Project Profile

for

Proposed Installation of High Pressure Gas Pipeline

Passing Through the Edge of the Ma On Shan Country Park

Adjacent to the Ma On Shan Service Reservoir

Reference : **R187.04.DOC**

Client : **The Hong Kong and China Gas Company Limited**

Date : **July 2004**

For and on behalf of CH2M-IDC Hong Kong Limited

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1.1 PROJECT TITLE

1.1.1 Proposed High Pressure Gas Pipeline Passing Through Ma On Shan Country Park adjacent to Ma On Shan Service Reservoir

1.2 PURPOSE AND NATURE OF THE PROJECT

1.2.1 The Hong Kong and China Gas Co. Ltd. (HKCG) is committed to continuous improvement in services for her customers in the territory by providing reliable and sufficient fuel gas supply. Under this project, HKCG has commissioned the construction of the Eastern Transmission Pipeline (ETP) – T7 Section in Ma On Shan of about 4.2km long to further enhance the gas supply for the local distribution to Ma On Shan areas.

1.2.2 However, during the detail design stage of construction period for the ETP – Road T7 section, part of the original pipeline alignment was modified (Realigned Section) due to other technical constraints imposed by existing highway operation practice. It is found that about 400m, part of the proposed Realigned Section, falls within the boundary of the Ma On Shan Country Park after the realignment. It must be noted that most of this pipeline section (about 320m out of 400m) falls within a Government/Institute and Community (G/IC) Zone where a Water Service Department's (WSD) Ma On Shan Service Reservoir (MOSSR) located. According to Lands Department information, this G/IC zone has been allocated to WSD as the Water Works Reserve Area (Government Land Allocation No. ST146 Ma On Shan Fresh Water and Salt Water Service Reservoir). The rest of the Realigned Section are located within the Road T7 construction site.

1.3 NAME OF THE PROJECT PROPONENT

1.3.1 Hong Kong and China Gas Company Limited (HKCG)

1.4 LOCATION AND SCALE OF THE PROJECT AND ITS HISTORY

Size of Gas Pipe

1.4.1 The proposed pipeline ETP-T7 is a high pressure gas pipe in Ma On Shan, with total length of about 4.2 km. The gas pipe to be laid is 600mm diameter and made of 12.7mm thick high-grade steel. It will be buried with at least 1.1m soil covers in accordance with the requirement of the Gas Authority and be installed section by section. Each segment of gas pipe is 12m long and weighs about 2.5 tonne. The original alignment of the whole ETP is presented in Figure 1.

History of the Realignment

1.4.2 HKCG has verified the original proposed alignment of the ETP – Road T7 section during the detailed deign stage and consulted with various Government departments on its final alignment for construction.

1.4.3 The proposed gas pipe connects from the existing pipe end near Heng On Estate, Ma On Shan and mainly runs besides the alignment of the Trunk Road T7 with its subsidiary roads, cycle tracks and other existing road carriageways. The Project is targeted to be completed in end 2004 / early 2005.

1.4.4 During the preliminary design stage, there was no indication of the construction of the ETP – T7 Section being classified as a designated project under the Environmental Impact Assessment

Ordinance (EIAO). The pipeline construction itself does not fall within either the category H – utility pipelines, transmission pipelines and substations, or within the category Q – Miscellaneous. In addition, the proposed alignment of the ETP-T7 Section pipeline runs alongside the future Road T7 and existing roads and does not encroach within any sensitive area described in category Q of schedule 2 of the EIAO. No environmental permit is required for the construction work of the ETP – Road T7 section in principle. Construction of the ETP – T7 Section commenced in 2001 in order to match with the construction programme of the Road T7. Up to June 2004, there was already about 3km of the pipeline completed in construction.

1.4.5 Subsequently, a section of pipeline of the Project which measures about 400m to the south of the Kam Ying Court in Ma On Shan, which was originally proposed besides the verge of Trunk Road T7 on the northwest side, was found potentially falling within the future expressway limit, as advised by the Highways Department. According to information provided by the Transport Department, the Trunk Road T7 will be completed in 2004 and will be designated as an expressway through the gazette procedure. Under the Expressway Ordinance, non-operational utilities, such as gas mains, is not allowed to be laid of within the expressway and the associated expressway limit. Therefore, Highway Department has confirmed that the proposed high-pressure pipeline should not be laid along the Trunk Road T7 unless there are strong justifiable reasons for the proposed service and there is no other feasible route.

Consideration of Alternative Alignment

1.4.6 In order to avoid encroaching into this future expressway limit, five alternative alignments have been considered to determine a suitable route for the Realigned Section (Figure 2). All these option have been consulted and commented with relevant Authorities. Table 1-1 below describes the considerations and characteristics of each alternative option for selecting the most feasible one.

Table 1-1 Characteristic and Consideration of the Five Alternative Alignments

Option	Location	Characteristics	Comment
A	Running along the southern boundary of Kam Ying Court	• Follow the alignment of the service road which is about 5m south to the Kam Ying Court.	• Construction Phase Environmental Impacts will be more significant due to the shorter buffer distance. • Gas Authority does not support this option.
B	Running through the slope between Kam Ying Court and Trunk Road T7	• Under Highway Department definition, the slope immediate north of the Trunk Road T7 is potentially identified to be part of the expressway limit. • Running through a steep slope.	• The construction of the pipeline and its future maintenance works may affect the stability of the slope and finally the Trunk Road T7. • Gas Authority does not support this option because the pipeline integrity may be affected by the stability of the steep slope.
C	Running along the Space between T7 and Water Service Department's Ma On Shan Service Reservoir	• Running through a narrow crest between the Road T7 and the Water Supplies Department's (WSD) Ma On Shan Service Reservoir (MOSSR).	• According to the T7 roadwork's Contractor's site investigation and survey for the said area, this proposed gas alignment was in conflict with the bored pile wall of Road T7, the existing water mains and the chamber. • Laying the proposed gas pipeline along the captioned limited space is technically not feasible.

Option	Location	Characteristics	Comment
D	Running through WSD's MOSSR	• Running through the Water Supplies Department's (WSD) Ma On Shan Service Reservoir (MOSSR) which serves the whole MOS residents.	• WSD informed that there are already some waterworks pipe and sub soil drains installed underneath the area besides the existing service reservoir. • In addition, WSD does not support this option. WSD considered that this proposed alignment would seriously affect the maintenance of the existing waterworks installations of the MOSSR.
E	Running along G/IC adjacent to WSD's MOSSR and passing through the edge of the MOS Country Park	• Running along and outside the fence wall of the WSD's MOSSR, where is a G/IC zone allocated to WSD as Water Reserve Area. • Next to an existing footpath within the G/IC area.	• WSD has no objection • Gas Authority prefers and has approved this option • Preferred alignment with less engineering and physical constraints.

Preferred Alignment

1.4.7 Option E (the Project) is identified as the single preferred route because of its compliance with the engineering and physical constraints associated with the proposed gas pipeline. Other alignment routes either have their own physical and/or engineering constraints coupled with environmental disabilities at varying levels, and hence are not considered as feasible alternatives.

1.4.8 The preferred route runs through the Road T7 construction site (about 210m), and the Ma On Shan Country Park (about 400m). It must be noted that most of this pipeline section (about 320m out of 400m) falls within a Government/Institute and Community (G/IC) Zone where a Water Service Department's (WSD) Ma On Shan Service Reservoir (MOSSR) located. According to Lands Department information, this G/IC zone has been allocated to WSD as the Water Works Reserve Area (Government Land Allocation No. ST146 Ma On Shan Fresh Water and Salt Water Service Reservoir). In addition, there are a footpath and a trail located within the G/IC zone. Therefore, the proposed works area within the country park boundary has been interfered by the public regularly.

1.4.9 Since part of the Realigned Section falls within the country park boundary, the project proponent had presented and discussed the project with the Country Park Board. It has been demonstrated in the Country Park Board that this proposed alignment is the only feasible option. The preferred option has been commented and agreed by the Country Park Board at its meeting on 1 April 2004.

