Project Profile for Light Rail Transit (LRT) Extension in Tin Shui Wai Reserve Zone and Grade Separation of the LRT with Pui To Road and Tsing Lun Road in Tuen Mun

(A) Basic Information

1. Project Title

The Light Rail Transit (LRT) Extension in the Tin Shui Wai Reserve Zone and Grade Separation of the LRT with Pui To Road and Tsing Lun Road in Tuen Mun

2. Purpose and Nature of the Project(s)

(i) LRT Extension

It has been forecast that by the year 2003 there will be dramatic increase in population in Tin Shui Wai, with the largest increase occuring in the Tin Shui Wai Reserve Zone. An extension of the LRT in the Tin Shui Wai Reserve Zone is proposed in order to cater for the increase in demand which will arise from the introduction of West Rail and the growth in population and employment in the Reserve Zone.

(ii) LRT Grade Separation

The purpose of this project is to improve safety by elevating the existing LRT alignments over road junctions along Pui To Road and a junction in Tsing Lun Road. Grade separation will be accomplished by LRT elevation over road junctions.

3. Name of Project(s) Proponent

Kowloon-Canton Railway Corporation (KCRC)

4. Description, Location, and Scale of Project(s)

(i) LRT Extension

The LRT extension is approximately 2.7 km long and will be situated partly in the Tin Shui Wai Development and Reserve Zones. The proposed alignment is shown in Figure 1.

The proposed alignment starts from Junction I between Tin Shui Road (Road L5) and Tin Wing Road (Road L7) in the Tin Shui Wai Development Zone. It runs along Tin Shui Road and Road L12 in the Reserve Zone. At the end of Road L12, the alignment turns right and runs parallel with Road D4. It finally passes through a central path and reaches Stop 500 on Tin Shing Road (Road L4). (Figure 2)

There will be six stops (Stops 510, 520, 530, 540, 550, 480) with two new rectifier stations near Stops 550 and 500. (Figure 3)

(ii) LRT Grade-Separation

The proposed LRT grade separation will involve the elevation of the LRT tracks over road junctions along Pui To Road between Kin On Stop and Pui To Stop (Figure 1). The elevated tracks will be aligned along the middle of Pui To Road which is currently occupied by the LRT reserve.

Junction 1 is the interchange of the existing LRT tracks from Tuen Mun North, Tuen Mun Centre and west of Pui To Road . Tracks from Tuen Mun North run along the west side of the Tuen Mun Nullah, whereas tracks from Tuen Mun Centre run parallel with Pui To Road across the nullah. Tracks from the west of Pui To Road are aligned in the middle of the road. (Figure 4)

Junction 2 is the intersection of Tin Hau Road, Pui To Road and Tsun Wen Road, with the at-grade LRT tracks aligned in the middle of Pui To Road (Figure 5). Junction 3 is the intersection of Pui To Road and Tuen Mun Heung Sze Wui Road (Figure 6).

There will be 8 temporary LRT track diversions required during the construction phase. Two footbridges will be demolished and reprovided.

Grade separation over a junction (Junction 4) of Tsing Lun Road and the existing LRT tracks near Fu Tei Interchange is also proposed (Figure 7). The LRT tracks which run alongside the Tuen Mun Nullah will be elevated over Junction 4. The construction of this scheme is necessary to provide for the construction of West Rail Tuen Mun North Station.

5. History of Site

(i) LRT Extension

The Tin Shui Wai Reserve Zone is situated north of Tin Shui Wai Development Zone. The Reserve Zone is a newly formed land area containing no major development at the time of writing, although as mentioned in A (2) above, there are plans for major residential developments to be constructed from 2000 onwards.

The surroundings of the Reserve Zone are typically agricultural areas. Prior to the undertaking of site formation works to facilitate the proposed housing developments, freshwater wetland and fishponds existed in the area with mangroves and woodland present in the periphery.

(ii) LRT Grade Separation

Junctions 1, 2 and 3

Pui To Road is a district distributor road which traverses the industrial area in Tuen Mun. Junctions 1, 2, and 3 are the three LRT/Road junctions along Pui To Road which will be affected by the grade separation scheme.

Junction 4

Junction 4 is situated near to the existing Fu Tei Interchange. There are some temporary structures and scattered village premises near Ng Lau Road. The land in Tuen Mun North was originally used for agricultural purposes.

6. Number and Types of Designated Projects to be Covered

The LRT extension in the Tin Shui Wai Reserve Zone and the LRT grade separation in Tuen Mun are the two designated projects covered in this project profile. Both projects are classified as Category A2 under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO).

7. Name and Telephone Number of Contact Person(s)

Name:

Telephone number:

Fax number:

(B) Outline of Planning and Implementation Programme

A technical study of the LRT extension in the Tin Shui Wai Reserve Zone and a traffic impact assessment of the LRT/road junctions in Tuen Mun have been completed by an engineering consultant. According to the preliminary construction programme from the technical study, detailed design by KCRC with external consultants will be initiated in July 1999 and completed by September 2000. Construction will then commence and finish by May 2003. The project is aimed to be commissioned and in service by December 2003.

(C) Possible Impact on the Environment

1. Construction Phase

(i) LRT Extension

The LRT Extension will generally run on ballasted track except at existing or proposed road crossings where paved track will be used. During construction, works such as excavation and bored piling will be involved and a range of ancilliary plant and machinery will be used.

