

Appendix 13

Risk Assessment Report

**(Potential risks associated with the High
Pressure Town Gas Pipeline)**

Risk Review Report

(Potential risks associated with the High Pressure Town Gas Pipeline)

Prepared by DeSPACE (International) Limited

November 2025

Proposed amendment to the Approved Lam Tsuen Outline Zoning Plan (OZP) No. S/NE-LT/11 ("the OZP") to rezone the application site from "Agriculture" ("AGR") to "Government, Institution or Community (1)" ("G/IC(1)"), Multiple Lots in D.D.8 and adjoining government land, Lam Tsuen, Tai Po for a proposed Social Welfare Facility (Residential Care Home for Persons with Disabilities (RCHD) and/or Residential Care Home for the Elderly (RCHE))

Risk Assessment (Towngas)

Departmental Comments	Response
<u>Email received on 9 Jan 2026 refers:</u> <u>EMSD</u>	
a) Further to our comments given on the first pre-submission, please note that a QRA will still be required in the design stage of the development.	Noted with thanks. QRA will be conducted at the post-planning approval stage.
b) Yet, our preliminary view is that the development would unlikely result in unacceptable risks. Therefore, we believe it is feasible to impose the QRA requirement as a condition in granting the approval for the application.	Noted with thanks.

1. INTRODUCTION

1.1 Project Background

- 1.1.1 The Proposed Development is located at multiple Lots in D.D.8 and adjoining Government land, Lam Tsuen, Tai Po, New Territories abutting Tai Po Shui Wo Road (hereafter referred to as the “Application Site”). The Sites are currently zoned “Agriculture” (“AGR”) on the Approved Lam Tsuen Outline Zoning Plan (OZP) No. S/NE-LT/11. DeSPACE (International) Limited has been engaged to prepare a Section 12A application to the Town Planning Board (TPB) to rezone the Site to “Government, Institution or Community (1)” (“G/IC(1)”) to facilitate development of two new developments of residential care home for the Elderly (RCHE)/residential care home for Persons with Disabilities (RCHD) on the sites (the Proposed Development).
- 1.1.2 The Hong Kong and China Gas Limited (HKCG) operates a underground high pressure town gas pipeline in the vicinity of the Proposed Development which follows the alignment of Lam Kam Road in Tai Po. Figure 2.1 shows the alignment of the pipeline.
- 1.1.3 A Risk Review Report has been conducted to assess the risks posed by the existing high pressure gas pipeline in the vicinity of the Proposed Development. Subject to the results, recommendations for mitigation measures will be proposed.

1.2 Particulars of the Town Gas Pipeline

- 1.2.1 Town gas is composed of hydrogen, methane, carbon monoxide and carbon dioxides. The town gas in Hong Kong is produced from the plants located in Tai Po and Ma Tau Kok. The composition of town gas is provided in Table 2.2. Town gas, as the final product produced from natural gas, naphtha and landfill gas, is a clean, safe, colourless, odourless and reliable fuel source. If leakage occurs, with about half the density of air, town gas will rise and dissipate in the air. Odouriser has been added to the gas such that it can easily be detected.
- 1.2.2 Town gas installations are regarded as a Potentially Hazardous Installation (PHI). The Government's policy is to minimize the potential risks associated with a PHI to internationally acceptable levels by controlling the siting of PHIs and the land use in the vicinity, and by requiring the installation to be constructed and operated to specified standards. The Coordinating Committee on Land-use Planning and Control relating to Potentially Hazardous Installations (CCPHI) was established in December 1986 to coordinate Government actions in relation to PHIs in Hong Kong.
- 1.2.3 The closest distance of the concerned town gas pipeline along Lam Kam Road to the site boundary of the Proposed Development is around 64m. A summary of the high pressure gas pipeline technical specification has been provided in a letter from HKCG to the Applicant dated 5.11.2026 in Appendix A. No part of the Town gas pipeline and their associated properties will be disturbed by the Proposed Development. Works, if any required, will not encase any part of the gas pipes in any form of concrete

structures, and will provide a clearance of minimum 600mm from the pipe.

