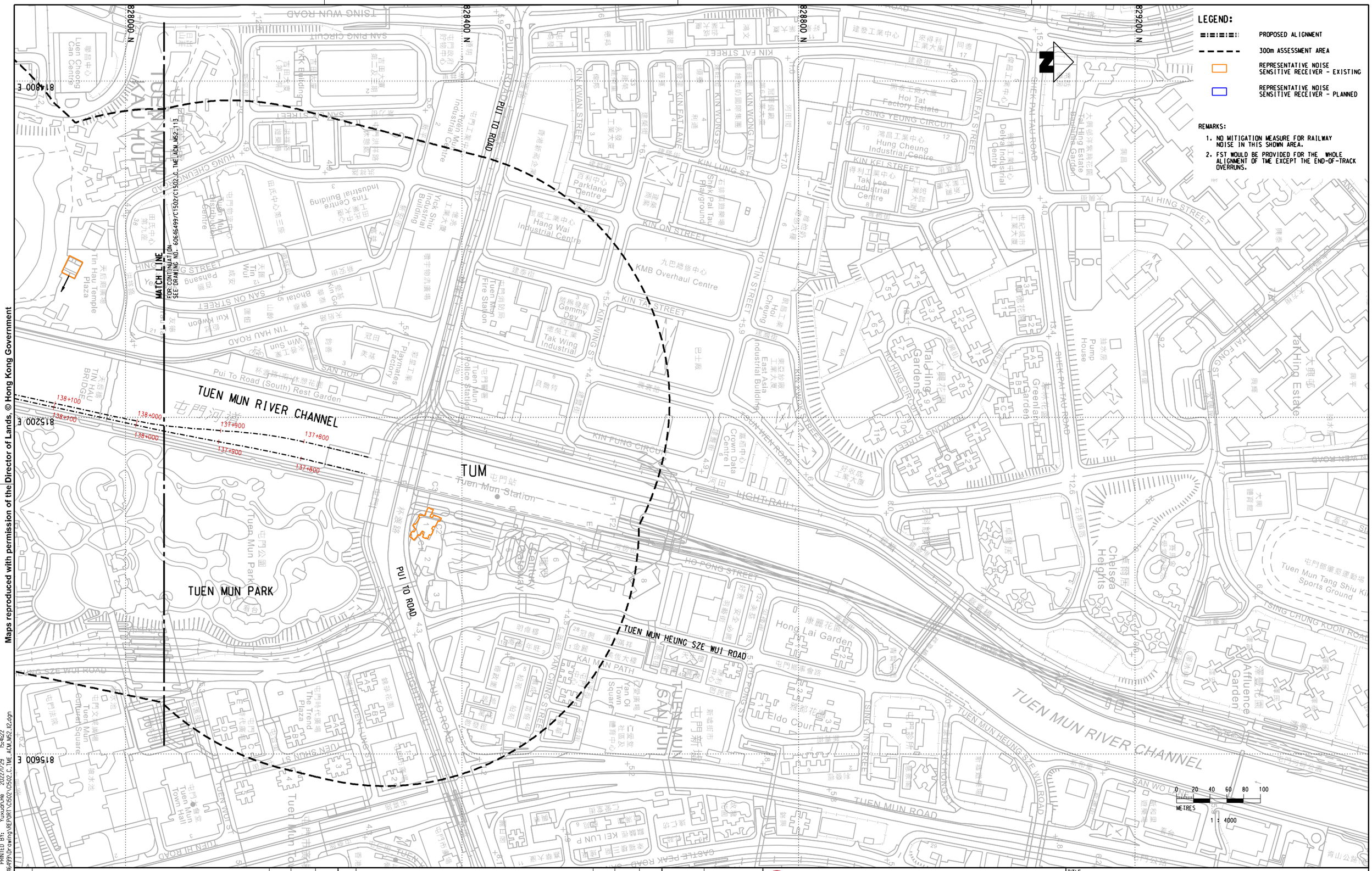
Notes:
(1) Up track – train direction to Tuen Mun South Station; Down track – train direction to Tuen Mun Station.
(2) The height of the semi-enclosure/enclosure is about 6m on top of 1.2m edge wall of viaduct subject to detailed design.

2.2.4 To reduce the sound reflection and portal effect arising from the installation of rail noise mitigation measures, internal surface of the proposed noise barriers, semi-enclosure and noise enclosure with opening would be equipped with acoustic panel or sound absorption lining.

2.2.5 With the implementation of the proposed rail noise mitigation measures provide in **Table 2.1**, both predicted rail noise operation of the Project and the cumulative rail noise impact would comply with the rail noise performance requirements set out in the approved EIA Report.

2.2.6 The implementation schedule of the proposed rail noise mitigation measures is provided in **Appendix C**.

Figures



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TUEN MUN SOUTH EXTENSION

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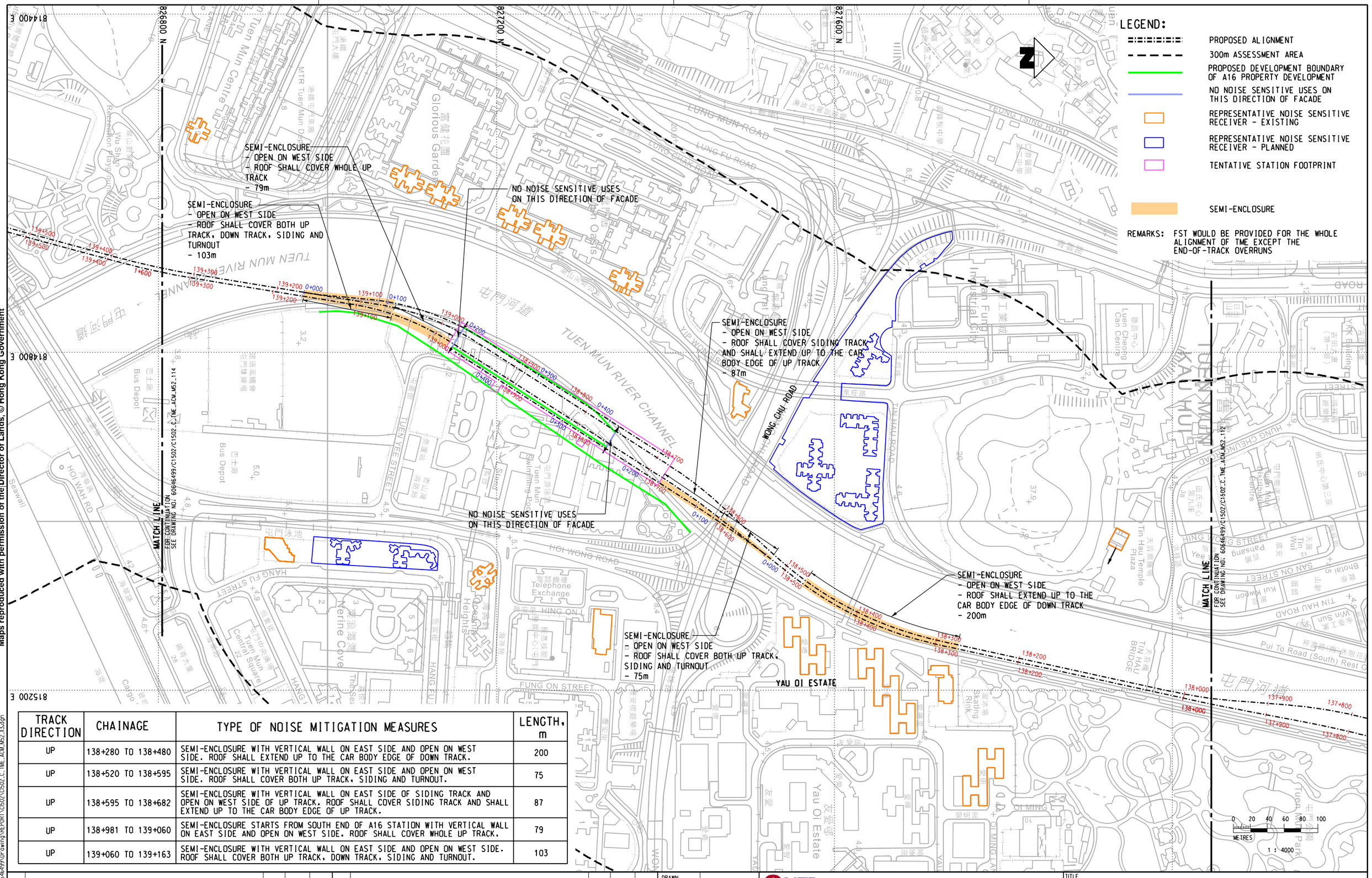
TITLE
C1502
TUEN MUN SOUTH EXTENSION
MITIGATION MEASURES FOR RAILWAY NOISE
(SHEET 1 OF 3)