(ii) LRT Grade Separation

Junctions 1, 2 and 3

A steel/reinforced concrete bridge structure supported by steel column portals is suggested for the proposed LRT elevated section above the existing operating LRT, while a conventional post-tensioned, prestressed concrete box girder supported by single reinforced concrete piers is suggested for the LRT elevated section landing at-grade or connecting to the Pui To Stop.

Temporary steelwork will be required to support temporary trackwork. Two footbridges will be demolished to facilitate the temporary trackwork diversions. The existing prestressed LRT bridge will need to be strengthened due to the demolition of a portion of the bridge structure. There will be steel formwork and scaffolding falsework for the construction of the concrete piers and the concrete box girder respectively. Bored piling will be involved in the foundation works.

Ballasted track will be used on all elevated sections and for temporary diversions.

There will be substantial utilities diversions required at the junctions. These utilities include sewer drain pipes, fresh water mains, salt water mains, CLP cables and public lighting cables, and telephone cables.

Junction 4

A conventional post-tensioned, prestressed concrete box girder is proposed for the LRT bridge over junction 4. Bored piling will be involved during construction of the foundation.

There will be temporary diversion of the existing LRT tracks and minor realignment of an existing access road for the temporary trackwork diversion. Ballasted track will be used.

Steel formwork and scaffolding falsework will be involved during the construction of the concrete piers and bridge deck structures respectively. Steel portal falsework will be required to provide temporary access for the vehicular traffic.

A sewer drainpipe at the junction will be diverted.

2. Major Environmental Impacts

Construction Phase

The potential environmental impacts during construction of the LRT extension in the Reserve Zone will include potential construction noise, air quality and waste impacts. The details of potential impacts are discussed below.

Noise

The powered mechanical equipment (PME) used during construction will produce noise that may affect the Noise Sensitive Receivers at the surroundings of the construction site.

The scale and extent of noise impacts will depend on the location, type, duration and time of construction activities and machinery used.

Air Quality

Dust generated from construction activities such as excavation, stockpiling and transporting excavated materials, etc., without mitigation may cause adverse effects on local air quality.

Exhaust emissions from powered mechanical equipment may also influence the local air quality.

Waste Impacts

During construction, there will be a variety of wastes generated, such as excess excavated material, general construction waste, chemical waste, and general refuse. Improper waste management procedures and unmitigated activities may impose adverse impacts on the environment.

Operational Phase

(i) LRT Extension

During the operational phase, noise and waste will be the primary contributors to environmental impacts. Sources of operational noise will include the LRT trains and the rectifier stations. Waste such as general refuse and industrial waste may also be generated from station activities. Impacts on local air quality will be minimal, as electric trains will be used.

(ii) LRT Grade Separation

The LRT railway operation will be the main contributor to potential increases in background noise levels.

(D) Major Elements of the Surrounding Environment

(i) LRT Extension

To date there is no major development within the Tin Shui Wai Reserve Zone, although site formation and utility installation has been completed under various engineering contracts. Residential developments and educational institutes are planned to be built within the Reserve Zone from the year 2000 onwards.

The closest residential properties to the new LRT extension are located in Area 27 (TSW Town Lot 5), which is situated south of Tin Wah Road.

(ii) LRT Grade Separation

To date there are mainly factories around Junctions 1 and 2. A police station and a fire station are close to Junction 2. Residential buildings, school and recreational areas are the nearby structures of Junction 3.

There are some village premises and temporary structures along Ng Lau Road near Junction 4.

(E) Environmental Protection Measures

Noise

There are several mitigation measures for construction noise that are commonly applied to most of the construction projects in Hong Kong. The following measures will be applied, as appropriate, to the construction of the LRT extension and the LRT grade separation:

- Quiet plant or processes will be used,
- Number of items of powered mechanical equipment will be minimised,
- Noisy activities will be scheduled to minimise exposure of nearby sensitive receivers to high levels of construction noise,
- Idle equipment will be turned off,
- Noise barriers will be used to protect nearby NSR's,
- Equipment will be orientated in such a way that noise generated from the equipment is directed away from the nearby NSR's.

During operation, noise will be mitigated by the following means:

- Provision of acoustic enclosures around rectifiers to mitigate noise generated by the exhaust fan.
- All equipment will be maintained in good working condition.
- Noise exposure at nearby noise sensitive receiver will be limited by controlling the frequency of LRT train service and the speed of the train.
- Installation of noise barriers if necessary.
- Control of noise at source.

Air Quality

Dust emissions will be controlled at source through various mitigation measures, including:

- watering unsealed roads,
- frequent wheel-washing of vehicles and road-cleaning,
- covering the stockpiled soil with sheets
- enclosure of the stockpiling area
- limiting exhaust emissions from the powered mechanical equipment by good house-keeping and regular maintenance

Waste Management

The following are the mitigation measures which will be used to limit waste generation:

- Either avoid or minimise the quantity of waste by careful purchasing control, reuse of formwork and good site management,
- Reuse and recycling of discarded materials such as wooden boards for formwork, bamboo for scaffolding, etc.,
- Employ proper treatment and disposal of waste

Chemical waste generated will be handled in accordance with the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*.