2. RISK REVIEW

2.1 Review Criteria

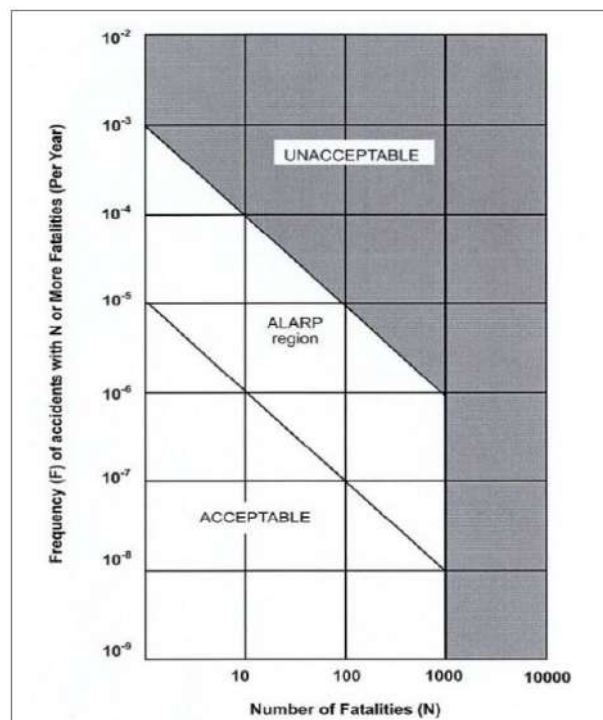
- 1.2.4 CCPHI adopts a set of Risk Guidelines (RG) as given in Chapter 12, Section 4.4 of the Hong Kong Planning Standards and Guidelines (HKPSG) to assess the off-site risk levels of PHIs in terms of individual and societal risks as shown below.

Individual Risk

It is the predicted increase in the chance of death per year to an individual who lives or works near to a PHI. Maximum level of off-site individual risk associated with PHIs should not exceed 1 in 100,000 per year i.e. 1×10^{-5} /year.

