LEASE OF PROPERTY AT 33 JALAN BUROH FOR PETROL STATION USE

ADDITIONAL CONDITIONS OF TENDER (TECHNICAL)

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PART I

1.0 GENERAL

- 1.1 The Successful Tenderer must in addition to the Particulars and Conditions of Tender, observe and comply with these Additional Conditions of Tender (Technical) in the development and lease of the Land Parcel at 33 Jalan Buroh. The Particulars and Conditions of Tender and these Additional Conditions of Tender (Technical) shall be read in conjunction with the technical information booklet enclosed in the sale packet. The Successful Tenderer shall also comply with all applicable guidelines issued by the Competent Authorities and Public Utility Licensees. All proposals are subject to the approval of all relevant Competent Authorities and Public Utility Licensees.
- 1.2 The conditions and requirements of all relevant Competent Authorities and Public Utility Licensees set out in these Additional Conditions of Tender (Technical) and in the Conditions and Requirements of Relevant Competent Authorities and Public Utility Licensees and the appendices thereto (to be complied with by the Successful Tenderer at his own cost and expense) are provided to tenderers for their information only. Whilst every care and attention has been taken in the compilation and preparation of these conditions and requirements, the JTC does not warrant that they constitute an exhaustive list of the conditions and requirements of the relevant Competent Authorities and Public Utility Licensees in respect of the development or that they are free from any errors or omissions. These conditions and requirements are subject to change by the relevant Competent Authorities and Public Utility Licensees and the onus lies on the Successful Tenderer to verify these conditions and requirements with JTC, the relevant Competent Authorities and the Public Utility Licensees directly and comply with their current conditions and requirements.
- 1.3 JTC is not liable to any tenderer and tenderers shall not claim against the JTC for any errors and/ or omissions in and for any loss suffered by any tenderer arising directly or indirectly from the reference to, usage of and/or reliance on the contents of these Additional Conditions of Tender (Technical), the Conditions and Requirements of Relevant Competent Authorities and Public Utility Licensees and appendices thereto.
- 1.4 All references to "the Successful Tenderer" herein shall be deemed to include "the approved developer" as defined in the Particulars and Conditions of Tender where the context so admits.

PART II

2.0 PLANNING GUIDELINES

2.1. The planning parameters for the Land Parcel are:

PLANNING PARAMETERS	PROVISION / REQUIREMENT	
Site Area	2,303.20 sqm	
Land use/Zoning	The industrial component within the development on the Land Parcel shall be for any use or uses that are permitted by the Competent Authority under the Planning Act (Cap 232) for 'Transport Facilities' zoning, in accordance with the Master Plan Written Statement. The development shall be subject to the approval of JTC and all	
	the relevant Competent Authorities.	
Permissible Gross Plot Ratio	0.5 (maximum)	
development on the Land Parcel	All tenderers are advised to carry out their own simulations to ascertain the achievable GPR prior to submission of their tenders. The total PR and GFA shall be computed in accordance with Urban Redevelopment Authority's (URA) Development Control Guidelines.	
Retail Space	Commercial spaces shall not exceed 15% of the total proposed GFA or 150sqm, whichever is lower.	
	Ancillary facilities such as office, store and compressor room shall not exceed 10% of the total proposed GFA.	
	The ancillary retail space is subject to compliance with URA's Development Control handbook and other relevant Competent Authorities' requirements, including relevant Land Betterment Charges (LBC).	
Building Height (maximum) *	Maximum development height should not exceed 92m SHD (Singapore Height Datum).	
Storey Height Control	The maximum allowable storey height for the said development is up to 1-storey high.	
	To comply with Development Control Guidelines issued from time to time by the Competent Authority under the Planning Act (Cap. 232).	
	The technical and storey height control of the said development is to comply with all applicable standing guidelines issued by the Competent Authorities, including URA's Development Control Guidelines. The Successful Tenderer is to check with the Competent Authorities on the standing guidelines as the	

guidelines are reviewed from time to time. The lowest technical
and storey height control imposed by the Competent Authorities
will be applicable to the said Land. The final technical and storey
height are subject to the approval of the Competent Authorities.

PART III

3. DEVELOPMENT GUIDELINES

3.1 General Guidelines

3.1.1. Development Control

The Successful Tenderer shall comply with the Development Control Guidelines, Pollution Control Guidelines and any other guidelines that have been issued or may be issued from time to time by the Competent Authority.

3.1.2. Access into JTC Land

For the purpose of entering JTC Land to do any works for the purpose of or in relation to the proposed development as may be required under these present Technical Conditions of Tender or Conditions of Tender, the Successful Tenderer shall obtain a prior written consent from JTC. The consent may be granted on such terms and conditions and subject to the payment of such charges and fees as JTC or Competent Authorities may determine

3.1.3. Deviations from Planning Requirements

The requirements set out in this Part relating to location, height, size, area or extent of uses, etc. are specified with a view to achieve the relevant planning objectives as outlined or indicated in the provisions in this Part.

The Successful Tenderer may submit for JTC's consideration alternative proposal to any such requirements. Where JTC is satisfied that the alternative proposal will also serve to achieve the planning objective relevant to the requirement, the Successful Tenderer may be allowed to adopt such alternative proposals instead in which event the relevant provisions in this Part shall be deemed to be complied with. JTC however reserves the absolute discretion to decide whether or not to allow any alternative proposal to be adopted.

3.2. Particular Guidelines

3.2.1. Vehicular Access

The proposed permanent access point for the Land Parcel shall be taken from Jalan Buroh (minor), and egress to Jalan Buroh, as shown indicatively in the Control Plan (Annex A).

- 3.2.2. The ingress/egress locations should be at least 30m away from the access of the adjacent plot. The exact location and the number of access point(s) shall be subjected to the requirements and approval of the Land Transport Authority (LTA).
- 3.2.3. The Successful Tenderer has to put in the necessary measures to ensure traffic safety (these measures may not be limited to putting in place traffic signage to

remind motorists to slow down). Such measures are to comply with LTA's standard guidelines. The Successful Tenderer is encouraged to reduce the construction traffic during peak hours.

- 3.2.4. The vehicular access should have adequate sight distance of oncoming traffic, especially if it is near road bends.
- 3.2.5. Boundary walls/fences that are located near the egress (access) of the development shall be porous to ensure that motorists are able to view the pedestrian/cyclist activities at the gate, before exiting from the development.
- 3.2.6. The line of sight for vehicles entering/exiting the developments should be adequate and not obstructed/blocked by trees, guardhouses or boundary walls. If the line-of-sight distance is affected, any foliage/trees shall be relocated by the Successful Tenderer.

PART IV

3.0 OTHER REQUIREMENTS

4. TENDER SUBMISSION / OTHER REQUIREMENTS

4.1. Plans of Proposed Development

- 4.1.1. Tenderers are <u>not required</u> to submit plans of the proposed development in their tenders for Land Parcel.
- 4.1.2. The Successful Tenderer shall after the acceptance of his tender by JTC submit plans of the proposed development to JTC (if and when required to do so) and all relevant Competent Authorities for approval.

4.2. CONQUAS Assessment of Construction Quality

- 4.2.1. The Successful Tenderer shall be required to refer and submit the proposed development to the Building and Construction Authority (BCA) to be assessed for the construction quality of the building works under the Construction Quality Assessment System (CONQUAS).
- 4.2.2. The Successful Tenderer shall for the purpose of this Condition comply with all requirements, procedures, directions and request of BCA and shall pay all fees, charges and other amounts payable to BCA for and in relation to the assessment of the construction quality of the proposed development under CONQUAS. The Successful Tenderer shall also render his full co-operation to BCA, its officers, employees and agents in relation to such assessment under CONQUAS.

4.3 Existing Footings, Obstructions and Other Materials

- 4.3.1 There may be footings and other obstructions left in the ground. The Successful Tenderer shall at his own cost and expense, carry out his own site verification of the possible positions of the footings, obstructions and other materials and ascertain the effect of these on the said development.
- 4.3.2 The Successful Tenderer shall be deemed to have taken into account the costs of such verification, tests, removal of the possible footings, obstructions and other materials etc which may affect the said development in his tender price.

4.4 Slopes and Earth Retaining Structures

4.4.1 The Successful Tenderer shall ensure that all slopes and earth retaining structures where required shall be designed to comply with the requirements of the relevant Competent Authorities. All slopes and earth retaining structures shall be kept within the boundary of the said Land.

4.4.2 The Successful Tenderer shall submit the details and design calculations prepared by a Professional Engineer for any proposed slopes or earth retaining structures to JTC and to the relevant Competent Authorities for approval before commencement of works.

4.5 Working Area

- 4.5.1 The Successful Tenderer shall confine the construction work within the boundary of the said Land. He shall not cause obstruction to other parties who may be working around the said Land at the same time.
- 4.5.2 Hoarding shall be put up by the Successful Tenderer to ensure the safety and well-being of pedestrians. These hoarding shall be maintained in good condition throughout the project completion period of the said development.

4.6 Cleaning and Maintenance of Roads and Drains

4.6.1 The Successful Tenderer shall maintain the cleanliness of public roads and drains used by his vehicles throughout the period of the Development Works. He shall construct a washing bay for the cleaning of earth-laden lorries before they leave the work site and shall be responsible for cleaning up all deposits left by his vehicles on the road. The Successful Tenderer shall be responsible for paying any fines imposed by the relevant Competent Authorities e.g. Environmental Health Department, Traffic Police etc.

LEASE OF PROPERTY AT 33 JALAN BUROH FOR PETROL STATION USE

CONDITIONS AND REQUIREMENTS OF RELEVANT COMPETENT AUTHORITIES/ PUBLIC UTILITY LICENSEES (FOR INFORMATION OF TENDERERS)

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1.0 **DEFINITION**

1.1 The lease of the Land Parcel at 33 Jalan Buroh ("the said Land") is subject to the Additional Conditions of Tender and the Conditions of Tender for the said Property contained in the Developer's Packet.

2.0 GENERAL CONDITIONS AND REQUIREMENTS

- 2.1 The Successful Tenderer is required to consult and comply with all technical conditions imposed by the relevant authorities such as the Urban Redevelopment Authority, Land Transport Authority, National Environment Agency, Public Utilities Board, SP Power Grid and the Singapore Civil Defence Force, etc.
- 2.2 The Successful Tender for the said Land is required under the said Conditions of Tender to ascertain the exact and detailed conditions and requirements of all relevant Competent Authorities and Public Utility Licensees in respect of any Development Works to be carried out on the said Property thereon and shall at his own cost and expense observe and comply with the same.
- 2.3 Without affecting the generality of paragraph 2.1 above and without prejudice to the obligations of the Successful Tenderer as set out therein, the contents herein are provided for the information of the tenderers only. Whilst every care and attention has been taken in the compilation and preparation hereof, JTC does not warrant that the contents herein represent all the conditions and requirements of the relevant Competent Authorities/ Public Utility Licensees in respect of the proposed development on the Land Parcel or that they are free from errors or omissions whatsoever. The contents herein are subject to changes by the relevant Competent Authorities/ Public Utility Licensees concerned and the onus lies on the Successful Tenderer to verify these conditions and requirements directly with the JTC, the relevant Competent Authorities and Public Utility Licensees and comply with their current conditions and requirements.
- 2.4 A summary of the initial services requirements of the relevant Competent Authorities/ Public Utility Licensees is set out herein. It serves only as an indication of the possible work involved with regards to services and is by no means exhaustive or final.
- 2.5 The Successful Tenderer shall ensure that the following requirements are complied with: -
- 2.5.1 To consult and liaise directly with the relevant Competent Authorities/Public Utility Licensees regarding the actual locations of all service mains within the Land Parcel and on the requirements and conditions for services diversion and provision prior to the commencement of site work. All necessary precautions shall be taken by the Successful Tenderer to safeguard the service mains before they are diverted.
- 2.5.2 To engage his own licensed Cable Detection Worker (CDW) and licensed Telecommunication Cable Detection Worker (TCDW) to carry out cable detection

and if necessary to carry out trial trenches to locate any manholes and cable routes prior to the commencement of site work. The Successful Tenderer shall bear the cost of any diversion work.