SCALE 1 : 4000 (A3)

FIGURE NO. C1502/C/TME/ACM/M52/112

REV. A



TRACK DIRECTION	CHAINAGE	TYPE OF NOISE MITIGATION MEASURES	LENGTH, m
UP	138+280 TO 138+480	SEMI-ENCLOSURE WITH VERTICAL WALL ON EAST SIDE AND OPEN ON WEST SIDE. ROOF SHALL EXTEND UP TO THE CAR BODY EDGE OF DOWN TRACK.	200
UP	138+520 TO 138+595	SEMI-ENCLOSURE WITH VERTICAL WALL ON EAST SIDE AND OPEN ON WEST SIDE. ROOF SHALL COVER BOTH UP TRACK, SIDING AND TURNOUT.	75
UP	138+595 TO 138+682	SEMI-ENCLOSURE WITH VERTICAL WALL ON EAST SIDE OF SIDING TRACK AND OPEN ON WEST SIDE OF UP TRACK. ROOF SHALL COVER SIDING TRACK AND SHALL EXTEND UP TO THE CAR BODY EDGE OF UP TRACK.	87
UP	138+981 TO 139+060	SEMI-ENCLOSURE STARTS FROM SOUTH END OF A16 STATION WITH VERTICAL WALL ON EAST SIDE AND OPEN ON WEST SIDE. ROOF SHALL COVER WHOLE UP TRACK.	79
UP	139+060 TO 139+163	SEMI-ENCLOSURE WITH VERTICAL WALL ON EAST SIDE AND OPEN ON WEST SIDE. ROOF SHALL COVER BOTH UP TRACK, DOWN TRACK, SIDING AND TURNOUT.	103

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

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TITLE

C1502
TUEN MUN SOUTH EXTENSION
MITIGATION MEASURES FOR RAILWAY NOISE (SHEET 2 OF 3)

SCALE 1 : 4000 (A3)

FIGURE NO. C1502/C/TME/ACM/M52/113

REV. A

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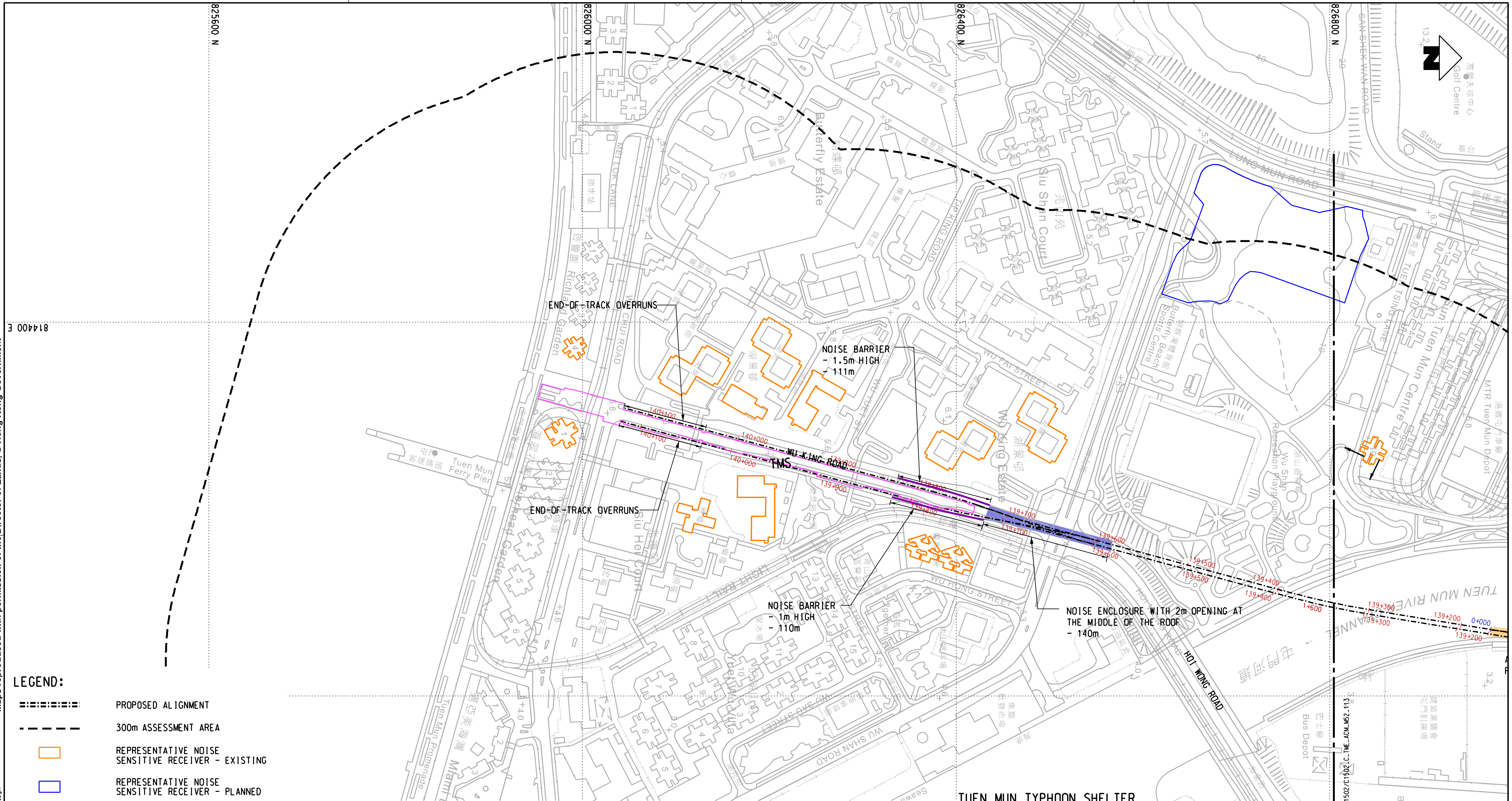

LEGEND:

- PROPOSED ALIGNMENT
- 300m ASSESSMENT AREA
- REPRESENTATIVE NOISE SENSITIVE RECEIVER - EXISTING
- REPRESENTATIVE NOISE SENSITIVE RECEIVER - PLANNED
- TENTATIVE STATION FOOTPRINT
- ENCLOSURE WITH OPENING
- NOISE BARRIER

REMARKS: FST WOULD BE PROVIDED FOR THE WHOLE ALIGNMENT OF TME EXCEPT THE END-OF-TRACK OVERRUNS

TRACK DIRECTION	CHAINAGE	TYPE OF NOISE MITIGATION MEASURES	LENGTH, m
UP	139+582 TO 139+722	NOISE ENCLOSURE WITH 2m WIDE OPENING AT THE MIDDLE OF THE ROOF.	140
DOWN	139+585 TO 139+725		
UP	139+722 TO 139+832	1m HIGH NOISE BARRIER ABOVE EXTERIOR PARAPET (I.E. 3.1m ABOVE TOP OF RAIL) ON EAST SIDE WHICH SHALL EXTEND TO NORTH END OF TMS STATION PLATFORM.	110
DOWN	139+725 TO 139+836	1.5m HIGH NOISE BARRIER ABOVE EXTERIOR PARAPET (I.E. 3.6m ABOVE TOP OF RAIL) ON WEST SIDE WHICH SHALL EXTEND TO NORTH END OF TMS STATION PLATFORM.	111

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TUEN MUN SOUTH EXTENSION

ORIGINATOR: AECOM

TITLE

C1502
TUEN MUN SOUTH EXTENSION
MITIGATION MEASURES FOR RAILWAY NOISE
(SHEET 3 OF 3)

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SCALE 1 : 4000 (A3) | FIGURE NO. C1502/C/TME/ACM/M52/114 | REV. A