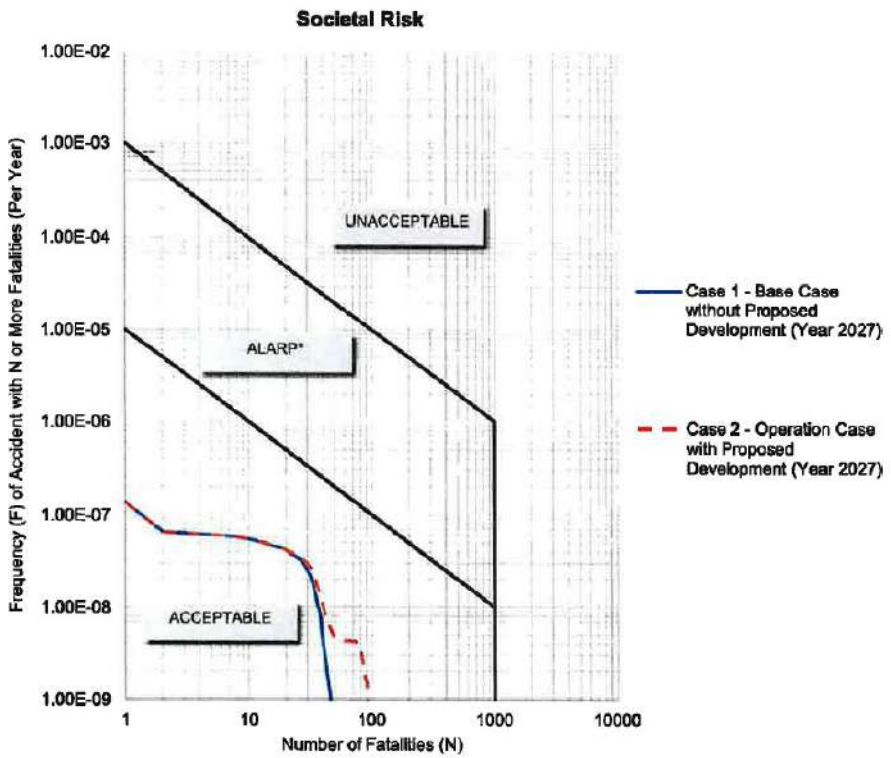
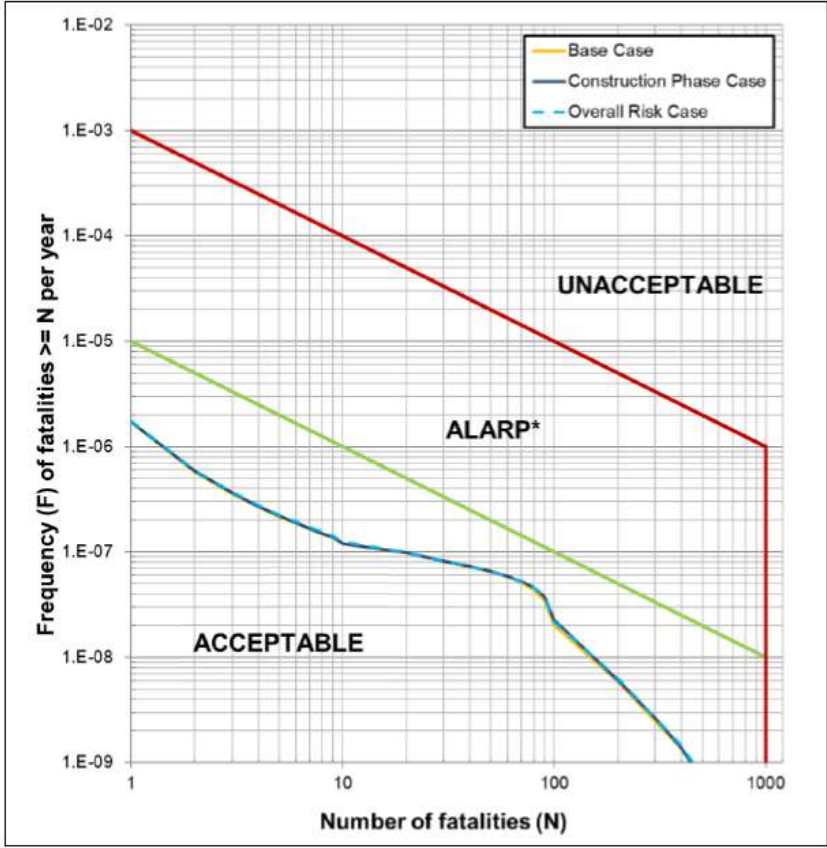
Societal Risk

It expresses the risks to the whole population living near a PHI. With the population increases, the societal risk will be increased. The societal RG is presented graphically in Figure 3.1. It is expressed in terms of lines plotting the cumulative frequency (F) of N or more deaths in the population from incidents at the installation. Two F-N risk lines are used in the RG that mark “acceptable” or “unacceptable” societal risks. The intermediate region indicates the acceptability of societal risk is borderline and should be reduced to a level which is “as low as is reasonably practicable” (ALARP). It seeks to ensure that all practicable and cost effective measures that can reduce risk will be considered.



- 2.1.1 Considering a buffer distance of about 64m between the closest point of the project site and the concerned towngas pipeline, this Risk Review estimates the individual and societal risks of the Proposed Development by comparing the project context with recent approved similar project cases associated with high pressure gas pipeline of comparable specifications, making references to their Quantitative Risk Assessments (QRA) conducted. Please find Table 1 below summarizing the key parameters of the cases, which the planning applications and QRAs were approved on 8.12.2023 and 7.6.2024 respectively.
- 2.1.2 With reference to Table 1 below, the concerned towngas pipeline along Lam Kam Road shares similar technical specifications with those in the two cases. For individual risk, the risk prediction is independent of the surrounding population levels. For case no. Y/SK-HC/7, the maximum level of off-site individual risk associated with the pipelines does not exceed the prescribed criterion of 1×10^{-5} per year. While the towngas pipeline of that case has exactly the same technical specifications as that of the subject case, and has a much closer distance (10-15m) to the development site boundary than the subject site (64m), it is anticipated that individual risks for the subject Proposed Development would be minimal and within acceptable level as well.
- 2.1.3 For societal risk, with reference to the FN curves of the two similar projects, the predicted fertility rates are both more than 100 times below the unacceptable level. With a much further distance from the towngas pipe of the subject proposed development, it is anticipated that the chance for predicted fertility rates of this project to reach the unacceptable levels would be minimal.