(F) Use of Previously Approved EIA Reports

1. Title:

Tin Shui Wai Development: Engineering Investigations for Development of Areas 3, 30 & 31 of the Development Zone and the Reserve Zone - EIA Final Assessment Report

Date of Approval:

March, 1997

Environmental Aspects Addressed:

An EIA has been carried out for the development of Tin Shui Wai Areas 3, 30 and 31 of the Development Zone (DZ) and the Reserve Zone (RZ). The EIA considered the potential environmental impacts on both existing and future sensitive receivers, assessed the construction and operational impacts and recommended mitigation.

Noise, air quality, visual impact, water quality, waste and ecology were considered in the assessment.

Relevance of the Findings of Environmental Impacts and Mitigation Measures

The captioned EIA encompassed the potential environmental effects of the construction and operation of the proposed LRT extension in the Reserve and Development Zones, although only construction air quality and operational noise are specific to the LRT Extension whereas other disciplines evalaute and consider the impacts from the entire development more holistically.

The issue of most potential significance is the proximity to the Deep Bay as the Reserve Zone borders Buffer Zone 2 for which stringent environmental requirements specifically concerning noise, air quality and water quality are defined.

A range of mitigation measures were proposed in order to control and ameliorate impacts during the construction and operational phases of the development. The most prominent of which is the proposal to provide ecological compensation in the form of a constructed wetland which will also provide for stormwater detention and pollutant removal prior to discharge into Deep Bay.

Operational noise impacts on sensitive receivers in the Reserve Zone have been predicted. It was concluded that the predicted noise level of the train operation is within the criteria stipulated in HKPSG. Further noise assessment for the LRT terminus is required, specifically concerning the mitigation or elimination of wheel squeel, when more detail on the operation of the terminus is available.

Mitigation measures for the disciplines of air quality and construction noise have also been recommended to reduce the levels of impact to within acceptable levels.

Provided the measures are adopted, all impacts will be well within accepted criteria.

The relevant sections of the cationed EIA to the Project are listed below:

ISSUE	DESCRIPTION	SECTION	PAGE
Noise	Operational Noise	4.2	4-33
Air Quality	Construction Impact Assessment	6.5	6-6

2. Title:

KCRC -West Rail
Final Assessment Report
West Kowloon to Tuen Mun Centre
Contract No. TS-900
Environmental Impact Assessment

Date of Approval:

23 March, 1998

Environmental Aspects Addressed:
The EIA report was aimed at assessing the impacts on the environment resulting from the construction and operation of West Rail, including works at Tin Shui Wai and Tuen Mun North Stations. The disciplines covered by the EIA included the full range of environmental disciplines listed under the EIAO.

Relevance of the Findings of Environmental Impacts and Mitigation Measures

Construction works for West Rail at Tin Shui Wai and Tuen Mun, such as excavation and piling, are similar to the construction works required for the LRT extension and the grade separation works. Noise, air quality and waste are considered to be the main environmental issues of relevence as demonstrated in the captioned EIA.

Mitigation measures were recommended to reduce the environmental impacts during the construction and operational phases.

Provided the suggested mitigation measures are applied, the potential environmental impacts will be reduced to within established criteria.

The relevant sections of this EIA report are listed below:

ISSUE	DESCRIPTION	SECTION	PAGE
Noise	Prediction of Impact	8.3.2.2	330
	Recommended Mitigation	5.3.2.4 8.3.2.4	76 333
	Fixed Plant Noise	8.3.3.1	338
Air	Potential Sources of Impact	8.4.1.2	348
	Recommended Mitigation	5.4.1.5 8.4.1.5	89 351
Waste	Potential Sources and Prediction of Impacts	8.10.1	397
	Recommended Mitigation: -Construction Phase -Operational Phase	 8.10.3.2 8.10.3.3	 404 405