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Appendix A

Assessment Assumptions and Operation Parameters

Assumptions Adopted in Railway Noise Assessment

Item	Parameters
Train Type and No. of Car	• Electric Multiple Unit train, train length 200m for 8-car train
Train Source Term(1) for 8-car train at 130kph at 25m	• Rolling Noise: SEL = 81.4 dB(A) (2) • Structure Re-radiated Noise: ▪ Typical Viaduct, Plain Track – Leq, 30min = 40.6 dB(A) ▪ Viaduct, turn out inside enclosure – Leq,30min = 47.1 dB(A) • Air-Conditioning Noise: ▪ Lmax = 48.8 dB(A) (at viaduct for running train) ▪ Lmax = 54.8 dB(A) (at station for running train) ▪ SWL = 83.5 dB(A) (at station for each Air-conditioning unit of stationary train)
Train Frequency per hour per Direction	Mainline(3): • 28 number during peak daytime period (0700 – 2300 hours) • 20 number during peak night-time period (2300 – 0700 hours) Sidings(4): • 2 number during daytime and night-time periods
Gap Size(5) Correction	+10 log(G/250)
Speed Correction	Speed Profile(6) of TME is provided in **Appendix 4.15B**. 20 log10 (V/Vref) • where V = Train speed, Vref = Reference train speed
Train Frequency Correction	+10 log10 (N) where N = Train frequency per 30 min per Direction
Distance Correction	Cdist = – 10 $\log_{10}$ (dist/25) where dist is the perpendicular slant distance of track segment to NSR in meters
Screen Correction	As per CRN Chart 6(a) & Chart 6(c)
Angle of View Correction	Cangl = 10 $\log_{10}$ [$\pi\theta/180$ – cos 2αsin θ] – 5 where θ is angle subtended by the segment at NSR, and α is orientation of the segment along the trajectory of the track *Ref: CRN Chart 7*
Air Absorption Correction	Cair = 0.2 – 0.008 x d' (where dist is slant distance from track to NSR) *Ref: CRN Chart 4*
Reflection Correction	Crefl = 1.5 (θ'/θ) dB(A) (θ' is the sum of the angles subtended by all reflecting facades on the opposite side of the railway facing the receiver point and θ is the total angle subtended by the source line at the receiver point, +1.5dB maximum correction for each reflection *Ref: CRN Clause 31.2)*

Item	Parameters
Façade Correction	+2.5 dB(A)
Rail and Rolling Stock Condition Deterioration	+3 dB(A)
Joint/Turnout Correction	+7 dB(A)

Notes:

(1) Considering that the design of TME would adopt same design configuration of the WRL, i.e. floating slab track (FST) for minimisation of structural-borne noise, and a multi-plenum system which includes (1) an undercar sound-absorbing plenum formed by vehicle side skirts; (2) "under-walkway" sound-absorbing plena on both sides of vehicle; and (3) edge walls with sound absorption for minimisation of air-borne noise, the source term as adopted in West Rail Operation Noise Assessment Report (July 2015) would be applicable to the rail noise assessment of TME.

(2) According to rolling noise source term adopted in *West Rail Operation Noise Assessment Report* (July 2015), SEL of 8-car train at 130 kph at 25m for down track (to Hung Hom) and up track (to Tuen Mun) are 81.4 dB(A) and 80.7 dB(A) respectively. As a conservative approach, SEL of 81.4 dB(A) was adopted for rail noise assessment. Reference was also made on *West Rail Operation Noise Assessment Report* (July 2015) for the source term of structure re-radiated noise and A/C noise.

(3) Train frequency of the Project follows the current train frequency of WRL and are same as those adopted in *West Rail Operation Noise Assessment Report* (July 2015). The 30-minute train movement will be 50% of the hourly movements provided.

(4) There will only be a maximum of 1 number of siding train per 30 minutes during day-time, evening and night-time periods and the multi-plenum system will be provided on the viaduct of the stabling sidings.

(5) The standard gap size between the train and walkway of TME is 250mm at the plain track and up to about 400mm at the curve track area. Following the same assessment approach as adopted in WRL, a correction factor of +10 log(G/250) was included in the calculation according to the identified gap size location larger than 250mm.

(6) Train speed will be controlled by automatic signal control system and thus the trains running on TME will be operated according to the train speed profile.

Remark:

SEL = Lmax + 10log(L/V) +10.5 – 10log[(4D/(4D2+1)) + 2tan-1(1/(2D))]

where D = d/L, d = perpendicular distance from the track (m), L = train length (m) and V = train speed (km per hour)

Modelling Assumptions and Calculation Methodology

Item	Details of Assumptions/Methodology
Modelling Assumptions	• Rolling Noise: At 0.9m above top of rail level • Structure Re-radiated Noise : At 1m below top of rail level and 1m away from parapet wall horizontally • Air-Conditioning Noise: At 4m above top of rail level(1) • Rolling Noise through vent at A16 Station: SWL of 53.5 dB(A) per unit area • Air-Conditioning Noise from stationary train at TMS Station: Time factor of 50%(2) (with trains swap to park in each platform in turn, and thus stationary train will stay about 50% of time) • Openings of the sidings at A16 Station: 1.5m in height • Operation mode within sidings: Train will not idle in the sidings (i.e. train will be shut down after arrival / will be started only before launching to mainline) • At least 50% of the sidewall of the sidings provided with acoustic panel with a minimum absorptive coefficient of 0.7. • Mainline completely segregated from the sidings with solid walls such that the noise from the mainline will not break out via the openings of the sidings • Maximum train speed within sidings limited to 25kph • Ceiling roof of TMS Station with acoustic panels • Building structure of about 23.4mPD at both ends of TMS Station
Calculation Methodology	• Rolling Noise (Line Source): CRN(3) • Structure Re-radiated Noise (Line Source): CRN(3) • Air-Conditioning Noise for running train (Line Source): CRN(3) • Air-Conditioning Noise for stationary train (Point Source): ISO 9613 • Rolling Noise through vent at A16 station, Area Source(4): ISO 9613 • Gap Size Correction: +10 log(G/250) • Speed Correction: 20 log10 (V/Vref) where V = Train speed, Vref = Reference train speed • Train Frequency Correction: +10 log10 (N) where N = Train frequency per 30 min per Direction • Distance Correction (CRN): Cdist = – 10 log10 (dist/25) where dist is the perpendicular slant distance of track segment to NSR in meters • Screen Correction: CRN Chart 6(a) & Chart 6(c) • Angle of View Correction: Cangl = 10 $\log_{10}$ [$\pi\theta/180$ – cos 2αsin θ] – 5 where θ is angle subtended by the segment at NSR, and α is orientation of the segment along the trajectory of the track (Ref: CRN Chart 7) • Air Absorption Correction: Cair = 0.2 – 0.008 x d' where dist is slant distance from track to NSR (Ref: CRN Chart 4)

Item	Details of Assumptions/Methodology
	• Reflection Correction: 1.5 (θ'/θ) dB(A) where θ' is the sum of the angles subtended by all reflecting facades on the opposite side of the railway facing the receiver point and θ is the total angle subtended by the source line at the receiver point, +1.5dB maximum correction for each reflection (Ref: CRN Clause 31.2) • Façade Correction: +2.5 dB(A) • Rail and Rolling Stock Condition Deterioration: +3 dB(A) • Joint/Turnout Correction: +7 dB(A)
Gap Size	

Alignmnet	Curve No.	TML Chainage		Outside Curve	Inside Curve
		Start	End	Hori. Distance between Train Floor and Walkway (mm)	Hori. Distance between Train Floor and Walkway (mm)
Up Track	1	137+776.121	137+874.997	**286**	**270**
	2	137+924.729	138+004.944	**279**	**263**
	3	138+274.444	138+513.017	**368**	**330**
	4	138+585.560	138+690.664	**332**	**300**
A16-STATION					
	5	138+969.066	139+116.175	**400**	**380**
	6	139+265.977	139+412.218	**318**	**282**
TURNOUT	7	139+667.577	139+702.562	**336**	**336**
	8	139+716.485	139+778.994	**315**	**315**
TMS-STATION					
Dn Track	1	137+774.245	137+895.503	**358**	**326**
	2	137+920.548	138+032.236	**351**	**317**
	3	138+274.812	138+545.449	**367**	**333**
	4	138+585.648	138+698.869	**371**	**339**
A16-STATION					
	5	138+942.868	139+089.978	**400**	**380**
	6	139+270.410	139+415.994	**319**	**281**
TURNOUT	7	139+671.438	139+706.423	**336**	**336**
	8	139+720.346	139+782.855	**315**	**315**
TMS-STATION					
Dn Track					
TURNOUT	1	0+000.493	0+035.478	**336**	**336**
	2	0+061.671	0+221.300	**390**	**390**
Up Track					
TURNOUT	1	0+000.493	0+035.478	**336**	**336**
	2	0+053.242	0+113.647	**278**	**278**

Notes:

(1) There would be 2 A/C units at the roof of each car. For a 8-car train, there would be a total of 16 A/C units.