Table 1 – Comparison of Contexts with Recent Approved Similar Project Cases Associated with High Pressure Gas Pipeline of Comparable Specifications

	Y/YL-NTM/9 (Approved on 8.12.2023)	Y/SK-HC/7 (Approved on 7.6.2024)	Proposed Development
Site Location	81 San Tam Road, Yuen Long	Various Lots in D.D. 244 and Adjoining Gov. Land, Nam Pin Wai, Sai Kung	
Pipe Diameter (Nominal)	600 mm	750 mm	750 mm
Pipe Wall Thickness	12.7mm	12.7mm	12.7mm
Maximum Operation Pressure	35 barg	35 barg	35 barg
Hydraulic Test Pressure	-	900 psi	900 psi
Pipe Material	Steel	Steel	Steel
Minimum Depth	1.1 m	1.1 m	1.1 m
Closest distance of the pipeline to the site boundary	About 24m	About 10 – 15m	Around 64m
Proposed population	192	50	550
Individual risk (criteria: does not exceed 1×10-5 per year)	Below 1×10 ⁻⁷ per year (Acceptable)	1×10 ⁻⁸ per year (Acceptable)	Acceptable
Societal risk (criteria: does not exceed the unacceptable level)		Figure 7.3 Societal Risk of Different Cases 	With reference to the FN curves of the two similar projects, the predicted fertility rates are both more than 100 times below the unacceptable level. With a much further distance from the towngas pipe of the subject proposed development, it is anticipated that the chance for predicted fertility rates of this project to reach the unacceptable levels would be minimal.

3. General Requirements For Construction Work In The Vicinity Of Gas Main

The project proponent shall at all time comply with the General Requirements For Construction Work In The Vicinity Of Gas Main, which are set out as follows:

1. Notification of work should be circulated as stipulated in the Excavation Permit issued by Highways. The same procedure should also be followed for construction site other than Highways' area.
2. Contact HKCG at least 3 days in advance for excavation adjacent to gas pipe. Site meeting to be arranged whenever required. HKCG could be contacted via 29631811 or 28806999 in case of emergency.
3. When excavation is to be carried out adjacent to a gas main, the exact alignment and profile must be ascertained by a series of hand-dug trial holes.
4. BORING AND DRILLING IN THE VICINITY OF GAS MAIN IS STRICTLY PROHIBITED. HKCG must be consulted first should this work be required.
5. No excavator is allowed for excavation at 1 metre around the gas pipe.
6. No naked flame is allowed adjacent to the gas pipe.
7. Do not encase, even temporarily, part or all of our gas pipes in any form of concrete structure.
8. To avoid the risk of gas accumulation leading to any tragedy, no gas pipe is allowed being enclosed in confined space such as long decked over trench.
 - 8.1 In case the proposed deck of trench will cover any gas pipe, it should be considered to adjust the trench alignment and/or the working method at the planning stage. Should any gas pipe required to be diverted, the request should be made to HKCG and the diversion should be completed before the trench is decked.
 - 8.2 If inevitably any gas pipe to be left in the decked trench, prior agreement should be sought from HKCG. Adequate protection measure such as partition should be built to separate the gas pipe from the confined space under deck.
9. No machinery should sit directly above our metal iron gas pipes.
10. The velocity and amplitude of vibration acting on the gas pipe by the work must not exceed 25mm/s peak particle velocity and 0.2mm respectively.
11. The velocity and amplitude of vibration acting on the gas governor by the work must not exceed 13mm/s peak particle velocity and 0.1mm respectively.