1.5 NUMBER AND TYPES OF DESIGNATED PROJECTS TO BE COVERED BY THE PROJECT PROFILE

1.5.1 There is only one designated project (DP) covered in this Project Profile.

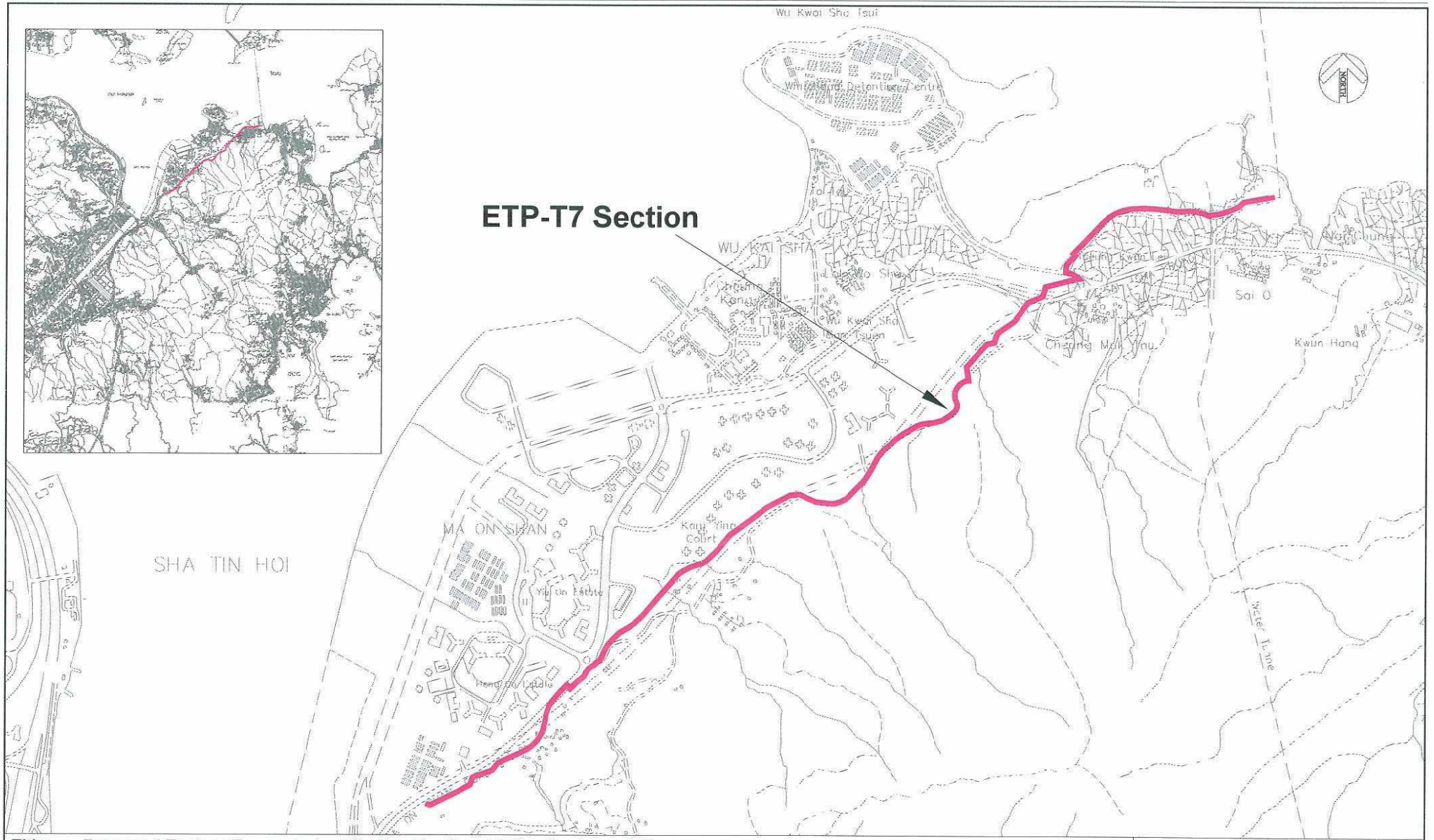
1.5.2 In accordance with category h of Part 1, Schedule 2 of the EIAO, the section of the ETP – Road T7 Section, which runs along the alignment of Road T7, is not classified as designated project.

1.5.3 The proposed 600mm diameter gas pipeline with about 400m out of a totally 4.2km long ETP - Road T7 Section within the Ma On Shan Country Park Boundary is regarded as a designated project by virtue of Q.1 in Schedule 2, Part I of the EIA Ordinance without satisfying the cases listed in Q.1 (a) to (j). It is because this proposed pipeline is located within the boundary of an existing country park and its dimension is larger than 120 mm.

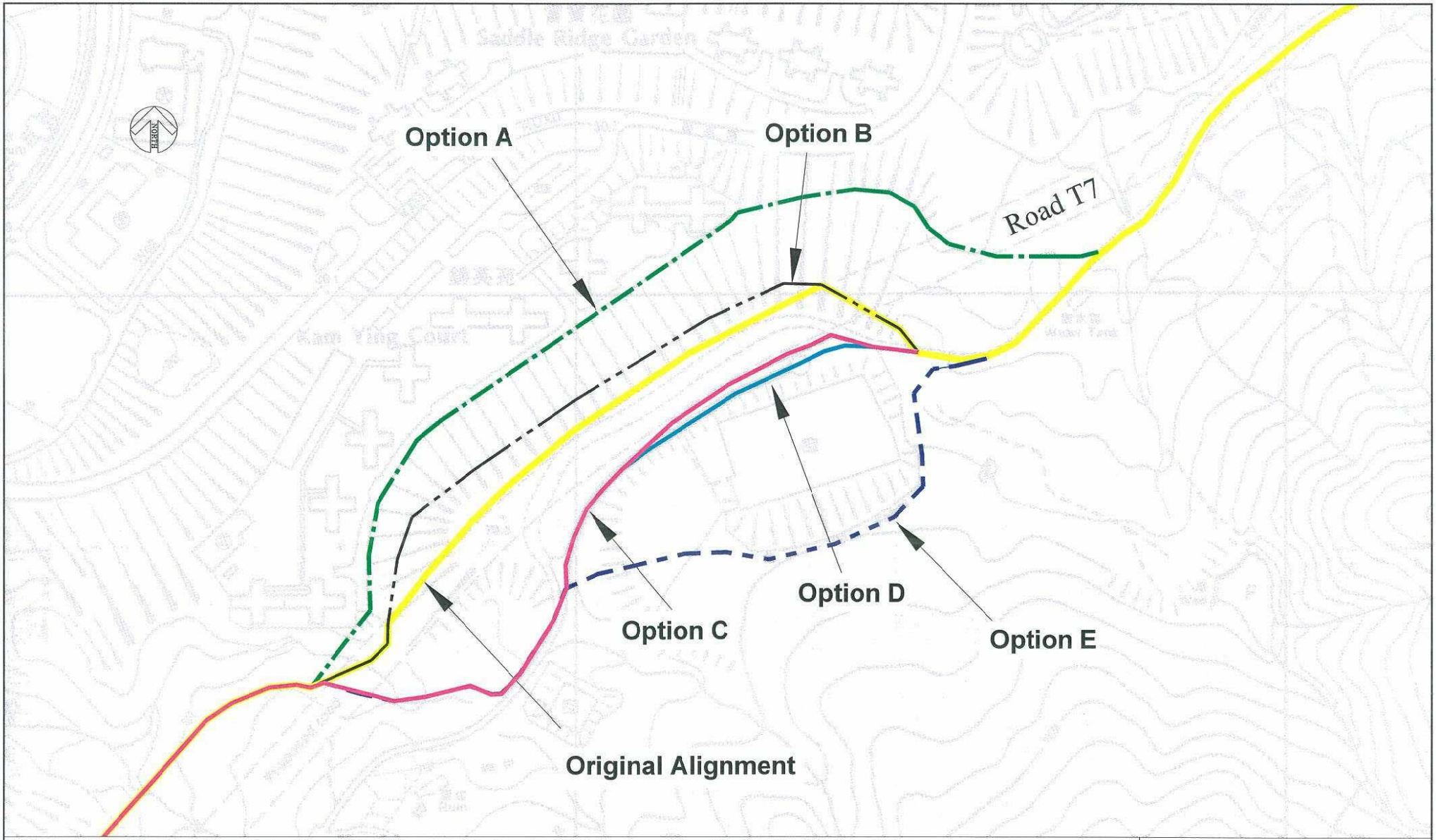
1.6 NAME AND TELEPHONE NUMBER OF CONTACT PERSONS