- 2.5.3 To ensure that all service mains that do not need to be diverted are identified and provided with protection, if necessary, during the construction stage of the proposed development. The cost of repairs to any damaged service main as a result of work carried out by the Successful Tenderer shall be borne by the Successful Tenderer.
- 2.5.4 To ensure that the relevant Competent Authorities/Public Utility Licensees are allowed free and unconditional access at all times to services that are required to remain within the Land Parcel for the purpose of installation, maintenance, repair and improvement works and all other work and activities incidental thereto.
- 2.5.5 To make his own arrangements with the relevant Competent Authorities/ Public Utility Licensees and pay for the costs of any diversion and/ or "Capping off" of existing services, provision of service mains and service connection, if any, in connection with the proposed development.
- 2.5.6 To provide for all the internal distribution for water, electricity, drainage and sanitary discharge for the proposed development.
- 2.5.7 To liaise with all the relevant Competent Authorities/ Public Utility Licensees on upgrading the road reserves abutting the Land Parcel to ensure that the necessary roadside drains, sidetable, kerb, etc are carried out in accordance with the latest Road Reserve requirements.
- 2.6 The Successful Tenderer shall be responsible to carry out at his own cost and expense his own site investigation to verify whether there is any sub-structure or other obstructions e.g. footings, piles, tree roots, etc. and other obstructions left in the ground of the Land Parcel, and ascertain their effect on the proposed development.
- 2.7 There may be some other existing services affected by the proposed development. The Successful Tenderer shall inform the relevant Competent Authorities / Public Utility Licensees immediately and bear the necessary cost of diversion and/or "capping off" of these existing services, if any.
- 2.8 In general, no structure shall be sited close to or over existing/ proposed services. The Successful Tenderer shall comply with all the necessary requirements as stipulated by the relevant Competent Authorities/ Public Utility Licensees.
- 2.9 The Successful Tenderer shall seek all relevant agencies' approval on the layout plan.

3.0 LAND TRANSPORT AUTHORITY (LTA)

- 3.1 The Successful Tenderer shall ensure that all proposed street works, as well as proposed engineering / construction works within the road reserve shall be prepared / designed, submitted, supervised and constructed in accordance with Street Works (Private Street Works) Regulations, Street Works (Public Street Works) Regulations and the following prevailing standards and code of practice:
 - (i) Street Works Proposals relating to Development Works
 - (ii) LTA Standard Details of Road Elements
 - (iii) Materials & Workmanship Specifications for Civil & Structural Works
 - (iv) Code of Practice for Road Opening Works
 - (v) Code of Practice for Traffic Control at Work Zone
 - (vi) Architectural Design Criteria, and Civil Design Criteria
- 3.2 JTC is currently carrying out infrastructural works at the junction of Jalan Buroh / Jalan Buroh (minor) and Buroh Close. To mitigate the need to cater for a uturn layby along Jalan Buroh (minor), the Successful Tenderer shall provide the **ingress** from Jalan Buroh Minor and **egress** out to Jalan Buroh.
- 3.3 The access point shall be located as far away from the junction as possible i.e. edge of parcel boundary.
- 3.4 There is currently no mandatory requirement for EV charger provision. To help with EV transition, the Successful Tenderer is encouraged to consider implementing a minimum of 2 fast chargers within the Subject Site. The number of fast chargers (if any) and required power capacity shall be subject to the relevant Competent Authorities' review and approval.
- 3.5 The Subject Site (MK06-01833P) includes land that is partially zoned 'Road' in URA's Master Plan 2019. This land shall be included in the Petrol Station boundary and there is no need to vest the land to LTA at this point of time.
- 3.6 The technical details, extent and completion date of such works shall comply with the requirements of the LTA and other relevant Competent Authorities.
- 3.3 The Successful Tenderer shall at his own cost and expenses carry out all the proposed works.
- 3.4 Detailed plan submissions including the traffic plans for the Land Parcel showing the details of the access etc., shall be made to Development and Building Control (DBC) Division, LTA, for review and clearance during the Development Control (DC) and Building Plan (BP) stages.
- 3.5 When the petrol station vacates the site, the development, to remove/kerb-up all traffic features that were implemented to facilitate movements to and from the development (i.e. accesses, u-turn facility and its related signs along Jalan Buroh Minor, all signs and markings at and near the petrol station's accesses, etc).

4.0 PUBLIC UTILITIES BOARD (PUB)

[A] CATCHMENT AND WATERWAYS

4.1 The minimum platform level (MPL) for the subject site shall not be lower than 4m above Singapore Height Datum, or 300mm above the adjacent road/ground level for general developments, 600mm for multi-residential and commercial developments, 1m for special facilities and developments with direct or indirect linkages to underground special facilities, or any other level as determined by PUB as in stated in the latest edition of the 'Code of Practice on Surface Water Drainage', whichever is the highest.

The minimum crest levels for basements of general developments shall be at least 150mm above the MPL as stated above. For basements of industrial, institutional, commercial or multi-unit residential developments, the minimum crest level shall be at least 300mm above the MPL as stated above. The minimum crest level for entrances to the underground pedestrian network having direct or indirect underground linkage to MRT Stations, or other underground special facilities shall be 300mm above the MPL as stated above. Please pre-consult PUB(C&W) on the required MPL before making DC/BP submission.

In complying with the MPL requirement, thorough investigations of the site shall be conducted to determine suitable platform profiles to ensure that the runoff within, upstream of and adjacent to the subject site can be effectively drained away without causing flooding within the site and in the vicinity of the site. Any proposal to level/backfill the subject site shall be submitted to PUB(C&W) for comments and approval.

- 4.2 The Successful Tenderer shall locate and identify all existing drains within and in the vicinity of the development site. The existing drainage system within and in the vicinity of the proposed site shall not be interfered with, in any manner, without written approval from PUB(C&W). All works shall not cause damage or affect the structural integrity of the roadside/outlet drains.
- 4.3 The Successful Tenderer shall ensure that the design and construction of the proposed development within the site will not cause damage and affect the structural integrity of the existing drains.
- 4.4 The Successful Tenderer shall ensure that the runoff within, upstream of and adjacent to the site shall be effectively drained away without causing flooding within the site and in the vicinity of the site.
- 4.5 The Successful Tenderer shall take due care and precautionary measures to ensure that no damage, settlement or any adverse impacts occurs to any existing drain/drainage facilities in the course of the works. Free flow of water in the drains shall be maintained at all times. Any damages caused to the

drainage structures shall be reinstated at the Successful Tenderer's own cost to the satisfaction of PUB(C&W). The Successful Tenderer shall carry out an impact assessment to establish the influence zone of the proposed works which affect the existing drains and drainage facilities. The impact assessment to be submitted to PUB shall be endorsed by a qualified person (QP).

- 4.6 Pre-work and post-work surveys shall be submitted to PUB and shall cover drains/drainage facilities in the area affected by the work (and shall extend to at least the area within the second reserve of the MRT lines if applicable). All drains/drainage facilities shall be located and identified. The survey shall show the levels of the drains/drainage facilities and shall be accompanied by a set of photographs showing the conditions of the drains/drainage facilities. All survey work shall be carried out by a Registered Surveyor.
- 4.7 The Successful Tenderer shall carry out soil instrumentation for monitoring the soil/geo-technical/structural movements or changes at and around the worksite in particularly existing drains/drainage facilities throughout the contract period. The Successful Tenderer shall set the critical alert levels and put in place a contingency plan to rectify any damages to the drains/drainage facilities. The soil instrumentation shall be monitored daily and weekly summary reports of the results of the soil instrumentation shall be submitted to PUB. Any breach of the alert levels and/or anomaly found in the reports shall be immediately reported to PUB and rectify immediately to the full satisfaction of PUB. Details of the contingency plan including the schedule of works and developer/developing organisation chart of the agency and consultant/contractor shall be submitted to PUB before commencement of works.
- 4.8 In the event of breach of alert levels and/or anomaly in the soil instrumentation results, the Successful Tenderer shall alert PUB immediately and activate the contingency plan to mitigate and rectify the situation. The analysis and rectification reports of the affected drains and drainage facilities shall be submitted to PUB for comments/approval.
- 4.9 The Successful Tenderer shall conduct a joint visual inspection and any defects identified shall be made good to the full satisfaction of PUB and shall follow up with an incident report for the affected drains and drainage facilities within 3 days including remedial/repair works. If necessary, briefing/meeting shall be conducted by the Successful Tenderer to address the damage and follow up actions to rectify the situation.
- 4.10 The method of construction of temporary drains and/or drains affected by the works shall be submitted to PUB for comments and approval before commencement of the works. Upon completion of the works, postcondition survey and topography survey of the affected drains shall be submitted and PUB may request for joint site inspection of the rectification works.
- 4.11 The Successful Tenderer shall inform PUB in writing at least one week before the commencement of any work at the site which affects drains. PUB may require the affected drain to be upgraded in conjunction with the proposal.

Please further consult PUB(C&W) with the detailed proposal for further comments.

- 4.12 The planning, design, construction activities and procedures for plan submission shall comply fully with the requirements as stipulated in the latest edition of the Code of Practice on Surface Water Drainage and The Sewerage and Drainage (Surface Water Drainage) Regulations 2007. You may download version of the COP from PUB website: the latest the https://www.pub.gov.sg/drainage/COPsurfacewaterdrainage.
- 4.13 The topography of the site shall not be changed without the approval of PUB.
- 4.14 All affected drains and Drainage Reserves (location and alignment) and their respective sizes shall be indicated in the detailed plan drawings. Details such as inverts/copes of affected drains, adjacent ground levels and amount of soil cover shall also be indicated in the detailed submission to PUB. All drain crossings within road reserves (e.g. culverts and roadside drains) shall be clearly highlighted in the plans. Detailed proposal plans shall be submitted at the detailed planning stage for PUB's comments and clearance before the commencement of works.
- 4.15 The existing drainage system within and in the vicinity of the proposed site (if any) shall be upgraded/improved to cater for increased runoff from the proposed development. In addition, new drains, depending on the type and nature of the proposed development, may be built within the development site. Appropriate Drainage Reserves shall be set aside for drains in accordance with the prevailing Code of Practice on Surface Water Drainage.
- 4.16 The Successful Tenderer shall pre-consult PUB(C&W) on the required size of the proposed drains affected by the proposed development before making DC/BP (Drainage) submission. Detailed drainage plans for the proposed crossing-over/reconstruction of roadside drain / outlet drain including hydraulic calculations, backwater analysis, longitudinal and cross sections etc shall be submitted to PUB for approval before the commencement of works.
- 4.17 If the existing roadside drain is within the land lot to be alienated or amalgamated, the Successful Tenderer shall realign the existing roadside drain to within/abut the road reserve and reconstruct the roadside drain into covered drain. The Successful Tenderer shall construct the proposed drain to the required size as determined by PUB. The Successful Tenderer shall ensure that the design and construction of the proposed development within the site will not cause or affect the structural integrity of the existing roadside drains.
- 4.18 The detailed drainage plan shall be submitted to PUB(C&W) for approval prior to the commencement of work on site. Appropriate Drainage Reserves shall be set aside and secured for in accordance with the latest edition of the 'Code of Practice on Surface Water Drainage'.