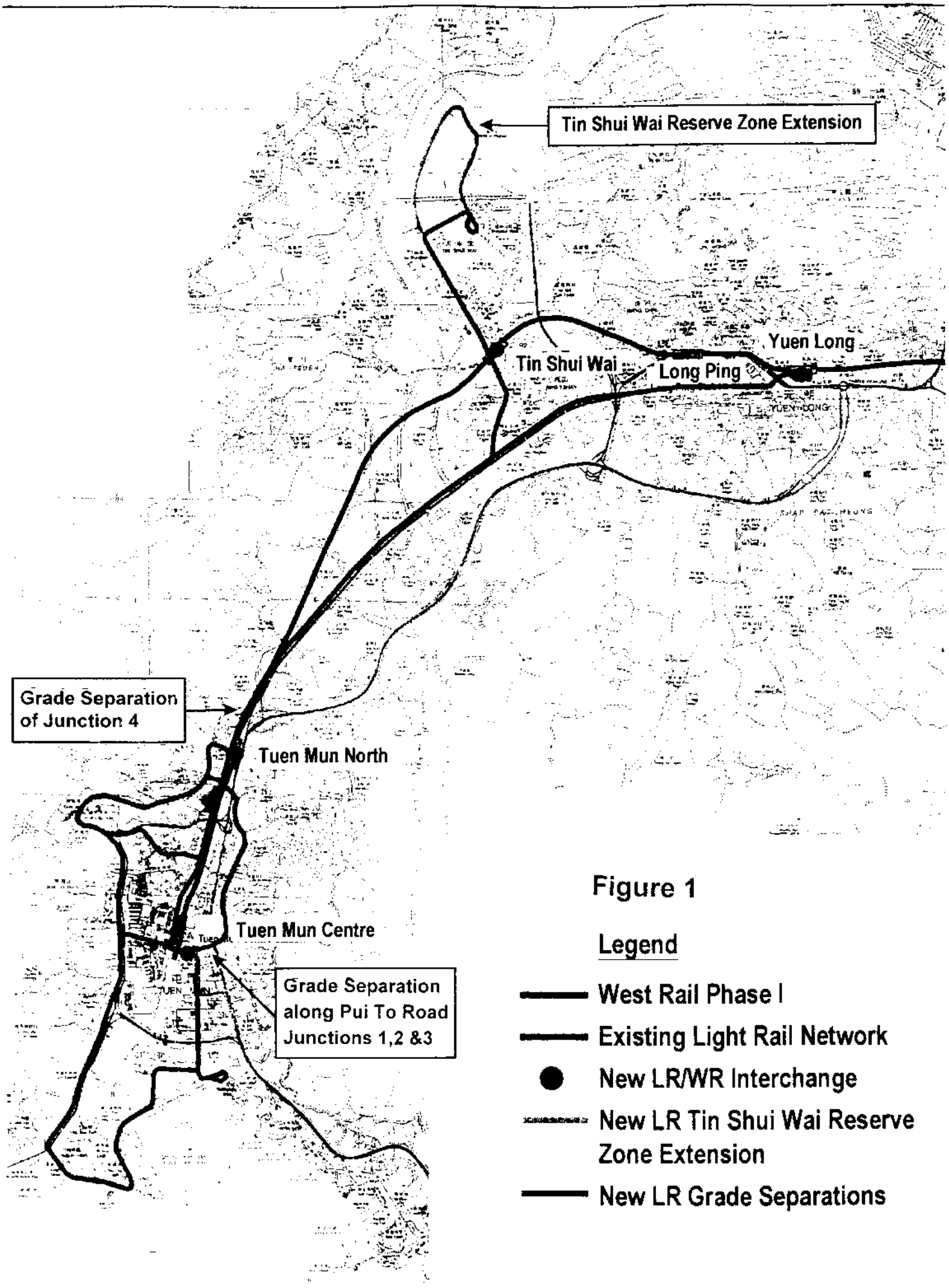

Tin Shui Wai Reserve Zone Extension
Yuen Long
Tin Shui Wai
Long Ping
Grade Separation of Junction 4
Tuen Mun North
Tuen Mun Centre
Grade Separation along Pui To Road Junctions 1,2 &3
Legend
West Rail Phase I
Existing Light Rail Network
New LR/WR Interchange
New LR Tin Shui Wai Reserve Zone Extension
New LR Grade Separations