12. Vibration monitoring records should be forwarded to HKCG for reference.
13. Excavation running close and parallel to the gas pipe should be avoided. Should such excavation be required, discussion/agreement must be sought from HKCG. Any mechanical joint to be exposed, the working party shall inform HKCG in advance and make provision to HKCG for leak detection and bolts replacement where necessary.
14. Suspension of gas pipe to be agreed with HKCG.
15. The gas pipe would normally have a cover of 450mm and 900mm in footpath and carriageway respectively. However, there are cases where gas mains have cover less than the before stated figures. Steel protection plates would normally be laid on top of shallow cover pipe. Due care should be given in subsequent excavation with the presence of steel plate.
16. Report any damage, even superficial, to HKCG for remedial action.
17. Access to HKCG's installations should be maintained at all times for regular inspection and emergency repair.
18. Sufficient clearance to be maintained for both safety and maintenance purpose. Normally, 600mm and 300mm clearance is required for steel and all other gas pipe respectively.
19. No exposed PE gas pipe under steel deck is allowed as welding slag from the jointing of steel deck may damage the gas pipe underneath unless proper protection agreed by HKCG. In other occasion, exposure of PE pipes should be avoided as far as practicable. Where exposure of PE pipes is inevitable, fire resistance protection wrapping of the exposed PE pipes should be installed and agreed with HKCG prior to application.
20. In case of emergency, contact HKCG at 28806999 which is manned 24 hours. If a gas leak is suspected, immediately stop work and evacuate the site personnel from the trenches. It should be noted that gas might travel through underground drains or conduits to other areas of the site. Evacuate the personnel from these areas if this is suspected.
21. HKCG should be consulted prior to any cutting or removal of a decommissioned gas pipe. As there may be residue gas inside a decommissioned gas pipe, cutting should only be employed by mechanical cutter or hack saw. In all circumstances, oxy-acetylene cutting SHOULD NOT be employed for cutting a decommissioned gas pipe.
22. Should there be settlement expected to be caused by the work, the predicted settlement contour should be forwarded to HKCG for assessment of the impact.
23. For plantation work with tree guard installation, the exact location and depth of the gas pipe should be confirmed by hand-dug trial holes prior to the driven of the tree guard into the ground to avoid damage of gas pipe underneath.

24. Due care should be given to the ancillary equipment attached to the gas main. Cathodic protection is installed for corrosion-resistant purpose and it has some cables linking from the gas pipe to the anodes and connected in a junction box placed in a pit. The anodes are normally installed at 1m away from the pipe whilst the anodes junction boxes would be installed at footpath at a distance from those gas main laid under carriageway.
25. The Code of Practice "Avoiding danger from gas pipes" has been prepared by the Gas Authority and approved and brought into effect in accordance with the provisions of section 9 of the Gas Safety Ordinance Cap 51 (the Ordinance). Its purpose is to provide practical guidance in respect of the requirements of the Ordinance and the Gas Safety (Gas Supply) Regulations (the regulations) concerning the avoidance of damage to gas pipes. These requirements are more specifically defined in regulation 23A of the regulations as follows-