- 4.19 The development schedule of the site shall be properly considered to avoid a situation where site and/or the lands in the vicinity of the site become 'land locked' without proper drainage outlets.
- 4.20 The runoff within, upstream of and adjacent to the sites shall be effectively drained away without causing flooding within the site and in the vicinity of the site. Any proposal to level/backfill the site shall be submitted for PUB(C&W)'s comments and clearance.
- 4.21 Industrial, commercial, institutional and residential developments greater than or equal to 0.2 hectares in size are required to control the peak runoff discharged from the development sites. The maximum allowable peak runoff to be discharged to the public drains will be calculated based on a runoff coefficient of 0.55, and for design storms with a return period of 10 years and for various storm durations of up to 4 hours (inclusive). Peak runoff reduction can be achieved through the implementation of ABC Waters design features and structural detention and retention features, such as:
 - i) Detention tanks;
 - ii) Retention/Sedimentation ponds;
 - iii) Wetlands;
 - iv) Bioretention swales;
 - v) Porous pavements;
 - vi) Bioretention basins or rain gardens, etc.
- 4.22 The Successful Tenderer shall be required to submit details (calculations and/or hydraulic model results) showing how the proposed system meets the required peak runoff rates. Due consideration shall be given to meeting ABC Waters stormwater quality objectives, which will often require treatment of stormwater runoff using ABC Waters design features. For design guidance on the ABC Waters design features, the Successful Tenderer can refer to the ABC Waters Guidelines and relevant chapters in the Engineering Procedures, available on the PUB website.
- 4.23 PUB has in 2006 launched the Active, Beautiful and Clean Waters (ABC Waters) Programme. As part of the Programme, PUB has launched ABC Waters design guidelines which provide ideas on how natural runoff treatment systems termed ABC Waters design features such as rain gardens, vegetated swales and bioretention swales can be integrated within a development. These features detain/ slow down stormwater runoff and improve water quality by using plants and soil. They also enhance landscape and biodiversity of the development. Specific information on the design of these features can be found at the website: <u>https://www.pub.gov.sg/abcwaters/designguidelines</u>.
- 4.24 PUB encourages the implementation of ABC Waters design features in the development as well as the achievement of ABC Waters certification. Information regarding ABC Waters Certification can be found via the link: <u>https://www.pub.gov.sg/abcwaters/certification</u>.

- 4.25 If applicable, the design and construction supervision of ABC Waters design features as well as drawing up the maintenance plan for these features shall be carried out by an ABC Waters Professional.
- 4.26 Successful Tenderer Ong The could contact Ms Geok Suat Theresa (ong geok suat@pub.gov.sg) and Ms Marie Lee (theresa_marie_lee@pub.gov.sg) for issues related to ABC Waters design features. Information regarding ABC Waters Certification can be found via the link: https://www.pub.gov.sg/abcwaters/certification.

[B] WATER RECLAMATION

- 4.27 The planning of this project shall comply with the Code of Practice on Sewerage and Sanitary Works (2nd Edition Jan 2019 and Addendum No.1 Mar 2021) [thereafter referred to as the "COPSSW (2nd Ed.)"].
- 4.28 There are existing 229mm/381mm diameter sewers and existing drain-lines within/ in the vicinity of the proposed site. Enclosed is a plan **Annex B** that shows the approximate location of our existing sewerage infrastructure within/in the vicinity of the proposed site. Thorough site investigation shall be carried out to determine the exact positions and levels of the existing sewerage infrastructure.
- 4.29 DTSS2 is currently laying sewers in the vicinity of the sites. **Annex B** shows the approximate alignments of the proposed sewers within/in the vicinity of the proposed site/work. The proposed sewers are expected to be ready by 2025.
- 4.30 The Successful Tenderer shall comply with the minimum setback from the proposed sewers (refer to the clause on the sewer/pumping main setback), and ensure that the proposed development does not impact the sewer laying works. In addition, the Successful Tenderer shall not impose any setback requirements from the proposed development/service that affect the alignment of the proposed sewers and/or subsequent operations & maintenance of the sewers.
- 4.31 The Successful Tenderer shall make the necessary provisions required to deconflict works on site e.g. providing site access or temporary partial site colocation when directed by PUB(WRN). Before implementing the proposed development/service in this proposal, the Successful Tenderer shall liaise and work with PUB(DTSS2) Proiect Officers. Lo Siew Hona at LO_Siew_Hong@pub.gov.sg or Lei Chon Hei at LEI_Chon_Hei@pub.gov.sg to find out more about the proposed sewers so as to better plan and budget for the de-conflicting works needed.
- 4.32 No building/ structure/piling/retaining structure, etc. (whether temporary or permanent), except lightweight and demountable elements (such as awnings, surface drains, compound boundary wall & fencing, planting troughs and link-way shelters), shall be sited over or across any sewers/pumping mains without

the approval of PUB. All proposed structures shall be kept as far away from the existing sewers/pumping mains as possible and no nearer than the following minimum lateral clearances (also known as sewer/ pumping main setback):

Sewer/Pumping Main Nominal	Sewer	Minimum Distance
Diameter(mm) D	Depth (m)	(m)*
≤ 600	≤3	1.0
	>3 and ≤5	1.5
	>5	2.0
> 600 to 1500	All	0.5D + 2.5
>1500 to 2500		0.5D + 3
>2500		0.5D + 4
Deep Tunnel Sewerage System (DTSS)		0.5D + 6
* measured from the outer most edge of the structure, including footings		
and overhangs, to the centreline of the sewer pipe or DTSS.		

More details can be found in COPSSW (2nd Ed.) Sections 1.2.4 and 1.2.5.

- 4.33 The Successful Tenderer shall take every measure to protect all existing sewers, particularly large (≥900mm diameter) sewers, affected by or in close proximity of the proposed works.
- 4.34 There are existing/proposed large diameter sewers (≥900mm) within/ in the vicinity of the proposed site.
- 4.35 The Successful Tenderer shall take every measure to protect all existing sewers, particularly large (≥900mm diameter) sewers, affected by or in close proximity of the proposed works. Large sewers are critical pipelines that serve very large catchments. Any damage to these sewers could lead to used water overflow/leaks affecting a sizable area where the consequential pollution/environment impact could be catastrophic. In this respect, you are advised to keep the proposed works away from these critical large diameter sewers at the earliest planning stage where possible.
- 4.36 For the protection of large (≥900mm diameter) sewers and DTSS tunnels & structures, the following shall be strictly complied with:
 - a. The Successful Tenderer shall comply with PUB's requirements for protection of large (≥900mm diameter) sewers and DTSS tunnels & structures given in COPSSW (2nd Ed.) Section 2.2.
 - b. A registered surveyor shall be engaged to ascertain the exact locations of all existing sewers and the DTSS tunnel in the vicinity of the proposed works. The layout plan, cross-sectional and longitudinal details indicating the vertical and horizontal distances between the proposed works/specified activities (including tunnelling, pipe/cable laying, piles, earth retaining or any other structures, etc.) and the edges of all existing sewers/DTSS tunnel endorsed by the registered surveyor shall be submitted. On request, PUB

would provide the "as-built" DTSS tunnel X-Y coordinates/levels and details to facilitate the surveying works and preparation of the detailed plans.

- c. To obtain information on the alignment and details of the DTSS tunnel/structures in the vicinity of the proposed site, the Successful Tenderer may liaise with and send your request to my colleagues, Mr Pham Huy Phuong (email: PHAM_Huy_Phuong@pub.gov.sg), Mr Jason Lim (email: Jason_LIM@pub.gov.sg) or Ms Angeline Loh (email: Angeline_LOH@pub.gov.sg) with a copy of the purchased SIP for the area.
- d. The detailed plans for the proposed works or specified activities must be submitted early to allow PUB(WRN) sufficient time to evaluate.
- 4.37 PUB's approval shall be obtained for any proposed abandonment of sewers/pumping mains/manholes/chambers/drain-lines as well as the manner in which they will be abandoned. The Successful Tenderer shall note that the upstream (inlet) and downstream (outlet) ends of the abandoned sewer connections, drain-lines or sewers/pumping mains of all sizes shall be sealed watertight with 225mm thick brick plugs rendered with cement mortar.
- 4.38 All abandoned sewers/pumping mains of diameter 300mm or larger and abandoned sewers/pumping mains of all sizes within the road reserve shall be grouted with cement grout or other approved materials.
- 4.39 All abandoned manholes/chambers are to be demolished, filled up with well compacted approved material, and the manhole frames and covers removed. Details of the requirements can be found in the COPSSW (2nd Ed.) and "Standard Requirements for Abandoning of Disused Sewerage System" for compliance [https://www.pub.gov.sg/Documents/StdReq_sealing.pdf].
- 4.40 The abandoned sewers/pumping mains/manholes/chambers/drain-lines, including the manner of abandonment (remove, seal, grout, partial demolition, etc.), shall be indicated on the as-built drawings submitted to PUB(WRN). The following details shall also be included:
 - a. whether the abandoned sewers/pumping mains/drain-lines are removed, grouted or sealed;
 - b. For manholes/chambers that are only partially demolished with approval from PUB(WRN), the extent of demolition shall be shown;
 - c. the exact extent/length of the abandoned sewers/pumping mains/drain-lines that is removed, grouted or sealed;
 - d. the exact locations of the watertight seals; and
 - e. the type of watertight seals.

- 4.41 No sewerage systems (including abandoned sewers/ pumping mains, any sensors, meters, equipment, instruments, etc. within manholes) shall be altered/interfered with without the approval from PUB(WRN). Where diversion/removal of any sewer/pumping main is required, it shall be carried out by the Successful Tenderer at his own cost & expense. Details of the diversion (pipe size, gradient, invert level, etc.) shall be submitted to PUB(WRN) for approval before the commencement of works.
- 4.42 The Successful Tenderer shall be responsible for seeking approval from all relevant authorities/land owners for the proposed sewerage works to be carried out beyond the development site. Such approval or consent from the land owner/authorities shall not include any conditions that require PUB to provide a letter of undertaking to divert the sewerage infrastructure in future. The Successful Tenderer is to ensure that all sewerage and sanitary designs comply with PUB's Code of Practice.
- 4.43 All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.
- 4.44 Where diversion/removal of any sewer/pumping main is required, it shall be carried out by the Successful Tenderer at his own cost & expense. All lateral connections shall be picked up and must not be affected by the proposed sewer diversion. Details of the diversion (pipe size, gradient, invert level, etc) shall be submitted to PUB(WRN) for approval before the commencement of works.
- 4.45 The Successful Tenderer must check for the presence of public sewerage pipelines by referring to the Sewerage Information Plan (SIP) and through site investigation. The SIP is available on SLA's INLIS at https://app1.sla.gov.sg/inlis/#/PUB/UP/Search. Please note that the sewerage information in SIPs is indicative and for reference only. A thorough site investigation, including trial trenches, shall be carried out to determine the exact position and levels of the existing sewers.
- 4.46 For development control clearance for the proposed development/building/infrastructure/utility works and clearance certificates for the proposed sewerage/sanitary works, the QP shall prepare plans and submit applications via BCA Corenet e-submission system to PUB's Building Plan Division (BPD). More details on these applications can be found at https://www.pub.gov.sg/Documents/Used%20Water%20Submission%20Proceedures.pdf.
- 4.47 Where there are any Specified Activities within the public sewer corridor [i.e. 10m for sewer/main of diameter <900mm, 20m for sewer/main of diameter ≥ 900mm and 40m for DTSS tunnel] as stipulated in COPSSW (2nd Ed.) Section 2.1.2, a written approval from the Director, Water Reclamation Network (WRN) of PUB should first be obtained before carrying out the specified activities at the site. QP shall submit the Application Form via the Protection of Water and Sewer Pipes (POWS) at https://bpu.pub.gov.sg/pows prior to any</p>

commencement of the specified activities. The applicant shall refer to COPSSW (2nd Ed.) Section 2 for the technical requirements on sewer protection.