Figure 1

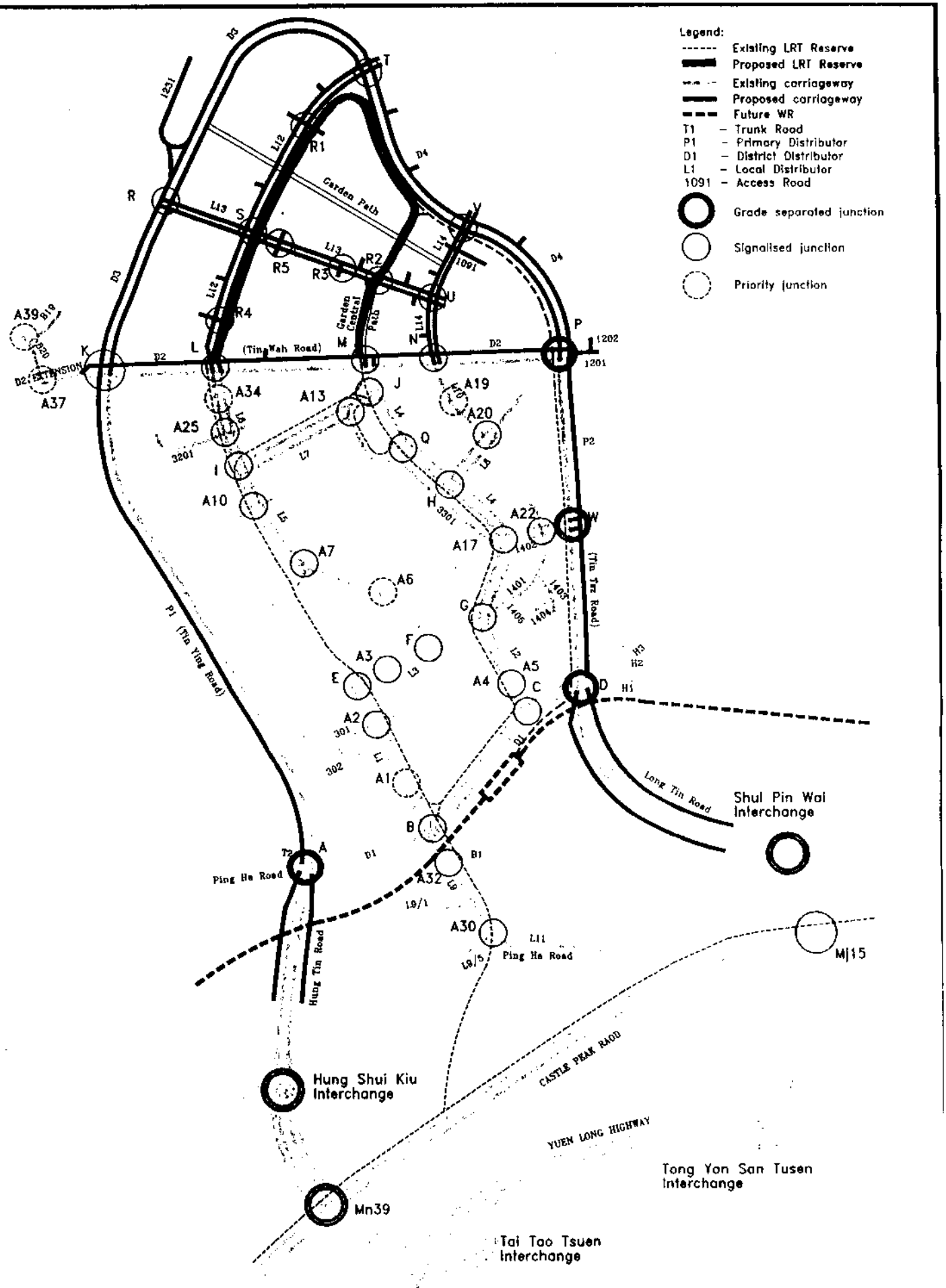
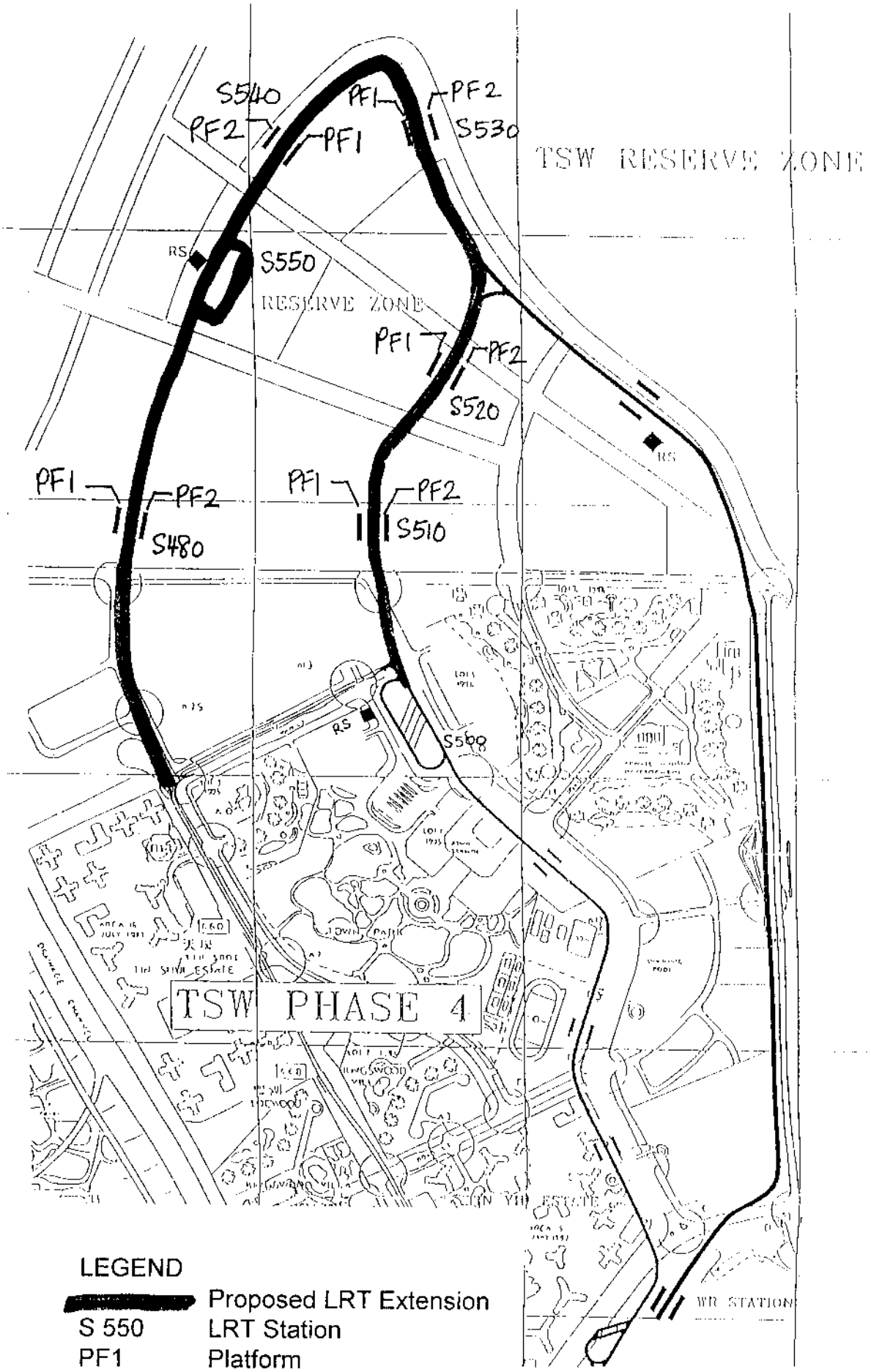