1.6.1 Hong Kong and China Gas Co. Ltd. (HKCG)

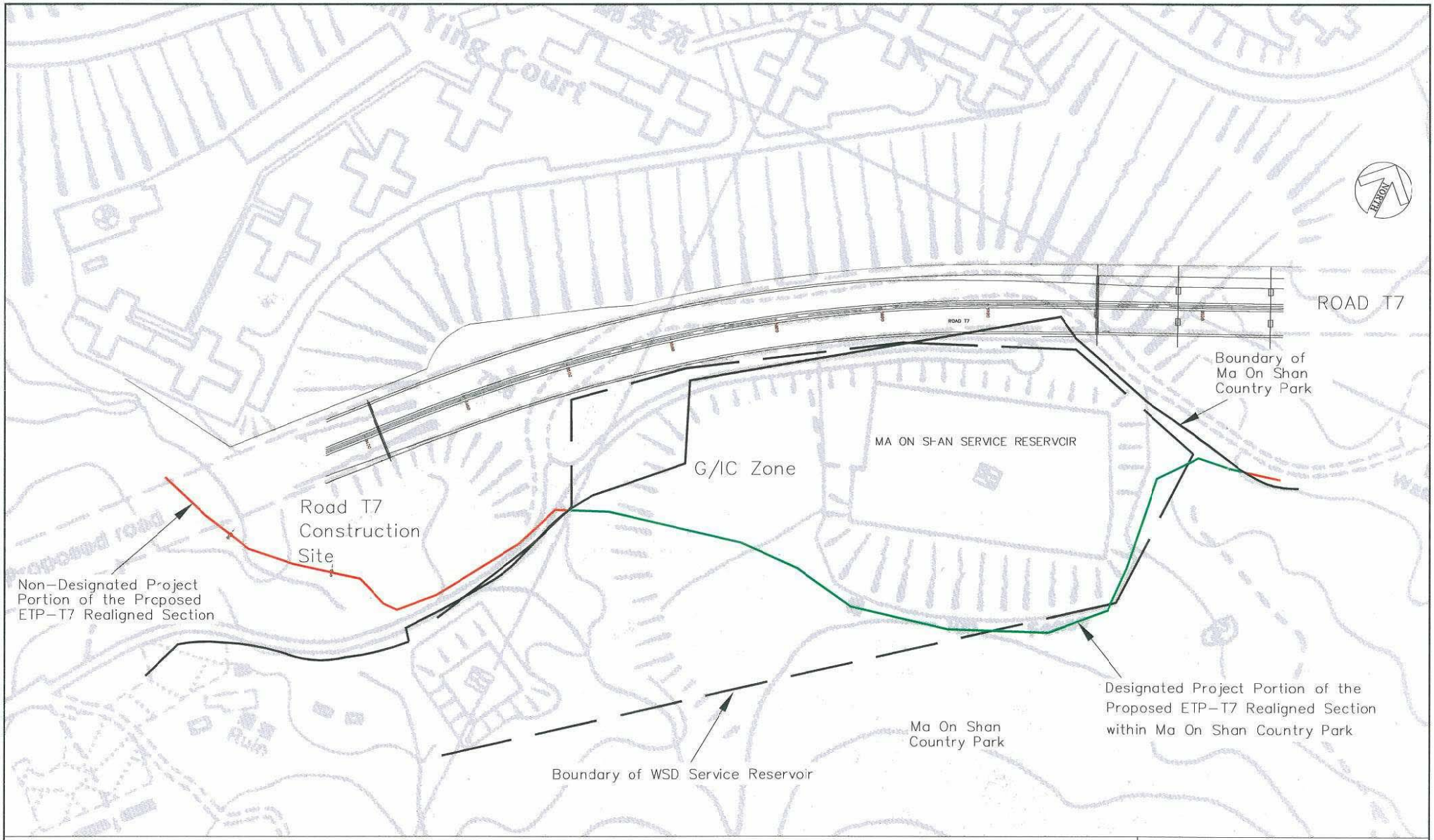
Name	Designation	Telephone No.	Fax No.
FONG Wai-Man Edmond	Strategic Projects Manager, Strategic Projects Section	2963 1272	2516 7979



Title: Proposed Eastern Transmission Pipeline Routing - T7 Section Layout Plan	**CH2M-IDC Hong Kong Limited**	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	**Scale: NTS**	**Figure: 1**



Title: Indicative Location of the Alternative Alignment Option for High Pressure Gas Pipeline beside Road T7	CH2M-IDC Hong Kong Limited	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	Scale: NTS	Figure: 2



Title: Proposed Realignment of the Pipeline within G/IC Zone and Ma On Shan Country Park	**CH2M-IDC Hong Kong Limited**	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	**Scale: NTS**	**Figure: 3**

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 PLANNING OF THE PIPELINE ALIGNMENT

2.1.1 The Project of installation and operation of the high-pressure gas pipe (Figure 4) is planned and designed by in-house staff of HKCG. A Contractor will be commissioned by HKCG to install the pipeline in accordance with both statutory standard and other guidelines under the supervision of HKCG. The construction works for the Project will be planned and constructed in phases, i.e. the gas pipe will be constructed with each opening of about **50m** long in length, under environmentally friendly manner to minimise construction nuisance.

2.2 PROGRAMME OF THE PROJECT

2.2.1 Construction of the Project tentatively will begin in **September/October 2004** and is expected to be completed in about 5 months under different phases. The rest of the ETP – Road T7 section is to be constructed under different time slot for completion before end 2004. The whole ETP – Road T7 section is scheduled to operate at end of 2004 / early 2005.

2.3 IMPLEMENTATION OF THE PROJECT

Minimization of Works Area

2.3.1 Installation of the gas pipe is typical of ordinary utility installation work. With reference to a project conducted by HKCG during Year 1995-1997 at Tai Lam Country Park, the width of works area was 7m. However, for this Project encroaching into existing tree planting areas, the works area will be reduced wherever possible to just allow the passing through of the powered mechanical equipment in addition to the safety buffer distance on both sides, in order to minimise the disturbance to the tree planting areas. In general, the width of the works area at these areas should be minimised to be around 5m (see details of Figure 5), whereas 3m for vehicle access and 2m for trench works.

2.3.2 With reference to Figure 5, the works area of the Project has been reduced to be minimal for the construction equipment travelling and transportation of construction material. Since each 12m long high-pressure gas pipe weighs about 2.5 tonne, powered mechanical equipment, such as crane lorry, is required to transport and handle these heavy gas pipes. A minimum 3m wide works area is required to act as a haul road serving the movement of the construction equipment, and to provide space for erection of temporary fencing board.

2.3.3 In order to reduce the construction period as well as the associated disturbances to the surrounding environment, excavator is proposed for the excavation of the trench and backfilling of excavated soil after installation of the pipelines, instead of using manpower to excavate the over 400m long trench at hill.

Typical Construction Sequence

2.3.4 The typical key activities associated with the installation of the gas pipe are described below.

- Trees, shrubs and any aboveground structure/facilities affected will be marked and removed from the works area. A tree survey report will be conducted prior to the commencement of construction. For this project, felling of tree is proposed in accordance with the tree survey report. Please see section 3.1.4– 3.1.10 and Appendix A for details.

- Temporary pedestrian walkway shall be provided to divert the pedestrian away from the works area where necessary. For this project, a non-slip temporary footpath with good indication on the entrance will be constructed prior to the commencement of the construction. If there are some trees located at the routing of the temporary pedestrian walkway, they will be retained.

- Temporary drainage shall be installed to allow stormwater to pass through the works area into existing U-channel, where necessary and practicable.
- Forming a haul road for travelling of construction plant to conduct trench excavation and pipe laying purpose, as well as to transport the pipe section, where necessary.
- During the course of trench excavation, adequate trench reinforcement such as use of sheet-piles and struts shall be provided to ensure the trench integrity and the stability of adjacent structure/feature/slope.
- Adequate safety trench barriers shall be provided along the sides of excavated trench to prevent person from falling into the trench, where necessary.
- According to the typical arrangement for installation of high-pressure underground pipeline as recommended in "Steel Pipelines for High Pressure Gas Transmission" published by the Institution of Gas Engineers and Managers, UK and **approved by the Gas Authority**, a trench of a minimum depth of about 1.85 m and about 1 m wide along the centreline of the proposed gas pipeline will be constructed (See Figure 5).
- The pipelines will be surrounded by fine sand to about 150mm thick. Accordingly, the formed trench will be filled with sand to a level of about 150mm before the laying of the pipelines.
- Pipe shall be fabricated to given length and thoroughly tested in factory before use. The pipe will be placed into the excavated trench and individual sections are then jointed by welding and followed by non-destructive test (i.e. radiographic examination of welded joint and inspected by Independent Radiographic Consultant) to ensure that the pipes are properly jointed.
- The trench will be filled by sand again to a level of about 150mm above the top of the pipelines. The trench will then be filled by the excavated materials. A minimum cover of 1.1m will be maintained on top of the laid pipeline as required by the Gas Authority.
- Suitable materials (here is excavated materials) will be used for trench backfilling and shall be properly compacted. During the course of trench backfilling, soil compaction test shall be taken to ensure the degree of compaction.
- Removal of trench shoring will take place upon the completion of backfilling operation. Compensatory plants will be cultivated within the works area as described in section 5.1.4 – 5.1.9. Original aboveground facilities will be reinstated. Any excess material (see section 4.1.15 – 4.1.16 for details), equipment, temporary haul road and waste will be cleaned and removed for site handover.