(2) The assumption of time factor (i.e. 50%) of Air-Conditioning Noise from stationary train at TMS station is based on worst-case scenario as confirmed by the MTRC.

(3) The train source term adopted in this noise assessment was made reference from the noise measurement for the existing viaduct of West Rail. Given that the Project would adopt same multi-plenum system, the corrections for slab-track, bridges and viaduct, and ballast would not be required.

(4) Prediction of noise emission from the openings is provided in Appendix 4.15A-1

A16 Siding Train Noise Emission from Openings

No. of Car	n	8
Train Length (m)	L	200
Ref. Train Speed (km/h)	Vr	130
Ref. Setback Distance (m)	D	25
Ref. SEL (dBA)	SELr	81.4
Train Speed (km/h)	V	25
Track wear correction	Cw	3
SEL (dBA)	SEL=SELr+20*LOG(V/Vr)+Cw	70.1
No. of passby	N	1
SPL Leq,30min (dBA)	SPL = SEL-10*log(30*60)+10*log(N)	37.5
Line source power density (dBA)	Lw' = SPL+8+10*log(D)-10*log(2*atan(L/2D))	55.7
Line source power for whole train (dBA)	Lw = Lw'+10*log(L)	78.7

Ref: Transportation Noise Reference Book equation 2.19

SPL of Train in Siding
Siding Room Internal Dimension

	Length L	Width W	Height H
m	300	6.4	7

Absorption coefficient

Material	Concrete Finishes	Open End	Acoustic Panel
α	0.02	1.00	0.70

Internal walls inside the siding

Side Wall				**Open End at Exit**		**Closed End Wall**		**Ceiling**		**Floor**	
S	α	S	α	S	α	S	α	S	α	S	α
LxH		LxH		WxH		WxH		LxW		LxW	
sq.m	50% Concrete Finishes	sq.m	50% Acoustic Panel	sq.m	Open End	sq.m	Concrete Finishes	sq.m	Concrete Finishes	sq.m	Concrete Finishes
1050.0	0.02	1050.0	0.70	44.8	1.00	44.8	0.02	1920.0	0.02	1920.0	0.02

Room Absorption			
Total S	Total Sα	Average α	R
sq feet			
8129.6	1634.5	0.201	2045.8

Distance to Opening	Directivity	SPL of Train in Siding
r	Q	Lp
m		dBA
6	4	53.5

Ref Formula: general equation for calculating sound pressure from sound power in reverberant room.
Lp=Lw+10log(Q/(pi*r*L)+4/R)

SWL for One Train at Opening of Siding

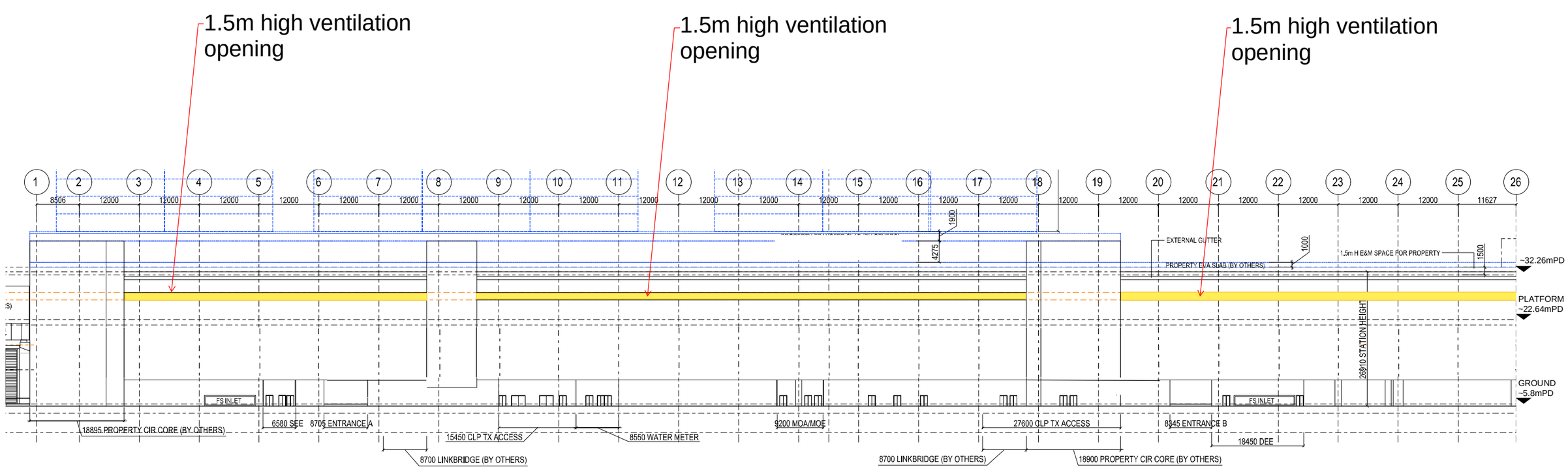
Length	Height	S	SWL at opening	SWL per unit area at opening
L	H	LxH		
m	m	sq m	dBA	dBA/sq.m
200	1.5	300.0	78.2	53.5

Facade Correction	CadnaA Input of SWL per unit area at opening
dB	dBA/sq.m
2.5	56.0

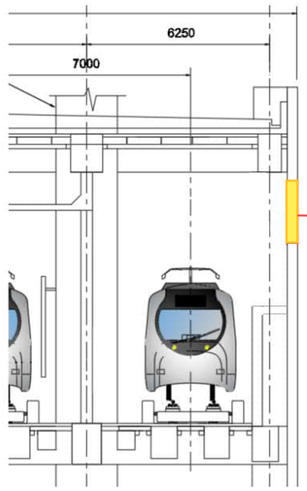
Legend:
Lw: Sound Power Level dB re 10-12 W

SPL (or Lp): Sound Pressure Level dB re 20μPa
α: Absorption coefficient of wall/ceiling/opening
S: Surface area
R: Room constant
r: Setback from train inside the siding to opening