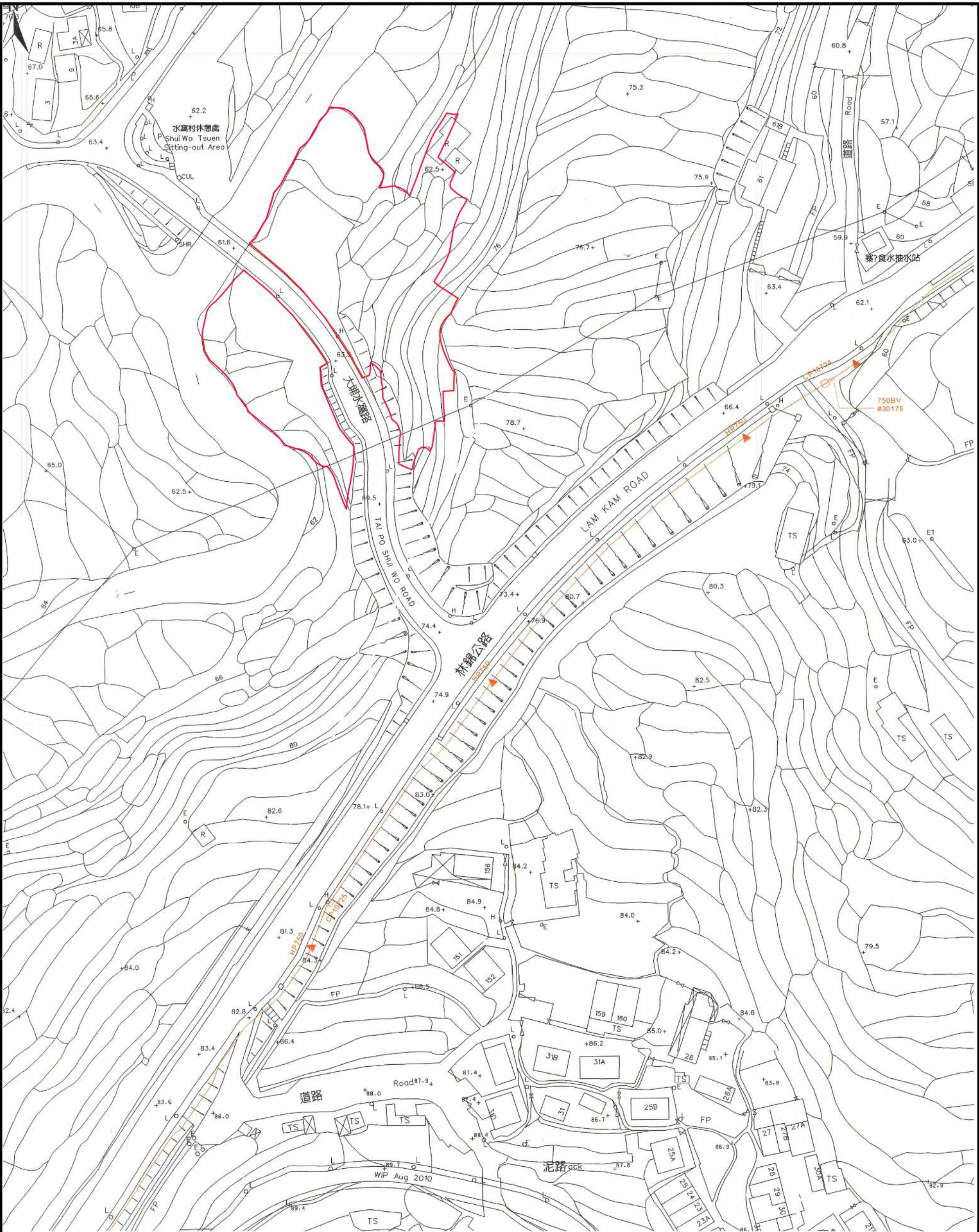
"23A. Works in the vicinity of gas pipes

- 1. No person shall carry out, or permit to be carried out, any works in the vicinity of a gas pipe unless he or the person carrying out the works has, before commencing the works, taken all reasonable steps to ascertain the location and position of the gas pipe.*
- 2. A person who carries out, or who permits to be carried, any works in the vicinity of a gas pipes shall ensure that all reasonable measures are taken to protect the gas pipe from damage arising out of the works that would be likely to prejudice safety."*

4. Conclusion

This report has reviewed the risk associated with the HKCG high pressure town gas pipeline with respect to the current technical specifications of the high pressure gas pipeline. The individual and societal risks associated with the gas pipeline are evaluated by comparing the project context with recent approved similar project cases associated with high pressure gas pipeline of comparable specifications with no specific mitigation measure required, making references to their QRAs conducted.

While the results of these comparable QRAs are found to be acceptable, with a much further distance from the town gas pipe of the subject proposed development, it is anticipated that the chance for the associated risks of this project to reach the unacceptable levels would be minimal. Thus, it is considered that the proposed rezoning proposal is technically feasible in respect of potential risks associated with the high pressure town gas pipeline. If required, a requirement to submit a QRA at the detailed design stage can be imposed.



Legend		圖例：		PE		CP	
LPA	現有低壓 A 管道 (2.0 千帕以下)	鋼蓋板	冷凝液罐	設有可探索警告帶的聚乙烯管道	隱樁保護裝置	大約埋深(米) 管網通訊導管	
LPB	現有低壓 B 管道 (2.0-7.5 千帕)	無蓋管的冷凝液罐 / 放散點	閘門	現有次高壓 B 管道 (斷以較低壓力運作)	大約埋深(米)		
MP	現有中壓管道 (7.5-240 千帕)	球閥井	球閥井	HP*	現有高壓管道 (斷以較低壓力運作)	TT: 鞍型旁通 / BS: 塞氣馬鞍 RS: 鞍型三通 / WT: 華士三通 [注意: 鞍型管件埋深, 比管道淺約 50 毫米]	
IPA	現有次高壓 A 管道 (240-400 千帕)	消管井	消管井	PE*	沒有可探索警告帶的聚乙烯管道		
IPB	現有次高壓 B 管道 (400-700 千帕)	立管井	立管井	RP	備用管道 / 保護管道檢測井	擬建 / 在建管道	
HP	現有高壓管道 (700 千帕以上)			RP / IPIT	擬建 / 在建管道		