- 4.48 The guideline on 'Prevention of Damage to Public Sewerage System' can be found in PUB website at https://www.pub.gov.sg/Documents/WRN_AdvisoryNotes.pdf. The QP/contractor is required to submit a notification to our Network Management Branch (NMB) at least 7 days before the commencement of any works or specified activities within the public sewer corridor.
- 4.49 PUB(DTSS2) has a proposed 2.0m Link Sewer within/in the vicinity of the proposed site. The proposed alignment is indicated in **Annex B**. The Successful Tenderer may liaise with Project Officers, Lo Siew Hong at LO_Siew_Hong@pub.gov.sg or Lei Chon Hei at LEI_Chon_Hei@pub.gov.sg if you need any clarifications.

[C] Water Supply

4.50 For water supply, the following requirements are to be complied with: a. The design of the internal water reticulation system shall comply with the Public Utilities (Water Supply) Regulations, Singapore Standard 636 - Code of Practice for Water Services and all other relevant statutory requirements. The modes of water supply to be adopted are as attached, Mode of Water Supply.pdf.

b. Notwithstanding the above modes of supply, where water is essential for the operations at the above premises, storage tanks of capacity equivalent to 1 day's water requirements shall be provided for the purpose of maintaining a continuous supply of water in the event of supply interruptions.

c. Where pumping system or storage tanks are required for the water services, a Professional Engineer must submit the Notification of WSI Works together with a set of drawings to Centralised Services Department. If all the fittings in the water service installation are receiving direct water supply from PUB watermain, then a Licensed Plumber shall be engaged to submit the Notification of WSI Works together with a set of drawings to Centralised Services Department prior to commencement of the WSI works.

d. PUB is presently supplying NEWater for direct non-potable purposes such as for cooling towers, industrial processes, general washing, landscaping, and other non-potable purposes. All new nondomestic premises, such as commercial and industrial developments, etc, including those existing premises undergoing addition/alteration works where it is applicable to use NEWater, are therefore required to provide a dedicated NEWater pipe system now to facilitate the supply of NEWater when it becomes available in future. Provision shall also be made for a NEWater storage tank to be installed within the premises with its inlet not higher than 15 m above mean sea level and a capacity equivalent to the 1 day's non-potable water requirement. There shall be no cross connection between the PUB water and NEWater supply pipelines. The Successful Tenderer may consult PUB during the pre-planning stage on the detailed requirements. Please refer to **Annex C (modes of water supply).**

4.51 Protection of Water Mains:

The Water Supply Plan **(Annex D)** shows the approximate positions of existing and proposed water main of 100 mm diameter and above in the vicinity of the proposed site. Smaller submain to customers' premises / properties are not indicated. Please determine by means of trial holes the exact alignment and levels of all existing water pipe during the design stage and let PUB(WSN) know whether they are affected by the proposed works so that PUB can advise whether diversion is required. If diversion is required for water pipes of 300 mm dia and below, consultation must be made at least 6 months ahead and the cost of diversion of any water pipes of 500 mm and above, being our vital water pipes should be avoided unless absolutely necessary. If diversion is unavoidable, please be advised to engage a qualified pipe laying contractor with CR07 work head to carry out the diversion of the affected existing watermains.

Appended a copy of PUB WSN Advisory-Prevention of Damage to Watermains **(Annex E)** which provides the details on the protection and submission requirements for applications to seek PUB's approval for proposed works carried out in the vicinity of our water mains. This submission shall be made via PUB's online submission portal, Protection of Water and Sewer pipes (POWS) at https://bpu.pub.gov.sg/pows. The latest Water Supply Plan is available on SLA's INLIS portal at <u>https://www.sla.gov.sg/INLIS</u>.

- 4.52 Water Conservation:
 - a. Water conservation measures as stipulated in the Public Utilities (Water Supply) Regulations and SS 636 Code of Practice for Water Services shall be adopted.
 - b. Only water fittings (i.e. taps and mixers, dual-flush low capacity flushing cisterns, urinal flush valves/ waterless urinals) that are rated with at least 2-tick rating under PUB's Mandatory Water Efficiency Labelling Scheme (MWELS) shall be installed. The proposed development should obtain the Water Efficient Building (Basic) Certification by PUB.
 - c. Unless with written permission by PUB, fixed or movable sprinklers are not allowed to be used to deliver any form of water supplied by PUB, including potable water, NEWater, raw water, effluent water, industrial water for watering any garden, lawn or other land including commercial market gardens, commercial nurseries, sports grounds, golf courses, race courses, public and club tennis courts. Where possible, developers are encouraged to use drought tolerant plants.
 - d. For non-domestic developments with estimated water requirements of at least 5,000 m3/month, and government developments with estimated water

requirements at least 3,000 m3/month, private water meters in accordance to PUB's requirements to monitor water usage in the key areas as stipulated in the Fourth Schedule of the Public Utilities (Water Supply) Regulations shall be installed.

- e. Wherever possible, alternate sources of water (such as industrial water, high grade industrial water, sea water, recycled water, rainwater and AHU condensate etc) should be used to meet the non-potable water requirements of the proposed development.
- f. Wherever possible, water recycling system should be set up to reclaim water for reuse for non-potable purposes such as production process, toilet flushing, irrigation and as cooling tower make up water, etc.
- g. Use non-water cooled systems (such as air-cooled, refrigerant-cooled, etc) for cooling purposes wherever possible.
- h. Cooling towers should achieve minimum 7 and 10 Cycles of Concentration (COC) using potable water and NEWater respectively.
- 4.53 For West BU: Please contact PUB officer Mr Shahrudin or Mr Abu at Tel: 68852475/68852477. Email to: Shahrudin_ABDUL_SAMAD@pub.gov.sg or <u>Abu_Hasli_ABU_BAKAR@pub.gov.sg</u>
- 4.54 For small mains diversion (300mm diameter & below), please contact:

KUA_Cheng_Chuan@pub.gov.sg or Suriani KAMSAN (PUB) – West Zone Suriani_KAMSAN@pub.gov.sg

For large mains diversion (larger than 300mm diameter), please contact Kai Yeong LOH (PUB) LOH_Kai_Yeong@pub.gov.sg or Suriani KAMSAN (PUB) Suriani_KAMSAN@pub.gov.sg

5.0 NATIONAL PARKS BOARD (NPARKS)

The Successful Tenderer shall adhere to all NParks' general requirements below:

- 5.1 If the Successful Tenderer intends to carry out any regulated activities under the Parks and Trees Act and its Regulations that arise out of or pursuant to the use of the proposed Site, it must seek the Commissioner of Parks and Recreation's ("Commissioner") approval before doing so.
- 5.2 Before seeking the Commissioner's approval, the Successful Tenderer is required to consult the Commissioner, through the Greenery and Development Planning Branch at NPARKS_GDP@nparks.gov.sg at the planning and design stage of the development works concerning the proposed Site.
- 5.3 The Successful Tenderer is required to present the following at the consultation:

- a. A survey plan (survey done less than 2 years at the point of application and endorsed by a qualified surveyor) of the site and its peripheral roads, at a scale of at least 1:500. The plan must also clearly indicate the location, species, height and girth of trees at the proposed Site; and
- b. All other relevant additional information such as plans on construction hoardings.
- 5.4 The Successful Tenderer shall note and adhere to the following requirements in respect of the green verge(s) / road table(s) / green buffer(s) surrounding the proposed Site. Further details of these requirements can be found in NParks' "Guidelines on Greenery Provision and Tree Conservation for Developments". It is available for downloading at https://www.nparks.gov.sg/partnerus/development-plan-submission/guidelines-on-greenery-provision-and-treeconservation-for-developments.
- 5.5 The proposed development on the proposed Site shall not encroach on the green verge(s) surrounding the proposed Site, nor shall it affect any roadside table surrounding the proposed Site.
- 5.6 The Successful Tenderer shall ensure that the green verge(s) abutting the proposed Site are not to be affected by the development and use of the proposed Site, including without limitation:
 - Ensuring that the construction or provision of any vehicular ingress/egress, acceleration/deceleration/storage/ vehicular lanes, services access, bus stops, and any structure required under statute to be erected to divert or reconstruct services or road features/elements, shall not affect the trees and plants located in the green verge(s);
 - b. Ensuring that the green verge is kept clear and shall be free from obstructions and encumbrances at all times, including without limitation bicycles parked on the green verge or items left on the green verge;
 - c. Ensuring that vehicular and service access points, pick-up/drop-off points, taxi lay-bys, loading/unloading bays and fire engine hard-standing areas are to be located within the proposed Site and not within the green verge(s); and
 - d. Ensuring that there is no change of soil level to the green verge(s) without prior approval from the Commissioner.
- 5.7 The Successful Tenderer must also ensure that the development on the proposed Site complies with the requirements for green buffers, including without limitation the following:
 - a. The green buffers must be free from any encroachment above ground, and/or any structures or services are to be recessed to at least 2-metre below ground level and are not to slope with gradients steeper than 1:2.5; and
 - b. The width of the green verge shall be in accordance with LTA's standard road code for that category of road or aligned with the existing green verge along the road, whichever is wider.

- 5.8 If there is any indication that the works at the proposed Site will affect the green verge(s) / road table(s) / green buffer(s) in any way whatsoever, the Successful Tenderer must seek the Commissioner's approval as set out in paragraph 5.1 above, as well as the approval of the other applicable authorities under the relevant legislation, for the conduct of the works that will affect the green verge(s) / roadside table(s).
- 5.9 Development works are to be confined within the proposed Site and working boundaries. There must not be any illegal dumping or storing of construction materials beyond the approved boundaries. The proposed Development shall not encroach on the road reserve line and affect any roadside table.
- 5.10 The Successful Tenderer shall comply with all applicable planting provision and aeration requirements for open air parking at street level. Further details of these requirements can be found in NParks' "Guidelines on Greenery Provision and Tree Conservation for Developments". It is available for downloading at https://www.nparks.gov.sg/partner-us/developments

6.0 NATIONAL ENVIRONMENT AGENCY (NEA)

- 6.1 The subject site is affected by multiple building height constraints (BHC) imposed by NEA, and the most stringent BHC is 92m SHD. The proposed development shall comply with the BHC requirement.
- 6.2 Sewage and sullage water from the proposed development shall be discharged into the public sewer. The Successful Tenderer shall check with PUB (Water Reclamation Network Department) on the point of sewer connection and the allowable discharge rate.
- 6.3 The proposed petrol station development shall also comply with the following pollution control requirements during the Building Plan (BP) clearance stage:
 - a. Vapour recovery systems shall be provided to minimise odour nuisance to neighbouring premises during re-filling of storage tanks and re-fuelling of vehicles operations;
 - b. Vent pipes for underground fuel tanks shall be at least 4m in height and sited at least 9m away from adjacent residential premises;
 - c. The ancillary vehicle repair workshop activities (if any) carried out in the subject site shall exclude engine overhaul, spray painting and panel beating. Such activities are pollutive in nature and shall be carried out in designated vehicle workshop area;
 - d. Underground fuel storage tanks are to be designed with secondary containment and leak detection system coupled with an alarm;

- e. Wastewater generated from the said development shall be channelled into public sewer via a wastewater treatment facility such as oil interceptor. The quality of the wastewater shall comply with the discharge limits as stated in Sewerage & Drainage (Trade Effluent) Regulations for discharge into a public sewer.
- 6.4 All the applicable requirements and provisions of the Singapore Standard on Code of Practice for Pollution Control (i.ee. SS593:2013), the Code of Practice on Environmental Health, the Environmental Protection and Management Act, the Environmental Public Health Act, the Radiation Protection Act, the Energy Conservation Act and their Regulations shall be complied with.