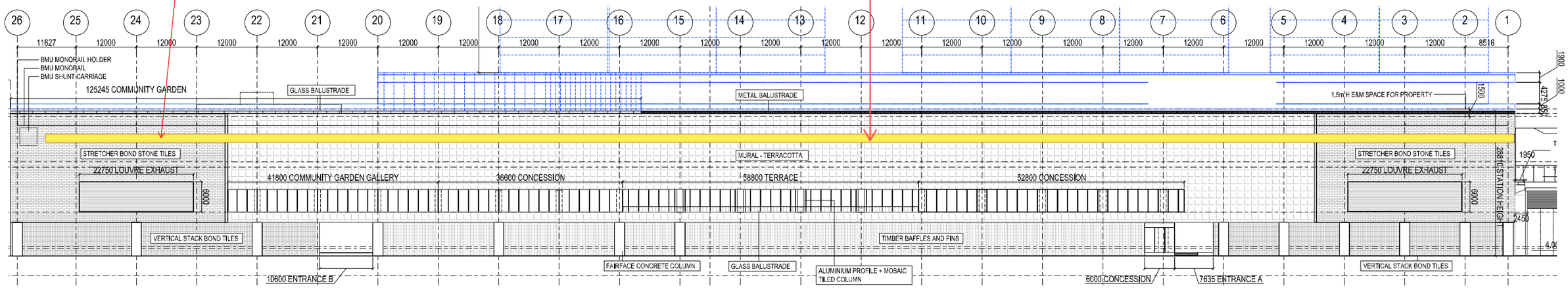
Q: Directivity factor

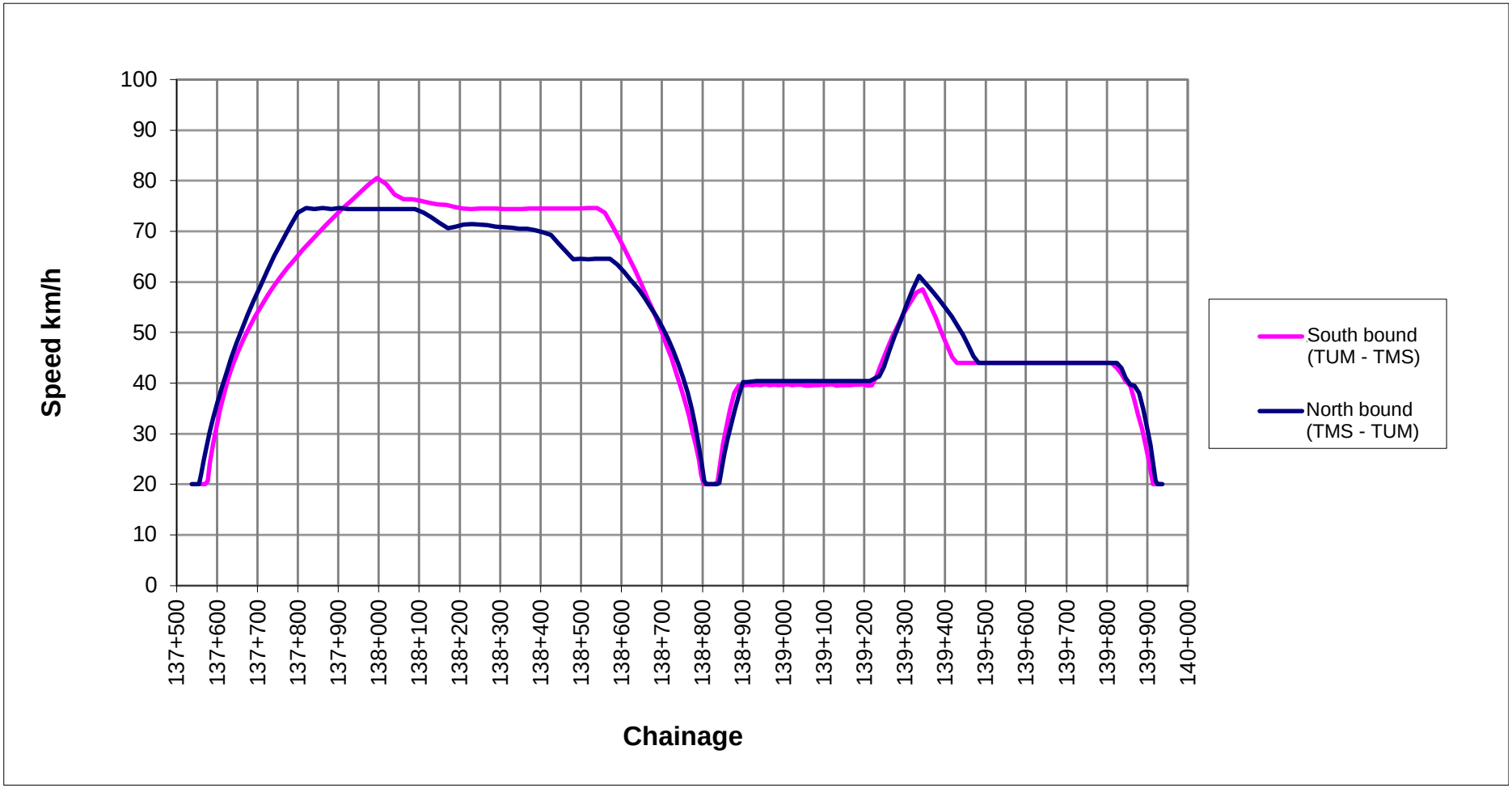

1.5m high ventilation opening
1.5m high ventilation opening
1.5m high ventilation opening
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
8506 12000 11627
1900
4275
EXTERNAL GUTTER
PROPERTY E/A SLAB (BY OTHERS)
1000
1.5m H E&M SPACE FOR PROPERTY
1500
~32.26mPD
PLATFORM ~22.64mPD
GROUND ~5.8mPD
26910 STATION HEIGHT
FS INLET
FS INLET
18895 PROPERTY CIR CORE (BY OTHERS)
6580 SEE 8705 ENTRANCE A
15450 CLP TX ACCESS
8550 WATER METER
9200 MDA/MOE
27600 CLP TX ACCESS
8545 ENTRANCE B
18450 DEE
8700 LINKBRIDGE (BY OTHERS)
8700 LINKBRIDGE (BY OTHERS)
18900 PROPERTY CIR CORE (BY OTHERS)

TYPICAL SECTION OF SIDING



1.5m high ventilation opening




Speed km/h
100
90
80
70
60
50
40
30
20
10
0
137+500
137+600
137+700
137+800
137+900
138+000
138+100
138+200
138+300
138+400
138+500
138+600
138+700
138+800
138+900
139+000
139+100
139+200
139+300
139+400
139+500
139+600
139+700
139+800
139+900
140+000
Chainage
South bound
(TUM - TMS)
North bound
(TMS - TUM)

Appendix B

Design of TME Structures (For Illustrative Purpose)

826000 N
827000 N
828000 N
814000 E
815000 E
816000 E

LEGEND:

PROPOSED ALIGNMENT

TENTATIVE STATION FOOTPRINT

APPROXIMATE LOCATION OF BUILDING STRUCTURES AT STATION

TUEN MUN RIVER CHANNEL

CASTLE PEAK BAY (TSING SHAN WAN)