Figure 2 ROAD HIERARCHY IN TIN SHUI WAI



LEGEND

▬▬	Proposed LRT Extension
S 550	LRT Station
PF1	Platform
RS	Rectifier Station

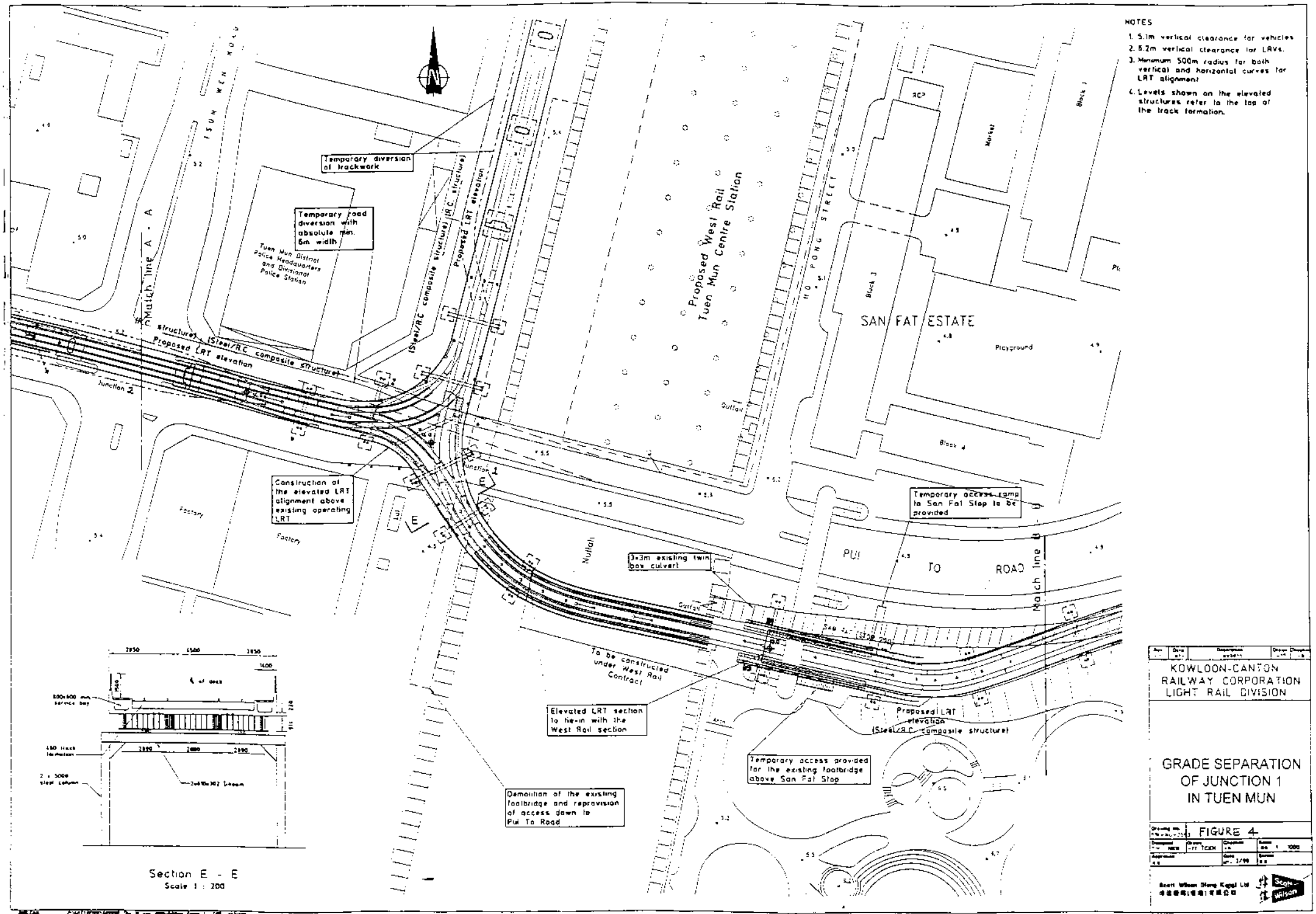
FIGURE 3

LIGHT RAIL TRANSIT SYSTEM

SITE PLAN FOR TIN SHUI WAI RESERVE ZONE

KOWLOON-CANTON RAILWAY CORPORATION
LIGHT RAIL DIVISION

HYDER CONSULTING LIMITED


NOTES
1. 5.1m vertical clearance for vehicles
2. 5.2m vertical clearance for LRVs.
3. Minimum 500m radius for both vertical and horizontal curves for LRT alignment
4. Levels shown on the elevated structures refer to the top of the track formation.
Temporary diversion of trackwork
Temporary road diversion with absolute min. 6m width
Tuen Mun District Police Headquarters and Divisional Police Station
Match line A - A
ISUN WEN ROAD
Proposed LRT elevation (Steel/R.C composite structure)
Proposed West Rail Tuen Mun Centre Station
HO PONG STREET
SAN FAT ESTATE
Playground
Market
Block 1
Block 3
Block 4
Construction of the elevated LRT alignment above existing operating LRT
Factory
Nullah
3x3m existing twin box culvert
Temporary access ramp to San Fat Stop to be provided
PUI TO ROAD
Match line B
To be constructed under West Rail Contract
Elevated LRT section to tie-in with the West Rail section
Proposed LRT elevation (Steel/R.C composite structure)
Temporary access provided for the existing footbridge above San Fat Stop
Demolition of the existing footbridge and reprovision of access down to Pui To Road
Section E - E
Scale 1 : 200
KOWLOON-CANTON RAILWAY CORPORATION
LIGHT RAIL DIVISION
GRADE SEPARATION OF JUNCTION 1 IN TUEN MUN
FIGURE 4
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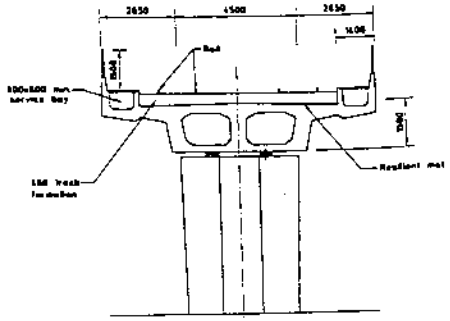
NOTES