2.4 CONSTRUCTION PHASE EQUIPMENT LIST

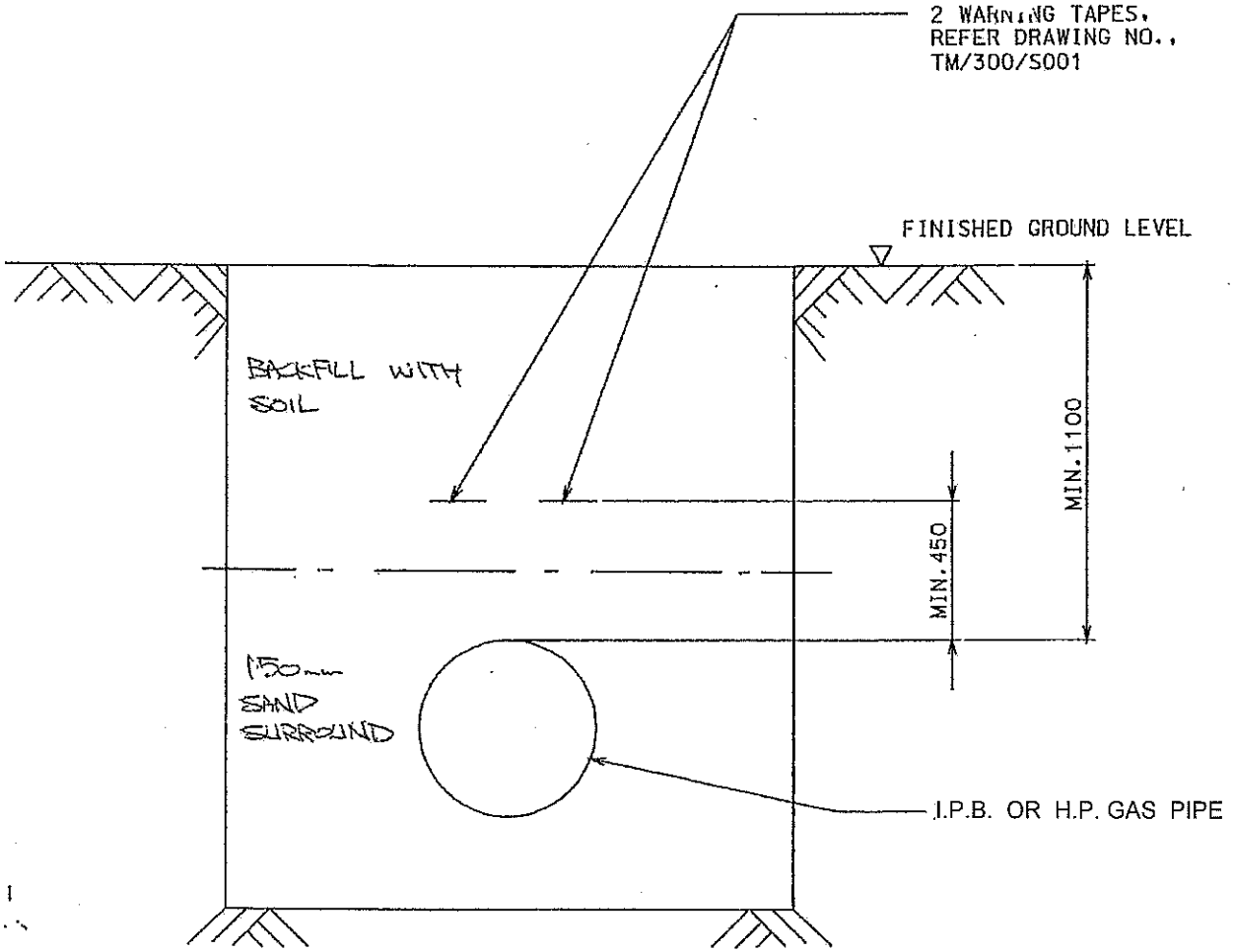
2.4.1 The following equipment will be employed for the installation of the gas pipe based on the assumption that the Project will be carried out in a **phased** manner. This equipment list has been commented and agreed by HKCG. The construction will be conducted during daytime. If night-time work is required, construction noise permit will be required, following the procedures as stipulated in the *Noise Control Ordinance*.

Table 2-1 Proposed Powered Mechanical Equipment List for the Construction Work

Powered Mechanical Equipment	Qty	ID Code	Sound Power Level, dB(A)	Utilisation
Excavator	2	BS C8-15	103	80%
Crane lorry	1	BS C7-101	94	50%
Dump truck	1	BS C9-39	103	20%
Power generator (enclosed by acoustic materials)	1	CNP 102	100	100%
Welding machine	2	Underground operation only	Negligible	10%
Pump (enclosed by acoustic materials)	2	CNP 283	85	100%
Compactor	1	CNP 050	105	100%

2.5 INTERACTIONS WITH OTHER PROJECTS IN THE AREA

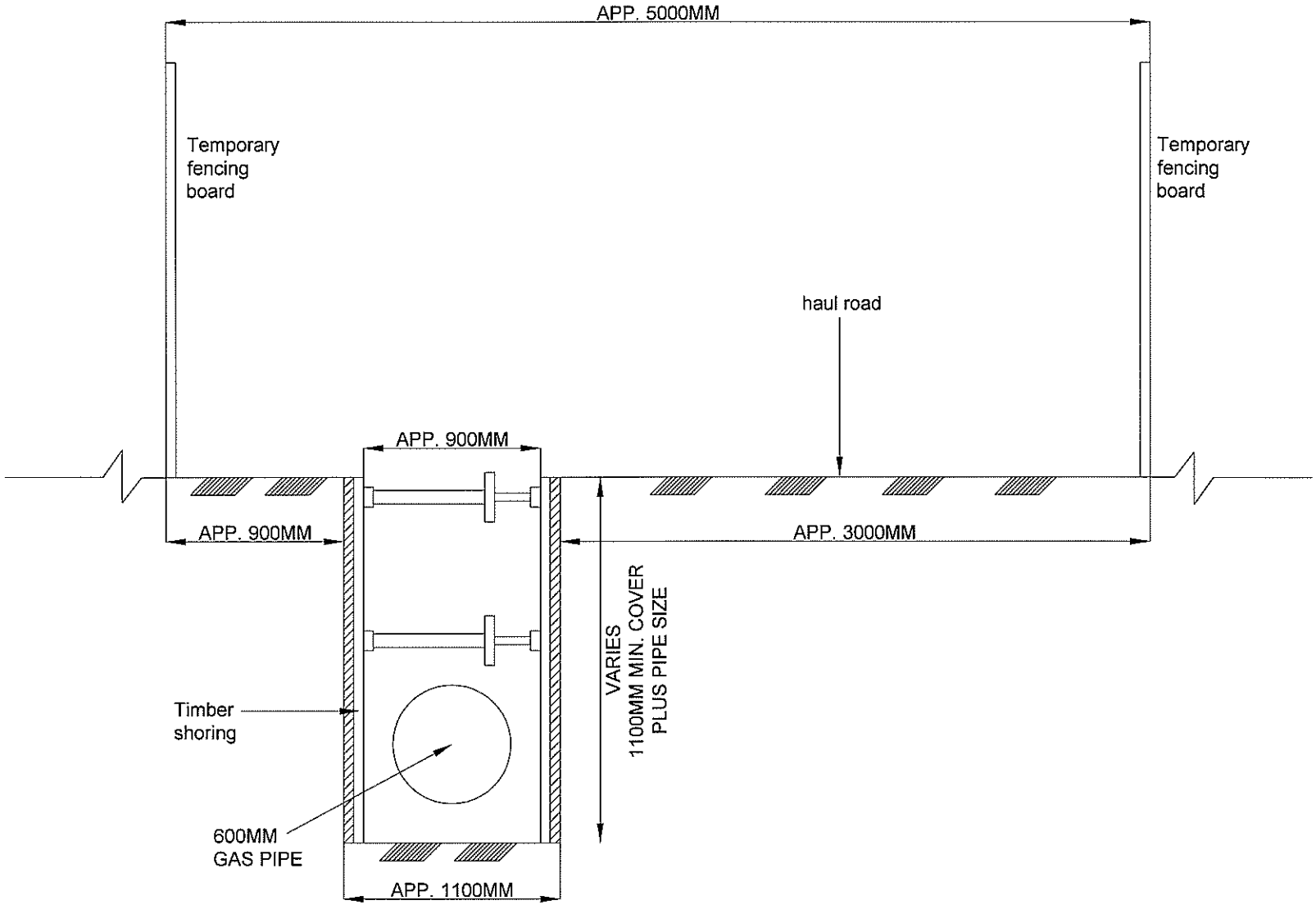
2.5.1 The planned Road T7 to the northwest of the proposed pipeline alignment is under construction. The Road T7 commenced construction in January 2001 for tentative operation in the Third Quarter of 2004 and is expected to be overlapped with the construction of the ETP – T7 section. However, the major infrastructure work is expected to be completed at mid – 2004. Therefore, the remaining construction work will be minor works, such as plantation alongside the Truck Road T7, reinstating the affected slope, etc. These minor works is expected not to generate significant construction impact.



NOTE:

1. ALL DIMENSION ARE IN mm.
2. IF STEEL CAPPING PLATES ARE USED. THE P.E. WARNING TAPES SHALL BE LOCATED ON TOP OF THE PLATES.

Title:	Typical Section of a High Pressure Gas Pipe	**CH2M-IDC Hong Kong Limited**	
Project:	Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	Scale: NTS	Figure: 4



Title: Construction Section of High Pressure Gas Pipe - Realigned Section of ETP - T7	**CH2M-IDC Hong Kong Limited**	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	**Scale: NTS**	**Figure: 5**

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 EXISTING AND PLANNING SENSITIVE RECEIVERS AND SENSITIVE PARTS

3.1.1 Ma On Shan is developed as an extension of the Shatin New Town. Land uses consist of public and private housing, commercial and industrial use, government institutional and community use and open space. The ETP-T7 gas pipe runs from southwest to northeast mostly along the planned slip road associated with Road T7.