0 50 100 150 200 250
METRES
1 : 10000

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APPROVED	
DATE	

MTR

TUEN MUN SOUTH EXTENSION

ORIGINATOR

AECOM

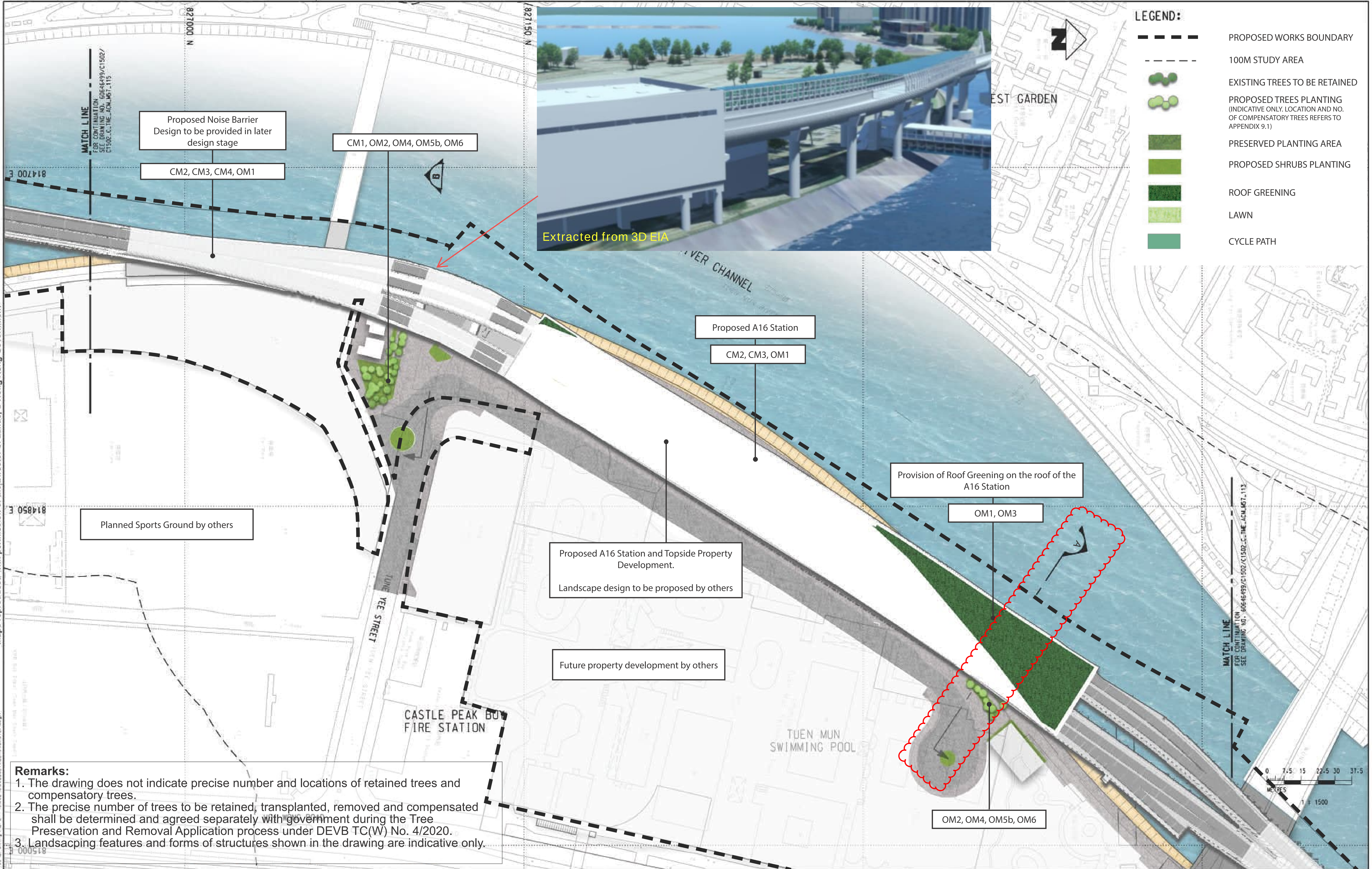
CADD REF.
C1502_C_TME_ACM_M50_101.dgn

TITLE
C1502
TUEN MUN SOUTH EXTENSION
APPROXIMATE LOCATION OF BUILDING STRUCTURES AT STATION

SCALE
1 : 10000 (A3)

FIGURE NO.
C1502/C/TME/ACM/M50/101

REV.
A



LEGEND:
PROPOSED WORKS BOUNDARY
100M STUDY AREA
EXISTING TREES TO BE RETAINED
PROPOSED TREES PLANTING
(INDICATIVE ONLY. LOCATION AND NO. OF COMPENSATORY TREES REFERS TO APPENDIX 9.1)
PRESERVED PLANTING AREA
PROPOSED SHRUBS PLANTING
ROOF GREENING
LAWN
CYCLE PATH
Extracted from 3D EIA
Proposed Noise Barrier Design to be provided in later design stage
CM2, CM3, CM4, OM1
CM1, OM2, OM4, OM5b, OM6
Proposed A16 Station
CM2, CM3, OM1
Provision of Roof Greening on the roof of the A16 Station
OM1, OM3
Planned Sports Ground by others
Proposed A16 Station and Topside Property Development.
Landscape design to be proposed by others
Future property development by others
OM2, OM4, OM5b, OM6
CASTLE PEAK BAY FIRE STATION
TUEN MUN SWIMMING POOL
TUNG YEE STREET
MATCH LINE
827000 N
827150 N
814700 E
814850 E
815000 E
1 : 1500
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Remarks:

1. The drawing does not indicate precise number and locations of retained trees and compensatory trees.
2. The precise number of trees to be retained, transplanted, removed and compensated shall be determined and agreed separately with government during the Tree Preservation and Removal Application process under DEVB TC(W) No. 4/2020.
3. Landsacping features and forms of structures shown in the drawing are indicative only.

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TUEN MUN SOUTH EXTENSION

ORIGINATOR: AECOM

CADD REF. C1502_C_TME_ACM_M57_114.dgn

TITLE

C1502

TUEN MUN SOUTH EXTENSION

LANDSCAPE MITIGATION PLAN

(SHEET 3 OF 5)

SCALE 1 : 1500 (A3)

REV. A

Remarks:
1. The drawing does not indicate precise number and locations of retained trees and compensatory trees.
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3. Landsacping features and forms of structures shown in the drawing are indicative only.

LEGEND:

- PROPOSED WORKS BOUNDARY
- 100M STUDY AREA
- EXISTING TREES TO BE RETAINED
- PROPOSED TREES PLANTING (INDICATIVE ONLY. LOCATION AND NO. OF COMPENSATORY TREES REFERS TO APPENDIX 9.1)
- PRESERVED PLANTING AREA
- PROPOSED SHRUBS PLANTING
- ROOF GREENING
- LAWN
- CYCLE PATH

Proposed viaduct structure between TMS Station and Tuen Mun River Bridge

CM2, CM3, CM4, OM1

Reinstatement of the landscaping area of riverside promenade adjacent to Wu Shan Cycle Park and Tuen Mun Road Safety Town

CM5, OM2, OM6

Proposed Tuen Mun River Bridge

CM4, OM1

Reinstatement of the landscaping area of Tuen Mun Road Safety Town

CM5, CM6, OM2, OM4, OM6

CM6

Reinstatement of Car Parking Area or Future Planned Development

Reinstatement of Temporarily Disturbed Landscape Areas Layout subject to detail design in later stage.

WU KING ROAD

HOI WONG ROAD

MATCH LINE FOR CONTINUATION SEE DRAWING NO.: 606464/93/C1502/C1502_C_TME_ACM_M57_116

MATCH LINE FOR CONTINUATION SEE DRAWING NO.: 606464/99/C1502/C1502_C_TME_ACM_M57_114

N 826700

N 826850

814700 E

814850 E

0 7.5 15 22.5 30 37.5
METRES
1 : 1500

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TUEN MUN SOUTH EXTENSION

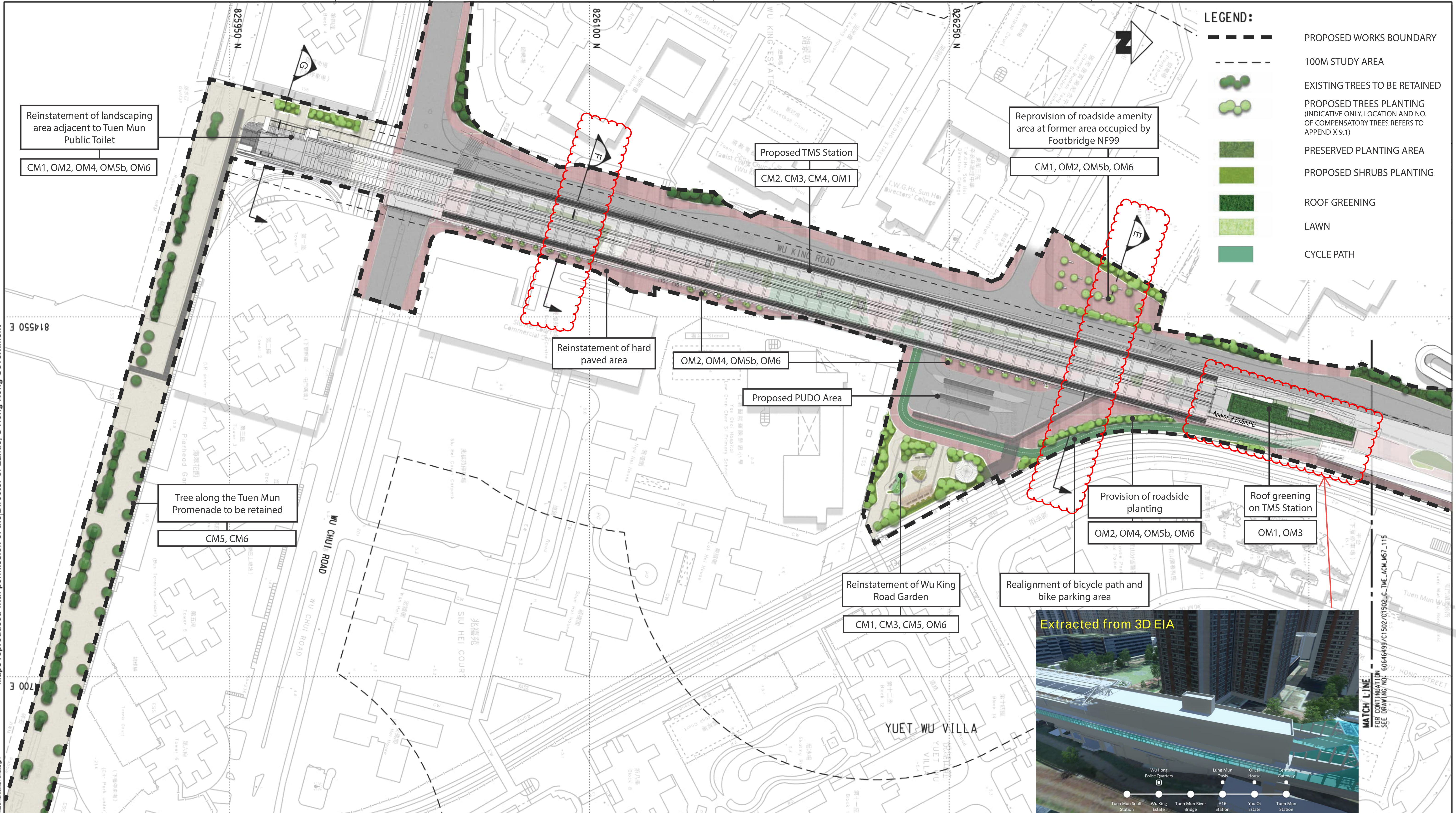
ORIGINATOR AECOM

CADD REF. C1502_C_TME_ACM_M57_115.dgn

TITLE
C1502
TUEN MUN SOUTH EXTENSION
LANDSCAPE MITIGATION PLAN
(SHEET 4 OF 5)