7.0 MINISTRY OF DEFENCE (MINDEF)

- 7.1 The Successful Tenderer shall ensure that all developments, structures and fixtures on the said Land shall not exceed the maximum height of 160m Singapore Height Datum (SHD). Such developments, structures and fixtures include those on the roof tops, whether permanent, temporary, transient or stationary (including but not limited to the building superstructure, TV antennae, water tanks, lift motor rooms, cranes, maintenance equipment, lightning conductors, moving objects, vegetation etc.) and all construction equipment and temporary structures (including but not limited to cranes, piling rigs, etc.) which shall all be subject to the same height limit.
- 7.2 Republic of Singapore Air Force's (RSAF) clearance shall be sought for the use of construction equipment and temporary structures above 120m SHD (Email: Height_Control@defence.gov.sg). For civil aviation height and requirements, please consult the Civil Aviation Authority of Singapore ("CAAS"). The more stringent height restriction(s) from the respective agencies shall apply.
- 7.3 All capital and operating costs or expenses incurred to meet all the above conditions and requirements will be borne by the Successful Tenderer.
- 7.4 The Successful Tenderer shall consult DSTA through URA Development Control Group or JTC if under the Plan Lodgement Scheme when the detailed development plans are available.

8.0 SINGAPORE CIVIL DEFENCE FORCE (SCDF)

- 8.1 The Successful Tenderer shall comply with the Fire Safety Act 1993 and its Regulations, the prevailing "Code of Practice for Fire Safety Precautions in Buildings" (Fire Code), SCDF Circulars, the relevant Codes of Practices and Standards. In addition, the following conditions shall apply:
 - a. Before making any commitment to bid, a QP shall be engaged to carry out a feasibility study to ensure the entire premises and new proposals are able to comply with all the Fire Safety requirements (the current Fire Code and other relevant standards/guidelines/circulars). The feasibility study shall also ensure those existing fire safety provisions of surrounding developments are not affected. The Successful Tenderer shall visit the FSD at SCDF Headquarters, 91 Ubi Ave 4, for a walk-in consultation should

he/she have any doubts or queries regarding the fire safety requirements or plan approval procedures.

b. For this existing petrol station site, it may be surrounded by neighbouring building structures, the Successful Tenderer shall provide the overall layout details to HazMat Department (at SCDF Headquarters at 91 Ubi Ave 4) for further comments as HazMat Department may impose additional Fire Safety provisions and mitigation measures. The Successful Tenderer may wish to consult HazMat Department (Email: Bryan_ng@scdf.gov.sg). The additional fire safety requirements may involve the erection of fire wall, additional emergency shut-off switch and specify the location of the refilling point (for underground storage tanks).

9.0 ELECTRICITY

9.1 There are proposed transmission cable routes at or in the vicinity of the proposed site. For more information, please contact the following officers of Transmission Engineering Section:

Mr Yam Chee Yi, Technical Officer at 6916 8989 Mr Seow Kah Ghee, Technical Officer at 6916 8988

10.0 TELECOMMUNICATIONS

- 10.1 The Successful Tenderer shall liaise with the Telecommunication System Licensee authorised under the latest Telecommunication Act, for the telecommunication supply to the proposed development.
- 10.2 The Successful Tenderer shall provide all facilities for telecommunication services, such as MDF room, Telecom riser ducts, lead-in pipes and manholes etc, within the Land Parcel. All Telecom facilities shall be provided according to the prevailing Info-communications Media Development Authority of Singapore (IMDA) "Code of Practice for Info-communications Facilities in Buildings".
- 10.3 The Successful Tenderer is advised to consult with and obtain the relevant plant maps or information from the relevant Telecommunication System Licensees (e.g. Singapore Telecommunications Ltd, Starhub Pte Ltd, Starhub Cable Vision Ltd, SP Telecommunications Pte Ltd, etc) and the Facilities-Based Telecommunication Licensees early during the planning stage of the proposed development, on the location and diversion of existing Telecoms & Broadband services.
- 10.4 The detailed Telecoms facilities plans by the Successful Tenderer for the said development shall be submitted to and duly verified by the Telecommunication Facility Co-ordination Committee ("TFCC") through the CORENET e-submission system and approved by IMDA prior to the commencement of works.

11.0 GAS

- 11.1 There are existing gas pipelines near the vicinity of the proposed site. The Successful Tenderer shall purchase the gas plan from PowerGas Pte Ltd's Mapping & Earthworks Administration section at tel. no. 69165022 or email. If the gas pipelines are affected by your proposal, kindly submit a request together with the diversion corridor and length to ebiz@spgroup.com.sg for consultation on gas pipeline diversion.
- 11.2 The Successful Tenderer shall submit written notice to SP PowerGrid Ltd (Earthworks Surveillance & Patrolling Section) if there is intention to carry out earthworks in the vicinity of gas pipelines at least 7 days prior to commencing the earthworks. All necessary precautionary measures must be taken to prevent damage to our gas pipelines at the work site. For advice on gas pipe damage prevention, you may contact Earthworks Surveillance & Patrolling office tel no. 69165119 section during hours at or email espsection@spgroup.com.sg
- 11.3 For further enquiries pertaining to the existing pipelines, please email gasenquiry@spgroup.com.sg. Please refer to **Annex F** on "Notes for Working Near PowerGas Gas Transmission Pipeline" and **Annex G** on "Requirements for Distribution Gas Pipe Diversion Works" for your information.

12.0 URBAN REDEVELOPMENT AUTHORITY (URA)

12.1 The Successful Tenderer shall comply with the following Development Control Guidelines for Petrol Station developments:

Gross Plot Ratio	Maximum 0.5
Storey Height	Maximum 1 storey
Site Coverage	Maximum 50%
Use Quantum	Commercial spaces shall not exceed 15% of the total proposed GFA or 150sqm, whichever is lower.
	Ancillary facilities such as office, store and compressor room shall not exceed 10% of the total proposed GFA.
	Within the allowable retail space, preparation, processing, and cooking of food is not allowed.

- 12.2 The Successful Tender shall comply with all the relevant agencies' conditions and technical requirements.
- 12.3 Please refer to Annex H for location of subject site in URA's Master Plan 2019.



PREPARED BY: JINGWEN DATE: 17.08.2022



Annex B

Height of Highest Fittings Method of Supply

Height of Highest Fittings		Method of Supply
i)	Up to 25 m above mean sea level	Direct.
ii)	Higher than 25 m above mean sea level but up to *37 above mean sea level	Indirect supply through high level storage tanks.
iii)	Higher than 37 m above mean sea level	Indirect supply through low level tank with pumping to high level storage tanks.
(* Refers to height of inlet pipe to high level storage tanks.)		





To: Agencies/ Developers/ Qualified Persons/ Contractors

PUB (WSN) ADVISORY NOTE- PREVENTION OF DAMAGE TO WATERMAINS

Our records show that there are existing watermains within and in the vicinity of your development lot. The Developer / Contractor is required to notify/obtain a written clearance from PUB (WSN) before carrying out any earth work/ piling work/ building work at the site, satisfying all the Conditions and Requirements set hereunder.

Works within the protection corridor of watermains < 300mm diameter require only a notification. There is no necessity to await PUB's response upon notification with the required declaration and supporting documents (1.A to 1.E) before commencement of work.

For works within the protection corridor of watermains \geq 300mm diameter, PUB will review the submissions within 14 working days, and if the submissions are in order, grant in-principle clearance for the Works. No works are to commence until clearance has been granted by PUB(WSN).

Penalties under PUB Act/ Regulations

We would like to draw your attention to Section 57 of the Public Utilities Act which stipulates a duty to enquire on water mains if any person wishes to carry out any work in the vicinity of watermains. We wish to highlight that under Section 47A of the Public Utilities Act, any person who, whether wilfully or otherwise, removes, destroys or damages or causes or permits to be removed, destroyed or damaged, any watermains belonging to or under the management or control of the Board, shall be guilty of an offence and shall be liable on conviction to a fine not exceeding \$40,000 or to imprisonment for a term not exceeding 3 months or to both; or if the watermains is 300 mm or more in diameter, to a fine not exceeding \$200,000 or to imprisonment for a term not exceeding 3 years or to both.

Under the Public Utilities (Protection of Water Pipes Infrastructure) Regulations 2017, which stipulates that for water pipes smaller than 300mm, the QP/PE/contractor shall notify PUB before commencement of the works. No approval by PUB is needed. For water pipes equal to or larger than 300mm, the QP, PE or contractor shall submit an application to PUB and obtain PUB's approval before commencement of works. Any person who is guilty of an offence under the Regulation shall be liable on conviction to a fine not exceeding \$10,000 and, in the case of a continuing offence, to a further fine not exceeding \$250 for every day or part of the day during which the offence continues after conviction.

For more information of the Public Utilities Act and Regulations, please refer to <u>http://sso.agc.gov.sg/Act/PUA2001</u>.



Mandatory requirement before commencement of works

Our records show that there are existing watermains within and in the vicinity of your development lot. The latest copy of the **Water Serivces Plan (WSP)** is available on SLA's INLIS portal: <u>https://www.sla.gov.sg/INLIS</u>.

Where the proposed works are to be carried out within a watermain corridor (see para 4. A and 4. B), the Developer/ Contractor shall notify and obtain the written approval from PUB before the carrying out of any activity.

The below requirement are deemed necessary and must be carried out by you, failing which PUB's clearance will not be granted:

1.A	Declaration by QP in the online submission portal, Protection Of Water and	
	Sewer pipes (POWS).	
1.B	Detailed method statement and drawings for the construction works, details	
	of the machinery/equipment used with analyses / assessment to	
	demonstrate that the construction method proposed will not cause any	
	impact or damage to the watermain. Include PE endorsed design for the	
	support of watermain and joints in case of the necessity to exposure the	
	watermains (see para 6. G).	
1.C	Construction Impact Assessment Report (CIAR) - The QP is to carry out a	
	construction impact assessment of the construction effects of the works on	
	the watermains in the vicinity of the works and submit the report to PUB.	
	Refer to para 6. B for detail.	
1.D	Instrumentation and monitoring plan of all the watermains that in the QP's	
	view are likely to be affected by the works. Refer to para 8. A to H for detail.	
1.E	PUB would require the owner/developer/contractor to install surveillance	
	cameras for works within watermain setback distance (see para 3. B) for	
	watermains ≥ 900mm diameter (see para 9. A and B).	

Who to make the submissions for the proposed works to PUB(WSN)

Before commencement of works, the owner/developer shall engage a Qualified Person to undertake the design, make and endorse all submissions to PUB.

For activities requiring BCA approval

• the QP is the PE appointed by the contractor/person carrying out activity

For activities not requiring BCA approval

- the QP is the PE appointed by the contractor/person carrying out activity, or
- contractor/person carrying out activity where PUB has dispensed the need for PE



The Professional Engineer shall be registered with the PE Board, Singapore and possess a valid practicing certificate.

How to make the submissions for the proposed works to PUB(WSN)

Submissions shall be made via PUB's Online Submission Portal, Protection of Water Pipes and Sewers (POWS). POWS serves as a centralised portal for processing of submissions by Qualified Persons/Professional Engineers/Contractors prior to carrying out specified activities near water pipes and public sewers.

- The link to POWS is as follows: <u>https://bpu.pub.gov.sg/pows</u>.
- SingPass login is required to access the portal.