3.1.2 For the proposed alignment of the Realigned Section, it runs from a slip road of the Road T7, west of the Kam Ying Court, towards the G/IC zone where a WSD Ma On Shan Service Reservoir (MOSSR) located. This G/IC zone has been allocated to WSD as the Water Reserve Area. Afterwards, the proposed alignment enters the G/IC zone and runs along and outside the chain link fence of the MOSSR from west to east and rejoins the ETP – T7 at an old trail northeast of the MOSSR (Figure 6). As shown in Figure 6, some section of the Project enters the Ma On Shan Country Park. For the alignment outside the G/IC zone and the Ma On Shan Country Park, there are no vegetations found because the area was part of the construction site for the Road T7.

3.1.3 Major elements in the surrounding include residential developments and the Ma On Shan Country Park.

Ecology – Ma On Shan Country Park and G/IC area

3.1.4 Part of the Project is constructed near the alignment of the Trunk Road T7, which was Road T7 construction site. No vegetation would exist along this section of pipe alignment.

3.1.5 However, part of the Realigned Section in the Ma On Shan Country Park and the G/IC zone falls within the trees and shrubs planting area. A tree Survey and felling report for this Realigned Section have been conducted and presented in Appendix A.

Flora

3.1.6 No protected species were found within or in the vicinity of the proposed alignment of the Project. Only common trees species were found within the proposed works area of the Project. Exotic species include *Acacia confusa, Pinus elliottii, Tristania conferta, Eucalyptus torelliana, Acacia mangium,* and *Acacia auriculiformis*. The native tree species found include *Albizia lebbek, Schefflera octophylla, Acronychia pedunculata* and *Zanthoxylum avicennae*.

Fauna

3.1.7 No mammals, birds, amphibians and reptiles were observed on-site during the visit on 10/12/2002. In addition, there were also no butterflies or dragonfly observed.

3.1.8 In general, there were no species of restricted distribution or conservation concern detected on-site.

Habitat Evaluation

3.1.9 The Realigned Section in the G/IC zone follows the footprint of a footpath and a trial, which are utilizing by morning walkers, hikers or country park visitors. The proposed works area of the Project including the DP portion will be regularly disturbed by human activities.

3.1.10 The vegetation is unremarkable due to the dominance of exotics. Table 3-1 provides an evaluation of the site / habitat in accordance with the TM on EIA Process.

Table 3-1 Evaluation of the Realigned Pipeline for Habitat Assessment

Criteria	Remarks
Naturalness	The works area has been modified by human activities, both by the plantation of exotic species and with the presence of trail as well as footpath. It must be noted that the G/IC zone which is already allocated to WSD as Water Reserve Area.
Size	The works area is small, linear and at the edge of the area of conservation (Ma On Shan Country Park)
Diversity	Low floral and faunal diversity
Rarity	This works area is common secondary plantation woodland with exotic species dominated.
Re-creatability	The majority of the planting is exotic species that re-creation is feasible.
Fragmentation	The works area is at the interface of the band of woodland at the edge of the Country Park and the WSD water reservoir.
Ecological linkage	These minor works will not disturb linkage with higher value habitats (uphill towards the core of the Country Park).
Potential value	The works area will be disturbed by morning walkers/ country park visitors using the footpath in the G/IC zone next to the western portion of the realigned pipeline section and the trail south to the MOSSR.
Nursery/ Breeding ground	Not Detected.
Age	Most of the tree planting within the Country Parks was carried out following World War II.
Abundance of wildlife	The works area is a common exotic plantation along a trail and footpath, supporting common woodland similar to secondary plantation woodland along footpath. No mammals, birds, amphibians and reptiles, as well as butterflies and dragonflies observed in site visit.

Noise

3.1.11 For the realigned pipeline, Kam Ying Court is the nearest sensitive uses which may be subject to the environmental nuisance due to the Project. Figure 6 shows the location of the representative sensitive receivers along the alignment of the proposed realigned gas pipe beside the Road T7 section.

Air Quality

3.1.12 The sensitive receiver associated with air quality is the same as those described above for noise issue.

Water Quality

3.1.13 There is a stream, running from south to north, located about 50m south of the western end of the realigned pipeline section within the G/IC area.

Visual and Landscape

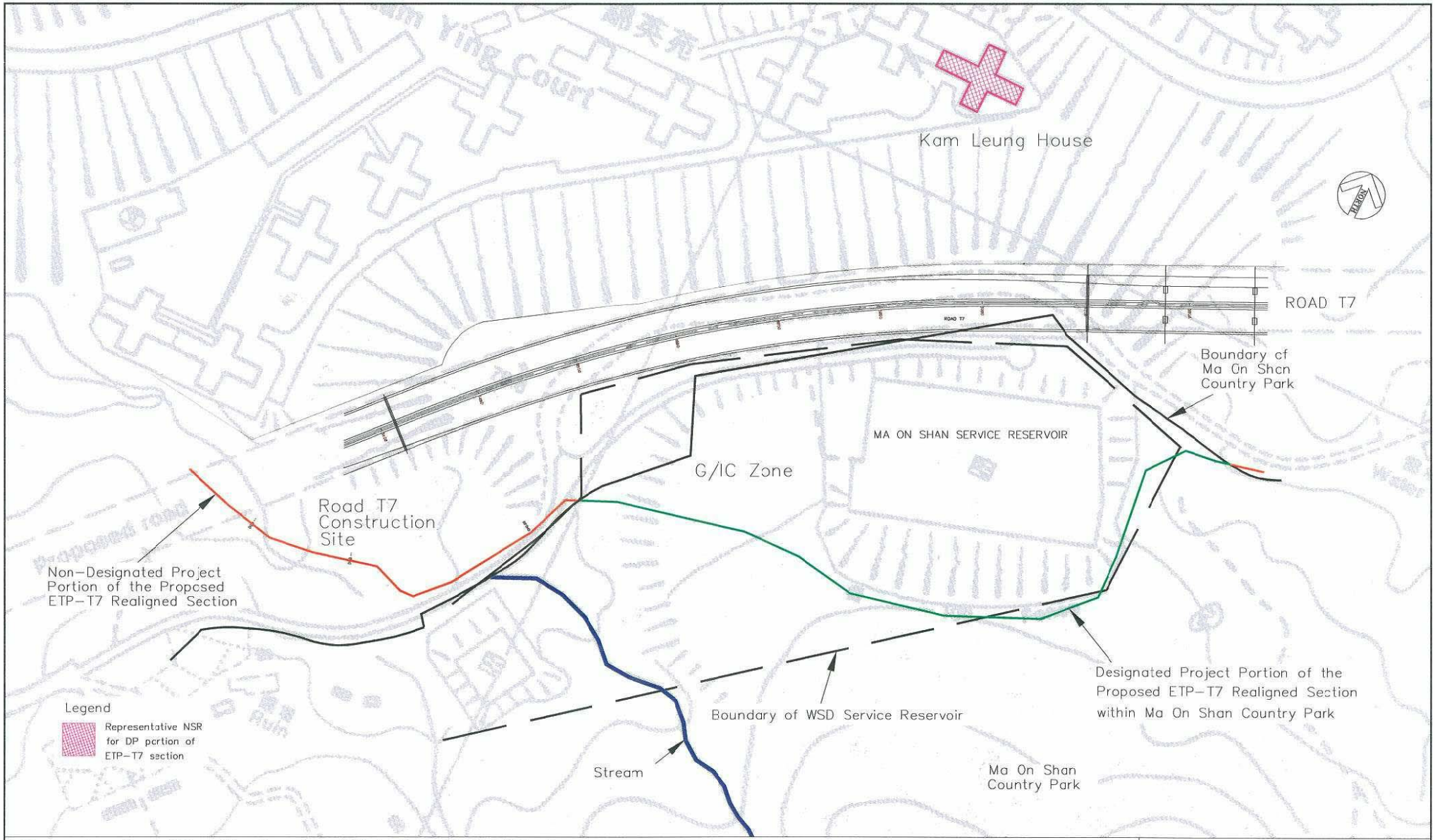
3.1.14 Partly works area for the Realigned Section can be viewed from the existing high-rise residential buildings of Kam Ying Court. The works area lies in a belt of woodland is situated at the edge of the fence of the WSD's MOSSR.

3.1.15 A concrete footpath is running from south to north immediate west of the chain link fence of the MOSSR. The footpath is found to fall within the G/IC zone. Plantation is found along the chain link fence of the MOSSR.

3.2 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT AND LAND USE

3.2.1 Ma On Shan is a newly developed area as an extension of the Sha Tin New Town. The proposed gas pipe will be installed underground along mainly the proposed and existing roads. The Project itself is not regarded as a sensitive receiver. The Ma On Shan Country Park where the proposed pipeline passing through is the major sensitive use. However, it must be noted that most of the works area of the DP portion are located within the G/IC zone which has been allocated to WSD as Water Reserve Area as there is a water service reservoir located.