1. 5.1m vertical clearance for vehicles
2. 5.2m vertical clearance for LRVs
3. Minimum 500m radius for both vertical and horizontal curves for LRT alignment.
4. Levels shown on the elevated structures refer to the top of the track formation.



Section D - D

Scale 1 : 200

KIN WING STREET
KIN ON STREET
KIN TAI STREET
Factory
Fire Station & Ambulance Depot
Tuen Mun Criminal Police Headquarters and Divisional Police Station
LRT Junction No.55
Proposed LRT elevation (RC structure)
Match line A - A
Junction 2
Minor temporary modification at Kin On Stop platform
Temporary LR track diversion (at-grade)
Relocation of access to the Fire Station
HUNG CHEUNG STREET
SAN HING CIRCUIT
SAN ON STREET

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LIGHT RAIL DIVISION

GRADE SEPARATION OF JUNCTION 2 IN TUEN MUN

FIGURE 5

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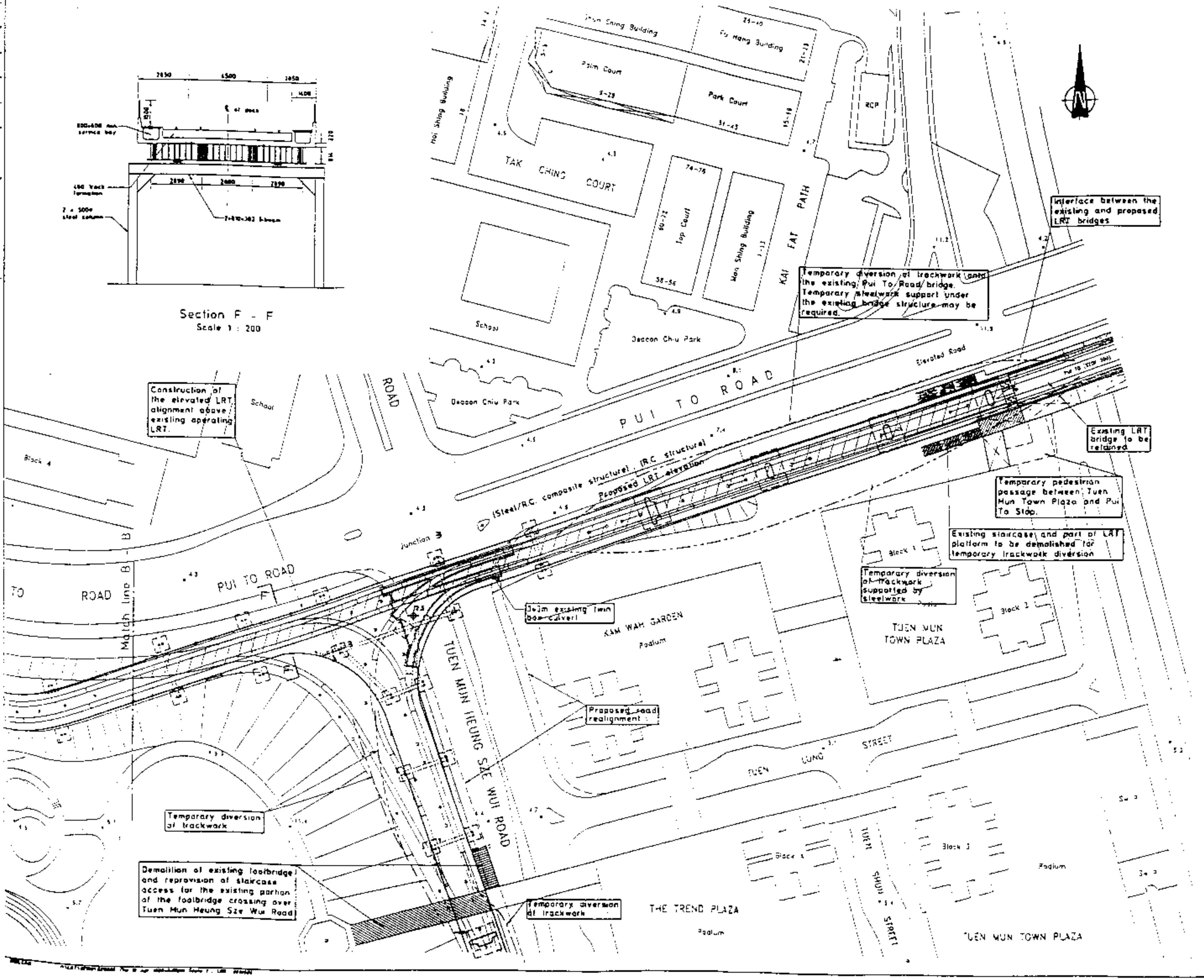

NOTES

1. 5.1m vertical clearance for vehicles
2. 6.2m vertical clearance for LRVs.
3. Minimum 500m radius for both vertical and horizontal curves for LRT alignment.
4. Levels shown on the elevated structures refer to the top of the track formation.