SCALE 1 : 1500 (A3)

REV. A



Remarks:

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MTR

TUEN MUN SOUTH EXTENSION

ORIGINATOR: AECOM

TITLE: C1502
TUEN MUN SOUTH EXTENSION
LANDSCAPE MITIGATION PLAN
(SHEET 5 OF 5)

CADD REF. C1502_C_TME_ACM_M57_116.dgn

SCALE 1 : 1500 (A3)

REV. A

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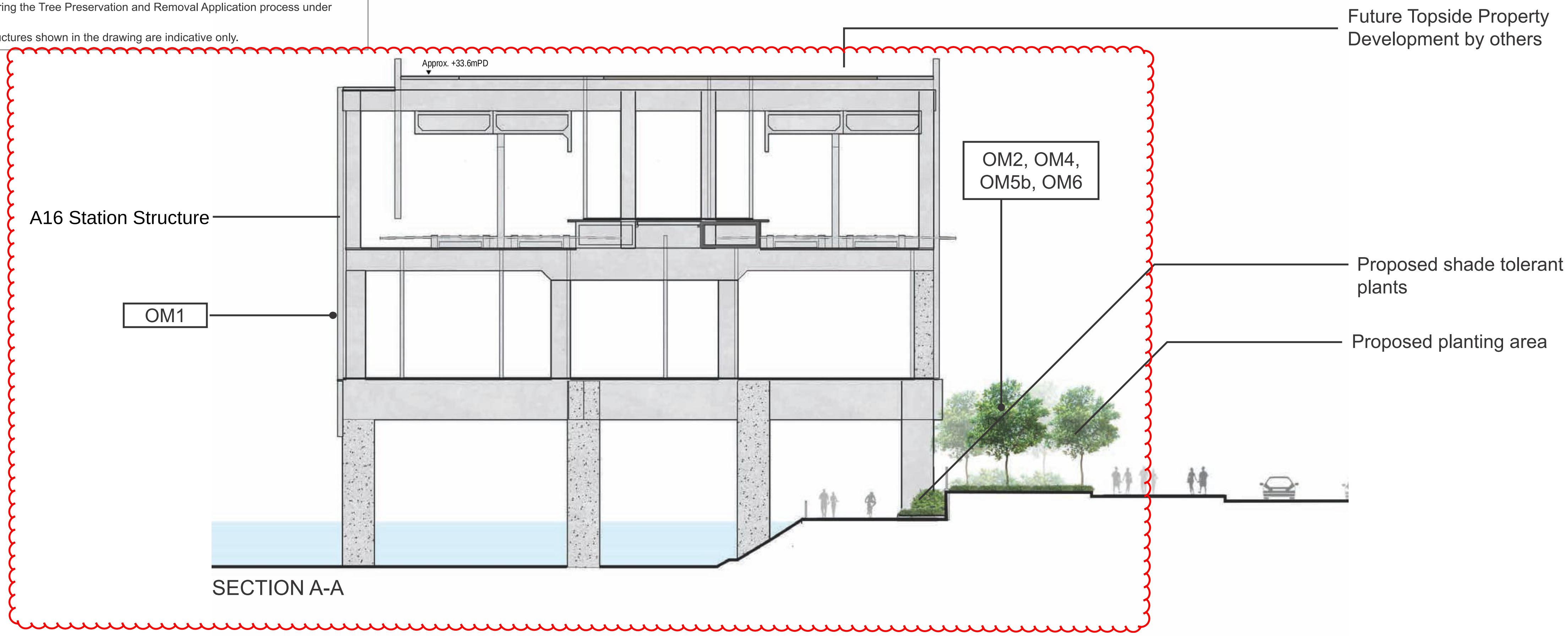

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CHECKED
APPROVED
DATE

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TUEN MA EXTENSION

ORIGINATOR

AECOM

CADD REF. C1502_C_TME_ACM_M57_117.dgn

TITLE

C1502

TUEN MUN SOUTH EXTENSION

IMPLEMENTATION OF MITIGATION MEASURES - SECTION (SHEET 1 OF 4)

SCALE N.T.S.

REV. A

Remarks:
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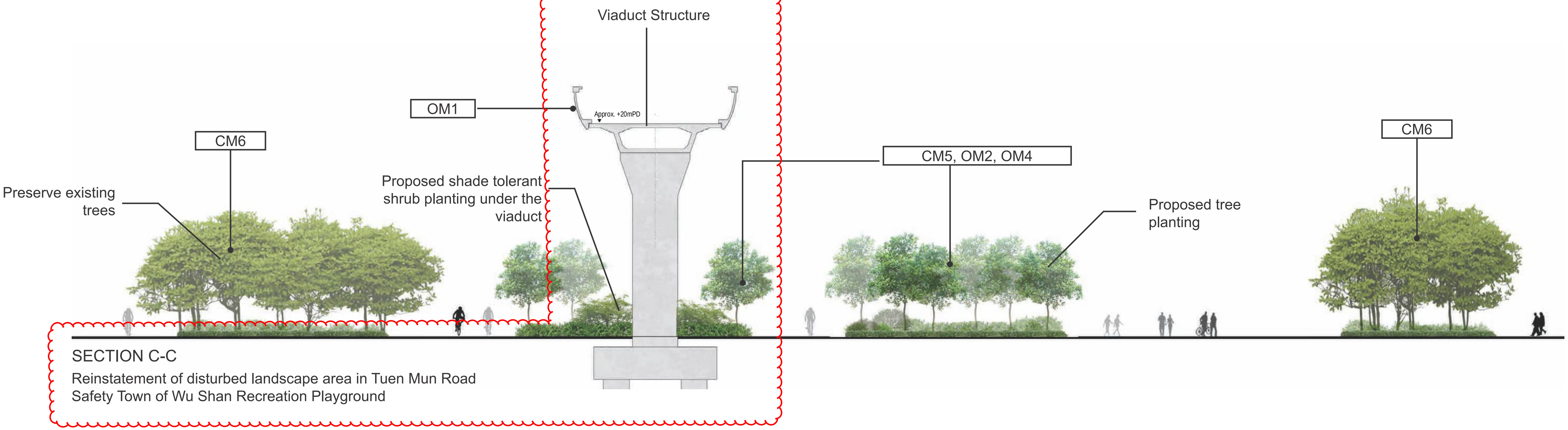

SECTION C-C

Reinstatement of disturbed landscape area in Tuen Mun Road Safety Town of Wu Shan Recreation Playground

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DESIGNED
CHECKED
APPROVED
DATE

MTR

TUEN MA EXTENSION

ORIGINATOR
AECOM

CADD REF. C1502_C_TME_ACM_M57_118.dgn

TITLE
C1502
TUEN MUN SOUTH EXTENSION
IMPLEMENTATION OF MITIGATION MEASURES - SECTION
(SHEET 2 OF 4)

SCALE N.T.S.