3.2.2 Moreover, the land use history does not indicate any potential land contamination and hazard impact.



Title: **Location of Sensitive Use along DP Portion of ETP-T7 Section**	**CH2M-IDC Hong Kong Limited**	
Project: **Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir**	**Scale: NTS**	**Figure: 6**

4. POSSIBLE IMPACT ON THE ENVIRONMENT

4.1 CONSTRUCTION PHASE IMPACT

4.1.1 The alignment of the ETP – T7 section except the Realigned Section is designed to avoid encroaching into any vegetation areas. ETP-T7 section shall be aligned along existing road carriageways, as well as the verge of Trunk Road T7, under the subsidiary road and cycle track within the construction site of Trunk Road T7. Given the construction work scale of Road T7, the construction work scale for the ETP – T7 section is comparatively small. The environmental nuisance due to the construction of the ETP –T7 section within the Road T7 construction site is expected to be of minimal.

4.1.2 A localised encroachment on the MOS Country Park is unavoidable (section 1.4), as there are several site constraints, such as expressway limits and WSD's MOSSR working limits.

4.1.3 The construction phase works of the Realigned Section, including the DP portion of pipeline, will involve site clearance, site preparation, earthworks (such as excavation of trenches), resurfacing works and other general construction activities. Due to site constraint, felling of trees within the works area is unavoidable. A tree survey has been conducted and found that all the trees within the works area are common and/or exotic species. However, compensatory trees will be replanted after the installation of the pipeline and resurfacing works. The landscape of the whole Realigned Section construction site will be restored in accordance with the compensatory proposal to be finalized with AFCD while the proposed works of the Realigned Section had been consented by AFCD.

4.1.4 As described in section 2.1.1, the construction work for the ETP – T7 section has been scheduled to be carried out in a phased manner. This construction schedule arrangement will definitely reduce the scale of the construction each time, as well as the associated potential environmental nuisance by restricting the number of construction equipment. In addition, due to site constraint, the works area will be kept to minimal as illustrated in section 2.3.1 – 2.3.3. Therefore, the scale of the construction work for the Project is expected to be limited.

Ecological Impact

4.1.5 As describe in sections 1.4.6 to 1.4.9, the proposed alignment is the sole preferred option because of its full accommodation of the engineering constraints associated with the proposed gas pipeline. Other alignment routes either have physical and/or engineering constraints as well as environmental considerations at varying levels, and hence are not considered as feasible alternatives. As such, the alignment with the Ma On Shan Country Park is unavoidable.

4.1.6 No vegetation would exist along the majority of ETP – T7 section, so that the only identified area subjected to ecological impact is part of the Realigned Section near and inside the Ma On Shan Country Park Boundary, including the G/IC zone. Accordingly, a tree survey was conducted for the areas alongside 5m outside the work site boundary of the Realigned Section in accordance with WBTC No. 14/2002 "Management and Maintenance of Natural Vegetation and Landscape Works, and Tree Preservation". The exact location of the Realigned Section is then determined with due consideration of the topographic survey plan to minimise the number of trees to be affected by the proposed work. It must be noted that the size of the works area has been minimised to just sufficient for the construction (sections 2.3.1 – 2.3.3) in order to minimize the potential impact.

4.1.7 Based on the findings of the tree survey including the tree survey plan in Figure 7 and results in Appendix A, it was identified that 161 number of trees may be affected by the proposed work of the Project (including the provision of temporary footpath) due to their close proximity to the preliminary alignment. After critical consideration and revision of the alignment, a total of 64

tree individuals are recommended to be retained and 97 tree individuals are inevitable to be felled, and most of them are located within the G/IC area which has been allocated to WSD. It must be noted that these trees are exotic and common species. The tree to be retained will also include the trees located within the temporary footpath.

4.1.8 It must be noted that most of the trees are located within the G/IC zone where has been allocated to WSD and are located besides an existing footpath. It is expected that the public, such as morning walker, has interfered these areas frequently. Given the paucity of fauna resulting from the already disturbed nature of the works area, presence of the footpath and trail, impacts to fauna are considered to be negligible. The proposed works would not affect any areas and/or habitats of ecological importance as listed in Note 2 and 3 of Appendix A in Annex 16 of the Technical Memorandum on EIA Process. Table 4-1 summarizes the ecological impact during construction phase for the Project.

Table 4-1 Summary of the Ecological Impact during Construction Phase

Criteria	Remarks
Habitat quality	The habitat is of low quality
Species	Species diversity, richness and abundance were low (fauna) to moderate (flora). All species are commonly found in the HKSAR.
Size/Abundance	The works area is small and narrow, and only selective felling of exotic trees and secondary colonizers will be required.
Duration	Construction period for the DP-portion is about 5 months.
Magnitude	The magnitude of the impact is considered to be low.
Reversibility	Trees will be compensatory replanted after the construction.

Fugitive Dust Impact

4.1.9 The construction of the Project would inevitably involve excavation works. Temporary stockpiling of excavated material on site could generate dust especially during dry season and may cause minor localised air quality nuisance. As the installation work will be carried out in a phased manner, the number of equipment used would be limited. The works area and the associated amount of material (please see section 4.1.15 – 16 for details) to be excavated and handled are in turn limited under each phase of construction. With the sufficient buffer distance, dust nuisance is expected to be minimal.

4.1.10 In addition, because of the limited number of construction vehicle and plant to be used in site, the nuisance from the construction vehicle and plant will be relatively limited.

Construction Noise Impact

4.1.11 Construction noise impact due to the use of powered mechanical equipment shall be limited as a result of the restricted number of equipment to be used and the selection of silenced mechanical powered equipment. Summary of construction assessment due to DP-portion is shown in Table 4-2. Appendix B shows a calculation of the noise inventory and noise impact with respect to different separation distances assuming that quiet PME and proper scheduling of power construction equipment to be adopted.

4.1.12 The construction noise nuisance is predicted based on the planned operation pattern of the PMEs. Representative noise sensitive uses with shortest distance from the DP portion has been selected and shown in Figure 6. It is found that the predicted noise level due to the DP portion pipeline is well below the daytime construction noise standards stipulated in the *Technical Memorandum of Environmental Impact Assessment Process* and is considered insignificant. The predicted construction noise impact is within the daytime construction noise standard.

Table 4-2 Predicted Construction Noise Level at Selected NSRs [Leq, dB(A)] - DP portion

Sensitive Uses	Shortest Distance from the Project (m)	Predicted Noise Level, dB(A)	Standard Noise Level, dB(A)
Kam Leung House, Kam Ying Court	180	59	75

4.1.13 Water quality impacts may arise due to site effluent including site runoff and potential washouts, fuel contaminated fluids, without proper site drainage control and improper site housekeeping, especially during the rainy season. Environmental protection measures can be applied to minimize and/or alleviate the potential minor impact (see sections 5.1.15 – 16 for details).

Waste Management

4.1.14 Construction and demolition (C&D) materials will be generated from excavation works. General refuse, construction chemical waste (e.g. oil and lubricant from construction plant) and C&D wastes of average quantity are expected and will be handled in a proper manner. C&D materials will be reused for backfilling wherever possible.

4.1.15 The size of the gas pipe laying trench, as advised by HKGC, will be about 1.85m x 0.9m. It is expected that there would be approximately 880 m^3 inert materials (public fill) to be excavated from the Project (i.e. within the G/IC zone and the MOS Country Park). Out of these, suitable excavated material will be backfilled as much as engineering possible, and it is estimated that the amount of materials to be disposed off-site for the Project is about 391 m^3.

Cultural Heritage

4.1.16 It has been checked with the Antiques and Monuments Office that the construction site does not fall within any sites of cultural heritage. No cultural heritage impact is expected.

Landscape and Visual Impact

4.1.17 Within the Project, there are 97 number of trees along the works area would inevitably need to be felled during construction. The extent has been minimised as far as engineering possible (see section 2.3.1 – 2.3.3 for details). As the works area is partly within the MOS Country Park, clearing of vegetation and tree felling may result in landscape and visual impact. The construction site may also pose a temporary and localised visual intrusion to the nearby residents and visitor to the country park but such temporary and localised impact is insignificant to the residents. This impact will be limited to the morning walkers immediate next to the construction site. Since felling of some trees in the works area is unavoidable, a Tree Survey has been conducted. The results of the Survey are attached in Appendix A.

4.1.18 Reinstatement of the works area with compacted earth spoil followed by hydroseeding will remove the immediate scar. Compensatory planting of light/standard/heavy standard size trees with a ratio not less than 1:1 will further reinstate the visual and landscape of the affected area. It is proposed to replant the compensatory tree in a ratio of 1:3, but it will be subject to the final agreement with AFCD. The size of the compensatory tree will be altered subject to topographic status of the works area. Proposed species of the compensatory trees are shown in section 5.1.8 at below. Furthermore, natural encroachment from the adjacent vegetation will then finally provide total rehabilitation of the habitat. Footpath will be provided at its original location. Therefore, the potential impact will be minimised and is expected to be acceptable.