Contact for Enquires on the submission to PUB(WSN)

For submissions/enquiries on protection of water pipes, you may send an email or call the following officers:

- Potable Water/NEWater/Industrial Water pipelines at Northern & Eastern areas Mr Delvis Chew at <u>delvis chew@pub.gov.sg</u> or 96604443
- Potable Water/NEWater/Industrial Water pipelines at Central & Western areas – Mr Fong Xi Ning at <u>fong xi ning@pub.gov.sg</u> or 90124666
- Raw Water pipelines Mr Roderick Ho at <u>roderick ho@pub.gov.sg</u> or DID 65172916
- General enquires <u>PUB_WSN_Surveillance@pub.gov.sg</u>



Duty and Responsibility to locate and positively identify PUB watermains

2. A The information of the watermains is valid as at date plotted and is given without any liability for any error, mis-statement or omission therein. Positions of watermains as shown in the plan are **approximate** only. Smaller submains and connections to customers' premises /properties are not indicated in this PLAN.

2. B The exact locations and depths of all watermains (including the smaller submains and connections), must be positively identified by the contractor on site by means of trial holes conducted using manual excavation. The presence of water meters nearby indicate the presence of connections and these pipes shall be positively identified on site by trial holes. The alignment of the watermains must be pegged on site, so that the alignment is clearly visible and appropriate protection measures can be adopted. The below table shows the requirements for the marking of watermains and appurtenances within construction sites.

Type of Watermains	Pegging Requirements	Remarks
/Appurtenances		
Watermains < 1200mm dia	To mark out the centre	See standard drawings to
	alignment of the	mark out the centre
	watermain	alignment of watermains
		in Appendix 4
Watermains ≥ 1200mm dia	To mark out the centre	See standard drawings to
	alignment and the 2	mark out the centre
	edges of the	alignment and the 2
	watermain	edges of watermains in
		Appendix 4
Water Appurtenances like	To mark out the	See standard drawings to
valve chambers	location of the	mark out water
	appurtenances	appurtenances in
		Appendix 4

*Where it is not feasible to put in the markers as set out in Appendix 4 (i.e on carriageway), the contractor may consult PUB(WSN) and propose the use of alternatives for the marking of watermains and appurtenances .

2. C Do have proper protection for our existing watermains during excavation. PUB's watermains are not to be exposed, suspended or otherwise interfered with without prior approval from PUB. All exposed watermains should have a PE's certification on the design for supporting the existing watermains.



2. D Our watermains and appurtenances must be accessible for maintenance and repairs at all times. All chambers and appurtenances within the construction site should be clearly demarcated, suitably protected and hoarded up. Under no circumstances, shall any earth spoil or debris or any construction activities cover our chambers and appurtenances. All other necessary precautions must be taken by the contractor to safeguard and to avoid the damage to the watermains.

2. E The alignment of the watermains must be pegged on site, so that the alignment is clearly visible and appropriate protection measures can be adopted. You shall reconfirm the alignment of the watermains before reapplying missing or faded pegs and surface markers on the ground or inside trench.

2. F You shall update the peggings / markings at the worksite after the carrying out of any watermain diversion, decommissioning of watermains or commissioning of new watermains. You shall brief all worksite personnel of the new positions of the watermains.

2. G Trial trenches conducted may not locate the watermains, as shown on the plan. This does not mean that the watermain is not there. The watermain may be the deeper than the depth of the trail holes. The Developer/ Contractor shall then undertake geophysical or other methods to positively identify and locate all the watermains, shown on the plan.

2. H Please contact PUB officer in-charge for assistance if you are unable to detect the exact locations of the watermains on site.

General Requirements

3. A No structure, including rigid pavement either permanent or temporary shall be erected over our watermains. Our buried watermains require a minimum cover of one metre, and you must not at any time increase, reduce or remove this, without our approval. The Developer/ Contractor is required to provide adequate protection for our watermains.

3. B No structure either permanent or temporary shall be erected over or within the below minimum setback distance from the watermain.



WATERMAIN SETBACK DISTANCE CLEARANCE REQUIRED

Watermain	Nett Clearance Required	
Diameter (mm)		
100 to 600	1.0m from outer edge of any structure to	
(depth ≤ 3m)	centreline of water pipe	
100 to 600	1.5m from outer edge of any structure to	
(depth > 3m to 5m)	centreline of water pipe	
150 to 600	2.0m from outer edge of any structure to	
(depth > 5m)	centreline of water pipe	
> 600 to 1500	2.5m from outer edge of any structure to outer	
	edge of water pipe	
> 1500 to 2200	3.0m from outer edge of any structure to outer	
	edge of water pipe	
> 2200,	4.0m from outer edge of any structure to outer	
Tunnels or	edge of water pipe	
Tunnelled pipes		

3. C All services must undercross our watermains. Services undercrossing our watermains shall be protected throughout the entire width of the undercrossing section and a minimum clearance of 1 metre all-round the pipe must be provided.

3. D No heavy machinery or vehicles shall be driven over PUB watermains. Where vehicles need to cross any existing watermains, adequate protection would have to be installed e.g. use of steel plates over the ground with sufficient earth cover of 1m minimum, above the pipes for load distribution during construction access. There shall be no stacking and storage of materials or parking of vehicles directly above the watermains.

3. E PUB will not be held responsible for any damage or injury caused to any persons, property, road, etc as a result of watermain leakage due to the Developer/Contractor's works. The Developer/Contractor shall be fully liable for any damage caused to adjacent property whether public or private as a result of any leakage from the watermain due to his works. The Developer/Contractor shall undertake all repairs to the adjacent property at his own costs and reimburse the owners directly for any consequential claims or expenses claimed by them. The Developer/Contractor will also be required to indemnify PUB against all losses and claims arising from damage to watermains.



Verification of Proposed Works within Watermain Corridor

4. A After positively identifying existing watermains on site (including its depth and alignment), the Developer/ Contractor shall assess whether if the proposed works lie within the water main corridor, as indicated in the Table below.

4. B The water main corridor as set by PUB, is the distance between two vertical planes, on either side of the centreline of any watermain, as specified in the table below.



Watermains Diversion for Proposed Works within Watermain Corridor

5. A The Developer / Contractor shall consult PUB at the earliest opportunity during the design stage on the handling of the affected watermain. The Developer / Contractor shall arrange for site meetings with PUB to seek PUB's comments on whether the affected watermain should be diverted or remain in its original position with adequate protection measures implemented. If deemed necessary by PUB, the affected watermain shall be diverted out of the watermain corridor and the Developer / Contractor shall be responsible for engaging a Licensed Plumber / Contractor to carry



out the diversion works according to PUB's pipe-laying specifications. If PUB deems that diversion of the affected watermain is not feasible, the Developer / Contractor shall make necessary modifications or design changes to his works such that the watermain is either no longer affected or adequately protected by appropriate measures.

5. B If PUB deems that that the proposed works (whether within or outside of the watermain corridor) impose risks or constraints on the future operation, maintenance or repair of the watermain, PUB may direct the Developer/ Contractor to divert the watermain or make necessary modifications or designs changes to his works.

5. C In general, watermains of 500mm in diameter and above are considered critical and shall not be diverted unless absolutely necessary.

5. D The cost of all abovementioned diversions, modifications and design changes to proposed works, as PUB may direct, shall be borne by the Developer / Contractor.

Responsibilities Required from Qualified Persons

6. A The developer/contractor's QP shall submit for the information of PUB the procedures and methods for all excavation and other construction works within the entire corridor of the watermains to prevent damage to the watermains during the work. See para 1. A to 1. E.

6. B Construction Impact Assessment Report (CIAR) - The QP is to carry out a construction impact assessment of the construction effects of the works on the watermains in the vicinity of the works and submit the report to PUB. The report shall include the following details:

- (i) The ground conditions, geotechnical profiles and relevant borehole logs.
- (ii) The proposed construction equipment and methods, and sequencing of construction.
- (iii) Assessments on the use of the proposed construction equipment /methodology on the existing watermain, vibrations, ground displacements and groundwater draw downs and how the impacts would be mitigated to meet requirements. (See para 6. C to F)
- (iv) The damage potential and risks to the watermains.
- (v) Preventative and precautionary measures to protect the watermains from damage and remedial measures to be taken in the event of damage/incidents.



6. C Equipment Vibrations - Construction activities such as piling, excavation, soil improvement, diaphragm wall and retaining wall construction etc and the use of construction equipment such as piling/boring machine etc shall not subject the watermain to a peak particle velocity (PPV) exceeding 15 mm/s at any frequency. The QP shall provide a detailed impact assessment that clearly demonstrates the vibration attenuation for each of the equipment proposed to be used at the development site and in similar ground conditions to show that this vibration limit would not be exceeded on the existing watermains.

6. D Groundwater Drawdown – The developer/contractor's QP shall confirm that there will not be any groundwater drawdown in the vicinity of the PUB watermain. If there is drawdown of groundwater, the developer/contractor's QP shall propose mitigation measures.

6. E For Cement-lined Steel and Cement-lined Ductile Iron pipes:

In general, the allowable limits are as follows:

- longitudinal deflection not exceeding L / 250 or 20mm whichever is lesser, where L is defined as the calculated length of sagging pipe section, at ends of which there will be no expected horizontal nor vertical movement.
- 2. diametrical deformation not exceeding 2% of the pipe diameter
- 3. The total stress on the pipe at any point (including existing stress and additional stress due to the proposed works) shall not exceed 133 N/mm².

6. F For Cement-lined Cast Iron Pipes (with lead-caulked pipe-joints):

All cast iron pipes are assumed to take zero longitudinal deflection and zero diametrical deformation. This is because existing cast iron pipeline are old and due for replacement. They cannot be subject to any additional loading/ stresses. Development near a cast iron pipeline must be designed to prevent any increase in stress / strain to the pipeline.

6. G If water pipes are required to be exposed and supported to facilitate construction works, QP needs to provide PE endorsed design for the utility support. The watermain should be supported by box-in structural design that can fix the pipe rigidly on all 4 sides to prevent movement/deflection of the water main, especially at the spigot & socket or welded joint positions. Please provide wooden wedges or rubber shins in between the supports and pipe to further prevent any movement and damages to the pipes once the metal supports are in place. Extra precaution should be taken at the pipe bends due to additional thrust force at pipe bends.

6. H You shall not dig any trial holes in the vicinity of watermains without the written consent from PUB. You shall comply with any additional requirements that may be imposed by PUB.



6. I The QP shall advise PUB on the likely risk to the watermain and his proposed mitigating measures for preventing the water mains from damage to the satisfaction of PUB.

6. J If there are changes to the schedule for the carrying out of the work or changes in the work method, the QP shall study the implications, review the earlier impact assessment that had been carried out and promptly notify PUB if there are any changes to such earlier assessment.

Good Practices at Worksite

7. A You should provide full-time site supervisor to monitor the worksite operations for the entire duration of any work. You shall ensure that the site supervisor is familiar with these requirements.

7. B You shall ensure that daily site briefings with all worksite workers are conducted (in languages that are understood by all workers) to remind them about the location of the watermains and the measures to be taken to prevent damage to the watermains. You shall keep records of such daily briefings (which shall include but are not limited to date and time, venue and person conducting the briefings, contents of briefings and the list of worksite workers who have attended such briefings). You shall also disallow any worksite worker who has not attended such briefings from being involved with any part of the intended work. New staff must be briefed before they start work.

7. C You shall inform PUB officers of the identity of the Worksite management/ QP(S)/ Provisional Registered Excavator Operator (PREO)/ Registered Excavator Operator (REO), the proposed methods of carrying out of the work and/ or location of the proposed work. You shall also inform PUB officers if there are any changes to the above.

7. D You shall ensure that information on the presence of watermains in the vicinity of the worksite and all mitigation measures to be taken to prevent damage to such watermains have been communicated and adhered to by all personnel of all working levels in the project team, including sub-contractors and any third party who are in any way involved with any part if the intended work.

7. E You shall contact PUB if you find any live or abandoned watermains in the course of carrying out any work at the worksite which have not been shown in the Water Service Plan.