Figure No.	Figure Title	Date	Scale	Prepared by
Figure 1	Site Plan	Nov 2025	1:1000 in A3	 DeSPACE (International) Limited



香港中華煤氣有限公司
The Hong Kong and China Gas Company Limited



環保生活每一天
Go Green Every Day

5 November 2025

Your ref :

Our ref : SM-a02-25-00093-jc

Mr Greg Lam
DeSPACE (International) Limited

[REDACTED]
[REDACTED]
[REDACTED]

Dear Mr Lam

RE: Planning Application for Social Welfare Facility at Multiple Lots in D.D.8 and adjoining Government land, Lam Tsuen, Tai Po, New Territories

Reference is made to your letter dated 18 August 2025 in relation to the captioned subject.

A copy of technical information and drawings of the existing High Pressure 750mm along Lam Kam Road in the concerned area are enclosed for your action.

You are advised to provide our Company a copy of the Quantitative Risk Assessment report for review and comment.

Should you have any further enquiry, please feel free to contact Mr Jack Cheng at [REDACTED] or me at [REDACTED]

Thank you for your kind attention.

Yours sincerely

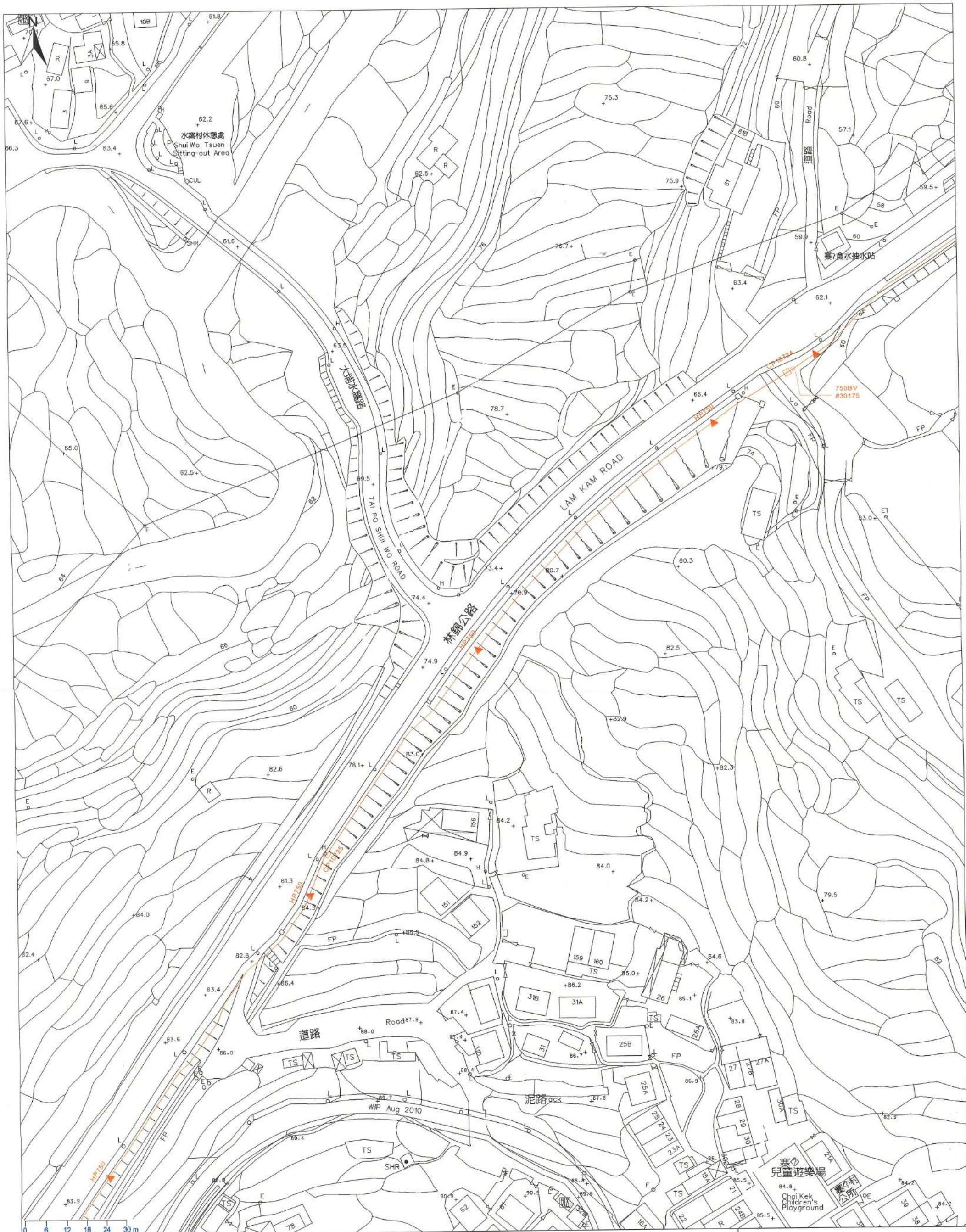
Jacqueline Hui
Senior System Maintenance Manager