Others

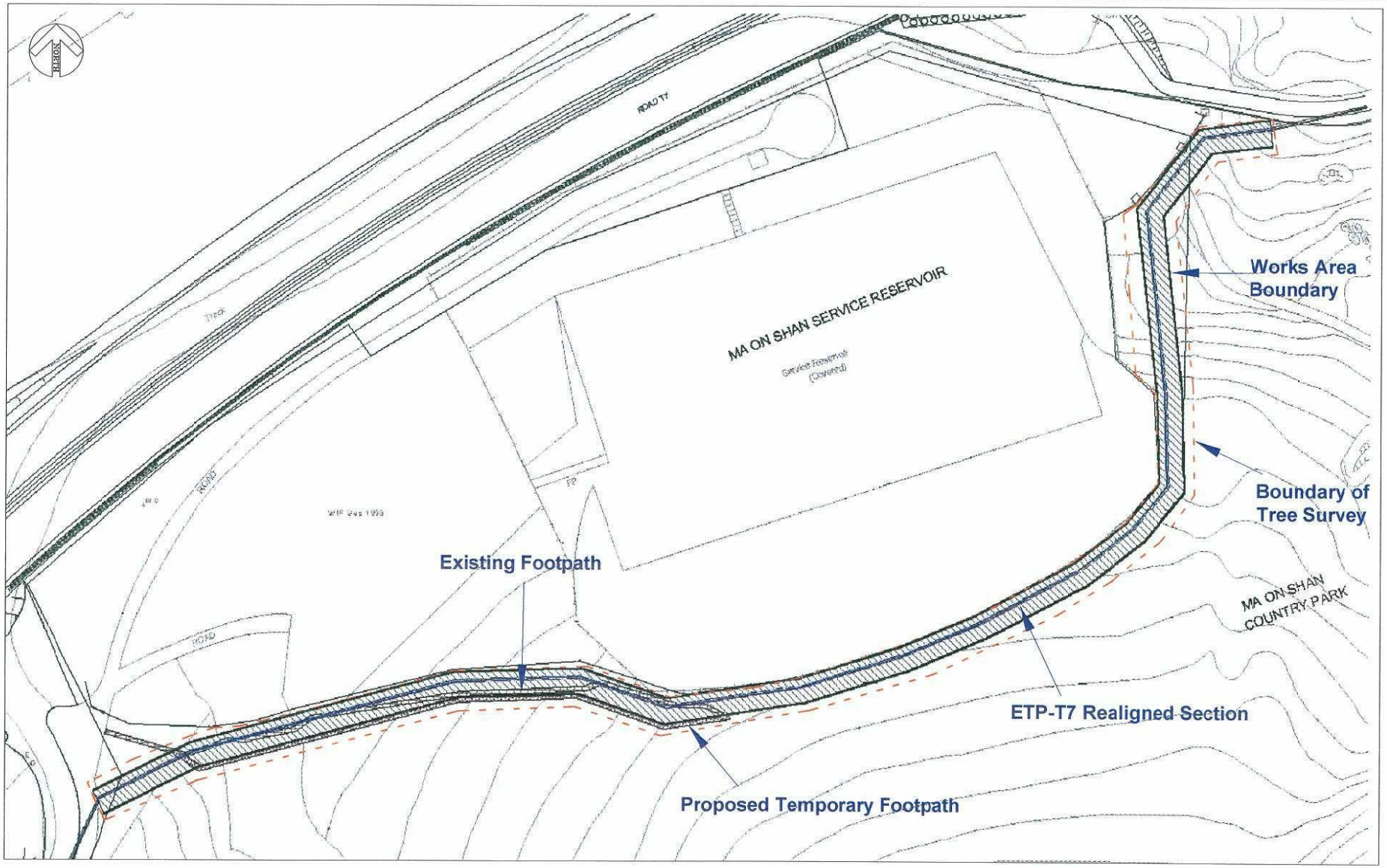
4.1.19 The existing footpath (located with the G/IC zone) that falls within the DP portion is extensively used by morning walkers and would result in temporary disturbance. Measures have been proposed to alleviate the potential temporary disturbance (see section 5.1.19-5.1.22 for details).

4.2 OPERATIONAL PHASE IMPACT

4.2.1 The high pressure gas pipe will be used to transmit fuel gas and buried underground. No air & water quality, noise and waste impacts are expected to be generated during the operation of the pipeline.

4.2.2 The proposed pipeline will be installed underground. The affected area will be reinstated after construction with replanting where necessary. Ecological impact and landscape and visual impact are not anticipated after reinstatement.

4.2.3 Moreover, the underground pipeline has been thoroughly tested and buried underground sufficiently in accordance with Gas Authority's requirement to avoid any potential damage of the pipework. No significant risk impact is anticipated.



Title: Tree Survey Plan & Works Area for Realigned Section	CH2M-IDC Hong Kong Limited	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	Scale: NTS	Figure: 7

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

5.1 PROTECTION MEASURES TO MINIMISE ENVIRONMENTAL IMPACTS

5.1.1 No unacceptable environmental impact is envisaged during the operational phase of the Project. The remaining paragraphs of this section will focus on measures between construction phase and post-construction works.

General Principle

5.1.2 In general, the alignment of the ETP – T7 section has been thoroughly considered in order not to encroach or even approach any sensitive areas such as vegetation zones of greenbelt areas, site of cultural heritage, areas with dense populations, etc.

5.1.3 To further reduce the extent of impact during the construction of the ETP – T7 Section, the installation of the gas pipe will be carried out in a phased manner to reduce the nuisance to the public and the surrounding environment. The gas pipe installation works will be divided into several phases, with each opening of about 50m in length, so that both the works area and equipment utilised at any time of the construction phase can be limited and in turn individual environmental impact can be reduced to minimum. The overall construction period for the Project could be tentatively completed in about 5 months.

Ecological Compensation Measures

5.1.4 The only identified area that would require tree felling is along the works area of the Realigned Section within Ma On Shan Country Park. Figure 7 also shows the layout of the works area for the Project. In addition, the existing footpath is in close proximity to the Realigned Section and need be inevitably cleared before the commencement of the installation work. Therefore, a temporary footpath is required to be constructed prior to the construction work. However, the tree located on the alignment of the temporary footpath will not be felled to minimise the ecological impact.

5.1.5 In accordance with the tree survey result, no transplantation of trees is recommended due to site constraints and limitations of works sequences required for this project. However, compensation measures are proposed to reinstate and enhance the conservation value of the disturbed area. The compensation measures proposed include tree compensation and maintenance of these compensation plants. Enhancement of the environment will be described in Landscape and Visual impact section as below.

5.1.6 Compensation planting is recommended after the completion of the construction. The details of compensation planting are shown in section 5.1.7 at below. The alignment of the Project, existing, temporary and proposed footpath, after installation, as well as the location of compensation planting are shown in Figure 8. In order not to interfere the future underground pipeline due to tree's root, no tree will be planted within 1m on both sides of the pipeline, which is a general recommendations of tree planting in the close proximity to gas pipeline advised by HKCG. However, hydroseeding will be implemented on these areas. Because of this engineering constraint, it is recommended that the compensatory trees will be replanted along the works area.

5.1.7 In order to enhance the disturbed environment, it is proposed that light / standard / heavy standard trees will be replanted in not less than 1:1 ratio along the works area of the Project. The size of the trees will be subject to topographic condition of the works area. Light size tree will be planted at steep slope, such as eastern side of the MOSSR while standard / heavy standard will be planted at relatively flat area (southern and western side of the MOSSR). In order to enhance the environment but not to cause overcrowd, it is proposed to replant the trees in a ratio of 1:3. It must be noted that the compensatory measures will be finalised with AFCD.

5.1.8 For the species of the trees, native species is considered to be suitable in conservation points of view. In the market, the native species available include the following species: *Ficus microcarpa* (Chinese Banyan), *Ficus virens* (Big-leaved Fig), *Cinnamomum camphora*

(Camphor Tree), *Schefflera octophylla* (Ivy tree), *Gordonia axillaris* (Hong Kong Gordonia) and *Aquilaria sinensis* (Incense Tree), etc. If native species are out of stock, exotic species, such as *Albizia lebbeck* (Lebbeck Tree), can also be replanted. In addition to the tree compensation, a 2-years maintenance of the compensatory plant by HKCG is also proposed to ensure the compensation plants will be in a health status.

5.1.9 In all circumstances, the Contractor will be required to exercise with care to avoid unnecessary damage to the existing vegetation outside the boundary.

Fugitive Dust Control Measures

5.1.10 Any works that involve the handling of dusty materials are regulated under the *Air Pollution Control (Construction Dust) Regulation*. In accordance with the requirements of the *Air Pollution Control (Construction Dust) Regulation*, the Contractor shall be responsible for the design and implementation of these recommended measures to ensure full protection of the nearby Air Sensitive Receivers (ASRs). In the regulation, temporary fencing board is proposed to alleviate the potential fugitive dust impact. Also, the site should be watered in sufficient frequency and the excavated material should be covered to prevent erosion.

5.1.11 The Contractor shall devise, arrange methods of working and carrying out the works in such a manner so as to minimise dust impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.

5.1.12 Before the commencement of any work, the Engineer may require the methods of working, plant, equipment and air pollution control system to be used on the site to be made available for inspection and approval to ensure that they are suitable for the project.