7. F You shall provide adequate lighting if the work are to be carried out at night.



7. G You shall engage only a REO or PREO to operate a powered mechanical excavator.

7. H You shall ensure that powered mechanical excavation is only used, under the close standing supervision of a full time site supervisor, when working near or above any watermain.

7. I You should implement a PTW system to monitor and ensure that all Earthworks are properly tracked and controlled if such Earthworks are to be carried out in the vicinity of watermains. Under the PTW system, such Earthwork shall be approved by the manager of the project or his authorised deputy. You shall periodically audit the PTW system for its effectiveness.

Instrumentation and Monitoring

8. A The QP shall include in the monitoring plan of all the watermains that in his view are likely to be affected by the works.

8. B The QP's method statement shall include the proposed monitoring intervals and all requirements imposed by PUB.

8. C The QP shall be responsible for ascertaining and setting the safe limits (including alert level and work suspension level) of ground movements, vibration levels or other changes for ensuring the structural integrity and proper functioning of all watermains. He shall provide comprehensive basis for the proposed safe limits. See para 6. C to F.

8. D The QP shall verify and certify by monitoring that the permissible limits set for deformation and vibration are not exceeded.

8. E It shall be clearly understood that the submissions of the instrumentation monitoring results and reports to PUB are only for PUB's information. The QP shall be fully responsible for the analysis and interpretation of all the readings and measurements and for taking all remedial measures where necessary. When abnormal readings or measurements are obtained, QP shall immediately investigate the causes of the abnormalities and take all necessary remedial measures. QP shall promptly inform PUB should such abnormalities be likely to affect the structural integrity of the watermain.

8. F Instrumentation monitoring regime consists of inclinometers, ground settlement markers, vibration meters, piezometers, strain gauges, rod extensometers, etc. shall be carried out by QP to check whether ground movements & vibration impacts are within allowable limits during the construction works. Records of the

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instrumentation monitoring regime shall be endorsed by the QP and properly maintained at the site, submitted to PUB or made available for inspection by PUB upon request. See para 6. C to F.

8. G The QP shall monitor and review the instrumentation monitoring results daily, looking out particularly for excessive ground movements that may cause damage to the watermains. The QP shall submit the instrumentation monitoring records to PUB weekly or at a frequency otherwise stipulated by PUB. QP shall highlight in his submission if there are any excessive ground movements monitored or any other abnormalities.

8. H The QP shall stop the works immediately if the instrumentation monitoring results exceed the allowable limits and inform PUB immediately. The QP shall assess the impact on the watermain and submit a report and proposed mitigation measures to PUB.

Appendix 2

Additional Requirements for submission prior to Commencement of Works

9. A PUB would require the owner/developer to install surveillance cameras for works within watermain setback distance (see para 3. B) for watermains \geq 900mm diameter:

- (i) Owner/developer shall provide web-based IP surveillance cameras to continuously monitor construction activities in the vicinity of the large diameter (≥ 900mm) watermain. The number of cameras to be provided shall be approved by PUB and shall be sufficient to cover the entire corridor of the watermains.
- (ii) The surveillance cameras must be able to capture still pictures and perform continuous video recording.
- (iii) The owner/developer shall provide PUB with the Internet website address for centralized viewing of the still picture and video recordings of the construction activities above PUB watermains captured by the surveillance cameras.

9. B The owner/developer is required to submit their proposed designs and notify / obtain an approval from PUB before commencement of the works.



Protection of Watermains from Damages

10. A Please inform PUB 24 hours Call Centre at Tel No. 1800-CALL PUB (1800-2255 782) immediately in the event of damage to a watermains.

10. B You and/ or your workers shall not attempt to repair or modify any damaged watermain.

10. C Please take all necessary measures to prevent damage to our watermains and appurtenances in the course of your work. I have attached a copy of the **"DOs and DON'Ts"** (see Appendix 3), which provides the details on the protection requirements for proposed works carried out in the vicinity of our water mains, for your compliance.

10. D PUB shall be entitled to ask you to stop work with immediate effect in the event of non-compliance to this Advisory. PUB shall not be liable to you in any way for any losses, claims or damages arising from or in connection with such stop work requests.

10. E You shall comply with any requirements as reasonably prescribed by PUB in PUB's review and endorsement of the relevant method statement and any other documents submitted by you in relation thereto for the work.

10. F The cost to repair any watermains damaged as a result of work carried out is to be borne by the party which causes the damage. The party will also be billed for repair of the mains and the estimated quantities of water lost from the damaged main. The party will also be required to indemnify PUB against all losses and claims arising from damage to watermains.

Other Administrative Notes

11. A These requirements are applicable to all persons who carry out any work and strict compliance is required, unless otherwise permitted in writing to PUB. Please consult PUB, if necessary.

11. B The requirement stated above are not exhaustive. Additional requirements may be issued from time to time by PUB. These additional requirements, together with the requirements in this Advisory, shall form the full list of requirements that must be complied with at all times. You are advised to carry out all necessary assessment and take all necessary precautions to prevent damage to any existing watermains.



DOs AND DON'TS WHILST WORKING IN THE VICINITY OF WATERMAINS

DOs

- 1 Do write in to PUB, Water Supply (Network) Dept for the latest watermains plans.
- 2 Do trial holes to identify the exact location of existing watermains.
- 3 Do use manual excavation especially near watermains.
- 4 Do use pipe locators with the assistance of valve chambers and hydrants to identify the location of existing watermains.
- 5 Do consult PUB, Water Supply (Network) Dept on the location of the existing watermains when you are unable to locate them.
- 6 Do lay services such as cables, pipes with a separation distance of one meter from PUB existing watermains.
- 7 Do have proper protection for our existing watermains during excavation (PE certification on design of supporting existing watermains is required).
- 8 Do peg the alignment of the watermains within the worksite clearly with signages/visible markers.
- 9 Do install instrumentation (eg. ground settlement markers, vibration meters to be placed at site to monitor the impact of soil movement/ vibration to PUB water mains) for monitoring at the site.

DON'Ts

- 1 Don't allow heavy machinery to move over PUB watermains without adequate protection (eg steel plate).
- 2 Don't use excavator for trial holes to locate the existing water mains when near them. The last 0.5m must be checked by use of probes and manual excavation.
- 3 Don't lay sewer pipes on top of our existing watermains.
- 4 Don't construct any structures on top of our existing watermains.
- 5 Don't allow our valve chambers to be covered over with construction debris especially at worksites. Contact PUB, Water Supply (Network) Dept for PUB valve chambers at worksites to be raised to prevent them from accidentally being covered over. Our watermains and connections must be accessible for maintenance and repair works at all times;
- 6 Don't expose our watermains without prior approval from us.
- 7 Don't erect any structure either permanent or temporary over or within one metre from our watermains. Our buried watermain requires a minimum cover of one metre, and you must provide adequate protection for our main should the cover be removed or reduced by your works.



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				NOTES: 1. SIGNBOARD : PLYWOOD (24mm THICKNESS). 2. TIMBER POST : 75mm x 50mm SECTION. 3. TIMBER POST : 75mm x 50mm SECTION. 3. TIMBER POST SHALL BE DRIVEN TO AN ADEQUATE DEPTH TO ENSURE THE STABILITY OF THE SIGNBOARD. 4. THE ALIGNMENT OF ALL WATER PIPES WITHIN CONSTRUCTION SITES SHALL BE CLEARLY MARKED OUT AT ALL TIMES. 5. THE SIZE(mm) AND DEPTH(m) OF THE WATER PIPES SHALL BE CLEARLY INDICATED ON THE MARKERS. PLEASE REFER TO THE STANDARD DESIGN FOR SUCH MARKERS. 6. THE INTERVAL OF THESE MARKERS SHALL BE AT MOST 3m APART. 7. FOR WATER PIPES <1200mm DIA., MARKERS INDICATING THE CENTRE ALIGNMENT OF THE WATER PIPES WILL SUFFICE. 8. FOR WATER PIPES ≥1200mm DIA., THE WATER PIPES SHALL BE MARKED AT EITHER LEFT EDEC OR RIGHT EDGE OF THE PIPE.
	75	GROUND LEVEL		REV DATE AMENDMENTS DRAWN CHECKED
	K ELEVA SCALE 1 : 3	ΓΙΟΝ		PROJECT TITLE STANDARD DRAWINGS DRAWING TITLE APPENDIX 4: DETAILS OF MARKERS FOR WATERMAINS AND WATER APPURTENANCES
				DATE: 29 JUN 2020 SCALE : AS SHOWN DRAWING NO. REV: -
				THIS DRAWING IS COPYRIGHT A1



To all concerned parties

We act for PowerGas Ltd.

NOTES FOR WORKING NEAR POWERGAS GAS TRANSMISSION PIPELINE

1. Introduction

- 1.1 The Gas Transmission Pipeline (GTP) is designed to carry gas at high pressures. It is buried underground with granite dust and earth backfill cover as required under LTA's regulations. Warning markers are planted near the gas pipeline or patch on nearby lamppost to indicate its existence and warn third parties working in the area.
- 1.2 SPPG patrols the pipeline regularly to monitor works in the vicinity by third parties. Such works if done without knowing the existence and/or exact location of the pipeline can potentially damage the gas pipeline and/or it's coating. SPPG pays special attention to drilling, piling, blasting or any high impact works such as, excavation, tunneling works and construction of structures near or over the gas pipeline and gas plant.
- 1.3 Any party who intend to carry out any construction activities in the vicinity of the GTP shall notify and collaborate with SPPG to implement measures to protect the gas pipeline and gas plant from all possible damages.

2. Statutory Requirement

2.1 Section 32 Carrying out earthworks within vicinity of gas plant or gas pipe of the Gas Act (Chapter 116A) requires anyone who wants to carry out earthworks in the vicinity of the gas plant or gas pipe to;

(a) give the gas transporter (SPPG) not less than 7 days' notice in writing of the date on which it is proposed to commence the earthworks;

(b) obtain from the gas transporter the necessary information on the location of the gas plant or gas pipe; and

(c) consult the gas transporter on the steps to be taken to prevent the gas plant or gas pipe from being damaged while the earthworks are being carried out.

- 2.2 Section 32 also requires the person carrying out the earthwork to comply with the requirements of the transporter, ensure precautionary measures are taken to prevent damage to the gas pipe or gas plant and provide access to the transporter for inspection or taking necessary protective measures.
- 2.3 Any person that contravenes this Section 32 is guilty of an offence and shall be liable to a fine not exceeding \$100,000 or to imprisonment for a term not exceeding 5 years or both.



3. Requirements on Third Parties working near the Gas Transmission Pipeline

3.1 **Pre-work Consultation with SPPG**

- a) The works owner and contractor shall inform SPPG in advance of their intention to work in the vicinity of the GTP and submit NCE accordingly. Such works include excavation, piling, earthwork leveling, bore logging, trial holes, blasting, tunneling or any earth works. The proposed work with construction drawings and method of statements shall be given to SPPG to evaluate the impact of the works on the pipeline. This enables SPPG to advise on appropriate precautionary measures to be taken.
- b) The works owner and contractor shall obtain the as-built drawings of GTP from SPPG. They are required to incorporate the pipeline alignment co-ordinates into their construction drawings. Please note that the information in the as-built drawings should be treated as confidential and should not be shared.
- c) No works in the vicinity of GTP shall be carried out without prior consultation with SPPG. An impact assessment for the works and implementation of precautionary measures to prevent damage to the gas pipe or gas plant shall be submitted to SPPG
- d) SPPG shall be kept informed of any changes to the proposed works.
- e) No permanent structures shall be designed and constructed above the GTP. However, surface road over the pipeline without reducing the pipeline cover may be acceptable, subject to SPPG's concurrence.