JH/jc/wl

Encl.

Technical Information - High Pressure Pipeline along Lam Kam Road

Parameter	Specification
Pipe Diameter (Nominal)	750 mm
Design Pressure	35 barg
Maximum Operating Pressure	35 barg
Hydraulic Test Pressure	900 psi
Air Test Pressure	100 psi
Pipe Material	Steel
Pipe Wall Thickness	12.7 mm
External Coating	400 Micron Fusion Bonded Powder Epoxy
Internal Coating	50 Micron of Two Pack Epoxy Flow Coating
Jointing Method	Butt Welding
Year of Construction	1991-1993
Non-Destructive Test of Jointing	100% X-Ray
Backfilling Material	Surrounded by 150 mm Thick Zone 2 Fresh Water Sand and selected fine soil
Cathodic Protection	Sacrificial Anode at about 300 m Interval
Minimum Depth	1.1 m
Material Grading (Pipe/ Fitting)	API 5L X 52/ X 60
Welding Specification	Welding complied with BS 4515 & BGC/PS/P2
Isolation Valves (Cameron Full Bore Ball Valve)	Upstream: Ball Valve at Lam Kam Road Downstream: Ball Valve at Route Twisk
Pipe Length between Isolation Valves	3.2 km



煤氣
Towngas

香港中華煤氣有限公司
The Hong Kong and China Gas Company Limited

網絡發展部

時間: 15:59:29

比例: 1 : 1000

圖例:

- LPA 現有低壓 A 管線 (2.0 千帕以下)
- LPB 現有低壓 B 管線 (2.0-7.5 千帕)
- MP 現有中壓管線 (7.5-240 千帕)
- IPA 現有次高壓 A 管線 (240-400 千帕)
- IPB 現有次高壓 B 管線 (400-700 千帕)
- HP 現有高壓管線 (700 千帕以上)
- PE 設有可探察管帶的聚乙烯管線
- IPB* 現有次高壓 B 管線 (難以較低壓力運作)
- HP* 現有高壓管線 (難以較低壓力運作)
- PE* 沒有可探察管帶的聚乙烯管線
- RP 備用管線 / 保留管線
- RPIT 掘測井
- RPIT 掘測井

- 鋼蓋板
- 冷凝液罐
- 無管帶的冷凝液罐 / 散熱點
- 閘門
- 球閘
- 清管井
- 立管井
- CF 陰極保護裝置
- 大約埋深(米)
- 管網通訊線
- TT: 接型旁路 / RS: 基氣馬路
- RS: 接型三通 / WT: 變土三通
- [注意: 變型管件埋深, 比管線淺約 50 毫米]

圖則顯示的管道位置只作參考之用。
其實際位置和深度仍須以人手開挖
探孔確定。在煤氣管道設施附近施
工期間, 必須加倍小心。

檢查日期: Sep 5 2025