Construction Noise Management

5.1.13 The predicted noise levels as shown in Table 4-1 indicate that the phasing of the construction activities with selection of silenced mechanical powered equipment and proper scheduling on construction equipment are effective in controlling the noise level. The construction noise level will meet the TM on EIA Process daytime noise criterion of 75 dB(A) at the closest NSRs. In addition, the temporary fencing board, that from part of the mitigation measures as proposed under the *Air Pollution Control (Construction Dust) Regulation*, is recommended and this will help to further minimize the construction noise.

5.1.14 To be prudent in the construction noise management, the following additional noise management measures and good site practices are recommended for implementation, where practicable:

- Contractor shall comply with and observe the *Noise Control Ordinance* (NCO) and its current subsidiary regulations;
- Before the commencement of any work, the Engineer may require the Contractor to submit the method of working, equipment and sound-reducing measures intended to be used at the site for approval;
- Only well-maintained plants should be operated on-site;
- Plants should be serviced regularly during the construction programme;
- Machines that may be in intermittent use should be shut down or throttled down to a minimum between work periods;
- Silencers and mufflers on construction equipment should be utilised and should be properly maintained during the construction programme, where practicable;
- Noisy activities can be scheduled to minimise exposure of nearby NSRs to high levels of construction noise. For example, noisy activities can be scheduled for midday or at times coinciding with periods of high background noise (such as during peak traffic hours);
- Noisy equipment such as emergency generators shall always be sited as far away as possible from NSRs;

- Mobile plants should be sited as far away from NSRs as possible; and
- Material stockpiles and other structures should be effectively utilised as noise barrier, where practicable.

Water Quality Control Measures

5.1.15 In general, the Contractor will be required to note and comply with the Water Pollution Control Ordinance and its subsidiary regulations. The Contractor shall carry out the Works in such a manner as to minimise adverse impacts on the water quality during the execution of the Works, and arrange the method of working to minimise the effects on the water quality within and outside the site area. Potential water quality impact during the installation of the pipeline shall be controlled with the following as basic principles:

- Prevent or minimise the likelihood of the identified pollutants being in contact with rainfall or runoff; and
- Measures to abate pollutants in the stormwater runoff.

5.1.16 These principles shall be achieved through the implementation of adequately designed water quality control measures as Best Management Practices (BMPs). The guidelines for handling and disposal of construction site discharges as detailed in EPD's ProPECC Note PN1/94 "Construction Site Drainage" shall be followed. In general, these measures include provision of san/silt removal facilities such as sand traps, silt traps and sediment basins, where practical. These facilities should be regularly inspected and maintained, and the deposited silt and grit should be removed regularly. A row of sand bags can also be placed along the boundary of the works area to prevent any excess earth or storm water flowing down to the nearby stream in the G/IC zone, if necessary. Any trade effluent or foul or contaminated or cooling or hot water should not be discharged into public sewer, stormwater drain, channel or stream course.

Waste Management

5.1.17 The excavated construction and demolition materials will be stockpiled and reused for backfilling onsite wherever possible. The Contractor is also required to maximise the reuse of the materials in other projects if practicable. The remaining materials should be transported to public filling area for disposal. Construction and demolition materials should be properly stockpiled with waterproof covering or at least three sides enclosed to avoid wind erosion and washing away due to surface runoff. Limited construction chemical and general wastes are expected due to relatively small scale of the project and limited number of construction equipment. Given the limited amount of materials to be removed through the application of on-site reuse / recycle (please see sections 4.1.15 – 16 for details), the burden on the public filling facilities is considered insignificant. As such, detailed waste management plan is not necessary.

5.1.18 A trip ticket system following the guideline stipulated in Works Bureau Technical Circular No 15/2003 is proposed to ensure the C&D material will be disposed of to Government designated public filling areas.

Landscape and Visual Impact

5.1.19 The landscape and visual impact during the installation of the pipeline is considered transient in nature. Nonetheless, temporary fencing board with partial transparent window, part of the mitigation measures proposed under the Air Pollution Control (Construction Dust) Regulation, is recommended to be erected along the site adjacent to any sensitive uses, including morning walkers using the footpath, to provide shielding and to minimise the visual impact on these sensitive receivers. Furthermore, the Contractor will adopt the best management practice to tidy up the site and ensure that construction and demolition materials and wastes are properly stored.

5.1.20 Tree compensation with comparable sizes will be adopted to reinstate the landscape and visual condition of the construction site. Figure 8 shows the location of the compensatory planting. It must be noted that, in general, the compensatory trees cannot be planted within 1m both sides of the pipeline to prevent interference to the pipeline due to the root of the trees, but these area will be hydroseeded. In addition, it is expected that shrubs at the edge of the alignment will

recolonise naturally in time. In addition, the compensation tree is proposed to be maintained by HKCG for 2 years to ensure their health statues.

5.1.21 A temporary footpath is proposed to run parallel south of the realigned pipeline section to temporarily replace the cleared existing footpath, during the construction phase. This temporary footpath will serve the morning walkers as well as the country park visitors. After the completion of pipeline construction, the original footpath will be reinstated. The locations of the temporary and reinstated footpath are also shown in Figure 8.

5.1.22 In addition to the tree compensation and provision of the original footpath, provision of some facilities and furniture is also proposed to enhance the environment. The proposed facilities and furniture can include the provision of the seating bench, litter bin and wooden railing along the reinstated concrete footpath, tree information introductory board, etc. Details of the provision of some recreation facilities and furniture will be subject to agreement with AFCD.

Others

5.1.23 The pipeline will be installed at a sufficient safe depth as required by the Gas Authority; therefore, there is no significant and unacceptable risk.

5.2 POSSIBLE DISTRIBUTION AND DURATION OF THE ENVIRONMENTAL EFFECTS

5.2.1 Although the works area (DP portion of the ETP – T7 section) is located within the Ma On Shan Country Park, most of its proposed alignment is within the G/IC zone and such land is allocated to Water Supplies Department as the Water Works Reserve Area (Government Land Allocation No. ST146 Ma On Shan Fresh Water and Salt Water Service Reservoir). A trail is found running parallel this chain link fence within the G/IC zone, indicating morning walkers or country park visitor may occasionally disturb the environment.

5.2.2 The duration of the works (the Project, about 400m long) is expected to be completed in about 5 months and constructed in phases; thus it's construction will only affect a localised area. In addition, ecological survey indicated the area consists mostly exotic and/or common species. No adverse residual impacts on ecology, noise, air quality, water quality, waste or landscape and visual are predicted with the implementation of the mitigation measures as well as necessary pollution control clauses described above.

5.3 COMMENT ON ANY FURTHER IMPLICATIONS

5.3.1 The ETP – T7 section requires the installation and operation of a 4.2 km long high-pressure gas pipe running from south to north in Ma On Shan district. In comparing the distance from the construction site of the original alignment and that of the Realigned Section to the nearest residential blocks, the Realigned Section is further away from the nearest residential blocks. Thus, the environmental impact due to the construction of the ETP-T7 at this section upon the nearest residential blocks is expected improving from its original position in terms of construction noise and dust.

5.3.2 It is envisaged that no significant nor unacceptable environmental impact will be resulted during the operational phase of the Project. The extent of temporary environmental impacts during the construction phase have been minimised through proper implementation of the recommended protection measures in above. The construction of the Project will not cause unacceptable environmental impact due to its small in scale, the simple nature of works, and the implementation of protection measures such as air, noise, water quality, landscape and visual, ecology and waste management.

5.4 USE OF PREVIOUSLY APPROVED EIA REPORTS

5.4.1 No previous approved EIA reports were used in this Project.

Title: Proposed Location of the New Planting Trees	**CH2M-IDC Hong Kong Limited**	
Project: Proposed Installation of High Pressure Gas Pipeline Passing Through the Edge of the Ma On Shan Country Park Adjacent to the Ma On Shan Service Reservoir	**Scale: NTS**	**Figure: 8**

6. OVERALL CONCLUSION

6.1.1 The selected routing for the Realigned Section of ETP-T7 section gas pipeline is the only feasible route and has already been consented by AFCD and approved by the Country and Marine Park Board. Furthermore, the proposed alignment has also been approved by the Gas Authority. Other alignment routes are either have their own physical and/or engineering constraint coupled with environmental disabilities at varying levels, and hence are not considered as feasible alternatives. In addition, the alignment of the Realigned Section of ETP-T7 Section is further away from the nearest residential blocks than the original alignment, thus having less construction noise and dust impacts on the nearby residents are expected to be less than that of the original position.

6.1.2 Environmental protection have been considered for this pipeline installation work, such as minimizing the works area and constructed in different phases. The extent of the environmental impact due to the construction and operation arising from this Designated Project has been evaluated and assessed either qualitatively or quantitatively throughout the context. Dust, noise, site run-off, construction waste and cultural heritage impacts will be minimal during the construction phrase. The potential impacts on the ecology as well as visual and landscape issues on the works area are expected to be acceptable with the provision of protection and compensatory measures. In addition, it must be noted that the works area of the Project where is within the G/IC zone have been regularly interfered by the public. An implementation schedule of the suggested environmental protection measures is shown in Appendix C.

6.1.3 The potential environmental impacts are either unlikely to be adverse and with the implementation of the protection measures described in the Project Profile is anticipated to meet the requirements of the Technical Memorandum made under the EIAO.