KOWLOON-CANTON RAILWAY CORPORATION
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GRADE SEPARATION OF JUNCTION 3 IN TUEN MUN

FIGURE 6

Scale 1 : 1000

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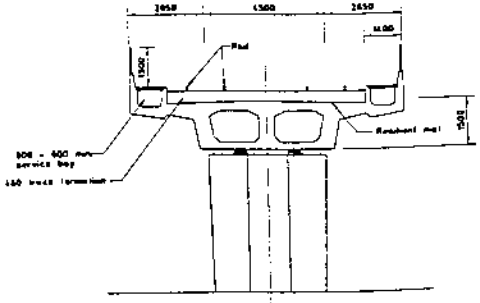
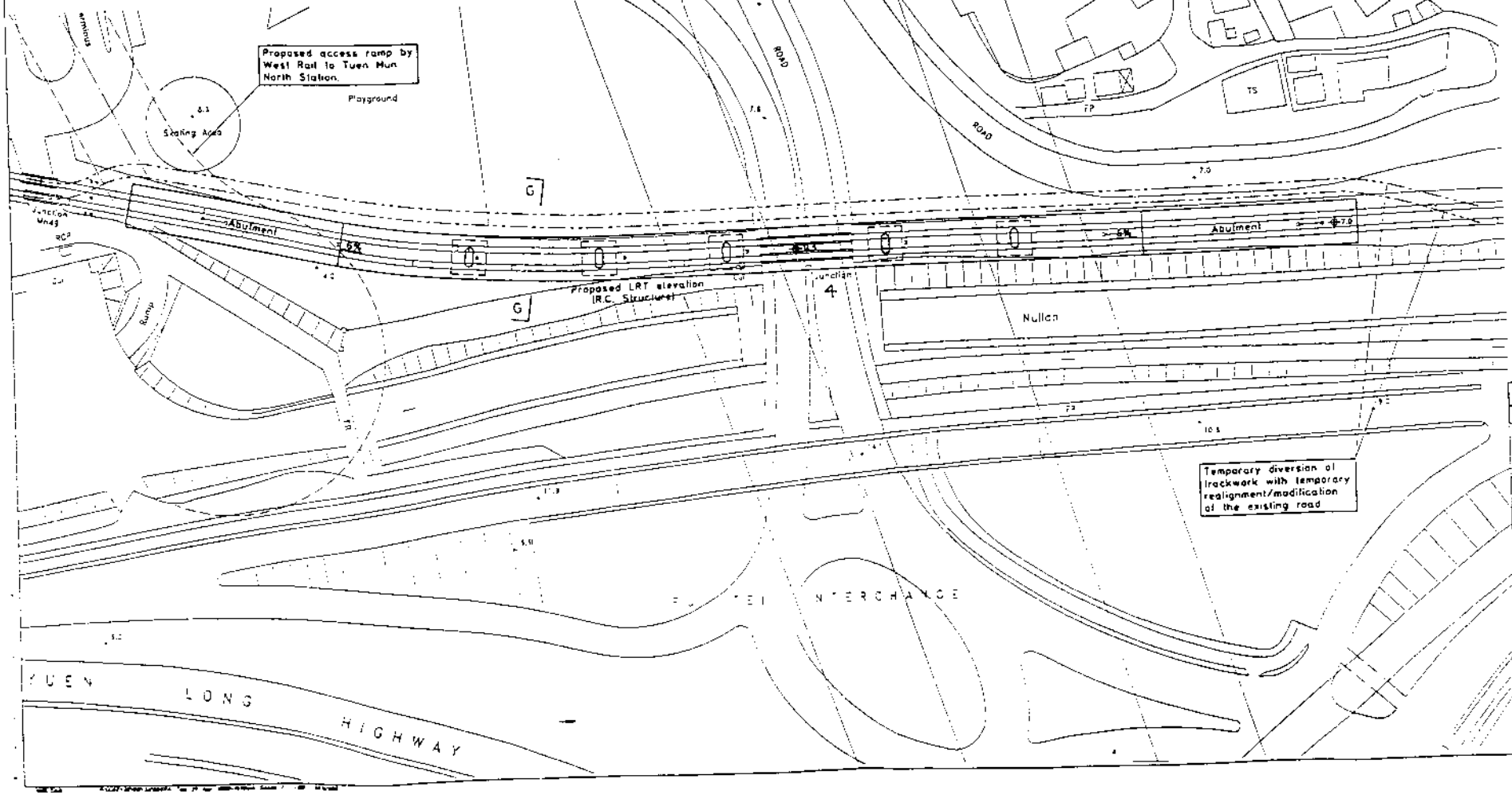
NOTES

1. 5.1m vertical clearance for vehicles.
2. 6.2m vertical clearance for LRVs.
3. Minimum 500m radius for both vertical and horizontal curves for LRT alignment.
4. Levels shown on the elevated structures refer to the top of the track formation.



Section G - G
Scale 1 : 200



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Rev	Date	Description	Drawn / Checked

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LIGHT RAIL DIVISION

GRADE SEPARATION OF JUNCTION 4 IN TUEN MUN

FIGURE 7

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