REV. A

Remarks:

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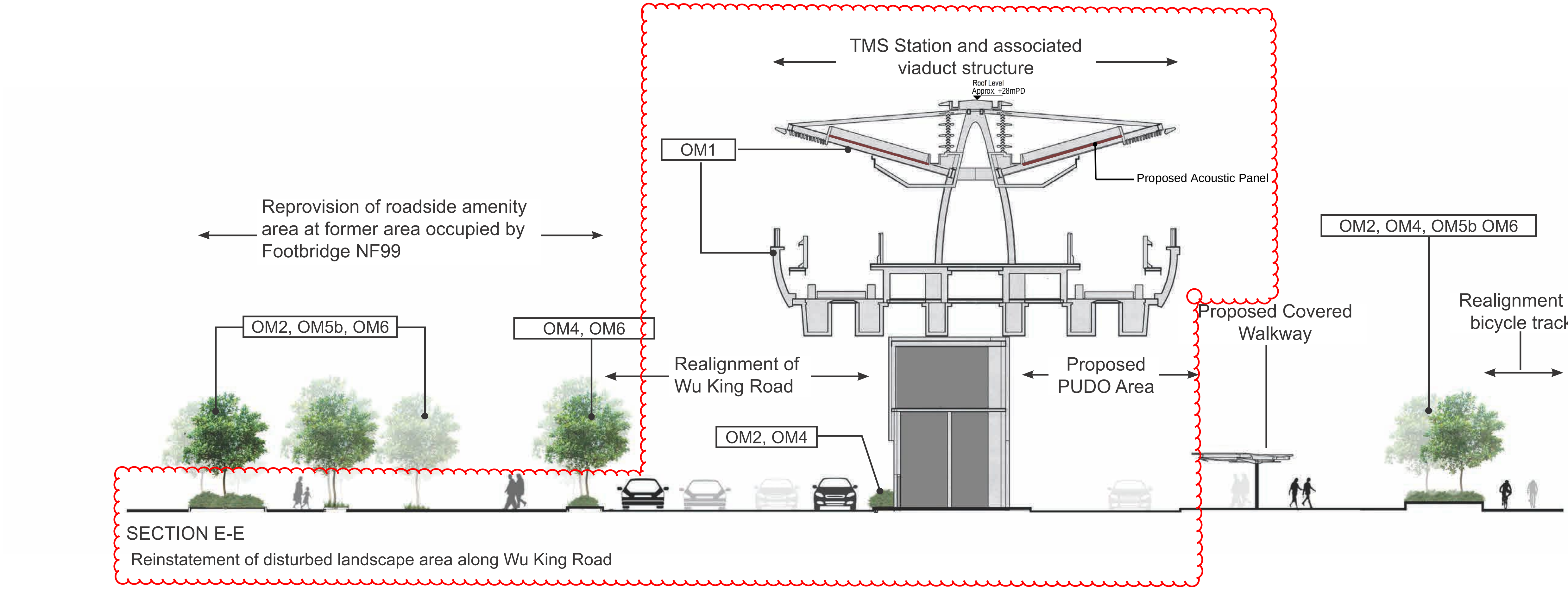
3. Landsacping features and forms of structures shown in the drawing are indicative only.



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TUEN MA EXTENSION

ORIGINATOR AECOM

CADD REF. C1502_C_TME_ACM_M57_119.dgn

TITLE
C1502
TUEN MUN SOUTH EXTENSION
IMPLEMENTATION OF MITIGATION MEASURES - SECTION
(SHEET 3OF 4)

SCALE N.T.S.

REV. A

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Remarks:
1. The drawing does not indicate precise number and locations of retained trees and compensatory trees.
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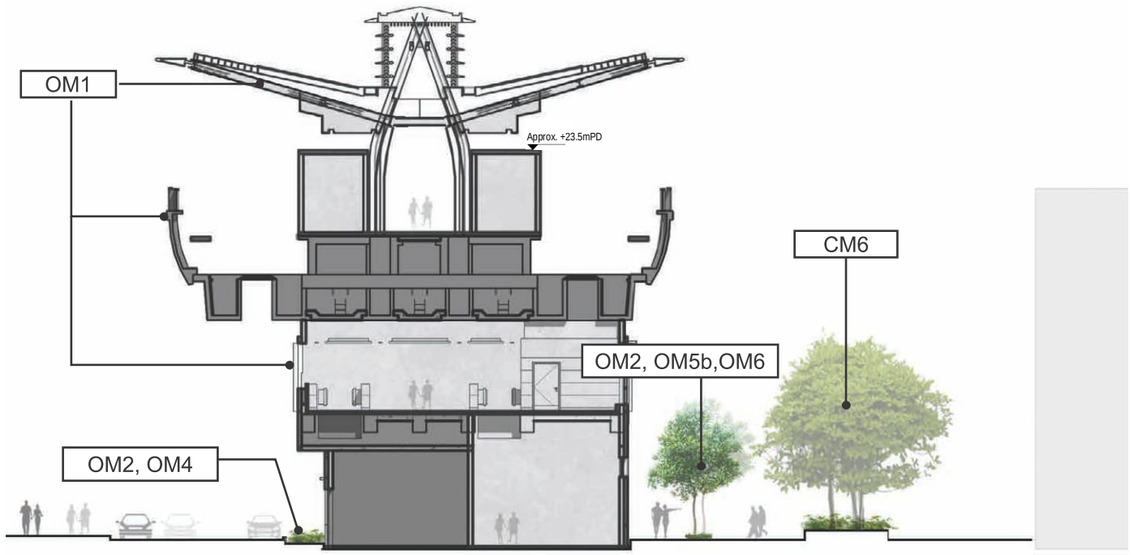
3. Landsacping features and forms of structures shown in the drawing are indicative only.



SECTION F-F
Reinstatement of disturbed landscape area along Wu King Road

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MTR

TUEN MA EXTENSION

ORIGINATOR
AECOM

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TITLE
C1502
TUEN MUN SOUTH EXTENSION
IMPLEMENTATION OF MITIGATION MEASURES - SECTION
(SHEET 4 OF 4)

SCALE N.T.S.

REV. A

Appendix C

Implementation Schedule of the Rail Noise Mitigation Measures

Implementation Schedule of Rail Noise Mitigation Measures

Reference Section in the RNMP	Recommended Rail Noise Mitigation Measures	Implemented by	Location			Tentative Construction Programme	Requirements or Standard to be achieved
			Track Direction	From	To		
Section 2.1.1	• Use of resilient rail base-plates for mounting tracks on viaduct to reduce vibration transmission to the viaduct structure, thereby reduce re-radiated noise from the viaduct structure; • Mounting of track on a floating slab system to further reduce vibration transmission to the viaduct structure; • Use of train skirts and floor with absorptive lining to create a noise-absorbing plenum beneath the train car. The train skirts would be extended to approximately 250mm above the derailment containment upstand on the floating slab in normal running; • Use of edge wall of about 1.2m above walkway with sound absorption to form an additional barrier for sensitive receivers at lower floor levels; and • Use of central plenum and trackside walkways (<=1.3m width) to create noise-absorbing plena on both sides of the train car.	MTRC	Along the TME			Jul 2025 – Dec 2028	EIAO-TM Annex 5 & Noise Control Ordinance
Table 2.1	• Semi-enclosure(1) (Length:200m) with vertical wall on East Side and open on West side. Roof shall extend up to the car body edge of Down track	MTRC	Up	138+280	138+480	Jul 2025 – Feb 2028	EIAO-TM Annex 5 & Noise Control Ordinance
	• Semi-enclosure(1) (Length:75m) with vertical wall on East side and open on West side. Roof shall cover both Up Track, siding and turnout		Up	138+520	138+595		

Reference Section in the RNMP	Recommended Rail Noise Mitigation Measures	Implemented by	Location			Tentative Construction Programme	Requirements or Standard to be achieved
			Track Direction	From	To		
	• Semi-enclosure(1) (Length:87m) with vertical wall on East side of siding track and open on West side of Up Track. Roof shall cover siding track and shall extend up to the car body edge of Up Track.		Up	138+595	138+682		
	• Semi-enclosure(1) (Length:79m) starting from South end of A16 Station with vertical wall on East side and open on West side. Roof shall cover whole Up Track.		Up	138+981	139+060		
	• Semi-enclosure(1) (Length: 103) with vertical wall on East Side and open on West side. Roof shall cover both Up Track, Down Track, siding and turnout.		Up	139+060	139+163		
	• Noise Enclosure(1) (Length: 140m) with 2m wide opening at the middle of the roof		Up	139+582	139+722		
			Down	139+585	139+725		
	• 1m high noise barrier(1) above exterior parapet (i.e. 3.1m above top of rail) (Length: 110m) on East side which shall extend to North end of TMS Station platform		Up	139+722	139+832		
	• 1.5m high noise barrier(1) above exterior parapet (i.e. 3.6m above top of rail) (Length:111m) on West side which shall extend to North end of TMS Station platform		Down	139+725	139+836		

Note:
(1) The internal surface of the proposed noise barriers, semi-enclosure and noise enclosure with opening should be equipped with acoustic panel or sound absorption lining.