3.2 **Precautionary Measures during Works**

- a) The works owner and contractor shall take all necessary precautions to prevent any damages to the GTP during the construction stage. They shall inform SPPG before carrying out any excavation works near the gas pipeline and **report all damages** to the gas pipeline and its coating to SPPG. Repair shall be done immediately to prevent corrosion aggravation to the gas pipeline at the damage location and thus becoming a potential hazard.
- b) All propose works shall be accompanied with Risk Assessment, Impact Assessment and Safe Works Methodology endorsed by QP.
- c) If any **earthwork is within 5m of the pipeline (or more when required)**, a registered surveyor shall be engaged to peg the pipeline alignment and interpret the pipeline depth from the pipeline drawings. Pegging and marking shall be clear and prominent and remain as such for the duration of works. Trial holes to prove the location of the GTP shall be carried out and all trial holes shall only be done in the presence of SPPG officer. A SPPG RES(Registered Earthwork Supervisor) shall supervise the earthwork and monitor the pipeline depth closely based on the surveyor's interpretation.
- d) Only manual excavation is allowed within 1m of the gas pipeline and only hand excavation is allowed within 0.5m of the gas pipeline.
- e) Under no circumstance shall the GTP be exposed without written consent of SPPG. GTP shall only be exposed in the presence of SPPG Officer. If a GTP is exposed, the owner/contractor shall take the necessary measures to protect the pipe from any physical impact that may cause damage to the pipe and/or its coatings to the satisfaction of SPPG.



- f) Do not shift or remove warning markers indicating the existence of the GTP at site without SPPG's approval. The contractor shall protect them from being damaged or tempered. In the event the warning markers are damaged, they shall be reported to SPPG and replaced immediately. Where necessary, additional temporary warning markers shall be installed to warn others of the presence of gas pipeline.
- g) For **blasting works**, piling or any works that cause ground vibration, the peak particle velocity (PPV) of ground shock generated by the blast shall be limited to 15mm/s measured at the pipeline and 5mm/s measured at gas plant. The PPV shall be monitored in real time. SPPG shall be notified once the PPV reaches 10mm/s for the gas pipeline or 3mm/s for the gas plant.
- h) For tunneling, shaft excavation and piling works, ground consolidation could occur due to ground water losses resulting in surface settlement. This settlement can potentially induce excessive stress on the pipeline. The contractor shall engage a Qualified Personnel conduct a risk assessment to assess the impact of tunneling on the surrounding area and to the GTP. To monitor the surface settlement, surface monitoring points shall be installed along the pipeline alignment at every 10m intervals for at least 100m pipe length from the tunnel or shaft. The settlement shall be regularly monitored while excavation or tunneling works are being carried out. A differential settlement of 20mm will require all parties involved to assess the ground consolidation and evaluate the need to implement measure to arrest the consolidation. Contractors are advised to stop works when the settlement has reached 50mm and a thorough stress analysis of the pipeline shall be done by competent persons recognised by SPPG. Depending on the findings of the analysis, measures shall be taken to relieve the pipeline from stress induced. Detailed assessments are also required for any pipelines that have gross structural discontinuities (i.e. bends, tees, valves, ect)
- i) For crossing and parallel laying of services to GTP, Table 1 shows the required separation distance between the GTP and other services or structures. It should be noted that other authorities may have stricter or additional requirements on minimum separation distance between proposed building / structure and the pipeline than what is stated here. Services crossing the pipeline shall not be at the previous boring pit locations of the pipeline, the locations are to be advised by SPPG. The services crossing over the GTP shall not be an obstruction for SPPG to access the GTP.
- j) For movement of heavy haulage over the gas pipeline, the transporter shall submit the propose route to SPPG. The load per axal shall be limited to 10tonne and sufficient load distribution shall be placed for crossing over the pipeline and if the pipeline is not buried under a proper road.
- k) For any new development surrounding the GTP, the developer shall inform the property owner on the location of the pipeline within their premises and draw up measures to prevent any possible damage to it. Pipeline within a fenced compound shall be accessible to SPPG for patrolling and any maintenance works as and when required.
- I) For laying of new pipeline or construction of new structure with cathodic protection a proper studies and survey needs to be implemented by the contractor to ensure no cathodic protection system are compromise or interfered with.
- m) For major works that span over a long period of time, the owner and contractor shall hold monthly meetings to update SPPG on the progress and any changes to their works.



3.3 Repair of Damage Pipe/Coating

In the event the pipe and/or its coating are damaged by the third party works or found damaged, **immediate report** shall be made to SPPG. SPPG will undertake the necessary repair works. All costs of such repairs shall be borne by the third party responsible for the damage.

3.4 Emergency Works

When emergency works have to be done near the pipeline in the interest of public or private safety, the owner and contractor shall **call SPPG** at the 24-hour hotline at **1800 752 1800 or 69167400**. SPPG officers will respond to site to advise on the approximate location of the gas pipeline. The contractor shall ensure safe works are executed for emergency works near the gas pipeline or gas plant. The Principal shall submit a written notice to ESP within 24 hours after the work has commenced.

4. Enquiries

The above requirements are only stated in general. The concerned party shall consult SPPG on all works near the GTP. SPPG reserves the right to alter any stated requirements or impose additional requirements that are necessary depending on site conditions and type of work. Refer all enquiries and correspondences on works near the GTP to:

Postal address

Transmission Pipelines Operations and Maintenance (TPOM) Section SP PowerGrid Ltd (Gas Operation) National Gas Control Centre 24A Senoko Ave Singapore 758314

Email: gasenquiry@spgroup.com.sg

Telephone numbers

Transmission Pipelines Operations and Maintenance (TPOM) Section : 6916 6136 / 6916 6112

24-hour System Control Centre: 6916 7400

24-hour Customer Service Centre: 1800 752 1800

HEAD OF SECTION TRANSMISSION PIPELINES OPERATIONS AND MAINTENANCE (TPOM) GAS OPERATIONS SP POWERGRID LTD As agent for and on behalf of PowerGas Ltd



Table 1: Minimum Separation Distance Between GTP And Other Services / Structures

S/N	Service / Structure	Minimum separation distance / Requirements
1.	Bore / sheet piling	5.0m
2.	200x200 Concrete Piles	3.0m
3.	Tunneling	Clearance distance 2.0m or more. Depending on
		size and depth, it may require real time monitoring
		of soil movement and settlement and additional
		Risk/Impact Assessment.
4.	Directional Drilling	2.0m plus radius of final tunnel size
5.	Formed Drain / Earth Drain	1.2m / 1.5m
6.	Minor Drain	0.5m
7.	Water/Sewer Pipe: less than 700mm	1.0m
	dia.	
8.	Water/Sewer Pipe: 700mm dia. or	2.5m or more depending on size of pipe and
	larger	construction method.
9.	Electric Cables: less than 22 KV	0.5m
10.	Electric Cables: 22KV and above	1.2m
11.	Telecom cables	0.5m
12.	Low pressure gas pipe	0.5m
13.	Shrubs	1.2m
14.	Trees	2.0m
15.	Soil Investigation	10.0m (If lesser, with positive identification of GTP)
16.	Posts / foundations for light, signs etc	1.5m
17.	Road Pavement	1.5m
18.	Off-Road Crossing for heavy vehicles	1.5m or more with 25mm steel plating on surface.
19.	Earthing Rods	5.0m



To all concerned parties

We act for PowerGas Ltd.

Requirements for Distribution Gas Pipe Diversion Works

Planning Phase

- 1. Prior to any excavation works, the project owner / contractor shall request for gas services returns and acquire the gas plans.
- 2. Where any gas pipe is affected, the project owner / contractor shall liaise with Gas Distribution Planning section for diversion of pipes. As far as possible, no gas pipes shall be within the hoarding area of the work site.
- 3. The project owner / contractor shall provide a feasible corridor free from other underground services and away from semi-rigid / rigid pavements to facilitate the diversion work. If there are other underground services along the proposed corridor, the project owner / contractor shall consult and obtain the necessary clearances from the relevant agencies for the new gas pipe to be laid.
- 4. Depending on the extent and complexity of the diversion, a long lead time may be required. Hence, the project owner is advised to consult the planning team early.

Construction Phase

- 1. The project owner / contractor shall coordinate all diversion activities with Gas Distribution Projects section.
- 2. The consultant / contractor shall arrange a site walk with the SPPG Officer-in-Charge prior to the commencement of pipe laying works.
- 3. The project owner / contractor shall peg the confirmed pipe corridor.
- 4. A minimum clearance of 300mm shall be maintained between our gas pipes and all other services or structure.
- 5. Wherever possible, valves shall be installed to enable quick isolation of pipeline within the work site (e.g., crossing of bored tunnels, cut-and-cover tunnels). These isolation valves should not be located inside the work site.
- 6. Where the cut-and-cover tunnel runs parallel to the gas pipes, there shall be a minimum clearance of 5 metres from the diaphragm wall.
- 7. Once laying of gas pipeline is completed, pipe cleaning and pressure test will be conducted.
- 8. For works within third party worksites, a site inspection with the SPPG Officer-in-Charge shall be conducted prior to commissioning of the gas pipe to check that the site is in order.

Gas Pipeline Safety and Integrity

- 1. All vent shafts to the tunnels shall be at least 20 metres away from the gas pipes.
- 2. All piles shall be at least 5 metres away from the gas pipes, which shall be determined by trial holes.

- 3. All crossings over cut-and-cover tunnels shall be replaced temporarily with steel pipes for suspension and subsequently replaced with polyethylene pipes upon the completion of the construction work. The steel pipe supports shall be endorsed by a Professional Engineer (Civil) and submitted to SPPG Gas Operations. The support system shall allow access to the pipe for inspection and for fire-fighting purposes in the event of an emergency.
- 4. No air intake / outlet shall be located near the gas pipes.
- 5. Valve chambers which are still located within the work site due to site constraints, shall be raised 0.5 metres above ground level and kept visible and accessible at all times for emergency.
- 6. The project owner / contractor shall be aware of all gas pipes within the work site and shall ensure that all parties working within the site are also aware of the locations of the gas pipes. Where possible, prominent markers indicating the pipe route shall be displayed.
- 7. The project owner / contractor shall be responsible to maintain the integrity of the gas pipes within the work site, and to comply with the following:
 - a) No permanent structure is to be constructed over any gas pipe,
 - b) No Electronic Parking System (EPS) is to be constructed over any gas pipe,
 - c) No heavy machinery / equipment is allowed to be placed over any gas pipe,
 - d) No heavy machinery / vehicle movement is allowed over any gas pipe and,
 - e) Access shall be provided for gas leak survey to be conducted regularly along the pipe route within the work site.
- 8. Wherever possible, no hot work is allowed in the vicinity of the gas pipes. If hot work is unavoidable, the project owner / contractor shall take all necessary measures, including but not limited to the following:
 - a) The site shall be certified gas-free by a qualified Safety Officer,
 - b) Gas-free checks shall be conducted regularly before and throughout the work,
 - c) All necessary precautions to prevent damage to the gas pipes shall be taken,
 - d) All possible occurrence of fire hazards shall be eliminated and, if necessary, consult SPPG on other precautionary actions to be taken.
- 9. The project owner / contractor shall notify SPPG Gas Operations of any works directly or indirectly affecting the gas pipes.
- 10. The project owner / contractor shall monitor possible ground movements / soil subsidence in the vicinity of their work sites and inform SPPG Gas Operations immediately if any such movements / subsidence is observed / detected and where gas pipes are present.
- 11. In the event that any gas leak is detected, all works shall cease immediately and SPPG Gas Operations 24 hrs Gas Service Operation Centre shall be contacted at Tel: 1800-752-1800 for assistance.

Acknowledged by:	
Project Name:	
Name of Consultant	Name of Project Manager

Signature / Date

Signature / Date

